

## Technical Datasheet



µGard®2

### Sensor Unit MC2

for Freon Gases & Refrigerants in LEL Range (LFL)  
with Analog Output

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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](http://www.msr-24.com).

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■ All Products  
■ Made  
■ in Germany

## DESCRIPTION

**Exchangeable sensor unit including digital value processing and self-control for the continuous monitoring of the ambient air to detect low-flammable refrigerants in higher concentration range.**

The sensor unit MC2 houses a module with  $\mu$ Controller, analog output and power supply in addition to the semiconductor sensor element including amplifier. The  $\mu$ Controller calculates a linear 4–20 mA (or 2–10 V) signal out of the measurement signal and also stores all relevant measured values and data of the sensor element.

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

## APPLICATION

The  $\mu$ Gard<sup>®</sup>2 Sensor MC2 is used for the detection of refrigerants and Freon gases of refrigerant class A2L in chiller systems when a typical 4–20 mA (or 2–10 V) signal is required.

## FEATURES

- Digital measurement value processing
- Internal function control with integrated hardware watchdog
- Data / measured values in  $\mu$ C of the sensor unit, therefore simple exchange uncalibrated <> calibrated
- Low zero-point drift
- Long sensor lifetime
- Easy maintenance and calibration by exchange of the sensor unit or by comfortable on-site calibration
- 4–20 mA (or 2–10 V) analog output with selectable signal output for special mode, fault etc.
- Reverse polarity protected, overload and short-circuit proof
- IP65 version
- Housing for integration of the sensor unit (option)
- Display (option)
- Display with 2 open-collector outputs for horn (resettable) and warning lamp (option)
- Conformity to:
  - EN 378
  - EN 14624
  - EN 45544-1
  - EN 61508-1-3
  - EN 61010-1
  - ANSI/UL 61010 1
  - CAN/CSA-C22.2 No. 61010-1
- Duct mounting kit (accessory)

## SPECIFICATIONS

<b>ELECTRICAL</b>	
Power supply	16–29 V DC, reverse-polarity protection; 18–27 V AC (only for output signal 2–10 V)
Power consumption	65 mA, max. (1.6 VA for 24 V)
Analog output signal	Proportional, overload and short-circuit proof, load $\leq 500 \Omega$ for current signal, $\geq 50 \text{ k}\Omega$ for voltage signal 4–20 mA or 2–10 V = measuring range 3.2–4 mA or 1.6–2 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
<b>SENSOR ELEMENT</b>	
Gas type	See Ordering Information
Sensor element	Semiconductor sensor
Measuring range	0-50 % LEL
Repeatability	$\pm 20 \%$
Response time	$t_{90} \leq 150 \text{ s}$
Oxygen concentration	21 % (standard) 18 % minimum level
Humidity range	15–90 % RH not condensing
Pressure range	Atmospheric $\pm 10 \%$
Temperature operation	-30 °C to +60 °C (-22 to 140 °F)
Temperature storage	0 °C to +50 °C (32 °F to 122 °F)
Storage time	Max. 12 months
Calibration interval	12 months
Sensor lifetime	> 5 years / normal environment
Recommended mounting height	Depending on gas type
Poisoning	The sensitivity of semiconductor sensors can be influenced by substances containing silicon compounds and even poisoned and destroyed by them. The sensors are also susceptible to poisoning by organic solvents.
<b>PHYSICAL</b>	
Enclosure P (M25)	Polycarbonate UL 94 V2
Colour	RAL 7032 (light grey)
Dimensions	(D x H) 24 x 22 mm (0.94 x 0.87 in.)
Weight	Ca. 30 g (0.066 lb)
Protection class	IP65 (only if mounted in housing type A, D or N)
Mounting	Screw mounting / M25
Wire connection	Screw-type terminal min. 0.25 mm <sup>2</sup> , max. 1.3 mm <sup>2</sup> , 3-pin
<b>REGULATIONS</b>	
Directives	EMC directives 2014/30/EU, CE  Compliance with: EN 378 EN 14624 EN 45544-1 EN 61508-1-3 EN 61010-1:2010 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

<b>OPTIONS</b>	
<b>ENCLOSURE TYPE A</b>	
Enclosure A for integration of sensor unit	Polycarbonate UL 94 V2
Enclosure colour	RAL 7032 (light grey)
Dimensions	(B x H x T) 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 unit	6 x M20 / M25
<b>LCD-DISPLAY</b>	
LCD	2 lines, 16 characters each, monochrome
<b>OPEN-COLLECTOR</b>	
Transistor output (2)	For horn (resettable) and warning lamp
Switching capacity	24 V DC / 50 mA (+ switching)

All specifications were collected under optimal test conditions.

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

No cross-sensitivity data is available for these sensors. It is well known that all semiconductor sensors are also sensitive to combustible gases, e.g. alcohols, etc.

## OVERVIEW FREON GASES

MSR Group	Freon	MSR Code	Freon type	Calibration gas	Group	Measuring range	Relative gas density Air =1
%LFL		2020-01	R32	R32	HFC	0-50 % LEL	1.82
		2020-02	R455a	R455a	CFC/HFO	0-50 % LEL	> 1
		2020-03	R454b	R454b	HFO	0-50 % LEL	> 1
		2020-04	R1234yf	R1234yf	HFO	0-50 % LEL	4
		2020-05	R1234ze	R1234ze	HFO	0-50 % LEL	4

## ORDERING INFORMATION

<b>MC2-</b>	<b>X-</b>	<b>S20XX-XX-X-</b>	<b>X-</b>	<b>X</b>	
			<b>P</b>	Sensor housing plastic	<b>Sensor housing</b>
			<b>0</b>	Without display	
			<b>1</b>	With display for indication of readings (only in housing A or N)	
			<b>2</b>	With display for values and operation, 2x open collector for horn and warning lamp (only housing A or N)	<b>Display</b>
				<b>Gas type</b>	<b>Measuring range</b>
		<b>S2020-01-A</b>		R32	0–50 % LEL
		<b>S2020-02-A</b>		R455a	0–50 % LEL
		<b>S2020-03-A</b>		R454b	0–50 % LEL
		<b>S2020-04-A</b>		R1234yf	0–50 % LEL
		<b>S2020-05-A</b>		R1234ze	0–50 % LEL
					<b>Gas type / Measuring range</b>
			<b>0</b>	Without housing	
			<b>A</b>	Plastic housing type A, 94 x 130 x 57 mm	
			<b>5</b>	Stainless steel housing type 5, 113 x 135 x 45 mm	
			<b>D</b>	Plastic housing type D, 94 x 65 x 57 mm	
			<b>N</b>	Plastic housing type N, 80 x 82 x 55 mm	<b>Housing for the integration of the sensor</b>

### EXAMPLE

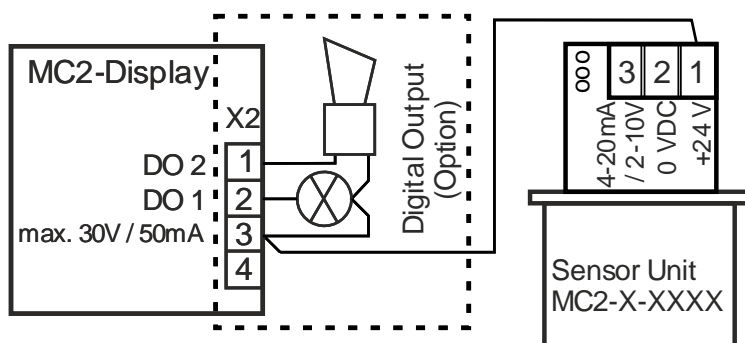
R32 sensor unit in plastic housing P, measuring range 50 % LEL, in plastic housing type A, without display  
**Ordering number: MC2-A-S2020-01-A-0-P**

### ACCESSORY

Duct mounting kit

**Ordering number: C2-Z2**

## WIRING CONFIGURATION



### Note:

The installation of the sensor unit MC2 directly on the MSC2, MGC2 or MSB2 housing isn't possible, only external connection with separate housing!

For 4–20 mA output signal you have to remove the resistor between pin 2 and pin 3.