



μGard®2

# Sensor unit MC2 with analog output for Freon gases and refrigerants

Exchangeable sensor unit including digital value processing and self control for the continuous monitoring of the ambient air.

The sensor unit MC2 houses a module with μController, analog output and power supply in addition to the semiconductor sensor element including amplifier. The μController calculates a linear 4 – 20 mA (or 2 – 10 V) signal out of the measurement signal of the sensor 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 μGard®2 Sensor MC2 is used for the detection of refrigerants and Freon gases 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 μC of the sensor unit, therefore simple exchange uncalibrated <> calibrated
- Low zero point drift
- Long sensor life time
- 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
- Housing for integration of the sensor unit
- IP 65 version
- Display (option)
- Display with two open-collector outputs for horn (resettable) and warning lamp (option)
- Conformity to
  - EN 61010-1
  - ANSI/UL 61010 1
  - CAN/CSA-C22.2 No. 61010-1)
  - EN 378
  - EN 61508-1-3
  - EN 45544-1
  - EN 14624
- Duct mounting kit (accessory)



Exchangeable sensor unit in plastic housing without cable



Exchangeable sensor unit in plastic housing with cable 5 m



Option housing "A" with sensor unit in plastic housing





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## Sensor unit MC2 with AO for refrig. Freon gases

### SPECIFICATIONS

#### Electrical

Power supply	16 – 29 V DC, reverse-polarity protect.; 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 ≤ 500 Ohm for current signal, ≥ 50 kOhm 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

#### Sensor performance

Gas type	See Order Information
Sensor element	Semiconductor sensor
Measuring range	20 – 2000 ppm
Repeatability	± 20 %
T <sub>90</sub>	t <sub>90</sub> ≥ 120 s
Temperature range	-35 °C to +50 °C (-31 to 122 °F)
Humidity range	5 - 95 % RH not condensing
Pressure range	Atmospheric ± 10 %
Sensor life time	> 5 years / normal environment
Calibration interval	12 months
Storage temperature range	0 °C to +50 °C (32 °F to 122 °F)
Storage time	Max. 12 months
Poisoning	The sensitivity of Pellistor sensors can be influenced by substances containing silicon compounds and even poisoned and destroyed by them.

#### Physical

Housing A for integration of the sensor unit	Polycarbonate UL 94 V2
Enclosure colour	RAL 7032 (light grey)
Dimensions (W x H x D)	94 x 130 x 57 mm (3.7 x 5.1 x 2.2 in.)
Weight	Ca. 0.2 kg
Packaging volume	Ca. 4.5 l
Protection class	IP 65
Mounting	Wall mounting
Pre-embossed entries for cable / sensor unit	6 x M20/M25
Enclosure M25	Polycarbonate UL 94 V2
Enclosure 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	IP 65
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

#### Directives

EMC directives 2014/30/EU  
CE  
Compliance with:  
EN 378; EN 61010-1:2010; ANSI/UL 61010-1; CAN/CSA-C22.2 No. 61010-1  
EN 61508-1-3; EN 45544-1; EN 14624

#### Warranty

1 year on sensor (not if poisoned or overloaded),  
2 years on device

All specifications were collected under optimal test conditions.

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



MSR-Electronic GmbH ::: Würdinger Str. 27 & 27A ::: 94060 Pocking ::: Germany

Specifications subject to change without notice.

Up-to-date data sheets and user manuals can be found in the download area on www.msr-24.com.

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## Options

### LCD Display

LCD

Two lines, 16 characters each, monochrome

### Open-collector (transistor) output (2)

Switching capacity

For horn (resettable) and warning lamp

24 V DC / 50 mA (+ switching)

## OVERVIEW FREON GAS TYPES

MSR Freon group	MSR code	Freon type	Calibration gas	Group	Measuring range	Relative gas density (air =1)
<b>FR02</b>	2061-01	R23	R23	HFC	2000 ppm	2.4
	2061-02	R508b	R23	HFC	2000 ppm	> Air
<b>FR03</b>	2063-01	R1234yf	R1234yf	HFO	2000 ppm	> Air
	2063-02	R452a	R1234yf	HFO	2000 ppm	> 1
	2063-03	R513a	R1234yf	HCFC	2000 ppm	> Air
	2063-04	R454c	R1234yf	HFO	2000 ppm	> Air
	2063-05	R454a	R1234yf	HFO	2000 ppm	> Air
	2063-06	R454b	R1234yf	HFO	2000 ppm	> Air
	2063-07	R1234ze	R1234yf	HFO	2000 ppm	> Air
<b>FR04</b>	2064-01	R123	R123	HCFC	2000 ppm	> Air
	2064-02	1233zd	R123	HCFC	2000 ppm	> Air
<b>FR06</b>	2070-01	R22	R22	HCFC	2000 ppm	3
	2070-02	R401a	R22	HCFC	2000 ppm	> Air
	2070-03	R401b	R22	HCFC	2000 ppm	> Air
	2070-04	R402a	R22	HCFC	2000 ppm	> Air
	2070-05	R402b	R22	HCFC	2000 ppm	> Air
	2070-06	R403a	R22	HCFC	2000 ppm	> Air
	2070-07	R408a	R22	HCFC	2000 ppm	> Air
	2070-08	R409a	R22	HCFC	2000 ppm	> Air
	2070-09	R411a	R22	HFC	2000 ppm	> Air
<b>FR07</b>	2077-01	R134a	R134a	HFC	2000 ppm	> Air
	2077-02	R407a	R134a	HFC	2000 ppm	> Air
	2077-03	R416a	R134a	HFC	2000 ppm	> Air
	2077-04	R417a	R134a	HFC	2000 ppm	> Air
	2077-05	R422a	R134a	HFC	2000 ppm	> Air
	2077-06	R422d	R134a	HFC	2000 ppm	> Air
	2077-07	R427a	R134a	HFC	2000 ppm	> Air
	2077-08	R437a	R134a	HFC	2000 ppm	> Air
	2077-09	R438a	R134a	HFC	2000 ppm	> Air
	2077-10	R449a	R134a	HFC	2000 ppm	> Air
	2077-11	R407f	R134a	HFC	2000 ppm	> Air
	2077-12	R450a	R134a	HFO	2000 ppm	> Air
<b>FR08</b>	2080-01	R125	R407c	HFC	2000 ppm	4.2
	2080-02	R32	R407c	CFC	2000 ppm	1.8
	2080-03	R404a	R407c	HFC	2000 ppm	3.45
	2080-04	R407c	R407c	HFC	2000 ppm	> 1
	2080-05	R410a	R407c	HFC	2000 ppm	2.3
	2080-06	R434a	R407c	HFC	2000 ppm	> Air
	2080-07	R507a	R407c	HFC	2000 ppm	3.45
	2080-08	R448a	R407c	HFO	2000 ppm	1.55
	2080-09	R452b	R407c	HFO	2000 ppm	> Air
	2080-10	R143b	R407c	HFO	2000 ppm	> Air

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.



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**ORDER INFORMATION**

MC2- X S20XX-XX-X - X- X- XX

00 Without connection cable (standard)  
 XX With connection cable: 01, 02, 03, 04, 05 ... 15 max. (length in m)

P Sensor housing plastic  
 S Sensor housing stainless steel

0 Without display  
 1 With display for indication of measurement values (only in housing A or N)  
 2 With display for values & operation, 2x open-collector for horn & warning lamp (only housing A / N)

	Gas type	Sensor type	Measuring range
S2061-01-A	R23	Semiconductor	20 – 2000 ppm
S2061-02-A	R508b	Semiconductor	20 – 2000 ppm
S2063-01-A	R1234yf	Semiconductor	20 – 2000 ppm
S2063-02-A	R452a	Semiconductor	20 – 2000 ppm
S2063-03-A	R513a	Semiconductor	20 – 2000 ppm
S2063-04-A	R454c	Semiconductor	20 – 2000 ppm
S2063-05-A	R454a	Semiconductor	20 – 2000 ppm
S2063-06-A	R454b	Semiconductor	20 – 2000 ppm
S2063-07-A	R1234ze	Semiconductor	20 – 2000 ppm
S2064-01-A	R123	Semiconductor	20 – 2000 ppm
S2064-02-A	R1233zd	Semiconductor	20 – 2000 ppm
S2070-01-A	R22	Semiconductor	20 – 2000 ppm
S2070-02-A	R401a	Semiconductor	20 – 2000 ppm
S2070-03-A	R401b	Semiconductor	20 – 2000 ppm
S2070-04-A	R402a	Semiconductor	20 – 2000 ppm
S2070-05-A	R402b	Semiconductor	20 – 2000 ppm
S2070-06-A	R403a	Semiconductor	20 – 2000 ppm
S2070-07-A	R408a	Semiconductor	20 – 2000 ppm
S2070-08-A	R409a	Semiconductor	20 – 2000 ppm
S2070-09-A	R411a	Semiconductor	20 – 2000 ppm
S2077-01-A	R134a	Semiconductor	20 – 2000 ppm
S2077-02-A	R407a	Semiconductor	20 – 2000 ppm
S2077-03-A	R416a	Semiconductor	20 – 2000 ppm
S2077-04-A	R417a	Semiconductor	20 – 2000 ppm
S2077-05-A	R422a	Semiconductor	20 – 2000 ppm
S2077-06-A	R422d	Semiconductor	20 – 2000 ppm
S2077-07-A	R427a	Semiconductor	20 – 2000 ppm
S2077-08-A	R437a	Semiconductor	20 – 2000 ppm
S2077-09-A	R438a	Semiconductor	20 – 2000 ppm
S2077-10-A	R449a	Semiconductor	20 – 2000 ppm
S2077-11-A	R407f	Semiconductor	20 – 2000 ppm
S2077-12-A	R450a	Semiconductor	20 – 2000 ppm
S2080-01-A	R125	Semiconductor	20 – 2000 ppm
S2080-02-A	R32	Semiconductor	20 – 2000 ppm
S2080-03-A	R404a	Semiconductor	20 – 2000 ppm
S2080-04-A	R407c	Semiconductor	20 – 2000 ppm
S2080-05-A	R410a	Semiconductor	20 – 2000 ppm
S2080-06-A	R434a	Semiconductor	20 – 2000 ppm
S2080-07-A	R507a	Semiconductor	20 – 2000 ppm
S2080-08-A	R448a	Semiconductor	20 – 2000 ppm
S2080-09-A	R452b	Semiconductor	20 – 2000 ppm
S2080-10-A	R143b	Semiconductor	20 – 2000 ppm

**HOUSING FOR INTEGRATION OF THE SENSOR UNIT**

- 0 Without housing
- A Plastic housing type A, 94 x 130 x 57 mm
- S Stainless steel housing type S, 113 x 135 x 45 mm
- D Plastic housing type D, 94 x 65 x 57 mm
- N Plastic housing type N, 80 x 82 x 55 mm





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### EXAMPLE

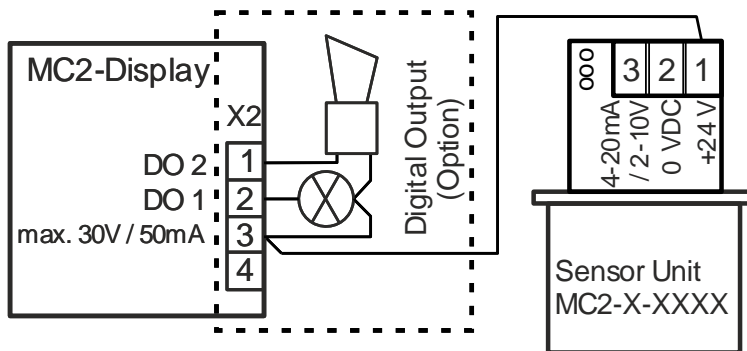
R1234yf sensor unit, measuring range 2000 ppm, in plastic housing type A, without display, sensor element in plastic housing without connection cable

Order number: MC2-A-S2063-01-A-0-P-00

ACCESSORY: Duct mounting kit

Order number: C2-Z2

### WIRING CONFIGURATION (including options)



### 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.



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