

Product Catalogue

Our device portfolio for you at a glance



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Filter monitoring



A qualitative dust measurement, for example by tribo-electric filter monitoring, includes both the monitoring of the clean gas dust content after dust collectors as well as the evaluation of the status of the exhaust gas cleaning systems.

The signal generation is based on the tribo-electric measuring principle. In other words the charge exchange between the probe and the streaming as well as the bouncing dust particles is carried out.

Devices are suitable for monitoring baghouse-, envelope- and cartridge filters and centrifugal separators (cyclones).

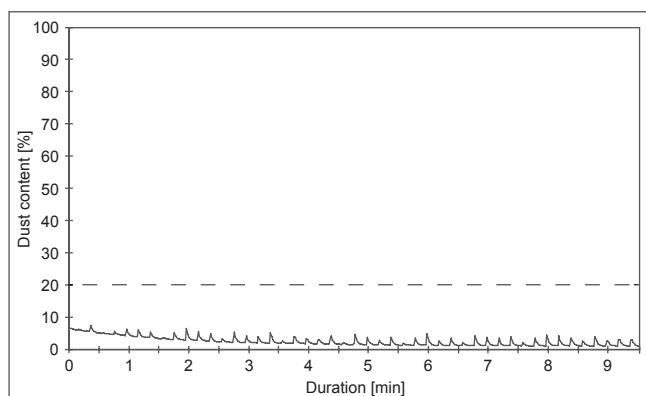
The evaluation of the filter controllers' signals therefore allows an identification of incipient wear of filter material at a very early stage, which means that emissions

of these bag rows had not been visible or had hardly been visible so far. So the operator receives the warning about a deteriorating filter state in good time long before a dust plume can be seen or noticed by authorities and neighbours. Therefore extraordinary dust emissions and filter leakage can be avoided.

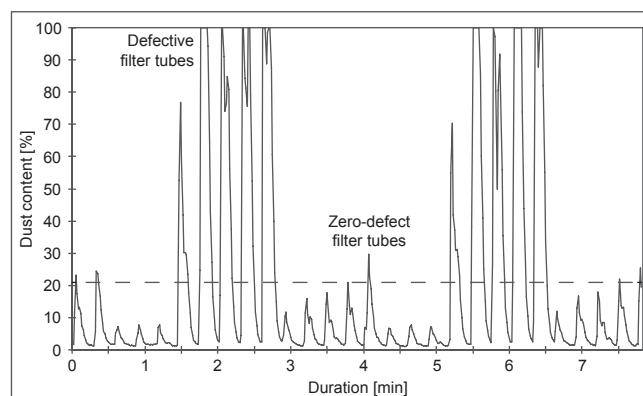
There are more than 10,000 pcs of Dr. Födisch AG filter monitor devices operating worldwide i.a.:

- cement industry
- metal-working industry (e.g. foundries, blasting plants)
- food processing industry
- wood-working industry
- chemical and pharmaceutical industry

Filter diagram with zero-defect filter bags



Filter diagram with defective filter bags



Filter monitoring devices by comparison

	PFM 92 C	PFM 13	PFM 13 C	PFM 02	PFM 02 EX	PFM 02 HB	PFM 14	PFM 14 K
Field of application								
Continuous monitoring of filters (except electrostatic precipitators)	•	•	•	•	•		•	•
Monitoring of exhaust gases in wood-processing industry						•		
Application in potentially explosive atmospheres (ATEX)					•			
Exhaust conditions:								
• Dry gases	•	•	•	•	•	•	•	•
• Occasional dew point shortfalls	•			•				•
• Media temperature up to 280 °C	•	•	•	•	•	•	•	•
• Media temperature up to 450 °C				• ^[2]				
Mobile use								•
Device characteristics								
Measuring principle:								
• Tribo-electric	•	•	•	•	•	•	•	•
Measuring arrangement:								
• In-situ	•	•	•	•	•	•	•	•
• Extractive								
Process connection:								
• Sleeve	• ^[3]	• ^[3]	• ^[3]	•	•	•	• ^[3]	• ^[3]
• Tri-Clamp	•	•	•	•	•		•	•
• Flange	•			•	•			
Data transfer:								
• Analogue outputs 4...20 mA	•	•	•	•	•	•	•	•
• Digital outputs (e.g. limit value 1/2, maintenance request, maintenance, failure)	•	•	•	•	•	•	•	•
Other device features:								
• Compact device with integrated electronics	•	•	•	•	•	•	•	•
• Integrated display/operating unit		•		•	•			
• Detached display/operating unit							•	•
• Variable length of probe rod	•	• ^[4]	• ^[4]	•	•		•	•
• Isolated piping	•	•	•	•	•		•	
Measuring components								
Dust	•	•	•	•	•	•	•	•
^[1] EC-type examination in progress ^[2] as special model PFM 02 T ^[3] customisation via adapter ^[4] probe rod length 300 mm or 500 mm (= immersion depth 410 mm resp. 610 mm)								

Filter monitoring device PFM 92 C

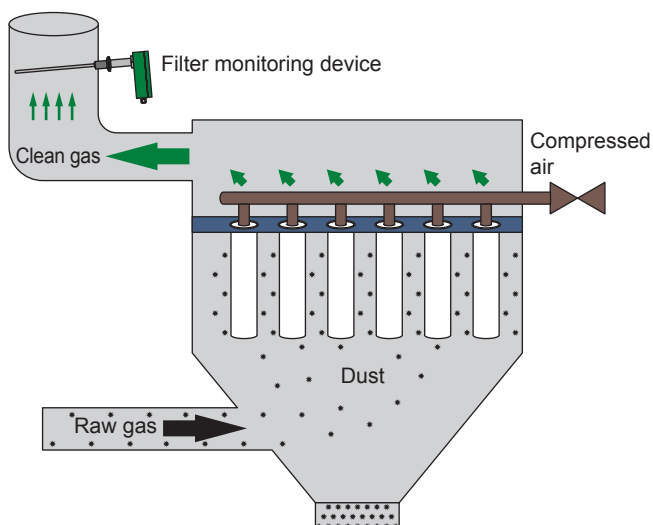
Continuous, tribo-electric in-situ measurement for qualitative monitoring of exhaust gas



APPLICATION

The PFM 92 C serves the permanent control of dust emissions. Applied as filter monitoring device it is an effective implement to detect and localise damages at filtering precipitators at early stage. Configured as dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

INSTALLATION EXAMPLE



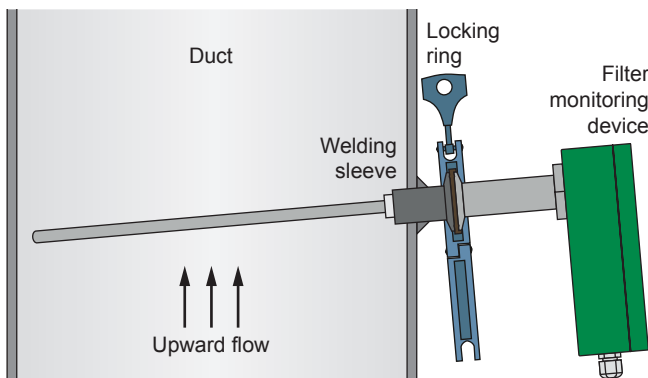
YOUR BENEFITS AT A GLANCE

- compact device with integrated operating elements
- variable application possibilities through probe rod modification
- different order configurations for power supply possible
- no purge air blower required
- low operational costs
- easy mounting

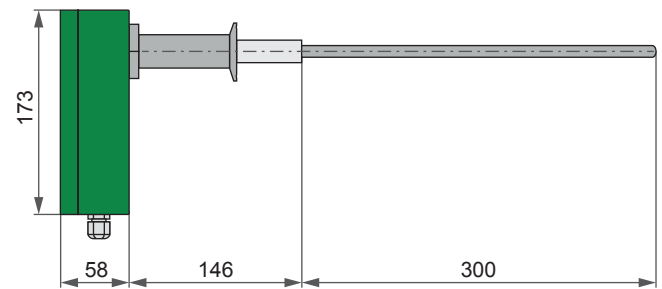
PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: max. 90% (non-condensing)
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION BY TRI-CLAMP



DIMENSIONS



TECHNICAL DATA

Housing:	compact device; IP65; protection class 1
Dimensions:	approx. 78 mm x 203 mm x 504 mm (w x h x d)
Weight:	approx. 1.8 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from the housing, stainless steel, length: 300 mm (standard); immersion depth: approx. 300 mm (dependent on application)
Display / Operating:	LEDs and switches at signal module
Ambient temperature:	-20...+50 °C
Relative humidity:	max. 90% (non-condensing)
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Flow velocity:	min. 3 m/s
Measuring range of dust:	0...100% (qualitative)
Gain levels:	4
Operational availability:	immediately after energising of power supply
Calibration:	by gravimetric comparison measurement (not required for trend measurements and filter analyses)
Analogue output:	4...20 mA, 4-wire transmitter, not galvanically separated (optionally with internal separation), burden max. 500 Ω
Digital outputs:	potential-free relay contacts (status signals for error, limit value 1 and 2); load capacity: max. 24 V DC at 0.1 A
Process connection:	1" welding sleeve with Tri-Clamp fastener
Cable gland / tightening zone:	M20 x 1.5 / 9...13 mm
Power supply:	24 V DC or 110 V AC, 50/60 Hz or 230 V AC, 50 Hz; 5 VA
<i>Special models are possible on request.</i>	

Filter monitoring device PFM 13

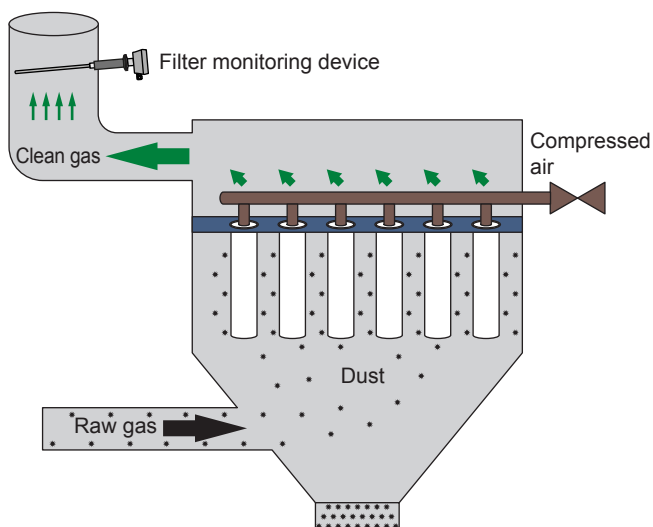
Continuous, tribo-electric in-situ measurement for qualitative monitoring of exhaust gas



APPLICATION

The PFM 13 serves the permanent control of dust emissions. Applied as filter monitoring device it is an effective implement to detect and localise damages at filtering precipitators at early stage. Configured as dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

INSTALLATION EXAMPLE



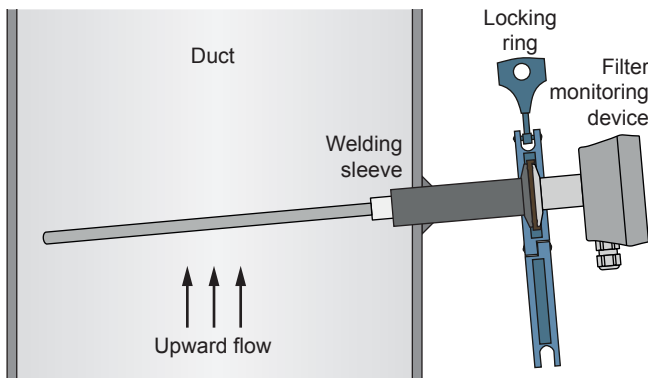
YOUR BENEFITS AT A GLANCE

- local diagnosis of system state by integrated graphic display
- no separate power supply necessary (2-wire transmitter)
- dust measurement and filter monitoring with one compact device
- no purge air blower required
- low operational costs
- easy mounting

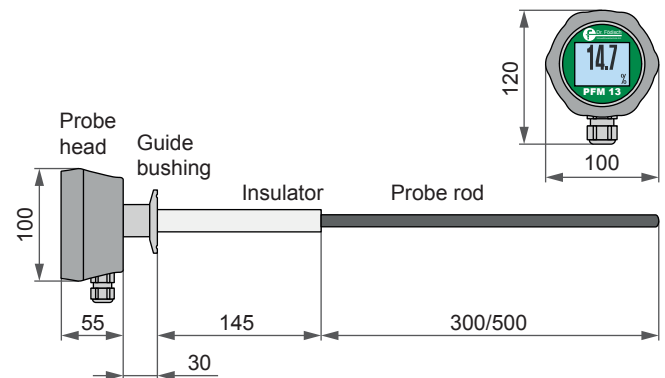
PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply for 2-wire transmitter
- processing of measuring signals

PROCESS CONNECTION BY TRI-CLAMP



DESIGN & DIMENSIONS



TECHNICAL DATA

Housing:	compact device (integrated graphic display with operating); IP65; protection class 1
Dimensions:	approx. 100 mm x 120 mm x 530/730 mm (w x h x d)
Weight:	approx. 1.0 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, length: 300/500 mm (possible to shorten mechanically); immersion depth: approx. 410/610 mm (dependent on application)
Display / Operating:	graphic display with touch function at probe head; switches at signal module
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Flow velocity:	min. 3 m/s
Measuring range of dust:	0...100% (qualitative)
Gain levels:	4
Operational availability:	immediately after switch-on of power supply
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue output:	4...20 mA, 2-wire transmitter, galvanically isolated to device ground, burden max. 150 Ω
Digital outputs:	limit value 1 and 2 freely adjustable via menu (solid-state relays, standard: not activated); load capacity: max. 60 VP, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve with Tri-Clamp fastener
Cable gland / tightening zone:	M20 x 1.5 / 9...13 mm
Power supply:	2-wire transmitter (4...20 mA); min. 15 V DC / max. 30 V DC
<i>Special models are possible on request.</i>	

Filter monitoring device PFM 13 C

Continuous, tribo-electric in-situ measurement for qualitative monitoring of exhaust gas



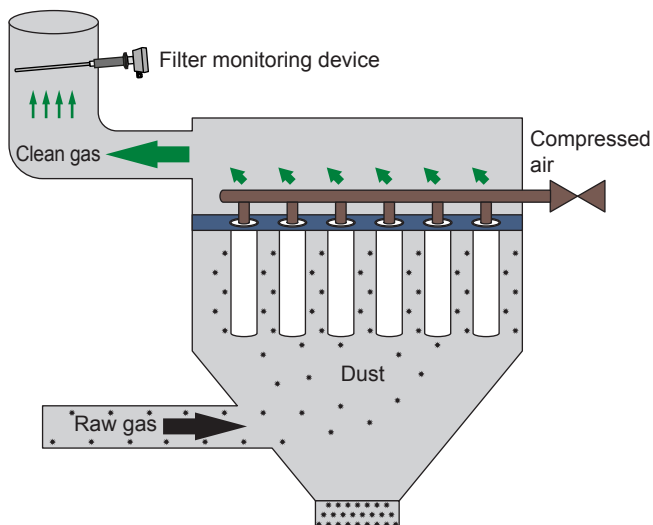
APPLICATION

The PFM 13 C serves the permanent control of dust emissions. Applied as filter monitoring device it is an effective implement to detect and localise damages at filtering precipitators at early stage. Configured as dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

YOUR BENEFITS AT A GLANCE

- dust measurement and filter monitoring with one compact device
- no separate power supply necessary (2-wire transmitter)
- no purge air blower required
- low operational costs
- easy mounting

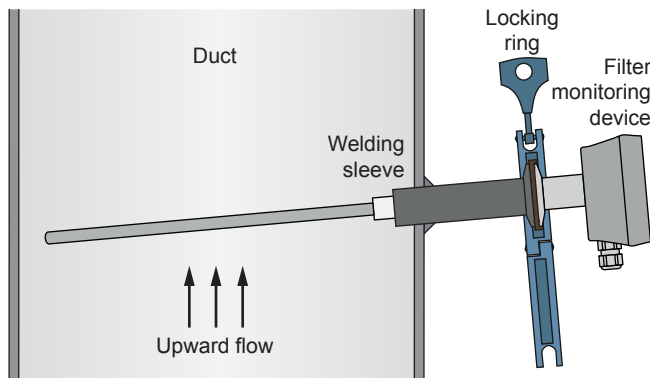
INSTALLATION EXAMPLE



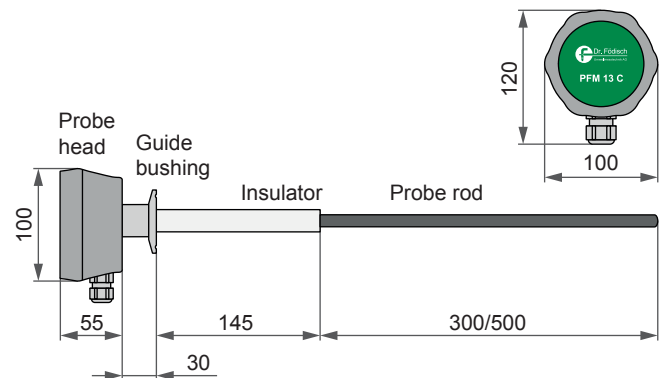
PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply for 2-wire transmitter
- processing of measuring signals

PROCESS CONNECTION BY TRI-CLAMP



DESIGN & DIMENSIONS

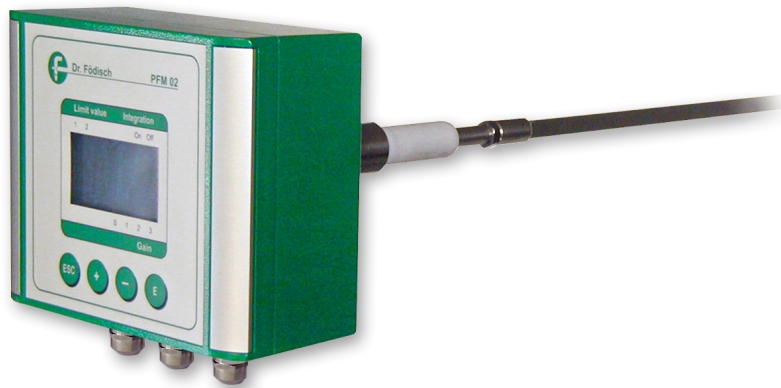


TECHNICAL DATA

Housing:	compact device; IP65; protection class 1
Dimensions:	approx. 100 mm x 120 mm x 530/730 mm (w x h x d)
Weight:	approx. 0.9 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, length: 300/500 mm (possible to shorten mechanically); immersion depth: approx. 410/610 mm (dependent on application)
Operating:	switches at signal module
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Flow velocity:	min. 3 m/s
Measuring range of dust:	0...100% (qualitative)
Gain levels:	4
Operational availability:	immediately after switch-on of power supply
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue output:	4...20 mA, 2-wire transmitter, galvanically isolated to device ground, burden max. 480 Ω
Process connection:	1" welding sleeve with Tri-Clamp fastener
Cable gland / tightening zone:	M20 x 1.5 / 9...13 mm
Power supply:	2-wire transmitter (4...20 mA); min. 15 V DC / max. 30 V DC
<i>Special models are possible on request.</i>	

Filter monitoring device PFM 02

Continuous, tribo-electric in-situ measurement with real-time monitoring of dust emissions

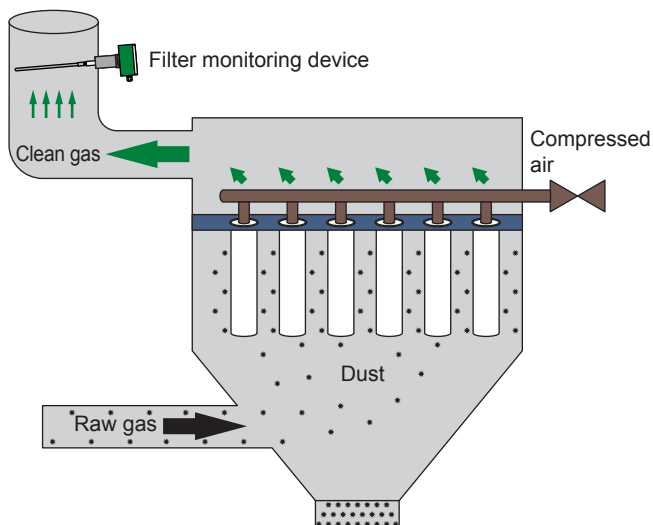


APPLICATION

The PFM 02 serves the permanent control of dust emissions. It can be applied as filter monitoring device as well as configured as dust measuring device.

If the average dust content in operating state is known, target value calibration can be applied. The device determines the appropriate calibrating factors automatically and provides the quantitative dust content as output.

INSTALLATION EXAMPLE



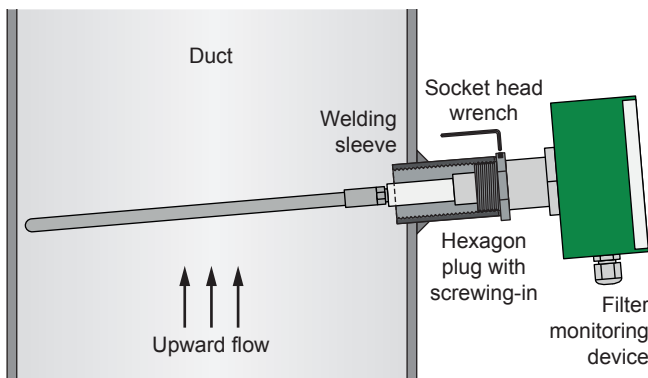
YOUR BENEFITS AT A GLANCE

- compact device → no separate operating device necessary
- variable application possibilities through probe rod modification
- rotatable probe head
- local diagnosis of system state by integrated graphic display
- real-time display with diagram or in text mode with display in % or mg/m^3
- target value calibration possible
- no purge air blower required
- low operational costs
- easy mounting

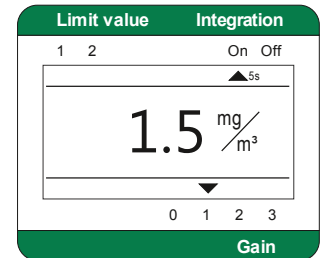
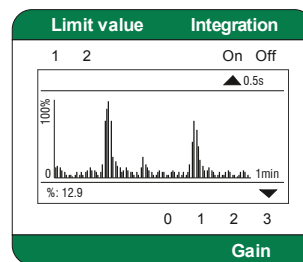
PRECONDITIONS ON SITE

- ambient temperature: $-20 \dots +50 \text{ }^\circ\text{C}$
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION



DISPLAY AS GRAPHIC & TEXT MODE



TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65, protection class 1
Dimensions:	standard approx. 160 mm x 160 mm x 510 mm (w x h x d)
Weight:	approx. 2.5 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, standard length: 300 mm (other lengths on request); circular, rectangular or wing profile as option; immersion depth: dependent on application
Display / Operating:	graphic display (128 x 64 Pixel), 4 operating keys
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C (higher temperatures on request)
Flow velocity:	min. 3 m/s
Measuring range of dust:	qualitative: 0...100%; quantitative: 0...10 mg/m³ (0...1000 mg/m³)
Gain levels:	4
Operational availability:	after approx. 3 min
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue output:	4...20 mA, galvanically isolated to device ground, burden max. 500 Ω
Digital outputs:	status signals max. 24 V DC at 0.1 A (for failure, maintenance, maintenance requirement, limit value 1 and 2); load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve
Cable gland / tightening zone:	3x M20 x 1.5 / 9...13 mm
Power supply:	230/110 V AC, 50-60 Hz, 24 V DC, 3 VA
<i>Special models are possible on request.</i>	

Filter monitoring device PFM 02 EX

Continuous, tribo-electric in-situ measurement in potentially explosive atmospheres



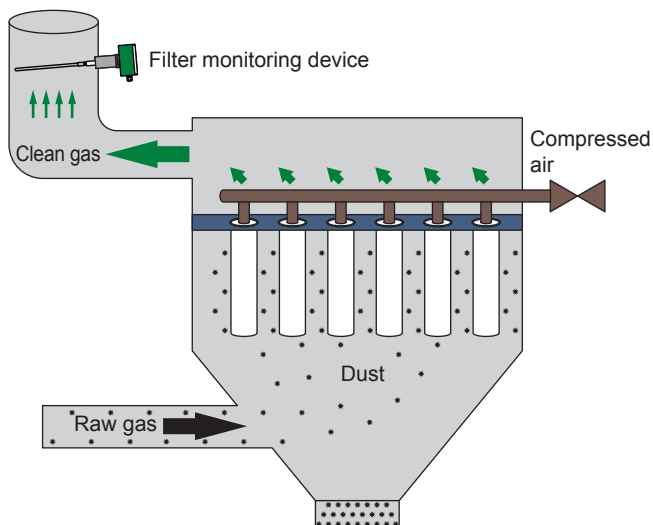
- EC-type examination certificate according to EN 60079, ATEX directive (IBExU04ATEX1249X)
- approved for Ex II 1/3D Ex ia/tc IIIC T74 °C Da/Dc or Ex II 3G Ex ic nA IIC T4 Gc



APPLICATION

The PFM 02 EX serves the permanent control of dust emissions. It can be applied as filter monitoring device as well as configured as dust measuring device in potentially explosive atmospheres.

INSTALLATION EXAMPLE



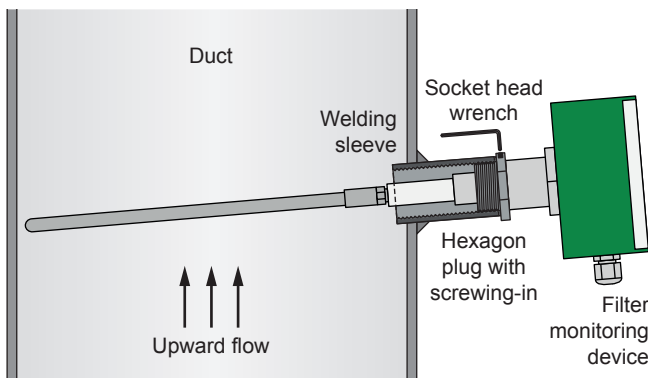
YOUR BENEFITS AT A GLANCE

- compact device consisting of probe and operating unit → no separate operating device necessary
- variable application possibilities through probe rod modification
- local diagnosis of system state by integrated graphic display
- real-time display with diagram or in text mode with display in % or mg/m³
- no purge air blower required
- low operational costs
- easy mounting

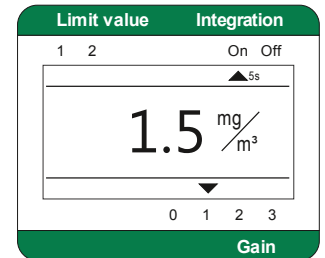
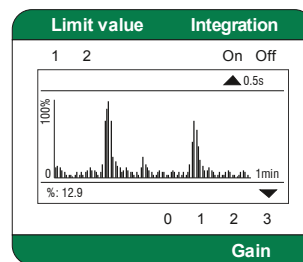
PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION



DISPLAY AS GRAPHIC & TEXT MODE

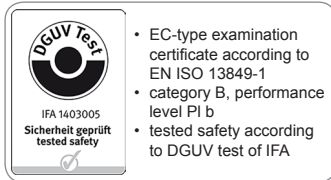


TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65, protection class 1
Dimensions:	approx. 160 mm x 160 mm x 510/710 mm (w x h x d)
Weight:	approx. 2.5 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, standard length: 300 mm (other lengths on request); circular, rectangular or wing profile as option; immersion depth: 400 mm as standard (dependent on application)
Display / Operating:	graphic display (128 x 64 Pixel), 4 operating keys
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 250 °C
Flow velocity:	min. 3 m/s
Measuring range of dust:	qualitative: 0...100%; quantitative: 0...10 mg/m³ (0...1000 mg/m³)
Gain levels:	4
Operational availability:	after approx. 5-15 min
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue output:	4...20 mA, galvanically isolated to device ground, burden max. 500 Ω
Digital outputs:	status signals max. 24 V DC at 0.1 A (for failure, maintenance, maintenance requirement, limit value 1 and 2); load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve
Cable gland / tightening zone:	1x M20 x 1.5 / 9...13 mm
Power supply:	24 V DC
<i>Special models are possible on request.</i>	

Residual dust sensor PFM 02 HB

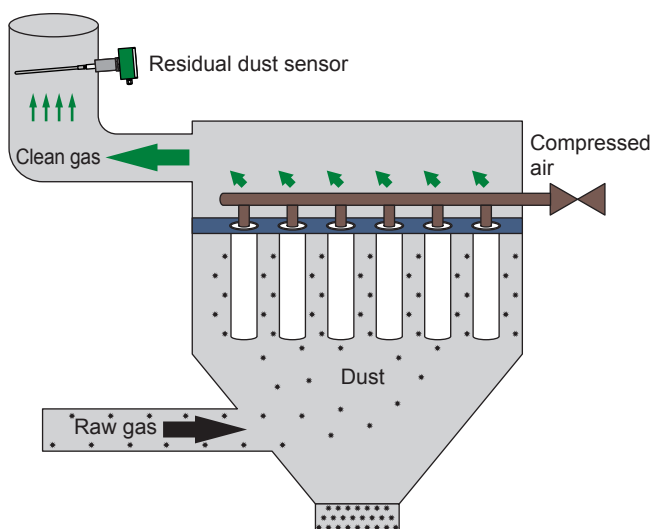
Continuous, tribo-electric in-situ filter monitoring for woodworking industry



APPLICATION

The residual dust sensor PFM 02 HB, purpose-built for woodworking industry, is developed for the monitoring of filter systems with air recirculation. With the safety function “save monitoring of residual dust content” it meets the demands of category B and Performance Level PI b according to EN ISO 13849-1.

INSTALLATION EXAMPLE



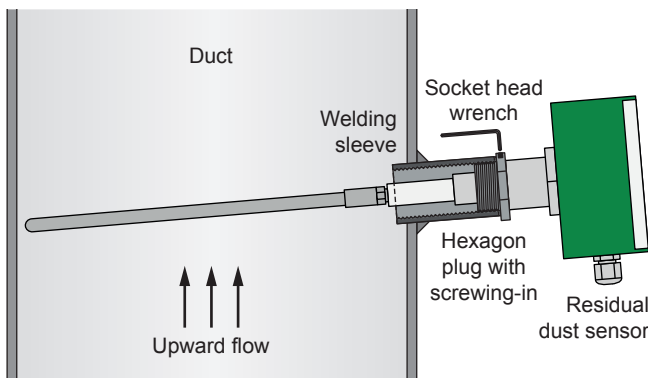
YOUR BENEFITS AT A GLANCE

- monitoring of air recirculation
- recirculated-air operation at filter systems possible
- reduction of heat energy
- compact device consisting of probe and operating unit
- no purge air blower required
- low operational costs
- easy mounting
- very low maintenance requirement

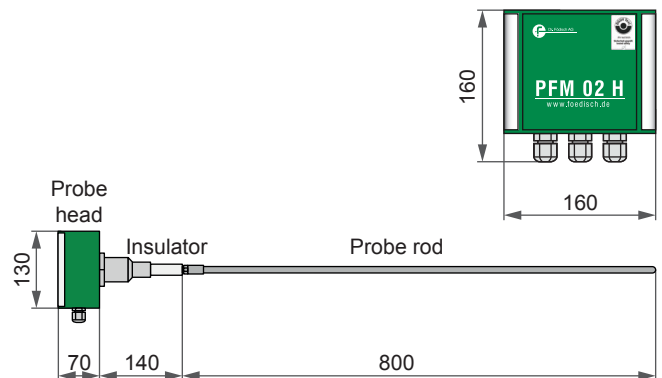
PRECONDITIONS ON SITE

- ambient temperature: -10...+35 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity approx. 4...12 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION



DESIGN & DIMENSIONS



TECHNICAL DATA

Housing:	compact device consisting of probe rod and electronics; IP65, protection class 1
Dimensions:	approx. 160 mm x 160 mm x 1010 mm (w x h x d)
Weight:	approx. 2.1 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, circular profile, probe rod length / immersion depth: approx. 800 mm
Ambient temperature:	-10...+35 °C
Dew-point spread:	min. +5 K (no bedewing of the isolator permissible)
Flow velocity:	approx. 4...12 m/s
Measuring range of dust:	qualitative: 0...100%
Operational availability:	after approx. 30 s
Analogue output:	only for zero point setting, 4...20 mA, galvanically isolated to device ground, burden max. 500 Ω
Digital outputs:	3x status signal max. 24 V DC at 0.1 A: <ul style="list-style-type: none"> • concentration > 0.1 mg/m³, warning • concentration > 0.3 mg/m³, alarm 1 - recirculated-air shutoff / filter break • alarm 2 - measuring range exceedance / system shutoff contacts normally closed, in case of warning/alarm open; load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Data transfer:	transmission of filter status data to the control of the filter system, interval: 0.25 h (special software at the control of the filter system necessary)
Process connection:	1" welding sleeve
Cable gland / tightening zone:	1x M20 x 1.5 / 9...13 mm
Power supply:	24 V DC ±20%, max. 0.25 A, 6 VA; pre-fuse 0.5 AT
<i>Special models are possible on request.</i>	

Filter monitoring device PFM 14

Continuous, tribo-electric in-situ measurement for qualitative monitoring of exhaust gas

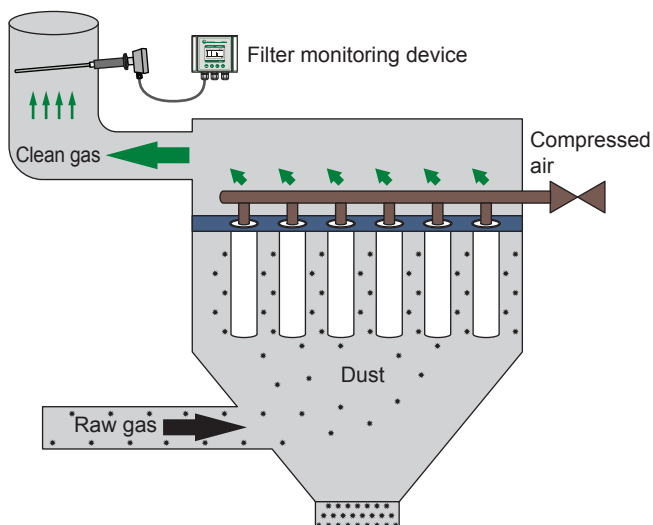


APPLICATION

The PFM 14 serves the permanent control of dust emissions. It can be applied as filter monitoring device as well as configured as dust measuring device.

The device consists of a probe with separated operating unit. They are connected via a cable by plug-in connections. Thereby, the operating unit can be mounted from the measuring point up to a distance of 50 m.

INSTALLATION EXAMPLE



YOUR BENEFITS AT A GLANCE

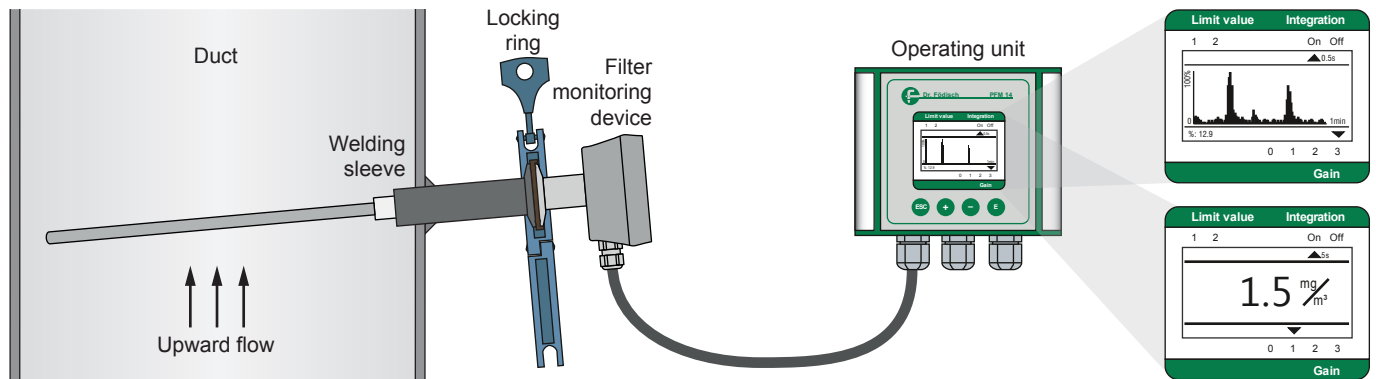
- probe with separated display and operating unit
- local diagnosis of system state by combined operating unit with graphic display
- real-time display with diagram or in text mode with display in % or mg/m^3
- no purge air blower required
- low operational costs
- easy mounting

PRECONDITIONS ON SITE

- ambient temperature: $-20...+50\text{ }^{\circ}\text{C}$
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION BY TRI-CLAMP

DISPLAY AS GRAPHIC AND TEXT MODE



TECHNICAL DATA

Housing:	tribo-electric probe with separate operating unit (max. cable length 50 m); IP65, protection class 1
Probe:	approx. 100 mm x 100 mm x 530/730 mm (w x h x d), weight approx. 2.1 kg; probe rod: electrically isolated from housing, length: 300 mm resp. 500 mm (possible to shorten mechanically); immersion depth: 400 mm resp. 600 mm (dependent on application)
Operating unit:	approx. 160 mm x 160 mm x 70 mm (w x h x d), weight approx. 3.0 kg
Display / Operating:	operating unit: graphic display (128 x 64 Pixel), 4 operating keys; probe: switches at signal module
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Measuring range of dust:	qualitative: 0...100%; quantitative: 0...10 mg/m³ (0...1000 mg/m³)
Gain levels:	4
Operational availability:	after approx. 5...10 min
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue output:	4...20 mA, galvanically isolated to device ground, burden max. 500 Ω
Digital outputs:	status signals max. 24 V DC at 0.1 A (for failure, maintenance, maintenance requirement, limit value 1 and 2); load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve with Tri-Clamp fastener
Cable gland / tightening zone:	2x M20 x 1.5 / 9...13 mm
Power supply:	230/110 V AC, 50-60 Hz, 24 V DC, 5 VA
<i>Special models are possible on request.</i>	

Mobile filter diagnosis device PFM 14 K

Mobile system for temporary, tribo-electric in-situ filter monitoring of exhaust gas



APPLICATION

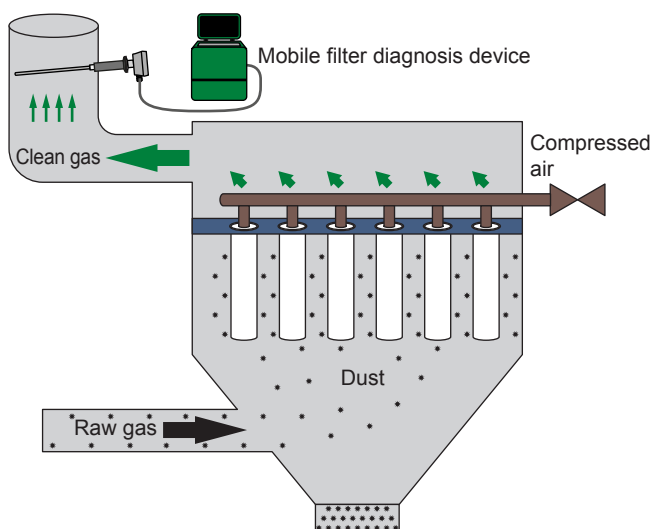
The PFM 14 K serves the temporary control of dust emissions. Applied as filter monitoring device it is an effective implement to detect and localise damages at filtering precipitators at early stage.

The monitoring and evaluation of the measuring results furthermore allows selective maintenance procedures.

YOUR BENEFITS AT A GLANCE

- design as portable case → easy and safe handling of the complete system
- immediate evaluation of the clean gas dust content after filter systems
- flexible use by variable length of the probe rod
- graphic presentation and storage by integrated recorder
- offline power supply by power bank
- easy mounting

INSTALLATION EXAMPLE



PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- socket with 1" or ½" welding sleeve at the duct



DESIGN

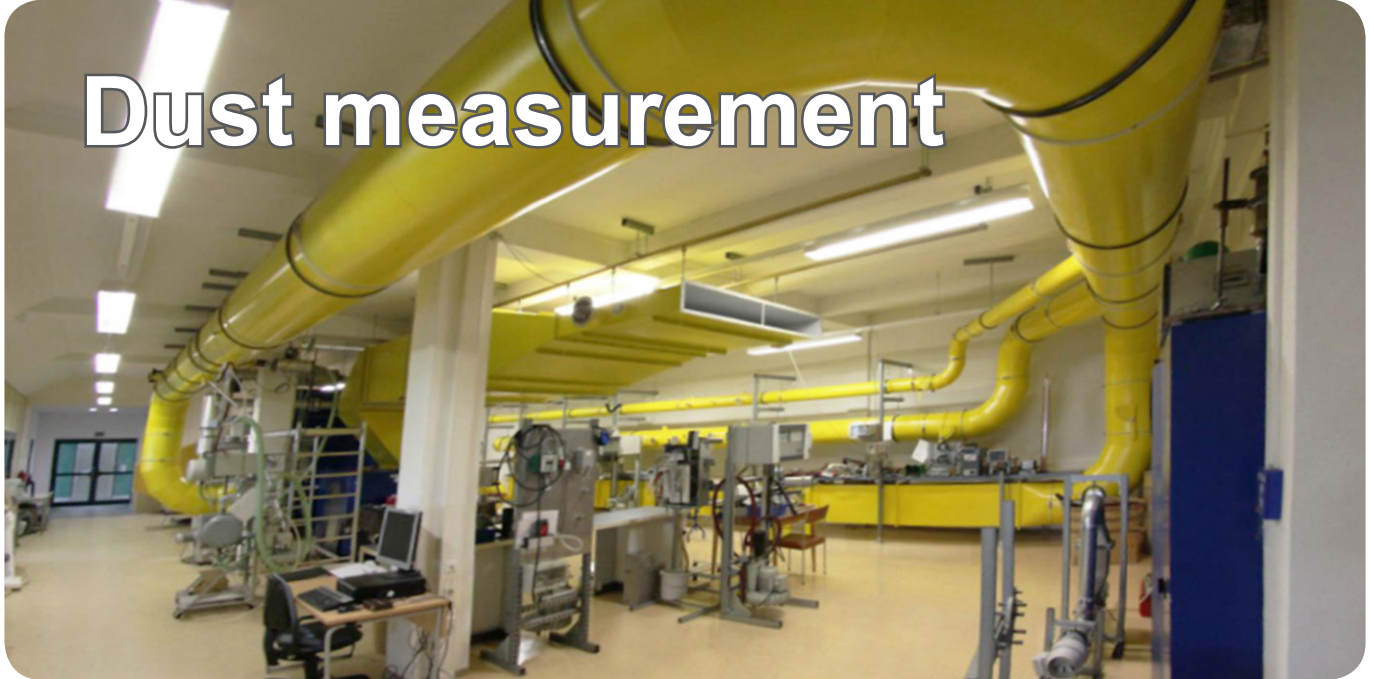
The device is a complete measuring system which is designed as a portable case. It consists of a measuring case with an integrated operating unit and an electronic recorder for graphic presentation and storage. The embedded power bank offers the possibility of an offline power supply for up to twelve hours.

The lower segment of the case is a combined box with all necessary accessories (e.g. probe, connecting cables).

TECHNICAL DATA

Housing:	complete measuring system designed as portable measuring case (incl. electronic recorder) and accessories box; IP54; protection class 1
Dimensions:	approx. 500 mm x 450 mm x 250 mm (w x h x d)
Weight:	approx. 12 kg
Probe:	tribo-electric probe consisting of probe head with mountable probe rods; IP65; protection class 1; probe rod: electrically isolated from housing, variable length though combinable parts; immersion depth: dependent on application; probe connection cable: 5 m (max. distance to measuring case)
Display / Operating:	operating unit: graphic display (128 x 64 Pixel), 4 operating keys; probe: switches at signal module
Registration:	electronic recorder with graphic display; internal storage, SD card slot, USB connection
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Flow velocity:	min. 3 m/s
Measuring range of dust:	qualitative: 0...100%; quantitative: 0...10 mg/m ³ (0...1000 mg/m ³ , dependent on adjusted amplification, dust type and measuring gas characteristics)
Gain levels:	16 (4 via operating unit, 4 via probe)
Operational availability:	immediately after switch-on of power supply
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Digital outputs (only internal):	3 status signals max. 24 V DC at 0.1 A (for failure, maintenance, maintenance request, limit value 1 and 2); load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve with inside thread (standard, not part of the scope of supply), alternatively applicable for ½" welding sleeve or Tri-Clamp fastener
Power supply:	230 V AC, 50-60 Hz, 15 VA; offline power supply by power bank possible, operation time approx. 12 h
<i>Special models are possible on request.</i>	

Dust measurement



Devices used for the continuous dust measurement register in the wider sense the physical changes caused by the particles in the measuring system converting them into electrical signals. For that the measured object can be analysed directly in exhaust gas channel (in-situ measurement) or a partial volume flow is collected and fed into a measuring device (extractive sampling).

As result of the in-situ techniques, the measurement signals derive from the direct interaction of light or a tribo-electric probe with the dust particles in the exhaust gas channel. For evaluation the scattered light or the absorbance of a transmitted light beam respectively tribo-electricity can be used.

The in-situ measuring devices are only suitable for the measurement of dust in dry gases.

In case of wet gases saturated with water vapour, the existing water droplets and aerosols create also effects, which distort the measurements results. Therefore in

these cases the extractive measurement technique should be selected. The basis of the extractive methods constructs a preferably isokinetic partial flow extraction from the main gas flow.

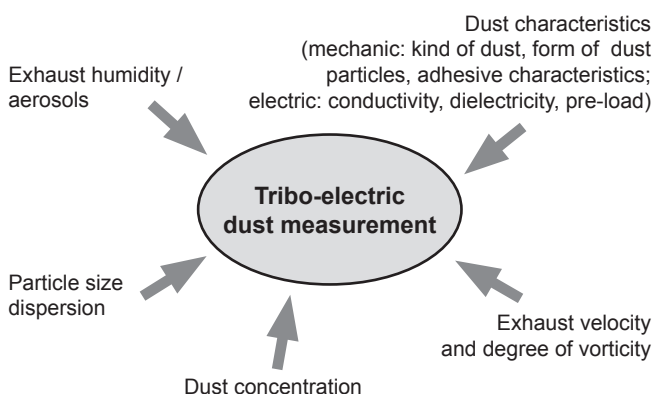
The process-related restrictions have substantial influence over the choice of the measurement method.

Dust concentration measuring devices are mainly applied in:

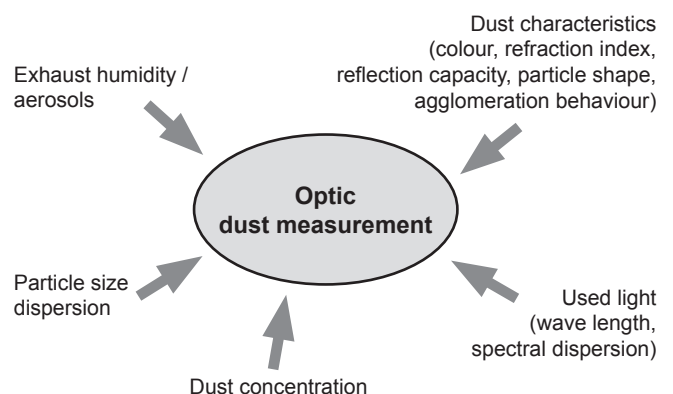
- coal-fired power plants
- biomass power plants
- energy-from-waste plants
- incinerators

Periodic dust concentration measurements are usually applied as a standard reference method for calibration of continuous dust concentration measuring devices (gravimetric calibration).

Influences on tribo-electric dust measurement



Influences on optic dust measurement

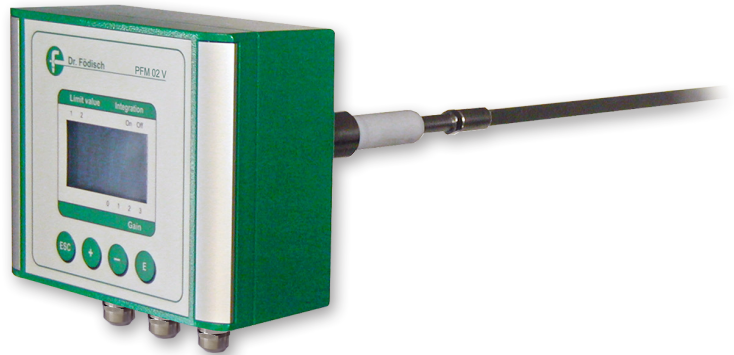


Dust measuring devices by comparison

	PFM 02 V ^[1]	PFM 97 ED	PFM 06 ED	GMD 12	GMD 13
Field of application					
Continuous measurement of dust concentration	•	•	•		
TUV-approved monitoring of dust emissions			• ^[2]		
Discontinuous, manual gravimetric determination of dust content (according to VDI 2066, page 1, 2, 3, 7) with mobile use				•	•
Determination of dust content based on hot weighing					•
Exhaust conditions:					
• Dry gases	•				
• Wet gases		•	•		
Device characteristics					
Measuring principle:					
• Tribo-electric	•	•			
• Optic			•		
• Gravimetric				•	•
Measuring arrangement:					
• In-situ	•				
• Extractive		•	•	•	•
Probe material:					
• 1.4571	•	•	•		
• Hastelloy	• ^[3]	•	•		
Process connection:					
• Sleeve	•			•	•
• Tri-Clamp	•				
• Flange	•	•	•		
Data transfer:					
• Analogue outputs 4...20 mA	•	•	•		
• Digital outputs (e.g. limit value 1/2, maintenance request, maintenance, failure)	•	•	•		
Other device features:					
• Compact device with integrated electronics	•				
• Integrated display/operating unit	•				
• Detached display/operating unit		•	•	•	•
• Variable length of probe rod	•	•	•		
• Isolated piping	•	•	•	•	•
Measuring components					
Dust concentration	•	•	•	•	•
Volume flow / velocity	• ^[1]			•	•
Temperature	• ^[1]			•	•
Pressure				•	•
Humidity				•	•
^[1] in combination with flow measuring device FMD 02 / FMD 09					
^[2] suitability tested according to EN 15267-3, certified in compliance with QAL1					
^[3] on request as special model					

Dust measuring device PFM 02 V

Continuous, tribo-electric monitoring of dust concentration in exhaust gas



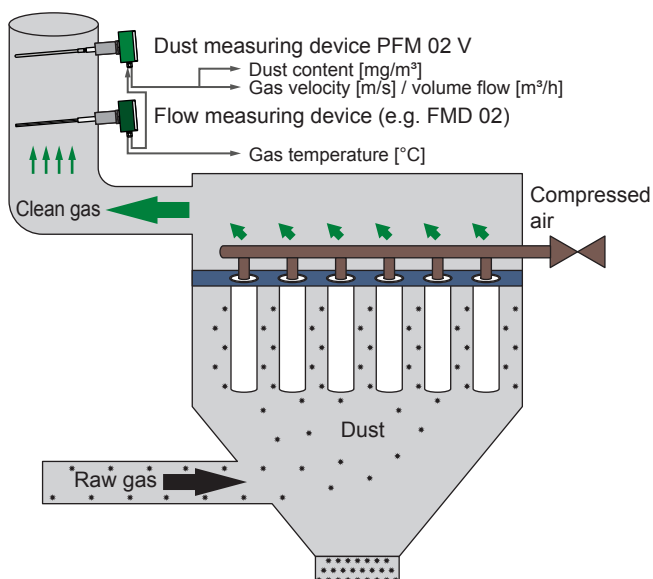
APPLICATION

The PFM 02 V is a highly sensitive system for continuous measurement of dust concentrations. Since velocity takes the second most influence on the tribo-electric measuring principle after the dust concentration, the measuring signal must be velocity-compensated in case of varying flows. That's why an additional velocity measuring device can be integrated into the measuring system (e.g. flow measuring device FMD 02 or FMD 09). Alternatively the PFM 02 V calculates with a substitute input value.

YOUR BENEFITS AT A GLANCE

- compact device consisting of probe and operating unit → easy mounting
- variable application possibilities through probe rod modification
- local diagnosis of system state by integrated graphic display
- real-time display with diagram or in text mode with display in % or mg/m^3
- input for velocity signal (in case of optional additional device)

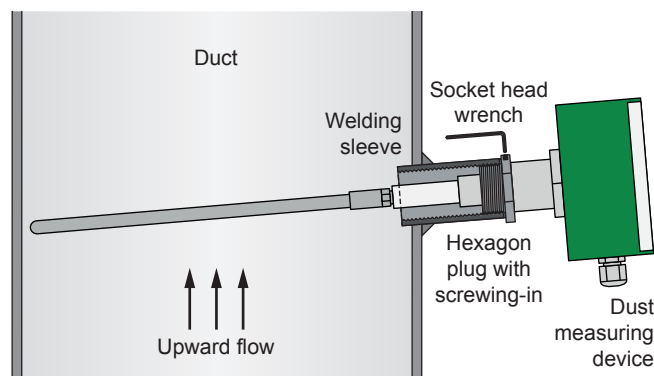
INSTALLATION EXAMPLE



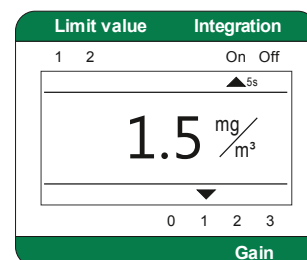
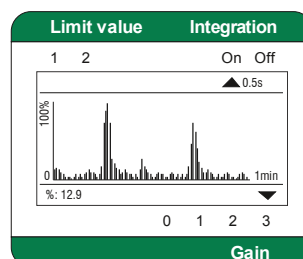
PRECONDITIONS ON SITE

- ambient temperature: $-20 \dots +50 \text{ }^\circ\text{C}$
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- dew-point spread: min. +5 K
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter

PROCESS CONNECTION



DISPLAY AS GRAPHIC & TEXT MODE



TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65, protection class 1
Dimensions:	approx. 160 mm x 160 mm x 510 mm (w x h x d)
Weight:	approx. 2.5 kg
Probe:	tribo-electric probe consisting of probe rod and probe head; probe rod: electrically isolated from housing, standard length: 300 mm (other lengths on request); circular, rectangular or wing profile as option; immersion depth: dependent on application
Display / Operating:	graphic display (128 x 64 Pixel), 4 operating keys
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C (higher temperatures on request)
Velocity measurement (in case of optional additional device):	calculation of analogue 4...20 mA signals of a separate velocity measurement or alternative input of a substitute value
Measuring range of dust:	qualitative: 0...100%; quantitative: 0...10 mg/m³ (0...1000 mg/m³)
Gain levels:	4
Operational availability:	after approx. 5-15 min
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analyses not required)
Analogue outputs:	2x 4...20 mA (dust, velocity / volume flow), galvanically isolated to device ground, burden max. 500 Ω
Analogue input:	1x 4...20 mA or 2-wire transmitter connection (12 V DC)
Digital outputs:	status signals max. 24 V DC at 0.1 A: failure/maintenance (normally closed, at failure open), limit value 1 and 2 / maintenance request (opening or closing contact selectable); load capacity: max. 60 Vp, max. 75 mA; forward resistance: max. 10 Ω
Process connection:	1" welding sleeve
Cable gland / tightening zone:	3x M20 x 1.5 / 9...13 mm
Power supply:	230/110 V AC, 50-60 Hz, 24 V DC, 3 VA
<i>Special models are possible on request.</i>	