Gas Detection.

Technical Datasheet

PolyGard®2

Sensor MC2

with Semiconductor Sensor Element
for Freon Gases or Refrigerants
with Analog Output

All Products
Made
in Germany

DESCRIPTION

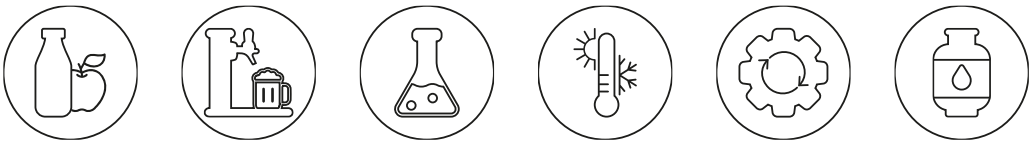
Semiconductor sensor including digital value processing and integrated self-diagnosis, for the continuous monitoring of the ambient air to detect refrigerants.

The intelligent MC2 Sensor for detection of refrigerants includes a semiconductor sensor element and electronics with a measuring amplifier and a µController as well as a module with a terminal for the analog output and the external power supply. The µProcessor converts the sensor's measuring signal into a linear 4–20 mA signal (or 2–10 V). All relevant data and measured values of the sensor are stored fail-safe in the internal memory of the µProcessor.

The maintenance of the 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 MC2 is used to detect a leakage of refrigerants in a variety of applications when an analog 4–20 mA (or 2–10 V) signal is required.



Food | Beverage dispensing | Laboratory | Climate | Process | Gas storage

FEATURES

- Internal function 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
- 4–20 mA (or 2–10 V) analog output with selectable signal output for Special Mode (fault, maintenance, service etc.)
- Reverse polarity protected, overload and short-circuit proof
- IP65 protection (when installed)

SPECIFICATIONS

ELECTRICAL	
Power supply	18–29 V DC, reverse-polarity protection; 18–27 V AC (only for output signal 2–10 V)
Power consumption	75 mA, max. (1.8 VA for 24 V)
Analog output signal	Proportional, overload and short-circuit proof, load ≤ 500 Ω for current signal, ≥ 50 kΩ for voltage signal 4–20 mA or 2–10 V = measuring range 3–4 mA or 1.5–2 V = underrange > 20–21.2 mA or 10–10.6 V = overrange 2 mA or 1 V = fault > 21.8 mA or 10.9 V = fault High
SENSOR ELEMENT	
Gas type	See Ordering Information
Measuring principle	Semiconductor
Measuring range	2000 ppm
Repeatability	< ± 20 % signal
t_{90} time	t_{90} ≤ 150 s (R 1234yf, R1234ze, R134a)
Reaction time	≤ 30 s
Temperature range	-30 °C to +60 °C (-22 to 140 °F)
Humidity range	15–90 % RH non-condensing
Pressure range	90–110 kPa
Life time[1] in air	> 5 years
Calibration interval[2]	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.
RECOMMENDED STORAGE CONDITIONS	
Storage temperature range[3]	0 °C to +50 °C (32 °F to 140 °F)
Storage time[4]	Ca. 12 months
Humidity range	15–90 % RH non-condensing
Pressure range	90–110 kPa
PHYSICAL	
Housing type P	Polycarbonate UL 94 V2
Housing colour	Similar to RAL 7035 (light grey)
Dimensions (Ø x H)	24 x 22 mm (0.94 x 0.87 in.)
Weight	Ca. 30 g (0.066 lb)
Protection class	IP65
Mounting	Screw mounting, external thread M25 x 1.5 mm
Wire connection	Screw-type terminal, 0.25–1.3 mm², 3-pin
REGULATIONS	
Directives	EMC directives 2014/30/EU CE UKCA Compliance with: 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] Expected service life for normal ambient conditions.
[2] Manufacturer-recommended calibration intervals for normal environmental conditions
[3] A deviating storage temperature can have a negative effect on sensitivity and service life.
[4] If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.

OPTIONS	
HOUSING TYPE A	
Material / flammability classification	Polycarbonate / UL 94 V2
Housing colour	Similar to RAL 7035 (light grey)
Dimensions (B x H x D)	94 x 130 x 57 mm (3.7 x 5.1 x 2.2 in.)
Weight	Ca. 0,2 kg (0.4 lb)
Package volume	Ca. 4,5 l
Protection class	IP65
Mounting	Wall mounting
Pre-embossing for cable entry / sensor	6 x M20/M25
DISPLAY	
LC Display	2 lines, 16 characters each, monochrome
Temperature range	-20 °C to +60 °C (-4 °F to 140 °F)
OPEN-COLLECTOR	
Transistor output (2)	For horn (resettable) and warning lamp
Switching capacity	24 V DC / 50 mA (+ switching)

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.
The T 021 (DGVU-I-213-056) and T 023 (DGVU-I-213-057) as well as T 055 leaflets must be observed.

OVERVIEW FREON GASES

MSR Freon Group	MSR Code	Freon Type	Calibration Gas	Group	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
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	HFC	1.21
	2080-02	R32	R407c	FC	1.82
	2080-03	R404a	R407c	FC	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 0.3–0.5 m below the ceiling
0,85 < d < 1,15: mounting at 1.2–1.8 m height
d ≥ 1,15: mounting 0.3–0.5 m above the floor

ORDERING INFORMATION

MC2- **X-** **S20XX-XX-X-** **X-** **P**

P	Sensor housing plastic	**Sensor housing**

0	Without display	
1	With display for indication of readings (only in housing A or N)	
2	With display for values and operation, 2x open collector for horn and warning lamp (only housing A or N)	**Display**

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

0	Without housing	
A	Plastic housing type A, 94 x 130 x 57 mm	
5*	Stainless steel housing type 5, 110 x 132 x 42.5 mm	
D	Plastic housing type D, 94 x 65 x 57 mm	
N	Plastic housing type N, 80 x 82 x 55 mm	**Housing**

* On request

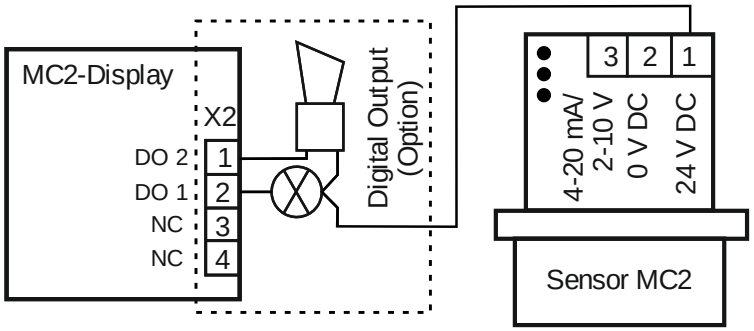
EXAMPLE

R32 sensor, measuring range 2000 ppm, with plastic housing type A without display (order number: MC2-A-S2080-02-A-0-P)

ACCESSORY

Sensor protection cap (order number: C2-Z1)
Duct mounting kit (order number: C2-Z2)
Calibration adapter (order number: C2-Z4, C2-Z4-A, C2-Z4-B, C2-Z4-C)
Splash protection SplashGuard (order number: C2-Z5)

WIRING CONFIGURATION



Note:
The installation of the MC2 sensor directly on the MSC2 or MSB2 isn't-possible, only external connection with separate housing! For the 4–20 mA output signal you have to remove the resistor between the pin positions 2 and 3.

FURTHER MEASURING PRINCIPLES

Infrared:
R32
➔ See data sheet DB_MC2_IR_Premium

MPS™:
R32, R1234ze
➔ See data sheet DB_MC2_MPS

Semiconductor/Freon_LFL:
R32, R455a, R454b, R1234yf, R1234ze
➔ See data sheet DB_MC2_Freon_LFL

Further information in the catalog: