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Datasheet EE451

Wall-Mounted Temperature Sensor for Indoor and Outdoor

Modbus

www.epluse.com

EE451

Wall-Mounted Temperature Sensor for Indoor and Outdoor

The EE451 wall-mounted sensor reliably measures the temperature (T) indoors and outdoors in building automation, HVAC and process control.

Analogue, Digital and Passive Outputs

The measured data is available at the voltage or current output, as well as on the RS485 interface with Modbus RTU protocol. Additionally, EE451 features a wide choice of sensing elements for passive temperature measurement. An optional display is available for the EE451 with analog output.

Easy Installation

The compact and robust design allows easy and quick installation as well as unbiased measurement of the ambient temperature.

Configurable and Adjustable

An optional adapter / stick and the free Product Configuration Software facilitate the setup and adjustment of the EE451.

EE451 with active output

EE451 with passive output

EE451 with active output and display

Features

LC display (optional)

- 38 x 20 mm (1.5 x 0.8")

External mounting holes

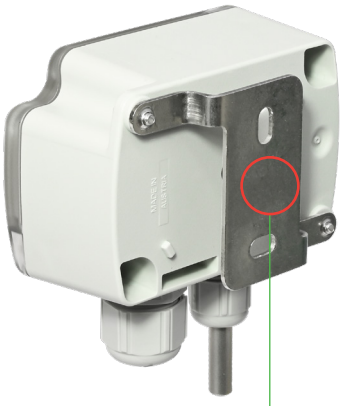
- Mounting with closed cover
- Protection against construction site pollution
- Easy and fast mounting

Bayonet screws

- Open / close with a ¼ rotation

Enclosure

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



Mounting bracket

- Distance to wall for correct measurement of ambient temperature

Test report

According to DIN EN 10204-2.2

Features

Accredited Traceable Calibration Certificate

Internationally recognised certificates for the calibration of measuring instruments from accredited laboratories document the traceability of the measurements to the International System of Units (SI). The E+E Elektronik calibration laboratory offers traceable calibrations.

The E+E calibration laboratory is accredited by Akkreditierung Austria in accordance with DIN EN ISO/IEC 17025 with the identification number 0608. This allows the laboratory to issue ISO 17025 certificates for the measurands humidity, temperature, dew point temperature, air velocity, flow, pressure and CO2.

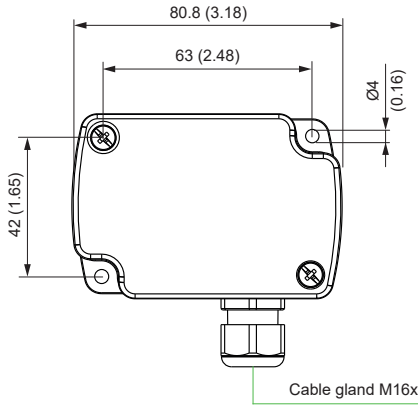
Visit www.eplusecal.com for detailed information on calibration and to enquire a certificate of accredited traceable calibration for the EE451 from the E+E Elektronik calibration laboratory.

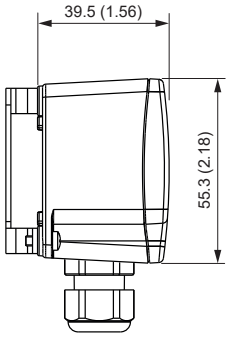
Dimensions

Values in mm (inch)

Passive Output

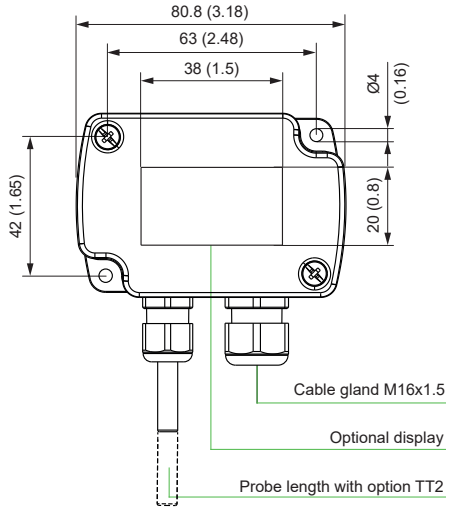
Mounting bracket included in the scope of supply

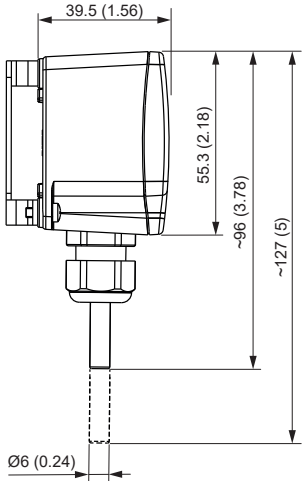




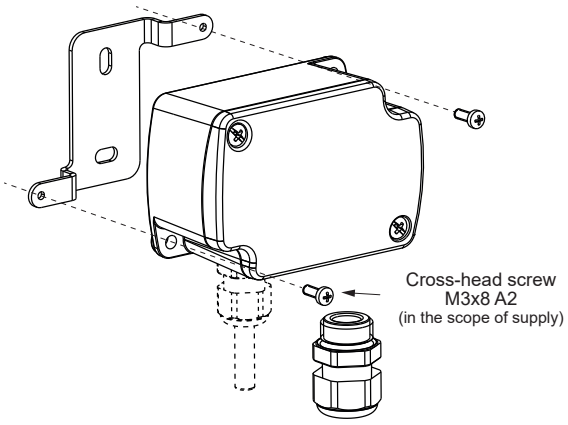
Active Output

Mounting bracket included in the scope of supply

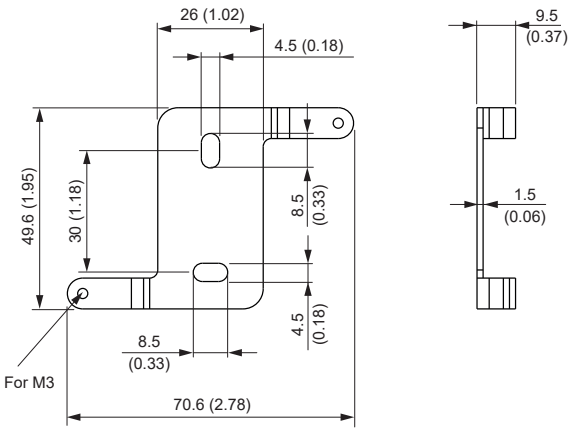




Mounting



Mounting Bracket



Technical Data

Measurands

Temperature (T) - Active

Measuring range	-40 °C…+70 °C (-40...+158 °F)
Accuracy @ 20 °C (68 °F) **Optional for analogue output**	 ±0.3 °C (±0.54 °F) ±0.1 °C (±0.18 °F)[1)]

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

Temperature (T) - Passive

Measuring range		-40 °C…+70 °C (-40...+158 °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: 1 000 Ω	TC: 3.850 x 10^{-3}/°C	DIN EN 60751
	NTC10k B3950	R_{25}: 10 kΩ ±0.5 %	$B_{25/85}$: 3 989 K ($B_{25/50}$: 3 950 K ± 1.0 %)	-
	NTC20k B4286	R_{25}: 20 kΩ ± 0.2 °C	$B_{25/85}$: 4 286 K ($B_{25/85}$: 4 286 K ± 1.0 %)	-
	Ni1000 TK5000 DIN B	R_0: 1 000 Ω	TC: 5 000 ppm/K	DIN 43760

Outputs

Analogue

Analogue output	0 – 10 V 4 – 20 mA (2-wire)	-1mA < I_L < 1 mA R_L ≤ 500 Ω	I_L = load current R_L = load resistance

Digital

Digital interface	RS485 (EE451 = 1 unit load)
Protocol **Factory settings** **Supported Baud rates** **Measured data types**	Modbus RTU Baud rate see order information, 8 data bits, parity even, 1 stop bit, Modbus address 66 9 600, 19 200 and 38 400 FLOAT32 and INT16

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			
	0 – 10 V, RS485 **4 – 20 mA**	15 – 35 V DC or 24 V AC ±20 % 10 V DC + R_L x 20 mA < V+ < 35 V DC	R_L = load resistance
Current consumption @ 24 V	**Voltage output**	DC supply max. 1.2 mA AC supply max. 4.6 mA_{rms}	With display max. 2.1 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 / UL94 V-2	
LC-display		Available for output A3 and A6 1 line, unit according selected measurand Without backlight Visible area 38 mm x 20 mm (1.5" x 0.8")	
Humidity working range		5…95 %RH, non-condensing	
Temperature working range	**Without display** **With display**	-40…+70 °C (-40...+158 °F) -20...+50 °C (-4...+122 °F)	
Storage conditions	**Without display** **With display**	-30…+70 °C (-22...+158 °F) 5…95 %RH, non-condensing -20...+50 °C (-4...+122 °F) 5…95 %RH, non-condensing	
Mounting bracket material		Stainless steel (1.4301 / 304)	
Enclosure	**Material** **Protection rating**	Polycarbonate (PC), UL94 V-0 approved IP65 / NEMA 4X	
Electromagnetic compatibility		EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class B ICES-003 Class B	
Conformity		CE UKCA	
Configuration and adjustment	**Analogue** **Digital**	PCS10 Product Configuration Software (free download: www.epluse.com/pcs10) and configuration adapter. EE-PCS Configuration Software (free download: www.epluse.com/configurator) and USB-C configuration stick.	

Ordering Guide

	Feature	Description	Code		
			EE451-		
Hardware Configuration	**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/ee451)	Pt100 DIN B			TP2
		Pt1000 DIN B			TP4
		NTC 10k, B3950			TP11
		Ni1000, TK5000 DIN B			TP19
	Accuracy	±0.3 °C (±0.54 °F)	No code		
		±0.1 °C (±0.18 °F)[2]	TT2		
	Display	Without display	No code		
		Display	D1		
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)	SAL*Value*		
	Output (T) scaling high	50	No code		
		Value (within the working range)	SAH*Value*		
	Protocol	Modbus RTU[3]		P1	
	Baud rate	9600		BD5	
		19200		BD6	
		38400		BD7	
	Accredited Traceable Calibration Certificate in accordance with DIN EN ISO/IEC 17025		see www.epluse.com		

1) Other passive sensor types are available on request for a minimum order quantity of 500 pcs.
2) Uncertainty of factory calibration at 20 °C ±0.1 °C (68 °F ±0.18 °F). The probe length for this configuration is 76.5 mm (3.01").
3) Factory settings: Parity even, stop bit 1. Modbus Map and communication setting: see User Guide and Modbus Application Note at www.epluse.com/ee451.

Order Examples

EE451-M3J3P1BD5

Feature	Code	Description
Model	M3	Active
Output	J3	RS485
Protocol	P1	Modbus RTU
Baud rate	BD5	9600

Order Examples

EE451-M3A3D1

Feature	Code	Description
Model	**M3**	Active
Output	**A3**	0 – 10 V
Display	**D1**	Display
Output (T) measurand	**No code**	Temperature [°C]
Output (T) scaling low	**No code**	0
Output (T) scaling high	**No code**	50

EE451-M3A6TT2

Feature	Code	Description
Model	**M3**	Active
Output	**A6**	4 – 20 mA
Accuracy	**TT2**	±0.1 °C (±0.18 °F)
Display	**No code**	Without display
Output (T) measurand	**No code**	Temperature [°C]
Output (T) scaling low	**No code**	0
Output (T) scaling high	**No code**	50

EE451-M7TP11

Feature	Code	Description
Model	**M7**	Passive
T sensor passive	**TP11**	NTC 10k, B3950

Accessories

For further information see datasheet Accessories.

Description	Code
USB configuration adapter for version with analogue output	**HA011023**
USB-C configuration stick for version with digital output	**HA011070**
E+E Product Configuration Software for digital output (Free download: www.epluse.com/configurator)	**EE-PCS**
E+E Product Configuration Software for analogue output (Free download: www.epluse.com/pcs10)	**PCS10**
Power supply adapter 24 V DC	**V03**
Conduit Adapter US, M16x1.5 – 1/2", plastic	**HA011110**

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