

# USER MANUAL

## EE671 - Miniature Air Flow Sensor

### GENERAL

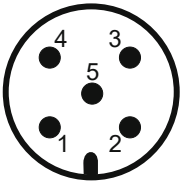
The EE671 air velocity sensor operates on the hot-film anemometer principle and features an innovative, very robust E+E sensing element manufactured in thin-film technology combined with innovative transfer-molding. The mounting flange allows for correct positioning and easy adjustment of the immersion 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 mainly 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.

### WIRING

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

Plug version	Cable version	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.

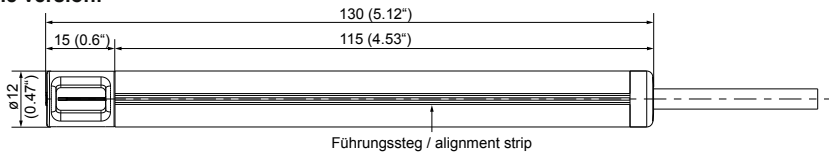
Accessory HA0108xx - connecting cable



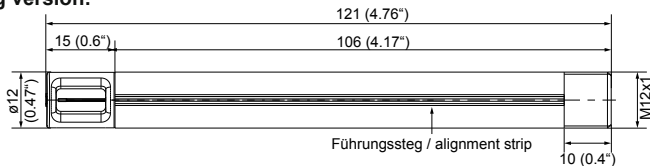
		Analogue output	Digital interface
1	 brown	SDA (digital setup interface E2)	V+ = Supply voltage
2	 white	GND	RS485 B (D-)
3	 blue	AV = Analogue output	GND
4	 black	SCL (digital setup interface E2)	RS485 A (D+)
5	 grey	V+ = Supply voltage	n.c.

### DIMENSIONS mm (inch)

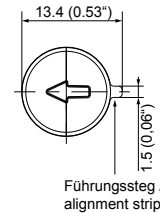
Cable version:



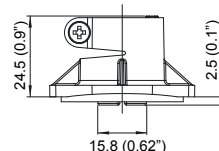
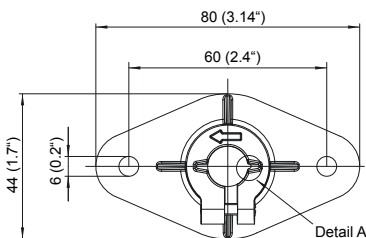
Plug version:



Front view sensor head:



Flange:



Detail A: Recess for alignment strip




## TECHNICAL DATA

### Flow measurement

Measurement range <sup>1)</sup>	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)
Output signal analogue <sup>1)</sup>	0 - 1 V (max. 1 mA) 0 - 5 V (max. 1 mA) 0 - 10 V <sup>2)</sup> (max. 1 mA)
RS485	Modbus RTU
Accuracy <sup>3)</sup> at 20 °C (68 °F) / 45 % rh and 1013 hPa (14.7 psi)	0.5...5 m/s (100...1000 ft/min): ±(0.2 m/s / 40 ft/min + 3 % of measured value) 1... 10 m/s (200...2000 ft/min): ±(0.3 m/s / 60 ft/min + 4 % of measured value) 1... 15 m/s (200...3000 ft/min): ±(0.35 m/s / 70 ft/min + 5 % of measured value) 1... 20 m/s (200...4000 ft/min): ±(0.4 m/s / 80 ft/min + 6 % of measured value)
Response time $\tau_{90}$ , typ.	4 s

### General

Supply voltage (Class III) 	10 - 29 V DC SELV
Current demand	max. 50 mA at 20 m/s (4000 ft/min)
Temperature range	operation: -20...60 °C (-4...140 °F) storage: -30...60 °C (-22...140 °F)
Operating range humidity	5...95 % RH (non-condensing)
Connection	
Cable version	0.5 m (1.6 ft) / 2 m (6.6 ft) cable, PVC, temperature-flexible, 5x0.25 mm <sup>2</sup> (AWG 23) with ferrules
Plug version	M12 connector system, 5-pin
Electromagnetic compatibility <sup>4)</sup>	EN 61326-1 ICES-003 ClassB EN 61326-2-3 FCC Part 15
Material / protection rating	Polycarbonate / IP50 (probe head); IP54 (enclosure)



1) See ordering information

2) Only at supply voltage  $V+ \geq 15$  V

3) 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).

4) 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
- User manual

### MODBUS RTU

The EE671 air flow sensor can be operated in a Modbus RTU network with max. 32 devices. For Modbus protocol settings see Modbus Application Note AN0103 ([www.epluse.com/EE671](http://www.epluse.com/EE671)).

**The factory setting for the Modbus address is 238 as an integer 16 bit value.** This address can be customised in the register 0x00 (value margin 1 - 247 permitted).

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	<sup>2)</sup> 1003	<sup>3)</sup> 0026	
Temperature	°F		32-bit float	↓ 1005	↓ 0028	
Temperature	K		32-bit float	↓ 1009	↓ 0030	
Air velocity	m/s		32-bit float	1041	0032	
Air velocity	ft/min		32-bit float	1043	0034	
Temperature <sup>1)</sup>	°C	x 100	x 100	16-bit integer	4002	0046
Temperature ↓	°F	x 50	x 100	16-bit integer	4003	0047
Temperature ↓	K	x 50	x 100	16-bit integer	4005	0048
Air velocity	m/s	x 100	x 100	16-bit integer	4021	0049
Air velocity	ft/min	x 1	x 10	16-bit integer	4022	0050
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

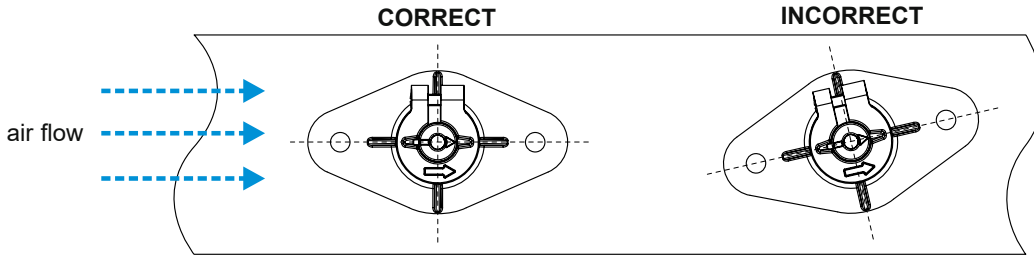
## MOUNTING

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.

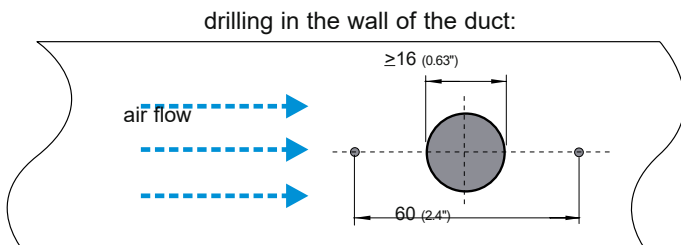
The arrows engraved on the sensing head of EE671 and on the mounting flange indicate the direction of the air stream during factory adjustment.

Observe the direction of the arrow when installing the mounting flange.

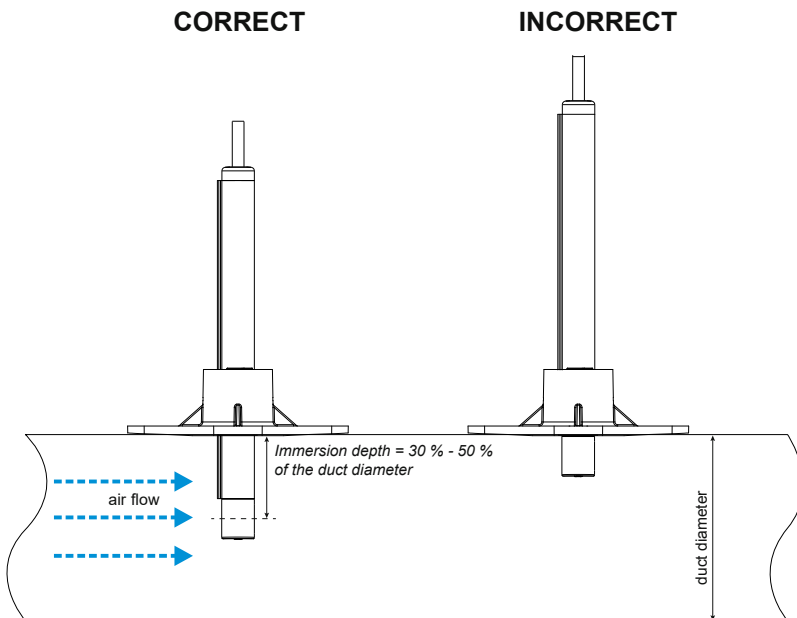
Once the mounting flange is correctly aligned to the air flow direction, the alignment strip along the probe assures that the EE671 is also correctly aligned.



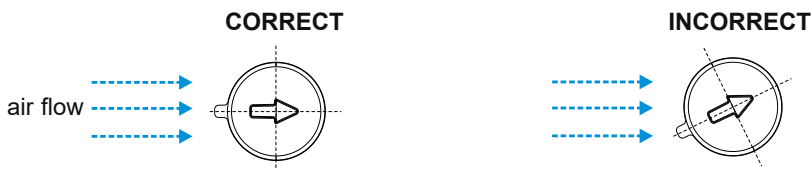
## MOUNTING INTO A DUCT



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.

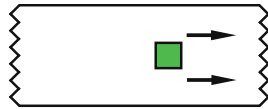
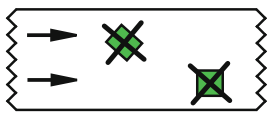


## MOUNTING GUIDELINES FOR AIR VELOCITY MEASURING DEVICES

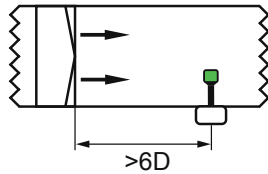
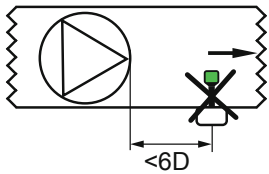
For accurate measurement results it is of paramount importance to place the sensing probe at a location with low turbulence, such as after filters, rectifiers, heaters or coolers. Turbulence appears after obstructions like fans, bends, junctions or section changes in the duct (diffusers / confusers), 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  $a \cdot b$ :

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

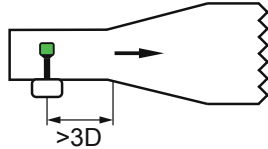
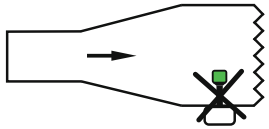
The following pictures supply guidelines for correct installation of air velocity transducers with respect to location and to minimum recommended settling zones.



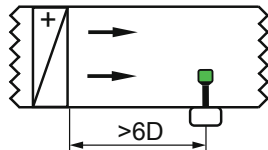
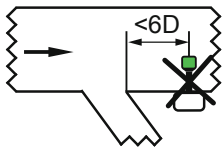
Install the sensor in the middle of the duct.



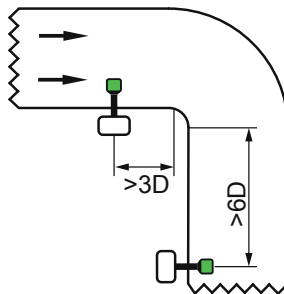
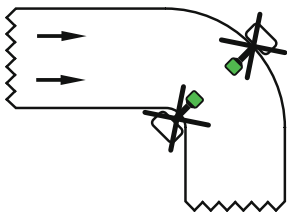
The preferred position of the sensor is after a filter.



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.

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**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**

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