Gas Detection.

MSR ELECTRONIC

Technical Datasheet

PolyGard®

Multi-Sensor-Controller MSC
Multi-Sensor-Board MSB

All Products Made in Germany

DESCRIPTION

Gas measuring, monitoring and warning controller based on state-of-the-art micro-technology for continuous monitoring of the ambient air to detect toxic and combustible gases, refrigerants or oxygen.

MSC

MSC Multi-Sensor-Controller for the connection of up to 3 sensors of the SC/MC series. The MSC offers 2 local bus slots for SC sensors of different gas types and 3 analog inputs for MC sensors with 4–20 mA signal. As an option, one ATEX-compliant SSAX sensor can be connected to the SC slot, then no other sensors can be connected. The controller monitors the measured values and activates the alarm relays if the set alarm thresholds for pre-alarm and main alert are exceeded. In addition, the values are provided for direct connection to the BMS via an RS-485 interface and also as 4–20 mA output.

MSB

Multi-Sensor-Board MSB for the connection of up to 3 sensors of the SC/MC series. The MSB offers 2 local bus slots for SC sensors of different gas types and 3 analog inputs for MC sensors with 4–20 mA signal. As an option, one ATEX-compliant SSAX1 sensor can be connected to the SC slot, then no other sensors can be connected. The MSB provides the power supply of the SC/MC/SSAX and makes the measured data available for digital communication and for the 4–20 mA output. Communication with the DGC controller takes place via the RS-485 field bus interface with DGC protocol. The alarm relays can be controlled both via the DGC controller and locally via the measurement signals. The digital input for acknowledgment or test function and other options such as display or various communication protocols for direct connection to superordinate BMS ensure the adaptation to the wide range of applications in gas detection technology.

General

The SIL2 compliant self-monitoring function in the board and in the connected sensors activates the fault message in case of an internal error as well as in case of a fault in the local bus communication (SC/SSAX1) and/or at the 4–20 mA input / output current signals.

Other options such as LCD display, 3-color status LED, buzzer, digital input for acknowledgment or test function, various communication protocols ensure proper adaptation to the wide range of applications in gas detection technology. For convenient commissioning the MSC/MSB can be pre-configured and parametrised with factory-set defaults.

The variant in the C housing can be installed in the WJP housing (Water Jet Protection) for splash water protection (see technical datasheet DB_WJP).

APPLICATION

The PolyGard® series **MSC and MSB** is designed for detection and warning of toxic and combustible gases, refrigerants or for oxygen monitoring in many commercial and industrial applications.
In industrial applications with increased electromagnetic interference fields, technical malfunctions may occur with the MSC.

MSC: Stand-Alone-Controller for SC/MC/SSAX

MSB: Board for DGC Bus System

FEATURES

- Internal function monitoring with integrated hardware watchdog
- Hardware and software according to SIL compliant development process
- Easy maintenance/calibration by replacing the sensor or via comfortable on-site calibration
- Modular technology (plug-in and exchangeable)
- Reverse polarity protected, overload and short-circuit proof
- 2x local bus connection for SC sensors and 3x analog input (4–20 mA) for MC sensors; max. 3 sensors in total or 1 SSAX1 sensor.
- 3 relays with SPDT contacts, potential-free max. 250 V AC, 5 A
- 2 transistor outputs, 24 V DC, 0.1 A (plus switching)
- Serial RS-485 interface with protocol for DGC or Modbus protocol
- 2 digital inputs
- LCD display (option)
- Warning buzzer and status LED for alarm, fault, operation and service (option)
- Acknowledgment button (option)
- Operating voltage 230 V AC, with wide range input 100–240 V AC (option)
- UPS (option)

SPECIFICATIONS

ELECTRICAL	
MSC power supply	24 V DC ± 20 %, reverse-polarity protected 24 V AC ± 15 % (power limited, see ELECTRICAL CONNECTION)
MSB power supply	16–29 V DC, reverse-polarity protected
Power consumption (24 V DC)	
• Board	Max. 60 mA (1.5 VA), w/o sensor, w/o WAO
• Per sensor (SC/SSAX)	Max. 40 mA (1.0 VA)
• Per sensor (MC)	Max. 75 mA (1.8 VA)
• Horn / warning light	Max. 40 mA (1.0 VA)
Alarm relay (2)	250 V AC, 5 A; 30 V DC, 2 A, potential-free, contacts (SPDT)
Fault signal relay (1) configurable as alarm relay	250 V AC, 5 A; 30 V DC, 2 A, potential-free, contacts (SPDT)
Transistor output (2)	24 V DC/0,1 A (switching to plus) only at 24 V DC power supply
Digital input (2)	Potential-free
Analog input (3)	4–20 mA, overload and short-circuit proof, input resistance 130 Ω
Analog output signal (1)[1]	Proportional, overload and short-circuit proof, load ≤ 500 Ω 4–20 mA = measuring range 3.3–<4 mA = tolerable underrange 2.4–<4 mA = tolerable underrange (Pellistor) > 20–21.2 mA = tolerable overrange ≥ 21,2 mA= error overrange ≤ 2,0 mA = fault ≤ 1,0 mA = processor power failure
Output for local bus (2)	5 V DC, 250 mA max., overload, short-circuit & reverse-pol. protect.
SERIAL INTERFACE	
Local bus	1-wire / 19200 Baud
Field bus	RS-485 / 19200 Baud
Tool bus	2-wire / 19200 Baud
MODBUS PROTOKOLL RTU RS-485	
Function	Transmission of measured values & alarm stages (see GA_SB_MSC_PX_Modbus_supplement_E)
AMBIENT CONDITIONS	
Temperature range	-25 °C to +60 °C (-13 °F to 140 °F), observe temp. range of options
Humidity range	15–95 % RH non-condensing
Pressure range	80–120 kPa
RECOMMENDED STORAGE CONDITIONS (without sensors)	
Storage temperature range[2]	-20 °C to +65 °C (-4 °F to 149 °F)
Storage time[3]	Ca. 6 months
Humidity range	20–90 % RH non-condensing
Pressure range	80–120 kPa
PHYSICAL	
Housing type C/E	Polycarbonate
Flammability classification	UL 94 V2
Housing colour	Similar to RAL 7035 (light grey)
Dimensions housing (W x H x D)	
• Housing type C	130 x 130 x 75 mm (5.12 x 5.12 x 2.95 in.)
• Housing type E	130 x 130 x 99 mm (5.12 x 5.12 x 3.90 in.)
Weight	Max. 0.6 kg (1.32 lbs)
Protection class (delivery state)[4]	IP65 NEMA 4X
Installation	Wall mounting
Knockouts for cable entry	Standard 6x M20/25
Connection type:	
• Local bus (SC/SSAX)	Plug-in connector, 3-pin
• Digital input, analog output	Screw-type terminals, 0.25–1.3 mm²
• Power supply, relays, field bus	Screw-type terminals, 0.25–2.5 mm²

[1] For dynamic input impedances of the receiver, a coupling resistor of 470 Ω must be inserted in series
[2] A deviating storage temperature can have a negative effect on sensitivity and service life.
[3] If stocked for a longer period, we recommend checking the zero point and recalibrating if necessary.
[4] If the housing is modified, it must be re-evaluated. IP protection ratings do not mean that the device will measure gas during or after exposure to these conditions. The SplashGuard C2-Z5 accessory is strongly recommended for these applications.

REGULATIONS	
Directives	EMC Directives 2014/30/EU Low Voltage Directive 2014/35/EU CE EN IEC 61010-1:2010 Conformity to: EN 50271 EN 50270 Type I EN IEC 61508-1–3 EN 50402 EN IEC 62990-1: Type SM EN 50104 EN 14624 EN 378 Option: 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	
DISPLAY	
LC-Display	2 lines, 16 characters each, background highlighted in 2 colours
Operation	Menu driven via 6 pushbuttons
Power consumption	5 V, 60 mA, 0.3 VA
Temperature range	-20 °C to +60 °C (-4 °F to 130 °F)
WAO STATUS-LED/BUZZER	
Colour/mode	Red/yellow/green (alarm-fault-operation-service)
Acoustic pressure	> 85 dB (A) (distance 0.1 m)
Frequency	2300 Hz ± 300 Hz
Protection class	IP65
POWER SUPPLY 100/240 V AC	
Wide range input	100–240 V AC - 50/60 Hz
Output rating type 5	5 VA
Output rating type 7	15 VA
UPS (only in connection with power supply type 7)	
Rechargeable battery (2x)	12 V, 0.8 Ah
Operating time	> 60 min
Average expected service life of the batteries	3 years
Temperature range	-5 °C to +30°C (23 °F to 86 °F)

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.

SENSOR CONNECTION OPTIONS

Sensor Connection Options	SC Sensors via Local Bus_1 or _2	MC Sensors with 4–20 mA Signal	SSAX1-2 Sensor via Local Bus_1 or SSAX1-1 Sensor via Local Bus_2
MSC / MSB Max. 3	0	0	1
	0	1–3	0
	1	0–2	0
	2	0–1	0

ORDERING INFORMATION

MSC2- / MSB2- X- X 3 X 3 X X X X X

Code	Description	Category
0	**Without further options**	
A	Version UL/CSA 61010-1(housing C, E)	**Further options**
0	**No built-on warning device**	**Warning device**
0	**Without display**	
2	With display/keypad	**Display**
2	**2x Analog input**	
3	3x Analog input	
5[1]	1x SSAX1-2 (zone 2) ATEX-compliant sensor slot	
6	1x SSAX1-1 (zone 1) ATEX-compliant sensor slot	**Version**
2	**2x Digital input**	
4[2]	1x Digital input and 1x reset button on the housing	**Digital input**
3	**Analog output & RS-485 with DGC protocol (Modbus incl.)**	**Output signal**
0	**Without buzzer & status LED**	
4	With buzzer & status LED (red, yellow, green)	**Optical/acoustical indicator WAO**
3	**3x Alarm relays**	**Alarm relays**
2[3]	**24 V DC / AC**	
5[3]	**100–240 V AC / 24 V DC, 5 VA**	
7	**100–240 V AC / 24 V DC, 15 VA**	
9	UPS 100–240 V AC / 24 V DC, 15 VA, 0.8 Ah	**Power supply**
0	Without housing	
C[4]	**Housing type C, 130 x 130 x 75 mm**	
E	Housing type E, 130 x 130 x 99 mm	**Housing**

[1] Only possible in combination with SSAX1-2-S4XX-A-10-K5 (zone 2)
[2] Not possible for MSB.
[3] Limited output power, therefore observe the permissible number of sensor heads according to Table 1.
[4].For 15 VA power supply version in combination with display, type E housing only

STANDARD VERSIONS MSC

Ordering number:
MSC2-C-230322000
MSC2-C-730322000

ACCESSORY

WJP Water Jet Protection housing (ordering number: WJP-C)
Accu-Package AP2-UPS (order number: AP2-1-0-1-00)

ELECTRICAL CONNECTION

Note:
The power requirement of the SC and MC sensor heads depends on the measuring principle used. Therefore, the maximum number of sensor heads depending on the operating voltage must be observed according to Table 1.

Supply voltage	E11XX-X MXXX-X	P34XX-X	SXXXX-X	I-S1164-X S4X0-A	IXXX-X	P34XX-X	SXXXX-X	I-S1164-X S4X0-A	IXXX-X	E11XX MXXX-X
	Series SC[1]					Series MC				
24 V DC	2	1				3				
24 V AC	2	1				0				
230 V AC 5 VA	2	1								3
230 V AC 15 VA	2	1				3				

Table 1: Supply voltage

[1] Do not connect 2x SC sensor heads of the same gas or the same gas group (Freon).

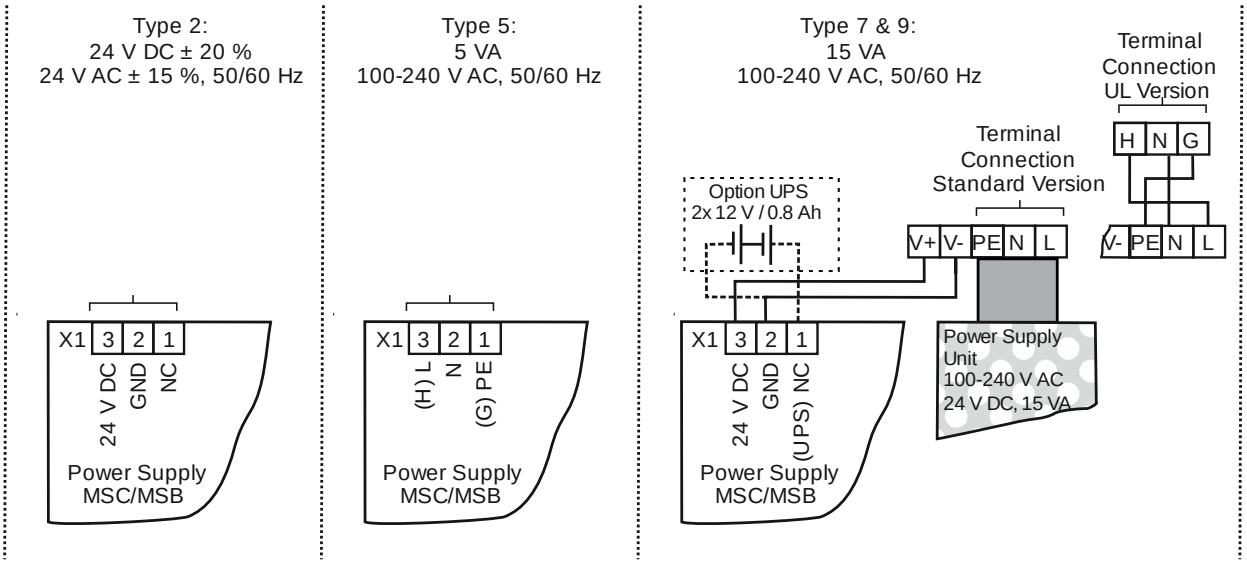

Figure 1: Connection of operating voltage

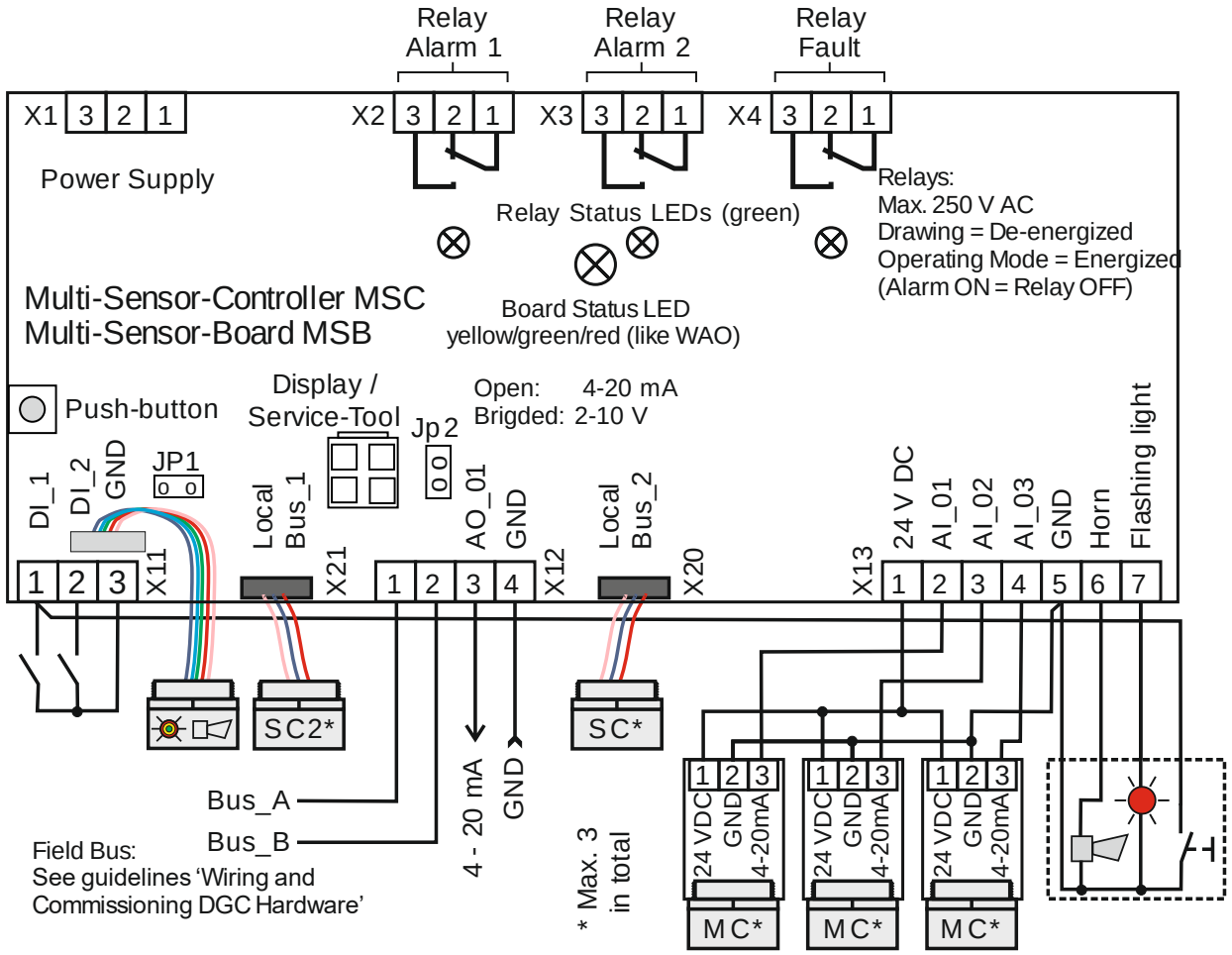

Figure 2: Connection of field devices and alarms

Documents

Catalog

YouTube