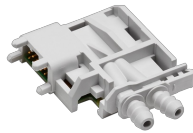




MONITORING SYSTEMS  
TYPE FMS



EFFECTIVE PRESSURE  
SENSOR



PRESSURE SENSOR



PLUG CONNECTION

## TYPE FMS

### FOR THE MONITORING OF VOLUME FLOWS

Electronic, self-powered monitoring system for fume cupboards

- Easy installation, expansion and commissioning due to plug connections
- Sockets for the most important connections are located on the outside of the casing
- Monitoring hardware can be expanded with modules
- Adaptable control panels for fume cupboards
- Innovative operation to support bespoke project requirements
- Control input signal for fans
- Configurable monitoring functions and alarm signalling
- Easy installation due to interactive EasyConnect configuration software
- Power supply unit for supply voltage 90 - 250 V AC
- 2 control panels can be connected, e.g. for fume cupboards with sash windows on two sides

Expansion options

- Expansion modules, to be mounted into or onto the base casing
- Easy installation and electric connection of the monitoring system
- Expansion modules can be factory mounted or fitted at a later stage
- Optional monitoring of supportive flow in fume cupboards



## CONTROL PANEL TYPE BE-SEG-03

### Application

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#### Application

- Monitoring system type FMS for the electronic, self-powered monitoring of volume flow rate or face velocity in fume cupboards, fume hoods and similar components.
- Easy and safe to use, providing maximum energy efficiency and data transparency
- For use within enclosed rooms
- Simple solution for fume cupboards with a constant volume flow rate

#### Equipment functions

- Differential pressure monitoring
  - Volume flow rate monitoring
  - Face velocity monitoring
  - Monitoring of supportive flow fans, and of volume flow or differential pressure signals from external units or devices
- 
- Optical and acoustic alarms as well as alarm signalling to higher-level systems (central BMS) with BE-SEG-02 or BE-SEG-03
  - Complete configuration, commissioning and diagnosis with interactive software for personal computers; the computer can be connected either directly to the unit or to the room control panel
  - For use in laboratories, clean rooms in the pharmaceutical and semiconductor industries, operating theatres, intensive care units and offices
  - For new installations, retrofit and refurbishment projects
  - Monitoring of the sash window opening to EN 14175

#### Special characteristics

- Extremely fast actual value measurement
- Monitoring of the differential pressure or volume flow rate; face velocity monitoring as an option (only with the optional face velocity transducer VS-TRD)
- Monitoring and signalling of the maximum sash opening according to EN 14175; acoustic signalling can be switched off or the duration can be limited
- Connection of one or two adaptable EASYLAB control panels Type BE-SEG-03 or BE-SEG-02; suitable also for fume cupboards with sash windows on two sides
- Operating mode default setting by an external unit or device using digital inputs
- Monitoring functions: Monitoring value 1, monitoring value 2, deactivate monitoring function
- Alarms and alarm signalling are configurable, e.g. suppressing alarms for certain operating modes

### Description

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#### Variants

- FMS-1: Monitoring system with integral diaphragm pressure transducer and measuring probe
- FMS-2: Monitoring system for external signals of 0 (2) to 10 V DC, e.g. from a face velocity transducer, volume flow controller or external differential pressure transducer

#### Parts and characteristics

- Power supply unit for supply voltage 90 - 240 V AC
- 2 control panels can be connected, e.g. for fume cupboards with sash windows on two sides
- Interactive EasyConnect software for configuration, commissioning and diagnosis of the monitoring system
- Bluetooth module (BlueCON) that can be connected to the monitoring system, for wireless connection to the configuration computer

#### Attachments

Expansion modules are factory mounted or can be fitted at a later stage

- S: EM-LIGHT-F – The monitoring system allows for switching a light on/off using the control panel. This expansion module is a wired socket for the connection of lighting. Maximum switch rating: 230 V AC 500 W.
- G: EM-CPL – Mating connector for the EM-LIGHT module. If EM-LIGHT is installed, a mating connector can be supplied to allow for plugging in the lighting.
- V: EM-VENT – Combined insulation piece and wire clamping bracket for digital output DO1, fan activation. The monitoring system can be used to activate or deactivate a fan. In case of 230 V AC power supply, this combined insulation piece and wire clamping bracket is provided.
- D: EM-DDT – Differential pressure transducer for monitoring a supportive flow. This expansion module may be used as an additional differential pressure transducer to monitor a supportive flow fan.

Optional transducers for FMS-2

- VS-TRD: Face velocity transducer
- PT699: Differential pressure transducer, –100 to 100 Pa

#### Construction features

- Electronic monitoring system with optional factory mounted expansion modules
- Control electronics using a microprocessor, with configuration settings stored in EEPROM memory and hence safe in case of a power failure
- Permanent function monitoring of the system and the connected sensors
- Sockets for the most important connections are located on the outside of the casing
- Connections for expansion modules
- Differential pressure transducer with room air induction to protect the measurement point

#### Materials and surfaces

- Casing in ABS plastic; RAL 5002

## TECHNICAL INFORMATION

Function, Technical data, Specification text, Order code, Related products



#### Functional description

For fume cupboard monitoring, the electronic EASYLAB monitoring system FMS is typically installed on the roof or on the side of the fume cupboard. The supplied control panel is typically mounted on the fume cupboard side frame.

Principal functions:

- Fume cupboard monitoring by internal or external differential pressure measurement, including optical or acoustic signalling, to EN 14175
- The monitoring system meets the requirements of EN 14175 and is hence suitable for all fume cupboards tested to EN 14175

Monitoring strategies:

FMS-1

- Equipment function – differential pressure, internal measurement: Measurement of the differential pressure at a suitable measurement point using an internal static differential pressure transducer. 2 pressure values can be monitored
- Equipment function – volume flow rate, internal measurement: Measurement of the volume flow rate at a suitable measurement point using an internal static differential pressure transducer. 2 volume flow rate values can be monitored

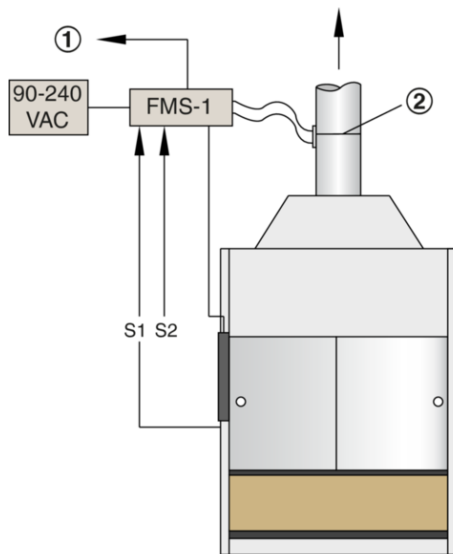
FMS-2

- Equipment function – face velocity: Measurement of the face velocity using the optional face velocity transducer VS-TRD. The velocity can be set
- Equipment function – differential pressure, external measurement: Measurement of the differential pressure at a suitable measurement point using an external differential pressure transducer. 2 pressure values can be monitored
- Equipment function – volume flow rate, external measurement: Monitoring of the volume flow rate by measuring the volume flow rate or differential pressure at a suitable measurement point using an external differential pressure transducer or the actual value signal from a volume flow controller. 2 volume flow rate values can be monitored

### Special functions

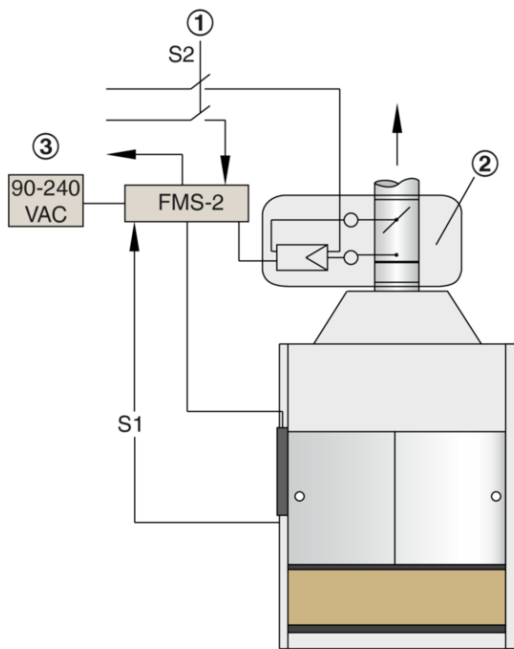
- Support of fume cupboards with supportive flow technology (optional)
- Connection of fume cupboards lighting using buttons on the control panel (EM-LIGHT, optional)
- Switching a fan on/off (240 V AC 2A max.)

### FMS-1



- ① Alarm signalling to the central BMS
- ② Effective pressure sensor
- S1 Sash window opening, EN 14175
- S2 Volume flow rate 1/2

### FMS-2



- ① Switching
- ② Volume flow controller
- ③ Alarm signalling to the central BMS
- S1 Sash window opening, EN 14175
- S2 Volume flow rate 1/2

Supply voltage	90 – 250 V AC
Power rating	Up to 13.5 V A (with maximum equipment)
Recovery time	<500 ms
Operating temperature	10 to 50 °C for operation, –10 to 70 °C for storage
Acceptable humidity	<90 % non-condensing
Switch rating of relay outputs	R1: 240 V AC 6 A, R2: 240 V AC 2 A, R3+4: 50 V 2 A
IEC protection class	II (protective insulation)
Protection level	IP 20
EC conformity	EMC to 2014/30/EU, low voltage to 2006/95/EC
Weight	0.5 kg
Dimensions (L × B × H)	159 × 136 × 65 mm

Electronic monitoring system for the demand-based monitoring of differential pressures, volume flow rates or face velocities in fume cupboards; function display to EN 14175 with optical and acoustic signalling. Monitoring strategies:

#### Equipment function FMS-1

Monitoring system with integral static differential pressure transducer, for the measurement and monitoring of two differential pressure values or volume flow rates

#### Equipment function FMS-2

Monitoring system for the connection of two external transducers using a 0 – 10 V DC signal for the measurement and monitoring of two differential pressure, volume flow rate or face velocity values.

#### Special characteristics

- Extremely fast actual value measurement
- Monitoring of the differential pressure or volume flow rate; face velocity monitoring as an option (only with the optional face velocity transducer VS-TRD)
- Monitoring and signalling of the maximum sash opening according to EN 14175; acoustic signalling can be switched off or the duration can be limited
- Connection of one or two adaptable EASYLAB control panels Type BE-SEG-03 or BE-SEG-02; suitable also for fume cupboards with sash windows on two sides
- Operating mode default setting by an external unit or device using digital inputs
- Monitoring functions: Monitoring value 1, monitoring value 2, deactivate monitoring function
- Alarms and alarm signalling are configurable, e.g. suppressing alarms for certain operating modes

#### Materials and surfaces

- Casing in ABS plastic; RAL 5002

#### Technical data

- Supply voltage: 90 – 250 V AC
- Power rating: Up to 13.5 V A (with maximum equipment)
- Recovery time: <500 ms
- Operating temperature: 10 to 50 °C for operation, –10 to 70 °C for storage
- Acceptable humidity: < 90 %, non-condensing
- Switch rating of relay outputs: R1: 240 V AC 6 A, R2: 240 V AC 2 A, R3+4: 50 V 2 A
- IEC protection class: II (protective insulation)
- IP protection level: IP 20
- EC conformity: EMC to 2004/108/EC, low voltage to 2006/95/EC
- Weight: 0.5 kg
- Dimensions (L × B × H): 159 × 136 × 65 mm

This specification text describes the general properties of the product. Texts for variants can be generated with our Easy Product Finder design programme.

**Order example: FMS-1/SG**

Variant	Monitoring system with integral diaphragm pressure transducer and measuring probe
Accessories	Lighting and mating connector for module EM-LIGHT

# FMS – 1 / SGVD



**1** Type

FMS Monitoring system

**2** Variant

- 1 Monitoring system with integral diaphragm pressure transducer and measuring probe
- 2 Monitoring system for external 0 (2) to 10 V DC signals

**3** Accessories

- Option 1: Lighting  
No entry: none  
S EM-LIGHT-F
- Option 2: Mating connector for the EM-LIGHT module  
No entry: none  
G EM-CPL
- Option 3: Combined insulation piece and wire clamping bracket for digital output DO1, fan activation  
No entry: none  
V EM-VENT
- Option 4: Differential pressure transducer for monitoring a supportive flow  
No entry: none  
D EM-DDT

## Interfaces, Dimensions and weight



### Inputs

1 analog input

- For the integration of a variable volume flow rate, differential pressure or face velocity (FMS-2 only), for 0 (2) – 10 V DC signals with configurable characteristic

2 volt-free digital inputs

- Switching from monitoring value 1 to value 2
- Supportive flow monitoring
- Sash window opening to EN 14175

### Outputs

1 analog output

- For signalling the actual volume flow rate or for providing the control input signal to a supportive flow fan, for 0 (2) – 10 V DC signals with configurable characteristics



#### 4 digital outputs

- Switching output as relay NO contact, 250 V 6 A (supply voltage), for switching the fume cupboard lighting; optional connection of the fume cupboard lighting using the integral socket for the lighting in the controller. (Expansion module EM-LIGHT)
- Switching output as relay changeover contact, 250 V 2 A (volt-free), for activating external units or devices
- 2 switching outputs as relay changeover contact, 50 V 2 A (volt-free)

Switching outputs are provided for activating supportive flow, switching between volume flow rate 1 and 2, alarm signalling

#### Interfaces for external signalling

The following information is available with conventional interfaces:

- Actual volume flow rate with equipment function 'volume flow rate monitoring' as an analog signal (not for supportive flow)
- Alarm state of the controller as digital switching contact
- Digital input for switching between monitoring values V1 and V2 or for deactivating FMS

#### Status display

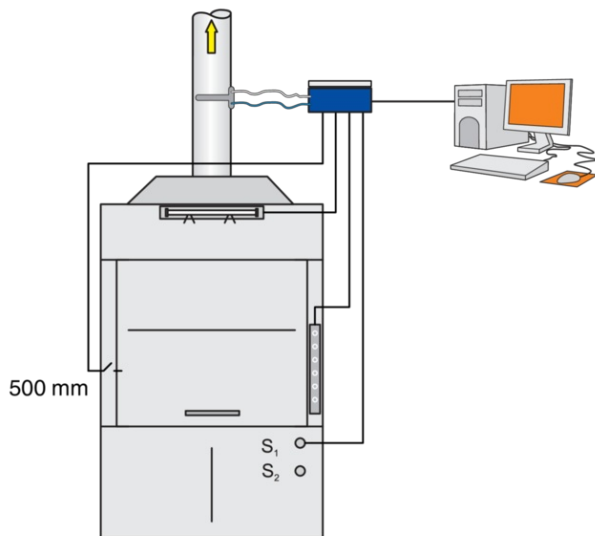
LEDs for status information and to signal errors: alarm, supply voltage with heartbeat

Additional status LEDs on the PCB: Display of the switching status of the digital inputs and outputs

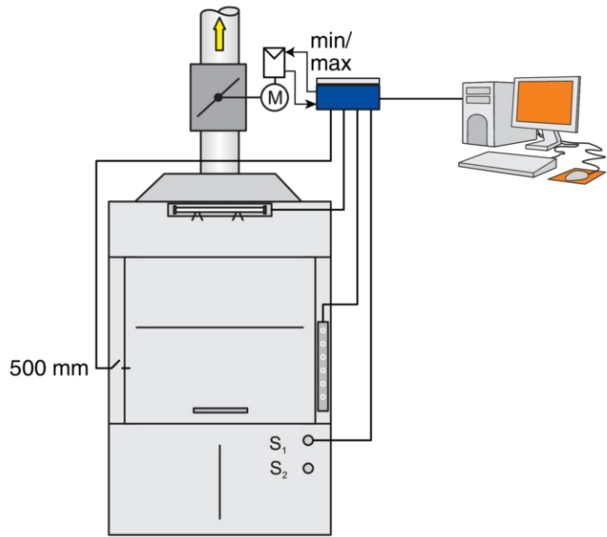
#### Electrical connection

For details on the connecting cable core identification refer to the FMS installation and operating manual.

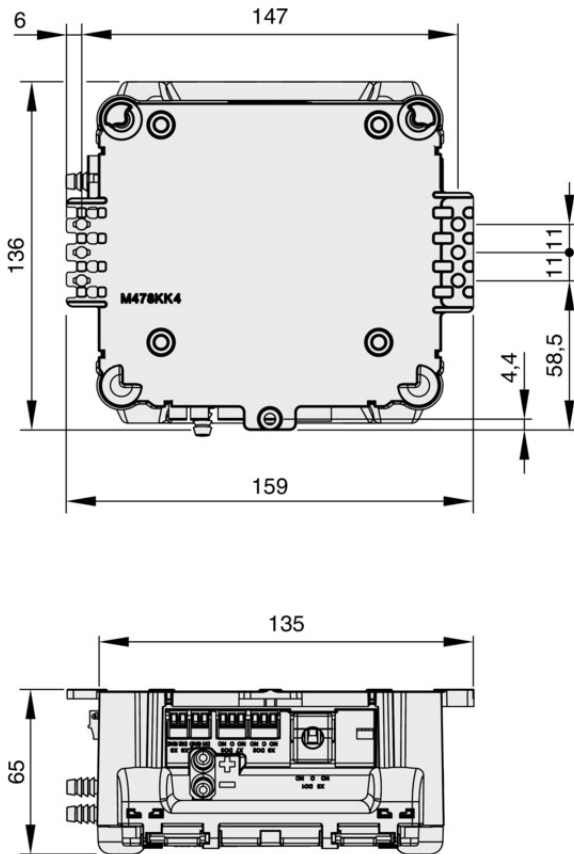
#### FMS-1



#### FMS-2



FMS monitoring system



Installation details

**Installation and commissioning**

- Easy installation, expansion and commissioning due to plug connections
- Sockets for the most important connections are located on the outside of the casing
- Monitoring hardware can be expanded with modules

The maximum power required depends on the construction of the monitoring system. Typical constructions with different equipment result in the following values:

- Monitoring system with one control panel: up to 9.5 V A
- Monitoring system with two control panels: up to 13.5 V A
- Monitoring system with one control panel and face velocity transducer: up to 13.5 V A

## TROX GmbH

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