



Datasheet CP872

**Modular Probe for CO₂, Humidity,
Temperature and Ambient Pressure**



CP872

Modular Probe for CO₂, Humidity, Temperature and Ambient Pressure

The CP872 probe, with a measurement range up to 5 % CO₂ (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 CO₂ and temperature adjustment procedure leads to excellent CO₂ 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

CP872 incorporates the dual wavelength NDIR CO₂ sensor, which automatically compensates for ageing effects and is highly insensitive to pollution. The RH sensing element with proprietary coating is suitable even for aggressive and corrosive environment.

Pressure and Temperature Compensation

The active compensation with on-board sensors leads to best CO₂ measurement accuracy independently of weather conditions, altitude or temperature.

4 in 1

Beside CO₂, the CP872 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 CP872 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 CP872 is also appropriate for applications with periodical H₂O₂ sterilization.

Analogue Output or RS485 Interface

The CO₂ measured data is available simultaneously on the analogue voltage and current outputs. Depending on the model, CP872 with RS485 interface with Modbus RTU 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 CP872.



Stainless steel probe with PTFE filter



Polycarbonate probe with H₂O₂ filter



Features

Interchangeable Sensing Module

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

Filter Cap

- PTFE
- Catalytic for H₂O₂ sterilization
- Replaceable



Supply and Output Module

- CO₂ voltage and current output
- Modbus RTU (CO₂, 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 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 CP872 M12 plug.

Modular Sensor Platform

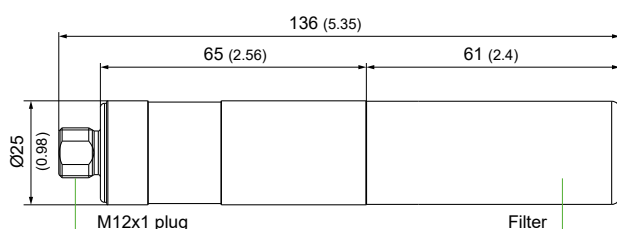
The CP872 is compatible with the Sigma 05 host device of the Modular Sensor Platform. Together they become a versatile, plug-and-play CO₂/RH/T/p modular sensor with analogue outputs and optional display. Besides CP872, Sigma 05 accommodates also other intelligent sensing probes.



Sigma 05 with CP872

Dimensions

Values in mm (inch)



Technical Data

Measurands

CO₂

Measurement principle	Dual wavelength non-dispersive infrared technology (NDIR)		
Measuring range	0...2000 ppm / 5000 ppm / 10000 ppm / 3 % / 5 %		
Accuracy @ 25 °C (77 °F) and 1013 mbar (14.7 psi) 0...2000 ppm 0...5000 ppm 0...10000 ppm 0...3 % 0...5 %	$< \pm(50 \text{ ppm} + 2 \% \text{ mv})$ $< \pm(50 \text{ ppm} + 3 \% \text{ mv})$ $< \pm(100 \text{ ppm} + 5 \% \text{ mv})$ $< \pm(1.5 \% \text{ of full scale} + 2 \% \text{ mv})$ $< \pm(1.5 \% \text{ of full scale} + 2 \% \text{ mv})$ mv = measured value		
Temperature dependency in the range of -20...+45 °C (-4...+113 °F) <10 000 ppm >10 000 ppm	$\pm(1 + \text{mv} / 1000) \text{ ppm}/^{\circ}\text{C}$ -0.3 % of mv/°C	$\pm 0.556 \cdot (1 + \text{mv} / 1000) \text{ ppm}/^{\circ}\text{F}$ -0.167 % mv/°F	mv = measured value
Residual pressure dependency¹⁾ in the range of -20...+45 °C (-4...+113 °F), related to 1013 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)
Accuracy¹⁾ @ 25 °C (77 °F) 20...80 %RH 0...95 %RH	$\pm 3 \% \text{ RH}$ $\pm 5 \% \text{ RH}$	

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)	$\pm 2 \text{ mbar} (\pm 0.03 \text{ psi})$
Temperature dependency in the range of 0...60 °C (32...140 °F)	$\pm 0.016 \text{ mbar/K} (0.00013 \text{ psi}/^{\circ}\text{F})$

Temperature (T)

Measuring range	-40...+60 °C (-40...+140 °F)
Accuracy , typ. ¹⁾ in the range of 5...60 °C (41...140 °F)	$\pm 0.5 \text{ }^{\circ}\text{C} (\pm 0.9 \text{ }^{\circ}\text{F})$

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 T _d	°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
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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 9600, 19200 and 38400 FLOAT32 and INT16

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...1100 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 FCC Part15 Class A	EN 61326-2-3 ICES-003 Class A	Industrial environment
Conformity	 		

