



## GROLAB CO<sub>2</sub> COMPACT SENSOR

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Maintaining the production environment under ideal conditions is essential to ensure healthy, productive, and high-quality plants. The new GroLab™ CO<sub>2</sub> Compact Sensor has been developed to automatically and reliably monitor the most critical environmental variables.

This 4-in-1 sensor accurately measures CO<sub>2</sub> levels, temperature, relative humidity and light intensity, four key parameters to adjust the environment to the plants' needs at every stage of development, from germination to fruiting.

It uses non-dispersive infrared detection (NDIR) technology, a reliable and widely adopted method for measuring CO<sub>2</sub>, which guarantees fast, stable, and accurate readings up to 5000 ppm. This functionality is essential in CO<sub>2</sub> enrichment systems as it prevents waste and maintains optimal conditions for plant growth.

With a compact and discreet design, the sensor is designed for simple and efficient installation even in limited spaces, ensuring reliable performance in controlled environments.

Fully integrated with the GroLab™ platform, it allows automatic data processing with alerts, historical records and automated actions according to defined parameters, delivering greater precision with less intervention.

Compatible with the GroLab™ PowerBot (version 03 or higher) and third-party systems, it communicates via the RS-485 protocol, a reliable and interference-resistant technology ideal for complex installations or industrial environments.

Installation is intuitive and does not require advanced technical knowledge. The compact form factor allows direct installation in the growing area, occupying minimal space and ensuring durability even under demanding conditions.

This sensor and all the GroLab modules along with a variety of peripherals can be acquired at our online shop ([opengrow.pt/shop](https://opengrow.pt/shop)) or the nearest specialized store ([opengrow.pt/store-locator](https://opengrow.pt/store-locator)).

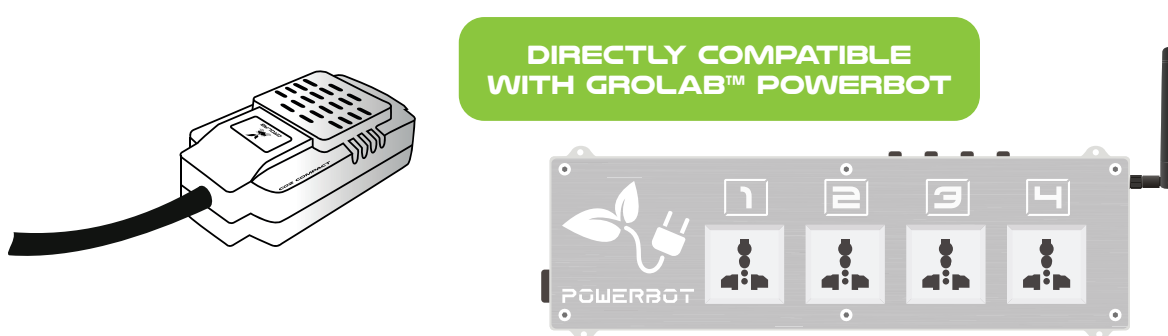


Figure 1 - CO<sub>2</sub> Compact Sensor Direct Compatible with GroLab™ PowerBot



### 4-IN-1 MEASUREMENT

Measures CO<sub>2</sub>, temperature, relative humidity, and light levels in real time, providing a complete overview of environmental conditions. This data is essential for smart decisions and automation when integrated into the GroLab™ system.



### AUTOMATIC CO<sub>2</sub> CONTROL

Connected to the PowerBot, the sensor allows GroLab™ to regulate CO<sub>2</sub> injection based on accurate measurements, maintaining optimal levels to maximise growth, reduce waste, and ensure the best environment for cultivation, especially in greenhouses or closed rooms.

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the GroLab Video Tutorials:  
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#### CLIMATE REGULATION

With temperature, humidity, and CO<sub>2</sub> readings, GroLab™ automatically adjusts the climate by activating extractors, heaters, and humidifiers as needed to create the best conditions for the plants.



#### LIGHTING STATUS

The integrated light sensor acts as a safety system, confirming that artificial lights are operating correctly and detecting any failures. It also validates the presence of light, ensuring CO<sub>2</sub> control activates only when lights are truly on, avoiding waste during nighttime.



#### VPD (VAPOUR PRESSURE DEFICIT)

Integrated temperature and humidity measurements allow precise calculation of VPD, a critical parameter for plant water balance. Effective VPD control helps optimise crop health and development while minimising stress and disease risk.



#### MONITOR & ANALYSIS

GroLab™ Software processes data collected by the GroLab™ CO<sub>2</sub> Compact Sensor, presenting real-time information via detailed graphs and comprehensive histories. With custom alerts and reporting options, it offers clear insights that facilitate efficient and informed environmental management.



#### INDUSTRIAL INTEGRATION

RS-485 communication provides high stability and resistance to interference even over long distances, making it ideal for industrial environments. Complete technical documentation facilitates integration with control and automation systems. See the manual for more on configuration and integration.



#### COMPACT DESIGN

Its discreet shape and small size allow easy installation in tight spaces while maintaining consistent reliability and performance.



#### SIMPLE INSTALLATION

Direct connection to PowerBot enables immediate data collection and automation via the GroLab™ system without complex technical configuration.



#### NOTIFICATIONS

When connected to the GroLab™ platform via PowerBot, the system can send real-time e-mail notifications about monitored parameters, including immediate alerts if values fall outside defined ranges. This feature enables tight environmental control with quick, informed intervention.

CO <sub>2</sub> Compact Sensor Specifications			
Hardware	HW05	CO <sub>2</sub> Specifications	Method: Non Dispersive Infrared (NDIR) Range: 400 - 5000ppm Accuracy: ±(50ppm + 5% of reading) Calibration Interval: Not required Temp. Dependence: 5ppm per °C or 0.5% of the reading per °C, whichever is greater Response Time: < 3 minutes for 90% step change typical Warm Up Time: < 2 minutes (operational) - 10 minutes (maximum accuracy)
Dimensions	60.5mm x 30mm x 18.2mm (2.38in x 1.18in x 0.72in)		
Net Weight	~50 grams (~1.76 oz)		
Exterior	Casing: Plastic Color: White		
Cable Lenght	5m (16.4 feet)		
Connector	RJ-12 (6p6c)	Temperature Specifications	Range: - 10 °C – 60 °C Accuracy: ± 1.5 °C
Operation Conditions	-10 to 60°C RH <95% non-condensing	Humidity Specifications	Range: 0 %RH – 100 %RH Accuracy:±6~9 %RH
Operating Voltage	+5~18Vdc	Luminosity Specifications	Range: 0 - 100% (0 ~ aprox. 700Lux)
Power Consumption	@5Vdc - max. 75mA - 0,375 W	Includes	GroLab CO <sub>2</sub> Compact Sensor RJ-12 Cable (5-meter cable) Instruction Manual
Communications	4-Wire RS-485		
Luminosity Specifications	Range: 0 - 100% (0 ~ aprox. 700Lux)	Warranty	3-year limited hardware warranty
Expected Service Life	>5 years		



## INSTALLATION EXAMPLE

Figure 2 illustrates a typical installation of the GroLab™ PowerBot module with the CO<sub>2</sub> Compact Sensor connected directly.

This setup can be adapted as needed. For example, the CO<sub>2</sub> cylinder may be placed outside the cultivation area or replaced with a combustion-based CO<sub>2</sub> generator, depending on design and safety requirements.

The Compact Sensor continuously monitors CO<sub>2</sub> levels. When values fall below a user-defined threshold, the PowerBot activates a solenoid valve connected to the CO<sub>2</sub> source, enriching the environment automatically.

The integrated light sensor monitors ambient light to ensure CO<sub>2</sub> enrichment occurs only during light periods, preventing unnecessary CO<sub>2</sub> waste at night.

Figure 3 shows a basic automation procedure in GroLab™ Software: if CO<sub>2</sub> drops below 500 ppm, the solenoid valve activates for 1 minute. After a 2-minute pause, levels are rechecked; if still low, the valve activates again. This cycle repeats until CO<sub>2</sub> rises above the threshold.

Figure 4 presents a temperature control automation: if temperature exceeds 29°C, a fan turns on and remains active until temperature falls below 27°C.

Besides CO<sub>2</sub>, temperature, and humidity, the sensor provides data that enable comprehensive environmental control and support advanced automation like climate regulation and VPD management.

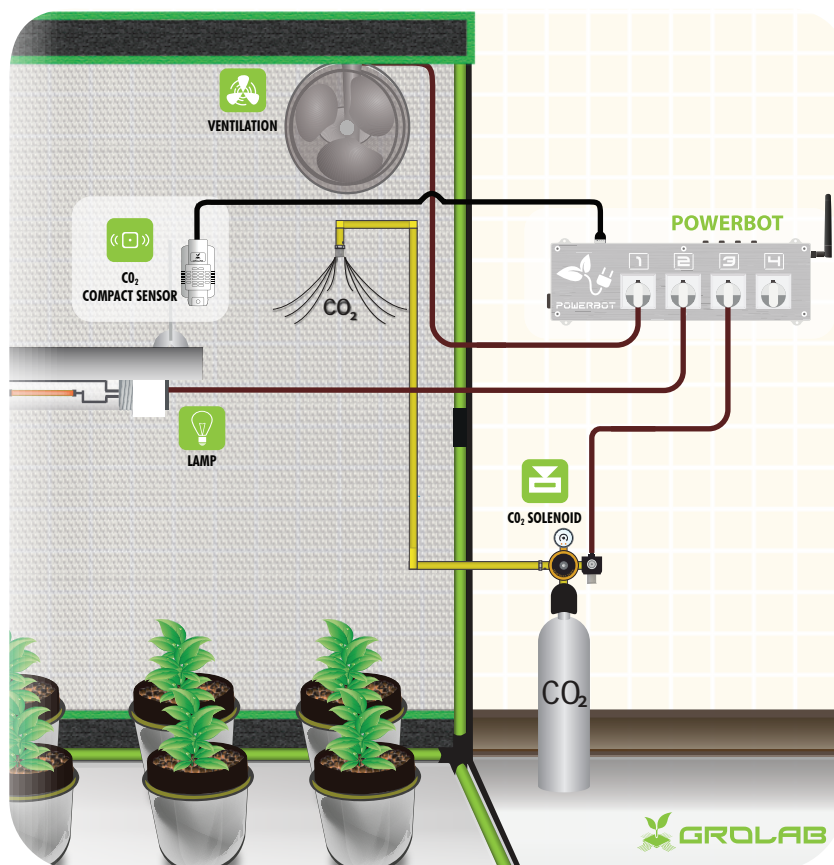


Figure 2 - CO<sub>2</sub> Compact Sensor Installation Example Schematics



Figure 3 - GroLab Software Alarm for CO<sub>2</sub> enrichment

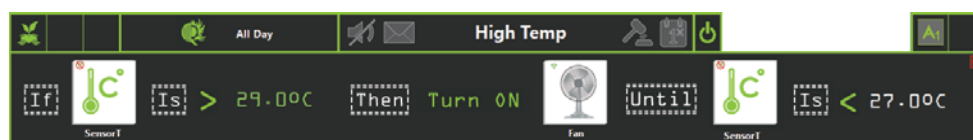


Figure 4 - GroLab Software Alarm for High Temperature

CONNECTION DIAGRAM

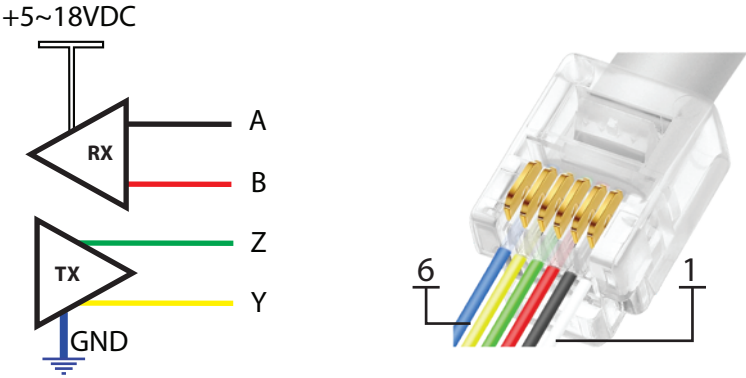


Figure 5 - Internal Diagram

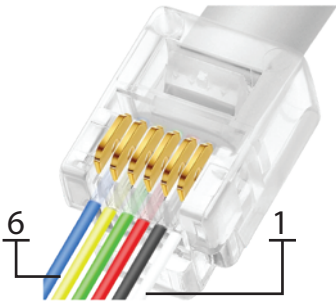
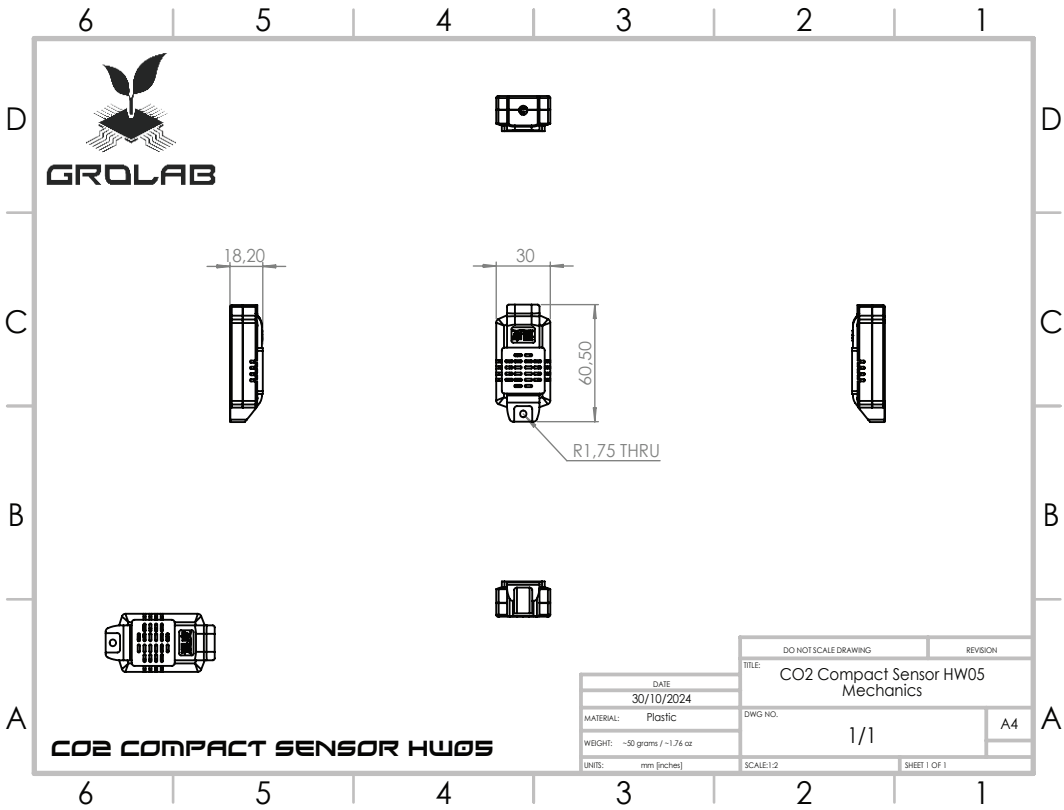


Figure 6 - RJ12 Pinout

PIN	WIRE COLOR	FUNCTION
1	WHITE	+5~18VDC
2	BLACK	A
3	RED	B
4	GREEN	Z
5	YELLOW	Y
6	BLUE	GND

Figure 7 - Pinout Functions

MECHANICS



COMPLIANCE



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This symbol on the product or packaging means that this product is compliant with RoHS Regulations of the European Parliament and Council Directive on the Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (2011/65/EU).



This symbol on the product or packaging means that this product complies with the following directives and regulations:

- (2014/53/EU) Radio equipment directive.
- (2011/65/EU) RoHS directive.
- (2014/35/EU) Low voltage directive.
- (2014/30/EU) EMC.

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