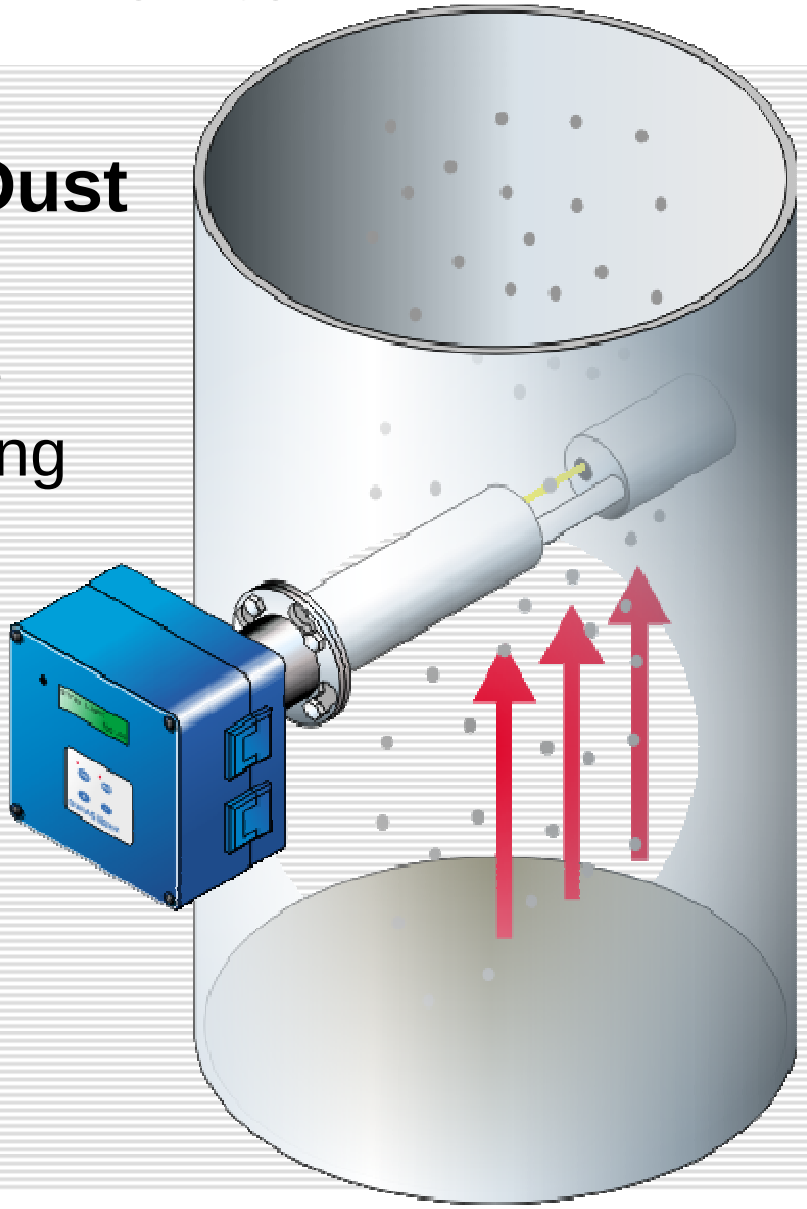
D-R 800
Dust Concentration Monitor

smart solutions for DURAG
combustion and environment GROUP

D-R 800 Dust Concentration Monitor

- **For Monitoring Minimal Dust Concentrations**
  - High sensitivity through the forward-scattering measuring principle
  - Easy installation with one-side stack mounting
  - No moving parts in stack for extended lifetime

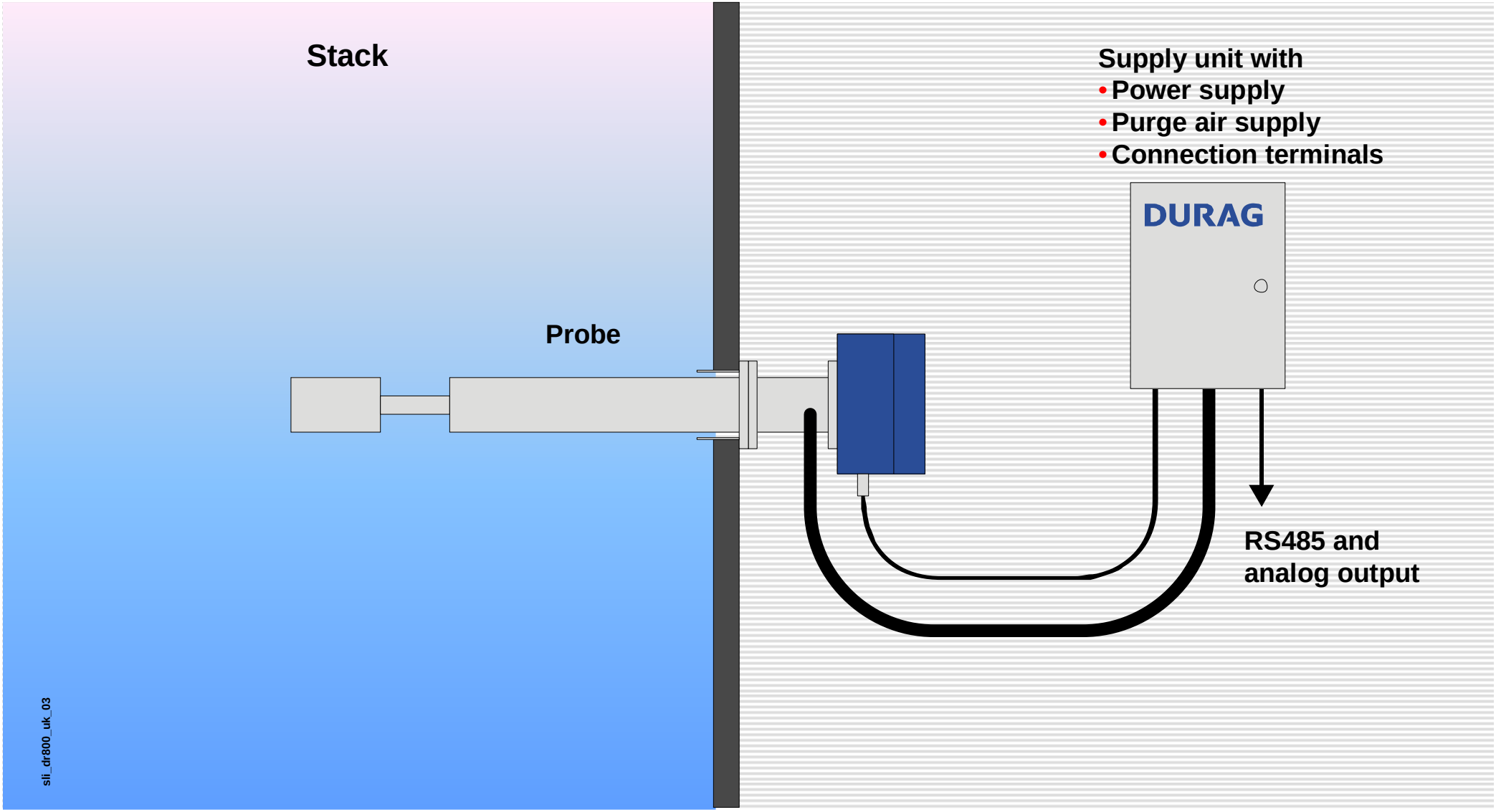


D-R 800: Features

In-situ measuring, continuous measuring

- **Easy one-side stack mounting**
  - no light trap
  - no complicated alignment
  - only one mounting flange
- **No moving parts in the stack which allows for**
  - extended lifetime
  - hermetically sealed housing against exhaust gas
- **Probe made of high-grade stainless steel (other on request)**
- **Simple device calibration**
- **Programming via control display directly at measuring device**
- **ModBus interface to DCS**
- **Automatic function test with soiling correction of measured values**
- **Two analogue output signals available with adjustable ranges**
- **Laser protection class II**

D-R 800: System Overview



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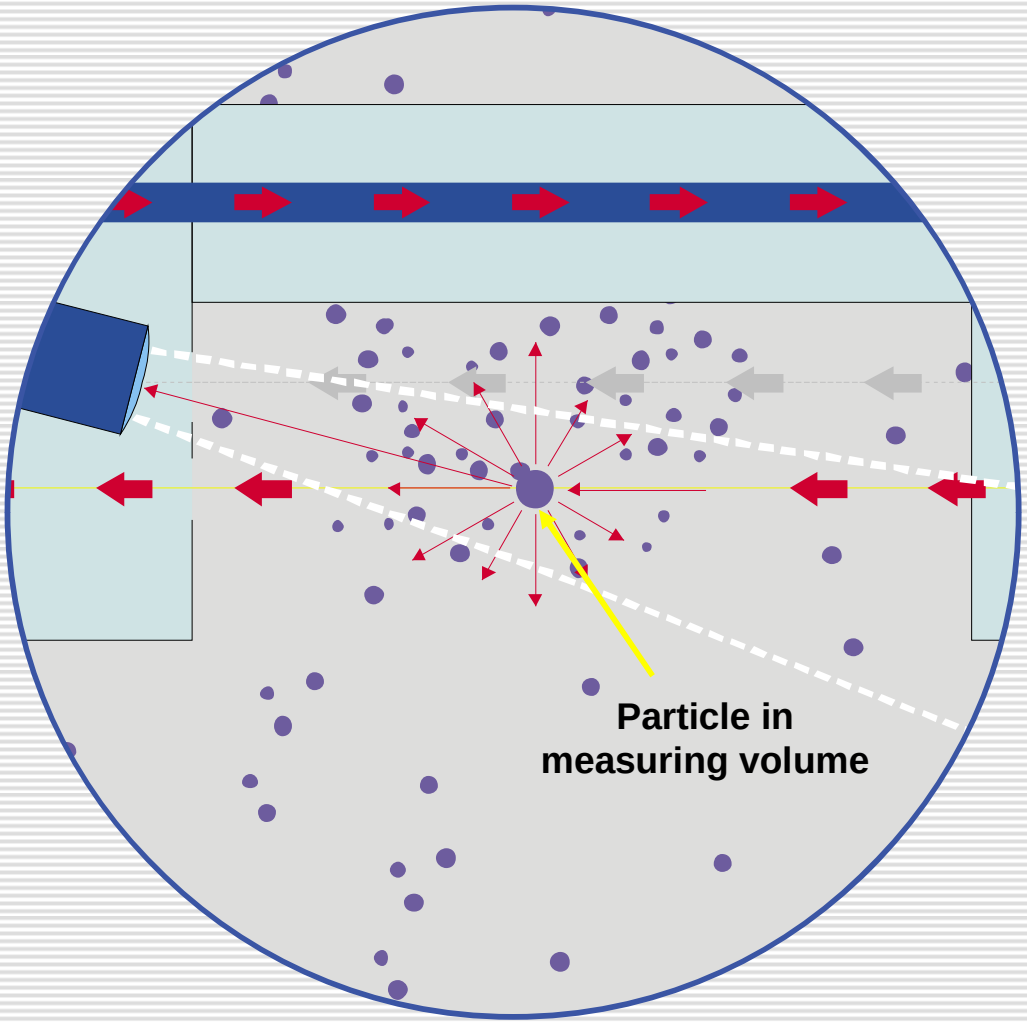
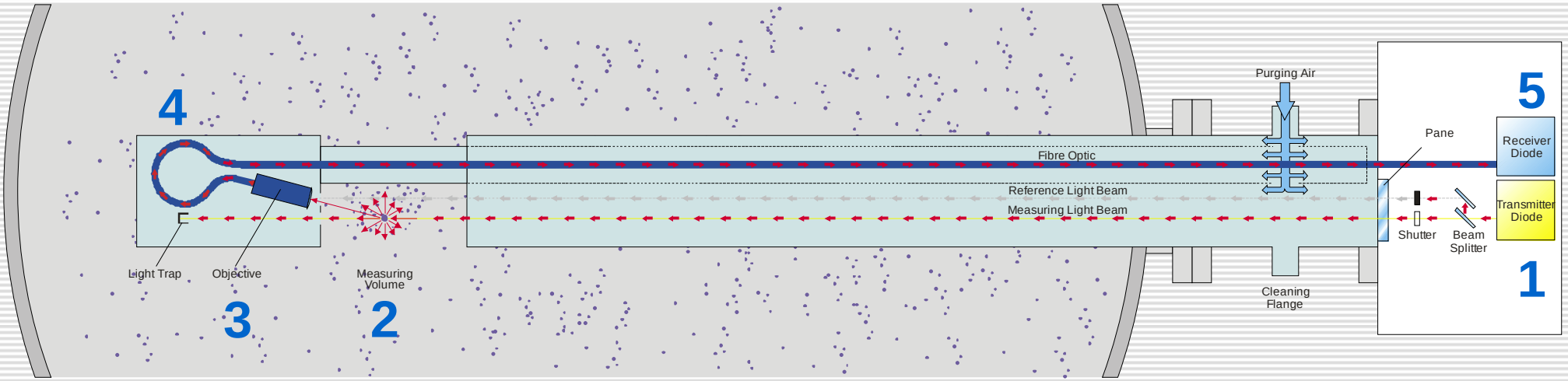
D-R 800: Measuring Principle



- Stray Light Method
- 15° Forward Scattering
- Modulated Laser Light
- The stray light is proportional to the dust concentration
- Reference light beam for soiling correction

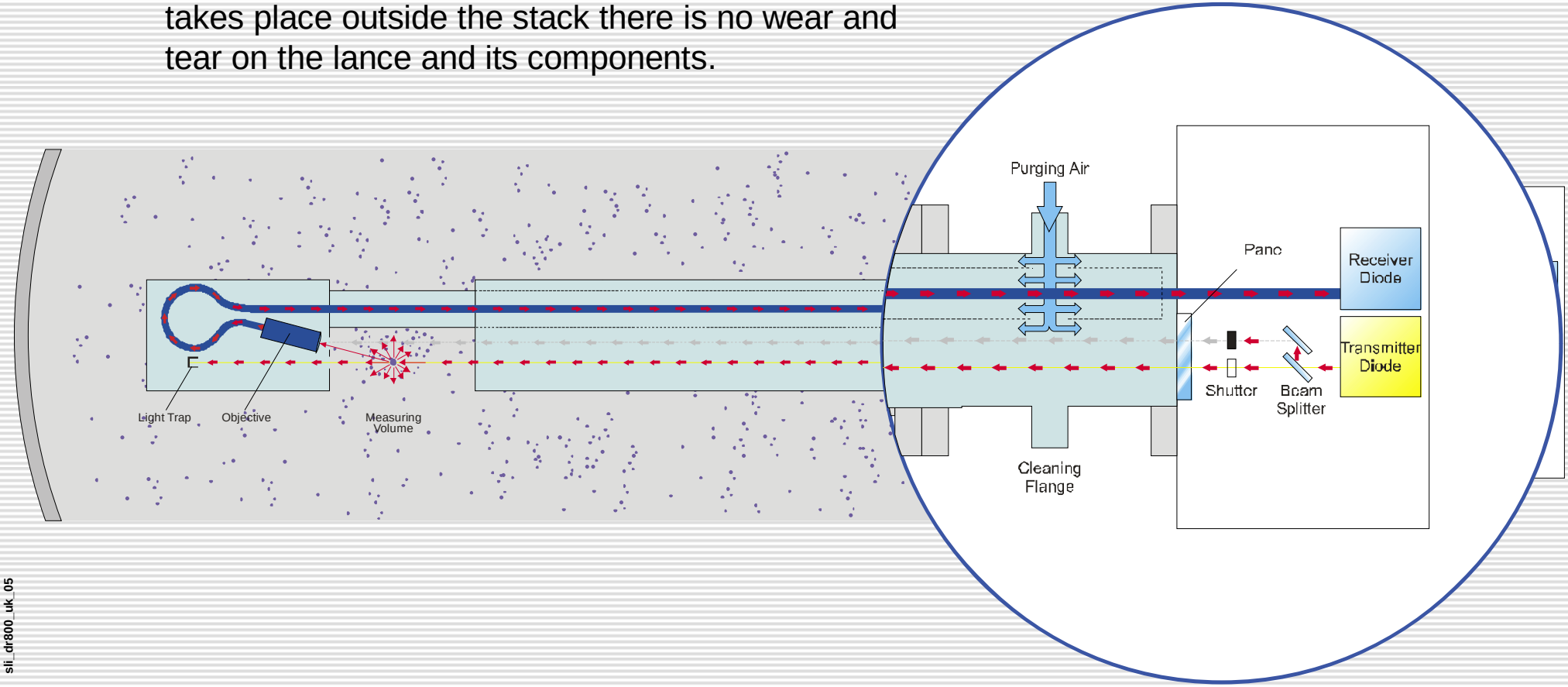
D-R 800: Measuring Principle I

- The collimated and modulated light beam of a laser **Emitting Diode (1)** crosses the **Measuring Volume (2)**; the dust particles are scattering light mostly in the forward direction
- This “stray light” is proportional to the dust concentration and is collected by an **Objective (3)** and transferred via a **Fibre Optic (4)** to the **Receiver Diode (5)**.
- The signal is processed by a highly sensitive circuit which calculates the final measurement value. The result can be calibrated according to the German regulation VDI 2066 into dust concentration [mg / m³]

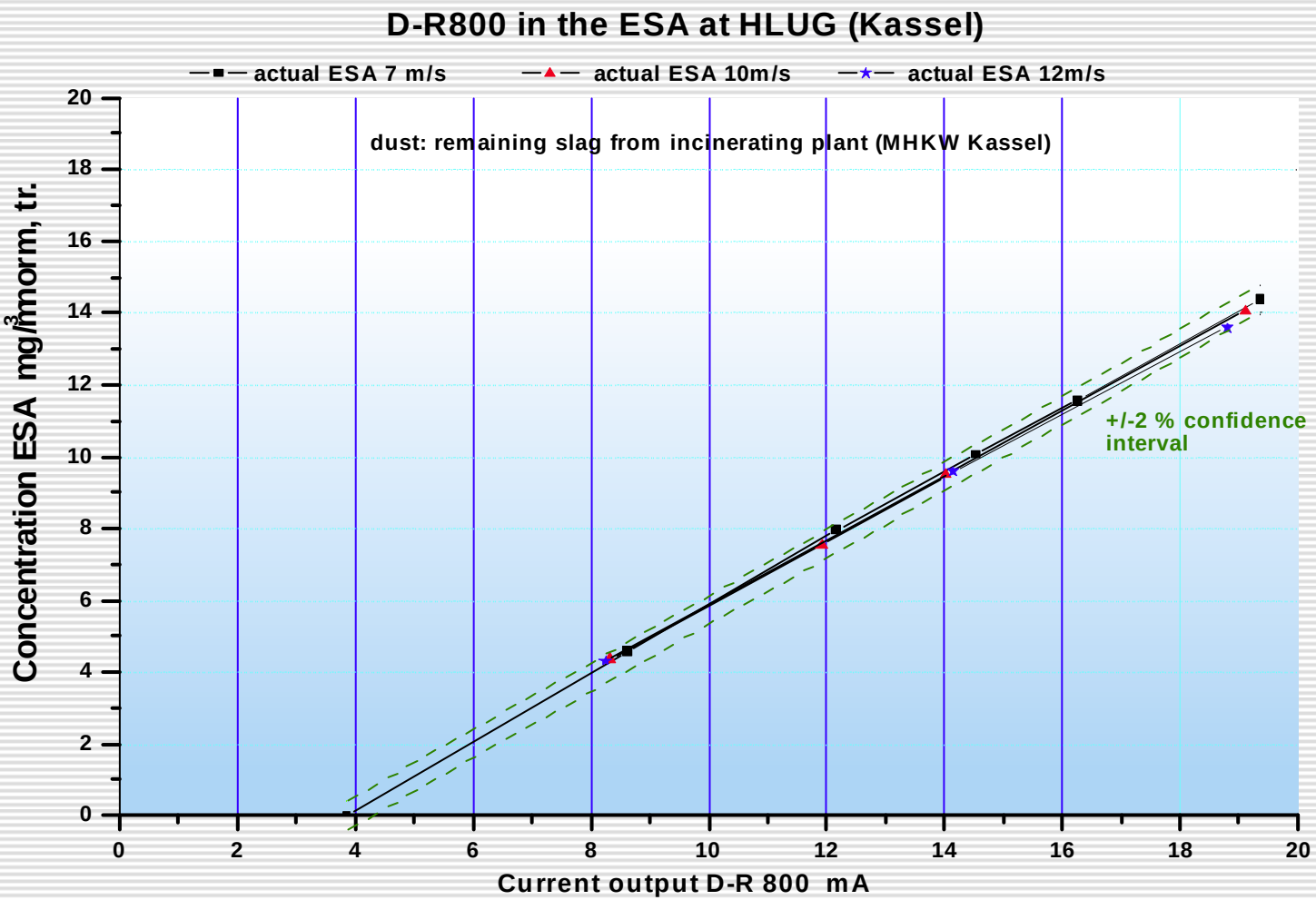


D-R 800: Automatic Check Cycle

- The automatic check cycle for which a **Beam Splitter (6)** with **Shutter (7)** inside the housing is used guarantees for reliable function. It switches between the measuring and the reference path. Since the switching takes place outside the stack there is no wear and tear on the lance and its components.



D-R 800: Calibration according to EN12384-1



- Calibration of the D-R 800 with different velocities and different dust concentrations

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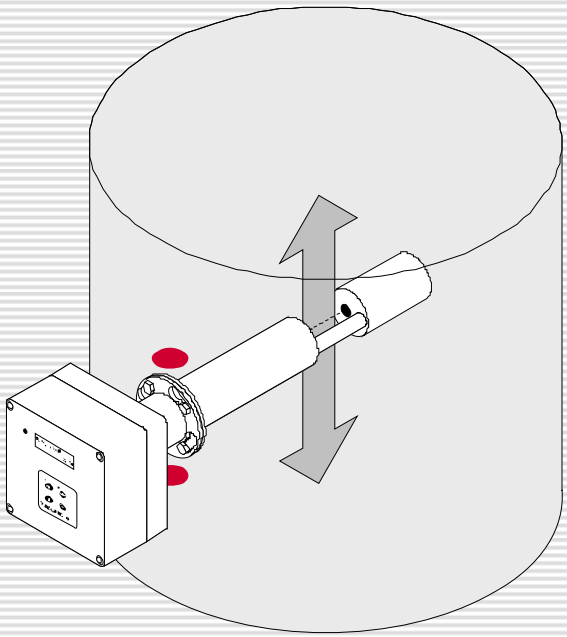
D-R 800: Installation Overview

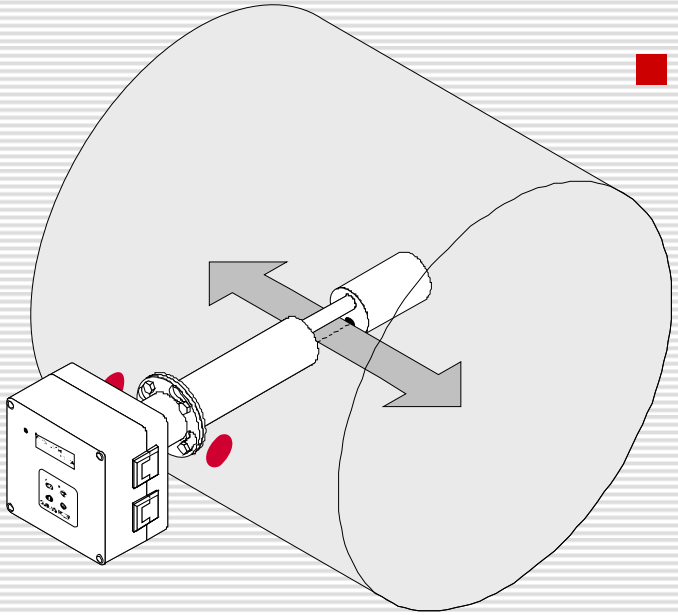
- Choice for vertical / horizontal stacks
- Choice of the mounting flange
- Mounting of the supply unit
- Installation on the stack
- Terminal connection
- Selecting the amplification
- Calibration with the adjustment factor
- Setting the current output range

D-R 800: Mounting at vertical / horizontal channels



vertical

BR800PR00

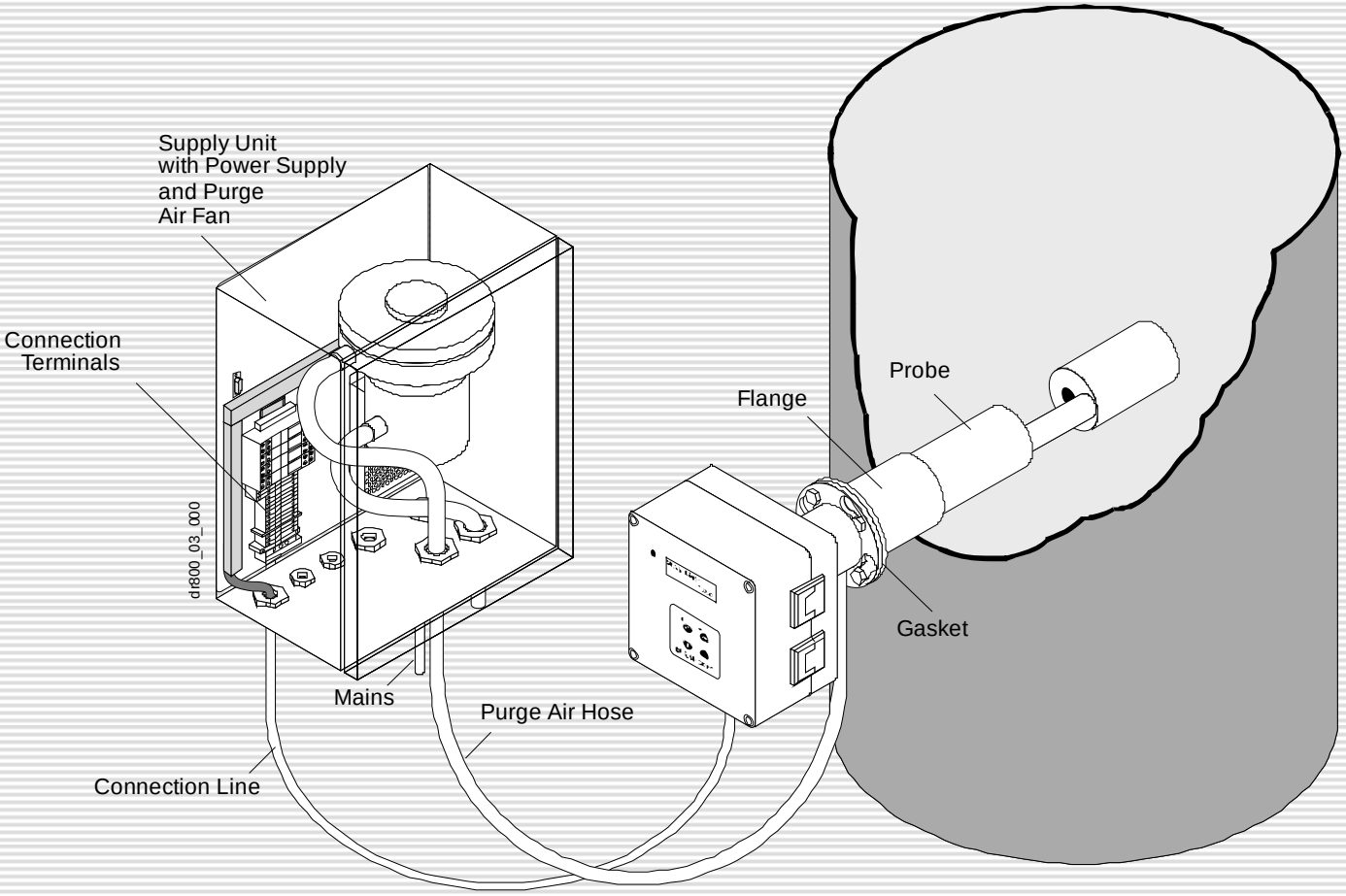


horizontal

BR800PR10

- **Red dots on the mounting flanges are always located on the level of the exhaust gas flow**

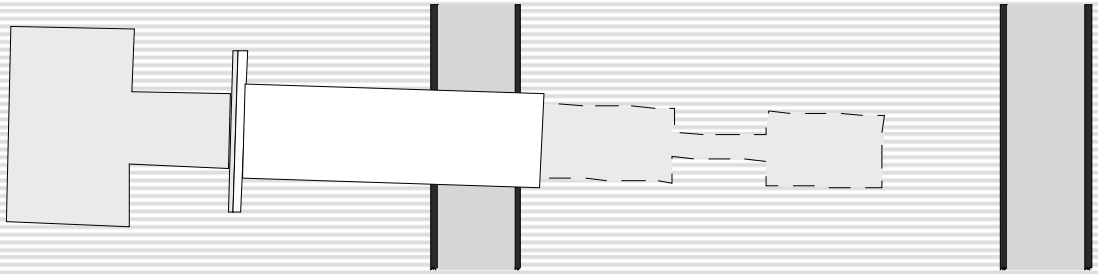
D-R 800: Installation



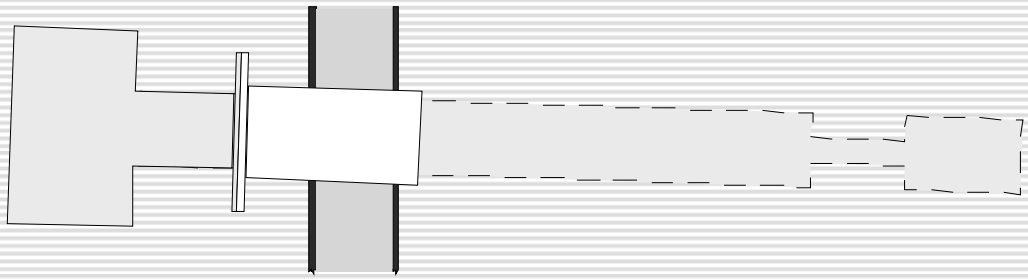
- The purge are has to run all the time the probe is inserted to the stack
- The flexible purge air tube and the connection line is available in 3 or 10 meter length

D-R 800: Flange mounting

Small stack



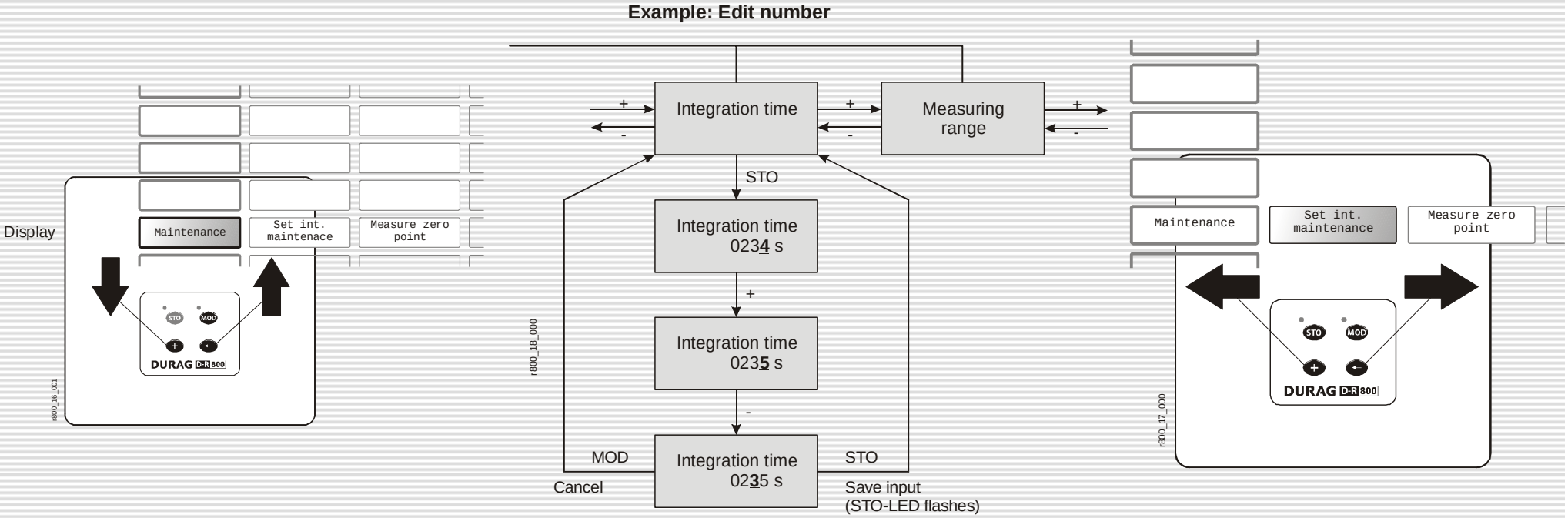
Big stack



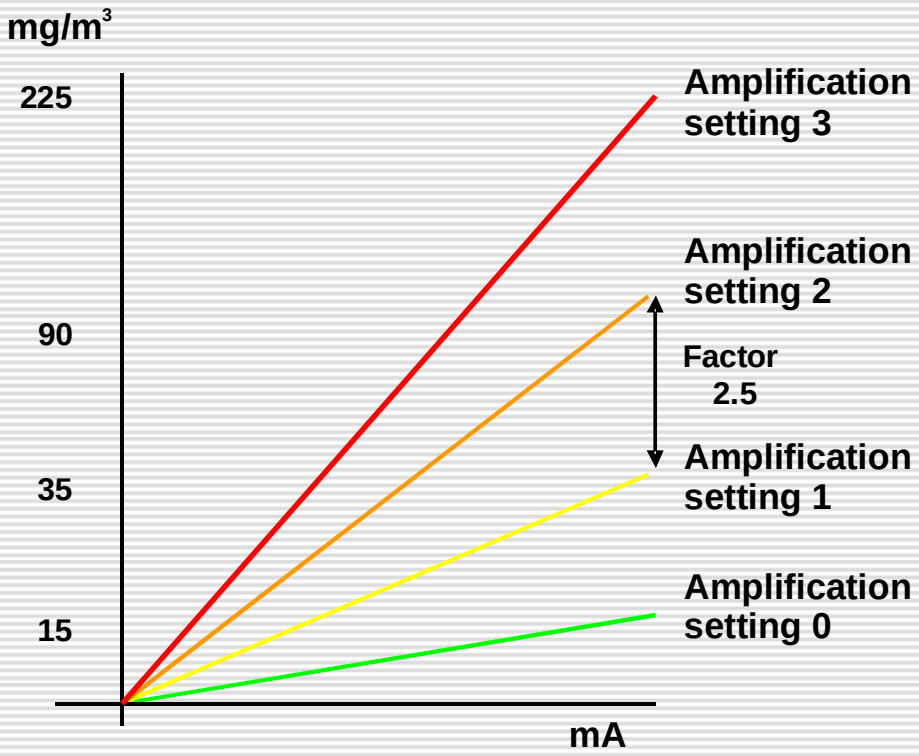
- The flange should be installed with a decline of 2°
- The flange should be inserted minimum 20mm into the stack
- Flange lengths 130mm, 240mm and 500mm for different wall thickness and different inner diameters available
- The minimum inner diameter is 350mm

D-R 800: Operation

- Simple to use operating panel with display
- Easy menu structure split in vertical and horizontal branches
- Shortcuts for fast moving



D-R 800: Hardware Range Selection



- Four different amplification settings selectable
- Smallest measuring range down to 10 mg/m³ – depending on kind of dust
- The expected maximum dust concentration must not exceed the selected measuring range
- The actual amplification setting is shown in the display (menu field: „Measuring range“ [E06])

D-R 800: Easy one point calibration

- Sample the actual dust concentration in the stack
- Take the actual stray light value from the D-R 800
- Calculate the factor:

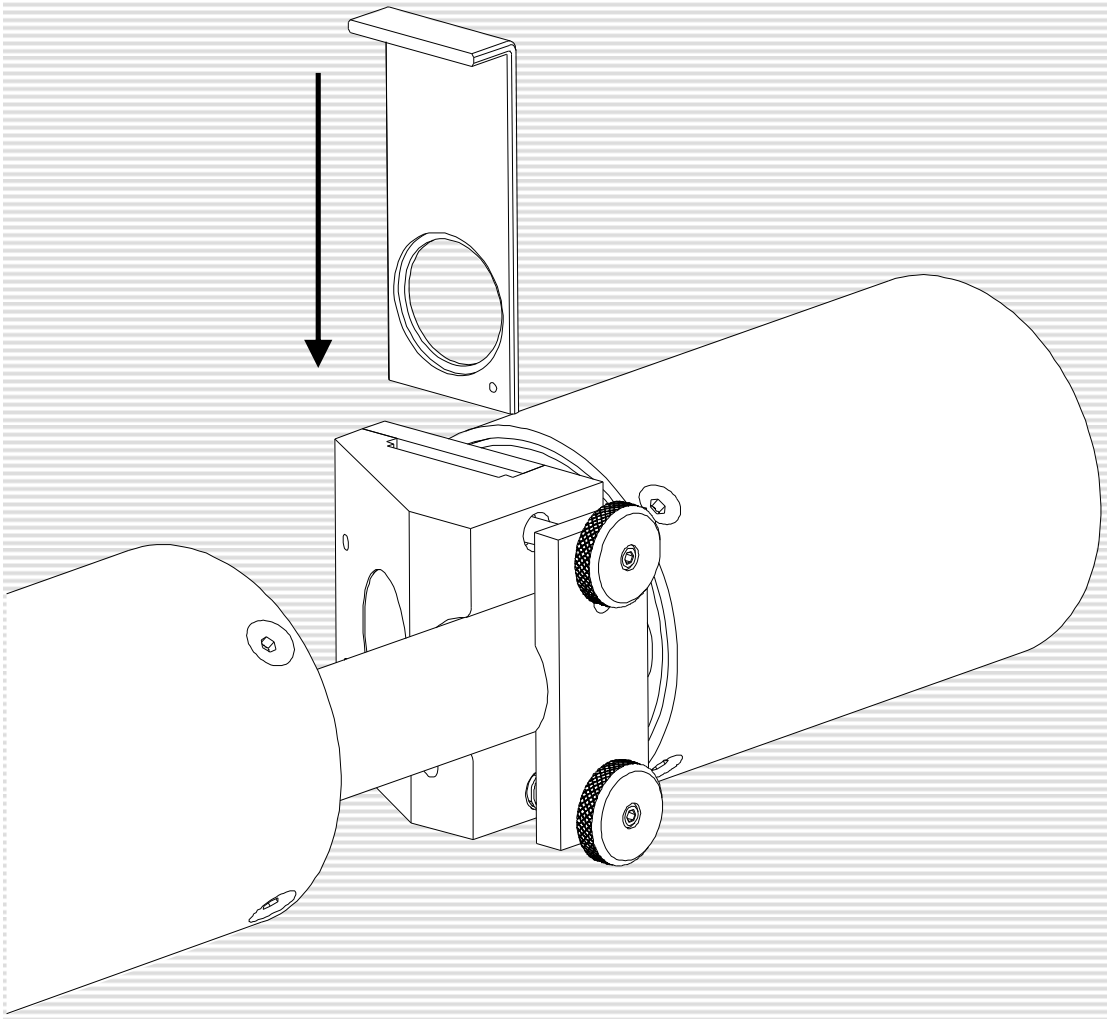
$$factor = \frac{dust\,concentration[mg/m^3]}{straylight[DR800]}$$

and insert the factor in the menu field „adjustment factor“ [E02]

- The shown dust concentration is directly updated with the new factor

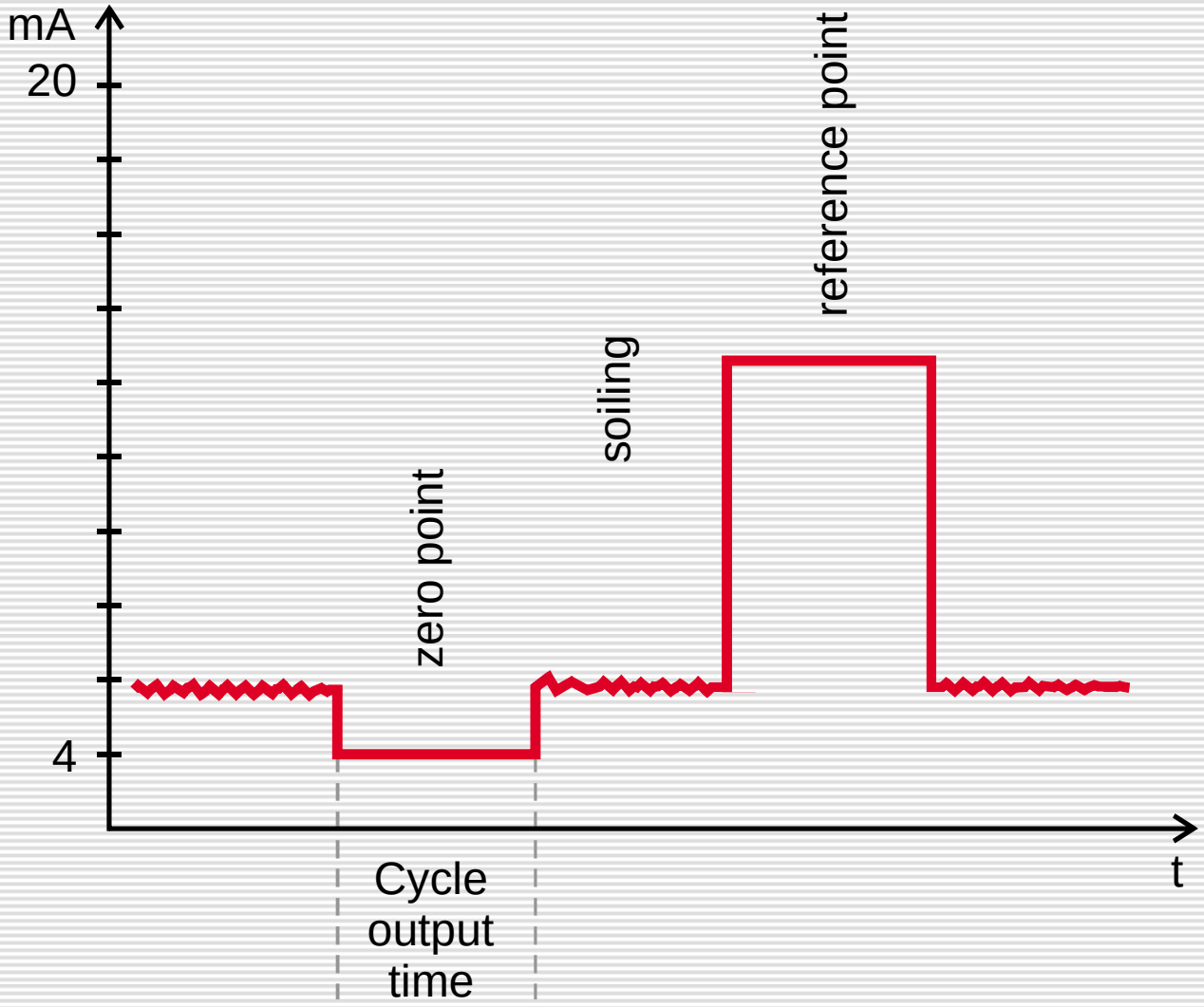
- Display in mg/m3
- Characteristic curve x^1, x^2 or x^3 selectable
- Current input for temperature compensation for calculating the normalized dust concentration according to EN13284-1
- For precise results gravimetric calibration required

D-R 800: Linearity test



- **Easy to-do linearity test**
- **Remove the D-R 800 probe from the stack**
- **Mount the control system (at first without a filter)**
- **Start the test cycle in menu field „Calibration“ [J06]**
- **The D-R 800 performs a self-check for one minute**
- **Now you can insert the different filters and the D-R 800 will show the different damping values of the filters**

D-R 800: Control cycle



- Automatically performed control cycle
- Zero point, soiling and reference point shown on the display and on the current outputs
- Free programmable interval from 0,1 h up to 48 h
- Free programmable cycle output time from 45 s up to 240 s (measuring time per value)

D-R 800: Technical Data

Type	Dust Concentration Monitor
Applications	Monitoring minimal dust concentrations
Measuring range	0 – 10 .. 0 - 200 mg/m^3
Flue gas temperature	Above dew point, up to 220℃, higher on request
Accuracy	2 % of measuring range
Measured components	Stray light intensity / dust concentration in mg/m^3
Measuring principle	Forward scattering
Measuring path	Stack wall thickness < 0.4 m
Measuring output	0/4...20 mA analogue output, max. load 500 Ω
Interfaces	RS 485 Modbus RTU
Protection	IP 65
Ambient temperature	-20°... +50℃
Supply voltage range	100 ... 230 V AC
Status/control signals	relay outputs and potential free inputs for status signals
System components	Measuring Probe, Supply Unit, Connecting&Mounting set
Test functions	Automatic zero and span check point

All specifications subject to change without notice