

D-R 290 **Dust and opacity monitor**

Continuous dust measurement
for medium to large concentrations

- QAL1 certified in accordance with EN 15267
- Compliant with US EPA 40 CFR 60 PS 1, PS 11 and ASTM D6216-12
- Contactless measurement
- Automatic control functions



Features

- Continuous dust measurement
- Smallest certified measuring range 0 ... 15 mg/m³
- Automatic measurement and correction of contamination of interfaces
- Automatic control functions
- Contactless measurement
- Maintenance and linearity check without disassembly

Technical data

Measuring principle	Transmission, in-situ, continuous, contactless measurement
Measuring variable	Optical density/absorbance, opacity, calibratable as dust concentration in mg/m ³
Measuring range	<ul style="list-style-type: none"> ▪ Opacity: Min. 0 ... 20%, max. 0 ... 100% ▪ Absorbance: Min. 0 ... 0.1, max. 0 ... 2.0 ▪ Dust concentration: Min. 0 ... 80 mg/m³, max. 0 ... 4000 mg/m³
Certified measuring range	0 ... 15 mg/m ³
Certificates	QAL1, MCERTS
Conformities	IED 2010/75/EU, EN 15267-1, EN 15267-2, EN 15267-3, EN 14181, US EPA 40 CFR 60 PS 1 / PS 11, 13th / 17th / 27th / 30th BImSchV, TA Luft
Interface*	<ul style="list-style-type: none"> ▪ Analog output: 1x 4 ... 20 mA, max. 400 Ω, potential-free (various parameters adjustable) ▪ Digital output: 2x NC/NO, max. 60 V_~, 30 V₋, 0.5 A (various parameters adjustable) ▪ RS 485 Modbus RTU, mini USB
Nominal voltage	24 V _~
Ambient conditions	<ul style="list-style-type: none"> ▪ Installation location: Indoor and outdoor installation** ▪ Temperature: <ul style="list-style-type: none"> -40 ... +60 °C -30 ... +60 °C (ATEX) -20 ... +60 °C (IECEX)
Operating conditions in duct	<ul style="list-style-type: none"> ▪ Temperature: Max. 250 °C, optional 1,000 °C ▪ Relative humidity: 0 ... 95%, non-condensing ▪ Relative pressure: <ul style="list-style-type: none"> -50 ... +20 hPa -50 ... 0 hPa (ATEX/IECEX)

Benefits

- Suitable for official emission monitoring
- Reliable measurement of medium to large dust concentrations
- Space-saving and easy installation
- Long life time and high availability under extreme plant conditions
- Low maintenance

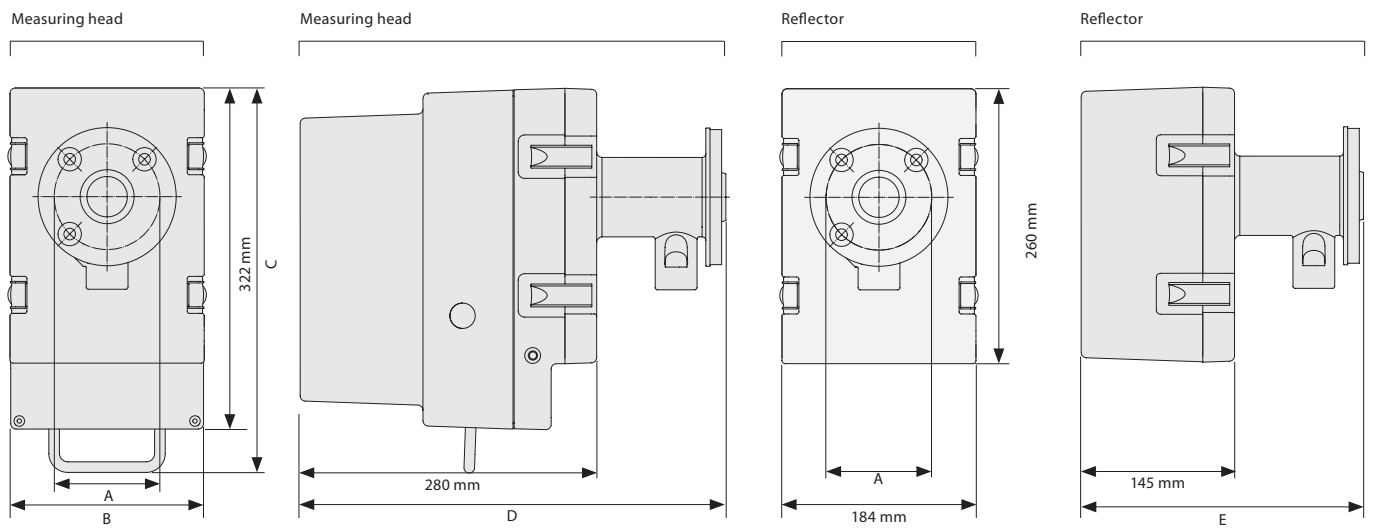
Duct dimensions	<ul style="list-style-type: none"> ▪ Inner diameter: 0.5 ... 18 m (measuring section ≥ 1 m) ▪ Wall thickness: Max. 0.56 m 	
Control functions	Automatic zero point and reference point measurement, automatic contamination measurement and compensation	
Protective function	Integrated fail-safe shutter (optional)	
Degree of protection	IP65 in accordance with DIN EN 60 529	
Light source	LED, 450 ... 680 nm	
Connections	<ul style="list-style-type: none"> ▪ Process: <ul style="list-style-type: none"> ▪ Bolt circle 100 mm: DN65 PN6 including stud bolts ▪ Bolt circle 150 mm: DN89 PN6/ANSI 4" 150 lbs, including stud bolts ▪ Device: M23 DURAG Standard ▪ Purge air hose: Ø 40 mm ▪ Purge air sensor: M12 8-pin 	
Explosion protection	ATEX (optional): <ul style="list-style-type: none"> ▪ II 2G Ex pxb IIC T4 Gb ▪ II 3G Ex pzc IIC T4 Gc ▪ II 3D Ex pD IIIC T100 °C Dc 	IECEX (optional): <ul style="list-style-type: none"> ▪ Ex pzc IIC T4 Gc
Display and operation	<ul style="list-style-type: none"> ▪ LED status display ▪ D-ESI 100 software*** ▪ or operating unit D-ISC 100 	
Material	Housing: Painted aluminum	
System components	<ul style="list-style-type: none"> ▪ D-R 290 dust monitor (measuring head + reflector) ▪ D-ESI 100 software*** ▪ D-TB 100 Terminal Box ▪ D-BL purge air unit ▪ or D-ISC 100 operating unit 	

* Additional interfaces with D-ISC 100 operating unit

** A weather protection cover is required for outdoor installation

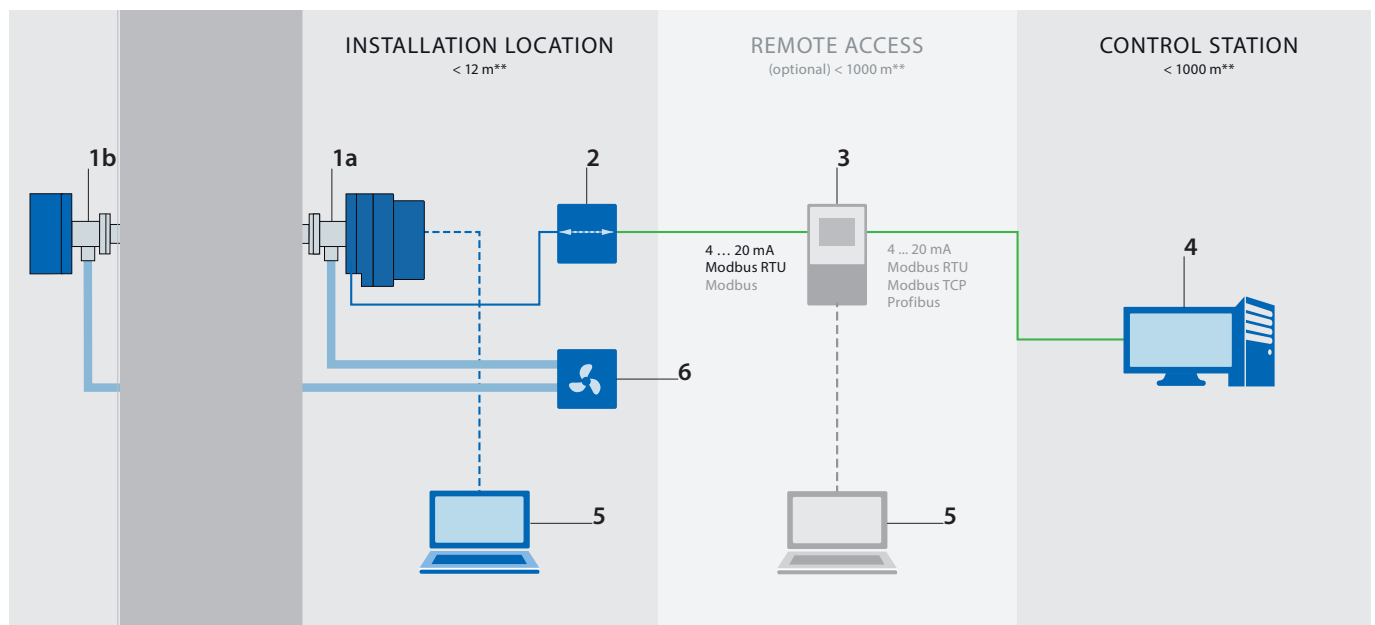
*** Enables remote access via web interface, requires PC with Windows operating system

D-R 290 | DIMENSIONS AND WEIGHT OF DIFFERENT PRODUCT VARIANTS



Hole variant 100 (150) mm	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	Weight (measuring head)	Weight (reflector)
Standard	Ø 100 (150)	184 (184)	363 (363)	398 (475)	263 (340)	~ 14 kg (~ 16 kg)	7.9 kg (9.6 kg)
ATEX		184 (184)	443 (443)	574 (613)		~ 18 kg (~ 20 kg)	
IECEX		352 (352)	405 (405)	574 (770)		~ 18 kg (~ 20 kg)	

EXAMPLES OF SYSTEM CONFIGURATIONS* | STANDARD + OPTIONAL WITH REMOTE ACCESS



- | | | |
|-------------------|------------------------------|---|
| 1 Dust monitor | 2 Terminal Box | 5 PC with Windows operating system and software |
| 1a Measuring head | 3 Operating unit | 6 Purge air unit*** |
| 1b Reflector | 4 Emission evaluation system | |

* All system components shown are available on request

** Maximum permitted cable and hose length

*** For product variant, bolt circle 150 mm, two purge air units are required

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