Monitoring systems
TFM-1

For the monitoring of volume flows

Monitoring system with integral static differential pressure transducer and measuring probe for fume cupboards, fume hoods and similar components of the supply air or extract air system

- Two values can be monitored, switching between the two is possible; alarms can be configured; monitoring can be switched off
- Optical and acoustic alarms are emitted on the control panel
- Control panel with lighting button that also displays power failures
- Monitoring parameters and additional functions can be adjusted using MConnect configuration software
- For new installations and for refurbishment

Alternative recording of the volume flow being monitored

- Using volume flow rate measuring unit Type VMR, VME or VMLK

Volume flow rate measuring units Type VMLK with Venturi nozzle and flange
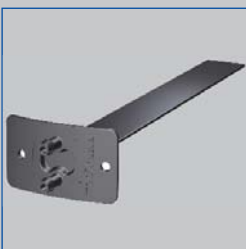
Measuring probe is part of the supply package

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Description

Fume cupboard
monitoring system TFM-1

Application
– Monitoring system TFM-1 for volume flow monitoring on fume cupboards, fume hoods and similar components
– Simple solution for fume cupboards with a constant extract air flow
– Optical and acoustic alarms as well as alarm signalling to higher-level systems (central BMS)
– Measured value recording by means of a measuring probe and an integral static differential pressure transducer
– For use in laboratories, clean rooms in the pharmaceutical and semiconductor industries, operation theatres, intensive care units, and offices
– For new installations, retrofit, and refurbishment projects

The correct aerodynamic function of a fume cupboard must be monitored and displayed (EN 14175-2, for refurbishment projects DIN 12924 may apply). Any fault must be indicated by an optical and acoustic alarm. The monitoring system TFM-1 meets these requirements.

Variants
– TFM-1: Monitoring system
– TFM-1 230 V: Monitoring system with mains supply connection 230 V AC

Useful additions
– MConnect: Configuration software for on-site configuration and service

Special features
– Two values can be monitored, switching between the two is possible; alarms can be configured; monitoring can be switched off
– Signalling of normal operation, volume flow rate higher or lower than setpoint, power failure
– Control of the fume cupboard lighting from the control panel
– Service access from the control panel
– On-site configuration with free-of-charge configuration software MConnect

Parts and characteristics
– Microprocessor system with programme and system data stored in nonvolatile memory
– Static differential pressure transducer, suitable for aggressive media
– Plastic measuring probe, easy to install in the duct
– Digital inputs for special functions, can be configured as make/break contacts
– Digital outputs for alarm signalling and special functions
– Power failure indication

Control panel
– Display: Volume flow rate or differential pressure alarm, red; power failure, flashing red
– Display: Normal operation, green
– Display: Volume flow rate exceeds setpoint or differential pressure deviates from setpoint, yellow
– Alarm acknowledgement
– Alarm sounder
– Socket to connect a notebook for service and commissioning

Construction features
– Casing can be opened and closed without tools
– Control panel with plug-in connecting cable

Materials and surface
– Casing made of galvanised sheet steel, powder-coated, white
– Control panel made of plastic, light grey

Installation and commissioning
– Install measuring probe in the duct
– Install monitoring device near the volume flow rate measurement location; ensure the correct installation orientation
– Mount the control panel
– Set all monitoring parameters using MConnect
– Carry out zero point correction and functional test

Technical data

TFM-1 and TFM-1-230-V

Supply voltage	24 V AC ± 15 %, 50/60 Hz
Supply voltage (TFM-1-230-V)	230 V AC ±10 %, 50/60 Hz
Power rating	3.5 VA
Measuring range, static differential pressure transducer	5 – 280 Pa
Switching signal input	3 volt-free switch contacts
Alarm output	1 volt-free change-over contact
Switching function output	3 volt-free make contacts
Operating temperature	10 – 40 °C
Switch rating of relay outputs	250 V AC, 5 A
IEC protection class	III (protective extra-low voltage)
Protection level	IP 20
EC conformity	EMC to 2004/108/EG, low voltage to 2006/95/EG
Weight	1.7 kg

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Function

Functional description

The volume flow rate is determined by measuring the effective pressure. For this purpose the measuring probe is installed in the duct. Instead of a measuring probe a measuring unit can be used, e.g. Type VMLK, VMRK or VMR.
The integral differential pressure transducer transforms the effective pressure into a voltage signal. During commissioning with the MConnect configuration software a constant that depends on the duct size is saved. This constant is used for calculating the volume flow rate actual value.
The monitoring system considers a minimum volume flow rate and a maximum volume flow rate (switching, e.g. from daytime to night-time operation). Separate alarms can be configured in case the actual flow rate exceeds the setpoint or falls short of the setpoint.
– Alarm delay
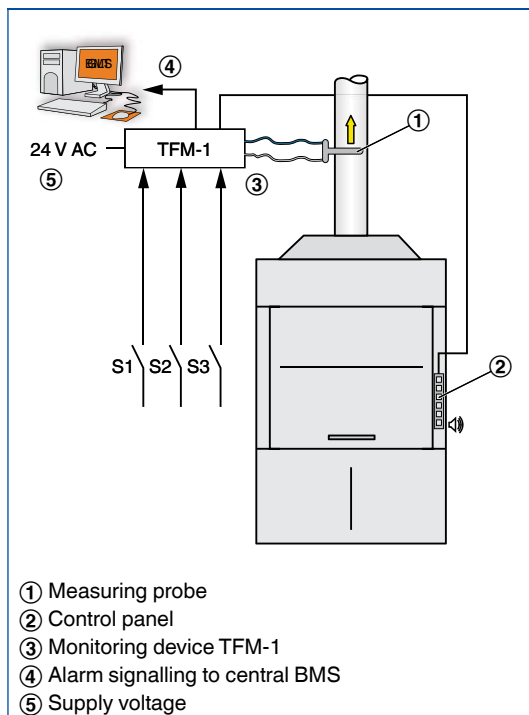– Duration of the alarm sounding; sound can also be suppressed
Alarms can be signalled to the central BMS if the alarm relay is wired to the central BMS
Operating states are displayed on the control panel; optical and acoustic alarms are also emitted on the control panel.
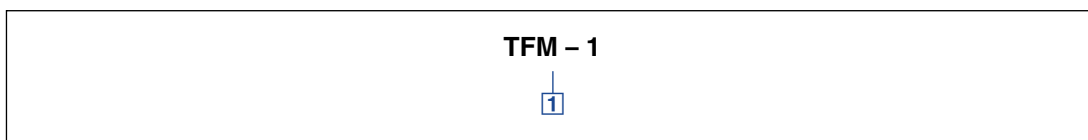Room occupants can acknowledge alarms on the control panel. Depending on the setup it might be possible to switch the fume cupboard lighting on/off from the control panel.
The monitoring function can be switched off.

Functional diagram

① Measuring probe
② Control panel
③ Monitoring device TFM-1
④ Alarm signalling to central BMS
⑤ Supply voltage

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Order code

TFM – 1

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1 **Type**
TFM-1 Monitoring system, supply voltage 24 V AC
TFM-1-230-V Monitoring system,
supply voltage 230 V AC

Operation

Control panel for monitoring systems TFM-1 and TFM-2

① Alarm indicator light, red
② Acoustic alarm acknowledgement
③ Indicator light for normal operation, green
④ Indicator light for $\dot{V}_{setpoint}$ being exceeded, yellow; this is also the button for the light
⑤ Connection socket for service and commissioning
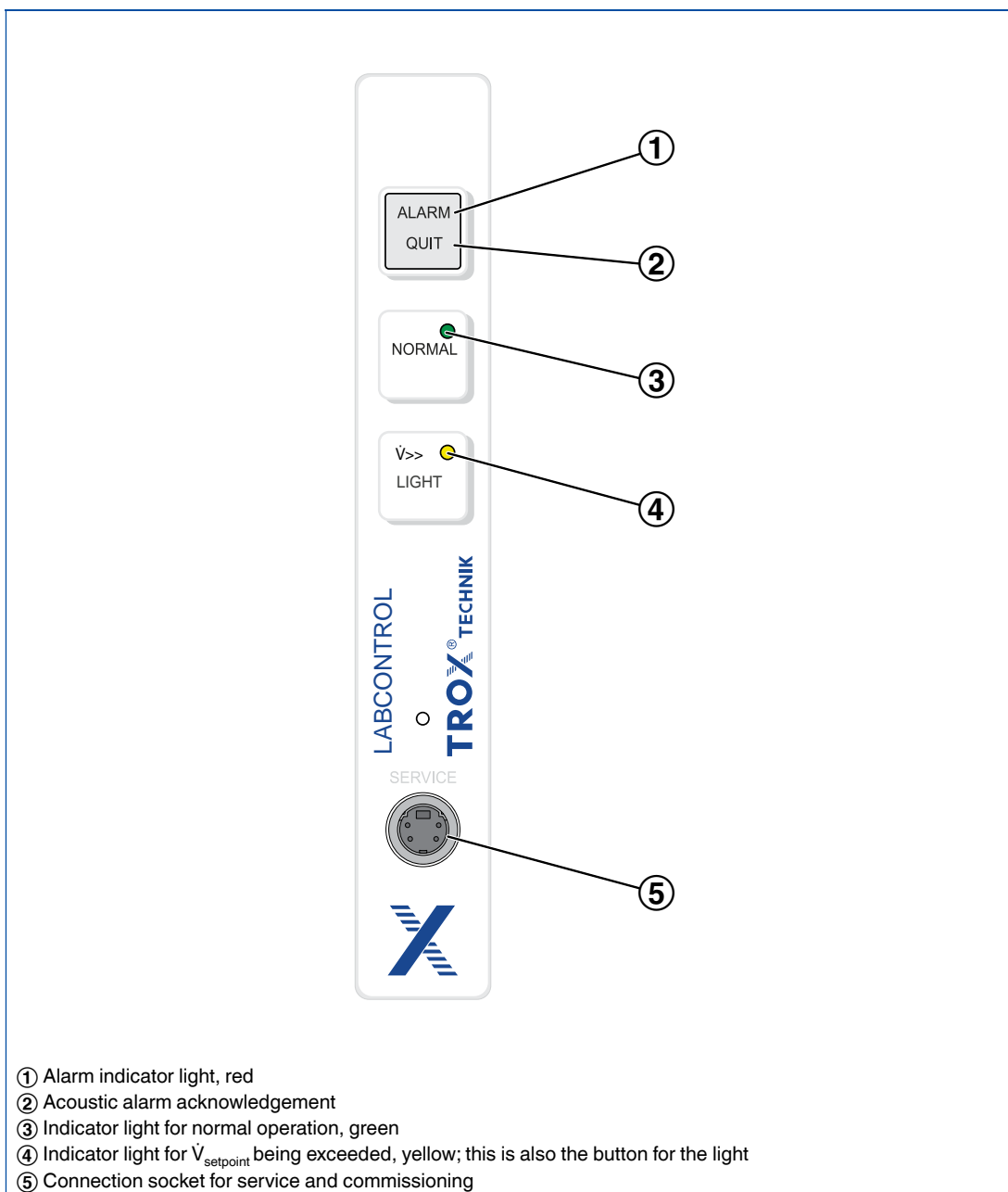
Standard text

Monitoring systems for volume flow monitoring on fume cupboards, fume hoods and similar components. Suitable for all kinds of laboratory extraction arms to EN 14175. Ready-to-use unit consists of the electronic system including a static differential pressure transducer in the same casing, a measuring probe to be installed in the ducting, a control panel, and measuring tubes. Volume flow rate monitoring of two limit values, minimum and maximum, with corresponding alarm functions that can be configured (alarm delay, duration of the alarm sounding, alarm suppression), output on a digital output. Control panel to display the operating state, to acknowledge alarms, to set special functions such as the lighting. Switching inputs for switching between the monitoring values or to switch off the monitoring function.

Special features
– Two values can be monitored, switching between the two is possible; alarms can be configured; monitoring can be switched off
– Signalling of normal operation, volume flow rate higher or lower than setpoint, power failure
– Control of the fume cupboard lighting from the control panel
– Service access from the control panel
– On-site configuration with free-of-charge configuration software MConnect

Materials and surface
– Casing made of galvanised sheet steel, powder-coated, white
– Control panel made of plastic, light grey

Technical data
– Supply voltage: 24 V AC, 50/60 Hz
– Power rating: 3.5 VA
– Measuring range, static differential pressure transducer: 5 – 280 Pa
– Switching signal: 3 volt-free switch contacts
– Alarm output: 1 volt-free change-over contact
– Switching function output: 3 volt-free make contacts

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Air management control systems

Basic information and nomenclature

■ Product selection

Air management control systems
Basic information and nomenclature

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Product selection

	Control						Monitoring	
	System EASYLAB			**System TCU-LON-II**			**TFM / TPM**	
Area of application	Fume cupboard control	Room balancing	Room pressure control	Fume cupboard control	Room balancing	Room pressure control	TFM-1, TFM-2 Volume flow rate monitoring	TPM Room pressure monitoring
Hardware components								
Adapter module		●						
Expansion module for 230 V mains supply	Optional	Optional	Optional				Optional	
Expansion module for 230 V mains supply and UPS	Optional	Optional	Optional					
LonWorks interface	Optional	Optional	Optional	●	●	●		
Expansion module – solenoid valve	Optional	Optional	Optional	●	●	●		
Expansion module – fume cupboard lighting	Optional						●	
Control panel with 2-character display	●							
Control panel with 40-character dispoay	●	●	●					
Control panel – TCU-LON-II standard				●			●	●
Control panel – expanded, AF-1							●	
Functions								
Monitoring – volume flow rate	●	●	●	●	●	●	●	
Monitoring – face velocity	●			●			Only with TFM-2	
Monitoring – sash position	●			●			●	
Monitoring – room pressure			●			●		●
Constant volume flow control	●	●		●	●			
Variable volume flow control	●	●		●	●			
Constant volume flow rate difference		●	●		●	●		
Room pressure control			●			●		
Room management function		●	●					
Additional functions								
Interface to central BMS	●	●	●	●	●	●	●	●
Damper blade position signal	●	●	●					
Divesity control		●	●		●	●		
Volume flow rate setpoint change		●	●		●	●		
Smoke extract	●							
Motion detector	●			●				
Control of automatic sash device	●						●	
Configuration software								
EasyConnect	●	●	●					
PlugIn TCU-LON II				●	●	●		
MConnect							●	●

● Possible   ☐ Not possible