FINE PARTICULATE MEASURING SYSTEM

Ex Type FMA 16.16.5xx

Fine particulate sensor
Type FSA 16.16

Evaluator
Type GMA 30.16.5xx

- **Ex I M1 Ex ia op is I Ma**
- **Measuring ranges: 0...2, 0 … 20 or 0 … 400 mg/m³**
- **Scattered light measurement principle with continuous measurement values**
- **High measuring accuracy due to sensitivity < 4 µm particle size**
- **Adjustments or status enquiries by means of a press button unit or a magnetic pointer. The housing need not be opened**
- **Code lock to prevent unauthorized manipulation (can be switched off)**
- **Fault self-diagnosis with alpha numeric display**
- **Test of the output signal by simulated measured values**
- **Choice between normed analog frequency-or current measured value output or digital RS485-interface (optional)**
- **Output range of the analog output signal is adjustable**
- **Two built-in limit switches with optocouplers or relays in the evaluator**
- **Connecting cable between sensor and evaluator can be plugged in**
- **Components can be replaced on site**
- **Measuring chamber is protected against contamination with purge air**

The stationary fine particulate measuring system type FMA 16.16.5xx is primarily intended among other things, for the continuous monitoring of the fine particulate concentration in mines and other services in the coal mining industry.

The device corresponds to the explosion protection rating of intrinsic safety "i", category I M1 Ex ia op is I Ma and can therefore continue to be used even with inadmissibly increased methane concentrations.

The certification corresponds to the ATEX directive 2014/34/EU for devices and protective systems for the intended use in potentially explosive areas.

The system is characterized by its stable measuring characteristics, easy operation with a closed housing, robustness and small dimensions.

The fine particulate concentration is recorded according to the principle of scattered light measurement.

Concentrations from 0 to 2, 0 to 20 or 0 to 400 mg/m³ can be measured, other measuring ranges are available on request.

An easily replaceable dust filter protects the purge air channel against contamination.

The operation of the system is very simple: The housing need not be opened. The operator places a small magnetic press button unit on the evaluator. As an alternative he can also use the provided magnetic pointer.

A four-digit code which can be entered initially, protects against unauthorized changing of the set values.

A self-monitoring microcontroller system not only processes the measurement values precisely, it also carries out the operator specific instructions such as the entry of the code, signal instructions and messages, analog and digital outputs and test functions etc.

A four digit back lit graphic display shows the measured values in 12 mm high digits. In a second line of the display, the set limit values and status information are shown. Messages are displayed in plain text.

The fine particulate sensor type FSA 16.16 and the evaluator type GMA 30.16.5xx are connected to each other via the connecting cable VDL 7 with plugs.

A 5/6-15 Hz frequency output or a 0.1/0.2-1 mA or 4-20 mA current output is available for remote transmission of the measured value. The transmission can be checked from the evaluation device using adjustable test signals. Optional, a digital RS485 interface with Modbus protocol is available for the remote transmission.

Two limit switches with either optocoupler or relay outputs are used for local alarming. Switching states are indicated by LEDs. Both limit values can be set independently of each other.

FINE PARTICULATE MEASURING SYSTEM

Type FMA 16.16.5xx

Technical Data

Certification	CE DMT 03 ATEX E 065 X according to directive 2014/34/EU
Zone, Explosion protection rating	Ex **I M1 Ex ia op is I Ma**
Fine particulate sensor FSA 16.16	
Measuring range	0 … 2 or 0 … 20 or 0 … 400 mg/m³
Resolution	0,01 or 0,1 mg/m³
Error of measurement	5 %
Measured value response time t_{90}	2 s
Evaluator GMA 30.16.5xx	
Display of measured value	4stellig, LC-Display
Display sequence	0,25 s
Display range	0,00...9999 mg/m³
Averaging of measured value	5...60 s
Adjustment range of the device code	0000...9999
Supply voltage	9...16 V–
Current consumption	<170 mA, depending on model
Alternative measured value outputs	
Frequency output	
Frequency range	6...15 Hz, 5 Hz error, switchable to 5...15 Hz, 0 Hz error
Output range adjustable between	1...999 mg/m³
Optocoupler output	max.: 30 V, 100 mA, 100 mW
Current output	
Ranges and loads	0.1/0.2...1 mA / ≤5200 Ω or 4...20 mA / ≤200 Ω
Output range adjustable between	1...999 mg/m³
RS485-IS-Interface	
Protocol	MODBUS-RTU
Address range	1 to 254
Adjustable baud rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400 Bd.
Connection values	max.: 30V, 3 W
Test function by simulated measured values	10 decimal steps from the start to the final value of the range of the data transmission output, error and overflow
Limit switch Alarm 1 and Alarm 2	
Setting range	0,1...400,0 mg/m³
Optocoupler output (quiescent current principle)	max. 30 V, 100 mA, 100 mW
Relay output (quiescent current principle)	max. 30 V, 1 A, 30 W
Surroundings temperature	-20...+60°C
Humidity	0... 80 % (30°C)
Casing:	
Fine particulate sonsor type FSA 16.16	Polyester, protection class IP 65, surface resistance <10⁹, Ohm, impact strength >7 Joule
Evaluator type GMA 30.16.5xx	Polyester, protection class IP 65, surface resistance <10⁹ Ohm, impact strength >7 Joule
Dimensions incl. plugs	FSA 16.16: L 360 mm, W 160, H 91 mm GMA 30.16: L 170 mm, W 122 mm, H 100 mm
Weights	FSA 16.16: 4,8 kg; GMA 30.16: 2,3 kg
Accessories to be ordered separately	
Connecting cable	VDL 4, 20m, other length on demand, ($R_L \leq 7{,}8\ \Omega$)
Connecting cable	VDL 7, 10m, max. length 100 m
Press button device	TAS 3

Technical changes reserved 2022-11

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