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GroLab PowerBot is a complete power supply module from the GroLab family. It provides the tools to monitor, control, and automate all the basic elements of any agricultural grow, maximizing the plants' growth and overall efficiency.

Equipped with a temperature and humidity sensor, which allows the PowerBot to keep the perfect climate conditions for the plants, at the same time GroLab makes it simple to customize the desired temperature and humidity values.

The PowerBot has four universal plugs that support per plug and in total up to 1200W (US version) and 2300W (other versions) or unlimited power when using an external electrical contactor. Lighting and ventilation systems, water pumps, humidifiers, heaters, and CO<sub>2</sub> dispensers are some examples of peripherals that PowerBot can automate.

In addition, it supports one flood detector, one universal switch sensor (e.g. motion/smoke detector), and one combined sensor (e.g. CO<sub>2</sub> and atmospheric pressure sensors). Besides automating most of the growing tasks, PowerBot also allows the creation of safety protocols and procedures, that combined with the sensors/detectors can avoid overheating and overwatering, as well as minimize damage in case of fire or flood.

GroNode (the system's core module) manages the PowerBot wirelessly through radio frequency (RF) communication.

In this way, if it is necessary to add more peripherals, sensors, or even spare parts to help get the most out of GroLab, please consult the nearest specialized store (**opengrow.pt/store-locator**) or check out our online shop at: **opengrow.pt/shop**.



## SPECIFICATIONS

PowerBot Specifications									
Hardware	HW08	Power Consumption	@5VDC - max. 350mA - 1.75W	Internal Temperature	Range: 0ºC~100ºC				
Dimensions	306.62mm x 101.40mm x 47.64mm	Power Supply	EU/UK/SA/AU Versions: 230VAC US Version: 120VAC	Sensor Inter-Module	Precision: ±0.6°C @ 25°C Radio Frequency - 2.4GHz				
Net Weight	~930 grams (~32.8 oz)	Outlets	EU/US/SA/AU Versions: 4 x Universal Outlets	Communication					
Gross Weight	~1350 grams (~47.70 oz)	Outlet Maximum	Supply @230VAC:	Includes	Antenna Fuse 10A				
Exterior	Casing: Stainless Steel and Acrylic Colors: Silver and White Buttons: On/Off Switch, Reset and 4 x Outlet Controller Status Green LED 4 x Outlet Status Green LED	Power	2300W(10A) Φ>0.95 / 1000W(4.3A) Φ<0.95 Supply @120VAC: 1200W(10A) Φ>0.95 / 500W(4.1A) Φ<0.95		- EU/UK/SA/AU Versions - 250Vac - US Version - 125Vac Universal Power Cord (2-meter cable): - EU Version @230Vac/10A - Shuko <-> C13 - AU Version @230Vac/10A - AS3112 <-> C13 - US Version @120Vac/13A - NEMA <-> C13 - UK Version @230Vac/10A - BS1363A <-> C13 USB Cable Type B-A (2-meter cable) Temp. & Hum. Sensor (2-meter cable)				
Visual Indicators		Connections	USB 2.1 type B SMA female Power Entry IEC 320-C14 Temp. & Hum. Sensor (2.5mm 4-Pin male) Flood Detector (2.5mm 4-Pin male) Switch Sensor (2.5mm 2-Pin male)						
insual marcators									
Operation	0 to 55°C								
Conditions	RH <95% non-condensing	-		Warranty	3-year limited hardware warranty				
Expected Service Life	>5 years		Combined Sensor (RJ12 6-Pin female)						

		Useful Pinout	S	
Port Name	Temperature & Humidity	Flood Detector	Universal Switch	RS-485
Visual Representation				
General Specifications	Vsupply + 5VDC Temp. Range: -40°C ~80°C Hum. Range: 0% ~100%	Vsupply + 5VDC Digital Operation: ON/OFF	Vsupply + 5VDC Digital Operation: ON/OFF	Vsupply + 5VDC Range & Precision*



\*It depends on the model of the sensor used. Check our online shop or partners for more information.

## MAIN FEATURES

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# POWER SUPPLIER

PowerBot provides power to all peripherals of the users' growing environment. It has four universal outlets capable of providing 10A\* (per outlet and in total) or unlimited power when using an external electrical contactor. \*Value may vary depending on the load characteristics (check PowerBot Specifications for more details).

## MANUAL CONTROL

This module comes with four external switches that give the user the ability to manually control all connected peripherals at any time on the spot.

# CLIMATE

With the combination between the external temperature and humidity sensor and the capacity to independently control the electrical devices, PowerBot can perform precise climate automation. This feature makes this module a perfect tool to keep the ideal climate conditions for the users' plants to grow healthily.

### COMBINED SENSORS

PowerBot offers an RS-485 communication port that supports, the most diverse variables of combined sensors such as CO<sub>2</sub>, atmospheric pressure, and luminosity. These sensors make it possible to increase environmental control capabilities, as well as to act on devices based on them, guaranteeing optimal conditions.

### LIGHTING

Automate any lighting system connected to PowerBot, from the latest LED panels to the traditional HPS lamps and even more. With just one PowerBot, one can control the lights in four different areas, add cool-down protection for HPS, and even use a channel to add that extra far red at sunset/sunrise. The GroLab advanced lighting offers complete freedom to customize the day cycle, meaning it is possible to set the cycle duration to 20 hours of combined day/night or even less.

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(+351) 968 517 60

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Parque Industrial de Coim 3500-618 Viseu, Portugal

## 

Automate the irrigation of any growing system with just one schedule, 15 minutes every hour. Set a drip system for a few seconds every day, or a few minutes every other day. With our tools and the ability to precisely control the users' water pump, from drip irrigation to full hydroponic systems, PowerBot and GroLab schedule capabilities allow users to pre-set the irrigation for any kind of system.

## TANK LEVEL MANAGEMENT

This module supports one universal switch sensor of the user's choice like a water level sensor, allowing to continuously monitor the water level of the tank. With the right peripherals connected to the PowerBot, like water pumps, users can create procedures to automatically stop all irrigation procedures if the water level in the tank is not suitable.

## FLOOD PREVENTION & DETECTION

Equipped to handle a flood detector, it will quickly detect leaks and excess water. In this way, the security features that the user has programmed will activate automatically to minimize damage and even notify of any anomaly.



## SAFETY PROTOCOLS & PROCEDURES

PowerBot allows the user to create safety protocols and procedures to avoid risky situations or even react to them to minimize damage. The cool-down feature prevents damage to devices that need some time to cool down before turning them ON (e.g. HPS lamps), the flood detector allows the user to detect leaks and shut down any devices they might see fit, and the security actions when losing communication with GroNode.

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PowerBot communicates with GroNode through radio frequency with a range of 25 meters (82 feet) indoors (depending on obstacles) and 100 meters (328 feet) in open spaces. This makes it easy to install the PowerBot on the users' growing area or even on the outside.

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## MONITOR & ANALYSIS

Using GroLab Software the user can monitor and analyze the climate variables and the device's current state in real time. The software provides notifications, charts, and grow(s) overview and even allows the export of the sensors/devices values from the beginning of the users' grow(s) life cycle.

## NOTIFICATIONS

If PowerBot senses something gets out of bounds, with the assistance of GroNode, it can send real-time alerts and updates to the users' e-mail (max of 20 e-mail notifications per hour) about the state of the devices and sensors connected to it. They just need to allow GroNode to access the internet, and configure it to notify in case any issue arises.

# LED INDICATOR

Its design features five LEDs, one per outlet (PowerBot offers four outlets) that indicate if the plugged device is ON, being useful to visually understand what is happening in the users' grow(s). Besides the LEDs of the outlets, this module includes a LED that indicates if the module is currently powered (LED blinking), and the connection state with GroNode (LED static). This status LED operation is fully configurable by the user.



## FREE FIRMWARE UPDATES

One of the advantages of a digital system is the ability to receive updates that can be easily applied. With this in mind, the Open Grow team works every day to fix any reported/discovered bugs as well as to improve and add new features to the GroLab system (software and modules). These updates are free of charge and can be quickly obtained through the GroLab Software with just a few clicks.



## REMOTE CONTROL

Connecting the GroNode to a router with an Internet connection allows the user to activate the GroLab system's remote control. This feature grants user access from anywhere at any time through the GroLab Software, allowing complete control of all the modules, including PowerBot.

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(+351) 968 517 6

info@opengrow.pt

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ue Industrial de Coi )-618 Viseu, Portuga

(+351) 232 458 475

## INSTALLATION EXAMPLE

The image below (Figure 1) represents a generic installation of a PowerBot module, however, the installation may differ depending on the user's needs as it can, for example, be installed outside the growing area.

In this installation example, the versatility of the PowerBot is perfectly visible, being useful in various situations like supplying power to all peripherals of the growing environment, irrigation system management with increased precision, and ambient control measured with combined sensors to keep the ideal climate conditions.

Besides being a complete power supply module, it also can monitor the level of any tank through a water level sensor. With this, the user doesn't have to worry about draining and refilling the tank.

Expand the lighting system across four different areas with a PowerBot. GroLab offers advanced tools that allow full customizing of the day/night cycle length and other lighting characteristics.

Finally, this module has a major impact on security due to its ability to connect a flood detector and a smoke or motion detector which are extremely useful to notify the user (via e-mail and software) to mitigate eventual water leaks and avoid risky situations.

The installation/use of PowerBot should be adjusted according to the growing environment and user's needs. If there is a need for help, please reach out to any GroLab representant or directly to us, we will be happy to assist.



Figure 1 - PowerBot Installation Example Schematics

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## **USEFUL TIPS**

To facilitate and avoid possible issues, please find below some tips regarding the installation of PowerBot.

PowerBot offers some extra security features, one of which is the "Cooldown Time", which prevents damage to devices like HPS lamps that need some time to cool down before turning them ON.

> PowerBot supports a flood detector and a smoke/motion detector, providing extra security to the growing area. If an intrusion is detected, GroLab can shut down all devices until the user interferes.

Controlling the growing environment is the main purpose of PowerBot. In addition to lighting control, it supports devices like extractors and fans that maintain much of the temperature and humidity.

## For better wireless communication

Ensure that the maximum distance between PowerBot and GroNode is not exceeded, typically 25 meters (82 feet) indoors and 100 meters (328 feet) in open areas. In addition, avoid obstacles between PowerBot and GroNode.

Do not install the PowerBot near other equipment that communicates wirelessly (including GroLab modules), ensuring a minimum of 20 centimeters (0.66 feet) between equipment.

Make sure antennas are screwed on tightly and positioned upward. When the module is installed on the wall, the antenna must be parallel to the wall. If the module is on a surface (a table, for example), the antenna must be perpendicular to the surface.

## To increase the lifetime and ensure the best functioning of the PowerBot

Keep the PowerBot out of extremely humid areas and prone to contact with water. When installed outdoors, PowerBot must be protected from environmental factors.

Perform periodic maintenance to ensure that PowerBot remains clean and dust free.

## USEFUL AUTOMATION PROCEDURES

Two main types of automation procedures can be created with the GroLab system: Schedules and Alarms.

The first type offers all the tools a grower expects from a scheduling system and even more. The second one makes it possible to trigger actions based on conditions, those actions/conditions can be freely chosen by the user.

Among several options, these procedures can act in any device or group of devices that belong to an area/grow. In addition, they provide distinct action modes, including timed actions.

These can be notified to the user by sending a warning e-mail or through sound (GroNode's buzzer).

To make it easy to understand and configure, we prepared some automation procedures examples that can be configured when using the PowerBot and its devices/sensors:

In Figure 2 there is a representation of an alarm that when the sensor detects a humidity value below 37.5%, the humidifier is turned ON until it reaches a value higher than 42.5% after it turns OFF the humidifier. Ensuring the humidity is always close to 40%.



Figure 2 - Low Humidity Alarm Example

🗶 AI GI	¢	All Day	¥⁄ 💌	ID: 3   Mix I	Irrigation	<u>≯</u> ₿0		A <sub>1</sub> G <sub>2</sub>
If Water pump	Is	ON	Then	Turn 0N	Âir pump	lFor	00:01:00	
Figure 3 - W	ater Pur	np Aları	n Example					

Figure 3 shows an alarm that turns ON the air pump 1 minutes every time the water pump starts rking, ensuring the supply of a proper oxygenated trient solution to the plants.

Note: Using this alarm is not enough to ensure good oxygenation and mixing of the tank, so it is recommended to use the air pump more regularly.

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