

Technical Datasheet



µGard®2

Sensor Unit MC2

for Freon Gases and Refrigerants
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.

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■ Made
■ in Germany

DESCRIPTION

Exchangeable sensor unit including digital value processing and self-control for the continuous monitoring of the ambient air to detect Freon and refrigerant gases.

The sensor unit MC2 houses a module with μ Controller, analog output and power supply in addition to the semiconductor sensor element including amplifier. The μ 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 μ Gard[®]2 Sensor MC2 is used for the detection of refrigerants and Freon gases in refrigeration plants 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 μ 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 two 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

ELECTRICAL	
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 500 Ω for current signal, ≥ 50 kΩ 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 ELEMENT	
Gas type	See Ordering Information
Sensor element	Semiconductor sensor
Measuring range	20–2000 ppm
Repeatability	± 20 %
Response time	$t_{90} \leq 150$ s (R134a)
Oxygen concentration	21 % (standard) 18 % minimum level
Temperature range	-30 °C to +60 °C (-22 to 140 °F)
Humidity range	15–90 % RH not condensing
Pressure range	Atmospheric ± 10 %
Sensor lifetime	> 5 years / normal environment
Calibration interval	12 months
Storage temperature range	0 °C to +50 °C (32 °F to 140 °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. The sensors are also susceptible to poisoning by organic solvents.
PHYSICAL	
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 ² , max. 1.3 mm ² , 3-pin
REGULATIONS	
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

OPTIONS	
ENCLOSURE A	
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
LCD-DISPLAY	
LCD	Two lines, 16 characters each, monochrome
OPEN-COLLECTOR	
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 Freon Group	MSR Code	Freon Type	Calibration Gas	Group	Measuring Range	Relative Gas Density air = 1
FR02	2061-01	R23	R23	HFC	2000 ppm	2.44
	2061-02	R508b	R23	HFC	2000 ppm	> 1
FR03	2063-01	R1234yf	R1234yf	HFO	2000 ppm	4
	2063-02	R452a	R1234yf	HFO	2000 ppm	> 1
	2063-03	R513a	R1234yf	HFO/HFC	2000 ppm	> 1
	2063-04	R454c	R1234yf	HFO	2000 ppm	> 1
	2063-05	R455a	R1234yf	HFO	2000 ppm	> 1
	2063-06	R454b	R1234yf	HFO	2000 ppm	> 1
	2063-07	R1234ze	R1234yf	HFO	2000 ppm	4
FR04	2064-01	R123	R123	HCFC	2000 ppm	5.28
FR06	2070-01	R22	R22	HCFC	2000 ppm	3.03
	2070-02	R401a	R22	HCFC	2000 ppm	> 1
	2070-03	R401b	R22	HCFC	2000 ppm	> 1
	2070-04	R402a	R22	HCFC	2000 ppm	> 1
	2070-05	R402b	R22	HCFC	2000 ppm	> 1
	2070-06	R403a	R22	HCFC	2000 ppm	> 1
	2070-07	R408a	R22	HCFC	2000 ppm	> 1
	2070-08	R409a	R22	HCFC	2000 ppm	> 1
	2070-09	R411a	R22	HFC	2000 ppm	> 1
FR07	2077-01	R134a	R134a	HFC	2000 ppm	3.59
	2077-02	R407a	R134a	HFC	2000 ppm	> 1
	2077-03	R416a	R134a	HFC	2000 ppm	> 1
	2077-04	R417a	R134a	HFC	2000 ppm	> 1
	2077-05	R422a	R134a	HFC	2000 ppm	> 1
	2077-06	R422d	R134a	HFC	2000 ppm	> 1
	2077-07	R427a	R134a	HFC	2000 ppm	> 1
	2077-08	R437a	R134a	HFC	2000 ppm	> 1
	2077-09	R438a	R134a	HFC	2000 ppm	> 1
	2077-10	R449a	R134a	HFC	2000 ppm	> 1
	2077-11	R407f	R134a	HFC	2000 ppm	> 1
	2077-12	R450a	R134a	HFO	2000 ppm	> 1
FR08	2080-01	R125	R407c	HFC	2000 ppm	1.21
	2080-02	R32	R407c	FC	2000 ppm	1.82
	2080-03	R404a	R407c	FC	2000 ppm	3.45
	2080-04	R407c	R407c	HFC	2000 ppm	> 1
	2080-05	R410a	R407c	HFC	2000 ppm	> 1
	2080-06	R434a	R407c	HFC	2000 ppm	> 1
	2080-07	R507a	R407c	HFC	2000 ppm	> 1
	2080-08	R448a	R407c	HFC	2000 ppm	> 1
	2080-09	R452b	R407c	HFO	2000 ppm	> 1
	2080-10	R143a	R407c	FC	2000 ppm	2.96

ORDERING INFORMATION

MC2-	X-	S20XX-XX-X-	X-	X		
					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	20–2000 ppm	
		S2061-02-A		R508b	20–2000 ppm	
		S2063-01-A		R1234yf	20–2000 ppm	
		S2063-02-A		R452a	20–2000 ppm	
		S2063-03-A		R513a	20–2000 ppm	
		S2063-04-A		R454c	20–2000 ppm	
		S2063-05-A		R455a	20–2000 ppm	
		S2063-06-A		R454b	20–2000 ppm	
		S2063-07-A		R1234ze	20–2000 ppm	
		S2064-01-A		R123	20–2000 ppm	
		S2070-01-A		R22	20–2000 ppm	
		S2070-02-A		R401a	20–2000 ppm	
		S2070-03-A		R401b	20–2000 ppm	
		S2070-04-A		R402a	20–2000 ppm	
		S2070-05-A		R402b	20–2000 ppm	
		S2070-06-A		R403a	20–2000 ppm	
		S2070-07-A		R408a	20–2000 ppm	
		S2070-08-A		R409a	20–2000 ppm	
		S2070-09-A		R411a	20–2000 ppm	
		S2077-01-A		R134a	20–2000 ppm	
		S2077-02-A		R407a	20–2000 ppm	
		S2077-03-A		R416a	20–2000 ppm	
		S2077-04-A		R417a	20–2000 ppm	
		S2077-05-A		R422a	20–2000 ppm	
		S2077-06-A		R422d	20–2000 ppm	
		S2077-07-A		R427a	20–2000 ppm	
		S2077-08-A		R437a	20–2000 ppm	
		S2077-09-A		R438a	20–2000 ppm	
		S2077-10-A		R449a	20–2000 ppm	
		S2077-11-A		R407f	20–2000 ppm	
		S2077-12-A		R450a	20–2000 ppm	
		S2080-01-A		R125	20–2000 ppm	
		S2080-02-A		R32	20–2000 ppm	
		S2080-03-A		R404a	20–2000 ppm	
		S2080-04-A		R407c	20–2000 ppm	
		S2080-05-A		R410a	20–2000 ppm	
		S2080-06-A		R434a	20–2000 ppm	
		S2080-07-A		R507a	20–2000 ppm	
		S2080-08-A		R448a	20–2000 ppm	
		S2080-09-A		R452b	20–2000 ppm	
		S2080-10-A		R143a	20–2000 ppm	
					Gas type/ Measuring range	
	0	Without housing				
	A	Plastic housing type A, 94 x 130 x 57 mm				
	5	Stainless steel housing type 5, 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				Housing for the integration of the sensor

EXAMPLE

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

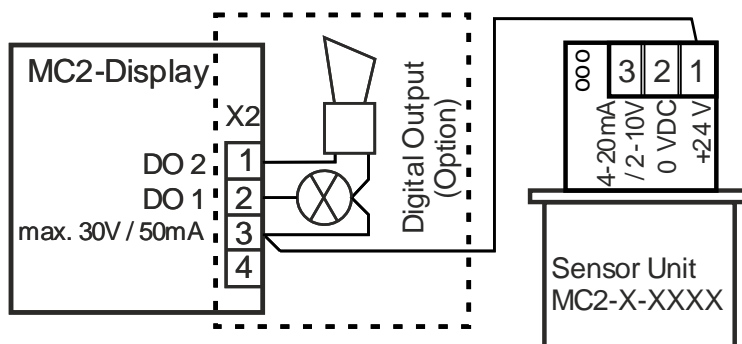
Ordering number: MC2-A-S2063-01-A-0-P

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.