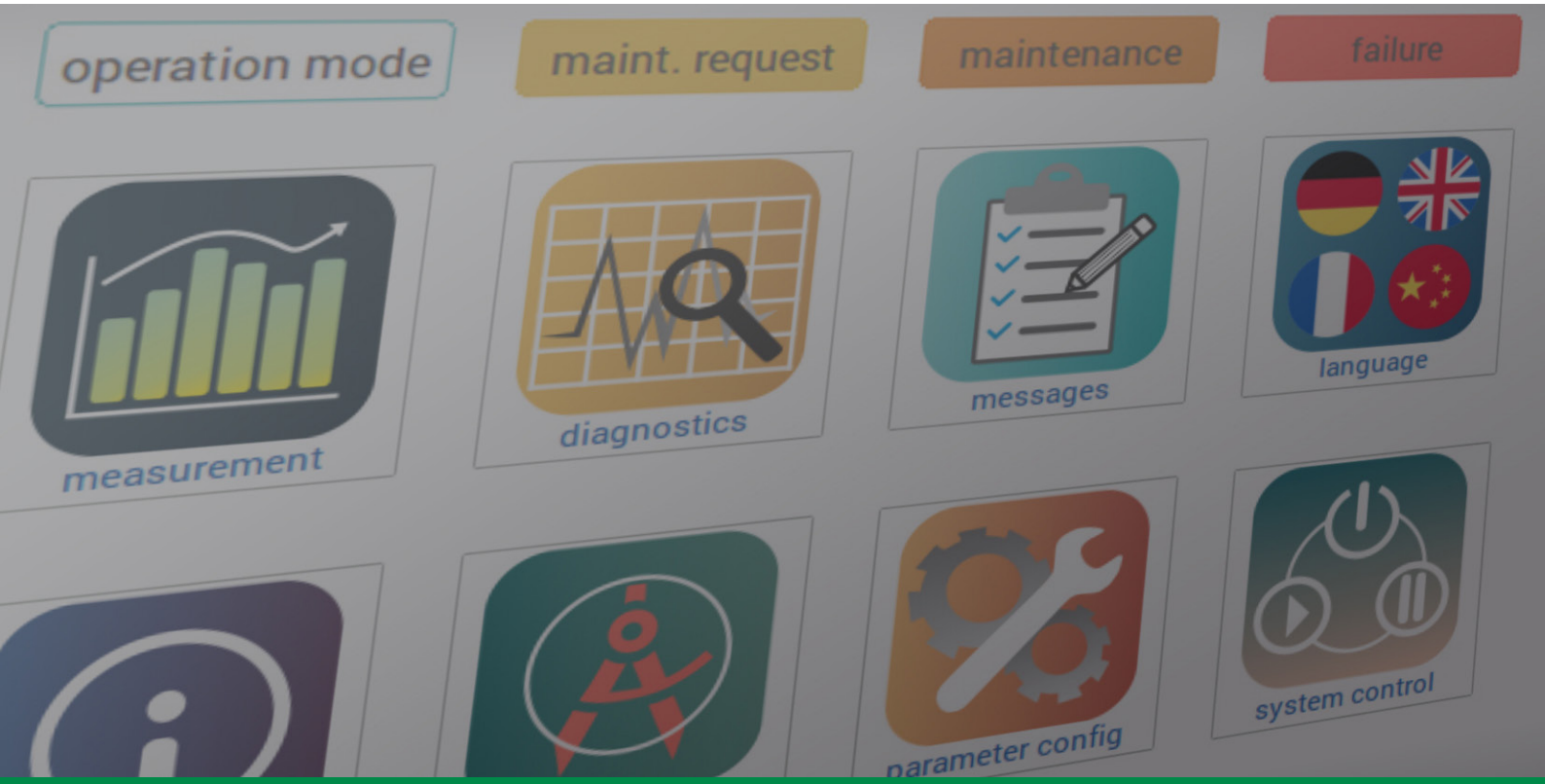
Dr. Födisch
Umweltmesstechnik AG



Product Catalogue

Our device portfolio for you at a glance

www.foedisch.de

Content

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.

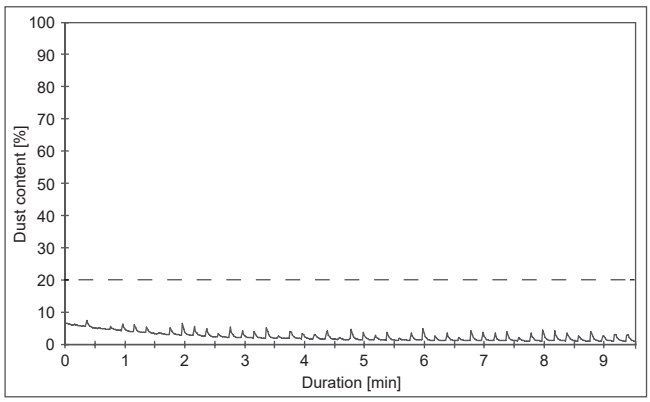
Devices are suitable for monitoring baghouse-, envelope- and cartridge filters and centrifugal separators (cyclones).

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.

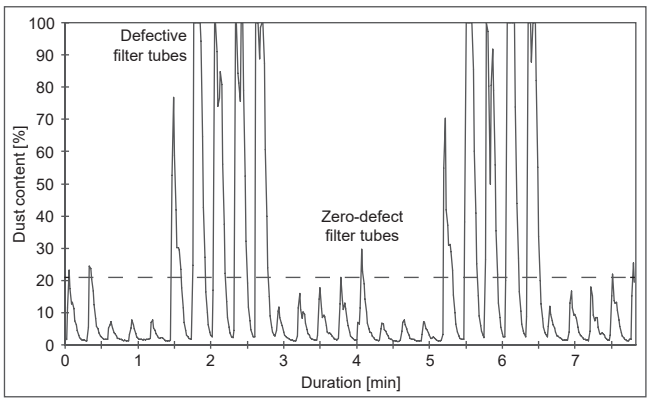
There are more than 10,000 pcs of Dr. Födisch AG filter monitor devices operating worldwide i.a.:

- 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 13 EX	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					●[1]				
Mobile use									●
Device characteristics									
Measuring principle:									
• Tribo-electric	●	●	●	●	●	●	●	●	●
Measuring arrangement:									
• In-situ	●	●	●	●	●	●	●	●	●
• Extractive									
Process connection:									
• Sleeve	●[2]	●[2]	●[2]	●[2]	●	●	●	●[2]	●[2]
• 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	●	●[3]	●[3]	●[3]	●	●		●	●
• Isolated piping	●	●	●	●	●	●		●	
Measuring components									
Dust	●	●	●	●	●	●	●	●	●

[1] *as special model PFM 02 T*
[2] *customisation via adapter*
[3] *probe rod length 300 mm or 500 mm (= immersion depth 410 mm resp. 610 mm)*

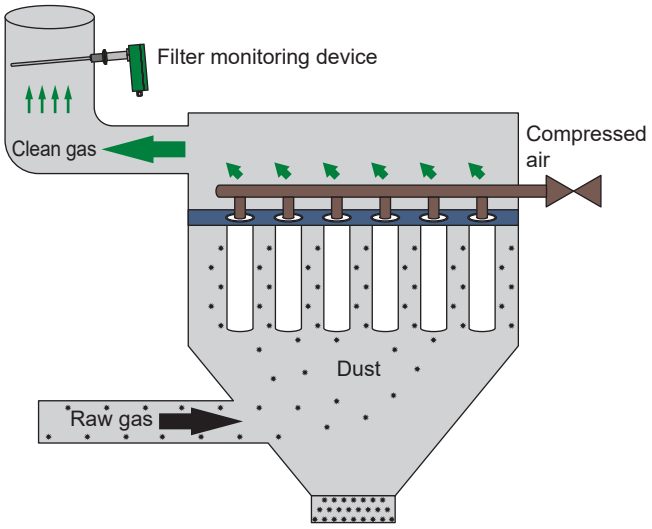
Filter monitoring device PFM 92 C

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 a filter monitoring device it is an effective implement to detect and localise damages to filtering precipitators at an early stage. Configured as a dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

INSTALLATION EXAMPLE



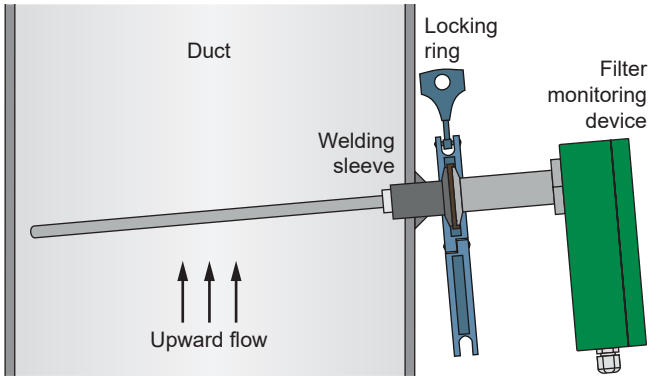
YOUR BENEFITS AT A GLANCE

- 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

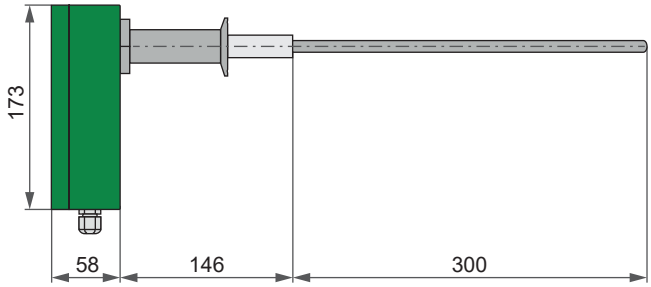
PRECONDITIONS ON SITE

- 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 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 switch-on of power supply
Calibration:	by gravimetric comparison measurements (for trend measurement and filter analysis not required)
Analogue output:	4...20 mA, 4-wire transmitter, not galvanically isolated (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

Special models are possible on request.

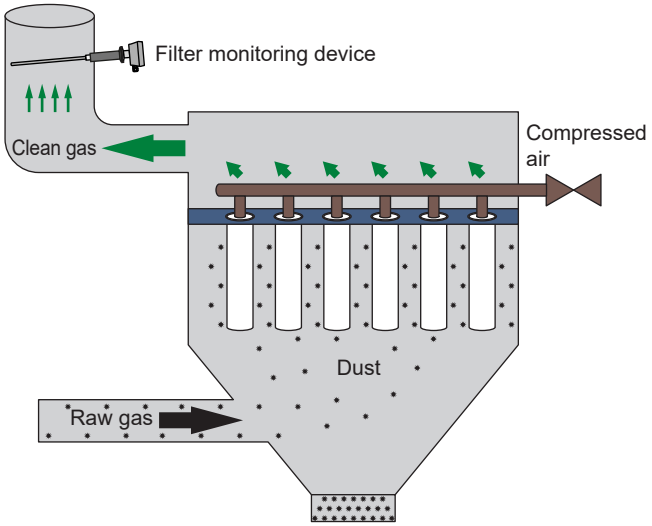
Filter monitoring device PFM 13

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 a filter monitoring device it is an effective implement to detect and localise damages to filtering precipitators at an early stage. Configured as a dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

INSTALLATION EXAMPLE



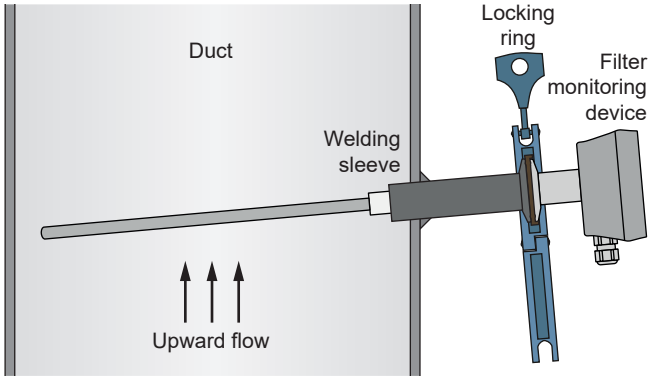
YOUR BENEFITS AT A GLANCE

- 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

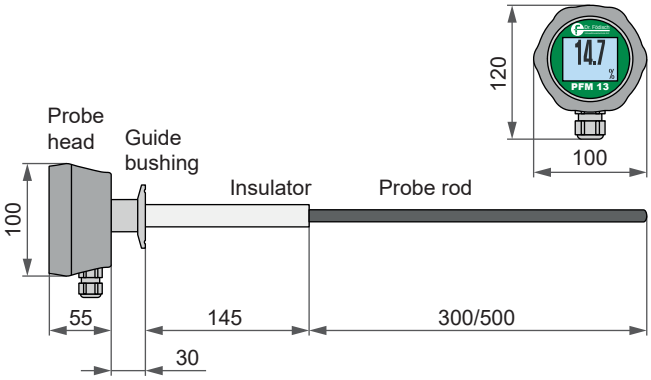
PRECONDITIONS ON SITE

- 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 analysis 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:	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

Special models are possible on request.

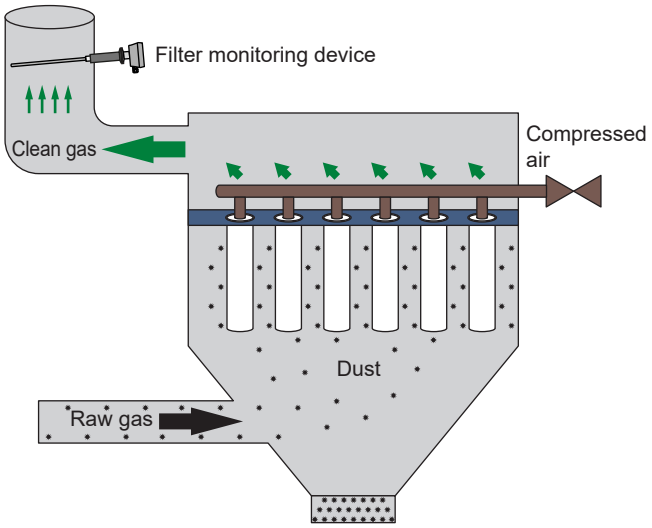
Filter monitoring device PFM 13 C

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 a filter monitoring device it is an effective implement to detect and localise damages to filtering precipitators at an early stage. Configured as a dust measuring device it can be used for continuous monitoring of clean gas contents and dust contents of filtering precipitators.

INSTALLATION EXAMPLE



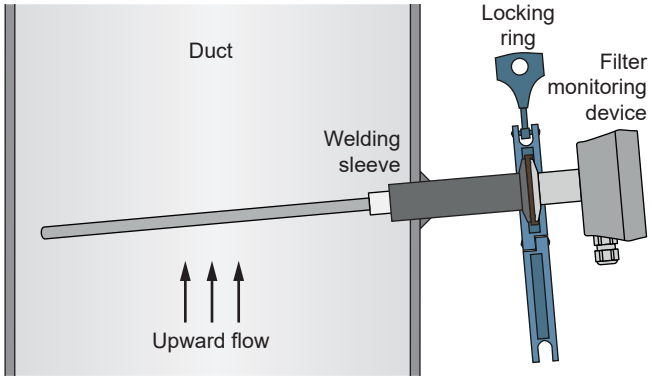
YOUR BENEFITS AT A GLANCE

- 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

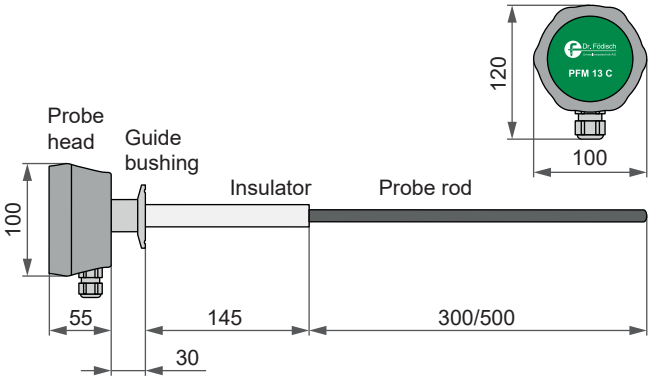
PRECONDITIONS ON SITE

- 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 analysis not required)
Analogue output:	4...20 mA, 2-wire transmitter, galvanically isolated to device ground, burden max. 480 Ω
Process connection:	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

Special models are possible on request.

Filter monitoring device PFM 13 C EX

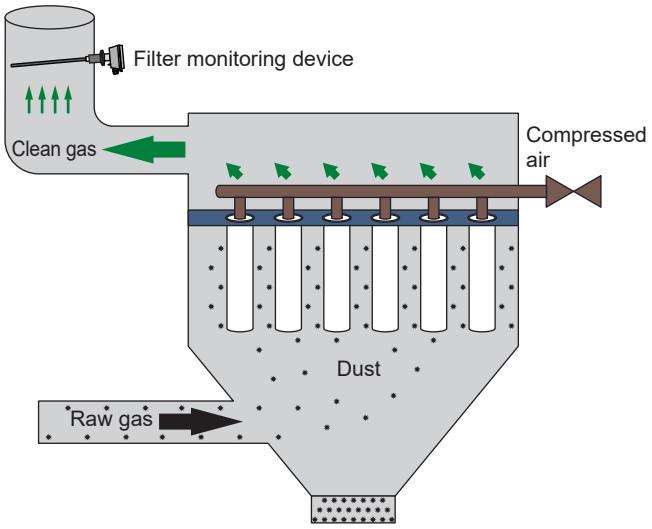
Highly sensitive system for continuous, tribo-electric in-situ measurement in potentially explosive atmospheres

- EC-type examination certificate according to EN 60079, ATEX directive (IBExU19ATEXB008X)
- approved for Ex II 3D Ex ic tc IIIC T80°C Dc X

APPLICATION

The PFM 13 C EX 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



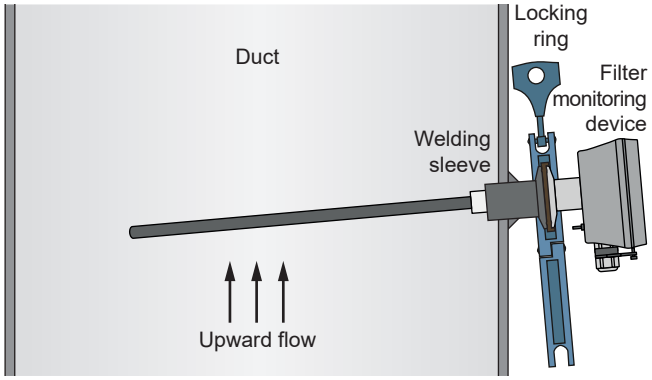
YOUR BENEFITS AT A GLANCE

- 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

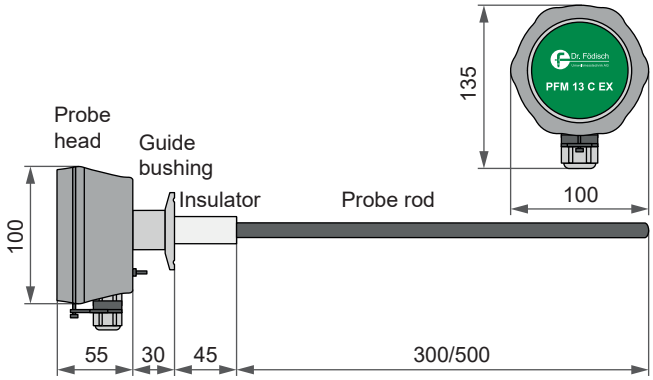
PRECONDITIONS ON SITE

- 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



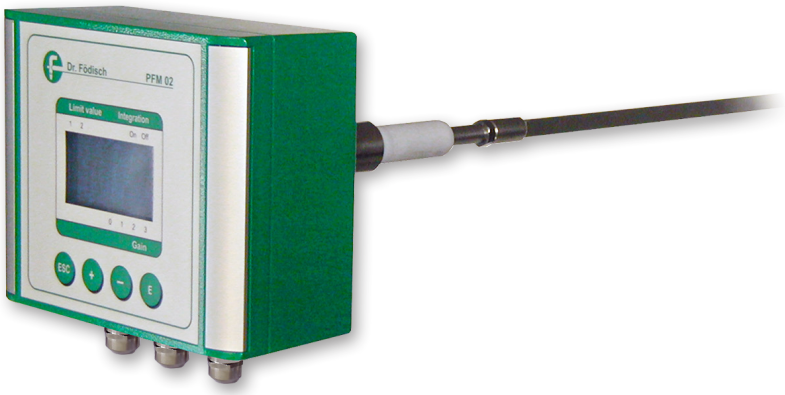
TECHNICAL DATA

Housing:	compact device; IP 65; protection class 1
Dimensions:	approx. 100 mm x 135 mm x 430/630 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. 310/510 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. 260 °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 analysis not required)
Analogue output:	4...20 mA, 2-wire transmitter, galvanically isolated to device ground, burden max. 480 Ω
Process connection:	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

Special models are possible on request.

Filter monitoring device PFM 02

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

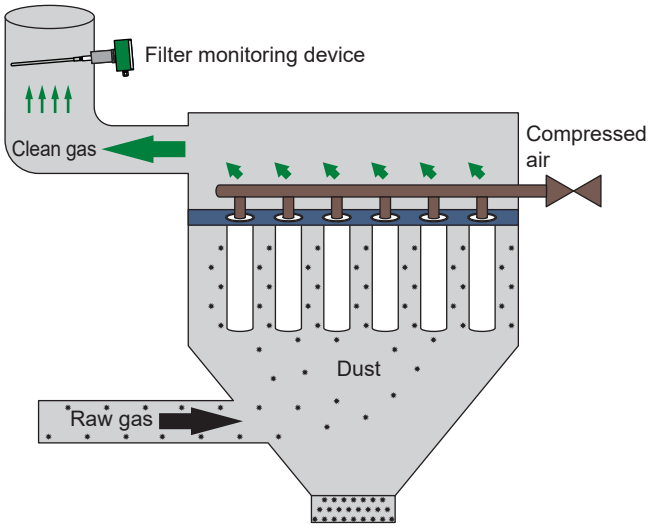


APPLICATION

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



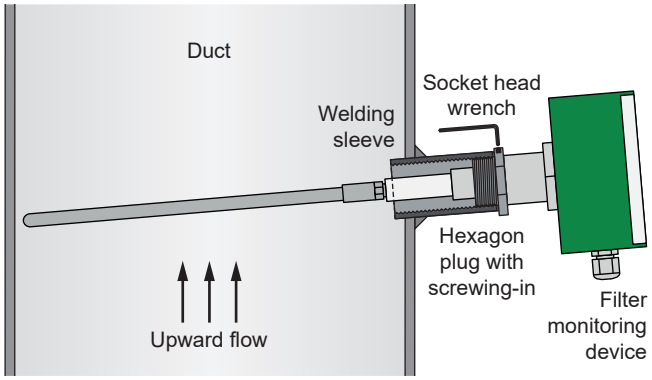
YOUR BENEFITS AT A GLANCE

- 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/m³
- target value calibration possible
- no purge air blower required
- low operational costs
- easy mounting

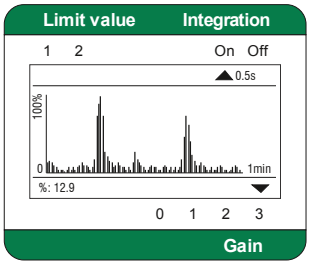
PRECONDITIONS ON SITE

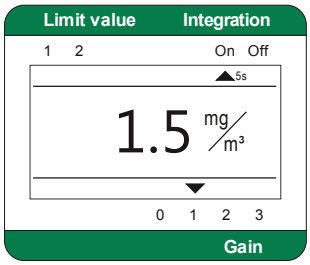
- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

PROCESS CONNECTION



DISPLAY AS GRAPHIC & TEXT MODE





TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65, protection class 1
Dimensions:	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 analysis 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

Special models are possible on request.

Filter monitoring device PFM 02 EX

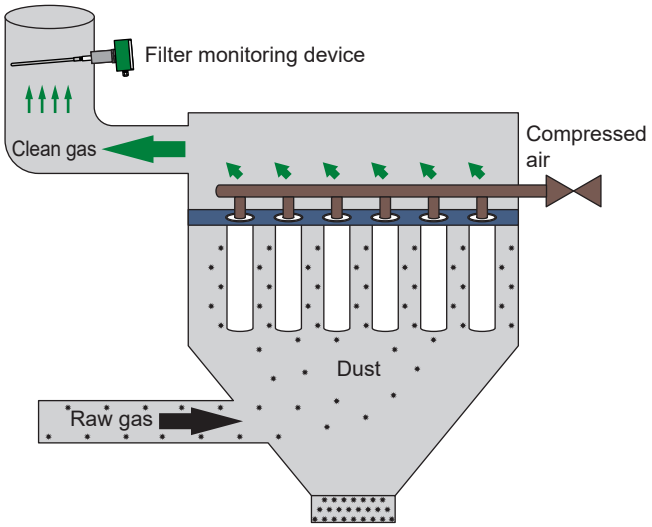
Continuous, tribo-electric in-situ measurement in potentially explosive atmospheres

- 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 a filter monitoring device as well as configured as a dust measuring device in potentially explosive atmospheres.

INSTALLATION EXAMPLE



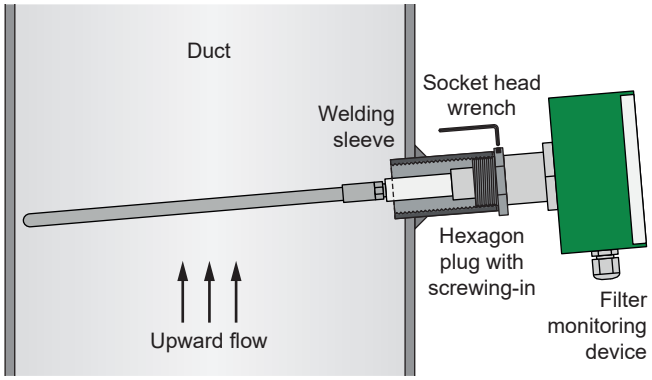
YOUR BENEFITS AT A GLANCE

- 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

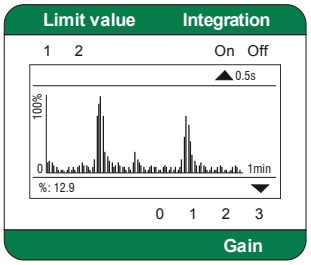
PRECONDITIONS ON SITE

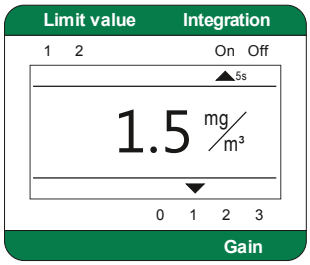
- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- power supply
- processing of measuring signals

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 analysis 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

Special models are possible on request.

Residual dust sensor PFM 02 HB

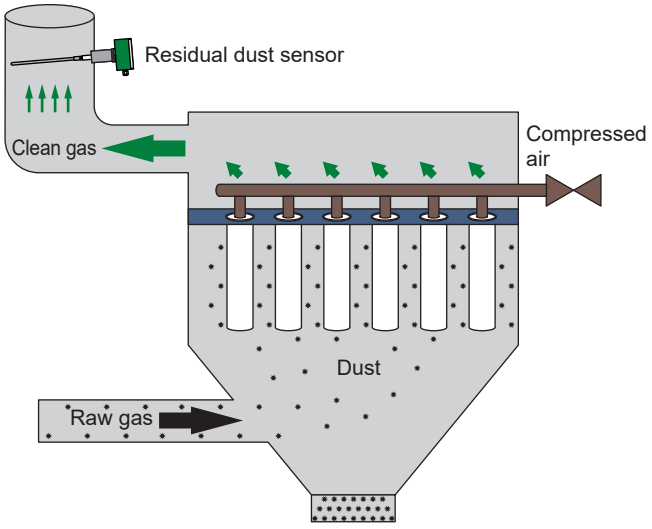
Continuous, tribo-electric in-situ filter monitoring for woodworking industry

- EC-type examination certificate according to EN ISO 13849-1
- category B, performance level Pl b
- tested safety according to DGUV test of IFA

APPLICATION

The residual dust sensor PFM 02 HB, purpose-built for the 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 Pl b according to EN ISO 13849-1.

INSTALLATION EXAMPLE



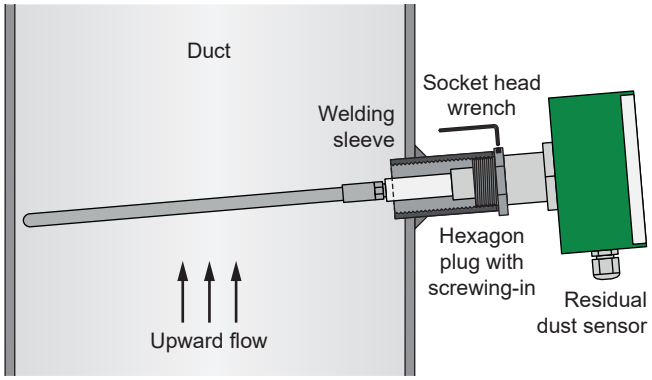
YOUR BENEFITS AT A GLANCE

- 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

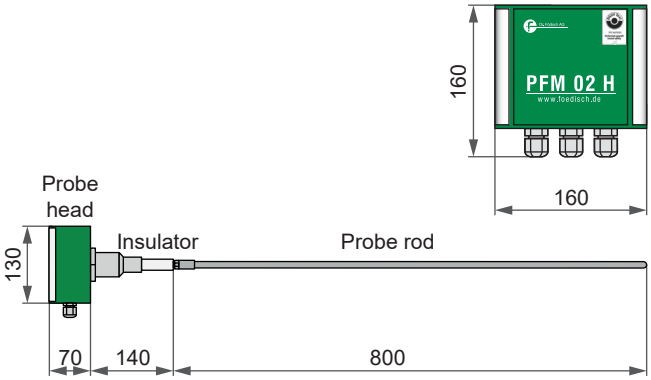
PRECONDITIONS ON SITE

- 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: • 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

Special models are possible on request.

Filter monitoring device PFM 14

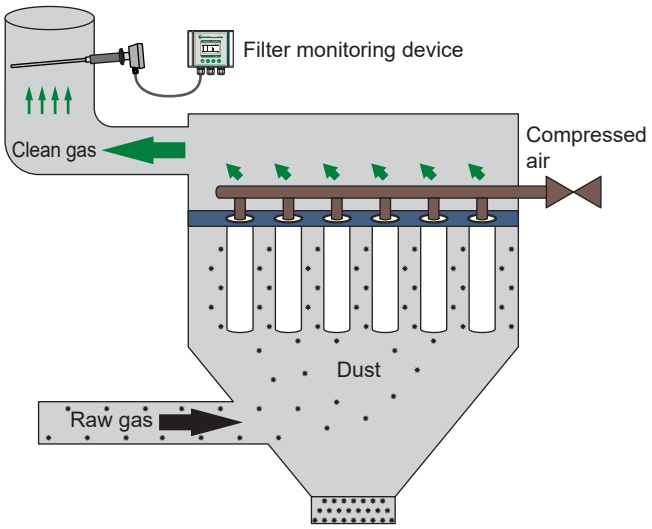
Continuous, tribo-electric in-situ measurement for qualitative monitoring of exhaust gas

APPLICATION

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

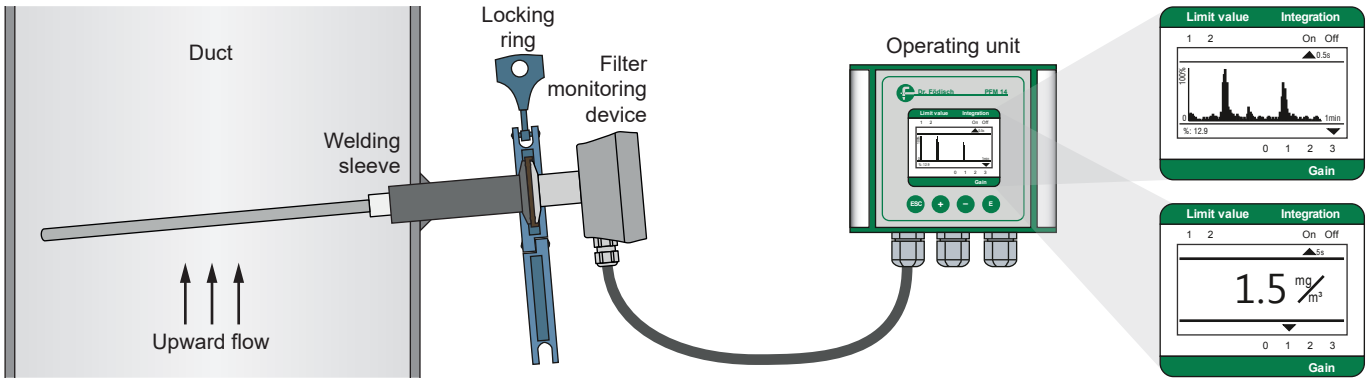
- probe with separated display and operating unit
- local diagnosis of system state by combined operating unit with graphic display
- real-time display with diagram or in text mode with display in % or mg/m³
- no purge air blower required
- low operational costs
- easy mounting

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 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 analysis 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

Special models are possible on request.

Mobile filter diagnosis device PFM 14 K

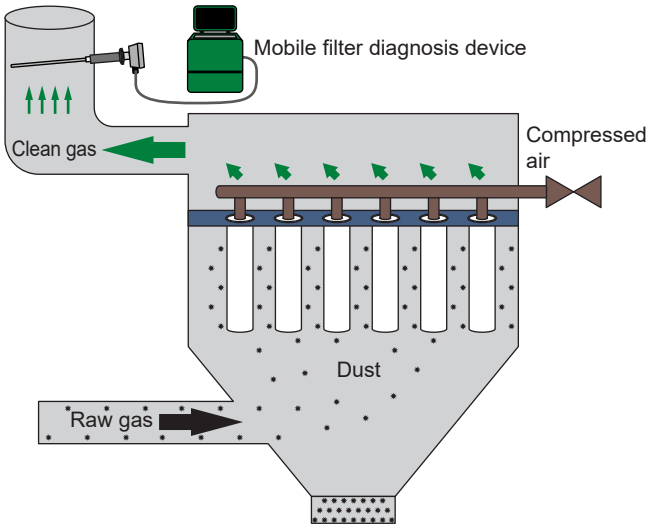
Mobile system for temporary, tribo-electric in-situ filter monitoring of exhaust gas

APPLICATION

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

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

INSTALLATION EXAMPLE



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

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/m³ (0...1000 mg/m³, 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 analysis 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

Special models are possible on request.

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 a 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 of 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 the case of wet gases saturated with water vapour, the existing water droplets and aerosols also create 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.

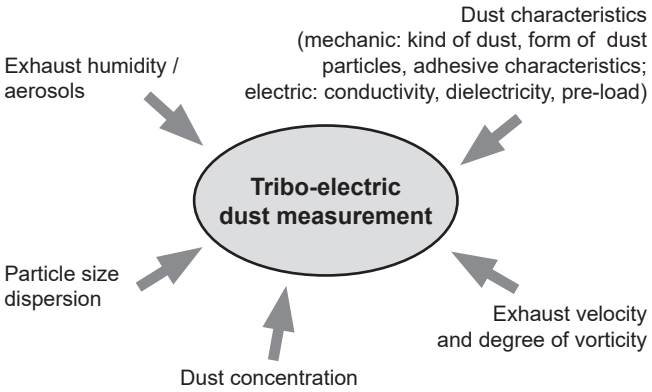
The process-related restrictions have substantial influence over the choice of the measurement method.

Dust concentration measuring devices are mainly applied in:

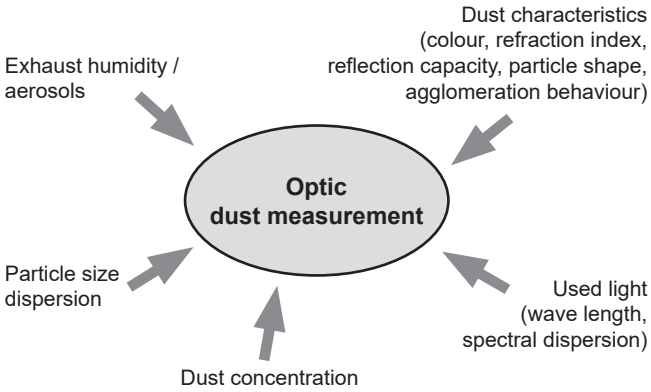
- coal-fired power plants
- biomass power plants
- energy-from-waste plants
- incinerators

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



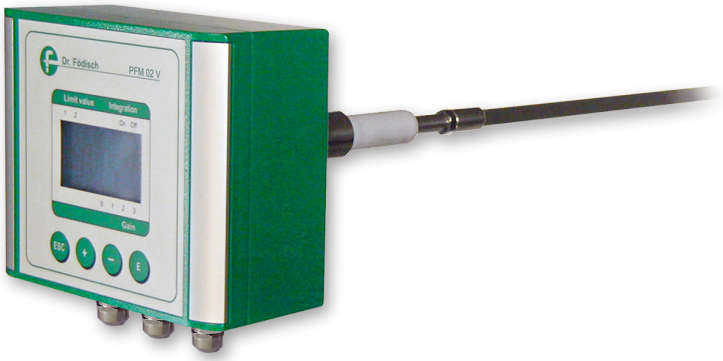
Dust measuring devices by comparison

	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			●[1]		
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	●[2]	●	●		
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	●[3]			●	●
Temperature	●[3]			●	●
Pressure				●	●
Humidity				●	●

[1] suitability tested according to EN 15267-3, certified in compliance with QAL1
[2] on request as special model
[3] in combination with flow measuring device FMD 02 / FMD 09

Dust measuring device PFM 02 V

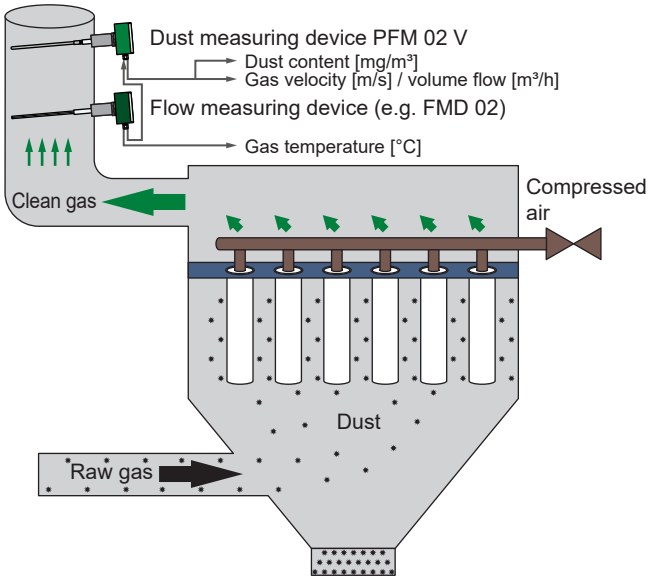
Continuous, tribo-electric monitoring of dust concentration in exhaust gas



APPLICATION

The PFM 02 V is a highly sensitive system for continuous measurement of dust concentrations. Since velocity is 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.

INSTALLATION EXAMPLE



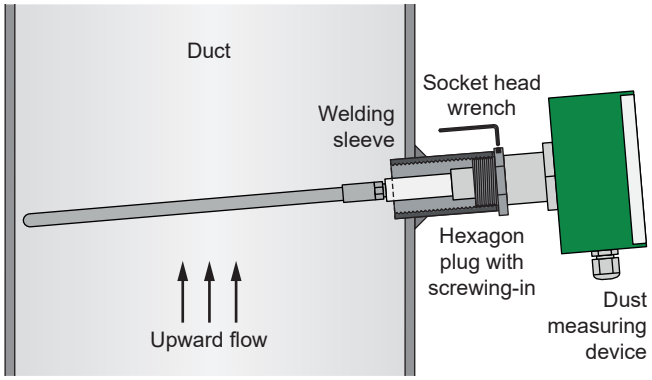
YOUR BENEFITS AT A GLANCE

- 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/m³
- input for velocity signal (in case of optional additional device)

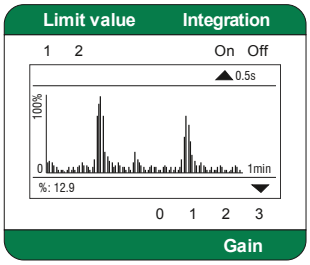
PRECONDITIONS ON SITE

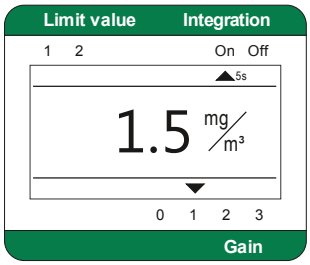
- ambient temperature: -20...+50 °C
- location free of percussion
- homogenous dust and stack gas distribution
- flow velocity of min. 3 m/s
- dew-point spread: min. +5 K
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter

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 analysis 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
Special models are possible on request.	

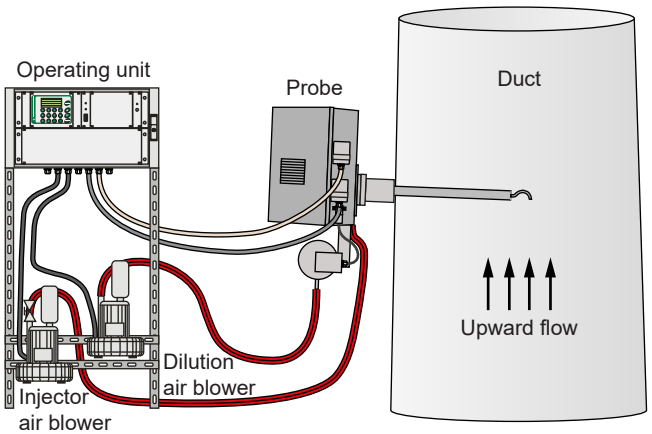
Dust concentration measuring device PFM 97 ED

Continuous, tribo-electric extractive measurement of dust contents in wet and sticky exhaust gases

APPLICATION

The measuring gas is sampled by a temperature-controlled probe, conveyed to a measuring cell and continuously diluted and dried with hot and dust-free ambient air. Inside the measuring cell the diluted measuring gas is gathered by means of tribo-electric probes. The dust-proportional signal is converted by the microcontroller integrated in the device to determine the dust content of the exhaust.

INSTALLATION EXAMPLE



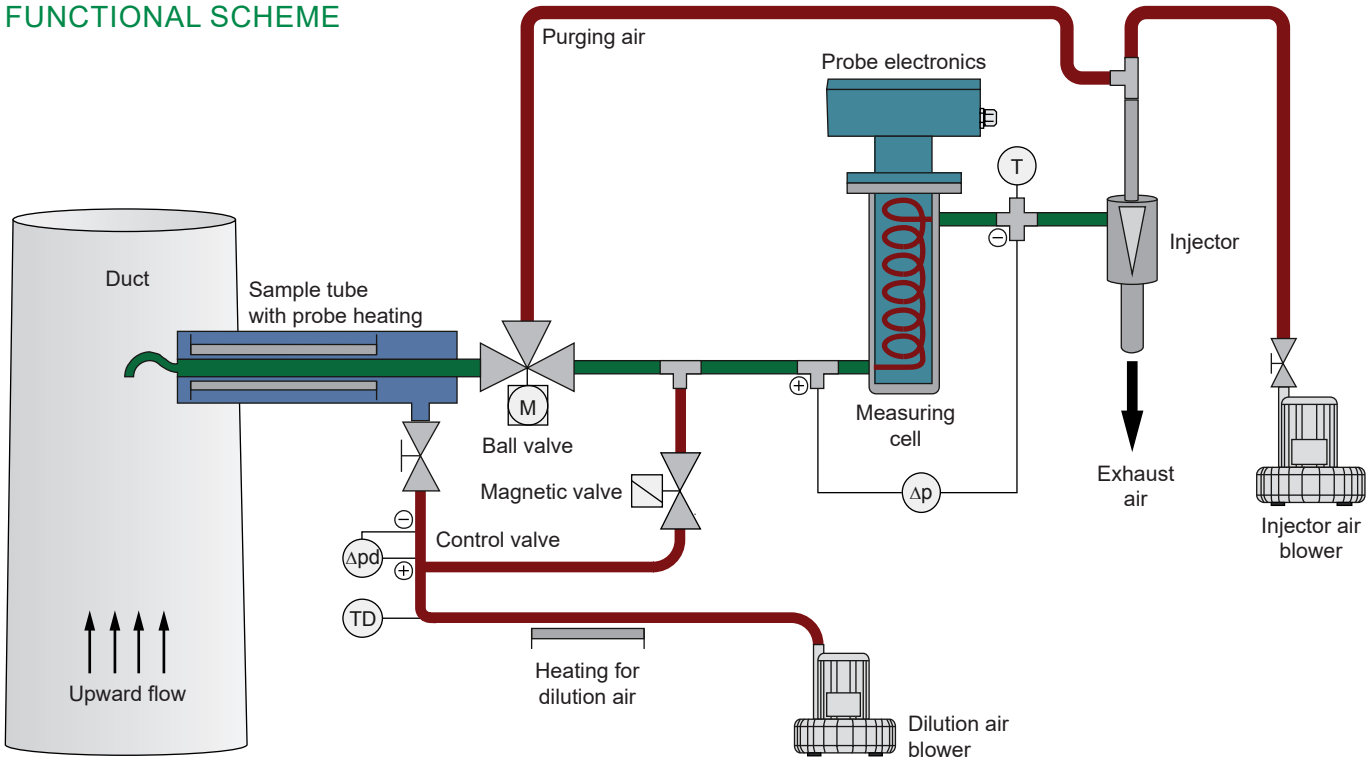
YOUR BENEFITS AT A GLANCE

- special device consisting of probe and operating unit
- relatively small required space
- compact device → only 1 sample fitting with integrated or separated return fitting necessary
- display option in mg/m³ by input of calibration parameters

PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: max. 90% (non-condensing)
- location free of percussion
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter

FUNCTIONAL SCHEME



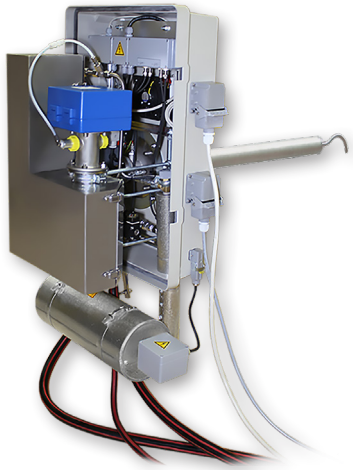
TECHNICAL DATA

Probe:	extractive sampling with GRP weather protection casing, IP55; approx. 610 mm x 1050 mm x 1500 mm (w x h x d), approx. 45 kg; immersion depth: max. 1000 mm; probe cable length max. 25 m
Operating unit:	steel sheet housing on profile rack (incl. blowers), IP65; approx. 600 mm x 1760 mm x 670 mm (w x h x d), approx. 90 kg; cable length max. 25 m
Display / Operating:	4-line LC display with operating keys, key switch and RS232 interface
Media temperature:	max. 280 °C (higher temperatures on request)
Exhaust humidity:	rel. humidity: 100%
Flow of measuring gas:	6...12 m³/h (sucked measuring gas and dilution air)
Pressure on ambience:	-30...+2 hPa
Measuring range:	dust i. o.: 0...15 mg/m³ (max. 500 mg/m³)
Accuracy:	± 2%
Calibration:	by gravimetric comparison measurement
Analogue outputs:	4x 4...20 mA, galvanically isolated with common ground, burden max. 1 kΩ
Digital outputs:	6x potential-free contact, max. 35 V UC, 0.4 A (for failure, maintenance, maintenance request, limit value 1 and 2, measuring range)
Digital input:	optional, external switch contact for switchover of measuring/purging
Process connection:	flange DN 80 PN 6, special design: tube Ø 100 mm
Clip contacts:	max. 2.5 mm²
Power supply:	3L, N, PE, 400 V AC 50 Hz, 4 kVA (max. 5x 4 mm²)
Special models are possible on request.	

Dust concentration measuring device PFM 06 ED

Continuous, optical extractive measurement of dust contents in wet and sticky exhaust gases

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- annual inspection



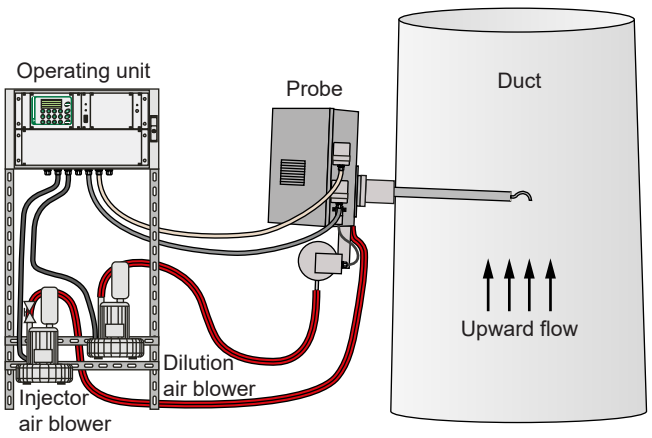
APPLICATION

The measuring gas is sampled by a temperature-controlled probe, conveyed to a measuring cell and continuously diluted and dried with hot and dust-free ambient air. For dust measurement, based on optical scattered light measurement, a laser lance unit in the measuring cell is streamed with the conditioned measuring air. In the electronics of the operating unit the signal of the optical unit is converted to an equivalent dust signal.

YOUR BENEFITS AT A GLANCE

- relatively small required space
- compact device → only 1 sample fitting with integrated or separated return fitting necessary
- display option in mg/m³ by input of calibration parameters
- isokinetic gas sampling possible

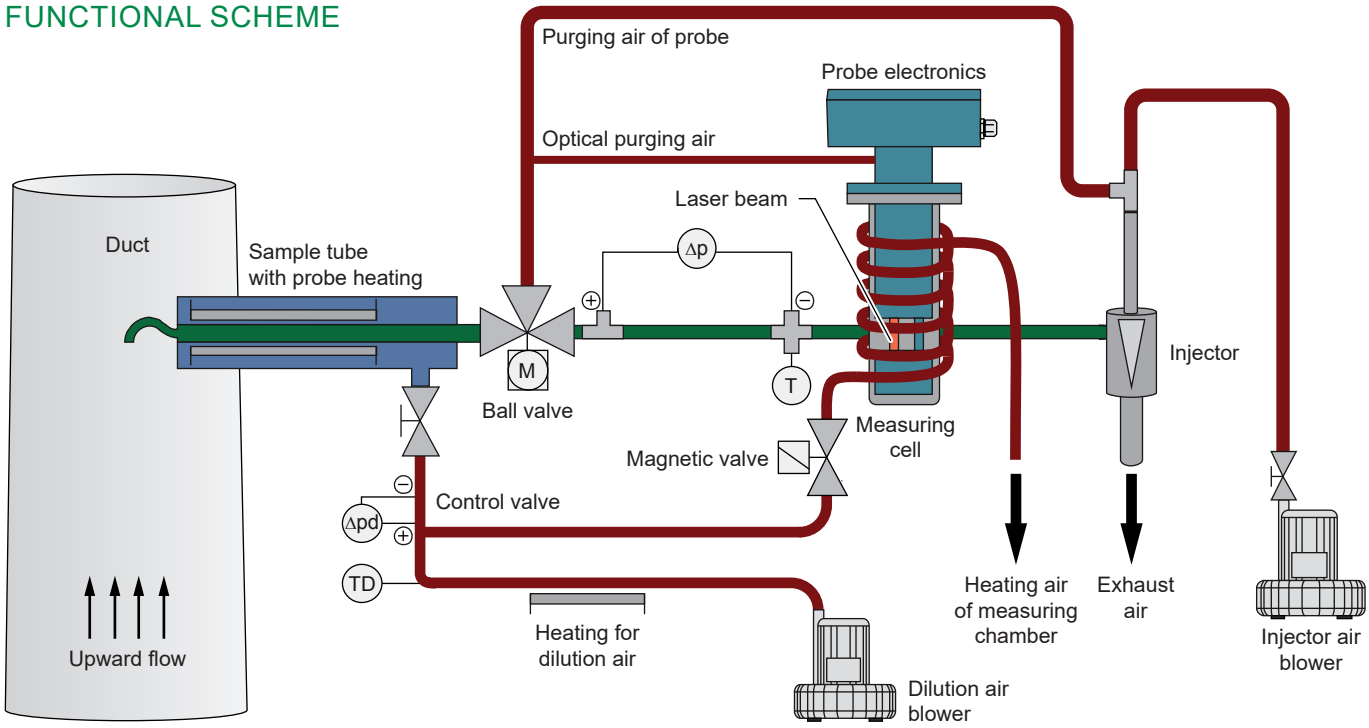
INSTALLATION EXAMPLE



PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: max. 90% (non-condensing)
- location free of percussion
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter

FUNCTIONAL SCHEME



TECHNICAL DATA

Probe:	extractive sampling with GRP weather protection casing, IP55; approx. 610 mm x 1050 mm x 1500 mm (w x h x d), approx. 65 kg; immersion depth: max. 1000 mm; probe cable length max. 25 m
Operating unit:	steel sheet housing on profile rack (incl. blowers), IP65; approx. 600 mm x 1760 mm x 670 mm (w x h x d), approx. 90 kg; cable length max. 25 m
Display / Operating:	4-line LC display with operating keys, key switch and RS232 interface
Media temperature:	max. 180 °C
Exhaust humidity:	rel. humidity: 100%
Flow of measuring gas:	6...12 m³/h (sucked measuring gas and dilution air)
Pressure on ambience:	-30...+2 hPa
Measuring range:	dust i. o.: 0...15 mg/m³ (max. 500 mg/m³)
Operational availability:	after 5 to 15 min (without preheating)
Calibration:	via gravimetric comparison measurement
Analogue outputs:	4x 4...20 mA, galvanically isolated with common ground, burden max. 1 kΩ
Digital outputs:	6x potential-free contact, max. 35 V UC, 0.4 A (for failure, maintenance, maintenance request, limit value 1 and 2, measuring range)
Digital input:	optional, external switch contact for switchover of measuring/purging
Process connection:	flange DN 80 PN 6, special design: tube Ø 100 mm
Clip contacts:	max. 2.5 mm²
Power supply:	3L, N, PE, 400 V AC 50 Hz, 4 kVA (max. 5x 4 mm²)
Special models are possible on request.	

Gravimetric measuring system GMD 12

Compact and high-grade automated system for isokinetic gravimetric dust measurement in exhaust ducts and stacks

APPLICATION

The gravimetric measuring device GMD 12 has the ability to measure all marginal parameters which are necessary for dust measurement (e.g. humidity of measuring gas, velocity in exhaust duct as well as temperature and pressure) on its own.

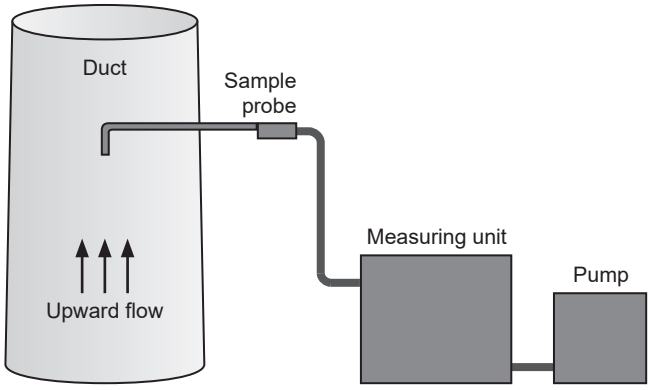
The GMD 12 consists of:

- measuring unit
- pump
- sample probes (dust probe, humidity probe)
- special accessories (e.g. filters)

YOUR BENEFITS AT A GLANCE

- semi-automatic measuring system
- easy and safe handling of the complete system by separately portable cases
- easy, menu-driven operating
- selection of the appropriate sample nozzle is assisted by the measuring unit
- storage of the current measuring values during measurement for future analysis
- ergonomic sample probe with integrated aerosol filter
- data transfer via compact flash memory card or RS232 interface

INSTALLATION EXAMPLE



PRECONDITIONS ON SITE

- ambient temperature: 0...50 °C
- location free of percussion
- dew-point spread: min. +5 K
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- accessibility to power supply
- socket with 3" welding sleeve at the duct

SAMPLE PROBES

Dust probe

Humidity probe

FUNCTION

By means of the GMD 12 the measuring gas velocity, the measuring gas pressure and the sampled measuring gas volume are registered. Besides, the measuring gas humidity can be measured by a separate sample probe. Consequently, all relevant parameters for determination of dust content are registered by the system on standard conditions and the measuring gas sampling is regulated in fully automatic and isokinetic way.

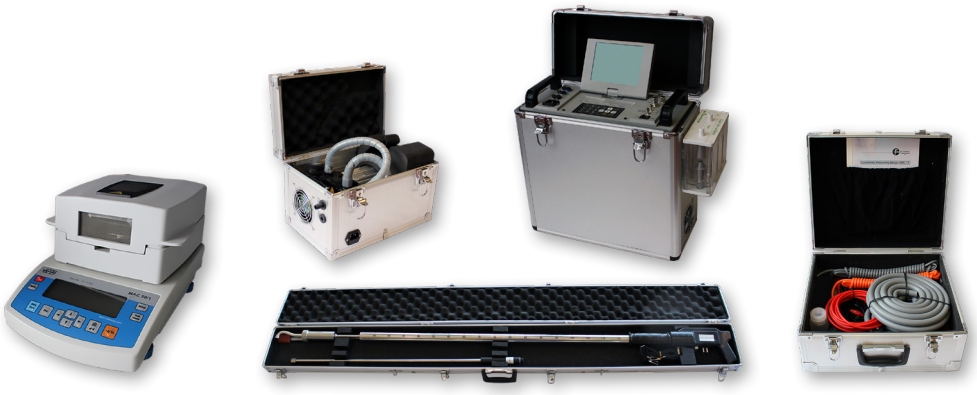
TECHNICAL DATA

Measuring unit:	case model, 500 mm x 440 mm x 190 mm (w x h x d), approx. 13 kg
Pump:	case model, 350 mm x 240 mm x 220 mm (w x h x d), approx. 12 kg
Sample probes:	case with dust and humidity probe, 1570 mm x 120 mm x 230 mm (w x h x d), approx. 6 kg; max. cable length / max. distance to measuring unit: 5 m • dust probe: length: 1550 mm; immersion depth: max. 1350 mm • humidity probe: length: 950 mm; immersion depth: max. 650 mm
Accessories:	all necessary cables, hoses, filter elements as well as thermal printer; case with accessories: 410 mm x 370 mm x 210 mm (w x h x d), approx. 9 kg
Display / Operating:	pivoting graphic display integrated in the measuring unit; complete evaluation of measuring results; Languages: German, English, other optional (Latin characters)
Ambient temperature:	0...50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Optimal dust content:	0...1 g/m³
Measuring ranges:	• dynamic pressure: 0...10 hPa • static pressure: -300...+300 hPa • barometric pressure: 700...1100 hPa • volume flow rate (sampling): 5...60 l/min • temperature (previous to flowmeter): 0...95 °C • temperature (exhaust): 0...280 °C • humidity: 0...40 vol. % • response time: < 8 s
Data output:	via Compact-Flash memory card (1 GB), RS232 interface or printer
Instrumentation opening:	3“
Power supply:	230 V AC / 50 Hz, 200 W
Optional:	• special nozzles respectively sample probe for detection of dust and fine dust concentrations • special plane filter head for measurement following EN 13284-1

Special models are possible on request.

Gravimetric measuring system GMD 13

Compact and high-grade automated system for isokinetic gravimetric dust measurement – sampling and weighing in one system on site



APPLICATION

As the world-wide first measuring system the GMD 13 features an integrated hot weighing system with the possibility of evaluation on site without additional laboratory equipment. The weighing is completely controlled and evaluated by the measuring unit. Easy and safe design of the system as well as project-based software provide precise measuring results.

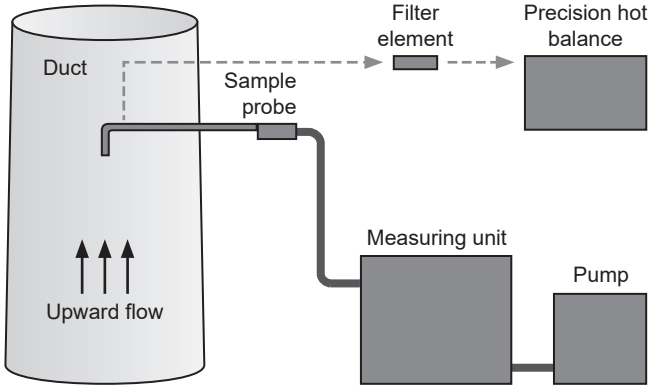
The GMD 13 consists of:

- measuring unit
- pump
- sample probes (dust probe, humidity probe)
- precision hot balance
- special accessories (e.g. filters)

YOUR BENEFITS AT A GLANCE

- weighing and evaluation with precision hot balance on site → economises transportation travelling, exsiccation and laboratory equipment (laboratory analysis additionally possible)
- easy, menu-driven operating with project-based software
- selection of the appropriate sample nozzle is assisted by the measuring unit
- storage of the current measuring values during measurement for future analysis
- data transfer via compact flash memory card
- input and processing of two measuring signals from other measuring devices

INSTALLATION EXAMPLE



PRECONDITIONS ON SITE

- ambient temperature: 0...50 °C
- location free of percussion
- measuring gas temperature max. 280 °C with optimal dust content of 1...100 mg/m³
- dew-point spread: min. +5 K
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter
- accessibility to power supply
- socket with 3" welding sleeve at the duct

FILTER ELEMENT

Filter holder | Filter | Filter holder head

HOT WEIGHING

- patented method of hot weighing of the filter
- possibility to determine the measured dust content promptly still on site
- pressed fibre glass filters, protected by a robust filter holder
- weighing of the complete filter element is admissible according to EN 13284-1 in parallel

TECHNICAL DATA

Measuring unit:	case model, 500 mm x 440 mm x 190 mm (w x h x d), approx. 13 kg
Pump:	case model, 350 mm x 240 mm x 220 mm (w x h x d), approx. 12 kg
Sample probes:	case with dust and humidity probe, 1570 mm x 120 mm x 230 mm (w x h x d), approx. 6 kg; max. cable length / max. distance to measuring unit: 5 m • dust probe: length: 1550 mm; immersion depth: max. 1350 mm • humidity probe: length: 950 mm; immersion depth: max. 650 mm
Balance:	case with precision hot balance, 240 mm x 300 mm x 430 mm (w x h x d), approx. 10 kg
Accessories:	all necessary cables, hoses, filter elements as well as thermal printer; case with accessories: 410 mm x 370 mm x 210 mm (w x h x d), approx. 9 kg
Display / Operating:	pivoting graphic display integrated in the measuring unit; complete evaluation of measuring results; Languages: German, English, other optional (Latin characters)
Weighing process:	semi-automated, weighing accuracy < 1.0 mg; expenditure of time per filter: 1st weighing approx. 5-30 min, every further weighing approx. 3-15 min
Ambient temperature:	0...50 °C
Relative humidity:	no special sensitivity
Dew-point spread:	min. +5 K
Measuring gas temperature:	max. 280 °C
Measuring ranges:	• dynamic pressure: 0...10 hPa • static pressure: -300...+300 hPa • barometric pressure: 700...1100 hPa • volume flow rate (sampling): 5...60 l/min • temperature (previous to flowmeter): 0...95 °C • temperature (exhaust): 0...280 °C • humidity: 0...40 vol. % • response time: < 8 s
Data output:	via Compact-Flash memory card (1 GB) or printer
Analogue inputs:	2x analogue input 4...20 mA for registration of the measuring values of present automatic dust measuring systems
Instrumentation opening:	3“
Power supply:	230 V AC / 50 Hz, 200 W
Optional:	• for real-time measurement of dust content: tribo-electric filter monitoring device PFM 13 • plane filter for measurement according to EN 13284-1

Special models are possible on request.

Fine dust measurement

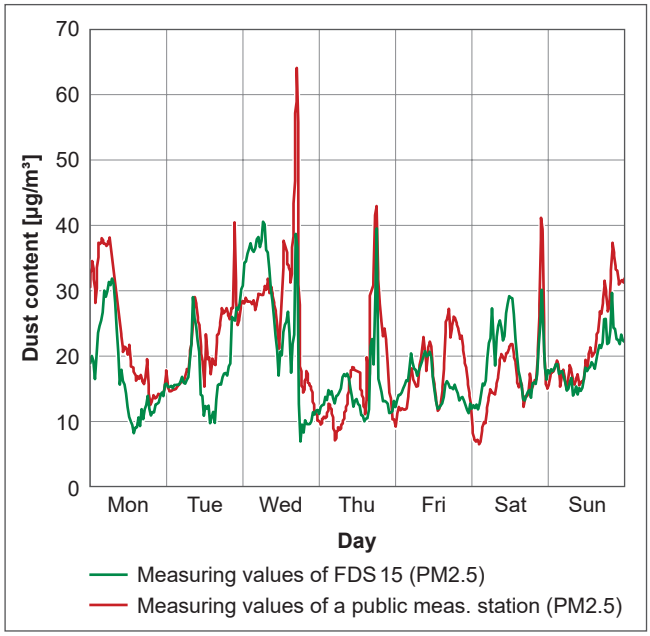
The air is the elixir of life. However, air contains impurities, whose composition and concentration vary depending on the location. Fine dust particles (PM2.5) in the air are damaging to the heart, lungs and brain. For their measurement complex and expensive measurement technology is often used. Thanks to the compact sensors of Dr. Födisch Umweltmesstechnik AG this is now history. These are low cost measuring devices for industrial applications.

Whether the application is for outdoor, indoor, stationary or mobile – the device handling is easy, the measurements are precise and independent from the weather conditions. By means of preconditioned air the particulate matter content of the air is measured every two seconds. By WLAN, the devices can be linked to other air quality / climate sensors to achieve an efficient, meaningful environmental monitoring.

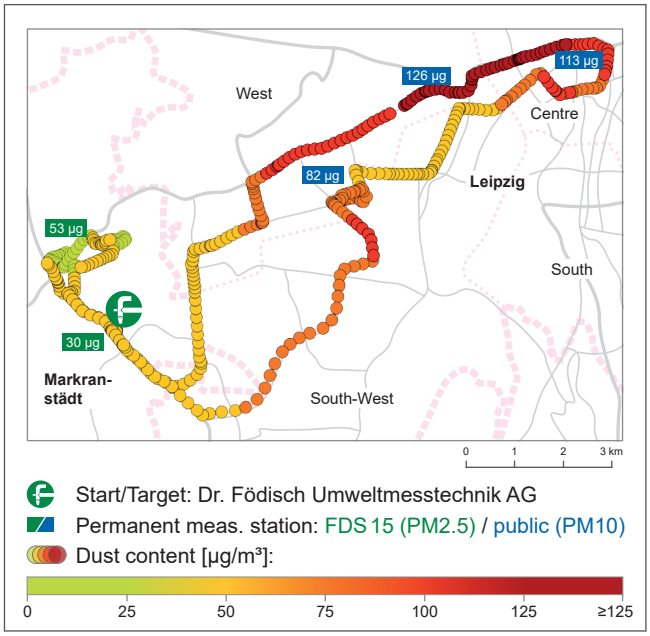
Fields of applications are:

- industrial areas, production halls and workplaces, urban areas
- ambient air monitoring, air management systems, traffic control and routing

Stationary fine dust measurement



Mobile fine dust measurement



Fine dust measuring devices by comparison

	FDS 15	FDS 17	FDS 17 m	FDS 18
Field of application				
Continuous measurement and monitoring of fine dust concentration	●	●		●
Indoor and outdoor measurement	●	●	●	●
Mobile use			●	
Device characteristics				
Measuring principle:				
• Optic (Scattered light measurement)	●	●	●	●
• Reference sensor	●	●	●	
Electrostatic precipitator	●[1]	●	●	●
Gas conditioning	●	●	●	●
Data transfer:				
• RS485 / Modbus RTU	●	●		●
• 4...20 mA current loop	●[1]	●[1]		
• WLAN module	●[1]	●[1]		
Other device features:				
• Integrated display/operating unit			●	
• Detached display/operating unit (as optional additional device)	●	●		●
• Suction from the bottom	●			●
• Suction from above (via measuring gas sampling probe)		●	●	
• Metal housing	●	●	●[2]	
• Plastic housing				●
• Power supply 100-240 V AC	●	●	●[3]	
• Power supply 12-24 V DC	●	●		●
Measuring components				
PM10/TSP		●		
PM10	●			
PM2.5	●	●		●
PM10/TSP and PM2.5 simultaneously		●	●	

[1] *optionally available*
[2] *designed as portable measuring case*
[3] *offline power supply by power bank possible*

Fine dust sensor FDS 15

Optical sensor for continuous measurement and monitoring of fine dust contents indoor and outdoor

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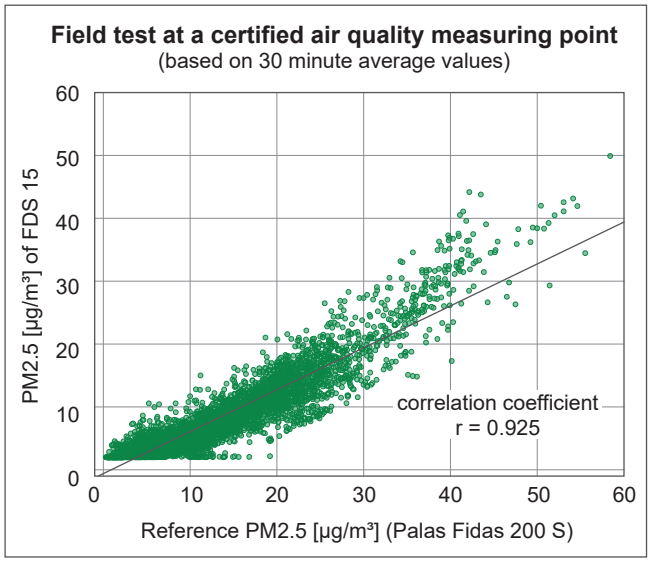
APPLICATION

The fine dust sensor FDS 15 establishes a new class of air quality monitoring – in environment as well as at work places.

Measuring value analysis via WLAN

COMPARISON MEASUREMENT



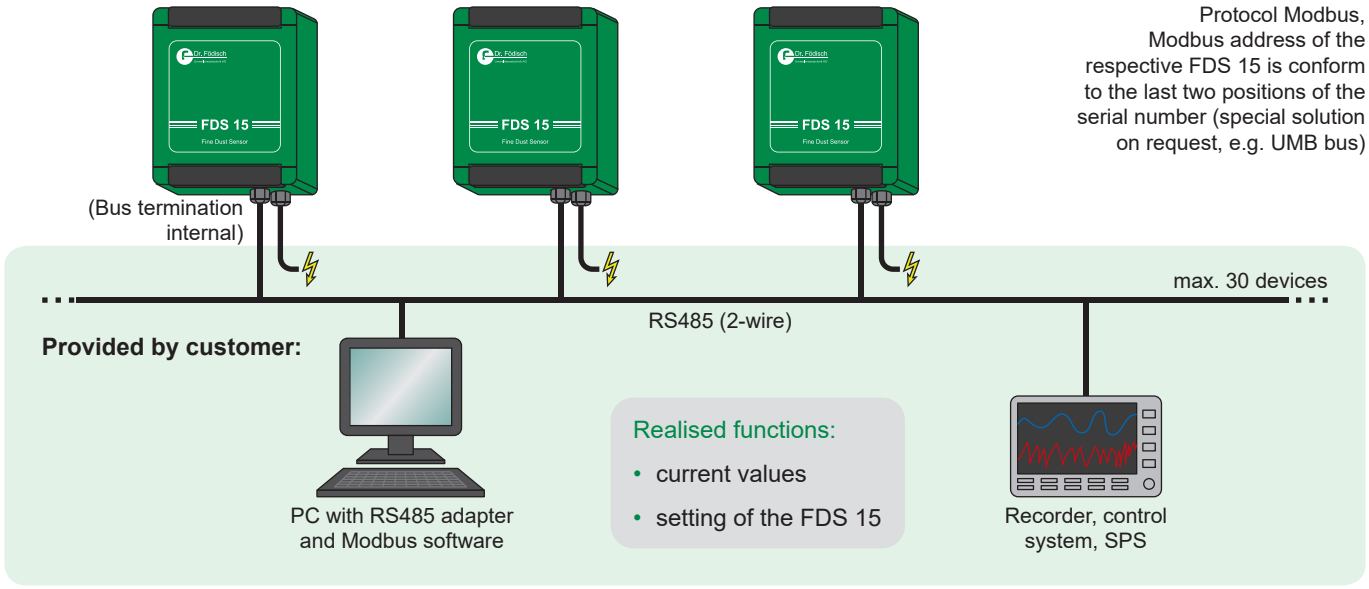
YOUR BENEFITS AT A GLANCE

- real-time measurement (PM10 or PM2.5)
- robust design
- active suction
- high accuracy through measuring gas conditioning
- long-term stability through two sensors
- cross linking of several FDS 15
- network-compatible, WLAN
- easy installation without special tool
- low operational costs
- patented electrostatic precipitator for zero point setting (optional)

PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: 0…95%
- place with representative dust loading
- protection against draught
- no direct solar radiation
- location free of percussion
- power supply
- signal connection (Modbus / mA / WLAN)

INSTALLATION EXAMPLE



TECHNICAL DATA

Housing:	compact sensor housing made of aluminium; IP33
Dimensions:	130 mm x 160 mm x 90 mm (w x h x d)
Weight:	approx. 2 kg
Ambient temperature:	-20...+50 °C
Relative humidity:	0...95%
Measuring method:	scattered light measurement
Average dust contents:	up to 200 µg/m³ (with electrostatic precipitator up to 500 µg)
Detection limit:	2 µg/m³
Flow:	2 l/min
Sensors:	2x optical sensor; separated control and signal evaluation
Zero point setting:	automatic, interval 2-8 h (optional by internal electrostatic precipitator with high voltage module, approx. 10 kV)
Fan:	for flow enforcement
Heating:	for conditioning of measuring gas (compliance with the dew-point spread), integrated over temperature protection
Interface:	RS485 (Modbus)
Clip contacts:	max. 0.5 mm; power supply connection: max. 2.5 mm
Power supply:	100-240 V AC, 0.7 A, 50-60 Hz (optional 12-24 V DC, 2.1 A); pre-fuse min. 5 A
Optional:	• 4...20 mA current loop • WLAN module • pre-separator with regulated heating • electrostatic precipitator

Special models are possible on request.

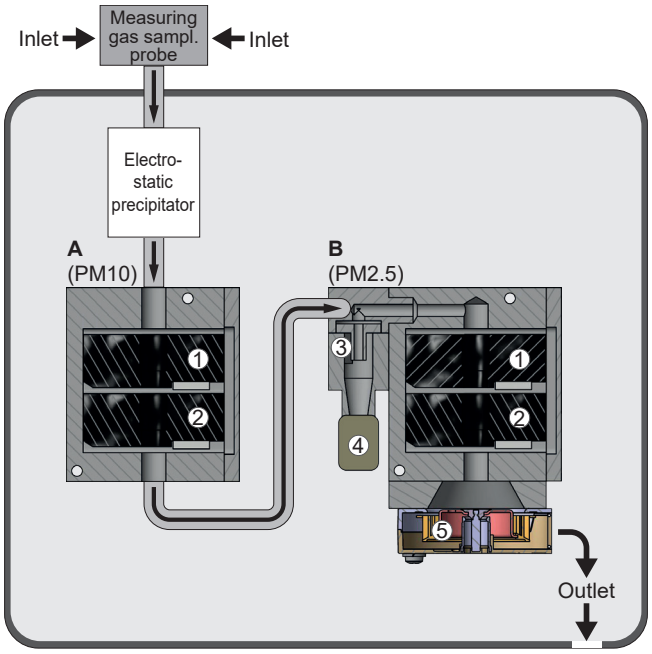
Fine dust sensor FDS 17

Optical sensor for continuous, simultaneous measurement and monitoring of fine dust contents PM10 and PM2.5 indoor and outdoor

SCHEMATIC DESIGN

A Sensor module for measurement of PM10
B Sensor module for measurement of PM2.5

1 Measuring sensor
2 Reference sensor
3 Pre-separator
4 Residual dust reservoir
5 Fan



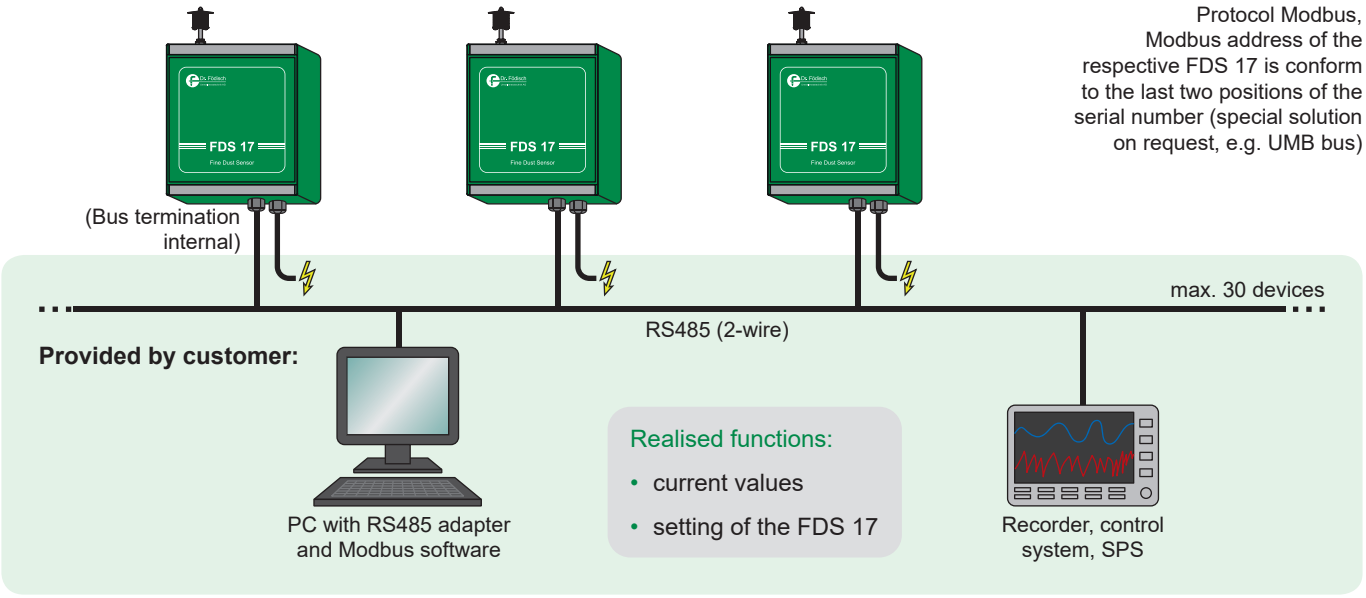
YOUR BENEFITS AT A GLANCE

- simultaneous real-time measurement of PM10/ TSP and PM2.5
- patented electrostatic precipitator for zero point setting
- robust design
- active suction
- long-term stability
- cross linking of several FDS 17
- network-compatible, WLAN
- easy installation without special tool
- low operational costs

PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: 0…95%
- place with representative dust loading
- protection against draught
- no direct solar radiation
- location free of percussion
- power supply
- signal connection (Modbus / mA / WLAN)

INSTALLATION EXAMPLE



TECHNICAL DATA

Housing:	compact sensor housing made of aluminium; IP33
Dimensions:	200 mm x 313 mm x 121 mm (w x h x d)
Weight:	approx. 4 kg
Ambient temperature:	-20...+50 °C
Relative humidity:	0...95%
Measuring method:	scattered light measurement
Average dust contents:	up to 500 µg/m³ (max. 2000 µg/m³)
Detection limit:	2 µg/m³
Flow:	2 l/min
Sensors:	2x sensor module with two optical sensors for each; separated control and signal evaluation
Zero point setting:	automatic by internal electrostatic precipitator with high voltage module, approx. 10 kV; interval 2-8 h
Fan:	for flow enforcement
Heating:	for conditioning of measuring gas (compliance with the dew-point spread), integrated over temperature protection
Interface:	RS485 (Modbus)
Clip contacts:	max. 0.5 mm; power supply connection: max. 2.5 mm
Power supply:	100-240 V AC, 0.7 A, 50-60 Hz (optional 12-24 V DC, 2.1 A); pre-fuse min. 5 A
Optional:	• 4...20 mA current loop • WLAN module

Special models are possible on request.

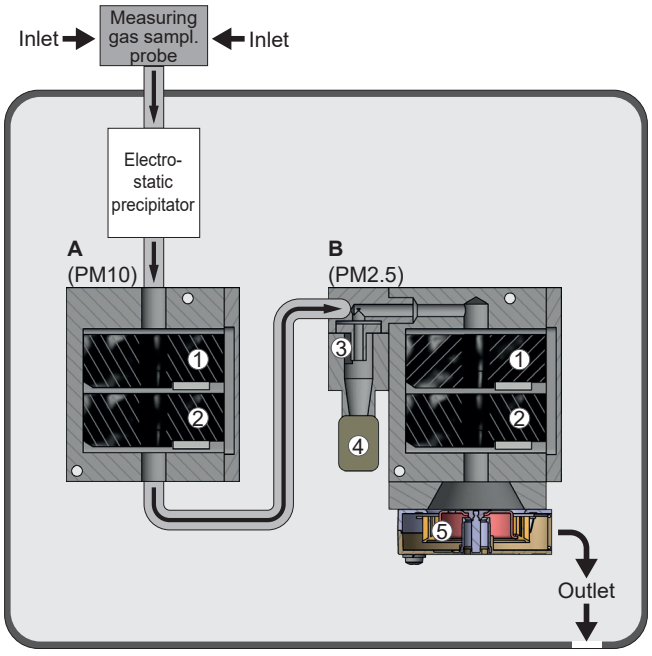
Mobile fine dust sensor FDS 17 m

Portable measuring case with optical sensor for simultaneous measurement and monitoring of fine dust contents PM10 and PM2.5 indoor and outdoor

SCHEMATIC DESIGN

A Sensor module for measurement of PM10
B Sensor module for measurement of PM2.5

1 Measuring sensor
2 Reference sensor
3 Pre-separator
4 Residual dust reservoir
5 Fan



YOUR BENEFITS AT A GLANCE

- simultaneous real-time measurement of PM10/ TSP and PM2.5
- patented electrostatic precipitator for zero point setting
- mobile use through design as portable case
- offline power supply by power bank
- data logger for storage of measuring values
- robust design
- active suction
- long-term stability
- easy installation without special tool
- low operational costs

PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: 0…95%
- place with representative dust loading
- protection against draught
- no direct solar radiation
- location free of percussion

APPLICATION

By means of the FDS 17 m it is possible to determine the current particulate matter concentration of the environment by simultaneous measurement of PM10 and PM2.5 and to make out health hazards.

APPLICATION EXAMPLES

- temporary monitoring of air quality (ambient air near industrial areas etc.)
- temporary monitoring of fine dust in the range of production (workshops, factory buildings etc.)
- temporary monitoring of room air quality in offices and public institutions (hospitals, schools etc.) or in the private domain

FUNCTION

The determination of the dust content in the FDS 17 m is based on the method of scattered light measurement.

After the fine dust of the ambient air has entered the device via the measuring gas sampling probe and has passed the electrostatic precipitator, the fine dust concentrations for PM10 and PM2.5 are measured in succession by the respective sensor module. For the analysis of alveolar particle fractions (PM2.5) an integrated pre-separator with residual dust reservoir is used.

In the device there is a periodic control and correction of zero point and reference point which is enabled by the electrostatic precipitator with integrated high voltage module. A high zero point stability is achieved by evaluation of the internal measuring signals.

TECHNICAL DATA

Housing:	complete measuring system designed as portable measuring case; IP33
Dimensions:	300 mm x 365 mm x 220 mm (w x h x d)
Weight:	approx. 7.5 kg
Ambient temperature:	-20...+50 °C
Relative humidity:	0...95%
Measuring method:	scattered light measurement
Average dust contents:	up to 500 µg/m³ (max. 2000 µg/m³)
Detection limit:	2 µg/m³
Flow:	2 l/min
Sensors:	2x sensor module with two optical sensors for each; separated control and signal evaluation
Zero point setting:	automatic by internal electrostatic precipitator with high voltage module, approx. 10 kV; interval 2-8 h
Fan:	for flow enforcement
Heating:	for conditioning of measuring gas (compliance with the dew-point spread), integrated over temperature protection
Display / Operating:	touch panel with 7“ display, 800 x 480 Pixel; language selection: German, English
Data storage:	internal data logger with real-time clock for automatic storage of measuring values
Interface:	USB connection for data exchange and updating of internal data logger
Power supply:	by delivered power cord, 100-240 V AC, 0.7 A, 50-60 Hz; offline power supply by embedded power bank possible (operation time: approx. 6 h)

Special models are possible on request.

Fine dust sensor FDS 18

Optical sensor for continuous measurement and monitoring of fine dust contents PM2.5 for immission control in the environment

APPLICATION

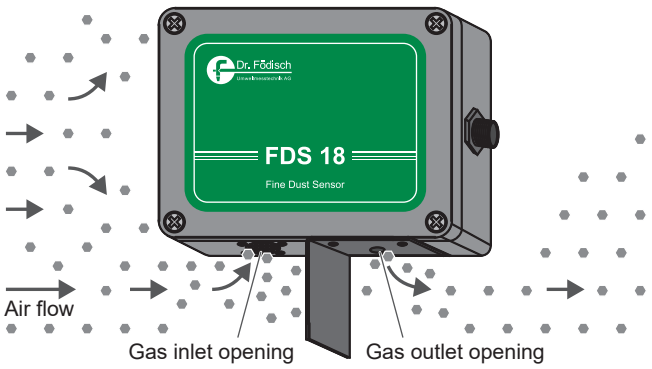
By means of the FDS 18 it is possible to determine the current particulate matter concentration of the environment and make out health hazards.

The continuous monitoring of the air quality is usable indoor and outdoor in the environment and at work places.

YOUR BENEFITS AT A GLANCE

- real-time measurement of PM2.5 for continuous monitoring of air quality
- active suction
- pre-separation for particles bigger than 2.5 µm
- patented electrostatic precipitator for zero point setting
- network-compatible
- easy installation without special tool
- long-lasting components

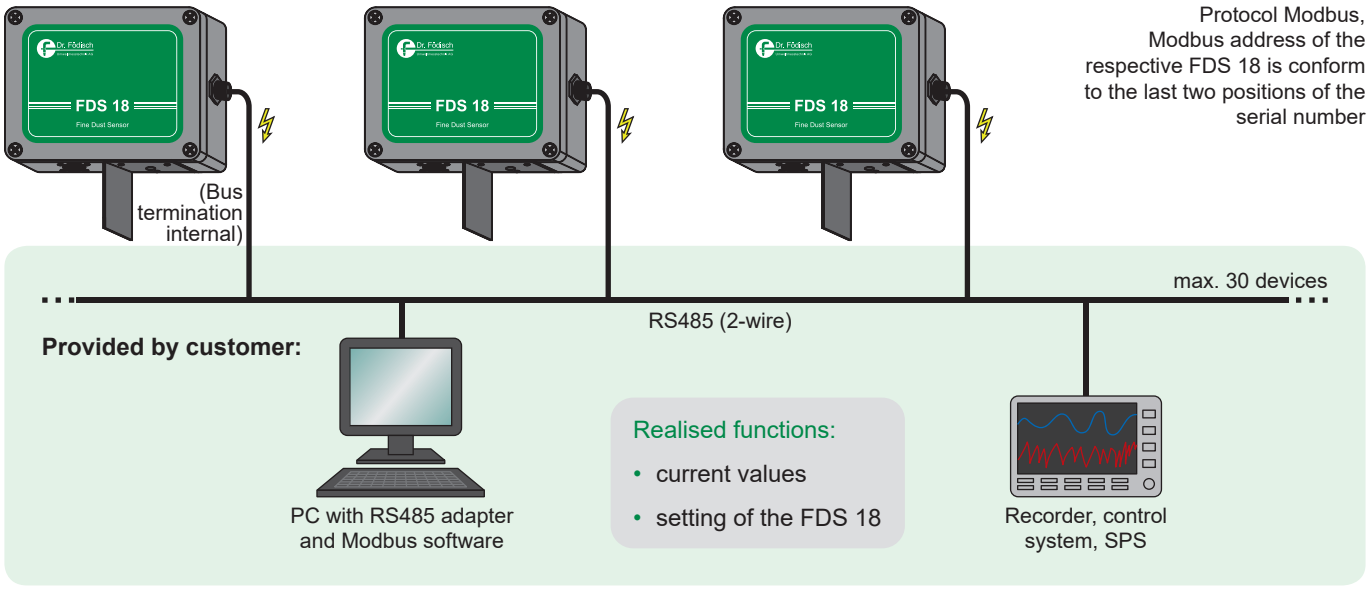
SCHEME OF AIR FLOW



PRECONDITIONS ON SITE

- ambient temperature: -20...+50 °C
- relative humidity: 0…95%
- place with representative dust loading
- protection against draught (optional partition plate for mounting in a duct)
- rain and splash water protected
- no direct solar radiation
- location free of percussion
- air flow up to 8 m/s (in observance of flow direction)
- M12 plug-in connection with 12 V DC power supply and RS485 RTU interface

INSTALLATION EXAMPLE



TECHNICAL DATA

Housing:	lightweight and compact sensor housing made of plastic; IP33
Dimensions:	128 mm x 132 mm x 80 mm (w x h x d)
Weight:	approx. 500 g
Ambient temperature:	-20...+50 °C
Relative humidity:	0...95%
Measuring method:	scattered light measurement
Average dust contents:	up to 500 µg
Detection limit:	2 µg/m³
Internal flow:	approx. 0.5 l/min
Sensor:	optical sensor with pre-separation and heating
Zero point setting:	automatic, interval 2-8 h (by internal electrostatic precipitator with high voltage module, approx. 10 kV)
Fan:	for flow enforcement
Conditioning:	heating for measuring gas (compliance with the dew-point spread), integrated over temperature protection
Connections:	M12 connection, for data output and power supply
Interface:	RS485 (Modbus)
Power supply:	12 V DC, 1.8 A

Hot-wet gas analysis

Device manufacturers face the principle challenge to develop simple devices with low demand for maintenance as well as multi-component measuring devices with an option for remote monitoring and service. Device-internal cycles for maintenance and auto-calibration affecting availability have to be reduced to a minimum. Maintenance intervals shall be at least 3 months or even longer (6 months). Moreover a modular construction offers the possibility to minimise time losses due to an optimised spares pooling.

Modern hot-wet gas analysers match perfectly with these requirements. A partial flow of gaseous components is withdrawn by a sampling probe and sampling pipe and led to the analyser. The sample gas is tempered at 185 °C for the whole gas path and monitored for flow and temperature. This high temperature level is necessary in order to prevent from condensing of water-soluble components. The system measures e.g. HCl, NH_3, H_2O, CO, NO, NO_2, CH_4, SO_2 and CO_2.

Oxygen is measured by an integrated zirconium dioxide sensor.

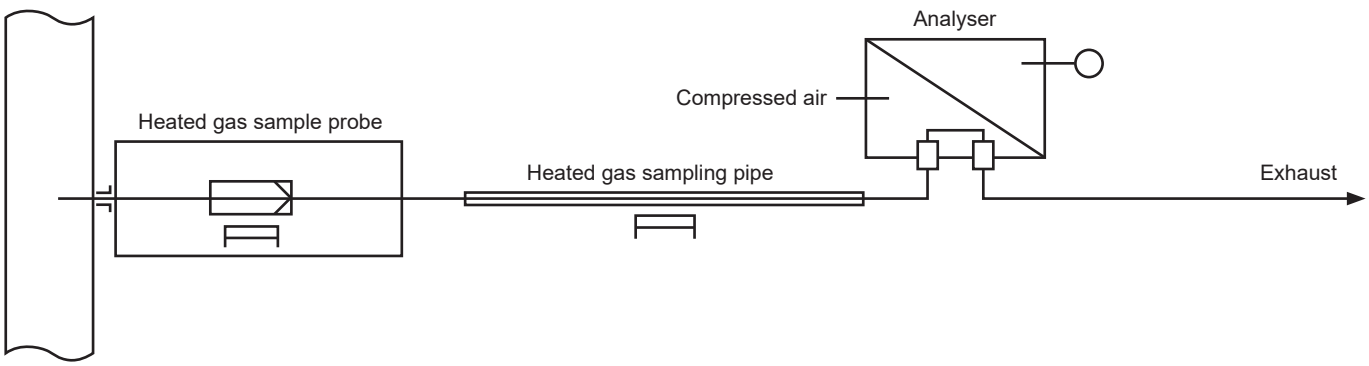
Apart from CEMS installations compliant with EN 15267-3 (QAL1 / MCERTS), it is possible to use the analysers for process measurements, e.g before and after DeNox or DeSox plants. Line switching is another possibility due to its rather easy handling.

Mobile measuring equipment offers high flexibility for special situations, e.g. test installations, reference measurements or for rental purposes.

The hot-wet gas analysers are widely used amongst others in:

- power plants
- incinerators for waste, biomass, sludge and hazardous substances
- pulp and paper industry
- glass melting plants
- cement industry

Example for simplified gas circuit diagram



Hot-wet gas analysers by comparison

	MCA 10 HWIR	MCA 10 m	MCA 10 Portable	MCA 14 m	UVA 17 HW	UVA 17 HW c	UVA 17 HW m	MCA 10 maritime
Field of application								
Process measurement	●	●	●	●	●	●	●	●
TUV-approved CEMS for combustion plants	●[1]							
TUV-approved CEMS for incineration plants	●[1]							
DNV-approved emission measurement and process control of exhaust treatment systems at sea shipping								●[2]
Mobile use		●	●	●			●	
Device characteristics								
Measuring principle:								
• Infrared photometer	●	●	●	●				●
• UV spectrometer					●	●	●	
• Zirconium dioxide sensor (O_2)	●	●	●	●	●	●	●	●
• Flame ionisation detector	●[3]							
Data transfer:								
• Analogue outputs 4...20 mA	●	●			●	●	●	●
• Digital outputs (e.g. limit value 1/2, maintenance request, maintenance, failure)	●	●			●	●	●	●
• RS232 / Modbus RTU	●	●			●	●	●	●
• RS485 / Modbus RTU	●	●						●
• Profibus	●							●
• Remote access	●	●	●	●	●	●	●	●
• Signal integration of external signals	●							●
Other device features:								
• Integrated display/operating unit					●	●	●	
• Detached display/operating unit	●	●	●	●				●
• Data logger function	●[4]	●[4]	●[4]	●[4]	●	●	●	●
• Integrated thermal printer				●				
• Integrated gas conveyance (ejector resp. pump)	●	●	●	●	●	●	●	●
• Operation without compressed air			●	●				
Measuring components								
Max. quantity of simultaneously detectable components	12	12	12	12	12	12	12	12
Max. quantity of simultaneously output components (for analogue outputs)	12	-	-	-	8	8	8	8
CO Carbon Monoxide	●	●	●	●				●
CO_2 Carbon Dioxide	●	●	●	●				●
NO Nitrogen Monoxide	●	●	●	●	●	●	●	●
NO_2 Nitrogen Dioxide	●	●	●	●	●	●	●	●
N_2O Nitrous Oxide	●	●	●	●				●
NH_3 Ammonia	●	●	●	●	●	●	●	●
SO_2 Sulphur Dioxide	●	●	●	●	●	●	●	●
CH_4 Methane	●	●	●	●				●
CH_2O Formaldehyde	●	●		●	●	●	●	
HCl Hydrogen Chloride	●	●	●	●				
HF Hydrogen Fluoride	●	●						
H_2S Hydrogen Sulfide					●	●	●	
Cl_2 Chlorine					●	●	●	
Hg^0 Elemental mercury					●	●	●	
TOC Total Organic Carbon	●[3]							
H_2O Water Vapour	●	●	●	●				●
O_2 Oxygen	●	●	●	●	●	●	●	●
... other components on request					●	●	●	

[1] suitability tested according to EN 15267-3, certified in compliance with QAL1 and MCERTS Performance Standards; [2] certified in compliance with MEPC.259(68), tested according to DNV GL CG-0339; [3] by further module in case of system construction; [4] only external via USB

Multi component analyser MCA 10

Extractive measuring system for continuous emission measurement of pollutants in flue gas and for process control

- certified in compliance with MCERTS Performance Standards
- certificate no.: Sira MC140256/01

- certified in compliance with GOST
- certificate no.: МП-242-1852-2015

- EN 15267, QAL1, Cert.-No.: 1729865-ts
- TUV-approved CEMS for combustion and incineration plants (as system part)

APPLICATION

The system design consists basically of three logic units:

- Multi component analyser MCA 10 HWIR
- Visualisation PC with user software
- PLC for analyser system

MEASURING RANGES

	Certific. range	Meas. range 2	Meas. range 3
CO:	0...75 mg/m³	0...300 mg/m³	0...5000 mg/m³
CO_2:	0...25 vol. %	0...50 vol. %	-
NO:	0...80 mg/m³	0...400 mg/m³	0...3000 mg/m³
NO_2:	0...50 mg/m³	0...500 mg/m³	-
N_2O:	0...50 mg/m³	0...3000 mg/m³	-
NH_3:	0...10 mg/m³	0…50 mg/m³	0…500 mg/m³
SO_2:	0...75 mg/m³	0...300 mg/m³	0...2500 mg/m³
CH_4:	0...50 mg/m³	0...500 mg/m³	-
CH_2O[1]:	0...10 mg/m³	0…20 mg/m³	0…100 mg/m³
HCl:	0...15 mg/m³	0...90 mg/m³	0...5000 mg/m³
HF:	-	0...20 mg/m³	-
TOC:	0...15 mg/m³	0...30 mg/m³	0...500 mg/m³
H_2O:	0...40 vol. %	-	-
O_2:	0...25 vol. %	-	-

[1] *suitability test in progress*
Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

- modularly structured hot gas analyser system (without gas cooler), compact 19" format
- up to twelve infrared components
- field-proven components, modern photometer technology
- long operation times, high reliability (6 months maintenance interval)
- pre-calibrated → immediately deployable
- integrated control, integrated zero gas provision
- self-control (additional control of inlet temperature)
- zero point drift control
- remote diagnosis and system setting via Ethernet
- connection of external device (TOC, Hg)

PRECONDITIONS ON SITE

- ambient temperature: 5...40 °C
- installation place indoors and dust-free with protection against percussions/vibrations
- power supply and PC/laptop/tablet* with USB interface (resolution min. 1024 x 768 Pixel; Windows XP Professional upwards for installation of delivered user software)
- instrument air according to ISO 8573.1, class 2
- appropriate gas sampling

** not necessary for system application*

TECHNICAL DATA

Analyser

Housing:	steel sheet housing, 19" format; IP40; 480 mm x 220 mm x 350 mm (w x h x d), approx. 28 kg
Measuring methods:	• bi-frequency measuring method (NO_2, SO_2, CH_2O[1], HF, H_2O, CO_2) • gas filter correlation (CO, NO, HCl, NH_3, N_2O, CH_4) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 infrared components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Sensitivity correction:	with test gas, once in 6 months (sensitivity tests as standard with a concentration of 80% of the measuring range)
Standardisation:	dry, wet
Gas conveyance:	air-jet pump
Forced air supply:	1...4 bar depending on flow rate
Display / Operating:	PC connection via USB (e.g. to the control panel in the analyser cabinet)
Interfaces:	2x RS232, USB
Power supply:	110 V bis 230 V, 50/60 Hz, 300 W
Other functions:	gas path continuously heated (standard 185 °C, higher temperatures on request), cross-sensitivity correction, air pressure correction, automatic zero point correction

Analyser cabinet

Housing:	steel sheet cabinet; 826 mm x 2100 mm x 600 mm (w x h x d), approx. 200...300 kg (dependent on application)
Display / Operating:	integrated 15“ control panel with touch surface, 1024 x 768 Pixel

System

Ambient conditions:	5...40 °C; relative humidity: max. 90% (non-condensing)
Compressed-air supply:	4...6 bar (dependent on application)
Compressed-air consumption:	approx. 1 m³/h (dependent on application)
Calibration:	• zero point: automatical with instrument air; • span point: with test gas, optionally automatical
Interfaces:	analogue outputs, Modbus, Profibus, further on request
Inputs:	for analogue and digital signals
Outputs:	Analogue outputs: 4...20 mA; Digital outputs: failure, maintenance, maintenance requirement, measuring range switch-over, other
Remote control:	Ethernet, analogue modem
Power supply:	230 V or 400 V / 50 Hz, 350 W (dependent on application) / 4000 W (analyser cabinet, air conditioner, probe) + 125 W/m measuring gas pipe

[1] *suitability test in progress*
Special models are possible on request.

Mobile multi component analyser MCA 10 m

Mobile measuring system for temporary emission measurement of pollutants in flue gas and for process control

APPLICATION

The analyser evaluates internally all specification-depending required concentrations with all necessary compensations and standardisations. The mainboard is responsible for all tasks of photometer control, sensor evaluation, concentration calculation and interface communication. The zero point setting is done fully-automatic with instrument air.

Via USB connection the measuring values are transferred to the delivered PC software.

MEASURING RANGES

	Meas. range 1	Meas. range 2	Meas. range 3
CO:	0...75 mg/m³	0...300 mg/m³	0...5000 mg/m³
CO_2:	0...25 vol. %	0...50 vol. %	-
NO:	0...200 mg/m³	0...400 mg/m³	0...3000 mg/m³
NO_2:	0...50 mg/m³	0...500 mg/m³	-
N_2O:	0...50 mg/m³	0...3000 mg/m³	-
NH_3:	0...10 mg/m³	0…50 mg/m³	0…500 mg/m³
SO_2:	0...75 mg/m³	0...300 mg/m³	0...2500 mg/m³
CH_4:	0...50 mg/m³	0...500 mg/m³	-
CH_2O:	0...10 mg/m³	0…20 mg/m³	0…100 mg/m³
HCl:	0...15 mg/m³	0...90 mg/m³	0...5000 mg/m³
HF:	0...20 mg/m³	-	-
H_2O:	0...40 vol. %	-	-
O_2:	0...25 vol. %	-	-

Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

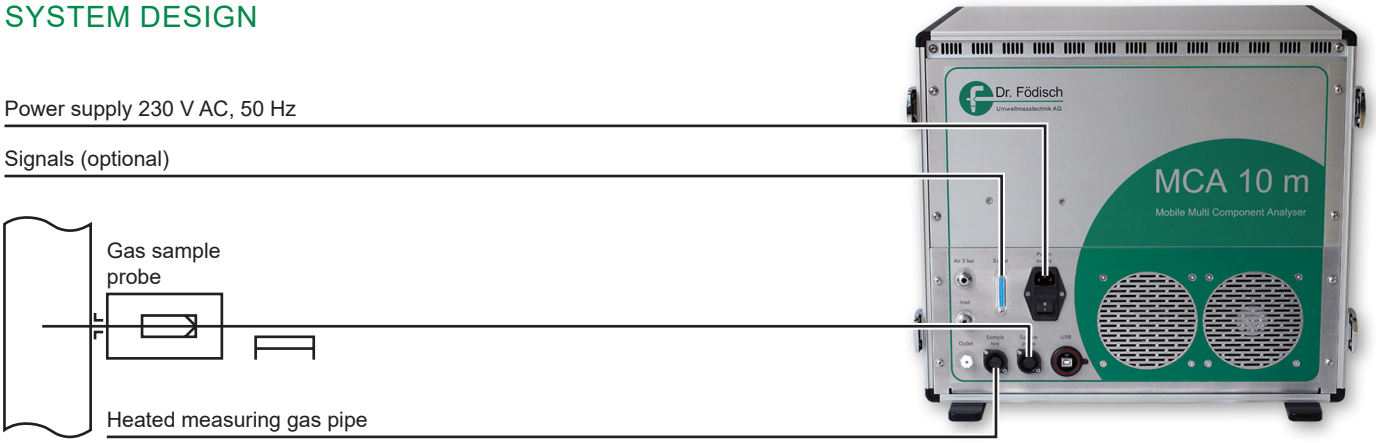
- mobile hot gas analyser system (without gas cooler)
- continuous, extractive measurement of up to twelve infrared components and oxygen
- field-proven components, modern photometer technology
- easy placement directly at the measuring point
- pre-calibrated → immediately deployable
- integrated control
- integrated zero gas provision
- self-control (additional control of inlet temperature)
- visualisation via integrated tablet, with data logger function

PRECONDITIONS ON SITE

- installation place indoors and dust-free with protection against wetness and percussions/vibrations
- power supply and PC/laptop/tablet* with USB interface (resolution min. 1024 x 768 Pixel; Windows XP Professional upwards for installation of delivered user software)
- instrument air according to ISO 8573.1, class 2
- appropriate gas sampling

** tablet as additional device available (option)*

SYSTEM DESIGN



TECHNICAL DATA

Housing:	mobile housing with carrying handles; IP54 (in case of closed housing cover) / IP31 (in case of opened housing cover); 536 mm x 453 mm x 480 mm (w x h x d), approx. 46 kg (depending on fitments)
Measuring methods:	• bi-frequency measuring method (NO_2, SO_2, H_2O, CO_2, HF) • gas filter correlation (CO, NO, HCl, NH_3, N_2O, CH_4) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 infrared components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	operation: 5...40 °C (temperature stability max. ± 5 °C); storage: 5...35 °C (temperature stability max. ± 3 °C); relative humidity: max. 90% (non-condensing)
Zero point correction:	automatical with instrument air
Sensitivity correction:	with test gas, once in 6 months (sensitivity tests as standard with a concentration of 80% of the measuring range)
Standardisation:	dry, wet
Gas conveyance:	injector
Media temperature:	max. 200 °C
Display / Operating:	user software (MCA10m_HID.exe) via USB connection
Data storage:	SSD, data logger function via tablet/ PC
Interfaces:	USB, other optional
Inputs/outputs:	optional
Controller outputs/ maximal power:	• controller of probe: max. 800 W • controller of measuring gas pipe: max. 1000 W
Power supply:	230 V AC, 50 Hz (optional: 115 V AC, 60 Hz), 400 W / max. 2500 W (dependent on periphery)
Other functions:	gas path continuously heated (standard 185 °C, higher temperatures on request), cross-sensitivity correction, air pressure correction

Special models are possible on request.

Mobile multi component analyser MCA 10 Portable

Mobile measuring system for temporary emission measurement of pollutants in flue gas and for process control

APPLICATION

The MCA 10 Portable is a hot gas analyser in lightweight 2-case design. It measures the concentrations of up to twelve infrared gas components and evaluates them internally. Visualisation, operating and data logging are realised via the delivered software.

The unique characteristic is that instrument air supply is not necessary for its operation. The zero point setting is carried out with ambient air.

MEASURING RANGES

	Meas. range 1	Meas. range 2	Meas. range 3
CO:	0...75 mg/m³	0...300 mg/m³	0...5000 mg/m³
CO_2:	0...25 vol. %	0...50 vol. %	-
NO:	0...100 mg/m³	0...400 mg/m³	0...3000 mg/m³
NO_2:	0...50 mg/m³	0...500 mg/m³	-
N_2O:	0...50 mg/m³	0...3000 mg/m³	-
NH_3:	0...10 mg/m³	0…50 mg/m³	0…500 mg/m³
SO_2:	0...50 mg/m³	0...300 mg/m³	0...2500 mg/m³
CH_4:	0...50 mg/m³	0...500 mg/m³	-
HCl:	0...15 mg/m³	0...90 mg/m³	0...5000 mg/m³
H_2O:	0...40 vol. %	-	-
O_2:	0...25 vol. %	-	-

Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

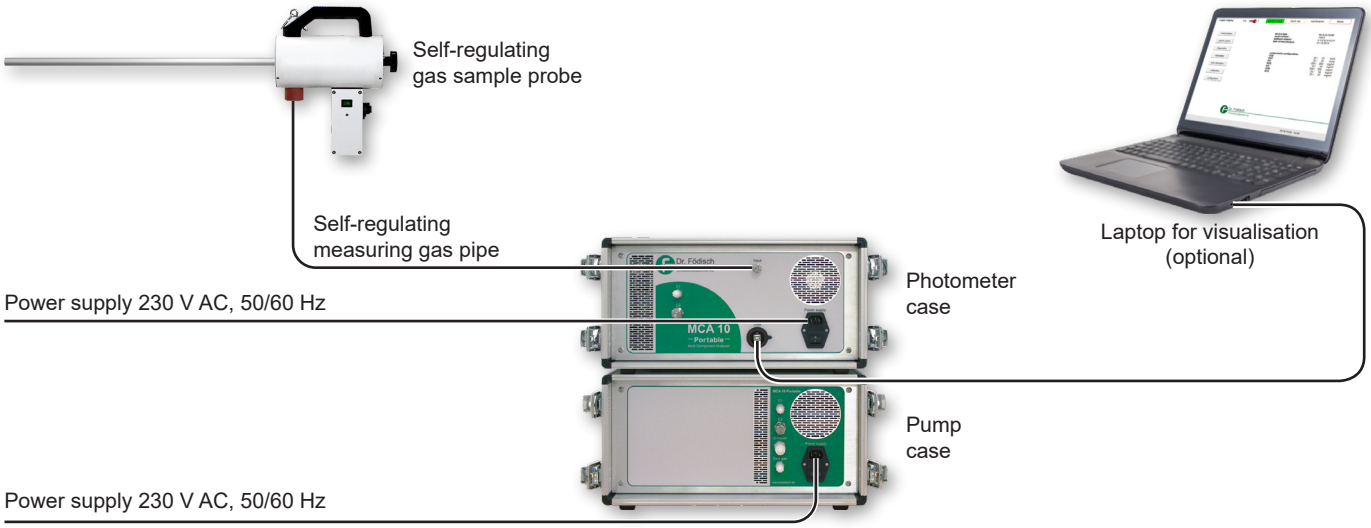
- mobile hot gas analyser system as lightweight 2-case design (without gas cooler)
- no instrument air necessary
- up to twelve infrared components and oxygen
- field-proven components, modern photometer technology
- self-sustaining operation by pump supply
- long operation times, high reliability
- easy placement directly at the measuring point
- pre-calibrated → immediately deployable
- integrated zero gas provision with ambient air
- visualisation and operating via delivered software

PRECONDITIONS ON SITE

- installation place indoors and dust-free with protection against wetness and percussions/vibrations
- provision of non-contaminated ambient air for zero point setting
- power supply and PC/laptop/tablet* with USB interface (resolution min. 1024 x 768 Pixel; Windows XP Professional upwards for installation of delivered user software)
- appropriate gas sampling

** tablet as additional device available (option)*

SYSTEM DESIGN



TECHNICAL DATA

Housing:	mobile housing as lightweight 2-case design, IP30; 480 mm x 245 mm x 475 mm (w x h x d); weight: photometer case 23.0 kg, pump case 12.8 kg (depending on fitments)
Measuring methods:	• bi-frequency measuring method (NO_2, SO_2, H_2O, CO_2) • gas filter correlation (CO, NO, HCl, NH_3, N_2O, CH_4) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 infrared components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	0...40 °C (temperature stability max. 5 K/h); relative humidity: max. 90% (non-condensing)
Pressure measurement:	measuring range: 0...1600 mbar, accuracy: ± 0.1%
Flow measurement:	measuring range: 0...1000 l/h, accuracy: ± 2%
Sensitivity correction:	with test gas, once in 6 months (sensitivity tests as standard with a concentration of 80% of the measuring range)
Standardisation:	dry, wet
Calibration:	automatically with ambient air, manually with nitrogen
Gas conveyance:	bellows pump (in separate pump case), compressed-air connection not necessary
Heat-up phase:	2 to 3 hours
Media temperature:	max. 200 °C
Display / Operating:	operating software via USB connection; storage function via tablet/laptop
Power supply:	230 V AC, 50/60 Hz (per case), 350 W (photometer case) / 100 W (pump case)
Other functions:	gas path continuously heated (standard 185 °C, higher temperatures on request), cross-sensitivity correction, air pressure correction
Special models are possible on request.	

Mobile multi component analyser MCA 14 m

Mobile measuring system for temporary emission measurement of pollutants in flue gas and for process control

APPLICATION

The MCA 14 m measures the concentrations of up to twelve infrared gas components and evaluates them internally. Visualisation, operating and data logging are realised via the delivered software.

The unique characteristic is that instrument air supply is not necessary for its operation. The zero point setting is carried out with ambient air.

MEASURING RANGES

	Meas. range 1	Meas. range 2	Meas. range 3
CO:	0...75 mg/m³	0...300 mg/m³	0...5000 mg/m³
CO_2:	0...25 vol. %	0...50 vol. %	-
NO:	0...100 mg/m³	0...400 mg/m³	0...3000 mg/m³
NO_2:	0...50 mg/m³	0...500 mg/m³	-
N_2O:	0...50 mg/m³	0...3000 mg/m³	-
NH_3:	0...10 mg/m³	0…50 mg/m³	0…500 mg/m³
SO_2:	0...50 mg/m³	0...300 mg/m³	0...2500 mg/m³
CH_4:	0...50 mg/m³	0...500 mg/m³	-
CH_2O:	0...10 mg/m³	0…20 mg/m³	0…100 mg/m³
HCl:	0...15 mg/m³	0...90 mg/m³	0...5000 mg/m³
H_2O:	0...40 vol. %	-	-
O_2:	0...25 vol. %	-	-

Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

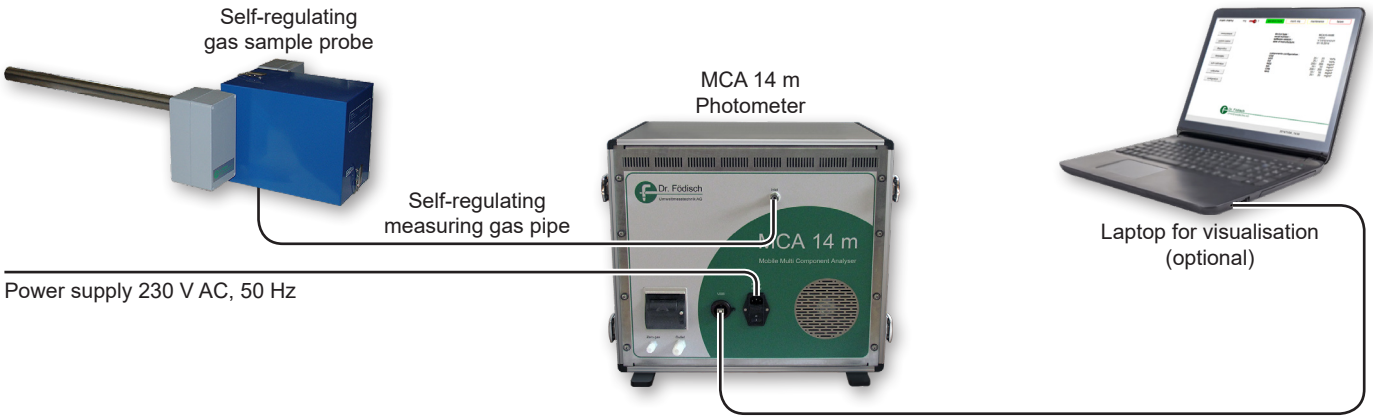
- mobile hot gas analyser system in small format
- no instrument air necessary
- continuous, extractive measurement of up to twelve infrared components and oxygen
- field-proven components, modern photometer technology
- self-sustaining operation by pump supply
- long operation times, high reliability
- easy placement directly at the measuring point
- pre-calibrated → immediately deployable
- integrated zero gas provision with ambient air
- visualisation and operating via delivered software
- optionally integrated thermal printer or RS232 connection for data output

PRECONDITIONS ON SITE

- installation place indoors and dust-free with protection against wetness and percussions/vibrations
- provision of non-contaminated ambient air for zero point setting
- power supply and PC/laptop/tablet* with USB interface (resolution min. 1024 x 768 Pixel; Windows XP Professional upwards for installation of delivered user software)
- appropriate gas sampling

** tablet as additional device available (option)*

SYSTEM DESIGN



TECHNICAL DATA

Housing:	mobile housing with carrying handles; IP54 (in case of closed housing cover) / IP31 (in case of opened housing cover); 536 mm x 453 mm x 430 mm (w x h x d), approx. 34 kg (depending on fitments)
Measuring methods:	• bi-frequency measuring method (NO_2, SO_2, H_2O, CO_2) • gas filter correlation (CO, NO, HCl, NH_3, N_2O, CH_4) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 infrared components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	operation: 0...45 °C (temperature stability max. ± 5 °C); storage: 5...35 °C (temperature stability max. 3 K/h); relative humidity: max. 90% (non-condensing)
Zero point correction:	automatical with ambient air
Sensitivity correction:	with test gas, once in 6 months (sensitivity tests as standard with a concentration of 80% of the measuring range)
Standardisation:	dry, wet
Heat-up phase:	ready for operation after approx. 90 min (at ambient temperature of approx. 20 °C)
Media temperature:	max. 200 °C
Display / Operating:	user software (MCA14m_HID.exe) via USB connection, language selectable by software (German, English, Chinese)
Data storage:	data logger function via tablet/PC
Data output:	output of measuring values and device configuration by integrated thermal printer or optionally via RS232 interface (Modbus)
Interfaces:	USB connection; optionally RS232 connection for data output
Power supply:	230 V AC, 50 Hz (optional: 115 V AC, 60 Hz), 510 W
Other functions:	gas path continuously heated (standard 200 °C, higher temperatures on request), cross-sensitivity correction, air pressure correction, gas conveyance by pump
Special models are possible on request.	

Hot gas UV analyser UVA 17 HW

Hot-wet spectrometer-based gas analyser for measurement of pollutants in flue gas with low concentrations and for process control

APPLICATION

The UV analyser UVA 17 HW can be used for monitoring of e.g. NO, NO_2, NH_3, SO_2 and O_2 in incineration plants as well as for process measurements in the chemical and pharmaceutical industry.

This analyser is based on a heated spectrometer and measures all UV absorbing gas components. An ejector supplies the sample gas. Due to the heated measuring cell (200 °C) an elaborate gas conditioning is not required. The applied Xenon flash light is characterised by a 2 to 3 times higher lifetime compared to other light sources.

The integrated zirconium dioxide sensor serves the oxygen measurement. A small PC with 7" colour display and an app-based menu allow an intuitive operation on site as well as remotely.

LOWEST MEASURING RANGES

Component	Analyser with short path cell	Analyser with long path cell
NO:	0...100 mg/m³	0...50 mg/m³
NO_2:	0...200 mg/m³	0...100 mg/m³
NH_3:	0...30 mg/m³	0...10 mg/m³
SO_2:	0...100 mg/m³	0...50 mg/m³
O_2:	0...25 vol. %	0...25 vol. %

Other components (e.g. CH_2O, H_2S, Cl_2, Hg^0) and measuring ranges on request.

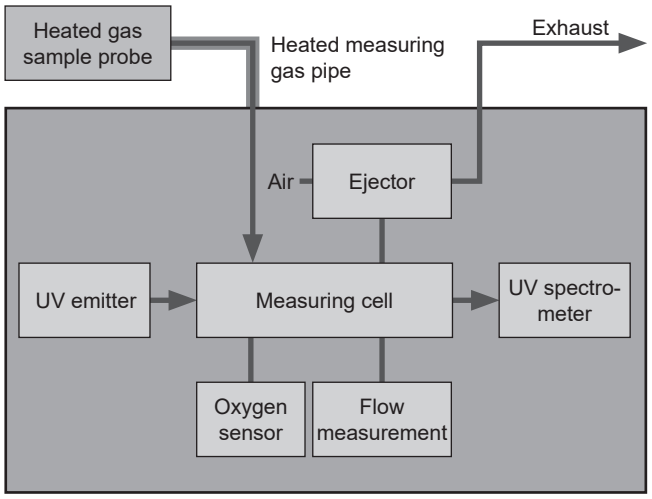
YOUR BENEFITS AT A GLANCE

- compact design
- long-term stable signal
- hot gas measurement up to 200 °C
- no gas conditioning, no gas cooler needed
- low-maintenance measuring gas conveyance by ejector
- user-friendly touch display
- extension of measuring components without additional hardware possible
- remote access

PRECONDITIONS ON SITE

- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- instrument air according to ISO 8573.1, class 2
- appropriate gas sampling

SCHEMATIC DESIGN



FUNCTION

The function of the UV analyser is based on the measurement of an integrated spectrometer in the spectral range of ultraviolet radiation of 180 to 400 nm. Fundamentally, the device is composed of light source, measuring cell and spectrometer which are interconnected via the optical path. The emitted radiation is absorbed partly by the process gas in the measuring cell and detected by a spectrometer afterwards. By using a chemometric model the gas component as well as the concentration can be determined.

Because of the modular design, there is the possibility for application of different spectrometers for adaptation to variable requirements.

TECHNICAL DATA

Housing:	robust housing with compact 19" format, IP40; 483 mm x 133 mm x 350 mm (w x h x d), approx. 12 kg
Measuring methods:	• spectrometer 180-400 nm (NO_2, SO_2, NO, NH_3, CH_2O, H_2S, Cl_2, Hg^0) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	5...40 °C (temperature stability max. 5 K/h); humidity: max. 90% (non-condensing)
Optical bench:	• gas path: continuously heated, standard 200 °C (higher temperatures on request) • path length of measuring cell: adjustable - short path cell: 260 mm - long path cell: 730 mm • particle filter: 2 µm
Zero point setting:	automatically with instrument air
Measuring gas conveyance:	via ejector
Display / Operating:	7“ touch display, 800 x 480 Pixel, status messages for failure, maintenance and maintenance request; Language selection: German, English, French, Chinese
Data storage:	data logger function
Interfaces:	RS232 (Modbus)
Inputs/outputs:	• 8 analogue outputs, 4...20 mA, potential-free, burden max. 500 Ω • 14 digital inputs (optocoupler), max. 30 V • 16 digital outputs, potential-free, max. 60 V, 500 mA
Remote control:	VNC, remote control via PC
Power supply:	110-250 V AC / 50-60 Hz, 350 W
Other functions:	integrated flow measurement; integrated pressure monitoring

Special models are possible on request.

Hot gas UV analyser UVA 17 HW c

Wall-mounted hot-wet gas analyser for measurement of pollutants in flue gas with low concentrations and for process control

APPLICATION

The UV analyser UVA 17 HW c can be used for monitoring of e.g. NO, NO_2, NH_3, SO_2 and O_2 in incineration plants as well as for process measurements in the chemical and pharmaceutical industry.

This analyser is based on a heated spectrometer and measures all UV absorbing gas components. An ejector supplies the sample gas. Due to the heated measuring cell (200 °C) an elaborate gas conditioning is not required. The applied Xenon flash light is characterised by a 2 to 3 times higher lifetime compared to other light sources.

The integrated zirconium dioxide sensor serves the oxygen measurement. A small PC with 7" colour display and an app-based menu allow an intuitive operation on site as well as remotely.

LOWEST MEASURING RANGES

Component	Analyser with short path cell	Analyser with long path cell
NO:	0...100 mg/m³	0...50 mg/m³
NO_2:	0...200 mg/m³	0...100 mg/m³
NH_3:	0...30 mg/m³	0...10 mg/m³
SO_2:	0...100 mg/m³	0...50 mg/m³
O_2:	0...25 vol. %	0...25 vol. %

Other components (e.g. CH_2O, H_2S, Cl_2, Hg^0) and measuring ranges on request.

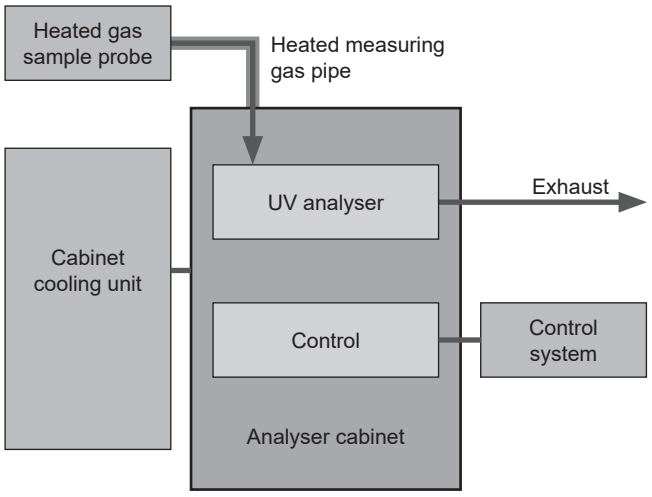
YOUR BENEFITS AT A GLANCE

- compact design
- long-term stable signal
- hot gas measurement up to 200 °C
- no gas conditioning, no gas cooler needed
- low-maintenance measuring gas conveyance by ejector
- user-friendly touch display
- extension of measuring components without additional hardware possible
- remote access

PRECONDITIONS ON SITE

- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- instrument air according to ISO 8573.1, class 2
- appropriate gas sampling

SCHEMATIC DESIGN



FUNCTION

The function of the UV analyser is based on the measurement of an integrated spectrometer in the spectral range of ultraviolet radiation of 180 to 400 nm. Fundamentally, the device is composed of light source, measuring cell and spectrometer which are interconnected via the optical path. The emitted radiation is absorbed partly by the process gas in the measuring cell and detected by a spectrometer afterwards. By using a chemometric model the gas component as well as the concentration can be determined.

Because of the modular design, there is the possibility for application of different spectrometers for adaptation to variable requirements.

TECHNICAL DATA

Housing:	steel sheet cabinet; 850 mm x 600 mm x 500 mm (w x h x d), approx. 55 kg
Measuring methods:	• spectrometer 180-400 nm (NO_2, SO_2, NO, NH_3, CH_2O, H_2S, Cl_2, Hg^0) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	5...40 °C (temperature stability max. 5 K/h); humidity: max. 90% (non-condensing)
Optical bench:	• gas path: continuously heated, standard 200 °C (higher temperatures on request) • path length of measuring cell: adjustable - short path cell: 260 mm - long path cell: 730 mm • particle filter: 2 µm
Zero point setting:	automatically with instrument air
Measuring gas conveyance:	via ejector
Display / Operating:	7“ touch display, 800 x 480 Pixel, status messages for failure, maintenance and maintenance request; Language selection: German, English, French, Chinese
Data storage:	data logger function
Interfaces:	RS232 (Modbus)
Inputs/outputs:	• 8 analogue outputs, 4...20 mA, potential-free, burden max. 500 Ω • 14 digital inputs (optocoupler), max. 30 V • 16 digital outputs, potential-free, max. 60 V, 500 mA
Remote control:	VNC, remote control via PC
Power supply:	110-250 V AC / 50-60 Hz, 350 W
Other functions:	integrated flow measurement; integrated pressure monitoring

Special models are possible on request.

Mobile hot gas UV analyser UVA 17 HW m

Mobile hot-wet gas analyser for power plant optimisation, low concentration measurement and process control

APPLICATION

The UV analyser UVA 17 HW m can be used for monitoring of e.g. NO, NO_2, NH_3, SO_2 and O_2 in incineration plants as well as for process measurements in the chemical and pharmaceutical industry.

This analyser is based on a heated spectrometer and measures all UV absorbing gas components. An ejector supplies the sample gas. Due to the heated measuring cell (200 °C) an elaborate gas conditioning is not required. The applied Xenon flash light is characterised by a 2 to 3 times higher lifetime compared to other light sources.

The integrated zirconium dioxide sensor serves the oxygen measurement. A small PC with 7" colour display and an app-based menu allow an intuitive operation on site as well as remotely.

YOUR BENEFITS AT A GLANCE

- mobile hot-wet gas analyser in compact design
- easy placement directly at the measuring point
- long-term stable signal
- hot gas measurement up to 200 °C
- no gas conditioning, no gas cooler needed
- low-maintenance measuring gas conveyance by ejector
- user-friendly touch display
- extension of measuring components without additional hardware possible
- remote access

LOWEST MEASURING RANGES

Component	Analyser with short path cell	Analyser with long path cell
NO:	0...100 mg/m³	0...50 mg/m³
NO_2:	0...200 mg/m³	0...100 mg/m³
NH_3:	0...30 mg/m³	0...10 mg/m³
SO_2:	0...100 mg/m³	0...50 mg/m³
O_2:	0...25 vol. %	0...25 vol. %

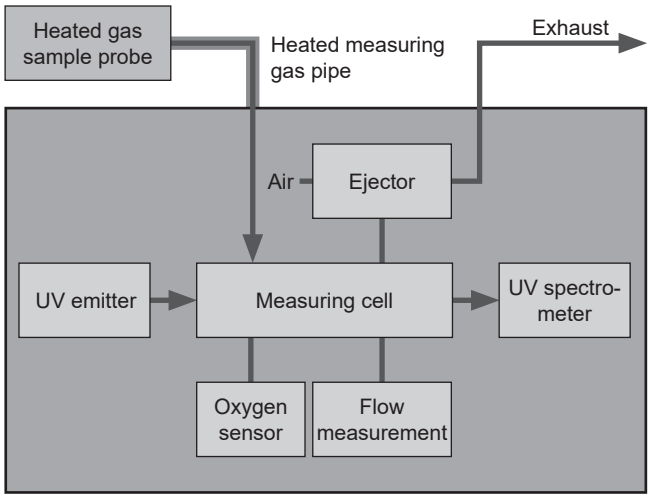
Other components (e.g. CH_2O, H_2S, Cl_2, Hg^0) and measuring ranges on request.

PRECONDITIONS ON SITE

- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- instrument air* according to ISO 8573.1, class 2
- appropriate gas sampling

** instrument air supply unit available (option)*

SCHEMATIC DESIGN



FUNCTION

The function of the UV analyser is based on the measurement of an integrated spectrometer in the spectral range of ultraviolet radiation of 180 to 400 nm. Fundamentally, the device is composed of light source, measuring cell and spectrometer which are interconnected via the optical path. The emitted radiation is absorbed partly by the process gas in the measuring cell and detected by a spectrometer afterwards. By using a chemometric model the gas component as well as the concentration can be determined.

Because of the modular design, there is the possibility for application of different spectrometers for adaptation to variable requirements.

TECHNICAL DATA

Housing:	robust housing with compact 19" format, IP40; design as portable case; 530 mm x 162 mm x 530 mm (w x h x d), approx. 20 kg
Measuring methods:	• spectrometer 180-400 nm (NO_2, SO_2, NO, NH_3, CH_2O, H_2S, Cl_2, Hg^0) • zirconium dioxide sensor (O_2)
Number of meas. components:	up to 12 components (dependent on application) and oxygen
Accuracy:	< 2% of the respective measuring range
Ambient conditions:	5...40 °C (temperature stability max. 5 K/h); humidity: max. 90% (non-condensing)
Optical bench:	• gas path: continuously heated, standard 200 °C (higher temperatures on request) • path length of measuring cell: adjustable - short path cell: 260 mm - long path cell: 730 mm • particle filter: 2 µm
Zero point setting:	automatically with instrument air
Measuring gas conveyance:	via ejector
Display / Operating:	7“ touch display, 800 x 480 Pixel, status messages for failure, maintenance and maintenance request; Language selection: German, English, French, Chinese
Data storage:	data logger function
Interfaces:	RS232 (Modbus)
Inputs/outputs:	• 8 analogue outputs, 4...20 mA, potential-free, burden max. 500 Ω • 14 digital inputs (optocoupler), max. 30 V • 16 digital outputs, potential-free, max. 60 V, 500 mA
Remote control:	VNC, remote control via PC
Power supply:	110-250 V AC / 50-60 Hz, 350 W
Other functions:	integrated flow measurement; integrated pressure monitoring
Optional:	• instrument air conveyance unit • gas sampling equipment

Special models are possible on request.

Multi component analyser system MCA 10 maritime

Extractive hot gas measuring system for emission measurement as well as for process control of exhaust treatment systems at sea shipping

- certified in compliance with MEPC.259(68), Doc. no.: 27975892/DNVGL
- tested according to DNV GL CG-0339, Cert. no.: TAA00002ZV
- ambient temperature in operation, vibration, electromagnetic compatibility: class A
- relative humidity, enclosure: class B

APPLICATION

The analyser system MCA 10 maritime is certified in compliance with MEPC.259(68) for continuous monitoring of SO_2 and CO_2 in flue gas. It is based on the long-time proven, suitability tested multi component analyser MCA 10 HWIR.

In addition to SO_2 and CO_2 further measuring components, e.g. NO and NO_2, can be detected.

The system MCA 10 maritime can be applied with a DNV certified probe and a heated measuring gas pipe.

MEASURING RANGES

	Meas. range 1	Meas. range 2	Meas. range 3
CO:	0...60 ppm	0...240 ppm	0...4000 ppm
CO_2:	0...12 vol.-% [1]	0...25 vol.-% [1]	0...50 vol.-%
NO:	0...60 ppm	0...300 ppm	0...2250 ppm
NO_2:	0...25 ppm	0...250 ppm	-
NH_3:	0...15 ppm	0…70 ppm	0…660 ppm
SO_2:	0...30 ppm	0...100 ppm [1] / 0...250 ppm [1]	0...875 ppm
CH_4:	0...70 ppm	0...700 ppm	-
H_2O:	0...40 vol.-%	-	-
O_2:	0...25 vol.-%	-	-

[1] *certified in compliance with MEPC.259(68)*
Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

- compact and robust measuring system with easy operating
- gas path continuously heated, no gas cooler needed
- appropriate for measurement preliminary and subsequent to exhaust treatment systems on ships
- measurement of up to 8 infrared components and oxygen
- internal measuring point switch-over possible
- correction of cross-sensitivity and air pressure
- low-maintenance technology with high measuring accuracy
- long-term stability by automatic zero point calibration
- automatic reference point calibration by adjusting filter (optional)
- low-maintenance fan instead of air conditioner
- remote control (optional) via Ethernet or UMTS router

PRECONDITIONS ON SITE

- ambient conditions according to DNVGL-CG-0339
- power supply
- instrument air according to ISO 8573.1, class 2
- test gases for calibration
- appropriate gas sampling (certified sample probe, heated measuring gas pipe)

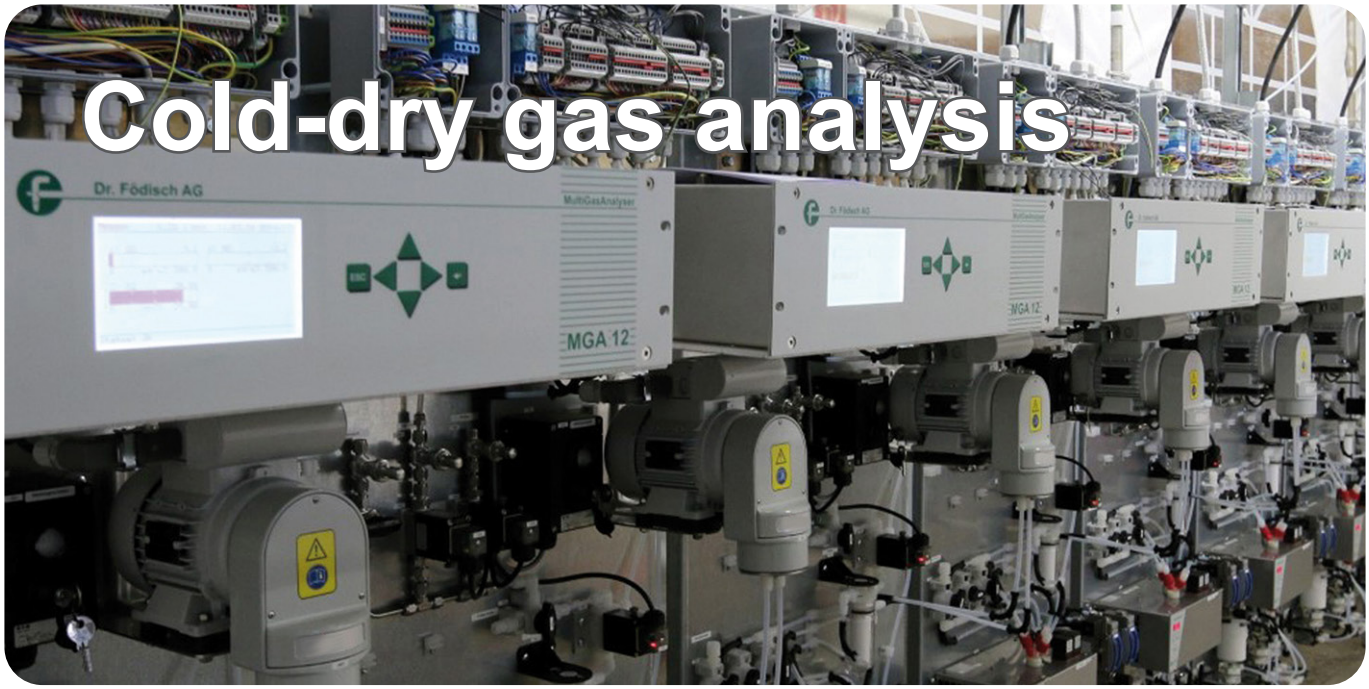
SYSTEM

TECHNICAL DATA

Analyser system:	steel sheet housing (IP54) with additional wall fixation and vibration dampers; 600 mm x 1510 mm x 500 mm (w x h x d), approx. 120 kg
Measuring methods:	• bi-frequency measuring method (NO_2, SO_2 [1], H_2O, CO_2 [1]) • gas filter correlation (CO, NO, NH_3, CH_4) • zirconium dioxide sensor (O_2)
Display / Operating:	15“ touch panel, 1024 x 768 Pixel
Tested interfaces:	• inputs for analogue and digital signals • analogue outputs 4...20 mA • digital outputs (e.g. failure, maintenance, maintenance requirement, measuring range switch-over) • Modbus RTU, Modbus TCP/IP, Profibus DP, Profinet
Compressed-air connection:	pressure: 4...6 bar, consumption: ca. 1 m³/h
Gas conveyance:	via ejector; gas path continuously heated (standard 185 °C, higher temperatures on request)
Standardisation:	dry, wet
Sensitivity correction:	with test gas, once in 12 months (when using automatic calibration)
Calibration:	• zero point: automatically with instrument air; • span point: with test gas, automatically by adjusting filter (optional)
Power supply:	230 V or 400 V / 50 Hz, 4000 W (analyser cabinet, fan, probe) + 125 W/m measuring gas pipe; further options on request
Ambient conditions (acc. to DNVGL-CG-0339):	• ambient temperature in operation: 5...45 °C (class A) • relative humidity: max. 95% (non-condensing) (class B) • vibration: class A • electromagnetic compatibility: class A • enclosure: class B
Available system components (optional):	DNV certified probe, measuring gas pipe, switch-over between two measuring points (certified; response time for each measuring point: T_{90} < 140 s)

[1] *certified in compliance with MEPC.259(68)*
Special models are possible on request.

Cold-dry gas analysis



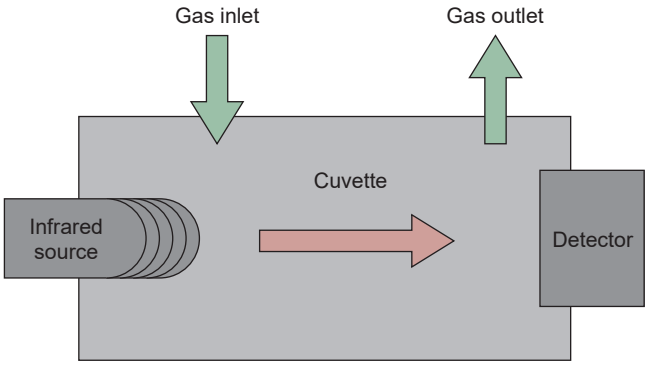
Cold-dry measurement is – same like hot-wet measurement – based on the extractive working principle. A partial flow of gaseous components is withdrawn by a sampling probe and sampling pipe and led to the analysis cabinet. A gas conditioning inside the cabinet cools the sample gas to 5 °C to dry the gas for analysis. Depending on the pollutants various analyser modules and measuring principles can be applied (UV spectrometer, NDIR photometer, electrochemical cell, paramagnetic or thermal conductivity sensor). Based on customer requirements the most efficient method for each component is chosen.

Apart from CEMS installations based on MGA 12 being in compliance with EN 15267-3 (QAL1), it is possible to use the analyser for process measurements, e.g. for ΔCO- or ΔNO-measurements.

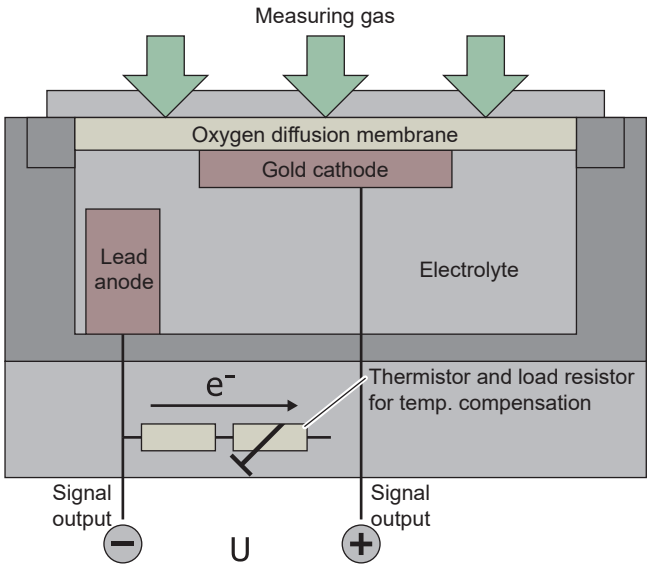
The cold-dry gas analysers are widely used amongst others in:

- power plants
- biomass boilers
- coal mills
- coke plants
- pulp and paper industry
- chemical industry

Scheme of infrared absorption



Scheme of electrochemical cell



Cold-dry gas analysers by comparison

	MGA 12	MGA 12 EX	UVA 17 CD	UVA 17 CD m
Field of application				
Process measurement	●	●	●	●
TUV-approved CEMS for combustion plants	●[1]			
Application in potentially explosive atmospheres (ATEX)		●		
Mobile use	●[2]			●
Device characteristics				
Measuring principle:				
• Infrared photometer	●	●		
• UV spectrometer			●	●
• Electrochemical cell	●	●	●	●
• Paramagnetic sensor (O_2)	●	●		
• Thermal conductivity sensor (H_2)	●	●		
Data transfer:				
• Analogue outputs 4...20 mA	●	●	●	●
• Digital outputs (e.g. limit value 1/2, maintenance request, maintenance, failure)	●	●	●	●
• RS232 / Modbus RTU	●	●	●	●
• Remote access	●	●	●	●
Other device features:				
• Integrated display/operating unit	●	●	●	●
• Detached display/operating unit				
Measuring components				
Max. quantity of simultaneously detectable components	8	5	12	12
Max. quantity of simultaneously output components (for analogue outputs)	5	5	8	8
CO Carbon Monoxide	●	●		
CO_2 Carbon Dioxide	●	●		
NO Nitrogen Monoxide	●	●	●	●
NO_2 Nitrogen Dioxide	●[3]	●	●	●
N_2O Nitrous Oxide	●	●		
SO_2 Sulphur Dioxide	●	●	●	●
CH_4 Methane	●[3]	●		
CH_2O Formaldehyde			●	●
H_2 Hydrogen	●[3]	●[3]		
H_2S Hydrogen Sulfide	●[3]	●	●	●
Cl_2 Chlorine			●	●
O_2 Oxygen	●	●	●	●

[1] *suitability tested according to EN 15267-3, certified in compliance with QAL1 and MCERTS Performance Standards*
[2] *on request as special model*
[3] *not part of the suitability test*

Multi gas analyser MGA 12

Cold gas measuring system for continuous emission measurement of pollutants in flue gas and for process control

- certified in compliance with MCERTS Performance Standards
- certificate no.: Sira MC180342/00

- certified in compliance with GOST
- certificate no.: МП-242-1746-2014

- suitability tested
- EN 15267-3
- QAL1 certified
- regular surveillance
- TUV approved
- ID 0000039321
- TUV-approved CEMS for combustion plants (as system part)

APPLICATION

In the MGA 12 four independent, selectively working measuring methods apply: infrared absorption (NDIR), electrochemical cell and paramagnetic measuring method as well as thermal conductivity sensor.

MEASURING RANGES

	Meas. range 1	Meas. range 2
CO:	0...125 mg/m³ (0...100 ppm)	0...1000 mg/m³ (0...800 ppm)
CO_2:	0...20 vol. %	-
NO:	0...300 mg/m³ (0...225 ppm)	0...1000 mg/m³ (0...750 ppm)
NO_2 [1]:	0...200 mg/m³ (0...95 ppm)	0...1000 mg/m³ (0...485 ppm)
N_2O [1]:	0...300 mg/m³ (0...155 ppm)	0...1000 mg/m³ (0...510 ppm)
SO_2:	0...200 mg/m³ (0...70 ppm)	0...1000 mg/m³ (0...350 ppm)
CH_4 [1]:	0...300 mg/m³ (0...420 ppm)	0...1000 mg/m³ (0...1400 ppm)
H_2 [1] [2]:	0...5 vol. %	0...100 vol. %
H_2S [1] [3]:	0...75 mg/m³ (0...50 ppm)	-
O_2 [3] [4]:	0...25 vol. %	-

[1] *not part of the suitability test*
[2] *measurement via thermal conductivity sensor* [1]
[3] *measurement via electrochemical cell*
[4] *measurement via paramagnetic sensor* [1]
Other components and measuring ranges on request.

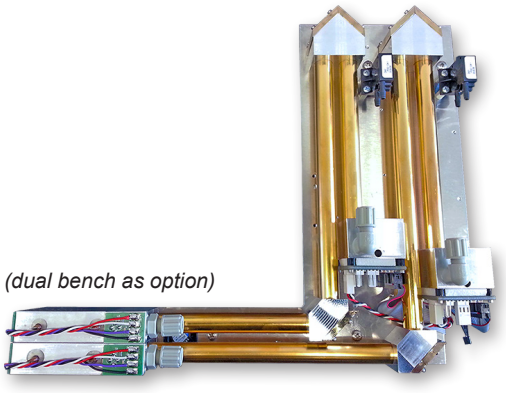
YOUR BENEFITS AT A GLANCE

- simultaneous measurement of up to eight gas components with limit value signalling and measuring range change-over
- two separated gas paths possible
- local diagnosis of the system state
- display of bar diagram for every component
- flow control as well as display of flow rate
- reduced cross-sensitivities by internal spectral filter
- internal monitoring for condensate ingress with switch contact for pump switch-off
- control of a back-purging probe (interval and pulse time)
- control of zero point drift
- low maintenance requirement

PRECONDITIONS ON SITE

- ambient temperature: 5...30 °C (with air conditioner 5...45 °C)
- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations

OPTICAL BENCH



(dual bench as option)

PHOTOMETER

- consisting of: emitting module, measuring cells, reflector modules, 4-channel pyrodetector with pre-amplifier electronics, detector module
- free-selectable length of the measuring path with direction changes: 50 mm to 700 mm
- spectral range: 1 µm to 9 µm
- no mechanically moved parts
- power supply: 5 V DC
- power consumption in operation: approx. 20 W (at ambient temperature of 30 °C)

TECHNICAL DATA

Analyser:	robust housing with compact 19" format 3RU, IP40; 483 mm x 133 mm x 350 mm (w x h x d), approx. 11 kg
Analyser cabinet:	800 mm x 2100 mm x 600 mm (w x h x d), approx. 170 kg
Measuring methods:	• infrared absorption (CO, CO_2, SO_2, NO, NO_2 [1], CH_4 [1], H_2O [1]) • electrochemical cell (O_2, H_2S [1]) • paramagnetic measuring method [1] (optional for O_2) • thermal conductivity sensor [1] (H_2)
Accuracy:	< 2% of the respective measuring range
Sensitivity correction:	manual, with test gas; optional: automatic
Response time:	T_{90} < 180 s (depending on plant and chosen component)
Ambient conditions:	5...30 °C (with air conditioning unit 5...45 °C); relative humidity: max. 90% (non-condensing)
Display / Operating:	graphic display (LCD), 240 x 128 Pixel, background-lighted; menu-driven operating; display possibility in mg/m³, ppm and vol. %; languages (factory-set): German, English, French, Polish; membrane keyboard
Analogue outputs:	5 active analogue outputs, 4...20 mA, potential-free, burden max. 500 Ohm
Digital inputs:	8 inputs (optocoupler; e.g. for sample probe, measuring gas pipe, gas cooling unit)
Digital outputs:	16 outputs, potential-free, 24 V DC with max. 0.4 A (max. 10 W); amongst others: • output signals for failure, maintenance, maintenance request, limit values, measuring range change-over, Autocal • control of automatic probe back-purging • internal humidity monitor for function „Pump off“ • control of metering of phosphoric acid (H_3PO_4)
Service interface RS232:	for remote software, compatible for all Windows operating systems (XP or higher version): • visualisation of all data by intuitive user surface • data storage on PC in TXT format • loading/saving of all relevant configuration data
Power supply:	110 V AC, 230 V AC / 50-60 Hz, 40 W
Other functions:	• standard: thermostatted infrared photometer; automatic zero point correction with ambient air; internal air pressure correction • optional: two separated gas paths; analyser-specific PC user software for visualisation, (remote) control and recording of data via interface RS232

[1] *not part of the suitability test*
Special models are possible on request.

Multi gas analyser MGA 12 EX

Cold gas measuring system for continuous emission measurement of pollutants in potentially explosive atmospheres

- approved for Ex II 2G Ex d IIB+H2 T5 Gb
- protective principle Ex d
- explosive gases can be passed through in a closed loop

MEASURING RANGES

	Meas. range 1	Meas. range 2
CO:	0...125 mg/m³ (0...100 ppm)	0...1000 mg/m³ (0...800 ppm)
CO_2:	0...20 vol. %	-
NO:	0...300 mg/m³ (0...225 ppm)	0...1000 mg/m³ (0...750 ppm)
NO_2:	0...200 mg/m³ (0...95 ppm)	0...1000 mg/m³ (0...485 ppm)
N_2O:	0...300 mg/m³ (0...155 ppm)	0...1000 mg/m³ (0...510 ppm)
SO_2:	0...200 mg/m³ (0...70 ppm)	0...1000 mg/m³ (0...350 ppm)
CH_4:	0...300 mg/m³ (0...420 ppm)	0...1000 mg/m³ (0...1400 ppm)
H_2 [1]:	0...5 vol. %	0...100 vol. %
H_2S [2]:	0...75 mg/m³ (0...50 ppm)	-
O_2 [2] [3]:	0...25 vol. %	-

[1] *measurement via thermal conductivity sensor* [1]
[2] *measurement via electrochemical cell*
[3] *measurement via paramagnetic sensor* [1]
Other components and measuring ranges on request.

YOUR BENEFITS AT A GLANCE

- protective principle Ex d
- pressure-resistant gas path up to 3 bar
- explosive gases can be passed through in a closed loop
- simultaneous measurement of up to five gas components
- reduced cross-sensitivities by internal spectral filter
- integrated zero gas valve for zero point correction
- all gas-contacting elements are made of metal

PRECONDITIONS ON SITE

- ambient temperature: -20...+40 °C
- protection against percussions/vibrations
- appropriate gas sampling and conditioning

DESIGN & APPLICATION

The multi gas analyser MGA 12 EX consists of a robust housing for application in potentially explosive atmospheres. In the interior of the housing the measuring technology of the analyser with the optical bench, the power supply unit and the signal processing is placed.

At the analysis of gas concentrations by the MGA 12 EX four different measuring methods are applied: infrared absorption, electrochemical cell, paramagnetic measuring method, thermal conductivity sensor.

TECHNICAL DATA

Housing:	robust housing, IP66; thermostatted infrared photometer (optical bench); 400 mm x 600 mm x 290 mm (w x h x d); approx. 40 kg (with option of paramagnetic oxygen measurement approx. 75 kg)
Measuring methods:	• infrared absorption (CO, CO_2, SO_2, NO, NO_2, CH_4, H_2O) • electrochemical cell (O_2, H_2S) • paramagnetic measuring method (O_2) • thermal conductivity sensor (H_2)
Accuracy:	< 2% of the respective measuring range
Response time:	T_{90} < 180 s (depending on plant and chosen component)
Ambient conditions:	-20...+40 °C; relative humidity: max. 90% (non-condensing)
Zero point correction:	automatic by integrated zero gas valve, with ambient air
Sensitivity correction:	manual, with test gas
Air pressure correction:	internal pressure sensor for real-time pressure compensation of measuring values
Gas inputs/outputs:	measuring gas input, zero gas input, exhaust output, air breather; respectively with flame barrier, 6 mm Swagelok
Display / Operating:	graphic display (LCD), 240 x 128 Pixel, background-lighted; menu-driven operating; display possibility in mg/m³, ppm and vol. %; languages (factory-set): German, English, French, Polish; 6 operating keys
Analogue outputs:	4 active analogue outputs, 4...20 mA, potential-free, burden max. 500 Ohm
Digital outputs:	4 digital outputs, potential-free, 24 V DC with max. 0.4 A (max. 10 W) for failure, maintenance, maintenance request and zero point setting
Service interface:	RS232 and remote software for maintenance and diagnostic purpose
Power supply:	230 V AC / 50-60 Hz, 40 W (max. 90 W)
Options:	• paramagnetic oxygen sensor for measurement of O_2 (not available for pressure-resistant model, standard pressure up to max. 500 mbar) • thermal conductivity sensor for measurement of H_2 (not available for pressure-resistant model, standard pressure up to max. 500 mbar) • pressure-resistant model: pressure resistance of the measuring gas path up to max. 3 bar (not available in connection with paramagnetic oxygen sensor or thermal conductivity sensor) • digital inputs (optocoupler; e.g. for air breather, measuring gas pipe, gas cooling unit)

Special models are possible on request.

Cold gas UV analyser UVA 17 CD

Cold-dry spectrometer-based gas analyser for measurement of pollutants in flue gas with low concentrations and for process control

APPLICATION

The UV analyser UVA 17 CD can be used for monitoring of e.g. NO, NO_2, SO_2 and O_2 in incineration plants as well as for process measurements in the chemical and pharmaceutical industry.

This analyser is based on a spectrometer and measures all UV absorbing gas components. The applied Xenon flash light is characterised by a 2 to 3 times higher lifetime compared to other light sources.

The oxygen measurement is carried out optionally by a paramagnetic oxygen sensor or an electrochemical cell.

A small PC with 7" colour display and an app-based menu allow an intuitive operation on site as well as remotely.

LOWEST MEASURING RANGES

Component	Measuring range
NO:	0...50 mg/m³
NO_2:	0...100 mg/m³
SO_2:	0...50 mg/m³
O_2:	0...25 vol. %

Other components (e.g. CH_2O, H_2S, Cl_2) and measuring ranges on request.

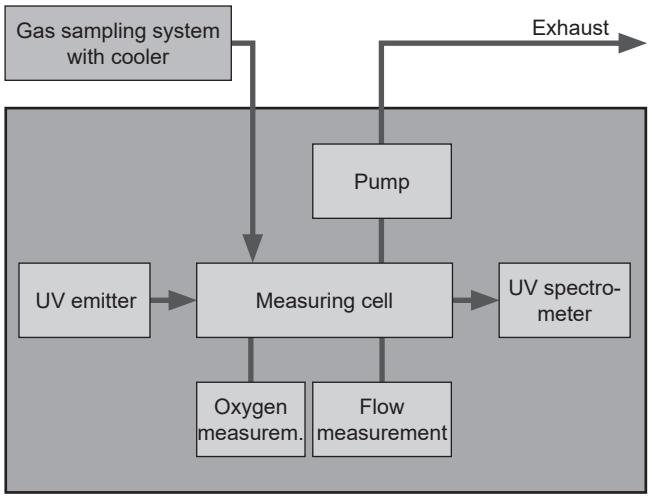
YOUR BENEFITS AT A GLANCE

- compact design
- long-term stable signal
- user-friendly touch display
- extension of measuring components without additional hardware possible
- remote access

PRECONDITIONS ON SITE

- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- appropriate gas sampling and conditioning

SCHEMATIC DESIGN



FUNCTION

The function of the UV analyser is based on the measurement of an integrated spectrometer in the spectral range of ultraviolet radiation of 180 to 400 nm. Fundamentally, the device is composed of light source, measuring cell and spectrometer which are interconnected via the optical path. The emitted radiation is absorbed partly by the process gas in the measuring cell and detected by a spectrometer afterwards. By using a chemometric model the gas component as well as the concentration can be determined.

Because of the modular design, there is the possibility for application of different spectrometers for adaptation to variable requirements.

TECHNICAL DATA

Housing:	robust housing with compact 19" format, IP40; 483 mm x 133 mm x 350 mm (w x h x d), approx. 12 kg
Measuring methods:	• spectrometer 180-400 nm (NO_2, SO_2, NO, CH_2O, H_2S, Cl_2) • electrochemical cell (optional for O_2) • paramagnetic measuring method (optional for O_2)
Number of meas. components:	up to 12 components (dependent on application) and oxygen
Accuracy of spectrometer components:	< 2% of the respective measuring range
Paramagnetic oxygen sensor:	• warm-up time: < 1 h (at 20 °C ambient temperature) • zero point drift: < ± 0.1% O2 / week (possibly higher at first commissioning or after longer storage) • temperature influence: - at zero point setting: < ± 0.05% O2 / °C - at reference point setting: < ± 0.2% of meas. value / °C
Ambient conditions:	5...40 °C (temperature stability max. 5 K/h); humidity: max. 90% (non-condensing)
Optical bench:	• path length of measuring cell: adjustable, 730 mm • particle filter: 2 µm
Zero point setting:	automatically with ambient air
Measuring gas conveyance:	via internal pump: • flow rate: max. 2.6 l/min • pressure: max. 1 bar • vacuum: max. 350 mbar
Display / Operating:	7“ touch display, 800 x 480 Pixel, status messages for failure, maintenance and maintenance request; Language selection: German, English, French, Chinese
Data storage:	data logger function
Interfaces:	RS232 (Modbus)
Inputs/outputs:	• 8 analogue outputs, 4...20 mA, potential-free, burden max. 500 Ω • 14 digital inputs (optocoupler), max. 30 V • 16 digital outputs, potential-free, max. 60 V, 500 mA
Remote control:	VNC, remote control via PC
Power supply:	110-250 V AC / 50-60 Hz, 50 W
Other functions:	integrated flow measurement
Special models are possible on request.	

Mobile cold gas UV analyser UVA 17 CD m

Mobile cold-dry gas analyser for power plant optimisation, low concentration measurement and process control

YOUR BENEFITS AT A GLANCE

- mobile cold-dry gas analyser in compact design
- easy placement directly at the measuring point
- long-term stable signal
- user-friendly touch display
- extension of measuring components without additional hardware possible
- remote access

APPLICATION

The UV analyser UVA 17 CD m can be used for monitoring of e.g. NO, NO_2, SO_2 and O_2 in incineration plants as well as for process measurements in the chemical and pharmaceutical industry.

This analyser is based on a spectrometer and measures all UV absorbing gas components. The applied Xenon flash light is characterised by a 2 to 3 times higher lifetime compared to other light sources.

The oxygen measurement is carried out optionally by a paramagnetic oxygen sensor or an electrochemical cell.

A small PC with 7" colour display and an app-based menu allow an intuitive operation on site as well as remotely.

LOWEST MEASURING RANGES

Component	Measuring range
NO:	0...50 mg/m³
NO_2:	0...100 mg/m³
SO_2:	0...50 mg/m³
O_2:	0...25 vol. %

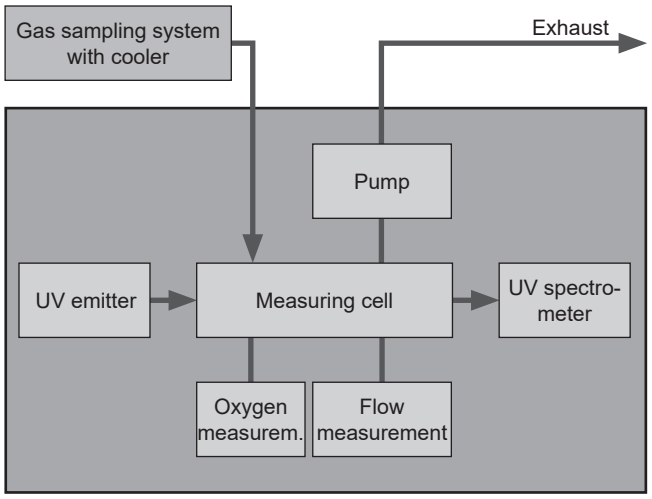
Other components (e.g. CH_2O, H_2S, Cl_2) and measuring ranges on request.

PRECONDITIONS ON SITE

- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- appropriate gas sampling and conditioning*

** gas conditioning unit available (option)*

SCHEMATIC DESIGN



FUNCTION

The function of the UV analyser is based on the measurement of an integrated spectrometer in the spectral range of ultraviolet radiation of 180 to 400 nm. Fundamentally, the device is composed of light source, measuring cell and spectrometer which are interconnected via the optical path. The emitted radiation is absorbed partly by the process gas in the measuring cell and detected by a spectrometer afterwards. By using a chemometric model the gas component as well as the concentration can be determined.

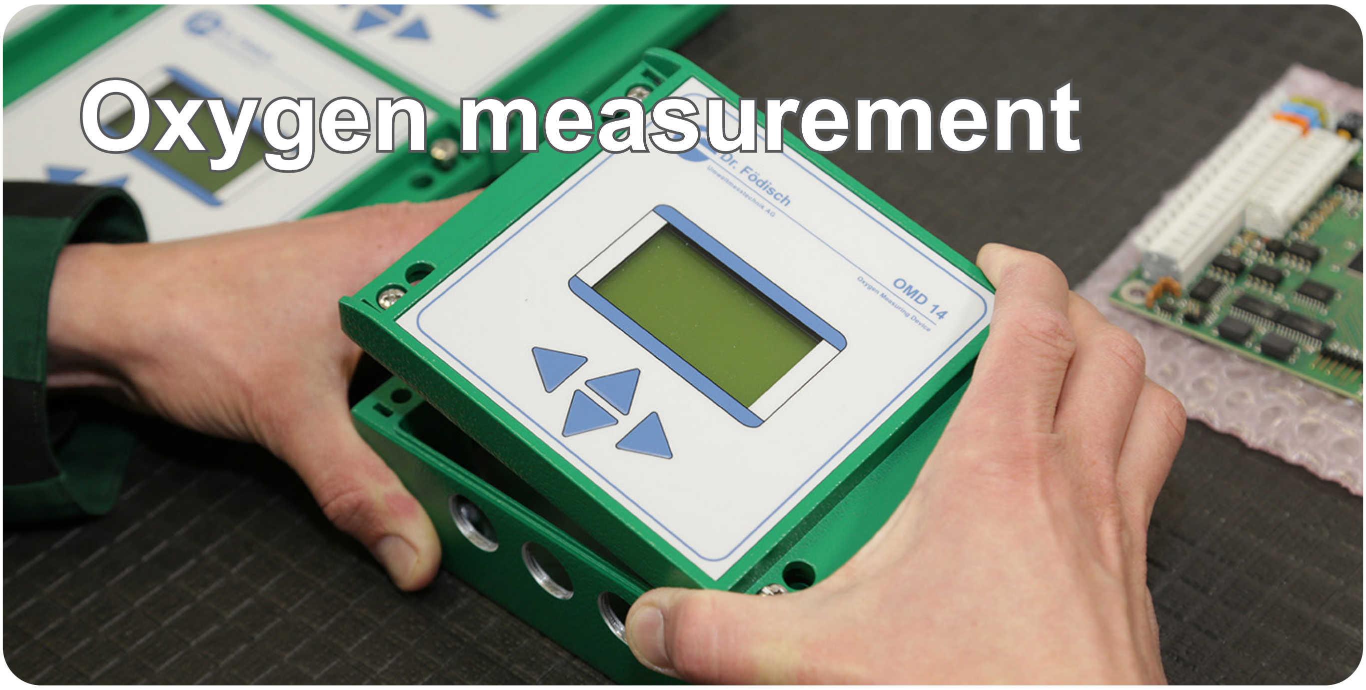
Because of the modular design, there is the possibility for application of different spectrometers for adaptation to variable requirements.

TECHNICAL DATA

Housing:	robust housing with compact 19" format, IP40; design as portable case; 530 mm x 162 mm x 530 mm (w x h x d), approx. 20 kg
Measuring methods:	• spectrometer 180-400 nm (NO_2, SO_2, NO, CH_2O, H_2S, Cl_2) • electrochemical cell (optional for O_2) • paramagnetic measuring method (optional for O_2)
Number of meas. components:	up to 12 components (dependent on application) and oxygen
Accuracy of spectrometer components:	< 2% of the respective measuring range
Paramagnetic oxygen sensor:	• warm-up time: < 1 h (at 20 °C ambient temperature) • zero point drift: < ± 0.1% O2 / week (possibly higher at first commissioning or after longer storage) • temperature influence: - at zero point setting: < ± 0.05% O2 / °C - at reference point setting: < ± 0.2% of meas. value / °C
Ambient conditions:	5...40 °C (temperature stability max. 5 K/h); humidity: max. 90% (non-condensing)
Optical bench:	• path length of measuring cell: adjustable, 730 mm • particle filter: 2 µm
Zero point setting:	automatically with ambient air
Measuring gas conveyance:	via internal pump: • flow rate: max. 2.6 l/min • pressure: max. 1 bar • vacuum: max. 350 mbar
Display / Operating:	7“ touch display, 800 x 480 Pixel, status messages for failure, maintenance and maintenance request; Language selection: German, English, French, Chinese
Data storage:	data logger function
Interfaces:	RS232 (Modbus)
Inputs/outputs:	• 8 analogue outputs, 4...20 mA, potential-free, burden max. 500 Ω • 14 digital inputs (optocoupler), max. 30 V • 16 digital outputs, potential-free, max. 60 V, 500 mA
Remote control:	VNC, remote control via PC
Power supply:	110-250 V AC / 50-60 Hz, 50 W
Other functions:	integrated flow measurement
Optional:	• gas conditioning unit • gas sampling equipment

Special models are possible on request.

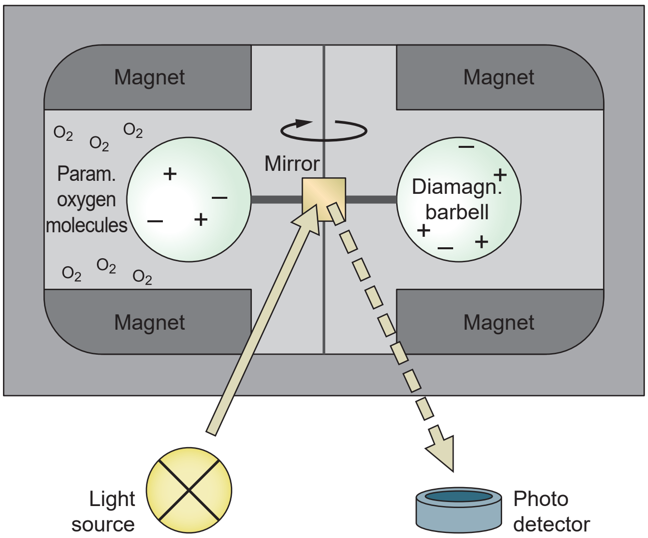
Oxygen measurement



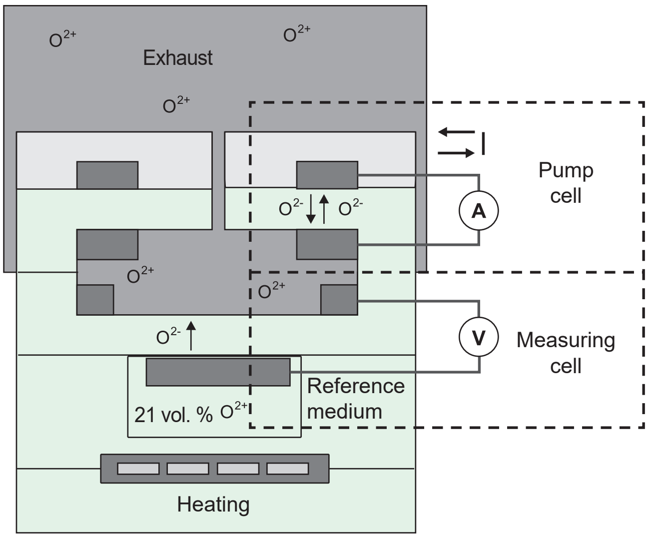
Quick and exact oxygen measuring values are necessary for optimisation of combustion control and emission monitoring. The oxygen analysers of the Dr. Födisch Umweltmesstechnik AG are used for the oxygen concentration measurement in flue and process gases.

The oxygen can be measured by a zirconium dioxide sensor on in-situ-basis or extractively. In this case electrochemical cells or paramagnetic sensors are applied.

Scheme of paramagnetic measuring cell



Scheme of zirconium dioxide sensor



Oxygen measuring devices by comparison

	OMD 14	MGA 12	MGA 12 EX
Field of application			
Process measurement	●	●	●
Application in potentially explosive atmospheres (ATEX)			●
Exhaust conditions:			
• Corrosive gases	●[1]	●	●
• Media temperature over 350 °C		●	●
Device characteristics			
Measuring principle:			
• Electrochemical cell		●	●
• Paramagnetic sensor		●	●
• Zirconium dioxide sensor (O_2)	●		
Measuring arrangement:			
• In-situ	●		
• Extractive		●	●
• Integrated display/operating unit	●	●	●
Data transfer:			
• Analogue outputs 4...20 mA	●	●	●
• Digital outputs (e.g. limit value 1/2, maintenance request, maintenance, failure)	●	●	●
• Remote access		●	●
Other device features:			
• External gas conditioning not necessary	●		
Measuring components			
Oxygen	●	●	●
Temperature	●		
IR components		●	●

[1] *on request as special model*

Oxygen measuring device OMD 14

In-situ measuring device for continuous measurement of the concentration of free oxygen in flue gases and process gases

APPLICATION

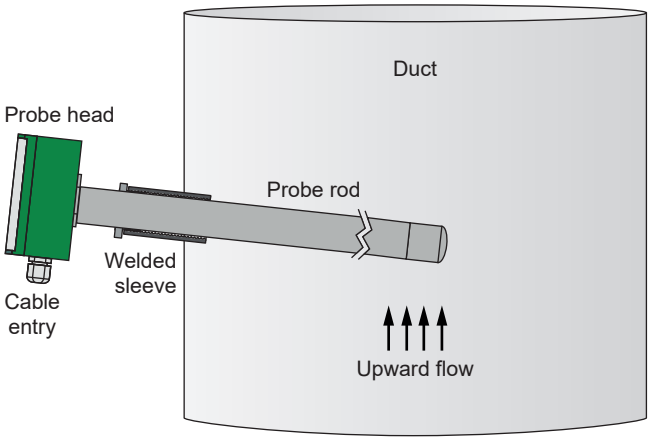
The oxygen measuring device OMD 14 is used for the measurement of the oxygen concentration in flue gases and process gases. It is a compact system with integrated control unit. The probe length can be adapted to the channel dimensions.

Optionally there is the possibility to measure the humidity content (H_2O) or to include a signal for an integrated temperature measurement (PT100).

YOUR BENEFITS AT A GLANCE

- compact device consisting of probe and operating unit → easy installation
- integrated graphic display for ease of operation
- display of O_2 (and optionally H_2O) in vol. %
- very low maintenance requirement
- easy manual calibration with test gases in separate adjustment device
- extremely low operational costs
- different probe lengths possible

INSTALLATION EXAMPLE



PRECONDITIONS ON SITE

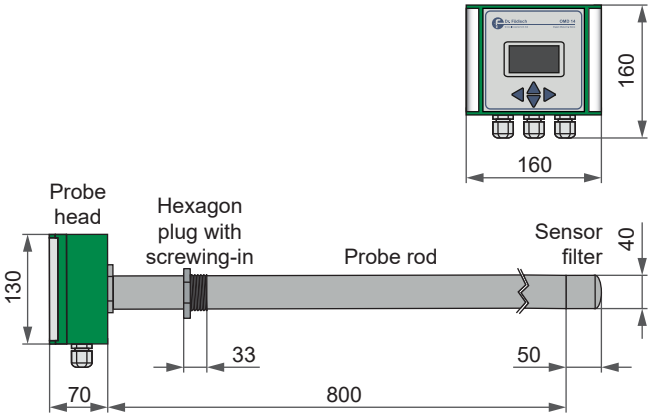
- ambient temperature: -20...+55 °C
- ambient humidity: max. 90% (non-condensing)
- homogenous dust and stack gas distribution
- installation place with run-in/run-out zone of min. 5-fold length of duct diameter
- media temperature: max. 250 °C (optional: max. 350 °C)

DESIGN AND FUNCTION

The OMD 14 consists of an in-situ probe and a probe head. The probe is equipped with a regulated sensor heating and electronics for operating and visualisation. In the probe head the evaluation electronics and the measuring value display are located.

Centrepiece of the device is a two-cell zirconium dioxide sensor. This measures the oxygen concentration by means of the amperometric measuring method. By the provision of the sensor with a higher reference voltage, a measurement of the water vapour content is additionally realised.

DESIGN & DIMENSIONS



TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65; 1 ½" fitting; approx. 160 mm x 160 mm x 930 mm (w x h x d); approx. 5.3 kg
Probe:	in-situ probe with zirconium dioxide sensor; probe rod length: 1000 mm (standard)
Measuring range:	• O_2: 0...25 vol. % (other measuring ranges on request), accuracy: ± 0.2 vol. % • H_2O: 0...40 vol. %, accuracy: ± 2 vol. % • temperature (optional): 0...300 °C (standard)
Response time:	T_{90} < 60 s (dependent on application)
Ambient conditions:	-20...+55 °C; relative humidity: max. 90% (non-condensing)
Media temperature:	max. 250 °C (optional up to 350 °C)
Operational availability:	approx. 15 min (at 20 °C ambient temperature)
Manual calibration:	by optional adjustment device with test gas connection
Maintenance interval:	12 months (standard)
Display:	graphic display in text mode with momentary value display
Inputs:	For connection of one external device for calculation of additional measurands (e.g. temperature) the following inputs are existent: • 1x analogue input (4...20 mA), potential-free • 1x digital input (status)
Outputs:	• 2x analogue output (4...20 mA), potential-free (1x oxygen concentration, 1x optional measurement of H_2O or temperature) • 5x digital output (failure, maintenance, maintenance request, limit value 1 and 2), potential-free, max. switching capacity 25 W, rated voltage 60 V
Interface:	RS485 (Modbus)
Process connection:	1 ½" welding sleeve
Power supply:	12-24 V DC or 100-240 V AC (depending on model); max. 25 W
Optional:	• available sensors: PT100, thermocouple • media temperature up to 350 °C (measuring range: 0...400 °C)

Special models are possible on request.

Multi gas analyser MGA 12 for O_2 measurement

Extractive gas analyser for continuous measurement of oxygen in flue gases and process gases

APPLICATION

The multi gas analyser MGA 12 can be applied as single oxygen measuring device being rather independent from process condition.

For oxygen measurement two different measuring methods are applicable. These are carried out by electrochemical cell respectively by paramagnetic sensor.

YOUR BENEFITS AT A GLANCE

- limit value signalling and measuring range change-over
- two separated gas paths possible
- local diagnosis of the system state
- display of bar diagram
- flow control as well as display of flow rate
- control of a back-purging probe (interval and pulse time)
- control of zero point drift
- low maintenance requirement

POSSIBLE MEASURING RANGES

O_2(E):	0...5 vol. %	0...25 vol. %	-
O_2(P):	0...5 vol. %	0...25 vol. %	0...100 vol. %

E = by measurement of electrochemical cell
P = by measurement of paramagnetic sensor

PRECONDITIONS ON SITE

- ambient temperature: 5...45 °C
- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- appropriate gas sampling and conditioning

ELECTROCHEMICAL CELL

The electrochemical cell consists of a non-porous fluororesin membrane and a solid integrated gold electrode. By the reduction at the gold electrode, current is generated and converted to voltage by a thermistor. Thereby the measured voltage is proportional to the concentration of the measuring gas component.

PARAMAGNETIC SENSOR

The measuring cell consists of a non-homogeneous magnetic field with a diamagnetic, nitrogen-filled glass bar-bell. Therein the paramagnetic oxygen molecules of the measuring gas react. By the therefrom motivated rotation of the glass bar-bell the emitted light of the light source is led via the mirror to the photo detector in the respective interval, whereupon the incoming light signal is proportional to the oxygen concentration in the measuring gas.

TECHNICAL DATA

Housing:	robust housing with compact 19" format 3RU, IP40; 483 mm x 133 mm x 350 mm (w x h x d), approx. 5 kg
Measuring methods:	• electrochemical cell • paramagnetic measuring method
Electrochemical cell:	measuring range: 0...25 vol. %, further on request
Paramagnetic sensor:	• measuring range: 0...5 vol. %, 0...25 vol. %, 0...100 vol. %, further on request • response time: T_{90} < 3 s with 1 l/min (150 ml/min, bypass) flow and gas change from nitrogen to air • repeatability: max. ± 0.03 % (time base for gas switch min. 5 min) • zero point drift: max. ± 0.1% per week • influence at zero point: max. ± 0.05 per °C; no pressure influence • influence at span point: max. 0.2% of measured value per °C; backpressure regulator, no pressure influence • flow error: max. 0.1% with in-build fix bypass • position-dependent zero point deviation: max. 0.02 vol. % per 1° deviation from horizontal position
Ambient conditions:	5...45 °C; relative humidity: max. 90% (non-condensing)
Sensitivity correction:	manual, with test gas (e.g. ambient air); optional: automatic
Display / Operating:	graphic display (LCD), 240 x 128 Pixel, background-lighted; menu-driven operating; display possibility in mg/m³, ppm and vol. %; languages (factory-set): German, English, French, Polish; membrane keyboard
Analogue outputs:	max. 5 active analogue outputs, 4...20 mA, potential-free, burden max. 500 Ohm
Digital inputs:	8 inputs (optocoupler; e.g. for sample probe, measuring gas pipe, gas cooling unit)
Digital outputs:	16 outputs, potential-free, 24 V DC with max. 0.4 A (max. 10 W); amongst others: • output signals for failure, maintenance, maintenance request, limit values, measuring range change-over, Autocal • control of automatic probe back-purging
Service interface RS232:	for remote software, compatible for all Windows operating systems (XP or higher version): • visualisation of all data by intuitive user surface • data storage on PC in TXT format • loading/saving of all relevant configuration data
Power supply:	110 V AC, 230 V AC / 50-60 Hz, 10 W (electrochemical cell) / 20 W (paramagnetic sensor)
Other functions:	• standard: automatic zero point correction • optional: two separated gas paths; internal pump; analyser-specific PC user software for visualisation, (remote) control and recording of data via RS232 interface

Special models are possible on request.

Multi gas analyser MGA 12 EX for O_2 measurement

Extractive gas analyser for continuous measurement of oxygen in potentially explosive atmospheres

- approved for Ex II 2G Ex d IIB+H2 T5 Gb
- protective principle Ex d
- explosive gases can be passed through in a closed loop

APPLICATION

The multi gas analyser MGA 12 EX can be applied as single oxygen measuring device in potentially explosive atmospheres.

For oxygen measurement two different measuring methods are applicable. These are carried out by electrochemical cell respectively by paramagnetic sensor.

YOUR BENEFITS AT A GLANCE

- protective principle Ex d
- pressure-resistant gas path up to 3 bar
- explosive gases can be passed through in a closed loop
- integrated zero gas valve for zero point correction
- all gas-contacting elements are made of metal

POSSIBLE MEASURING RANGES

O_2(E):	0...5 vol. %	0...25 vol. %	-
O_2 (P):	0...5 vol. %	0...25 vol. %	0...100 vol. %

E = by measurement of electrochemical cell
P = by measurement of paramagnetic sensor

PRECONDITIONS ON SITE

- ambient temperature: -20...+40 °C
- protection against percussions/vibrations
- appropriate gas sampling and conditioning

ELECTROCHEMICAL CELL

The electrochemical cell consists of a non-porous fluororesin membrane and a solid integrated gold electrode. By the reduction at the gold electrode, current is generated and converted to voltage by a thermistor. Thereby the measured voltage is proportional to the concentration of the measuring gas component.

PARAMAGNETIC SENSOR

The measuring cell consists of a non-homogeneous magnetic field with a diamagnetic, nitrogen-filled glass bar-bell. Therein the paramagnetic oxygen molecules of the measuring gas react. By the therefrom motivated rotation of the glass bar-bell the emitted light of the light source is led via the mirror to the photo detector in the respective interval, whereupon the incoming light signal is proportional to the oxygen concentration in the measuring gas.

TECHNICAL DATA

Housing:	robust housing, IP66; 315 mm x 415 mm x 178 mm (w x h x d); approx. 24 kg
Measuring methods:	• electrochemical cell • paramagnetic measuring method
Electrochemical cell:	measuring range: 0...25 vol. %
Paramagnetic sensor:	• measuring range: 0...5 vol. %, 0...25 vol. %, 0...100 vol. %, further on request • response time: T_{90} < 3 s with 1 l/min (150 ml/min, bypass) flow and gas change from nitrogen to air • repeatability: max. ± 0.03 % (time base for gas switch min. 5 min) • zero point drift: max. ± 0.1% per week • influence at zero point: max. ± 0.05 per °C; no pressure influence • influence at span point: max. 0.2% of measured value per °C; backpressure regulator, no pressure influence • flow error: max. 0.1% with in-build fix bypass • position-dependent zero point deviation: max. 0.02 vol. % per 1° deviation from horizontal position
Ambient conditions:	-20...+40 °C; relative humidity: max. 90% (non-condensing)
Zero point correction:	automatic by integrated zero gas valve
Sensitivity correction:	manual, with test gas (e.g. ambient air)
Air pressure correction:	internal pressure sensor for real-time pressure compensation of measuring values
Gas inputs/outputs:	measuring gas input, zero gas input, exhaust output, air breather; respectively with flame barrier, 6 mm Swagelok
Display / Operating:	graphic display (LCD), 240 x 128 Pixel, background-lighted; menu-driven operating; display possibility in mg/m³, ppm and vol. %; languages (factory-set): German, English, French, Polish; 6 operating keys
Analogue outputs:	4 active analogue outputs, 4...20 mA, potential-free, burden max. 500 Ohm
Digital outputs:	4 digital outputs, potential-free, 24 V DC with max. 0.4 A (max. 10 W) for failure, maintenance, maintenance request and zero point setting
Service interface:	RS232 and remote software for maintenance and diagnostic purpose
Power supply:	230 V AC / 50-60 Hz, 40 W (max. 90 W)
Special models are possible on request.	

Flow measurement

The continuous velocity and temperature measurement is very important when operating a system with gas flows (for example indoor exhaust air, exhaust gases).

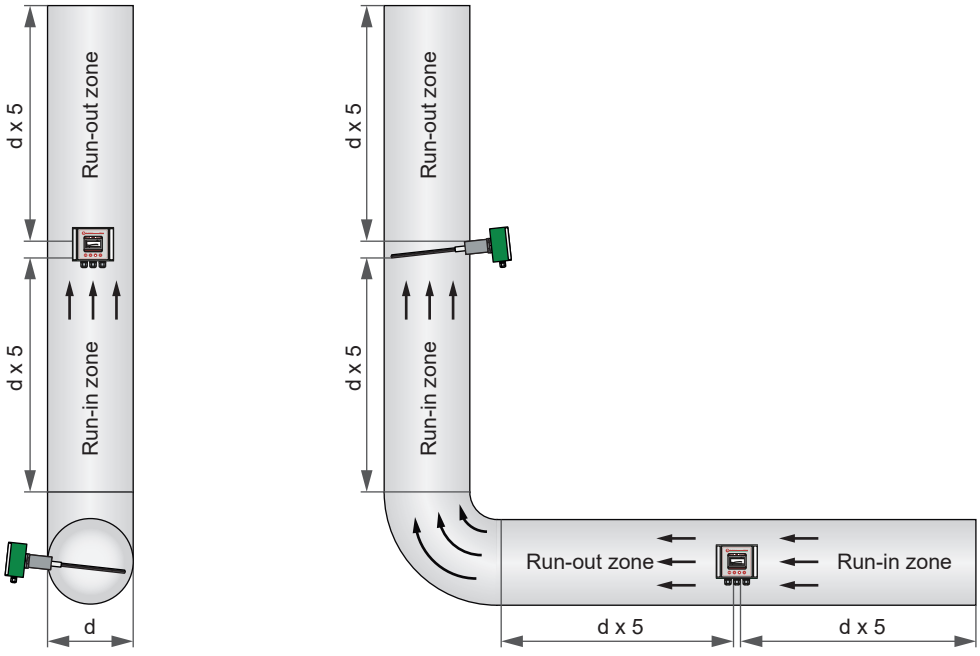
The flow rates are required for standardisation of pollutants' concentrations for the purpose of emission monitoring. For conversion into absolute emitted masses one needs the volume, which is calculated on the gas velocity. This also plays an important role in emissions allowance trading.

Flow measuring devices are mainly applied in:

- coal/gas/oil-fired power plants
- biomass power plants
- energy-from-waste plants
- incinerators
- chemical industry
- fertilizer industry

Device installation at the duct

(Recommendation of Dr. Födisch Umweltmesstechnik AG)



Flow measuring devices by comparison

	FMD 02	FMD 09
Field of application		
Process monitoring of exhaust volume flow resp. of exhaust velocity	●	●
Application in heavily polluted gases with high dust content in the exhaust (> 50 mg/m³)		●
TUV-approved monitoring of exhaust volume flow resp. of exhaust velocity		●[1]
Exhaust conditions:		
• Dry gases	●	●
• Wet gases		●
• Corrosive gases		●
• Media temperature up to 280 °C	●	●
• Media temperature up to 800 °C		●
• Ambient temperature down to -20 °C		●
Device characteristics		
Measuring principle:		
• Dynamic pressure measurement	●	●
Measuring arrangement:		
• In-situ	●	●
• Extractive		
Probe material:		
• 1.4571	●	●
• Hastelloy		●
• Inconel		●
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	●	●
• Variable length of probe rod	●	●
• Back-purging		●
Measuring components		
Volume flow / velocity	●	●
Temperature	●	●
Absolute pressure		●

[1] *suitability tested according to EN 15267-3, certified in compliance with QAL1 and MCERTS Performance Standards*

Flow measuring device FMD 02

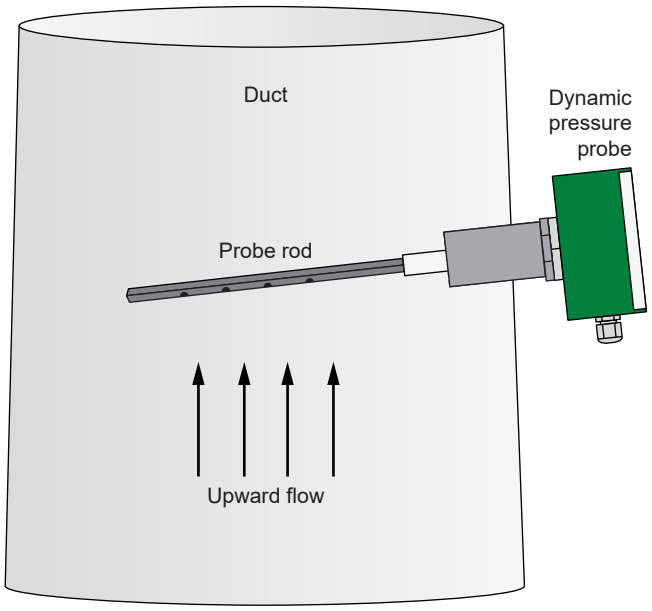
Continuous in-situ measurement of velocity and temperature of gas flows in pipelines

APPLICATION

The use of the measuring principle of dynamic pressure and PT100 assures a device which is easy in design and operating as well as the realtime monitoring of the measuring parameters.

The operating and display unit is integrated in the probe head. On the high-quality display all measuring values, status information and parameters are displayed.

INSTALLATION EXAMPLE



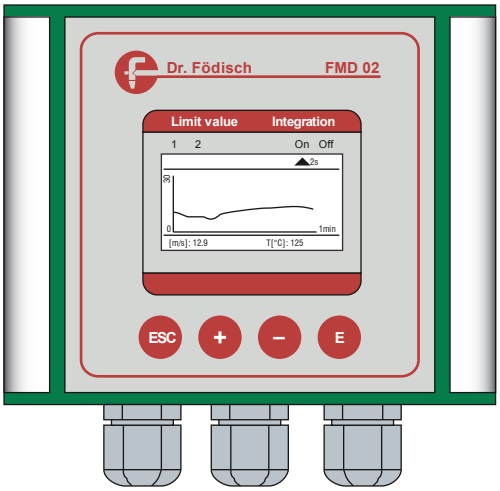
YOUR BENEFITS AT A GLANCE

- compact device consisting of probe and operating unit → no separate operating device necessary
- local diagnosis of system state by integrated graphic display
- real-time display with line diagram
- readout of volume flow at standard reference conditions possible
- easy mounting
- very low maintenance requirement

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
- dew-point spread: min. +5 K
- installation place with run-in/run-out zone of min. 5-fold/2-fold length of duct diameter

OPERATING UNIT



FUNCTION

The continuous measurement of velocity and temperature of gas flows is very important in the operation of a system with flowing gases (e.g. hall outlet air, exhaust etc.).

By the dynamic pressure probe the measuring gas is measured in the exhaust flow. Thereby the differential pressure is continuously measured. The signal which results from the differential pressure is a degree for the velocity of the exhaust. The microcontroller integrated in the device generates a proportional signal and evaluates the volume flow.

TECHNICAL DATA

Housing:	compact device (integrated operating unit); IP65, protection class 1
Dimensions:	approx. 160 mm x 160 mm x 655 mm (w x h x d) (standard)
Weight:	approx. 2.5 kg
Probe:	dynamic pressure probe with integrated PT100; immersion depth: 500 mm (standard)
Display / Operating:	graphic display (128 x 64 Pixel), 4 operating keys
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity respective to atmospheric humidity
Dew-point spread:	min. +5 K
Media temperature:	max. 280 °C (higher temperatures on request)
Flow velocity:	from approx. 3 m/s
Measuring ranges:	• velocity: 0…40 m/s • volume flow: 0...1.000.000 m³/h • differential pressure: 0...10 mbar (standard) • temperature: 0...300 °C
Operational availability:	after approx. 5-15 min
Analogue outputs:	2x 4...20 mA; selection of following measurands: velocity, volume flow, differential pressure, temperature and optionally absolute pressure; burden: max. 500 Ω
Digital outputs:	status signals max. 24 V DC at 0.1 A: failure (normally closed, at failure open), limit value 1 and 2 (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:	110/230 V AC, 50-60 Hz, 24 V DC, 5W

Special models are possible on request.

Flow measuring device FMD 09

Continuous in-situ measurement of velocity, temperature and absolute pressure of gas flows in pipelines

- certified in compliance with MCERTS Performance Standards
- certificate no.: Sira MC170329/00

- certified in compliance with GOST
- certificate no.: МП-2550-0272-2016

- EN 15267-3 tested
- QAL1 certified
- TUV approved
- annual inspection

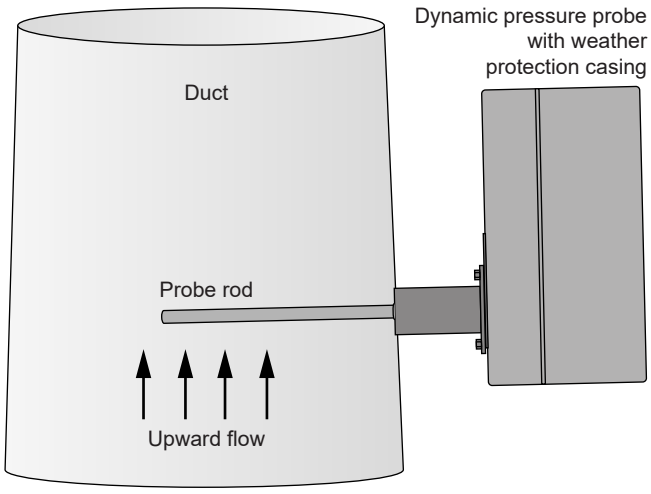
APPLICATION

The use of the measuring principle of dynamic pressure and PT100 assures a device which is easy in design and operating as well as the realtime monitoring of the measuring parameters.

The operating and display unit is integrated in the weather protection casing. On the high-quality display all measuring values, status information and parameters are displayed.

Optionally, the absolute pressure at the measuring point can be measured continuously by an absolute pressure transmitter.

INSTALLATION EXAMPLE



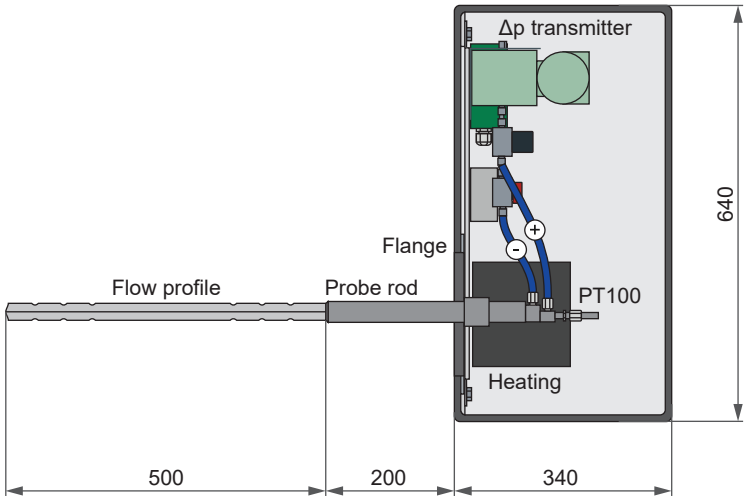
YOUR BENEFITS AT A GLANCE

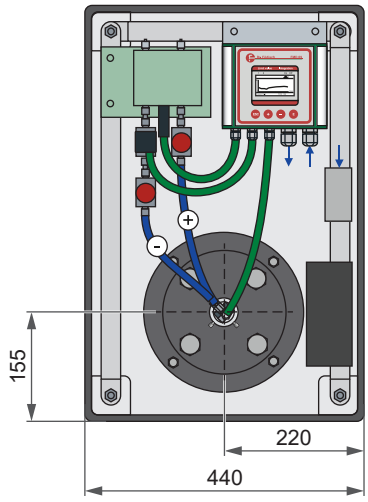
- compact device consisting of probe and operating unit → no separate operating device necessary
- local diagnosis of system state by integrated graphic display
- real-time display with line diagram
- readout of volume flow at standard reference conditions possible
- easy mounting
- very low maintenance requirement
- absolute pressure measurement (optional)

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

DESIGN & DIMENSIONS

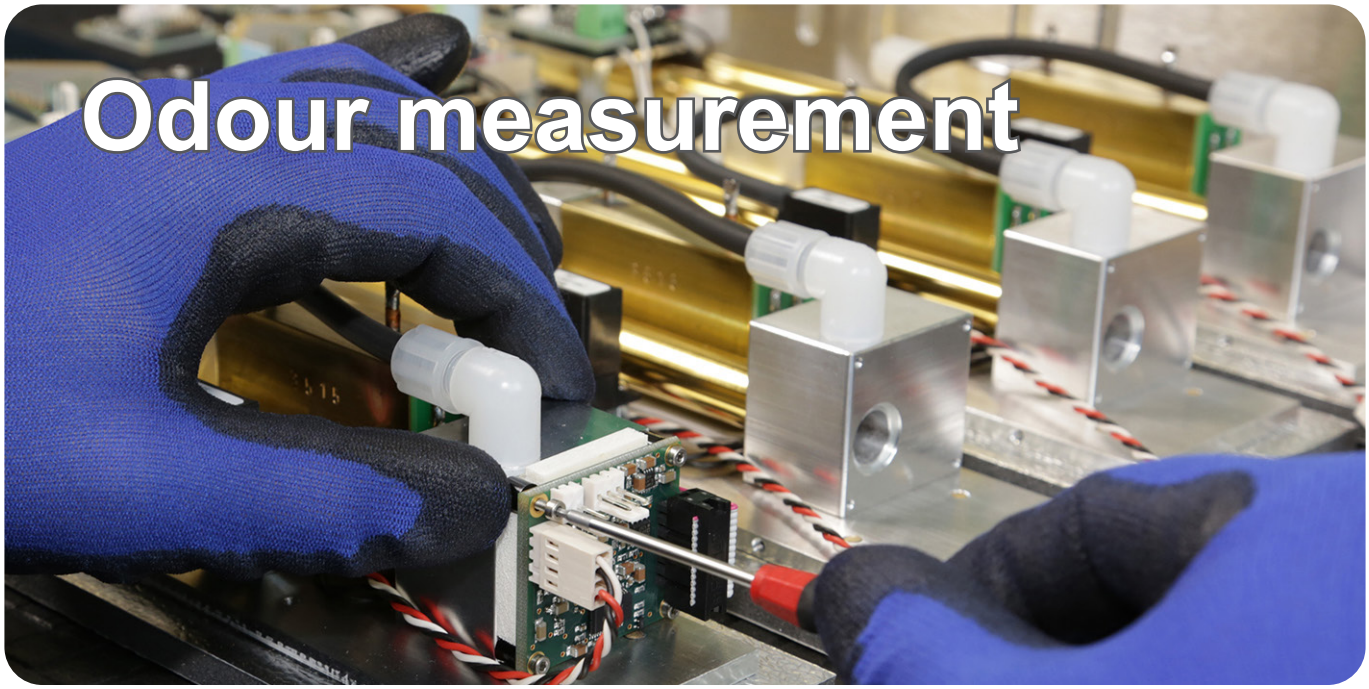




TECHNICAL DATA

Housing:	probe with GRP weather protection casing, IP55; 440 mm x 640 mm x 1040 mm (w x h x d), approx. 30 kg
Probe:	dynamic pressure probe with integrated PT100; immersion depth: 500 mm (standard)
Display / Operating:	integrated operating unit with graphic display and 4 operating keys
Ambient temperature:	-20...+50 °C
Relative humidity:	no special sensitivity respective to atmospheric humidity
Media temperature:	max. 280 °C (higher temperatures on request)
Flow velocity:	from approx. 3 m/s
Measuring ranges:	• velocity: 0...30 m/s (0...60 m/s) • volume flow (in operation / in standard condition dry): 0...3.200.000 m³/h • differential pressure: 0...5 mbar (0...10 mbar), measurement uncertainty <1% • temperature: 0...300 °C (0...800 °C), measurement uncertainty <1% • absolute pressure (optional): 800...1200 mbar
Operational availability:	after approx. 1 min
Analogue outputs:	3x 4...20 mA; selection of the following measurands: velocity, volume flow (in operation / in standard condition dry), differential pressure, temperature and optionally absolute pressure; burden: max. 500 Ω
Digital outputs:	status signals: max. 24 V DC at 0.1 A; failure, maintenance, limit value 1 and 2
Process connection:	flange DN 80 PN 6
Power supply:	110/230 V AC, 50-60 Hz, 24 V DC, 5W
Optional:	• readout of absolute pressure (measuring range: 800...1200 mbar) • feeding of frost protection heating (230 V AC, 500 W) • manual or automatic back-purging
Special models are possible on request.	

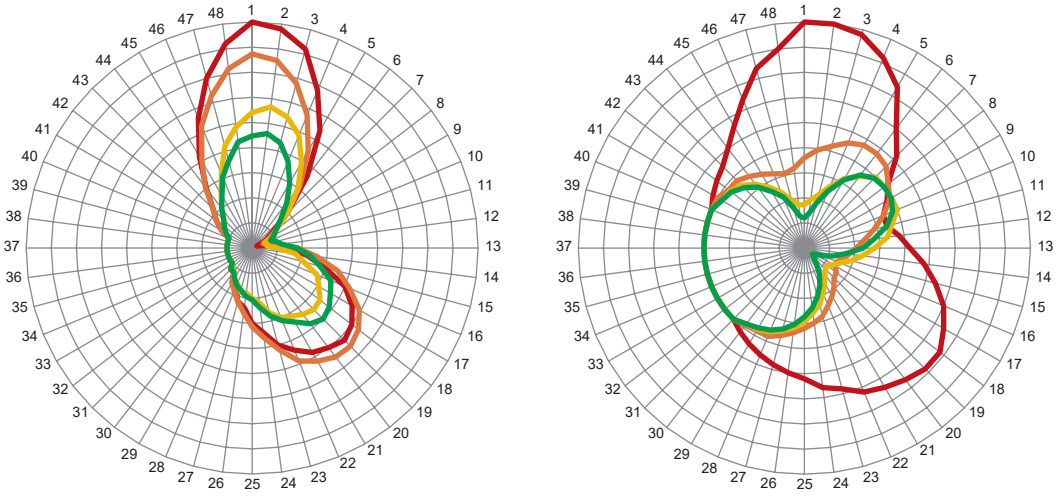
Odour measurement



Smells are only perceptible in a subjective way and can hardly be quantified. Especially in locations with high building density these smells are regarded as an annoyance. Upon making food or other productions smells can arise from various processes. In order to measure smells, complex gas sampling equipment and elaborate evaluation software are required.

The smell analyser of the Dr. Födisch Umweltmesstechnik AG can be used for continuous monitoring of odour emissions in order to identify early potentially bad smells for the neighbourhood and thereby to ensure an environmentally-friendly plant operation. The measuring system detects the composition respectively of the pattern of smells.

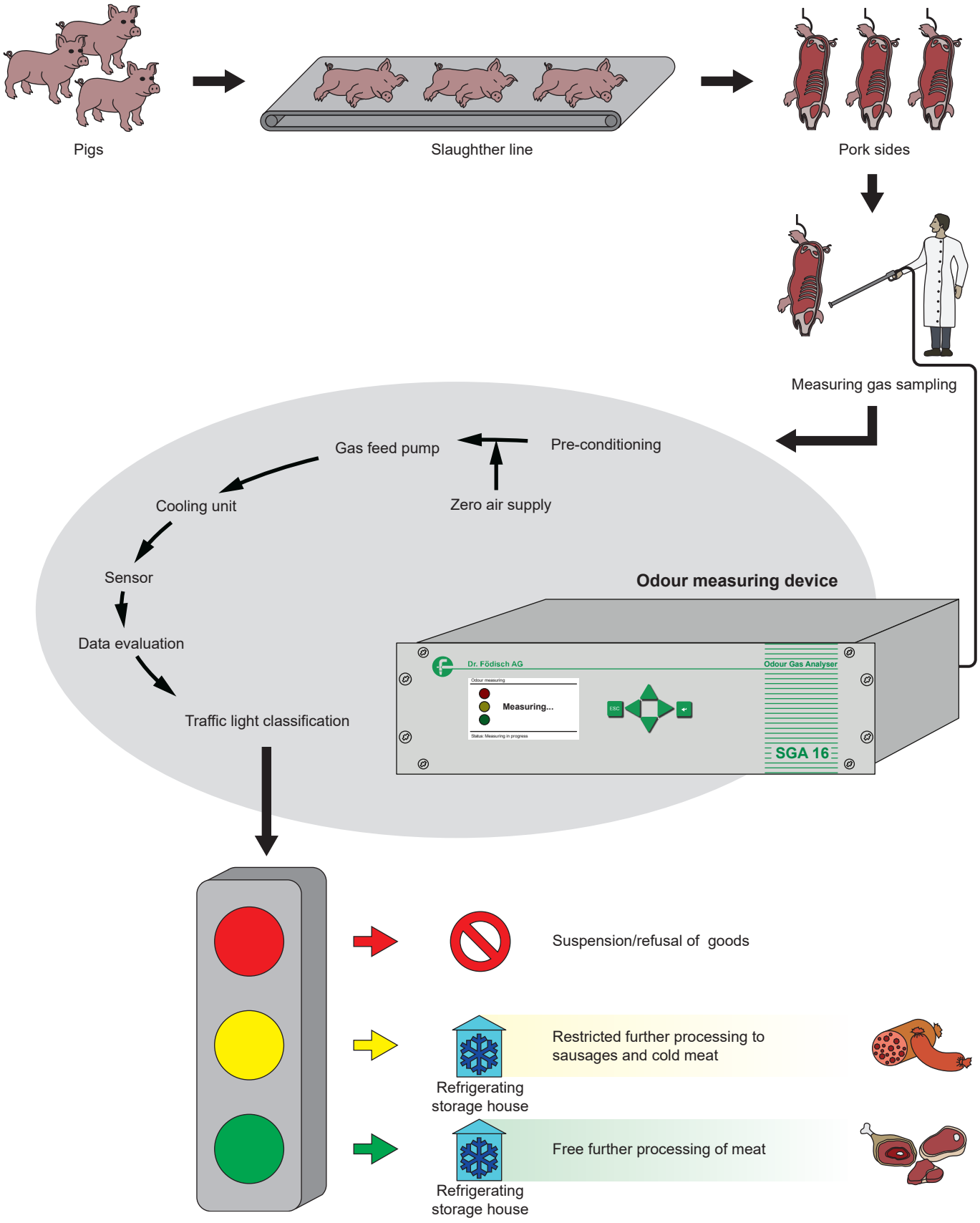
Patterns of an odour measurement



** sensors are differently configured and react depending on the different carbon/hydrogen compounds*

Procedure and evaluation of an odour measurement

(based on the example of meat production)



Odour measuring device SGA 16

Continuous monitoring of odour emissions

APPLICATION

Odours arise from the interaction of different chemical substances. So for example, the failure of a system (e.g. ionisation plant) causes an immediate odour development. To recognise potential smell nuisance early and to keep it away from the ambience, odour emissions can be monitored and subsequently an environment-friendly operation of plants can be assured.

FUNCTION

The sampled measuring gas is led into the photometer in the device. On the basis of infrared absorption there the measurement of volatile hydrocarbons (C_xH_y), specifically methane (CH_4) and carbon dioxide (CO_2), is made. For the recognition of the odour pattern a virtual gas sensor array is integrated. This reacts to different concentrations of the volatile hydrocarbons. The registration and allocation of all measuring data is carried out by the internal electronics. By means of the comprehensive evaluation software the stored odour patterns are recognised and evaluated.

APPLICATION EXAMPLES

- monitoring of air purification plants
- waste air of breweries
- general recognition of odour sources

YOUR BENEFITS AT A GLANCE

- high selectivity through the use of versatile sensors
- periodical zero point setting against possible drift of the sensors
- plausibility control of the measuring results

PRECONDITIONS ON SITE

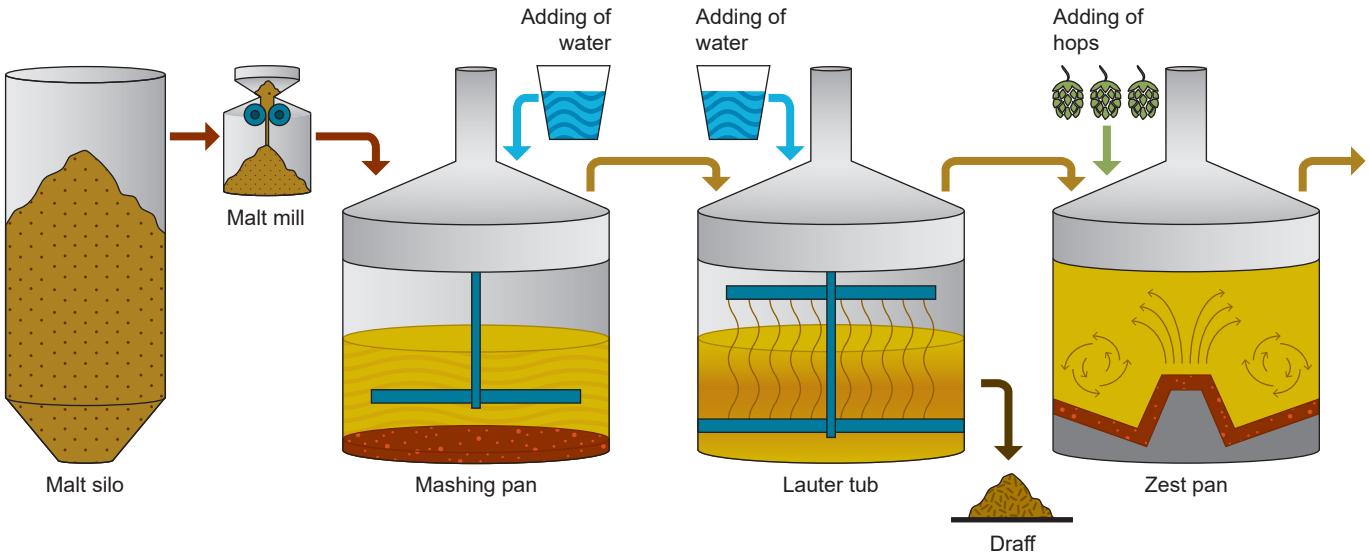
- ambient temperature: 5...45 °C
- installation place indoors and dust-free
- protection against wetness
- protection against percussions/vibrations
- appropriate gas sampling and conditioning

INTERNAL GAS FLOW CHART

APPLICATION EXAMPLE 1: ODOUR DEVELOPMENT IN BREWERIES

A process of brewing consists of several processes, which cause different odour developments. The following figure shows the possible sources of odour development during the process of brewing. By adding water and increasing the temperature the first typical odours develop. The major odour development by far arises during the cooking in the zest pan.

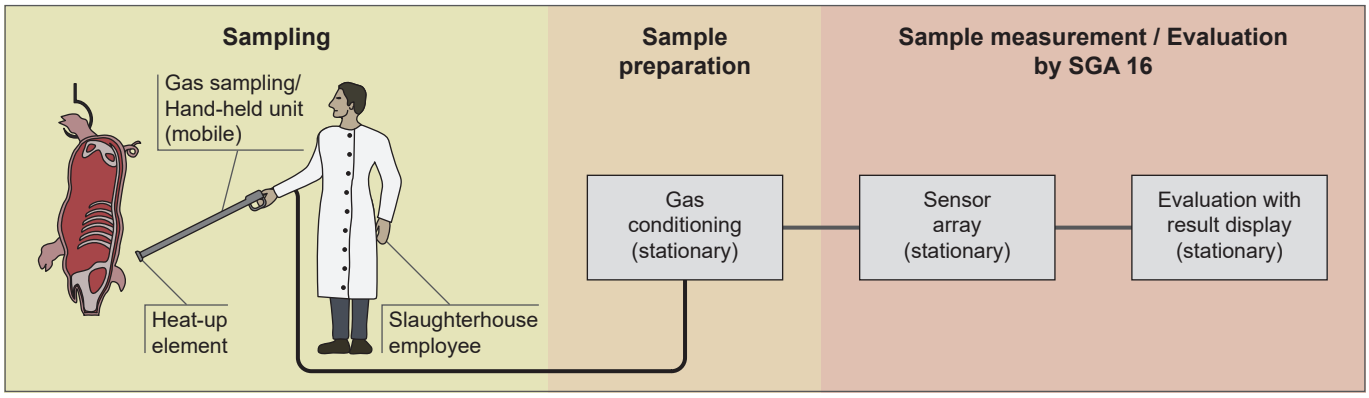
These odours can also be noticed as smell nuisance in the environment of the brewery. For early detection the SGA 16 can be used for odour measurement in the brewery hall. The odours from the process of brewering are supplied to the device and compared with predefined odour samples so that respective counteractive measures can be implemented for the hall exhaust air at an early stage.

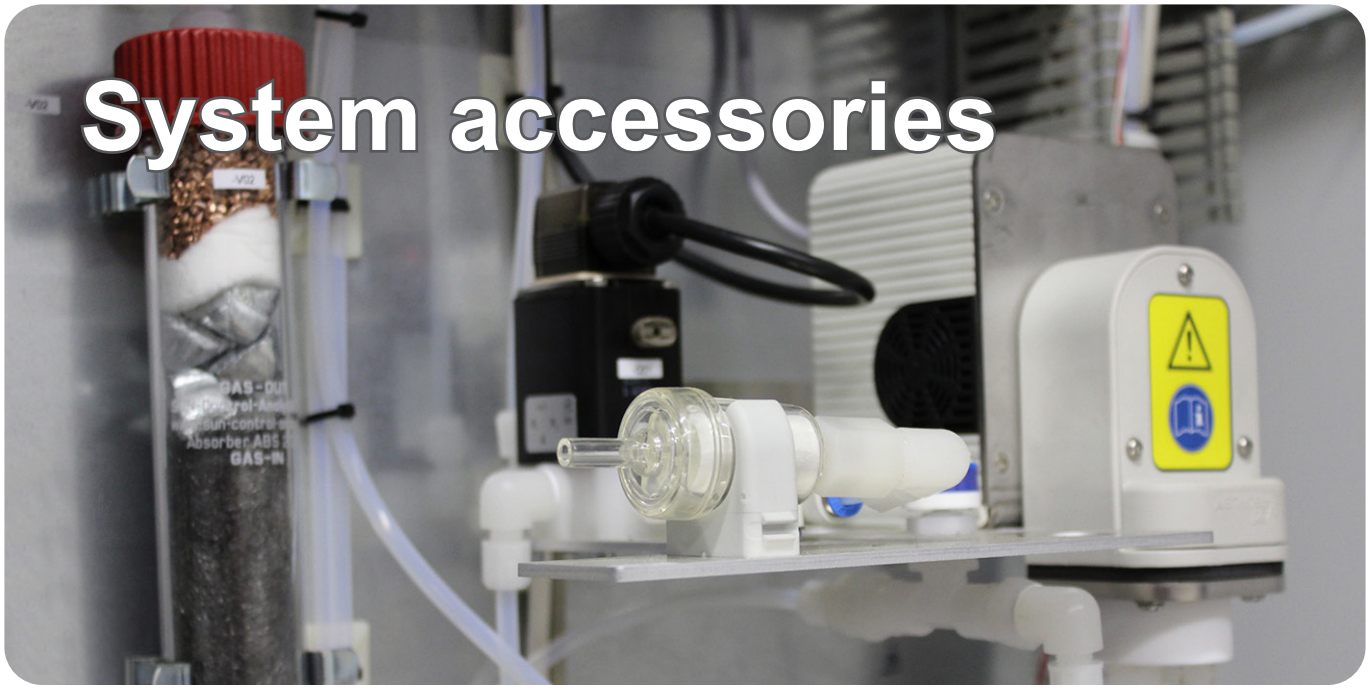


APPLICATION EXAMPLE 2: DETECTION OF BOAR SMELLS AT MEAT PRODUCTION

Male piglets produce hormones upon their sexual maturity which can initiate a disagreeable boar smell. This smell can decrease the sales of boar meat. At slaughtering a definition of these odours is currently made by manual odour tests. In order to standardise the judgement of the smell objectively, with the aid of the SGA 16 a respective check can be made.

The sampling is thereby made via an additional hand-held unit by which the neck fat is heated and the therein stored hormones are volatilised and sucked. Through a connected tube the extracted gas is led into the SGA 16 where the final measurement and evaluation of the odour sample is carried out.

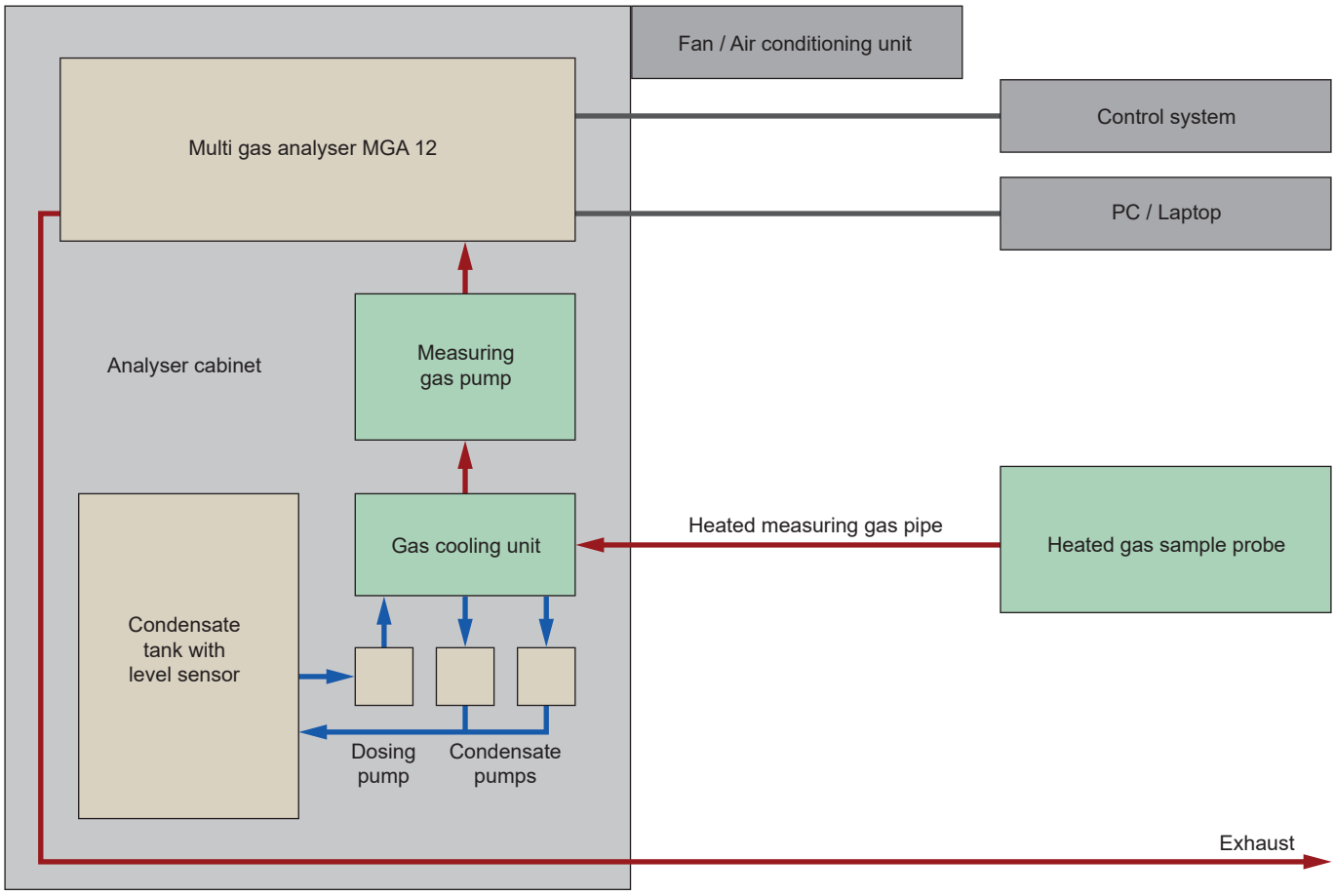




System accessories

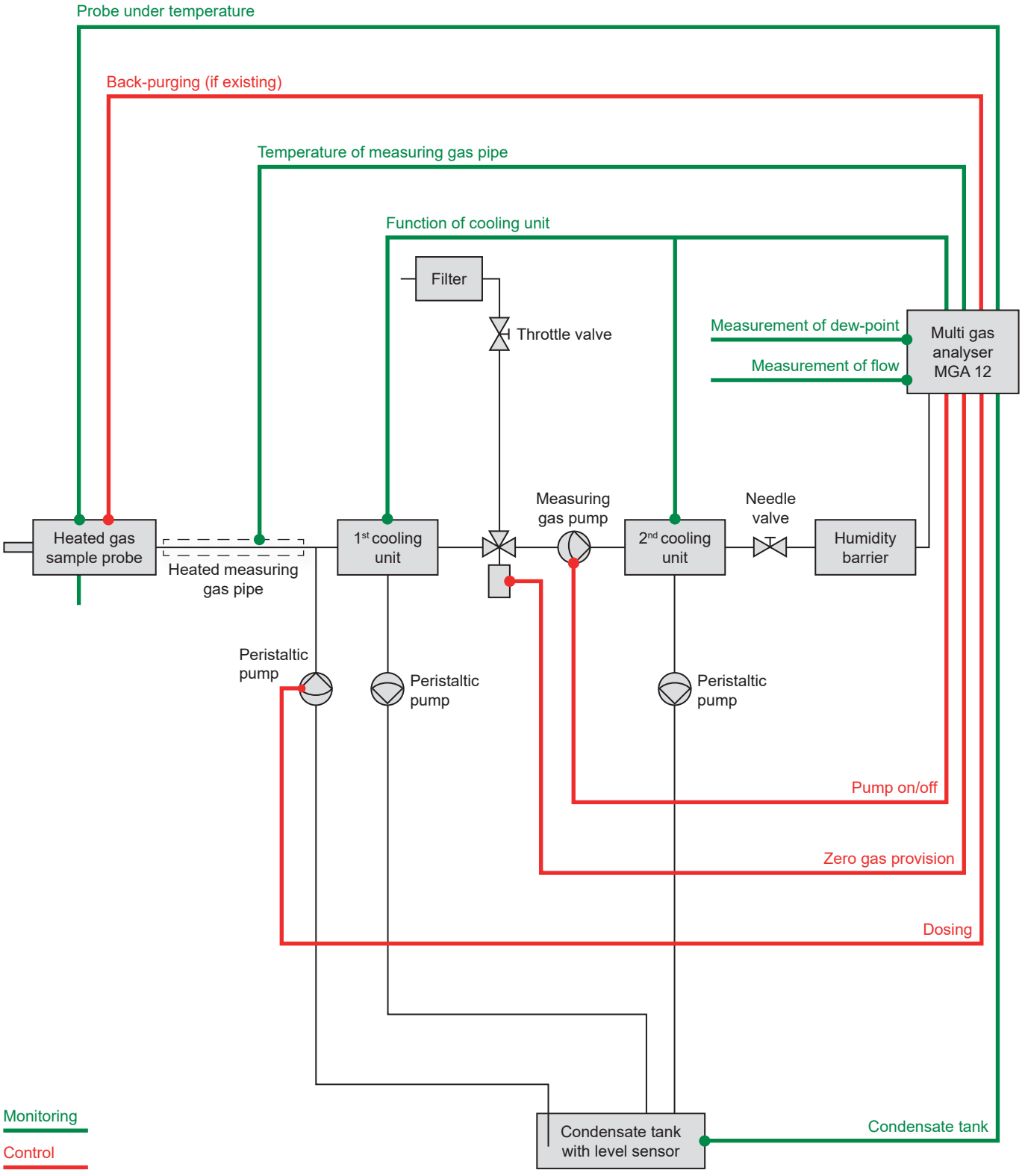
In order to complete the portfolio it is possible to purchase system-relevant components. That allows system integration companies to assemble systems locally while keeping the compliance with QAL 1 certification at the same time.

System scheme of analyser system



Monitoring and control in gas analysis systems

(based on the example of MGA 12 system)



Heated sample probe HSP 12

Extractive gas sampling in cold gas measuring systems for continuous emission measurement

YOUR BENEFITS AT A GLANCE

- self-regulating
- under temperature alarm
- low maintenance costs
- applicable for integration in gas measuring systems of MGA 12

PRECONDITIONS ON SITE

- ambient temperature: -20...+80 °C
- probe tube (optionally available, standard 1000 mm)
- flange for installation
- cable tray

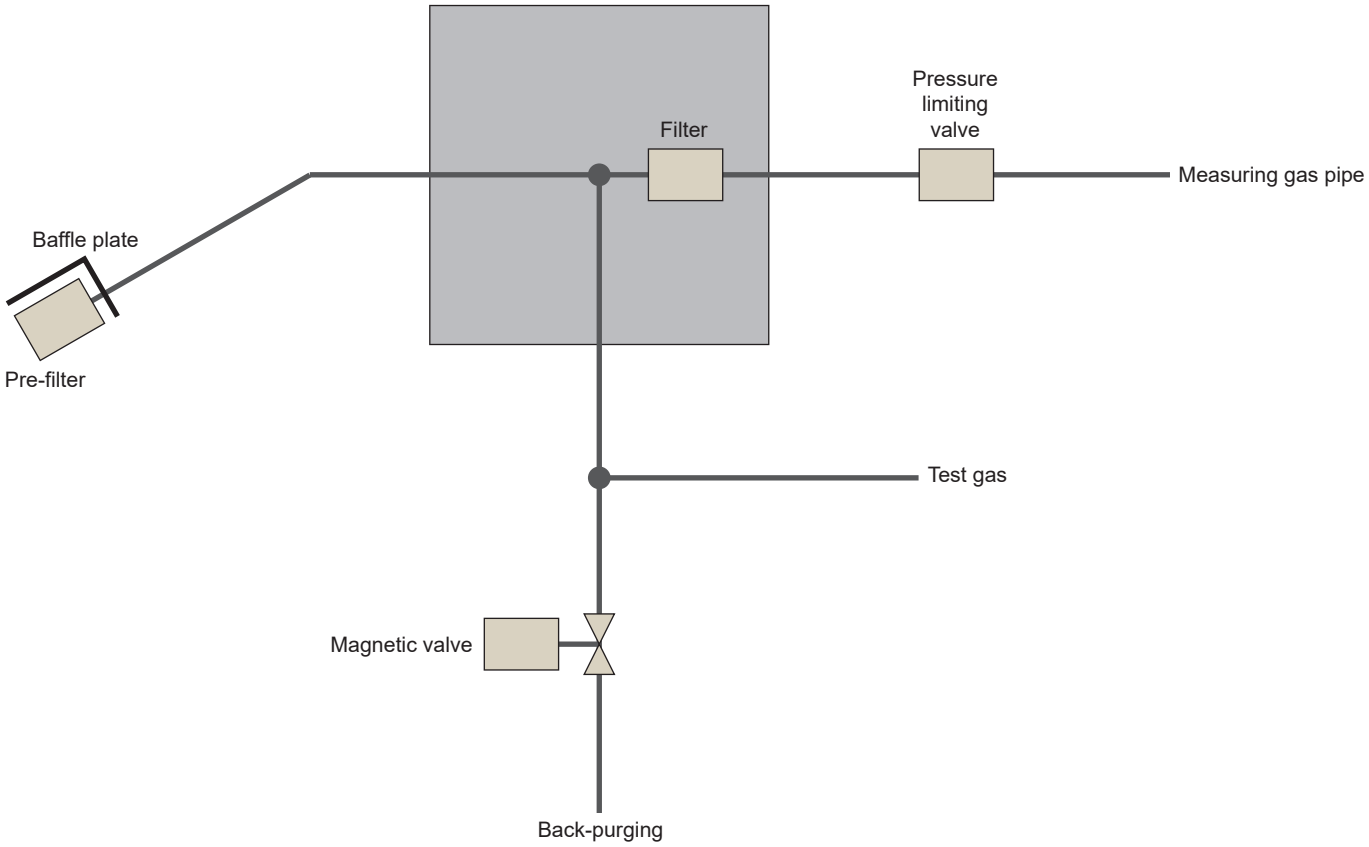
TECHNICAL DATA

Housing:	probe with isolation and outlet filter, IP54
Dimensions:	approx. 225 mm x 280 mm x 300 mm (w x h x d)
Weight:	approx. 15 kg
Material:	• probe: 1.4571 • sealing: Graphit/1.4404
Filter material:	• ceramics, filter fineness: 3 µm • stainless steel, filter fineness: 5 µm
Ambient temperature:	-20...+80 °C
Exhaust temperature:	max. 600 °C
Dust loading:	max. 2 g/m³
Operating pressure:	max. 6 bar
Probe temperature:	max. 200 °C, self-regulating by heating elements
Under temperature alarm:	contact open at < 140 °C
Connections:	• process connection: flange DN 65 PN 6 • measuring gas: NPT 1/4" • test gas: tube Ø 6 mm
Power supply:	115/230 V, 50/60 Hz, 500 VA

Special models are possible on request.

Optional back-purging

FUNCTIONAL SCHEME



TECHNICAL DATA OF PROBE BACK-PURGING

Connections:	• process connection: flange DN 65 PN 6 • measuring gas: DN 4/6 • test gas: DN 4/6 • back-purging: DN 6/8
Back-purging pressure:	max. 6 bar
Differential pressure at test gas:	min. 100 mbar (overflow method)
Pressure limiting valve:	max. 1.2 bar
Pre-filter:	filter fineness: 5 µm, differential pressure: 13 mbar
Power supply:	24 V / 8 W for magnetic valve
Accessories:	• pressure limiting valve (ETLA 666) • magnetic valve (ETLD 608) • pre-filter (ETLA 968) • baffle plate (ETLA 969)

Special models are possible on request.

Measuring gas pump MGP 12

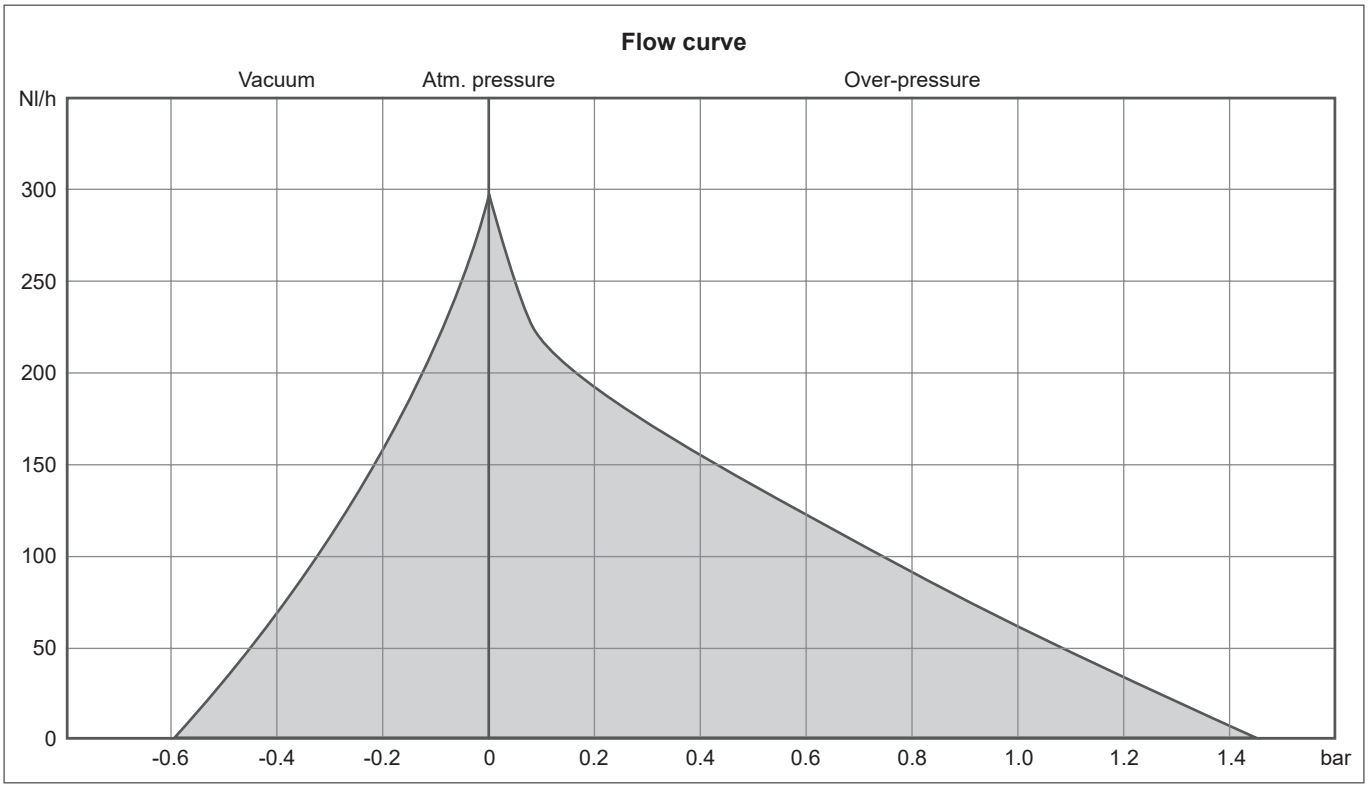
Gas conveyance in cold gas measuring systems for continuous emission measurement

YOUR BENEFITS AT A GLANCE

- bellow pump in compact design
- applicable in heavily polluted ambience
- pre-assembled → easy mounting
- low-noise operation
- low maintenance costs
- applicable for integration in gas measuring system of MGA 12

PRECONDITIONS ON SITE

- ambient temperature: 0...50 °C
- installation in closed housings
- protection against touching of energised or moving elements
- protection against wetness and pollution
- protection against percussions/vibrations



TECHNICAL DATA

Housing:	bellow pump with motor and integrated fan, IP20
Dimensions:	approx. 65 mm x 120 mm x 130 mm (w x h x d)
Weight:	approx. 1.3 kg
Media-touching materials:	PTFE, PCDC, 1.4571, 1.4401
Ambient conditions:	0...50 °C; max. 1000 m a.s.l.
Media temperature:	70 °C
Nominal flow rate:	280 l/h
Admission pressure:	max. 0.3 bar
Gas connections:	G 1/4"
Power supply:	115/230 V ± 5%, 50/60 Hz ± 2%, 100 W
Special models are possible on request.	

Peltier gas cooling unit GCU 16

Cooling unit for conditioning of measuring gas in gas analysis systems for protection of subsequent analysis device

APPLICATION

Safe process management depends on the prompt and precise determination of the respective operating parameters. Hence the gas analysis is an important precondition for the safe and efficient control of process flows, for protection of the environment as well as for quality assurance.

Many analysis techniques require the extraction of the measuring gas. However, this results in process-related impurity by particles or moisture and influences measuring results. Therefore the sampled measuring gas must be conditioned by a gas cooling unit before entry into the analysis device. This is, for example, applied at the monitoring of flue gas emissions in power plants.

YOUR BENEFITS AT A GLANCE

- compact design
- decreasing of water content in the measuring gas to a constant, lower dew-point → precipitation of water
- designed for the requirements in automated measuring systems (AMS) acc. to EN 15267-3
- pre-assembled → easy mounting
- short commissioning time
- display of current cooling block temperature
- nominal value of cooling block temperature and alarm limits adjustable
- low-noise operation
- low maintenance costs

PRECONDITIONS ON SITE

- ambient temperature: 5...50 °C
- gas inlet temperature max. 140 °C
- installation place indoors
- protection against wetness
- protection against percussions/vibrations

OPERATING UNIT

FUNCTION

The control of the cooling unit is made by a microprocessor. For operating the device possesses a graphic display with five operating keys. As a main display the current cooling block temperature is shown. Via the menu, amongst others, its nominal value as well as the alarm limits for over-/undershooting the nominal value can be adjusted. Messages are signalled via the status LEDs and the graphic display as well as they are output via the alarm output.

In the gas analysis system the alarm output can be used for example for controlling a measuring gas pump to enable a switch-on of the measuring gas not before reaching the admissible cooling range. The GCU 16 is equipped with two heat exchangers (optionally made of glass or PVDF) which are factory-set considered by the control.

TECHNICAL DATA

Housing:	stainless steel housing, IP20
Dimensions:	approx. 310 mm x 190 mm x 180 mm (w x h x d)
Weight:	approx. 7.5 kg
Display / Operating:	graphic display, 3 status LEDs, 5 operating keys; cooling block temperature as well as alarm limits adjustable via menu; temperature value output selectable in °C or °F
Cooling:	by Peltier effect; cooling power: 90 kJ/h at 25 °C ambient temperature
Ambient temperature:	operation: 5...50 °C; storage: -20 ... +60 °C
Dew-point stability:	0.1 K
Gas temperature:	inlet temperature: max. 140 °C ; outlet temperature: 2...20 °C (preset: 5 °C)
Flow rate:	max. 2 l/min (at 65 °C gas inlet temperature)
Differential pressure at 2 l/min:	19 mbar
Dead volume of heat exchanger:	glass: 19 ml (for each heat exchanger); PVDF: 18 ml (for each heat exchanger)
Pressure inside of heat exchanger:	glass: max. 3 bar; PVDF: max. 2 bar (max. permissible system operating pressure limited by possibly used peristaltic pumps and filters)
Connections of heat exchanger (metric):	glass: measuring gas inlet/outlet: GL14 (6 mm), condensate outlet: GL18 (8 mm); PVDF: measuring gas inlet/outlet: DN 4/6, condensate outlet: G1/4
Switching capacity of status contact:	potential-free output (alarm output), max. 250 V AC, 150 V DC, 2 A, 50 W
Power supply:	230 V AC / 50 Hz, max. 140 VA / 110 W
Electrical connections:	connector according to EN 175301-803 (power supply, alarm output)
Cable cross-section / tightening zone:	max. 1.5 mm² / 8...10 mm (adapted to rated current)
Mechanical load:	2...13.2 Hz, amplitude ± 1.0 mm, acceleration 13.2...100 Hz (tested according to DNVGL-CG-0339, table 6)
Optional:	• power supply 110 V AC, 60 Hz • material of heat exchanger: glass or PVDF

Special models are possible on request.

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