FWE200DH – EXTRACTIVE SCATTERED LIGHT DUST MEASURING DEVICE

RELIABLE DUST MEASUREMENT IN WET GASES

Dust measuring devices
RELIABLE DUST MEASUREMENT IN WET GASES

Particle measurement in a very wide range of application areas – from very small to average dust concentrations

Since drop formation interferes with the measurement of dust concentrations, measuring in wet exhaust gases, for example downstream from a flue gas desulfurization system, can be difficult. The Extractive Dust Measuring System FWE200DH measures small to medium dust concentrations accurately and very reliably. The gas is extracted via a sampling probe and heated above dew point. Any droplets in the gas are vaporized, making it impossible for them to falsify the measurement results.
Principle of operation

The FWE200DH operates as a bypass system. A partial gas flow is exhausted out of the gas duct via a sample gas probe and heated up in a thermocyclone, so that water drops and aerosols vaporize. Afterwards the sample gas is fed in a measurement cell in which a laser beam illuminates the particles contained in the gas and thus generates scattered light. A sensitive receiver measures this scattered light extremely accurately. The scattered light intensity measured in this way is the basis for determining the dust concentration. Finally the sample gas is again fed back via the sample gas probe into the gas duct.
Product description
The FWE200DH dust measuring system is designed to measure dust concentrations in wet gases. The gas is extracted via a sampling probe and heated above dew point in a thermocyclone. All of the droplets contained in the gas are condensed and are thus unable to falsify the measurement result. The scattered light measuring principle enables even minimal dust concentrations to be measured. The FWE200DH meets the requirements of the EN 14181 and the EN15267.

At a glance
- For very low to medium dust concentrations
- Gas sampling and return combined in one probe
- Contamination check
- Automatic monitoring of zero and reference point
- Easy parameterization and convenient operation – optionally via supplemental remote unit
- Integrated system diagnostics for early detection of maintenance requirements

Your benefits
- Reliable and approved dust measurement in wet gas
- Efficient operation due to very few expendable items and very low installation requirements
- Low-maintenance thanks to the absence of moving parts coming into contact with aggressive gas
- Compact design for installation directly on the duct
- Simple commissioning directly at the measuring site due to automatic measuring range adjustment
- Very long life cycle due to compact design

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For more information, simply visit the above link to obtain direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.
**Fields of application**

- Monitoring of wet scrubber facilities
- Measurement in saturated gas downstream of desulfurization plants
- Determination of dust concentrations in wet exhaust air

**Detailed technical data**

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications.

**FWE200DH system**

<table>
<thead>
<tr>
<th>Measured values</th>
<th>Scattered light intensity, dust concentration (after gravimetric comparison measurement)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-tested measurands</td>
<td>Dust concentration</td>
</tr>
<tr>
<td>Measurement principles</td>
<td>Scattered light forward</td>
</tr>
<tr>
<td>Spectral range</td>
<td>640 nm ... 660 nm Laser, protection class 2, power &lt; 1 mW</td>
</tr>
<tr>
<td>Measuring ranges</td>
<td>Dust concentration 0 ... 5 mg/m³ / 0 ... 200 mg/m³ Measuring ranges freely selectable Higher measuring ranges on request</td>
</tr>
<tr>
<td>Response time ($t_{90}$)</td>
<td>0.1 s ... 600 s Freely adjustable</td>
</tr>
<tr>
<td>Accuracy</td>
<td>± 2 % Of measuring range full scale</td>
</tr>
<tr>
<td>Process temperature</td>
<td>PVDF probe: ≤ +120 °C Hastelloy probe: ≤ +220 °C Versions for higher temperatures on request</td>
</tr>
<tr>
<td>Process pressure</td>
<td>With SLV7 2BH1100 purge air unit: –20 hPa ... 20 hPa</td>
</tr>
<tr>
<td>Process gas velocity</td>
<td>7 m/s ... 30 m/s</td>
</tr>
<tr>
<td>Process gas humidity</td>
<td>Max. 10 g/m³ liquid water without water vapour</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>–20 °C ... +50 °C Intake temperatures for purge air: –20 °C ... +45 °C</td>
</tr>
<tr>
<td>Conformities</td>
<td>Approved for plants requiring approval 2001/80/EC (13. BImSchV) 2000/76/EC (17. BImSchV) 27. BImSchV TA-Luft (Prevention of Air Pollution) EN 15267 EN 14181 U.S. EPA PS-11 compliant</td>
</tr>
<tr>
<td>Electrical safety</td>
<td>CE</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>System: IP 54 Control unit: IP 65</td>
</tr>
<tr>
<td>Analog outputs</td>
<td>3 outputs: 0/2/4 ... 20 mA, 750 Ω Electrically isolated</td>
</tr>
<tr>
<td>Analog inputs</td>
<td>6 inputs: 0 ... 20 mA Not electrically isolated</td>
</tr>
<tr>
<td>Digital outputs</td>
<td>5 relay outputs (change-over contacts), potential-free: 48 V, 1 A</td>
</tr>
<tr>
<td>Digital inputs</td>
<td>8 inputs: Potential-free</td>
</tr>
</tbody>
</table>
## Interfaces and bus protocols

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>Modbus TCP</td>
</tr>
<tr>
<td>Ethernet</td>
<td>OPC (via optional interface module)</td>
</tr>
<tr>
<td>Ethernet</td>
<td>SOPAS ET (via optional interface module)</td>
</tr>
<tr>
<td>RS-485</td>
<td>Modbus RTU (via optional interface module)</td>
</tr>
<tr>
<td>RS-485</td>
<td>PROFIBUS DP (via optional interface module)</td>
</tr>
<tr>
<td>RS-485</td>
<td>SOPAS ET (via optional interface module)</td>
</tr>
<tr>
<td>USB</td>
<td>SOPAS ET</td>
</tr>
<tr>
<td>RS-232</td>
<td>Proprietary service interface</td>
</tr>
</tbody>
</table>

## Indication

- LC display and status LEDs on control and remote unit

## Input

- Functional keys

## Operation

Menu-driven operation via control unit or software SOPAS ET

## Dimensions (W x H x D)

813 mm x 722 mm x 286 mm (FWE200DH measuring and control unit, for details see dimensional drawings)

## Weight

- FWE200DH measuring and control unit: 65 kg
- Sampling probe: ≤ 15 kg

## Power supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>115 V / 230 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50 Hz / 60 Hz</td>
</tr>
<tr>
<td>Power consumption</td>
<td>≤ 1.7 kW</td>
</tr>
</tbody>
</table>

Without heated sample gas line

## Test functions

- Automatic self-test (linearity, contamination, drift, aging)
- Contamination limits: at 30% warning, at 40% failure
- Manual linearity test with reference filter

## Options

- FWE200DH mounting rack

### SLV7-1 purge air unit, 2BH1100, 1-ph

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit to provide dust-free air for flushing of optical surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas flow rate</td>
<td>30 m³/h ... 40 m³/h</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 °C ... +45 °C Intake temperatures for purge air</td>
</tr>
<tr>
<td>Enclosure rating</td>
<td>IP 54</td>
</tr>
<tr>
<td>Dimensions (W x H x D)</td>
<td>550 mm x 550 mm x 258 mm (for details see dimensional drawings)</td>
</tr>
<tr>
<td>Weight</td>
<td>16 kg</td>
</tr>
</tbody>
</table>

## Power supply

<table>
<thead>
<tr>
<th>Voltage</th>
<th>230 V / 115 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50 Hz / 60 Hz</td>
</tr>
</tbody>
</table>

## Auxiliary gas connections

- Purge air: 40 mm

## Test functions

- Pressure switch (switching point –35 hPa)

## Integrated components

- 2-step air filter, type Europiclon, dust capacity 200 g
Ordering information

Our regional sales organization will help you to select the optimum device configuration.

Dimensional drawings (Dimensions in mm (inch))

FWE200DH control unit

FWE200DH remote unit
**FWE200DH SCATTERED LIGHT DUST MEASURING DEVICES**

**FWE200DH sampling probe**

- Dimensions:
  - 600/1,200 (23.62/47.24)
  - 250/850 (9.84/33.46)
  - 140/250 (5.51/9.84)

- Mounting flange, D=125 mm:
  - Ø 14 (0.55)
  - Ø 18 (0.71)
  - Ø 23 (0.91)
  - Ø 32 (1.26)
  - Ø 50 (1.97)
  - Ø 200 (7.87)
  - Ø 240 (9.45)

- Ø 240 (9.45)
- Ø 178 (7.01)
- Ø 125 (4.92)
- Ø 139.7 (5.50)

- Dimensions:
  - 152 (5.98)
  - 200 (7.87)

Subject to change without notice.
Weather hood for SLV4/SLV5/SLV7 purge air unit
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Detailed addresses and additional representatives → www.sick.com