

Carbo 6100/6300— CO₂ Sensor

The Carbo 6100/6300 is an inline sensor from Anton Paar GmbH for the determination of the CO₂ concentration in liquids.

The robust stainless steel construction of the Carbo 6100/6300 meets all requirements of the process environment. The sensor is maintenance free, safe to run dry and EHEDG-certified for hygienic applications. The Carbo 6100/6300 is installed directly in the pipe or tank and no bypass is required. It is simple to retrofit the Carbo 6100/6300 into existing plants. The process liquid flows past the sensor, the CO₂ concentration and temperature are measured simultaneously.

The Carbo 6100/6300 is available as:

- Carbo 6100/6300 + Pico 3000
- Carbo 6100/6300 + Pico 3000 + HMI
- Carbo 6100/6300 + Pico 3000 RC
- Carbo 6100/6300 + mPDS 5

Measuring principle of the CO₂ Sensor

The Carbo 6100/6300 is a highly selective optical sensor for measuring CO₂ in liquids using infrared spectroscopy. The measurement principle is based on the ATR method (Attenuated Total Reflection). A beam of infrared light is passed through the ATR crystal in such a way that it reflects off the internal surfaces in contact with the sample. The intensity of specific absorption bands of the reflected beam is measured by a detector and the corresponding CO₂ value is calculated. The observed infrared spectrum is not affected by other gases.

As the measurement is performed at the surface of the prism and uses an infrared beam, color and turbidity do not influence the measurement.



The Carbo 6100/6300 is an inline sensor which can be used to achieve consistent product quality. Features and benefits of the sensor:

- Maintenance-free
- Hygienic design
- Fast (measuring interval 4 sec)
- Degree of protection IP65 and IP67
- Fulfills the NAMUR recommendation NE107 (self-monitoring and diagnosis)
- Traceable materials, certified wetted parts and O-rings
- Automatic extract/sugar compensation (Carbo 6300 only)
- Drift free
- No external compressed air required
- No external purge gas required

The actual cable gland location may differ from the diagrams/pictures shown in the documentation due to the configuration of the sensor when ordered.



Technical specifications

Operating Conditions	Carbo 6100	Carbo 6300
CO₂		
Measuring Range	0 to 12 g/L (0 to 6 vol)	
Accuracy*	± 0.05 g/L (0.025 vol)	
Repeatability	± 0.01 g/L (0.005 vol)	
Resolution	<0.01 g/L (0.005 vol)	
t98 (@ 5 counts filtered)	20 s	
Measuring interval	min. 4 sec	
Line Pressure	max. 10 bar rel. (145 psi)	
Temperature		
Sample temperature	- 3 to + 40 °C, non-freezing	
CIP/SIP	CIP up to + 95 °C (max. 4 h)	CIP up to + 95 °C (max. 4 h) CIP/SIP up to 130 °C (max. 30 min)

* product specific adjustment required for Carbo 6100

Ambient Conditions	
Ambient Temperature Range	-20 °C to +50 °C
Humidity (non-condensing)	0 to 90% rel
Degree of Protection	IP 65 and IP 67

Other	
Self-diagnosis	Compliant with NAMUR NE 107 (self-monitoring and diagnosis)
Wetted Parts	Stainless steel 1.4404 (traceable materials), Sapphire, PEEK, EPDM
Weight	approx. 4 kg
Dimensions (W x H x D)	142 mm x 142 mm x 220 mm
Process connection	Tuchenhagen VARIVENT® Type N
Certifications	EHEDG Type EL Class I



Electrical Connections	
Power Supply	SELV/PELV DC 24 V \pm 20%
Power Consumption	max. 40 W
Cable Gland	max. 6 pcs. M16x1.5 EMC, earthing cones acc. to DIN 89345, brass nickel-plated for cable OD 4.5 to 10 mm
Connection Terminals	Push-in spring connection, 0.2 to 1.5 mm ² / AWG 24 to 16

Cables	
Cables must comply with the intended area of use, the cable gland type and the relevant national regulations and requirements.	
Power Supply	<p><u>Suggested cable type:</u> LiYCY, shielded 2 pole cable</p> <p><u>Conductor cross section:</u> max. 1.5 mm²</p> <p><u>Wire cross section:</u> min. 0.34 mm², max. 1.5 mm² without wire end ferrule; max. 0.75 mm² with wire end ferrule</p> <p><u>Diameter of cables:</u> 4.5 to 10 mm to ensure optimal sealing against the cable gland</p>
CANopen	<p><u>Cable type:</u> CANopen/DeviceNet cable 120 Ω shielded twisted pair</p> <p><u>Wire cross section:</u> Min. 0.20 mm², max. 1.5 mm² without wire end ferrule; max. 0.75 mm² with wire end ferrule</p> <p><u>Diameter of cables:</u> 4.5 to 10 mm to ensure optimal sealing against the cable gland</p> <p><u>Max. length:</u> 250 m</p>

Communication

Several fieldbuses and analog interfaces are available depending on the used version/mPDS 5 board (please see mPDS 5 and Pico 3000 instruction manuals).

All inputs and outputs (including relay outputs) connected to mPDS 5 or Pico 3000 RC have to be in accordance with PELV (Protective Extra Low Voltage) or with SELV (Safety Extra Low Voltage).

Dimensions of Carbo 6100/6300

