

EE431

Duct and Immersion Temperature Sensor

The EE431 duct and immersion sensor measures reliably the temperature (T) in air and liquids and is optimized for building automation, HVAC and process control.

Analogue, Digital and Passive Outputs

The measured data of the temperature is available on the voltage or current output, as well as on the RS485 interface with Modbus RTU or BACnet MS/TP protocol. In addition, EE431 features a wide choice of sensing elements for passive T measurement.

Easy Installation

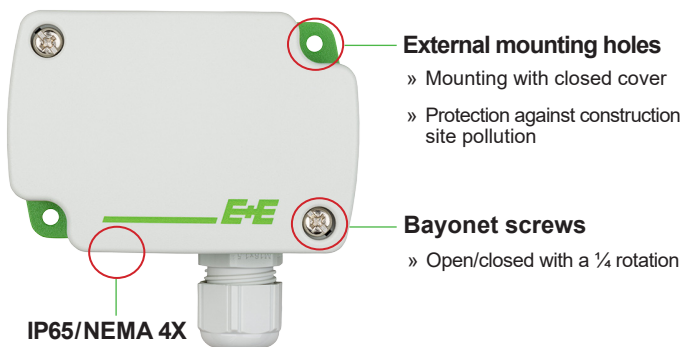
The device can be mounted either with the plastic mounting flange or via external mounting holes at the enclosure. The innovative immersion well is dedicated for measurement in liquids and allows for fast and safe replacement of the sensor. The EE431 with RS485 interface is appropriate for daisy-chain wiring.

Configurable and Adjustable

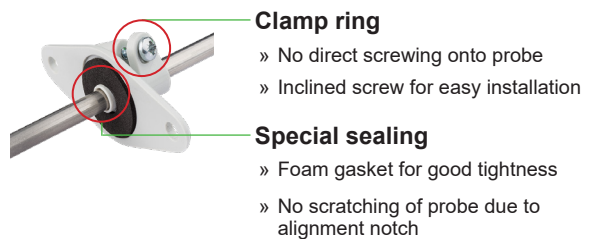
An optional adapter and the free EE-PCS Product Configuration Software facilitate the setup and adjustment of the EE431.



Features



Mounting flange



Immersion well



Test report according to
 DIN EN 10204-2.2

Technical Data

Active Output

Operating temperature	Probe duct sensor (probe tip):	-40...+110 °C (-40...+230 °F)
	Probe immersion sensor (probe tip):	-40...+150 °C (-40...+302 °F)
	Electronics:	-40...+70 °C (-40...+158 °F)
Analogue output	0 - 10 V	-1 mA < I _L < 1 mA
	4 - 20 mA (2-wire)	R _L < 500 Ω R _L = load resistance
Digital interface	RS485 (EE431 = 1 unit load)	
Protocol	Modbus RTU or BACnet MS/TP	
Default settings	Baud rate 9600 ¹⁾ , parity even, 1 stop bit, Modbus address 66	
Accuracy	±0.25 °C (±0.45 °F) at 20 °C (68 °F)	
	±0.1 °C (±0.18 °F) at 20 °C (68 °F) (optional only for analogue output) ²⁾	
Power supply (Class III) \triangleleft ³⁾ (EU) / class 2 (NA)	15 - 35 V DC or 24 V AC ±20 %	
for RS485 and 0 - 10 V output	10 V DC + R _L x 20 mA < V+ < 35 V DC	
for 4 - 20 mA output		

1) Supported baud rates: 9 600, 19 200, 38 400, 57 600, 76 800 and 115 200; find more details about communication setting in the User Manual and the Modbus Application Note at www.epluse.com/ee431

2) Uncertainty of factory calibration at 20 °C +/-0,1 °C

3) USA & Canada class 2 supply required, max. supply voltage 30 V DC

Current demand, typ.	analogue RS485	5 mA (DC) / 12 mA _{rms} (AC) 3.5 mA (DC) / 12 mA _{rms} (AC)		
Electromagnetic compatibility	EN 61326-1 FCC Part 15	EN 61326-2-3 ICES-003 Class B	Industrial environment	UK CA CE

Passive Output

Operating temperature (probe)	-40...+110 °C (-40...+230 °F) -40...+150 °C (-40...+302 °F) for immersion sensor with Pt and Ni T sensors
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T sensing elements	Sensor Type	Nominal Resistance	Sensitivity	Standard
	Pt100 DIN B	R ₀ : 100 Ω	TC: 3.850 x 10 ⁻³ /°C	DIN EN 60751
	Pt1000 DIN B	R ₀ : 1000 Ω	TC: 3.850 x 10 ⁻³ /°C	DIN EN 60751
	NTC10k B3950	R ₂₅ : 10 kΩ ± 0.5 %	B _{25/85} : 3989 K (B _{25/50} : 3950 K ± 1.0 %)	-
	NTC20k B4286	R ₂₅ : 20 kΩ ± 0.2 °C	B _{25/85} : 4286 K (B _{25/85} : 4286 K ± 1.0 %)	-
	Ni1000 TK6180 DIN B	R ₀ : 1000 Ω	TC: 6 180 ppm/K	DIN 43760
	Ni1000 TK5000 DIN B	R ₀ : 1000 Ω	TC: 5000 ppm/K	DIN 43760

Measurement current, typ.	< 1 mA (according technical data of the specific T sensing element)
T sensor connection	2-wire

General

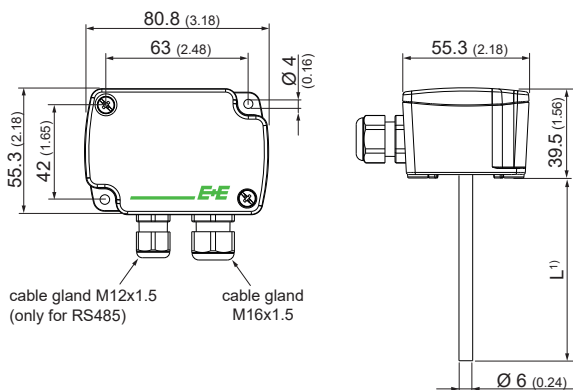
Insulation resistance (probe)	> 100 MΩ at 20 °C (68 °F)
Response time τ ₆₃	< 1 min, duct sensor at 3 m/s (590 ft/min) air velocity < 30 s, immersion sensor in liquid water bath
Probe material	Stainless steel (1.4571 / 316Ti)
Enclosure material	Polycarbonate, UL94 V-0 approved, T-range: -40...+110 °C (-40...+230 °F)
Protection rating	IP65/NEMA 4X
Cable gland	M16x1.5, M12x1.5, UL94 V-2
Electrical connection	Screw terminals, max. 2.5 mm ² (0.004 in ²)
Storage temperature	-30...+70 °C (-22...+158 °F)
Working and storage humidity	5...95 %RH, non-condensing

Immersion well

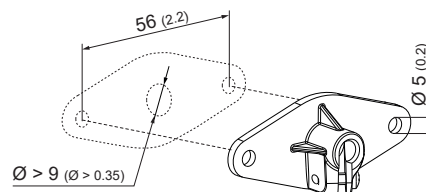
Material	Brass nickel-plated Stainless steel (tube: 1.4571 / 316Ti, mounting thread: 1.4404 / 316L)															
Pressure rating	15 bar (218 psi), brass 25 bar (363 psi), stainless steel															
Max. flow speed	<table border="1"> <thead> <tr> <th>Length</th> <th>50 mm (1.97")</th> <th>100 mm (3.94")</th> <th>135 mm (5.31")</th> <th>285 mm (11.22")</th> </tr> </thead> <tbody> <tr> <td>Brass</td> <td>26 m/s (5118 ft/min)</td> <td>12 m/s (2362 ft/min)</td> <td>6 m/s (1181 ft/min)</td> <td>1 m/s (197 ft/min)</td> </tr> <tr> <td>Stainless steel</td> <td>29 m/s (5708 ft/min)</td> <td>15 m/s (2953 ft/min)</td> <td>9 m/s (1771 ft/min)</td> <td>2 m/s (394 ft/min)</td> </tr> </tbody> </table>	Length	50 mm (1.97")	100 mm (3.94")	135 mm (5.31")	285 mm (11.22")	Brass	26 m/s (5118 ft/min)	12 m/s (2362 ft/min)	6 m/s (1181 ft/min)	1 m/s (197 ft/min)	Stainless steel	29 m/s (5708 ft/min)	15 m/s (2953 ft/min)	9 m/s (1771 ft/min)	2 m/s (394 ft/min)
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Dimensions

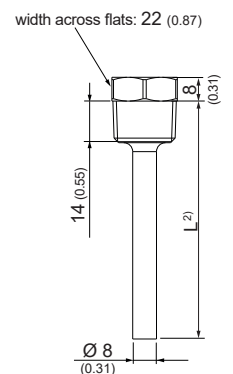
Values in mm (inch)



Plastic mounting flange



Immersion well



¹) According to ordering guide „Probe length“
²) According to ordering guide „Immersion well“

Ordering Guide

Position 1 - Temperature Sensor

		EE431-			
		M3		M7	
Hardware Configuration	Model	Active			
		Passive			
	Output	0 - 10 V	A3		
		4 - 20 mA	A6		
		RS485		J3	
	T sensor passive¹⁾ (see www.epluse.com/R-T_Characteristics)	Pt100 DIN B			TP2
Pt1000 DIN B				TP4	
NTC 20k, B4286				TP6	
Ni1000, TK6180 DIN B				TP9	
NTC 10k, B3950				TP11	
Ni1000, TK5000 DIN B				TP19	
Probe length	65 mm (2.56")		L65		
	115 mm (4.53")		L115		
	150 mm (5.91")		L150		
	300 mm (11.81")		L300		
Accuracy	±0.25 °C	no code			
	±0.1 °C ²⁾	TT2			
Unit	°C	no code			
	°F	MA2			
Scale T low	0	no code			
	Value (within working range)	SALValue			
Scale T high	50	no code			
	Value (within working range)	SAHValue			
Protocol	Modbus RTU ³⁾		P1		
	BACnet MS/TP ⁴⁾		P3		
Baud rate	9600		BD5		
	19200		BD6		
	38400		BD7		
	57600 ⁵⁾		BD8		
	76800 ⁵⁾		BD9		
	115200 ⁵⁾		BD10		

1) Other passive sensor types are available on request from a minimum order quantity of 100 pcs.

2) Uncertainty of factory calibration at 20°C +/-0.1°C.

3) Factory setting: Even parity, Stopbits 1. Modbus Map and communication setting: see User Guide and Modbus Application Note at www.epluse.com/ee431.

4) Product Implementation Conformance Statement (PICS) available at www.epluse.com/ee431.

5) Only for BACnet MS/TP.

Position 2 - Mounting Accessories

Plastic mounting flange HA401101

Immersion well: R½" ISO:

Length (L)	50 mm (1.97")	100 mm (3.94")	135 mm (5.31")	285 mm (11.22")
Brass	HA400101	HA400104	HA400102	HA400103
Stainless steel	HA400201	HA400204	HA400202	HA400203

Immersion well: ½" NPT:

Length (L)	50 mm (1.97")	100 mm (3.94")	135 mm (5.31")	285 mm (11.22")
Brass	HA400111	HA400114	HA400112	HA400113
Stainless steel	HA400211	HA400214	HA400212	HA400213

Order Example

Position 1:**EE431-M3J3L300P3BD7**

Model: Active
Output: RS485
Probe length: 300 mm
Protocol: BACnet MS/TP
Baud rate: 38400

Position 2:**HA400113**

Immersion well: ½" NPT, brass, 285 mm (11.22")

Position 1:**EE431-M7TP11L65**

Model: Passive
T sensor passive: NTC 10k, B3950
Probe length: 65 mm (2.56")

Position 2:**HA400201**

Immersion well: R½" ISO, stainless steel, 50 mm (1.97")

Accessories

Product configuration adapter

- for analogue output
- for digital output - USB configuration adapter

see data sheet EE-PCA

HA011066

Product configuration software

(free download: www.epluse.com/configurator)

EE-PCS

Power supply adapter

(see data sheet Accessories)

V03

Conduit adapter, M16x1.5 to 1/2"

HA011110