USER'S GUIDE

EE871 – CO_2 Probe with Digital Interface

GENERAL

The E+E CO_2 probe EE871 is designed for use in demanding OEM applications. It incorporates the dual wavelength NDIR CO_2 sensor, which compensates for ageing effects, is highly insensitive to pollution and stands for outstanding long term stability.

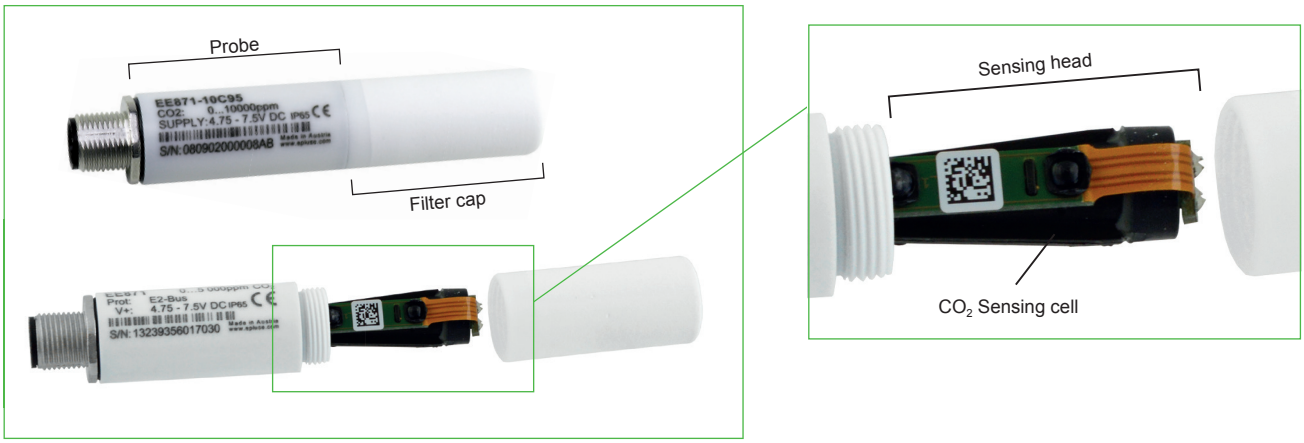
A multiple point CO2 and temperature factory adjustment leads to excellent CO_2 measurement accuracy over the entire temperature working range.

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.

For use in special applications do not hesitate to contact E+E Elektronik or a local distributor.

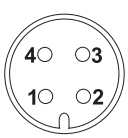
CAUTION

- The device shall not be exposed to extreme mechanical stress. The sensing head and mostly the sensing cell might not be exposed to any mechanical stress.



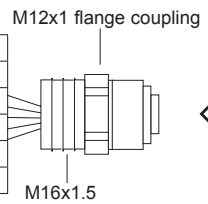
- The device must be operated with the filter cap on at all times. Do not touch the sensing cell or electronics inside the sensing head.
- A long response time indicates a dirty filter cap, as it might happen in polluted applications. Do not attempt to clean the filter cap; it would only cause its clogging. Replace the filter cap by an E+E original one, order no. HA010116.
- While replacing the filter cap take utmost care to not touch the sensing cell and the electronics.
- This device is not appropriate for safety, emergency stop or other critical applications where device malfunction or failure could cause injury to human beings.

CONNECTION DIAGRAM

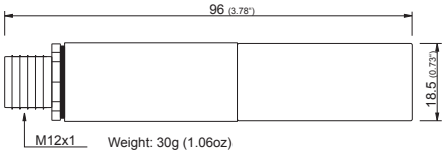


	Modbus	E2
1...	+UB	GND
2...	B-RS485	+UB
3...	A-RS485	DATA
4...	GND	CLOCK

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



DIMENSIONS



TECHNICAL DATA

(Modification rights reserved)

Measured values

CO_2

Measuring principle	Dual wavelength (non-dispersive infrared technology) NDIR	
Measurement range Accuracy at 25 °C and 1013 mbar[1] (77 °F...14,69 psi)	0...2000 ppm: 0...5000 ppm: 0...10,000 ppm:	< ± (50 ppm + 2 % from the measured value) < ± (50 ppm + 3 % from the measured value) < ± (100 ppm + 5 % from the measured value)
	0...3 %[2]: 0...5 %[2]:	< ± (1,5 % from full scale + 2 % from the measured value)
Response time t_{90} [3]	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 %[2]: 0...5 %[2]:	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
Average current consumption [4]	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)

1) For averaging output
2) Only with E2 interface
3) Both signals, with and without data averaging are available on the Modbus RTU and on the E2 interfaces.
4) The average current consumption depends on the measurement interval

EE871 WITH E2 INTERFACE

For communication with EE871 with E2 interface please see the support literature at www.epluse.com/EE871.

EE871 WITH MODBUS INTERFACE

For communication with EE871 with Modbus RTU interface please see the Modbus Application Note AN0103 at www.epluse.com/EE871.

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).

SETUP AND ADJUSTMENT

The EE871 probe is ready to use and does not require any configuration by the user. The factory setup of EE871 corresponds to the type number ordered. For ordering guide please see data sheet at www.epluse.com/EE871.

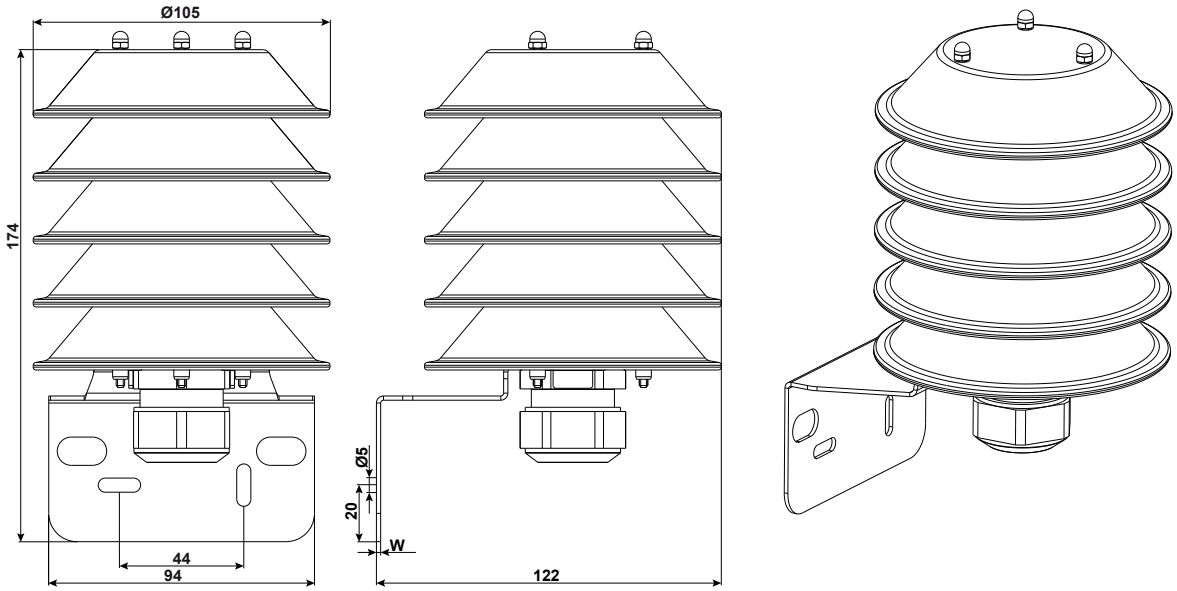
If needed, the user can change the factory setup. One can set the Slave-ID and the Modbus parameter (baud rate, parity and stop bits) and perform the adjustment/calibration of the CO_2 reading.

- **EE871 with Modbus Interface.** Use the optional Modbus Configuration Adapter HA011012, see data sheet “Accessories” at www.epluse.com/EE871) and the E+E Product Configuration Software EE-PCS.
- **EE871 with E2 Interface.** Use the optional E2 Test and Configuration Adapter HA011010, see data sheet “Accessories” at www.epluse.com/EE871 and the E+E Product Configuration Software EE-PCS.

The E+E Product Configuration Software EE-PCS is available for free download at www.epluse.com/configurator.

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.



REPLACEMENT PARTS / ACCESSORIES

For further information, see data sheet „Accessories“

Mounting flange	HA010212
M12x1 flanged coupling with 50 mm (1,97”) stranded wire	HA010705
Modbus configuration adapter	HA011012
E2 Test and configuration adapter	HA011010
E+E Product configuration software	EE-PCS (Download: www.epluse.com/Configurator)
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

SCOPE OF SUPPLY

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

USA
FCC notice:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the installation manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which thereceiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CANADIAN
ICES-003 Issue 5:
CAN ICES-3 B / NMB-3 B

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