USER MANUAL

EE671 - Miniature Air Flow Probe

GENERAL

The EE671 air velocity sensor operates on the hot-film anemometer principle and features an innovative, very robust E+E sensing element manufactured in thin-film technology combined with innovative transfer-molding.
The mounting flange allows for correct positioning and easy adjustment of the immersion depth.
EE671 is dedicated for accurate and reliable measurement in building automation and ventilation applications. For special applications do not hesitate to contact the manufacturer or their local distributor.

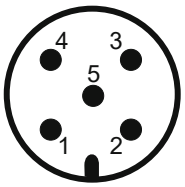
CAUTION

- Accurate measurement results are conditioned by the correct positioning of the probe in the air stream. Best accuracy is achieved in laminar flow.
- Observe the minimum inlet and outlet path length, see page 4.
- Avoid mechanical stress on the probe and especially onto the sensing head.
- Observe the humidity working range 5…95 % RH, non-condensing.
- Avoid installation in corrosive environment, as this may lead to sensor destruction.

ELECTRICAL CONNECTION

Important note:
The manufacturer cannot be held responsible for personal injuries or damage to property as a result of incorrect handling, installation, wiring, power supply and maintenance of the device.

Please note:
- The device may only be powered with a power supply class III ⧖ (Europe) or with a class 2 supply (North America).
- EE671 is an ESD-sensitive device. It is neither short-circuit-proof, nor surge-proof. The digital communication lines may not be connected to the supply lines.



front view on
M12 sensor plug

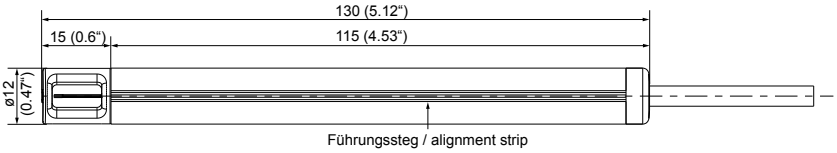
Pin number	Wire colour	Analogue output	Digital interface
1	grey	SDA (digital setup interface E2)	V+ = Supply voltage
2	brown	GND	RS485 B (D-)
3	green	AV = Analogue output	GND
4	yellow	SCL (digital setup interface E2)	RS485 A (D+)
5	white	V+ = Supply voltage	n.c.

Accessory HA0108xx - connecting cable

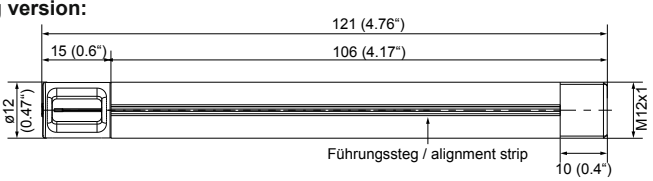
			Analogue output	Digital interface
1		brown	SDA (digital setup interface E2)	V+ = Supply voltage
2		white	GND	RS485 B (D-)
3		blue	AV = Analogue output	GND
4		black	SCL (digital setup interface E2)	RS485 A (D+)
5		grey	V+ = Supply voltage	n.c.

DIMENSIONS mm (inch)

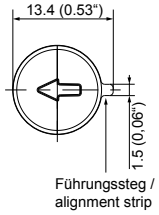
Cable version:



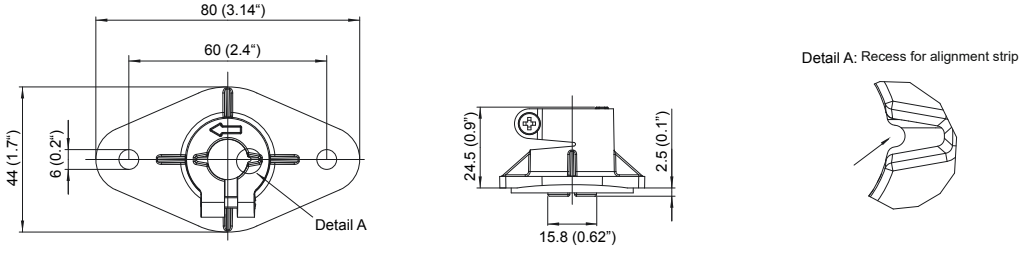
Plug version:



Front view sensor head:



Flange:



TECHNICAL DATA

Air Velocity

Measurement range	0...5 m/s	(0...1000 ft/min)	
	0...10 m/s	(0...2000 ft/min)	
	0...15 m/s	(0...3000 ft/min)	
	0...20 m/s	(0...4000 ft/min)	
Accuracy[1]	±(0.2 m/s / 40 ft/min	+ 3 % of mv):	0.5...5 m/s (100...1000 ft/min)
at 20 °C (68 °F) / 45 % RH and 1013 hPa (14.7 psi)	±(0.3 m/s / 60 ft/min	+ 4 % of mv):	1... 10 m/s (200...2000 ft/min)
	±(0.35 m/s / 70 ft/min	+ 5 % of mv):	1... 15 m/s (200...3000 ft/min)
mv = measured value	±(0.4 m/s / 80 ft/min	+ 6 % of mv):	1... 20 m/s (200...4000 ft/min)
Analogue output signal	0 - 1 / 5 / 10 V[2], max. 1 mA		
Digital interface	RS485 with Modbus RTU protocol (EE671 = 1 unit load)		
Response time τ_{90}, typ.	4 s		

General

Supply voltage (Class III)		10 - 29 V DC
Current consumption, max.		50 mA at 20 m/s (4000 ft/min)
Connection	Cable	0.5 m (1.6 ft) / 2 m (6.6 ft) cable, PVC, 5x0.25 mm² (AWG 23) with ferrules
	Plug	M12 connector, 5-pin
Electromagnetic compatibility[3]		EN 61326-1 EN 61326-2-3 Industrial Enviroment FCC Part15 Class A ICES-003 Class A
Material / protection rating		Polycarbonate / IP50 (probe head); IP54 (enclosure)
Temperature range	Operation	-20...60 °C (-4...140 °F)
	Storage	-30...60 °C (-22...140 °F)
Humidity range		5...95 % RH (non-condensing)

1) The accuracy statement includes the uncertainty of the factory calibration with an enhancement factor k=2 (2-fold standard deviation). The tolerance was calculated in accordance with EA-4/02 following the GUM (Guide to the Expression of Uncertainty in Measurement).
2) 0 - 10 V version only with supply voltage ≥ 15 V
3) The EE671 is not short-circuit-proof and not surge-proof (ESD-sensitive device).

SCOPE OF SUPPLY

- EE671 sensor according to ordering guide
- Protection cap
- Mounting flange
- Quick guide

MODBUS RTU

The EE671 air flow probe represents 1 unit load in a Modbus RTU network. For Modbus protocol settings see Modbus Application Note AN0103 (www.epluse.com/ee671).

Factory settings: Modbus address 238, Baud rate 9600, even parity, 1 stop bit. The Modbus address can be customised in the register 0x00 (value margin 1 - 247 permitted). Selectable Baud rates are 9600, 19200 and 38400, parity may be even, odd or none.

Device address, Baud rate and parity can be set via:
1. PCS10 Product Configuration Software and the appropriate configuration cable HA011018.
   The PCS10 can be downloaded free of charge from www.epluse.com/pcs.
2. Modbus protocol in the register 60001 (0x00) and 60002 (0x01).

Measured value	Unit	Scaling		Type	Register [DEC]		Protocol address [HEX]	
Read registers (function code 0x03 / 0x04)								
Serial number				ASCII	0001		0x00	
Software version				Binary	0009		0x08	
Sensor name				ASCII	0010		0x09	
Temperature	°C			32 bit float	[2] 1003	[3] 0026	[2] 0x3EA	[3] 0x19
Temperature	°F			32 bit float	1005	0028	0x3EC	0x1B
Temperature	K			32 bit float	1009	0030	0x3F0	0x1D
Air velocity	m/s			32 bit float	1041	0032	0x410	0x1F
Air velocity	ft/min			32 bit float	1043	0034	0x412	0x21
Temperature [1]	°C	[2] x 100	[3] x 100	16 bit integer	4002	0046	0xFA1	0x2D
Temperature	°F	x 50	x 100	16 bit integer	4003	0047	0xFA2	0x2E
Temperature	K	x 50	x 100	16 bit integer	4005	0048	0xFA4	0x2F
Air velocity	m/s	x 100	x 100	16 bit integer	4021	0049	0xFB4	0x30
Air velocity	ft/min	x 1	x 10	16 bit integer	4022	0050	0xFB5	0x31
Write registers (function code 0x06)								
Modbus address					0001		0x00	
Communication parameters					0002		0x01	

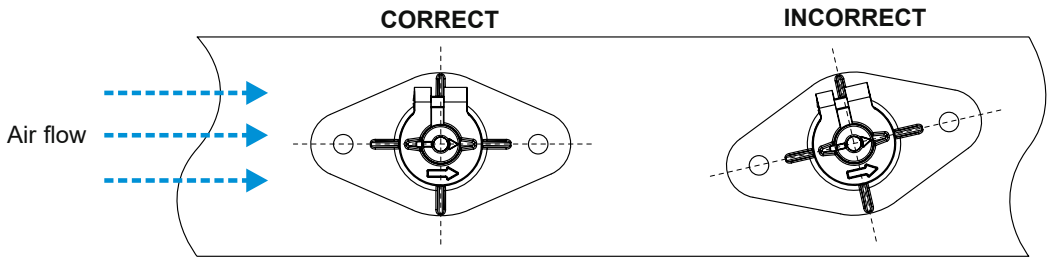
1) Please observe correct scaling for used registers
2) Measured values available in both registers
3) Registers in right column not intended for new design (0026...0050 / 0x19...0x31)

} left column E+E standard registers, right column legacy registers

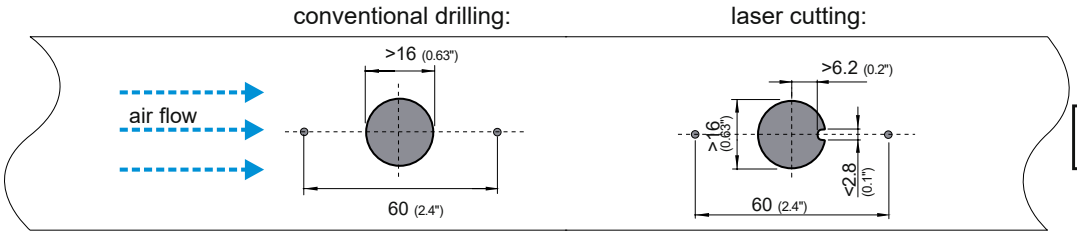
MOUNTING

Whenever possible use the mounting flange for installing the EE671. The flange allows for correct positioning in the flow and for easy adjustment of the immersion depth.

The arrows engraved on the sensing head of EE671 and on the mounting flange indicate the direction of the air stream during factory adjustment.
Observe the direction of the arrow when installing the mounting flange.
Once the mounting flange is correctly aligned to the air flow direction, the alignment strip along the probe assures that the EE671 is also correctly aligned.

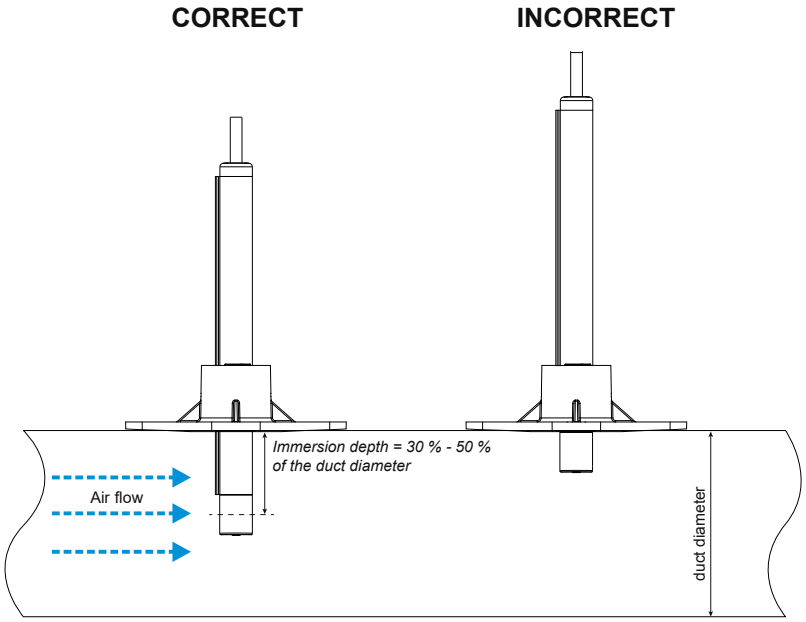


MOUNTING INTO A DUCT

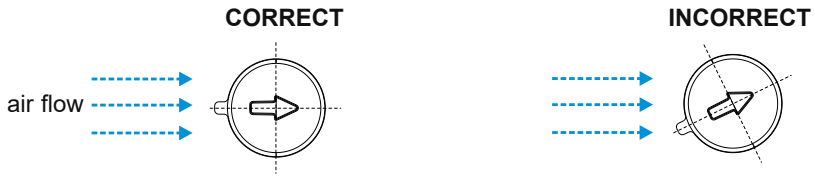


By leaving a key notch, the flange can be mounted only in the correct direction.

The mounting flange allows also for precise setting of the EE671 immersion depth. The entire sensing head must be in the air flow to be measured.



When installing the EE671 probe without the mounting flange, make sure that the arrow on the sensing head matches exactly the flow direction.

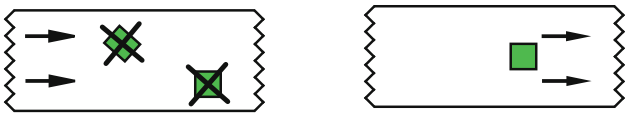


MOUNTING GUIDELINES FOR AIR VELOCITY MEASURING DEVICES

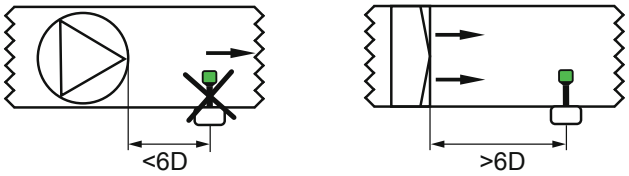
For accurate measurement results it is of paramount importance to place the sensing probe at a location with low turbulence, such as after filters, rectifiers, heaters or coolers. Turbulence appears after obstructions like fans, bends, junctions or section changes in the duct (diffusers / confusers), so the probe shall be placed far enough from these. The minimum length of the settling zone (straight duct section without obstructions whatsoever) between the probe and the source of turbulence depends on the diameter of the duct. An "equivalent diameter" D_{gl} can be defined for a rectangular duct with dimensions a · b:

$$D_{gl} = \frac{2 \cdot a \cdot b}{a + b}$$

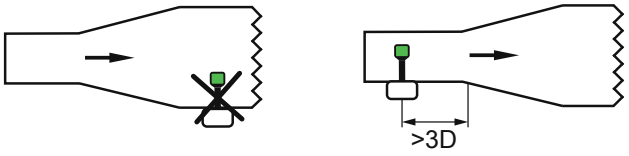
The following pictures supply guidelines for correct installation of air velocity transducers with respect to location and to minimum recommended settling zones.



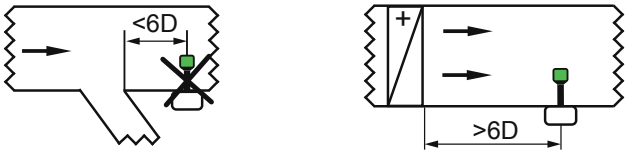
Install the sensor in the middle of the duct.



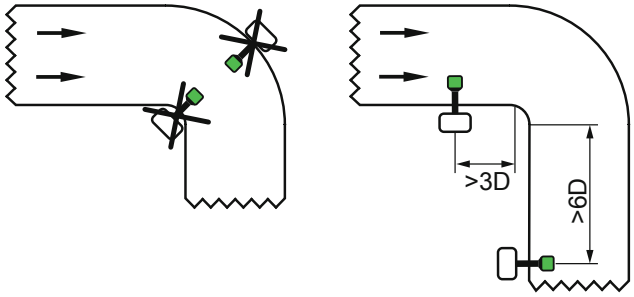
The preferred position of the sensor is after a filter.



Place the sensor in front of the diffusers at a position with high air velocity.



Place the sensor at a position with laminar (non turbulent) flow. Turbulence appears after fans as well as after bends, junctions, air heater, air cooler, filters, flaps or diameter changes in the duct.



MAINTENANCE OF THE E+E AIR VELOCITY SENSORS

Due to the absence of moving parts, the E+E air velocity sensors are not subject to wear. The construction (shape, dimensions and materials) of the hot film air velocity sensor is per se highly insensitive to dust and dirt. No maintenance is required under normal environmental conditions. For operation in polluted environment it is advisable to periodically clean the sensing head by washing it in isopropyl alcohol, preferably in an ultrasound cleaner. Alternatively shake it gently few minutes in a pot with isopropyl alcohol and let it dry free. Do not touch or rub the sensor and do not use any mechanical tools for cleaning.

USA
FCC notice:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CANADIAN
ICES-003 Issue 5:
CAN ICES-3 B / NMB-3 B

INFORMATION **+43 7235 605 0 / info@epluse.com**

E+E Elektronik Ges.m.b.H.
Langwiesen 7 • 4209 Engerwitzdorf • Austria
Tel: +43 7235 605-0 • Fax: +43 7235 605-8
info@epluse.com • www.epluse.com
LG Linz Fn 165761 t • UID-Nr. ATU44043101
Place of Jurisdiction: A-4020 Linz • DVR0962759