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Datasheet EE431

Duct and Immersion Temperature Sensor



EE431

Duct and Immersion Temperature Sensor

The EE431 duct and immersion sensor reliably measures 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 at 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.



EE431 temperature sensor with immersion well



EE431 temperature sensor with mounting flange

Features

RoHS
compliant

Enclosure

- Protection rating: IP65/Nema 4X
- Polycarbonate (PC)

External mounting holes

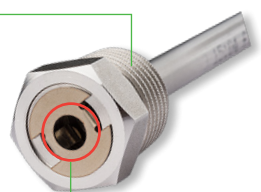
- Mounting with closed cover
- Protection against construction site pollution
- Easy and fast mounting

Bayonet screws

- Open/close with a $\frac{1}{4}$ rotation



Immersion well

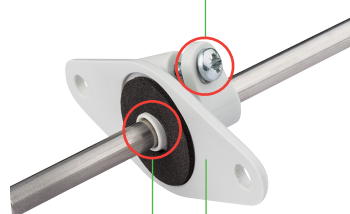


Innovative mounting spring

- For securing the probe inside the well
- No fastening screw, no tools required

Screw clamp

- No direct screwing onto probe
- Inclined screw for easy installation



Mounting flange

Special sealing

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

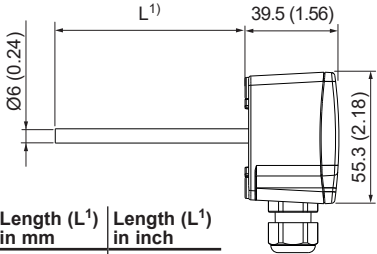
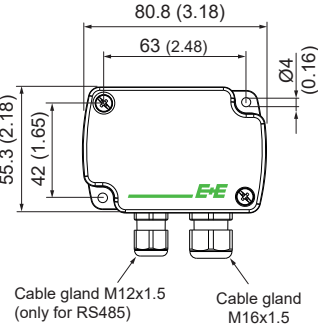
Test report

According to DIN EN 10204-2.2

Dimensions

Values in mm (inch)

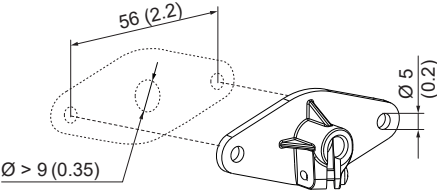
Temperature sensor



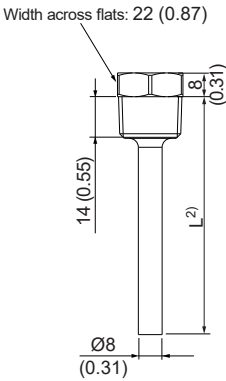
Length (L¹) in mm	Length (L¹) in inch
65	2.56
115	4.53
150	5.91
300	11.81

Mounting accessories

Mounting flange
(not included in the scope of supply)



Immersion well
(not included in the scope of supply)



Length (L²) in mm	Length (L²) in inch
50	1.97
100	3.94
135	5.31
285	11.22

Technical Data

Measurands

Temperature (T) - Active

Measuring range	Duct sensor (probe tip) Immersion sensor (probe tip)	-40 °C...+110 °C (-40...+230 °F) -40 °C...+150 °C (-40...+302 °F)
Accuracy @ 20 °C (68 °F)		±0.25 °C (±0.45 °F) ±0.1 °C (±0.18 °F) (optionally only for analogue output) ¹⁾

1) Uncertainty of factory calibration at 20 °C ±0.1 °C (68 °F ±0.18 °F).

Temperature (T) - Passive

Measuring range				
Duct sensor		-40 °C...+110 °C (-40...+230 °F)		
Immersion sensor with Pt and Ni T sensor		-40 °C...+150 °C (-40...+302 °F)		
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: 6180 ppm/K	DIN 43760
	Ni1000 TK5000 DIN B	R ₀ : 1000 Ω	TC: 5000 ppm/K	DIN 43760

Outputs

Analogue

Analogue output	0 - 10 V 4 - 20 mA (2-wire)	0 < I _L < 1 mA R _L ≤ 500 Ω	I _L = load current R _L = load resistance
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Digital

Digital interface	RS485 (EE431 = 1 Unit Load)
Protocol Factory settings Supported Baud rates Measured data types	Modbus RTU Baud rate see order information, parity even, 1 stop bit, Modbus address 66 9 600, 19 200 und 38 400 FLOAT32 and INT16
Protocol Factory settings Supported Baud rates	BACnet MS/TP Baud rate see order information, BACnet address 66 9 600, 19 200, 38 400, 57 600, 76 800 und 115 200

T Sensor Passive

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

Technical Data

General

Power supply class III  USA & Canada: Class 2 supply necessary, max. voltage 30 V DC for output RS485 and 0 - 10 V for output 4 - 20 mA		15 - 35 V DC or 24 V AC $\pm 20\%$ 10 V DC + $R_L \times 20 \text{ mA} < V+ < 35 \text{ V DC}$ R_L = load resistance
Current consumption, typ.	Analogue RS485	5 mA (DC) / 12 mA _{rms} (AC) 3.5 mA (DC) / 12 mA _{rms} (AC)
Electrical connection	Screw terminals max. 2.5 mm ² (AWG14)	
Cable glands	M16x1.5 / M12x1.5 / UL94 V-2	
Insulation resistance (probe) @20 °C (68 °F)	>100 MΩ	
Response time t₆₃ Duct sensor at 3 m/s (590 ft/min) air velocity Immersion sensor in liquid water bath	<1 min <30 s	
Humidity working range	5...95 %RH, non-condensing	
Temperature working range Duct sensor (probe tip) Immersion sensor (probe tip) Electronics	-40 °C...+110 ° (-40...+230 °F)C -40 °C...+150 °C (-40...+302 °F) -40...+70 °C (-40...+158 °F)	
Storage conditions	-30 °C...+70 °C (-22...+158 °F) 5...95 %RH, non-condensing	
Probe material	Stainless steel (1.4571 / 316Ti)	
Enclosure	Material	Polycarbonate (PC), UL94 V-0 approved
	Protection rating	IP65/NEMA 4X
Electromagnetic compatibility	EN 61326-1 FCC Part15 Class B	EN 61326-2-3 ICES-003 Class B Industrial environment
Conformity	 	

Mounting Accessories

Immersion Well

Material	Brass (nickel-plated) Stainless steel (tube: 1.4571 / 316Ti, mounting thread: 1.4404 / 316L)			
Pressure rating	Brass	PN 15 bar (218 psi)		
	Stainless steel	PN 25 bar (363 psi)		
Max. flow speed		50 mm (1.97")	100 mm (3.94")	135 mm (5.31")
	Brass	26 m/s (5 118 ft/min)	12 m/s (2 362 ft/min)	6 m/s (1 181 ft/min)
	Stainless steel	29 m/s (5 708 ft/min)	15 m/s (2 953 ft/min)	9 m/s (1 771 ft/min)

Ordering Guide

Feature		Description	Code	
Hardware Configuration			EE431-	
	Model	Aktive	M3	
		Passive	M7	
	Output	0 - 10 V	A3	
		4 - 20 mA	A6	
		RS485	J3	
	T sensor passive ¹⁾ (R-T-characteristics see www.epluse.com/ee431)	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	
Software Setup - Outputs	Output (T) measurand	Temperature [°C]	No code	
		Temperature [°F]	MA2	
	Output (T) scaling low	0	No code	
		Value (within the working range)	SALValue	
	Output (T) scaling high	50	No code	
		Value (within the working range)	SAHValue	
	Protocol	Modbus RTU ³⁾	P1	
		BACnet MS/TP ⁴⁾	P3	
	Baud rate	9 600	BD5	
		19 200	BD6	
		38 400	BD7	
		57 600 (for BACnet only)	BD8	
		76 800 (for BACnet only)	BD9	
		115 200 (for BACnet only)	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 settings: Parity even, stop bit 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.

Order Examples

EE431-M3J3L300P3BD7

Feature	Code	Description
Model	M3	Aktive
Output	J3	RS485
Probe length	L300	300 mm (11.81")
Protocol	P3	BACnet MS/TP
Baud rate	BD7	38 400

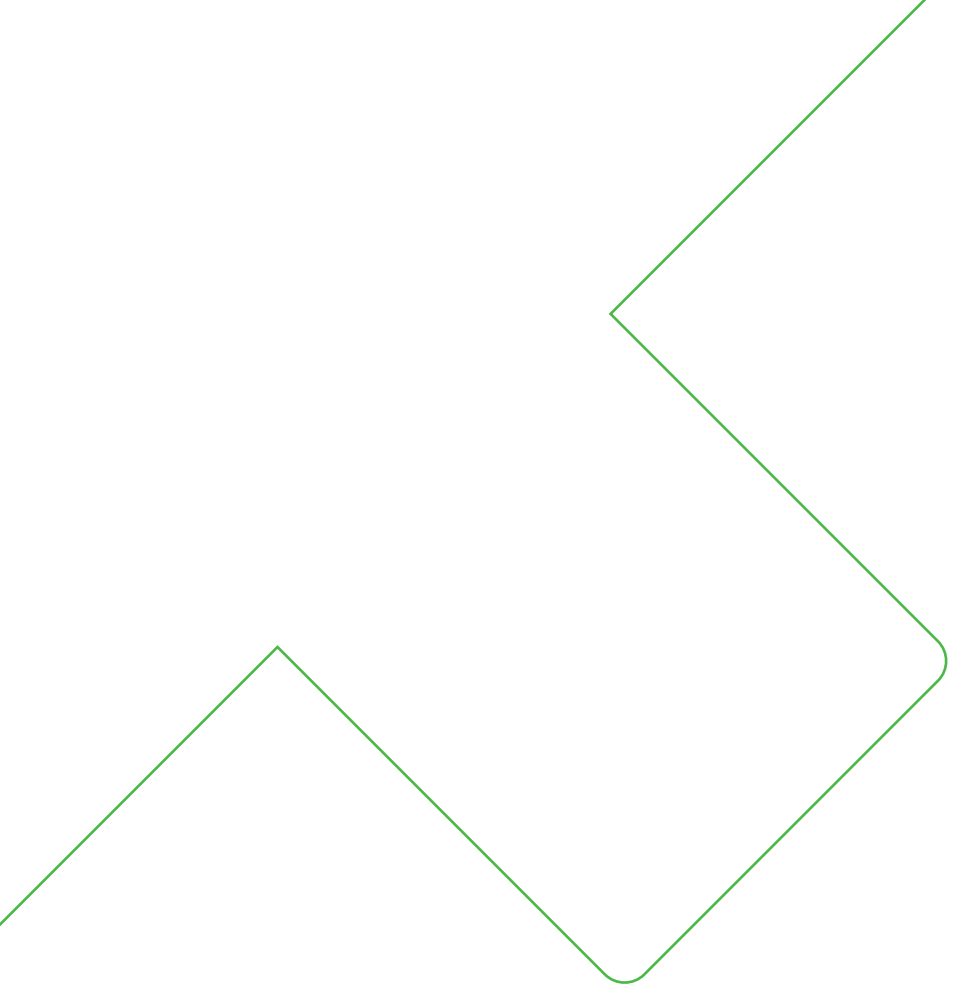
EE431-M7TP11L65

Feature	Code	Description
Model	M7	Passive
T sensor passive	TP11	NTC 10k, B3950
Probe length	L65	65 mm (2.56")

Accessories

For further information see datasheet [Accessories](#).

Description		Code			
Product configuration adapter for analogue output		See datasheet EE-PCA			
USB configuration adapter for digital output		HA011066			
E+E Product Configuration Software (free download: www.epluse.com/configurator)		EE-PCS			
Power supply adapter		V03			
Conduit Adapter, M16x1.5 auf 1/2"		HA011110			
Mounting flange		HA401101			
Immersion well - thread R ½" ISO	Length in mm (inch)	50 (1.97")	100 (3.94")	135 (5.31")	285 (11.22")
	Brass	HA400101	HA400104	HA400102	HA400103
	Stainless steel	HA400201	HA400204	HA400202	HA400203
Immersion well - thread ½" NPT	Length in mm (inch)	50 (1.97")	100 (3.94")	135 (5.31")	285 (11.22")
	Brass	HA400111	HA400114	HA400112	HA400113
	Stainless steel	HA400211	HA400214	HA400212	HA400213



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