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Datasheet EE680

Air Velocity and Temperature Sensor for Laminar Flow

Modbus

www.jlcinternational.com

EE680

Air Velocity and Temperature Sensor for Laminar Flow

The EE680 is dedicated for precise measurement of the standardised air velocity (vn) 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 optimised 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

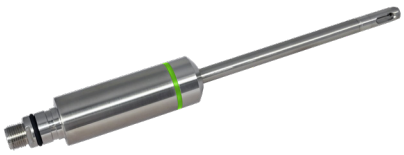
The vn and T measured data is available as current or voltage analogue outputs or on the RS485 interface with Modbus RTU protocol.

User Configurable and Adjustable

The setup and adjustment of the EE680 can be easily performed with an optional adapter and the free PCS10 Product Configuration Software.

EE680-T29 angled probe with flange

EE680-T15 straight probe with flange



EE680-T15 straight probe without flange

EE680 mounting flange

Features

EE680 Sensor

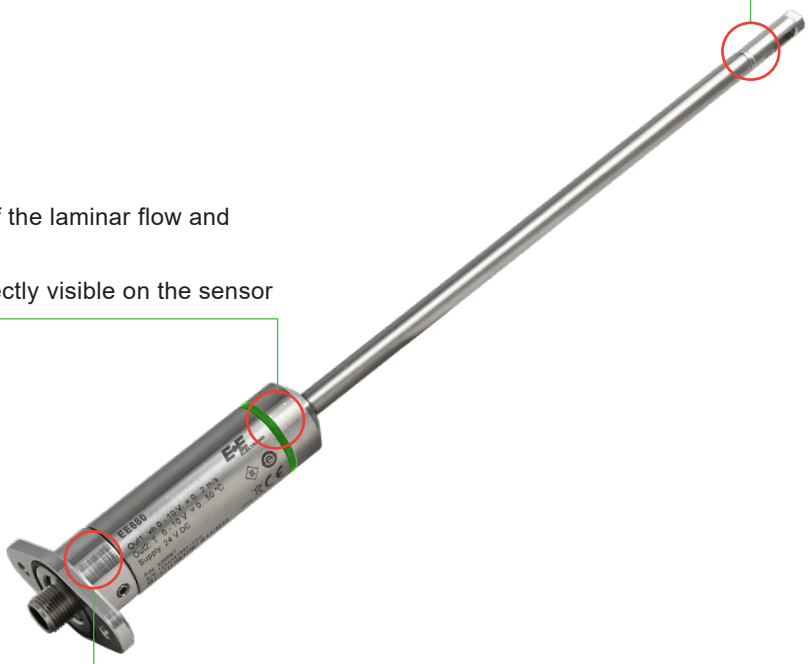
- Highly accurate over the entire working range
- Precise measurement of even smallest air flow
- Combined vn and T measurement
- Voltage, current or digital RS485 output, selectable
- User configurable and adjustable

Probe and Sensing Element

- E+E sensor 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 v points

Features

E+E 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 H_2O_2 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 vn / 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.

Sigma 05 with EE680

Accredited Traceable Calibration Certificate

Internationally recognised certificates for the calibration of measuring instruments from accredited laboratories document the traceability of the measurements to the International System of Units (SI). The E+E Elektronik calibration laboratory offers two levels of traceable calibrations.

- As a Designated Institute (DI) of the Republic of Austria, the E+E calibration laboratory maintains Austria's national measurement standards for humidity, dew point temperature, air velocity and CO_2. This authorises the E+E calibration laboratory to issue calibration certificates at the level of a National Metrological Institute (NMI).
- The E+E calibration laboratory is accredited by Akkreditierung Austria in accordance with DIN EN ISO/IEC 17025 with the identification number 0608. This allows the laboratory to issue ISO 17025 certificates for the measurands humidity, temperature, dew point temperature, air velocity, flow, pressure and CO_2.

Visit www.eplusecal.com for detailed information on calibration and to enquire a certificate of accredited traceable calibration for the EE680 from the Designated Institute.

ISO 9001 Calibration Certificate

An ISO 9001 calibration certificate documents the comparative measurement of a device against high quality reference equipment (factory level standard). The comparison is performed in accordance with internal procedures that comply with ISO 9001 and provides information on the specimen's measuring accuracy. The reference equipment is traceable to national standards, however, the calibration process is not accredited. Therefore, an ISO 9001 calibration is neither traceable nor internationally comparable.

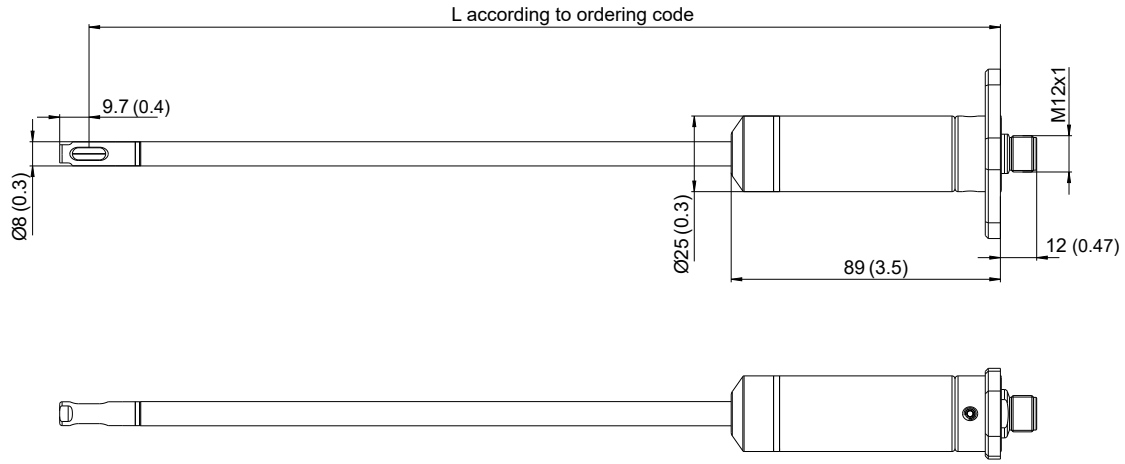
Visit www.epluse.com/iso9001cal for detailed information on calibration and to enquire an ISO 9001 calibration certificate.

Dimensions

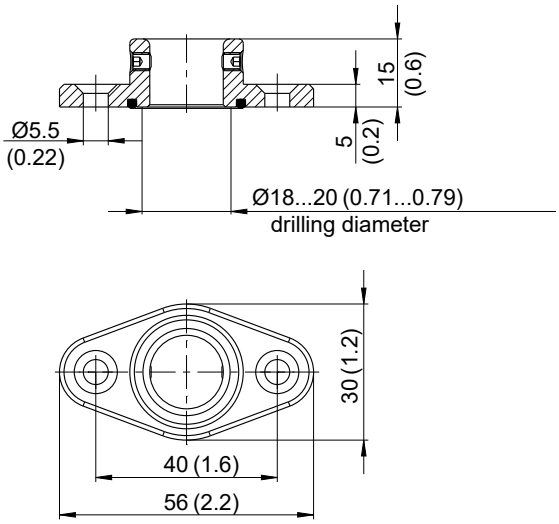
Values in mm (inch)

Type T15

Straight probe

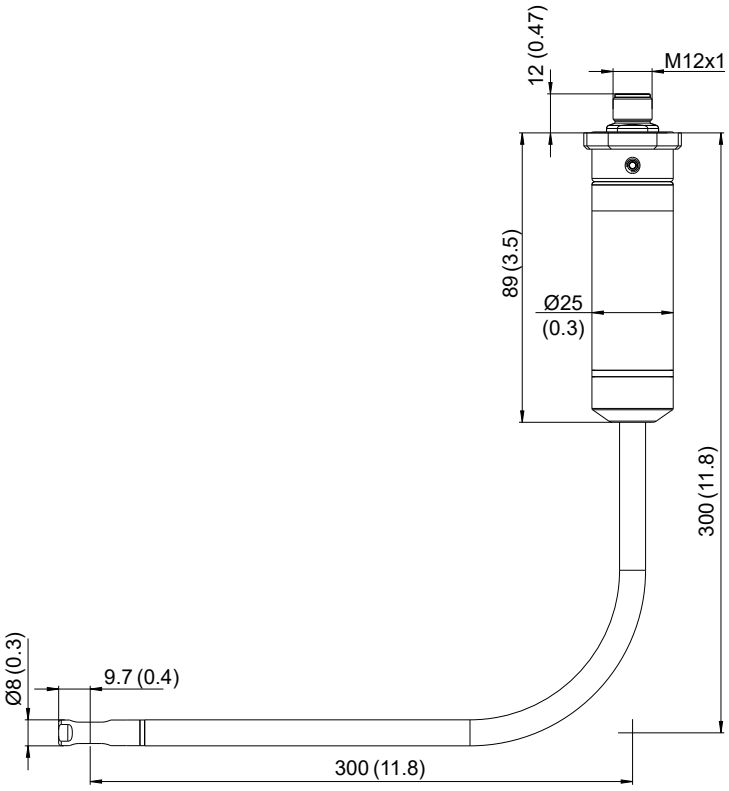


Mounting flange



Type T29

90° angled probe



Technical Data

Measurands

Air Velocity (v)

Standard conditions factory setting	pn = 1 013.25 mbar (14.7 psi); Tn = 23 °C (73 °F) Freely configurable via PCS10
Measuring range	0...2 m/s (0...400 ft/min)
Accuracy[1)] in air @ 23 °C (73 °F) and 1 013 hPa (14.7 psi)	0.1...2 m/s (20...400 ft/min): ± (0.5 % of mv +0.05 m/s) mv = measured value
Dependency **of inflow angle (α)** **of inflow direction**	<3 % for α < ±10° <3 %
Response time t_{90}, typ.	<1.5...40 s (Factory setting: 1.5 s, configurable via PCS10)

1) 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).

Temperature (T)

Measuring range	-20...+70 °C (-4...+158 °F)
Accuracy, typ. in air @ 23 °C (73 °F), at air flows ≥ 0.45 m/s	±0.5 °C (±0.9 °F)

Outputs

Analogue

Two freely scalable outputs	0 - 5 V / 0 - 10 V 0 - 20 mA (3-wire) / 4 - 20 mA (3-wire) -1 mA < I_L < 1 mA Load resistance ≤ 350 Ω

Digital

Digital interface	RS485 (EE680 = 1/10 unit load)
Protocol **Factory settings** **Supported Baud rates** **Measured data types**	Modbus RTU 9 600 Baud, parity even, 1 stop bit, Modbus address 68 9 600, 19 200, 38 400, 57 600, 76 800 and 115 200 FLOAT32 and INT16

General

Power supply class III USA & Canada: Class 2 supply necessary	24 V DC ±20 %
Current consumption, typ.	<30 mA
Electrical connection	M12x1, 5 poles, stainless steel 1.4404
Pressure working range	700...1 300 hPa (10.2...18.9 psi)
Storage conditions	-20...+70 °C (-4...+158 °F) 0...95 %RH, non-condensing
Enclosurematerial	Stainless steel 1.4404
Protection rating	IP65
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class A ICES-003 Class A
Conformity	CE UKCA
Configuration and adjustment	PCS10 Product Configuration Software (free download) and configuration adapter

Ordering Guide

	Feature	Description	Code			
			EE680-			
Hardware Config.	**Type**	Straight probe	T15		T15	
		90° angled probe		T29		T29
	Measuring range	0...2 m/s (0...400 ft/min)	No code			
	Probe length	200 mm (7.87")	L200		L200	
		300 mm (11.81")	L300	L300	L300	L300
	Mounting	With flange	TG5			
Software-Setup (Analogue-) Outputs	**Output signal**[1]	4 - 20 mA	GA6			
		0 - 20 mA	GA5			
		0 - 10 V	GA3			
		0 - 5 V	GA2			
		Digital interface RS485			No code	
	Output 1 measurand	Standardised air velocity[2] vn [m/s]	No code			
		Standardised air velocity[2] vn [ft/min]	MA23			
		Temperature T [°C]	MA1			
		Temperature T [°F]	MA2			
	Output 1 scaling low	0	No code			
		Value	SAL*Value*			
	Output 1 scaling high	2	No code			
		Value	SAH*Value*			
	Output 2 measurand	Temperature T [°C]	No code			
		Temperature T [°F]	MB2			
		Standardised air velocity vn [m/s]	MB22			
		Standardised air velocity vn [ft/min]	MB23			
	Output 2 scaling low	0	No code			
		Value	SBL*Value*			
	Output 2 scaling high	50	No code			
		Value	SBH*Value*			
	Protocol	Modbus RTU[3]			P1	
	Accredited Traceable Calibration Certificate in accordance with DIN EN ISO/IEC 17025		see www.eplusecal.com			
	ISO 9001 Calibration Certificate		see www.epluse.com/iso9001cal			

1) Applies to both outputs.
2) Standardised air velocity vn at standard conditions (factory setup): pn = 1 013.25 hPa (14.7 psi), Tn = 23 °C (73 °F), settable via PCS10.
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.

Order Example

EE680-T15L300TG5GA6

Feature	Code	Description
Type	**T15**	Straight probe
Measuring range	**No Code**	0...2 m/s (0...400 ft/min)
Probe length	**L300**	300 mm (11.81")
Mounting	**TG5**	With flange
Output signal	**GA6**	4 - 20 mA
Output 1 measurand	**No code**	Standardised air velocity vn [m/s]
Output 1 scaling low	**No code**	0
Output 1 scaling high	**No code**	2
Output 2 measurand	**No code**	Temperature T [°C]
Output 2 scaling low	**No code**	0
Output 2 scaling high	**No code**	50

EE680-T29L300TG5P1

Feature	Code	Description
Type	**T29**	90° angled probe
Measuring range	**No code**	0...2 m/s (0...400 ft/min)
Probe length	**L300**	300 mm (11.81")
Mounting	**TG5**	With flange
Output signal	**No code**	Digital interface RS485
Protocol	**P1**	Modbus RTU

Accessories

For further information see datasheet Accessories.

Accessories	Code
Modbus configuration adapter	**HA011018**
E+E Product Configuration Software (Free Download: www.epluse.com/pcs10)	**PCS10**
Protection cap for M12 socket	**HA010781**
Protection cap for M12 plug	**HA010782**
Sensor connection cable, shielded, 5 poles, M12x1 socket ←→ wire ferrules **1.5 m (4.9 ft)** **5 m (16.4 ft)** **10 m (32.8 ft)**	 **HA010819** **HA010820** **HA010821**
Y-Style Splitter, M12x1, 1 Plug ←→ 2 Sockets, 5 Poles	**HA030204**
Connector, M12x1 socket, 5 poles, for self assembly	**HA010708**
Mounting set	**HA011601**
M12 sealing plug, stainless steel	**HA011602**

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