



**EE870**

**Modular CO<sub>2</sub> Transmitter**



**Manual**

*YOUR PARTNER IN SENSOR TECHNOLOGY* **E+E**

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## GENERAL

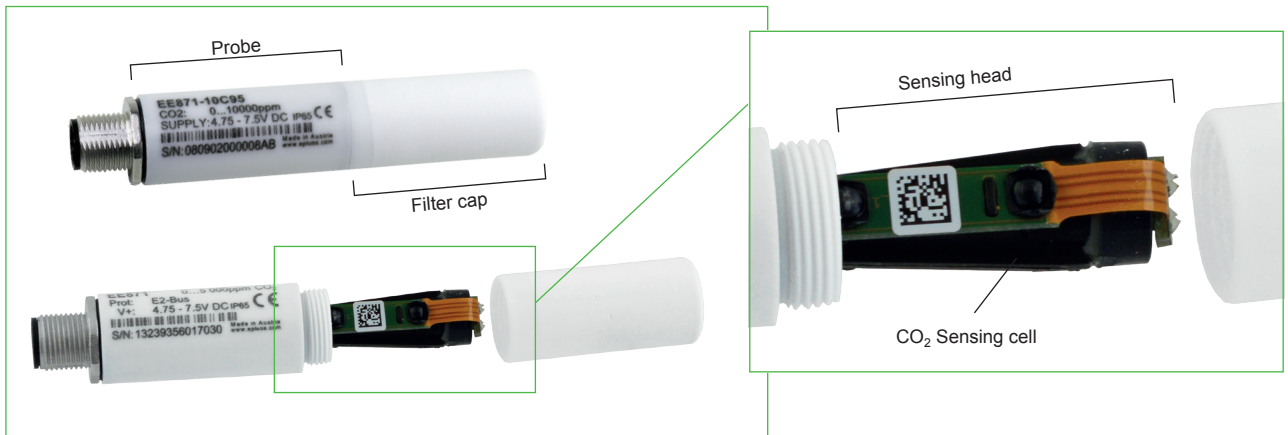
For technical data, options and accessories please see EE870 data sheet and operation manual at [www.epluse.com/EE870](http://www.epluse.com/EE870).

**The modular CO<sub>2</sub> transmitter EE870 consists of following components:**

- EE871 interchangeable CO<sub>2</sub> probe with E2 digital output. For technical data please see EE871 data sheet and operation manual ([www.epluse.com/EE871](http://www.epluse.com/EE871))  
For readjustment of EE871 please see data sheet and operation manual EE-PCS Product Configuration Software ([www.epluse.com/EE-PCS](http://www.epluse.com/EE-PCS))
- HA011014 converter board: The converter board supplies the EE871 CO<sub>2</sub> probe and converts its digital output signal into analogue outputs and Modbus RTU digital interface. The measured data is available simultaneously on the analogue outputs and on the Modbus interface. Technical data, setup and operations instructions for HA011014 are detailed in this document.
- Connecting cable between EE871 CO<sub>2</sub> probe and HA011014. EE870 scope of supply includes one of the following cables, as ordered:
  - HA010809..... 1 m length
  - HA010810 ..... 2 m length
  - HA010811 ..... 5 m length
  - HA010812 ..... 10 m length

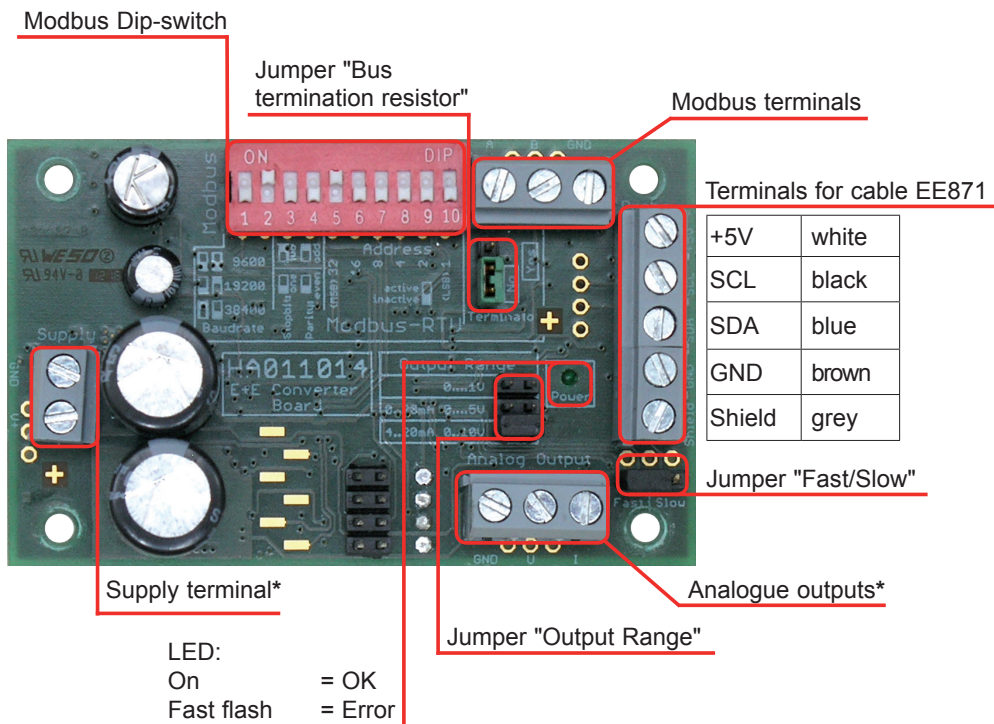
## IMPORTANT NOTES

- Connecting the supply voltage to the modbus terminals may destroy the device.
- The HA011014 converter board is supplied as a component and must be installed in accordance with the valid ESD guidelines and properly protected against environmental influences.



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

## CONNECTIONS / MOUNTING



\* **Very important:** for failure-free operation and performance according to the specs the supply GND and the measurement GND must be wired separately.

## TECHNICAL DATA

### Digital CO<sub>2</sub> Probe EE871

Measuring principle	Dual wavelength (non-dispersive infrared technology) NDIR	
Measurement range / Accuracy at 25 °C and 1013 mbar <sup>1)</sup> (77 °F...14,69 psi)	0...2000 ppm:	< ± (50 ppm + 2 % from the measured value)
	0...5000 ppm:	< ± (50 ppm + 3 % from the measured value)
	0...10,000 ppm:	< ± (100 ppm + 5 % from the measured value)
	0...3 %:	< ± (1,5 % from full scale + 2 % from the measured value)
	0...5 %:	< ± (1,5 % from full scale + 2 % from the measured value)
Response time t <sub>90</sub>	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:	typ. ± (1 + CO <sub>2</sub> concentration [ppm] / 1000) ppm/°C
	0...10,000 ppm:	
	0...3 %:	
	0...5 %:	typ. -0,3 % from the measured value/°C
Housing / Protection class	Plastic PC / Housing IP65	
Cable length	max. 10 m (32 ft)	
Electromagnetic compatibility (Industrial environment)	EN61326-1 EN61326-2-3	

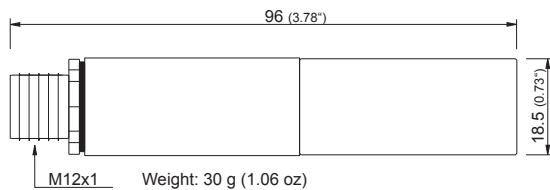


### Conversion Board

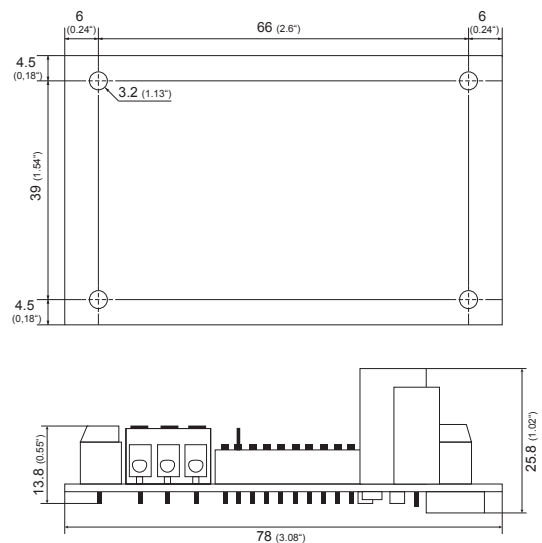
Supply voltage	10-35 V DC / 10-28.8 V AC	
Supply current	120 mA at 24 V DC / 300 mA at 10 V DC	
Protection class	IP00	
Electrical connection	screw terminal size: 2.5 mm <sup>2</sup>	
Analog outputs selectable by jumpers	0-1 V; 0-5 V; 0-10 V	-1 mA < I <sub>L</sub> < 1 mA
Resolution	0-20 mA; 4-20 mA	R <sub>L</sub> < 500 Ohm
Response time t <sub>90</sub>	12 bit	
Modbus RTU	60 s or 105 s selectable by jumpers	
Temperature dependence	setup with dip-switches (see operation manual)	
	Voltage:	typ. ±0.2 mV/°C (0 – 1V) typ. ±0.5 mV/°C (0 – 5V) typ. ±0.6 mV/°C (0 – 10V)
	Current:	typ. ±1 µA / °C
EE870 Operating conditions	-40...60 °C (-40...140 °F)	0...100 % RH (not condensating) 85...110 kPa (12.33...15.95 psi)
EE870 Storage condition	-40...60 °C (-40...140 °F)	0...100 % RH (not condensating) 70...110 kPa (10.15...15.95 psi)

## DIMENSIONS

### Digital CO<sub>2</sub> Probe EE871

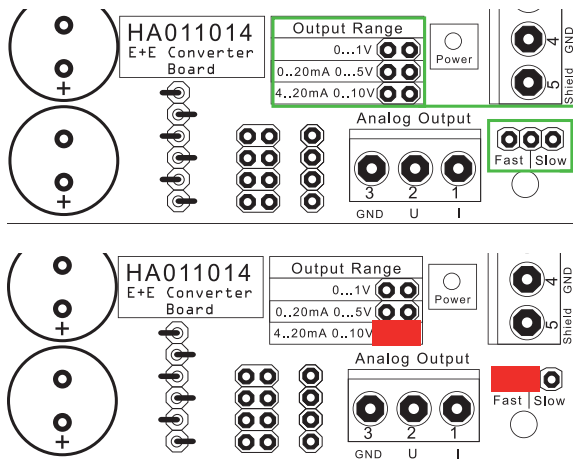


### Conversion Board



## HARDWARE SETTINGS

### Analogue-Output



Jumper for setting the analogue output:

	Current	Voltage
○○	-	0-1 V
○○	0-20 mA	0-5 V
○○	4-20 mA	0-10 V

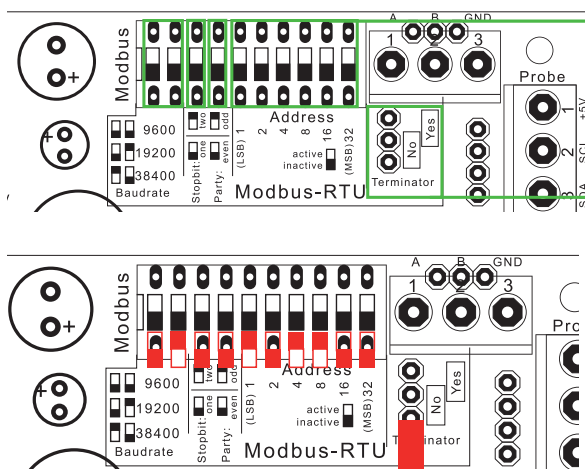
Jumper for setting the response time:

○○○	fast response time
○○○	slow response time

**Example:**

Jumper "Output Range" set to 0...10 V.  
Jumper "Fast/Slow" set to "Fast"

### Modbus-Interface



Dip-switch for Modbus settings

S1, S2	baud rate
S3	stopbit
S4	parity
S5 - S10	adresse of the converter

Jumper for termination resistor active/inactive

**Example:**

Dip-switch S1 and S2 "Baud rate" set on 19200  
Dip-switch S3 "Stopbit" set on "one"  
Dip-switch S4 "Parity" set on "even"  
Dip-switch S5 - S10 "Address" set on "13"  
(activate S5/S7/S8)  
Jumper "Termination resistor" set on "No"

## MODBUS MAP

Register address	Parameter name	Protocol address
0x00	Serial number	0
0x01		1
0x02		2
0x03		3
0x04		4
0x05		5
0x06		6
0x07		7
0x08	FW Version	8
0x09	Type number	9
0x0A		10
0x0B		11
0x0C		12
0x0D		13
0x0E		14
0x0F		15
0x10		16
0x11	Serial number	17
0x12		18
0x13		19
0x14		20
0x15		21
0x16		22
0x17		23
0x18		24

ASCII

ASCII

HIGH BYTE - main version  
LOW BYTE - sub version

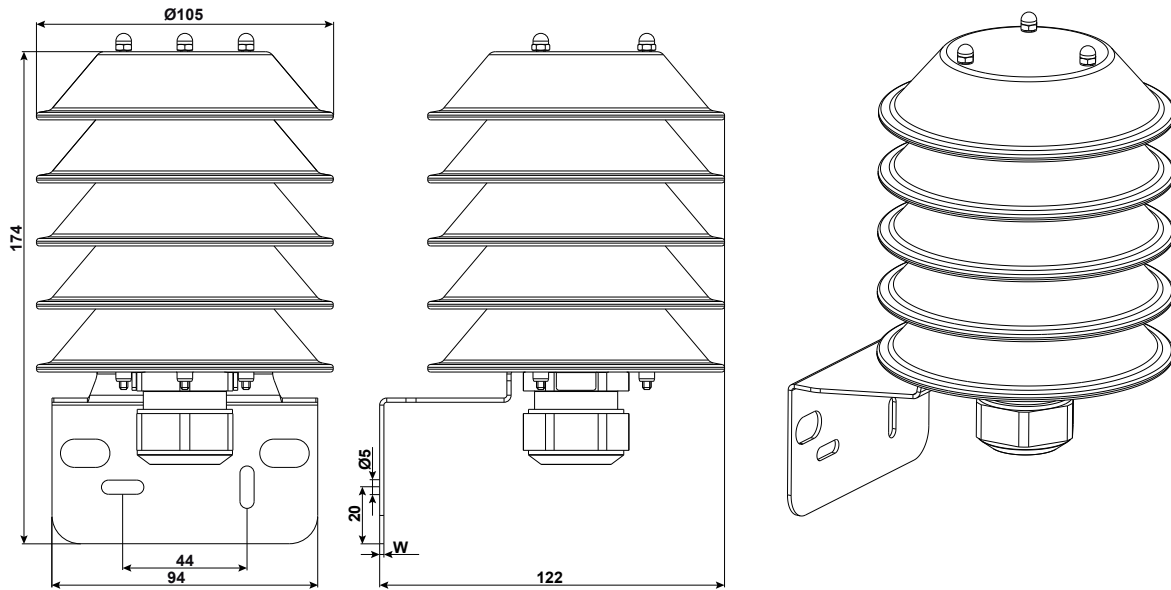
Register address	Parameter name	Protocol address
0x19	-	25
0x1A		26
0x1B		27
0x1C		28
0x1D	CO <sub>2</sub> fast	29
0x1E		30
0x1F	CO <sub>2</sub> slow	31
0x20		32
0x21	Gain Voltage	33
0x22		34
0x23	Offset Voltage	35
0x24		36
0x25	Gain Current	37
0x26		38
0x27	Offset Current	39
0x28		40
0x29	Measuring range	41
0x2A		42
0x2B		43
0x2C	Measuring range	44
0x2D		45
0x2E	Analogue Output low (V)	46
0x2F		47
0x30	Analogue Output high (V)	48
0x31		49
0x32	Slow or Fast	50

FLOAT

ASCII

## OPERATION OUTDOORS

For outdoor applications, the probe of EE870 must be used with the radiation shield order no. HA010507, which protects the device against rain, snow, ice, and solar radiation. The converter board must be protected IP65 (NEMA4) or better.



## ACCESSORIES

Replacement probe EE871-HRxJ2  
Cable M12 - flying leads (1 m (39.37") / 2 m (78.74") / 5 m (196.85") / 10 m (393.70"))  
Mounting flange for probe  
Radiation shield  
PFTE Filter cap  
Protection cap for the M12 cable socket  
Protection cap for the M12 probe plug

see data sheet EE871  
HA010809/10/11/12  
HA010212  
HA010507  
HA010116  
HA010781  
HA010782

## SCOPE OF SUPPLY

- EE871 probe according to ordering guide
- Test report according to DIN EN10204 - 2.2 for EE871
- Conversion board HA011014
- Connecting cable HA0108xx
- Operation manual
- Test report according to DIN EN10204 - 2.2 for conversion board

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