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technology.

+ 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. An optional display is available for the EE431 with analog output.

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 Product Configuration Software facilitate the setup and adjustment of the EE431.



EE431 temperature sensor with immersion well



EE431 temperature sensor with mounting flange



EE431 temperature sensor with display

Features

Enclosure

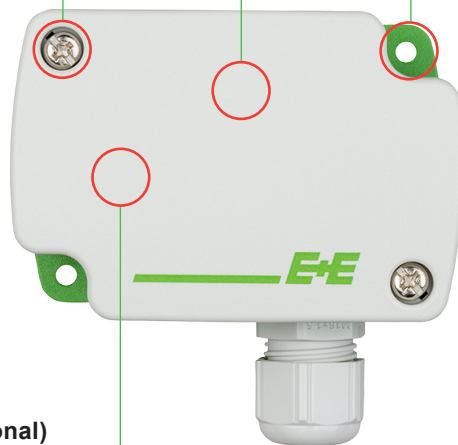
- Protection rating: IP65/Nema 4X
- Polycarbonate (PC)

External mounting holes

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

Bayonet screws

- Open/close with a ¼ rotation



LC display (optional)

- 38 x 20 mm (1.5 x 0.8")

Screw clamp

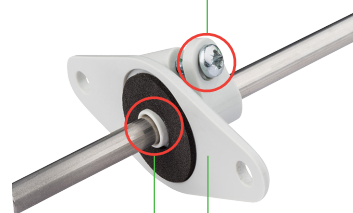
- No direct screwing onto probe
- Inclined screw for easy installation

Immersion well



Innovative mounting spring

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



Mounting flange

Special sealing

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

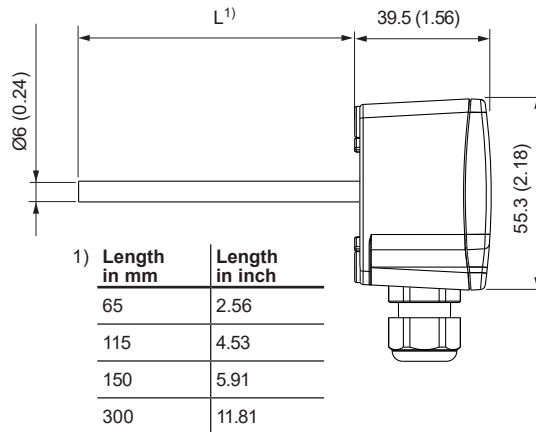
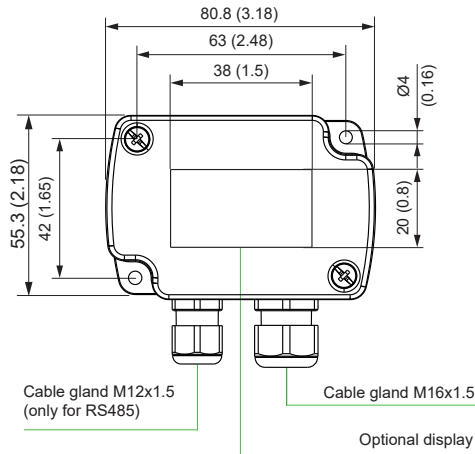
Test report

According to DIN EN 10204-2.2

Dimensions

Values in mm (inch)

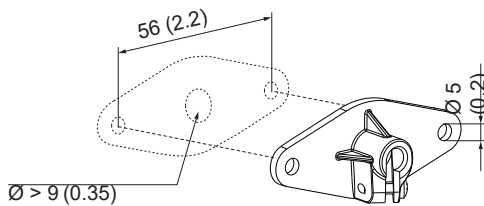
Temperature sensor



Mounting accessories

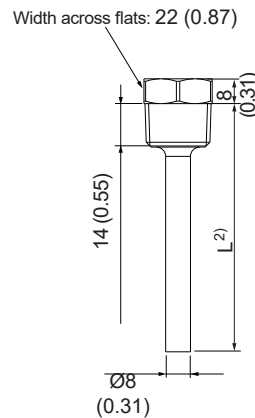
Mounting flange

(not included in the scope of supply)



Immersion well

(not included in the scope of supply)



2) Length in mm	Length 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) With immersion well (probe tip)	-40 °C...+110 °C (-40...+230 °F) -40 °C...+130 °C (-40...+266 °F)
Accuracy @ 20 °C (68 °F)	Optional for analogue output	±0.25 °C (0.36 °F) ±0.1 °C (±0.18 °F) ¹⁾

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

Temperature (T) - Passive

Measuring range	Duct sensor Immersion Sensor with Pt and Ni T sensor	-40 °C...+110 °C (-40...+230 °F) -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)	-1 mA < 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, data bits 8, parity even, 1 stop bit, Modbus address 66 9600, 19200 und 38400 FLOAT32 and INT16
Protocol Factory settings Supported Baud rates	BACnet MS/TP Baud rate see order information, data bits 8, parity none, 1 stop bit, BACnet address 66 9600, 19200, 38400, 57600, 76800 und 115200

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, @ 24 V	Voltage output	DC supply max. 0.8mA AC supply max. 4.6 mA _{rms}	with display max. 1.7 mA with display max. 7 mA _{rms}			
	Current output	According to output current	According to output current			
	Digital interface	DC supply typ. 3.5 mA AC supply typ. 12 mA _{rms}				
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				
LC-display		Available for output A3 and A6 1 line, switchable between °C / °F or according to order code Without backlight Visible area 38 mm x 20 mm (1.5" x 0.8")				
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)	With immersion well (probe tip) Active	Passive	Electronics without Display	Electronics with Display
		-40...+110 °C (-40...+230 °F)	-40...+130 °C (-40...+266 °F)	-40 °C...+150 °C (-40...+302 °F)	-40...+70 °C (-40...+158 °F)	-20...+50 °C (-4...+122 °F)
Storage conditions		Without display -30...+70 °C (-22...+158 °F) 5...95 %RH, non-condensing With display -20...+50 °C (-4...+122 °F) 5...95 %RH, non-condensing				
Probe material		Stainless steel (1.4571 / 316Ti)				
Enclosure		Polycarbonate (PC), UL94 V-0 approved IP65/NEMA 4X				
Material Protection rating						
Electromagnetic compatibility		EN 61326-1 FCC Part15 Class B	EN 61326-2-3 ICES-003 Class B	Industrial environment		
Conformity		 				
Configuration and adjustment For display and 0 - 10 V version		PCS10 Product Configuration Software (free download: www.epluse.com/pcs10) and configuration adapter.				
For digital and 4 - 20 mA version without display		EE-PCS Product Configuration Software (free download: www.epluse.com/configurator) and configuration adapter.				

Technical Data

Mounting Accessories

Immersion Well

Material	Brass (nickel-plated) Stainless steel (1.4404 / 316L; tube: 1.4571 / 316Ti)				
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")	285 mm (11.22")
	Brass	26 m/s (5 118 ft/min)	12 m/s (2 362 ft/min)	6 m/s (1 181 ft/min)	1 m/s (197 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)	2 m/s (394 ft/min)

Ordering Guide

Feature	Description	Code		
Hardware Configuration		EE431-		
	Model	Active	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		
Display	Without display	No code		
	Display	D1		
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		
Software Setup - Outputs				

- 1) Other passive sensor types are available on request from a minimum order quantity of 500 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	Active
Output	J3	RS485
Probe length	L300	300 mm (11.81")
Protocol	P3	BACnet MS/TP
Baud rate	BD7	38400

EE431-M3A3L115TT2D1

Feature	Code	Description
Model	M3	Active
Output	A3	0 - 10 V
Probe length	L115	115 mm (4.53")
Accuracy	TT2	±0.1 °C (Uncertainty of factory calibration at 20°C ±0.1°C)
Display	D1	Display

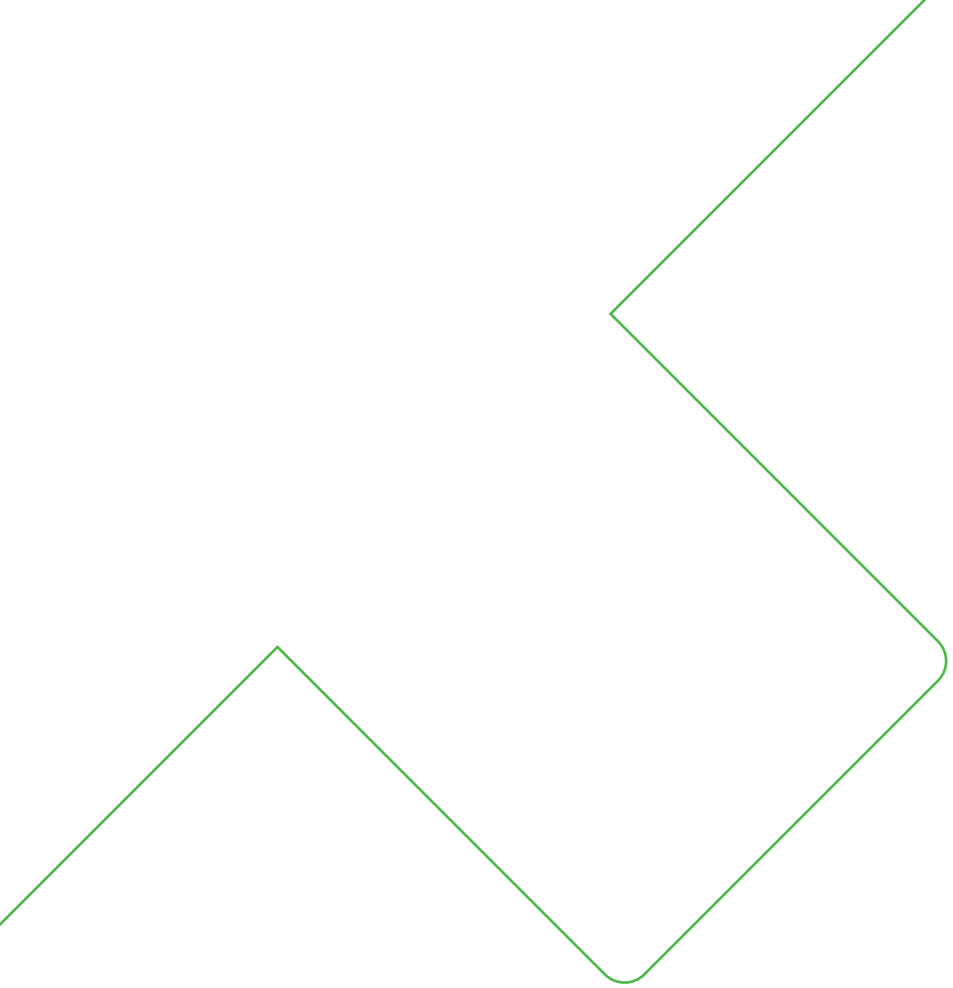
EE431-M7TP11L65

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 4 - 20 mA version without display		See datasheet EE-PCA			
Configuration adapter for display and 0 - 10 V versions without display		HA011023			
USB configuration adapter for digital output		HA011066			
E+E Product Configuration Software for digital output and for 4 - 20 mA version without display (Free download: www.epluse.com/configurator)		EE-PCS			
E+E Product Configuration Software (Free download: www.epluse.com/pcs10) for display and 0 - 10 V versions without display		PCS10			
Power supply adapter for digital output		V03			
Conduit Adapter, M16x1.5 auf 1/2"		HA011110			
Mounting flange		HA401101			
Immersion well - thread R 1/2" 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 1/2" 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



Company Headquarters &
Production Site

E+E Elektronik Ges.m.b.H.
Langwiesen 7
4209 Engerwitzdorf | Austria
T +43 7235 605-0
F +43 7235 605-8
info@epluse.com
www.epluse.com

Subsidiaries

E+E Sensor Technology (Shanghai) Co., Ltd.
T +86 21 6117 6129
info@epluse.cn

E+E Elektronik France SARL
T +33 4 74 72 35 82
info.fr@epluse.com

E+E Elektronik Deutschland GmbH
T +49 6171 69411-0
info.de@epluse.com

E+E Elektronik India Private Limited
T +91 990 440 5400
info.in@epluse.com

E+E Elektronik Italia S.R.L.
T +39 02 2707 86 36
info.it@epluse.com

E+E Korea Co., Ltd.
T +82 31 732 6050
info.kr@epluse.com

E+E Elektronik Corporation
T +1 847 490 0520
info.us@epluse.com



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