

EE680

Air Velocity and Temperature Sensor for Laminar Flow

The EE680 is dedicated for precise measurement of the air velocity (A_v) and the temperature (T) in laminar flow. The GMP-compliant design is ideal for cleanrooms and safety cabinets in pharmaceutical, life sciences and microelectronics industries.

Outstanding Measurement Performance

The EE680 operates on the hot film anemometer principle. It employs an E+E thin film sensing element which stands for excellent accuracy down to 0.1 m/s (20 ft/min), long term stability and low angular dependency. The multipoint air velocity factory adjustment leads to best performance over the entire working range. The E+E proprietary coating protects the sensing element against H_2O_2 and corrosive cleaning agents.

Versatility

The EE680 is available as straight and angled version with various probe lengths. The design is optimized for easy cleaning, while the mounting concept and the M12 stainless steel connector facilitate the installation and replacement. A led ring integrated in the stainless steel enclosure indicates the laminar flow conditions and the sensor status.

Analogue Outputs or RS485 Interface, User Selectable

The A_v and T measured data is available as current or voltage analogue outputs or on the RS485 interface with Modbus RTU protocol.

User Configurable and Adjustable

The setup and adjustment of the EE680 can be easily performed with an optional adapter and the free EE-PCS Product Configuration Software.



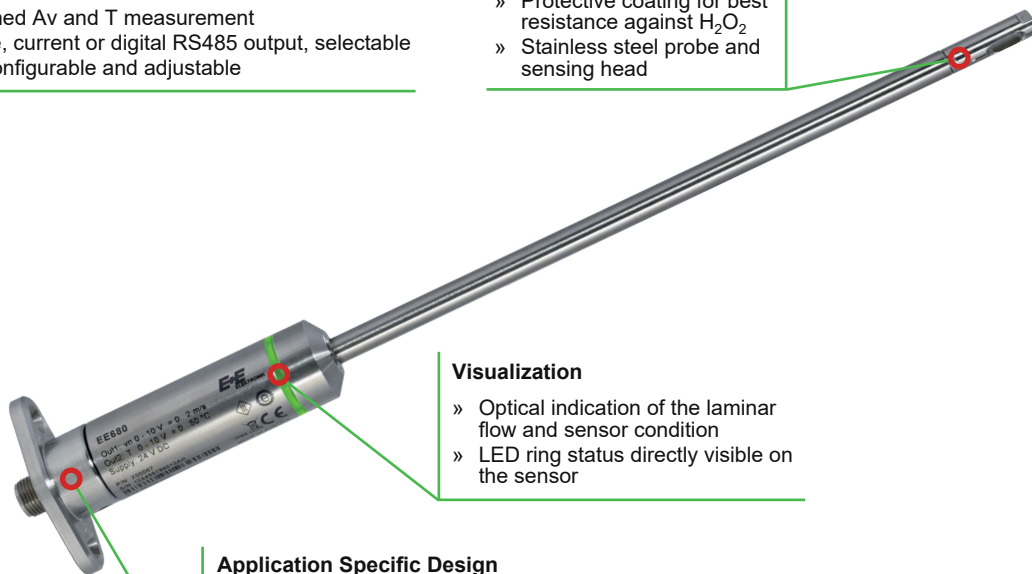
Features

EE680 Sensor

- » Highly accurate over the entire working range
- » Precise measurement of even smallest air flow
- » Combined A_v and T measurement
- » Voltage, current or digital RS485 output, selectable
- » User configurable and adjustable

Probe and Sensing Element

- » Protective coating for best resistance against H_2O_2
- » Stainless steel probe and sensing head



Visualization

- » Optical indication of the laminar flow and sensor condition
- » LED ring status directly visible on the sensor

Application Specific Design

- » GMP compliant design for easy cleaning
- » Straight or angled probe with various lengths
- » Stainless steel mounting flange
- » M12 stainless steel connector

Inspection Certificate

- » according to DIN EN 10204-3.1 with six A_v points

Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. The coating substantially extends the life-time and the measurement performance of the E+E sensor in applications with frequent H₂O₂ sterilization processes. Additionally, it improves the sensor's long term stability.

E+E Modular Sensor Platform

The EE680 is compatible with the Sigma 05 host device of the E+E Modular Sensor Platform. Together they become a versatile, plug-and-play Av/T modular sensor with analogue outputs and optional display. Besides EE680, Sigma 05 accommodates also other E+E intelligent sensing probes. See www.epluse.com/Sigma05 for further details.



Technical Data

Measurands

Air Velocity¹⁾

Measuring range	0...2 m/s (0...400 ft/min)
Accuracy ²⁾ in air at 23 °C (73 °F) and 1013 hPa (14.7 psi)	0.1...2 m/s (20...400 ft/min): ± (0.5 % of mv + 0.05 m/s) mv = measured value
Dependence of inflow angle (α)	< 3 % for α < ±10°
Dependence of inflow direction	< 3 %
Response time t ₉₀ , typ.	< 1.5...40 s (Factory setting: 1.5 s, configurable via EE-PCS)

Temperature

Measuring range	-20...70 °C (-4...158 °F)
Accuracy ³⁾ , typ. in air at 23 °C (73 °F)	±0.5 °C (±0.9 °F)

Outputs

Analogue	0 - 5 V / 0 - 10 V 0 - 20 mA / 4 - 20 mA (3-wire)	-1 mA < I _L < 1 mA Load resistance ≤ 350 Ω
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Digital interface

Protocol	RS485 (EE680 = 1 unit load) Modbus RTU
Default settings	Baud rate 9600, parity even, 1 stop bit, Modbus address 68

General

Power supply class III 	24 V DC ±20 %
Current consumption, typ.	< 30 mA
Electrical connection	M12x1, 5 poles, stainless steel 1.4404
Protection rating	IP65
Enclosure material	Stainless steel 1.4404
Pressure range	700...1300 hPa (10.2...18.9 psi)
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial Environment FCC Part15 Class A ICES-003 Class A
Storage conditions	-20...70 °C (-40...158 °F) 0...95 % RH, non-condensing
Configuration and adjustment	EE-PCS Product Configuration Software (free download) and configuration adapter

1) Standardized air velocity vn at standard conditions (factory setup): Tn = 23 °C (73 °F), pn = 1013.25 hPa (14.7 psi), settable via EE-PCS

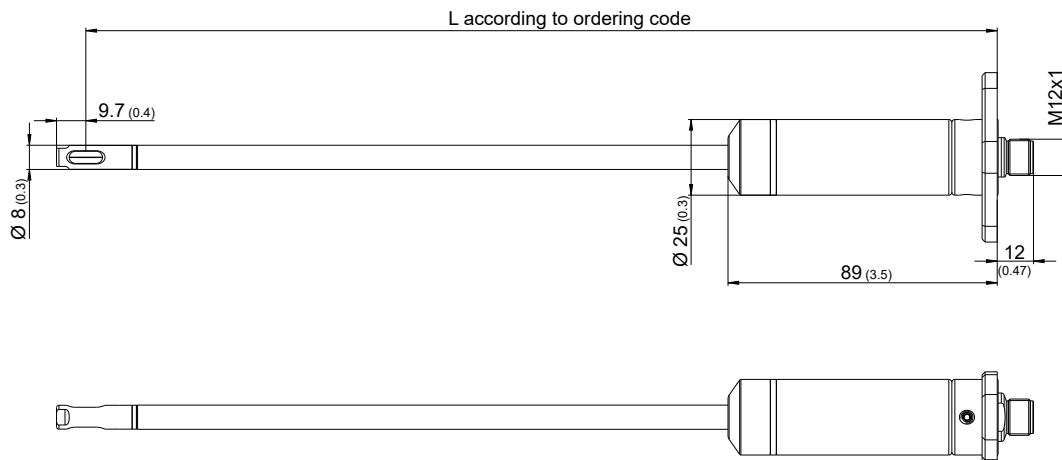
2) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-times standard deviation). The accuracy was calculated in accordance with EA-4/02 and with regard to GUM (Guide to the Expression of Uncertainty in Measurement)

3) At air flows ≥ 0.45 m/s

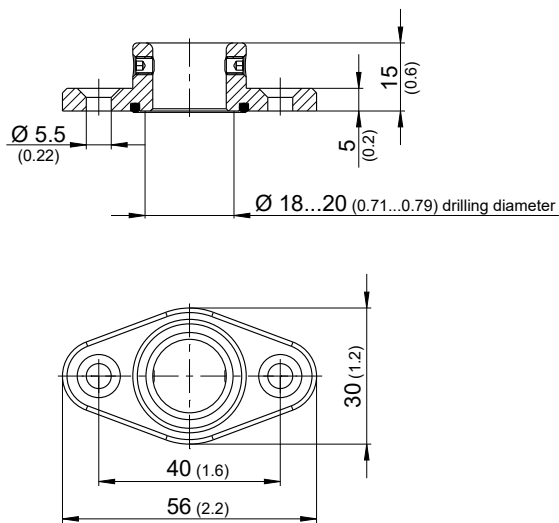
Dimensions

Values in mm (inch)

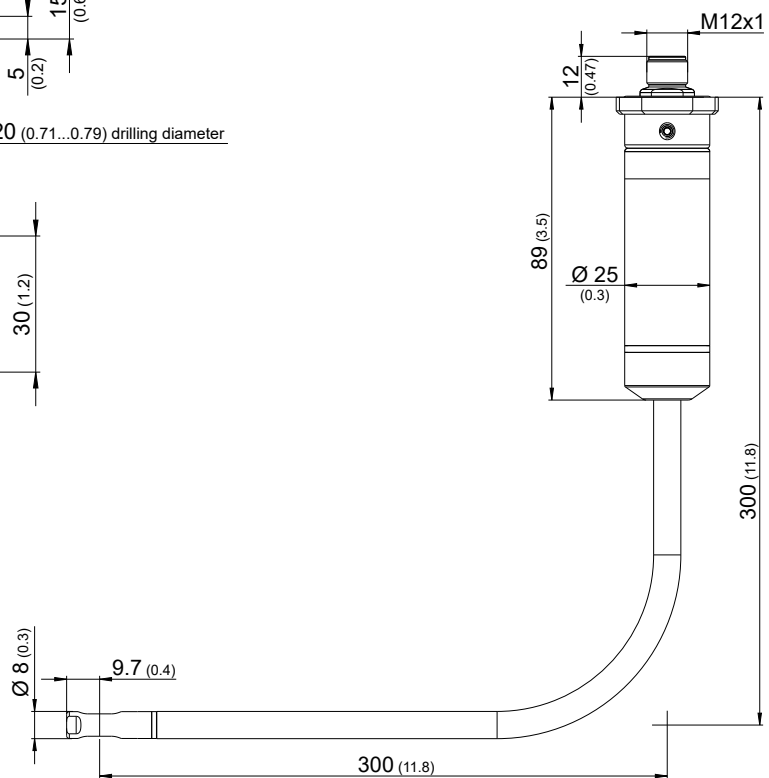
Type T15 Straight Probe



Mounting Flange



Type T29 90° Angled Probe



Ordering Guide

			EE680-			
Hardware Configuration	Type	Straight probe 90° angled probe	T15	T29	T15	T29
	Measuring range	0...2 m/s (0...400 ft/min)	no code			
	Probe length	200 mm (7.9") 300 mm (11.8")	L200 L300	L300	L200 L300	L300
	Mounting	With flange	TG5			
Software Setup	Output signal ¹⁾	4 - 20 mA 0 - 20 mA 0 - 10 V 0 - 5 V Digital interface RS485	GA6 GA5 GA3 GA2		no code	
	Output 1 measurand	Air velocity ²⁾ [m/s] Air velocity ²⁾ [ft/min] Temperature [°C] Temperature [°F]	no code MA23 MA1 MA2			
	Scaling 1 low	0 Value	no code SAL Value			
	Scaling 1 high	2 Value	no code SAH Value			
	Output 2 measurand	Temperature [°C] Temperature [°F] Air velocity ²⁾ [m/s] Air velocity ²⁾ [ft/min]	no code MB2 MB22 MB23			
	Scaling 2 low	0 Value	no code SBL Value			
	Scaling 2 high	50 Value	no code SBH Value			
	Protocol	Modbus RTU ³⁾	-		P1	

1) Applies to both outputs

2) Standardized air velocity v_n at standard conditions (factory setup): $T_n = 23\text{ °C}$ (73 °F), $p_n = 1013.25\text{ hPa}$ (14.7 psi), settable via EE-PCS

3) Factory settings: baud rate 9600, parity even, stop bits 1.

Modbus map and communication settings: See User Manual and Modbus Application Note at www.epluse.com/EE680

Ordering Example

EE680-T15L300TG5GA6

Type: Straight probe
 Measuring range: 0...2 m/s (0...400 ft/min)
 Probe length: 300 mm (11.8")
 Mounting: With flange
 Output signal: 4 - 20 mA
 Output 1 measurand: Air velocity [m/s]
 Scaling 1 low: 0
 Scaling 1 high: 2
 Output 2 measurand: Temperature in [°C]
 Scaling 2 low: 0
 Scaling 2 high: 50

EE680-T29L300TG5P1

Type: 90° angled probe
 Measuring Range: 0...2 m/s (0...400 ft/min)
 Probe length: 300 mm (11.8")
 Mounting: With flange
 Output signal: Digital interface RS485
 Protocol: Modbus RTU

Accessories

(for further information, see data sheet "Accessories")

Modbus configuration adapter
 E+E Product Configuration Software
 (free download: www.epluse.com/configurator)
 Protection cap M12 female connector
 Protection cap M12 male connector
 Connection cable M12 - flying leads (1.5 m (4.9 ft) / 5 m (16.4 ft) / 10 m (32.8 ft))
 T-coupler M12 - M12
 M12 cable connector for self assembly
 Mounting set EE680
 M12 sealing plug stainless steel

HA011018
 EE-PCS

HA010781
 HA010782
 HA010819/20/21
 HA030204
 HA010708
 HA011601
 HA011602