Datasheet CDS201

Room Sensor for CO_2, Temperature and Relative Humidity

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The CDS201 is optimized for demand controlled ventilation and building automation in residential and commercial applications.

Versatile

The CDS201 combines CO_2, temperature (T) and relative humidity (RH) measurement in one device with modern design and state-of-the-art technology.

Outstanding Measurement Performance

The CDS201 incorporates the E+E dual wavelength NDIR CO_2 sensor, which compensates for ageing effects, is highly insensitive to pollution and offers outstanding long-term stability. A multiple point CO_2 and T factory adjustment procedure leads to excellent CO_2 measurement accuracy over the entire T working range.

Outputs and Digital Interface

CDS201 features analogue outputs or RS485 interface. Beside CO_2, RH and T, the dewpoint temperature Td is also available via Modbus RTU.

Functional Design, Cost-saving Installation

The elegant enclosure is available in two sizes according to regional standards and features an optional display. The back cover contains just the push-in spring terminals, it can be mounted and wired without the front cover containing the electronics. Thus, the active part of the device is not exposed to construction site pollution and can be simply snapped onto the back cover right before commissioning. Besides, the active part can be replaced without tools within seconds.

Configuration

The digital version with RS485 interface can be set up and configured via PC with the free PCS10 Product Configuration Software and an optional configuration stick.

CDS201-M11 with display in US format

CDS201 without display in EU format

Features

Measurement performance

- High CO_2 / RH / T accuracy
- Excellent long term stability
- State-of-the-art E+E sensing elements
  - CO_2: NDIR dual wavelength
  - RH / T:
    - Protected by E+E proprietary coating
    - Patented sensor technology

Enclosure and connection

- Innovative design avoids false air ingress
- Time saving installation and wiring
  - Snap-on without tools
  - Push-in spring terminals
  - All electronics inside the front cover
- Smooth cover surface
  - Dust repellent
  - Easy cleaning
- EU and US format
- UL94HB approved enclosure material

Outputs

- Three analogue outputs
  - 0 – 10 V
  - 4 – 20 mA
- RS485 interface with Modbus RTU
- Large graphic display

Inspection certificate

Available via E+E certificate service

Features

Protective Sensor Coating

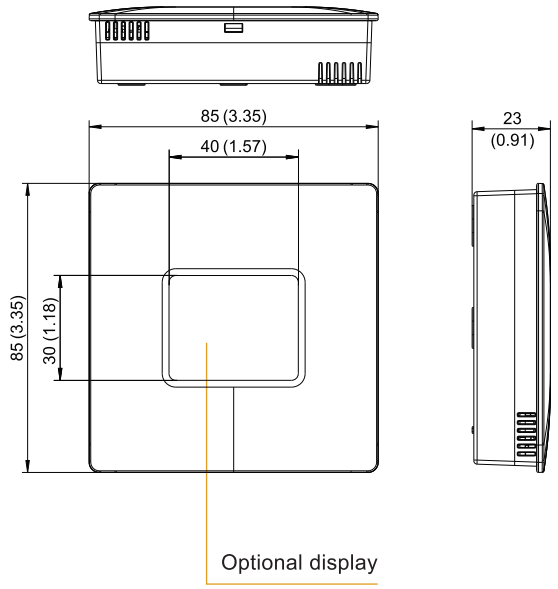
The E+E proprietary sensor coating is a protective layer applied to the active surface of the RH / T sensing element. The coating substantially extends sensor lifetime and ensures optimal measurement performance in corrosive environment (salts, off-shore applications). Additionally, it improves the sensors' long term stability in dusty, dirty or oily applications by preventing stray impedance caused by deposits on the active sensor surface.

Dimensions

Values in mm (inch)

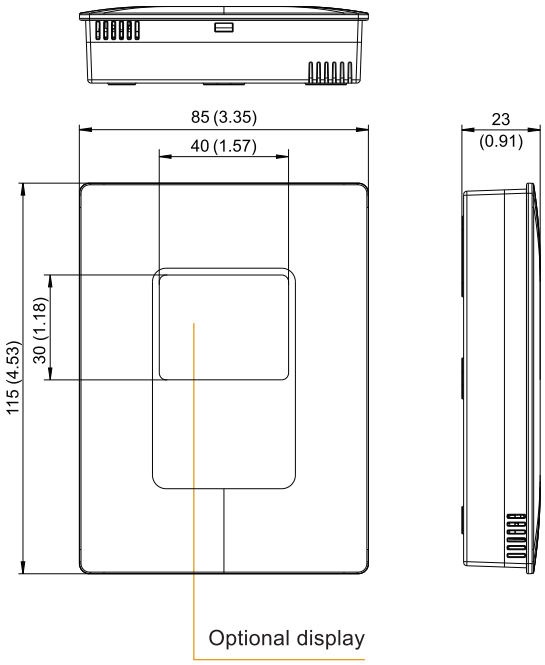
Enclosure

EU format



Enclosure

US format



Technical Data

Measurands

CO_2

Measurement principle	Dual wavelength non-dispersive infrared technology (NDIR)
Measuring range	0...2 000 / 5 000 ppm
Accuracy[1)] **0...2 000 ppm** **0...5 000 ppm**	 < ±(60 ppm +2 % of measured value) < ±(60 ppm +3 % of measured value)
Temperature dependency, typ.	±(1 + CO_2 concentration [ppm] / 1 000) ppm/°C ±0.556 * (1+ CO_2 concentration [ppm] / 1 000) ppm/°F
Residual pressure dependency in the range of -20...45 °C (-4...113 °F), related to 1 013 mbar	0.14 % of measured value/mbar
Response time t_{63}, typ.	<180 s

1) @ 20 °C (68 °F), with supply voltage 24 V DC, 0.2 m/s (39.4 ft/min) circulation and load resistor 250 Ω for version with current output.

Relative Humidity (RH)

Measuring range	0...100 %RH, non-condensing	
Accuracy[1)] incl. hysteresis, non-linearity and repeatability **0...80 %RH** **>80...100 %RH**	 ±(2.8 + 0.003 * mv) %RH ±4.1 %RH	 mv = measured value
Temperature dependency of electronics, typ.	0.008 % RH / °C (0.004 %RH / °F)	
Factory calibration uncertainty[2)] @ 23 °C (73 °F) **0...90 %RH** **90...100 %RH**	 ±(0.7 + 0.003 * mv) %RH ±1 %RH	 mv = measured value

1) Defined against E+E calibration reference at 23 °C (73 °F). With supply voltage 24 V DC, 0.2 m/s (39. 4 ft/min) medium flow and load resistor 250 Ω for version with current output.
2) Defined with an enhancement factor k=2, corresponding to a confidence level of 95 %.

Temperature (T)

Measuring range	-30...+60 °C (-22...+140 °F)
Accuracy[1)] **0- 10 V, RS485** **4 - 20 mA**	 ±0.35 °C (±0.63 °F) ±0.7 °C (±1.26 °F)
Temperature dependency of electronics, typ.	0.006 K/K
Factory calibration uncertainty[2)] @ 23 °C (73 °F)	±0.1 °C (±0.18 °F)

1) Defined @ 23 °C (73 °F) against E+E calibration reference. With supply voltage 24 V DC, 0.2 m/s (39. 4 ft/min) medium flow and load resistor 250 Ω for version with current output.
2) Defined with an enhancement factor k=2, corresponding to a confidence level of 95 %.

Calculated Physical Quantity

		from	up to	unit
Dew point temperature	Td	-30 (-22)	60 (140)	°C (°F)

Technical Data

Outputs

Analogue

CO_2: 0...2 000 / 5 000 ppm **T: acc. to ordering guide** **RH: 0...100 %**	0 - 10 V 4 - 20 mA (3-wire)	-1 mA < I_L < 1 mA R_L < 500 Ω	I_L = load current R_L = load resistance

Digital

Digital interface	RS485 (CDS201 = 1 unit load)
Protocol **Factory settings** **Supported Baud rates**[1)] **Measured data type**	Modbus RTU Baud rate according to ordering guide, 8 data bits, parity even, 1 stop bit, Modbus address 45 9600, 19200 and 38400 FLOAT32 and INT16

1) Ex works: see ordering guide.

General

Power supply class III USA & Canada: Class 2 supply necessary, max. voltage 30 V DC		24 V AC ±20 % or 15 - 35 V DC	
Current consumption, typ.		**@ 24 V DC**	**@ 24 V AC**
	0 - 10 V	6 mA	14 mA_{rms}
	4 - 20 mA	Acc. to output current	
	RS485	5 mA	12 mA_{rms}
Electrical connection		Push-in spring terminals max. 1.5 mm^2 (AWG 16)	
Display		1.8" LCD, dot-matrix, 2 or 3 lines, visible area 38 x 31 mm (1.5" x 1.2")	
Humidity range **Operation** **Storage**		 0…100 %RH non-condensing 0…95 %RH non-condensing	
Temperature range, operation and storage **without display** **with display**		 -30...+60 °C (-22...+140 °F) -20...+60 °C (-4...+140 °F)	
Enclosure **Material** **Protection rating**		 PC (Polycarbonate), RAL 9003 (signal white), UL94 HB approved IP30	
Electromagnetic compatibility		EN 61326-1 FCC Part15 Class B	EN 61326-2-3 ICES-003 Class B Industrial environment
Shock and vibration		Tested according to EN 60068-2-64 and EN 60068-2-27	
Conformity		CE UKCA	
Configuration[1)]		PCS10 Product Configuration Software (free download) and optional USB-C configuration stick	

1) With digital versions only.

Ordering Guide

	Feature	Description	Code			
			CDS201-			
Hardware Configuration	**Model**	CO_2 + T	M11			
		CO_2 + T + RH			M12	
	CO_2 measuring range	0...2 000 ppm	HV1			
		0...5 000 ppm	HV2			
	Output	0 - 10 V	A3		A3	
		4 - 20 mA (3-wire)	A6		A6	
		RS485		J3		J3
	Display	Without display	No code			
		With display	D1			
	Design	EU format	No code			
		US format	RG2			
Setup Analogue	**Output 1 measurand**	CO_2 scaling acc. to selected "CO_2 measuring range"	No code		No code	
	Output 2 measurand	Temperature T [°C]	No code		No code	
		Temperature T [°F]	MB2		MB2	
	Output 2 scaling low	0	No code		No code	
		Value[1)]	SBL*Value*		SBL*Value*	
	Output 2 scaling high	50	No code		No code	
		Value[1)]	SBH*Value*		SBH*Value*	
	Output 3 measurand	Relative humidity [%]			No code	
	Output 3 scaling low	0			No code	
		Value			SCL*Value*	
	Output 3 scaling high	100			No code	
		Value			SCH*Value*	
Setup Digital	**Protocol**	Modbus RTU[2)]		P1		P1
	Baud rate	9 600		BD5		BD5
		19 200		BD6		BD6
		38 400		BD7		BD7
	Units	Metric (SI)		No code		No code
		Non-metric (US/GB)		U2		U2

1) -35 °C (-31 °F) ≤ T scaling low < 20 °C (68 °F). 25 °C (77 °F) < T scaling high ≤ 70 °C (158 °F). T scaling high - T scaling low ≥ 20 °C (36 °F).
2) Factory setting: Even parity, 1 stop bit. Modbus Map see User Manual at www.epluse.com/cds201.

Order Examples

CDS201-M12HV1A6MB2SBL23SBH140

Feature	Code	Description
Model	**M12**	CO_2 + T + RH
CO_2 measuring range	**HV1**	0...2 000 ppm
Output	**A6**	4 - 20 mA (3-wire)
Display	**No code**	Without display
Design	**No code**	EU format
Output 1 measurand	**No code**	CO_2 scaling according to selected "CO_2 measuring range", 0...2 000 ppm in this case
Output 2 measurand	**MB2**	T [°F]
Output 2 scaling low	**SBL23**	23
Output 2 scaling high	**SBH140**	140
Output 3 measurand	**No code**	Relative humidity [%]
Output 3 scaling low	**No code**	0
Output 3 scaling high	**No code**	100

CDS201-M12HV2J3D1RG2P1BD5U2

Feature	Code	Description
Model	**M12**	CO_2 + T + RH
CO_2 measuring range	**HV2**	0...5 000 ppm
Output	**J3**	RS485
Display	**D1**	With display
Design	**RG2**	US format
Protocol	**P1**	Modbus RTU
Baud rate	**BD5**	9 600
Units	**U2**	Non-metric (US/GB)

Accessories

For further information see datasheet Accessories.

Description	Code
E+E Product Configuration Software (Free download from www.epluse.com/pcs10)	**PCS10**
USB-C configuration stick for CDS201 digital	**HA011070**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