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technology.

Datasheet EE872

Modular Probe for CO_2, Humidity, Temperature and Ambient Pressure

Modbus

BACnet

www.epluse.com

EE872

Modular Probe for CO_2, Humidity, Temperature and Ambient Pressure

The EE872 probe, with a measurement range up to 5 % CO_2 (50 000 ppm), is suitable for use in harsh and demanding environment in agriculture, life stock barns, hatchers, incubators, green houses or outdoors.

Outstanding Accuracy

A multi-point CO_2 and temperature adjustment procedure leads to excellent CO_2 measurement accuracy over the entire T working range of -40…+60 °C (-40…+140 °F), which is ideal for agriculture or outdoor use.

Long-Term Stability

EE872 incorporates the E+E dual wavelength NDIR CO_2 sensor, which automatically compensates for ageing effects and is highly insensitive to pollution. The RH sensing element with E+E proprietary coating is suitable even for aggressive and corrosive environment.

Pressure and Temperature Compensation

The active compensation with on-board sensors leads to best CO_2 measurement accuracy independently of weather conditions, altitude or temperature.

4 in 1

Beside CO_2, the EE872 measures also relative humidity (RH), temperature (T) and ambient pressure (p). Additionally, the device calculates the dew point temperature (Td).

Reliable in Harsh and Condensing Environment

The heated version of EE872 is suitable for high humidity and condensing environment. The IP65 enclosure and the replaceable filter offer excellent protection in polluted environment. With a special filter, the EE872 is also appropriate for applications with periodical H_2O_2 sterilization.

Analogue Output or RS485 Interface

The CO_2 measured data is available simultaneously on the analogue voltage and current outputs. Depending on the model, EE872 with RS485 interface with Modbus RTU or BACnet MS/TP protocol also provides the values for RH, T, p and Td.

Configurable and Adjustable

The free PCS10 Product Configuration Software together with an optional adapter cable facilitates the configuration and adjustment of the EE872.

Stainless steel probe with PTFE filter

Polycarbonate probe with H_2O_2 filter

Features

Interchangeable Sensing Module

- E+E dual wavelength NDIR, auto-calibration
- T and p compensation with on-board sensors
- Heated versions for preventing condensation
- RH sensing element protected by E+E sensor coating
- T range -40…+60 °C (-40…+140 °F)
- Configurable and adjustable

Filter Cap

- PTFE
- Catalytic for H_2O_2 sterilization
- Replaceable

Supply and Output Module

- CO_2 voltage and current output
- Modbus RTU or BACnet MS/TP (CO_2, T, RH, p, Td)
- IP65 protection rating
- Stainless steel or plastic enclosure
- M12 stainless steel connector
- User configurable

Test Report

According to DIN EN 10204-2.2

Features

Protective Sensor Coating

The E+E proprietary sensor coating is a protective layer applied to the active surface of the sensing element. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves the sensors' long term stability in dusty, dirty or oily applications by preventing stray impedance caused by deposits on the active sensor surface.

Device Protection During Site Cleaning

If the probe remains on the measuring site during cleaning operations, the optional calibration adapter can be used for protection. For this purpose, both nipples are closed with the rubber caps supplied. In case the probe is removed from the site, it is recommended to apply the protection caps for the M12 cable socket and the EE872 M12 plug.

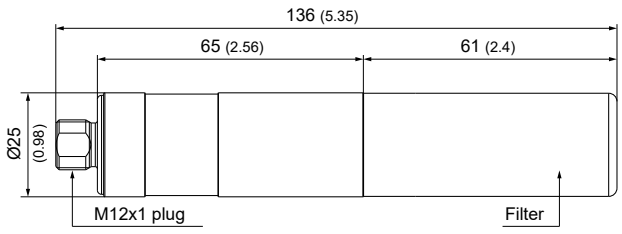
E+E Modular Sensor Platform

The EE872 is compatible with the Sigma 05 host device of the E+E Modular Sensor Platform. Together they become a versatile, plug-and-play CO_2/RH/T/p modular sensor with analogue outputs and optional display. Besides EE872, Sigma 05 accommodates also other E+E intelligent sensing probes. See www.epluse.com/sigma05 for further details.

Sigma 05 with EE872

Dimensions

Values in mm (inch)



Technical Data

Measurands

CO_2

Measurement principle	Dual wavelength non-dispersive infrared technology (NDIR)		
Measuring range	0...2 000 ppm / 5 000 ppm / 10 000 ppm / 3 % / 5 %		
Accuracy @ 25 °C (77 °F) and 1 013 mbar (14.7 psi) **0...2 000 ppm** **0...5 000 ppm** **0...10 000 ppm** **0...3 %** **0...5 %**	 < ±(50 ppm + 2 % mv) < ±(50 ppm + 3 % mv) < ±(100 ppm + 5 % mv) < ±(1.5 % of full scale + 2 % mv) < ±(1.5 % of full scale + 2 % mv)		 mv = measured value
Temperature dependency in the range of -20...+45 °C (-4...+113 °F) **<10 000 ppm** **>10 000 ppm**	 ±(1 + mv / 1 000) ppm/°C -0.3 % of mv/°C	 ±0.556*(1 + mv / 1 000) ppm/°F -0.167 % mv/°F	 mv = measured value
Residual pressure dependency[1] in the range of -20...+45 °C (-4...+113 °F), related to 1 013 mbar (14.7 psi)	0.014 % of mv/mbar	0.965 % of mv/psi	mv = measured value
Long-term stability, typ. @ 0 ppm CO_2	20 ppm/year		
Response time t_{63}, typ.[2]	90 s		
Measuring interval	15 s (user adjustable from 15 s to 1 h)		

1) Pressure dependency of a sensor without pressure correction: 0.14 % of mv/mbar.
2) With data averaging algorithm for smooth output signal. Faster response time available on request.

Relative Humidity (RH)

Measuring range **Heating enabled** **Heating disabled**	 0...100 %RH 0…95 %RH (non-condensing)
Accuracy[1] @ 25 °C (77 °F) **20...80 %RH** **0...95 %RH**	 ±3 %RH ±5 %RH

1) With 24 V DC supply, air flow min. 0.3 m/s, probe horizontal or with sensing head downwards, excl. hysteresis

Pressure (p)

Measuring range	700…1 100 mbar (10.15...15.95 psi)
Accuracy, typ. @ 25 °C (77 °F)	±2 mbar (±0.03 psi)
Temperature dependency in the range of 0...60 °C (32...140 °F)	±0.016 mbar/K (0.00013 psi/°F)

Temperature (T)

Measuring range	-40...+60 °C (-40...+140 °F)
Accuracy, typ.[1] in the range of 5...60 °C (41...140 °F)	±0.5 °C (±0.9 °F)

1) With 24 V DC supply, air flow min. 0.3 m/s, probe horizontal or with sensing head downwards, excl. hysteresis.

Calculated parameters

		Unit
Dew point temperature	Td	°C
		°F
		°K

Technical Data

Outputs

Analogue

CO_2	0 - 5 V / 0 - 10 V 0 - 20 mA / 4 - 20 mA (3-wire)	0 < I_L < 1 mA R_L ≤ 500 Ω	I_L = load current R_L = load resistance

Digital

Digital interface	RS485 (EE872 = 1/10 unit load)
Protocol **Factory settings**[1)] **Supported Baud rates** **Measured data types**	Modbus RTU Baud rate acc. to order code, parity even, 1 stop bit, Modbus address 237 9 600, 19 200 and 38 400 FLOAT32 and INT16
Protocol **Factory settings**[2)] **Supported Baud rates**	BACnet MS/TP Baud rate acc. to order code, BACnet address 6 9 600, 19 200, 38 400, 57 600, 76 800 and 115 200

1) More details about communication setting and the Modbus map: See User Manual and Modbus Application Note at www.epluse.com/ee872.
2) The BACnet MS/TP Product Implementation Conformance Statement (PICS) is available at www.epluse.com/ee872.

General

Power supply class III USA & Canada: Class 2 supply necessary, max. voltage 30 V DC **Current output** **RS485 interface and voltage output**	 15 - 35 V DC 12 - 30 V DC
Current consumption @ 24 V DC/AC and 15 s measurement interval **20 mA current output** **RS485 interface and voltage output**	 37 mA 17 mA
Peak current, max.	200 mA
Electrical connection	M12x1 5 poles, stainless steel 1.4404
Filter	PTFE (Polytetrafluoroethylene), UL94 V-0 approved
Storage conditions	-40...+60 °C (-40...+140 °F) 700...1 100 mbar (10.15...15.95 psi) 0...95 %RH, non-condensing
Enclosure material	Stainless steel 1.4404 PET (Polyethyleneterephthalate), UL94HB approved
Protection rating probe body	IP65
Electromagnetic compatibility	EN 61326-1 EN 61326-2-3 Industrial environment FCC Part15 Class A ICES-003 Class A
Conformity	CE UKCA

Ordering Guide

Probe

	Feature	Description		Code	
				EE872-	
Hardware Configuration	**Model**	CO_2 (default: heated)		M10	
		CO_2 + T + RH + p (default: not heated)			M13
	CO_2 measuring range	0...2 000 ppm		HV1	
		0...5 000 ppm		HV2	
		0...10 000 ppm		HV3	
		0...3 % (30 000 ppm)		HV5	
		0...5 % (50 000 ppm)		HV6	
	Probe material	PET (Polyethyleneterephtalate)		No code	
		Stainless steel		PM2	
	Filter	PTFE (Polytetrafluoroethylene)		No code	
		Catalytic for H_2O_2 sterilzation		F12	
Software Setup	**Output**	Output 1: 0 - 10 V	Output 2: 4 - 20 mA	GA7	
		Output 1: 0 - 5 V	Output 2: 0 - 20 mA	GA11	
		Modbus RTU		P1	P1
		BACnet MS/TP		P3	P3
	Baud rate	9 600		No code	
		19 200		BD6	
		38 400		BD7	
		57 600 (for BACnet only)		BD8	
		76 800 (for BACnet only)		BD9	
		115 200 (for BACnet only)		BD10	

Sensing Module (Spare Part)

	Feature	Description	Code
			EE872S-
Hardware Configuration	**Model**	CO_2 (default: heated)	M10
		CO_2 + T + RH + p (default: not heated)	M13
	CO_2 range[1)]	0...2 000 ppm	HV1
		0...5 000 ppm	HV2
		0...10 000 ppm	HV3
		0...3 % (30 000 ppm)	HV5
		0...5 % (50 000 ppm)	HV6

1) The sensing module's CO_2 range must match that of the originally ordered EE872 probe.

Order Examples

Sensor EE872-M10HV1GA7

Feature	Code	Description
Model	**M10**	CO_2
CO_2 range	**HV1**	0...2 000 ppm
Probe material	**No code**	PET (Polyethyleneterephtalate)
Filter	**No code**	PTFE (Polytetrafluoroethylene)
Output signal	**GA7**	Output 1: 0 - 10 V Output 2: 4 - 20 mA

Sensor EE872-M13HV6PM2F12P1

Feature	Code	Beschreibung
Modell	**M13**	CO_2 + T + RH + p
CO_2 range	**HV6**	0...5 %
Probe material	**PM2**	Stainless steel
Filter	**F12**	Catalytic for H_2O_2 sterilization
Protocol	**P1**	Modbus RTU
Baud rate	**No code**	9 600
Parity	**No code**	Even
Stop bit	**No code**	1

Sensing Module EE872S-M10HV1

Feature	Code	Beschreibung
Model	**M10**	CO_2 + T + RH + p
CO_2 range	**HV1**	0...2 000 ppm

Accessories

For further information see datasheet Accessories.

Description	Code
Mounting flange stainless steel	**HA010226**
Wall mounting clip Ø25 mm	**HA010227**
Radiation shield	**HA010510**
M12x1 flanged coupling with 50 mm (1.97") stranded wires	**HA010705**
Modbus configuration adapter	**HA011018**
E+E Product Configuration Software (Free download from www.epluse.com/pcs10)	**PCS10**
Connection cable M12x1 socket 5 poles / free ends **1.5 m (4.9 ft)** **5 m (16.4 ft)** **10 m (32.8 ft)**	**HA010819** **HA010820** **HA010821**
Y-style splitter M12 - M12	**HA030204**
M12x1 connector, 5 poles, for self assembly	**HA010708**
Protection cap / calibration adapter	**HA010785**
Protection cap for M12 socket	**HA010781**
Protection cap for M12 plug	**HA010782**

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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Version v1.8 | 03-2023

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