EE871

Digital CO_2 Probe for Demanding Applications

The E+E CO_2 probe EE871 is designed for use in harsh, demanding OEM applications. A multiple point CO_2 and temperature adjustment procedure leads to excellent CO_2 measurement accuracy over the entire temperature working range, ideal for use in agriculture or outdoors. EE871 incorporates the dual wavelength NDIR CO_2 sensor, which automatically compensates for ageing effects and is highly insensitive to pollution.

The IP65 enclosure and the replaceable PTFE filter offer excellent protection in harsh, polluted environment. The compact size, the M12 connector and the optional mounting flange allow for fast probe installation or replacement. With the optional radiation shield, EE871 can be also used outdoors.

The measured data range of up to 5 % CO_2 (50,000 ppm) is available on E2 digital interface and up to 1 % CO_2 (10.000 ppm) is available on Modbus RTU interface.

An optional kit facilitates easy configuration and adjustment of EE871. The measurement interval can be set according to the application requirements, by this the average current consumption can be reduced to 120 µA for battery-operated devices.

Typical Applications

Greenhouses and livestock barns
Fruit and vegetable storage
Hatchers and incubators
Outdoor CO_2 monitoring
Data loggers and handhelds

Key Features

Auto-calibration
Outstanding long-term stability
Temperature compensation
Very low current consumption
IP65 enclosure
Modbus RTU or E2 interface

Technical Data

Measured values

CO_2

Measuring principle	Dual wavelength (non-dispersive infrared technology) NDIR	
Measurement range	0...2000 ppm:	< ± (50 ppm + 2 % from the measured value)
Accuracy at 25 °C and 1013 mbar [1] (77 °F...14,69 psi)	0...5000 ppm:	< ± (50 ppm + 3 % from the measured value)
	0...10,000 ppm:	< ± (100 ppm + 5 % from the measured value)
	0...3 %: 0...5 %:	< ± (1,5 % from full scale + 2 % from the measured value)
Response time t_{90}	105 s with measured data averaging (smooth output) 60 s without measured data averaging	
Temperature dependency (-20...45 °C) (-4...113 °F)	0...2000 ppm: 0...5000 ppm: 0...10,000 ppm:	typ. ± (1 + CO_2 concentration [ppm] / 1000) ppm/°C
	0...3 %: 0...5 %:	typ. -0,3 % from the measured value/°C
Measurement interval	adjustable from 15 s to 1 h (Factory setting: 15 s)	

General

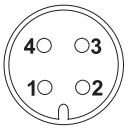
Digital interface	Modbus RTU or E2 (details: www.epluse.com)
Supply voltage	4.75 - 7.5 VDC

1) For averaging output

Average current consumption 2)	120 µA (at 1 h measurement interval)...4.3 mA (at 15 sec. measurement interval)
Current peak	max. 350 mA for 0.05 s
Housing / Protection class	Plastic PC / Housing IP65
Electrical connection	Connector M12 x 1
Cable length E2 interface	max. 10 m (32.8 ft)
Electromagnetic compatibility (Industrial enviroment)	EN61326-1 EN61326-2-3
Operating conditions	-40...60 °C (-40...140 °F) 0...100 % RH (non-condensing) 85...110 kPa (12,33...15,95 psi)
Storage conditions	-40...60 °C (-40...140 °F) 0...100 % RH (non-condensing) 70...110 kPa (10,15...15,95 psi)

2) The average current consumption depends on the measurement interval

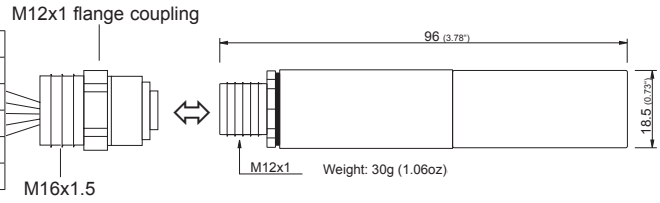
Connection



	Modbus	E2
1...	+UB	GND
2...	B-RS485	+UB
3...	A-RS485	DATA
4...	GND	CLOCK

Modbus	E2	
+UB	GND	brown
B-RS485	+UB	white
A-RS485	DATA	blue
GND	CLOCK	black
Shielding		grey

Dimensions (mm/inch)



Modbus Map

The measured values are saved as a 32Bit *float* value from 0x2D to 0x30. The factory setting for the Slave-ID is 246 as an *integer* 16Bit value. This ID can be customised in the register 0x00 (permitted values 1 - 247).

FLOAT (read register):

Coil / Register Numbers	*Data-Addresses*	*Parameter name*
30046	0x2D	CO_2 Response time = 60s
30048	0x2F	CO_2 Response time = 105s

INTEGER (write register):

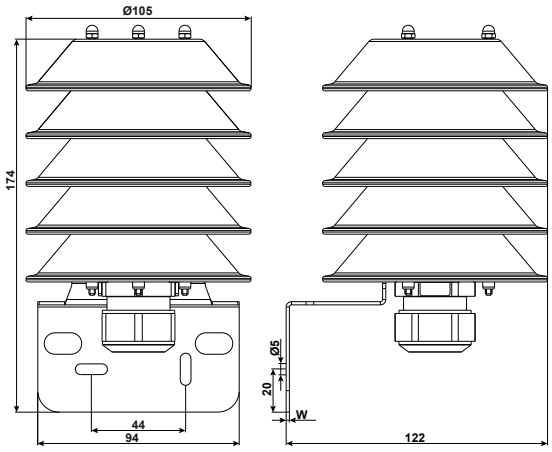
Coil / Register Numbers	*Data-Addresses*	*Parameter name*
60001	0x00	Slave-ID
60002	0x01	RS485 Setting
60003	0x02	Measuring time interval

For Modbus protocol setting please see Application Note (www.epluse.com/EE871).

Operation outdoors

For outdoor applications EE871 must be used with the radiation shield order no. HA010507, which protects the device against rain, snow, ice, and solar radiation.


EE871 with radiation shield



Scope of Supply

- EE871 probe according to ordering guide
- Test report according to DIN EN10204 - 2.2

Ordering Guide

			EE871
Hardware	**CO_2 Range**	0...2000 ppm	HR2000
		0...5000 ppm	HR5000
		0...10,000 ppm	HR1
		0...3 % (only with E2 Interface)	HR3
		0...5 % (only with E2 Interface)	HR5
	Digital Output	E2 Interface	J2
		Modbus RTU	no code
Software[1]	**Baudrate**	9600	no code
		19200	BD6
		38400	BD7
	Parity	no parity	PY0
		odd	no code
		even	PY2
	Stopbits	1 stopbit	no code
		2 stopbits[2]	BT2

1) Only for Modbus RTU
2) Only in combination with „no parity“

Ordering Example

EE871-HR5J2

CO_2 range:	0...5 %
Digital Output:	E2 Interface

EE871-HR2000PY2BT2

CO_2 range:	0...2000 ppm
Digital Output:	Modbus RTU
Baudrate:	9600
Parity:	even
Stopbits:	2

Accessories (For further information, see data sheet “Accessories”)

Mounting flange	HA010212
M12x1 flanged coupling with 50mm (1,97”) stranded wire	HA010705
Modbus configuration adapter	HA011012
E2 Test and configuration adapter	HA011010
E+E Product configuration software (Download: www.epluse.com/Configurator)	EE-PCS
Connecting cable M12 - flying leads (1.5 m (59.06”) / 5 m (196.85”) / 10 m (393.70”))	HA0108**19/20/21**
T-Coupler M12 - M12	HA030204
M12 Connector for self assembly	HA010707
PTFE filter cap	HA010116
Radiation shield	HA010507
Protection cap for the M12 cable socket	HA010781
Protection cap for the M12 plug of EE871	HA010782

Support Literature

www.epluse.com/EE871