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.

EE431 + mounting flange

EE431 + immersion well

Configurable and Adjustable

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

Features

External mounting holes
- » Mounting with closed cover
- » Protection against construction site pollution

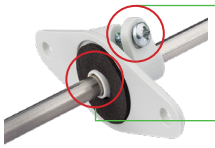
Bayonet screws
- » Open/closed with a ¼ rotation

IP65/NEMA 4X

RoHS compliant

Test report according to DIN EN 10204-2.2

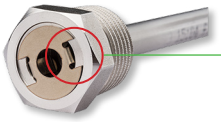
Mounting flange



Clamp ring
- » No direct screwing onto probe
- » Inclined screw for easy installation

Special sealing
- » Foam gasket for good tightness
- » No scratching of probe due to alignment notch

Immersion well



Innovative mounting spring
- » For securing the probe inside the well
- » No fastening screw, no tools required

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)	
Sensing element	Pt1000 class A, DIN EN 60751		
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 adress 66		
Accuracy	±0.3 °C (±0.54 °F) at 20 °C (68 °F)		
	±0.2 °C (±0.36 °F) at 20 °C (68 °F) (optional only for analogue output)		
Supply voltage (Class III) [2]	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) USA & Canada class 2 supply required, max. supply voltage 30 V DC

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

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

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: 1 000 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 %)	-
Ni1000 TK6180 DIN B	R_0: 1 000 Ω	TC: 6 180 ppm/K	DIN 43760
Ni1000 TK5000 DIN B	R_0: 1 000 Ω	TC: 5 000 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

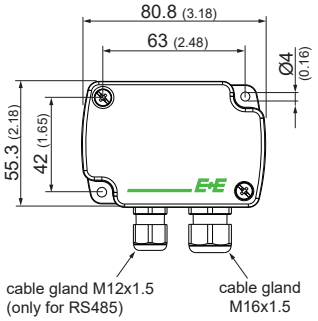
Material	Brass nickel-plated Stainless steel (tube: 1.4571 / 316Ti, mounting thread: 1.4404 / 316L)
Pressure rating	15 bar (218 psi), brass 25 bar (363 psi), stainless steel

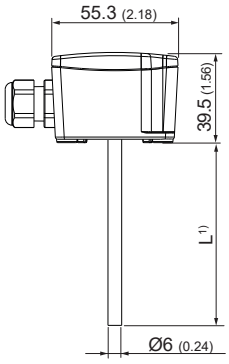
Max. flow speed

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)

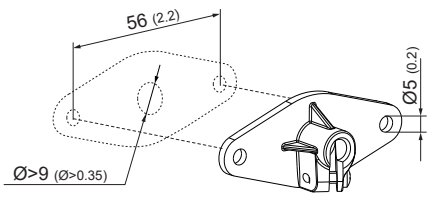
Dimensions

Values in mm (inch)

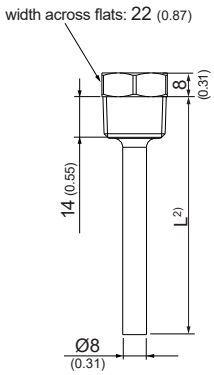




Plastic mounting flange



Immersion well



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

Ordering Guide

Position 1 - Temperature Sensor

			EE431-		
Hardware Configuration	**Model**	Active	M3		
		Passive			M7
	Output	0 - 10 V	A3		
		4 - 20 mA	A6		
		RS485		J3	
	T sensor passive[1] (see www.epluse.com/R-T_Characteristics)	Pt100 DIN B			TP2
		Pt1000 DIN B			TP4
		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	±0.3 °C	no code		
		±0.2 °C	TT2		
Setup Outputs	**Unit**	°C	no code		
		°F	MA2		
	Scale T low	0	no code		
		Value (within working range)	SAL*Value*		
	Scale T high	50	no code		
		Value (within working range)	SAH*Value*		
	Protocol	Modbus RTU[2]		P1	
		BACnet MS/TP[3]		P3	
	Baud rate	9600		BD5	
		19200		BD6	
		38400		BD7	
		57600[4]		BD8	
		76800[4]		BD9	
		115200[4]		BD10	

1) Other passive sensor types are available on request from a minimum order quantity of 100 pcs
2) Factory setting: Even parity, Stopbits 1. Modbus Map and communication setting: see User Guide and Modbus Application Note at www.epluse.com/ee431
3) Product Implementation Conformance Statement (PICS) available at www.epluse.com/ee431
4) 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:	38 400

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	see data sheet EE-PCA
- for digital output - USB configuration adapter	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