



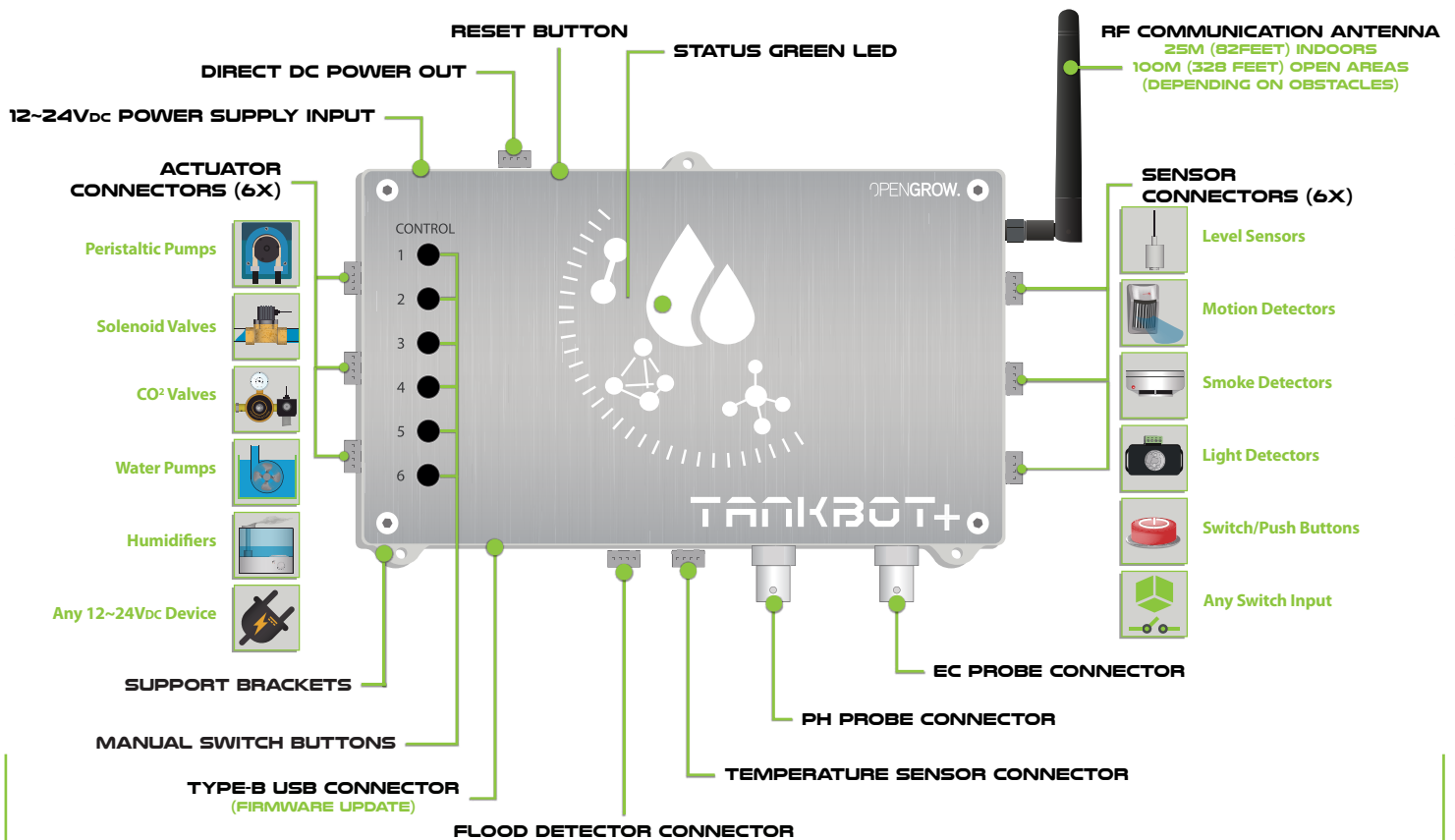
GroLab TankBot Plus is a precise grow controller that ensures complete monitoring and management of the water tank, making it an essential module for any agricultural growing system.

Supports up to six actuators of 12~24VDC allowing to connect a wide variety of peripherals like peristaltic pumps, solenoid valves, water pumps, relays, and power contactors, that can be used to automate several tasks like nutrients dosing, pH regulation, water recycling, tank refilling, irrigation...

In terms of monitoring capabilities, TankBot Plus can monitor the pH, EC, water temperature, flood detector, and six universal switch sensors (e.g. water level sensors and motion/smoke detectors).

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.

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



One GroLab GroNode is required to have access to all the TankBot Plus features.

Learn quickly and easily with the GroLab Video Tutorials: opengrow.pt/tutorials/



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SPECIFICATIONS

| TankBot Plus Specifications | | | |
|------------------------------|--|-----------------------------------|---|
| <i>Hardware</i> | HW20 | <i>Power Consumption</i> | @5Vdc - max. 120mA - 0.6W |
| <i>Dimensions</i> | 159.31 mm x 112.97mm x 36.03mm (6.27in x 4.55in x 1.42in) | <i>Power Supply</i> | 12Vdc/3A |
| <i>Net Weight</i> | ~250 grams (~8.82 oz) | <i>Connections</i> | USB 2.1 type B SMA female 12~24Vdc (4~8A) (Jack ID 2.5mm OD 5.5mm) 2 x 12~24Vdc Direct Power Output (2.5mm 4-Pin male) 6 x 12~24Vdc Actuator (2.5mm 4-Pin male) 6 x Switch Sensor (2.5mm 4-Pin male) Temperature Sensor (2.5mm 4-Pin male) Flood Detector (2.5mm 4-Pin male) PH Connector (BNC) EC Connector (BNC) |
| <i>Gross Weight</i> | ~808 grams (~28.50 oz) | | |
| <i>Exterior</i> | Casing: Stainless Steel and Acrylic Colors: Silver and White Buttons: Reset and 6 x Output Control | | |
| <i>Visual Indicators</i> | Status Green LED | | |
| <i>Operation Conditions</i> | 0 to 55°C RH <95% non-condensing | <i>Inter-Module Communication</i> | Radio Frequency - 2.4GHz |
| <i>Expected Service Life</i> | >5 years | <i>Includes</i> | Antenna USB Cable Type B-A (2-meter cable) Power Adapter 12Vdc/3A PH Probe (2-meter cable) Temperature Sensor (2-meter cable) 7 x Connector Plug (2.5mm 4-Pin female) PH 4.01 Calibration Solution (20 ml) PH 7.01 Calibration Solution (20 ml) |
| | | <i>Warranty</i> | 3-year limited hardware warranty |



| Frequency Band(s) | Max. Output Power (EIRP) |
|-------------------|--------------------------|
| 2.4 G | 100 mW |

| Useful Pinouts | | | | | | | | |
|------------------------|--------------------------|----------------------------|---|--------------|---|---------------------------|--------------------------------|---|
| Port Name | Power Out | Outputs | Inputs | Power Input | Temperature | PH | EC | Flood Detector |
| Visual Representation | | | | | | | | |
| General Specifications | Vout 12~24Vdc IMAX 2A | Vout 12~24Vdc IMAX 0.5A | Vsupply + 5Vdc Digital Operation: ON/OFF | Vin 12~24Vdc | Vsupply + 5Vdc Range: 0~150°C Accuracy* | Range: 1 ~14 Accuracy* | Range: 0~20 µS/cm Accuracy* | Vsupply + 5Vdc Digital Operation: ON/OFF |

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

MAIN FEATURES



POWER SUPPLIER

TankBot Plus can provide power to all peripherals of your growing environment. It has six connectors that support 12~24Vdc actuators allowing a wide variety of devices from small water pumps, peristaltic pumps, relays, power contactors, etc.



PH MONITOR & ADJUSTMENT

This module gives the possibility to deep analysis, monitor, and control the pH. The GroLab system programmable procedures offer several options to regulate pH based on the user's needs.



EC MONITOR & ANALYSIS

TankBot Plus also supports an EC probe extending the monitor and control of the water tank to another level. GroLab system can notify the user and even react based on the electrical conductivity of your water.



WATER TEMPERATURE

Combining the water temperature sensor support with the capability to handle the device to heat/cool the water makes the TankBot Plus a great option to continuously regulate the water temperature, ensuring the optimum conditions for plants to grow



NUTRIENTS DOSING

Connecting peristaltic pumps on TankBot Plus opens the door to the nutrients dosing domain. GroLab system provides all the necessary tools to calibrate the peristaltic pumps and to create procedures to precisely pump the amount of the required nutrients.



SPEED CUSTOMIZATION

TankBot Plus provides the capability to customize device speed.* This feature can improve precision even with low-cost devices.
*Note that the first actuator connector does not have this capability.



ADVANCED IRRIGATION

Thanks to the capability of handling actuators of 12~24Vdc (depending on the power supply), it is possible to create impressive irrigation systems that can independently feed multiple grows.

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TANK LEVEL MANAGEMENT

This module supports six extra switch sensors of the users' choice like water level sensors, allowing the continuous monitoring of the tanks' water level. With the right peripherals connected to the TankBot Plus, like solenoid valves or water pumps, one can create procedures to automatically drain and refill, allowing complete tank maintenance.



FLOOD PREVENTION & DETECTION

Equipped with a flood detector, TankBot Plus will quickly detect any water leaks/excesses and automatically activate the programmed security features to minimize damages. These security features offer numerous options, from simply notifying when any anomaly is detected to even acting on the devices (when combined with other GroLab modules).



SAFETY PROTOCOLS & PROCEDURES

TankBot Plus allows the creation of safety protocols and procedures to avoid risky situations or even react to them to minimize damage.

Fires and intrusions are some examples of risk situations this module can handle. The cool-down feature prevents damage to devices that need some time to cool down before turning them on.



MODULE COMMUNICATION

TankBot Plus 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 TankBot Plus close to the water tank.



MONITOR & ANALYSIS

Using GroLab Software the user can monitor and analyze the different pH, EC, temperature, and the four extra sensors in real-time. The software provides notifications, charts, and grow(s) overview and even allows the user to export the sensors' values from the beginning of the grow(s) life cycle.



NOTIFICATIONS

When a user provides an Internet connection to GroNode it can send real-time alerts and updates to their e-mail, keeping them updated about the state of the grow(s) anywhere, anytime. One just needs to permit GroNode to access the Internet, and configure it to notify in case of any issue arises.



LED INDICATOR

Its design features a LED that indicates if the module is currently powered ON (LED blinking) and the successful connection with GroNode (LED static).



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 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 TankBot Plus.

INSTALLATION EXAMPLE

The image below (Figure 1) represents a generic installation of a TankBot Plus module, however, the installation can differ depending on the user's needs.

In this installation example, the monitoring and management of a water tank by TankBot Plus are perfectly visible, being useful in several situations such as pH and EC monitoring, pumping precisely the number of required nutrients, regulating the water temperature, supplying energy to all the six peripherals of the growing environment, and offering complete tank maintenance with sensors.

In addition to being a complete feed module, it can also monitor the level of any tank through a switch sensor. With this, the user can create procedures to automatically drain and refill the tank.

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

The installation/usage of TankBot Plus should be adjusted according to the growing environment and user 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.

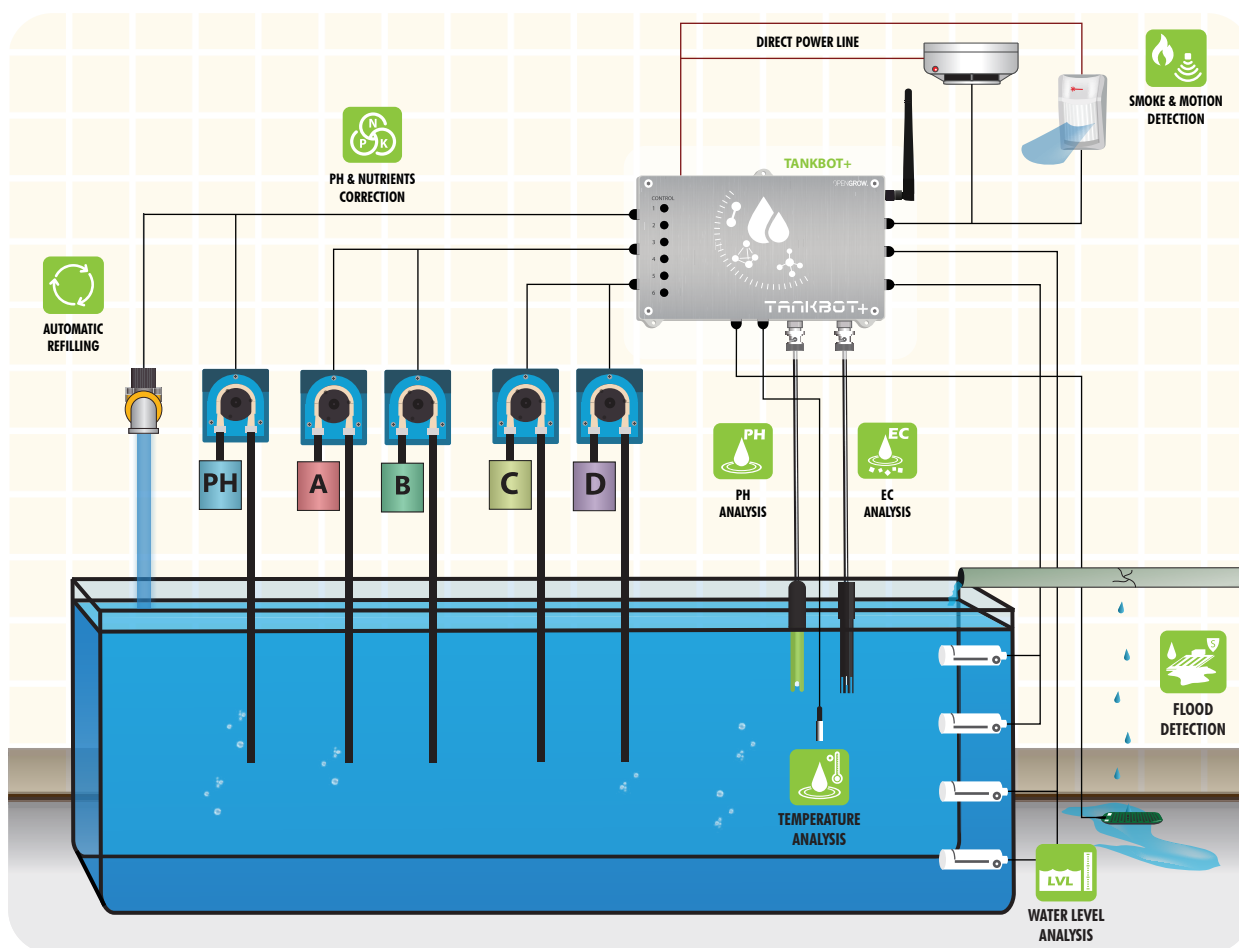


Figure 1- TankBot Plus Installation Example Schematics

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USEFUL TIPS

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

- The user should pay attention to not switching the pH and EC probes when installing them on the module.
- The user can use the direct power out connector on TankBot Plus, to directly power devices that need so, like smoke or motion detectors.
- Probes calibration procedure using the GroLab software tools is quite intuitive, but make sure to read all the step descriptions provided.
- Calibrating peristaltic pumps before starting any automation procedure will allow the user to work in milliliters instead of seconds.

For better wireless communication

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

- Keep the TankBot Plus out of extremely humid areas and prone to contact with water. When installed outdoors, TankBot Plus must be protected from environmental factors.
- Perform periodic maintenance to ensure that TankBot Plus remains clean and dust free.
- PH and EC probes must be cleaned and calibrated every two months.

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 TankBot Plus and its devices/sensor:

- In Figure 2 you can see the configuration for an alarm that can control your pH. Whenever the pH is higher than 7.1, the peristaltic pump will turn ON and debit 15 milliliters (ml) of acid. If after 15 minutes the pH value is still above 7.1, the pump will add more 15ml of acid, and wait 10 more minutes, until the value gets below 7.1.

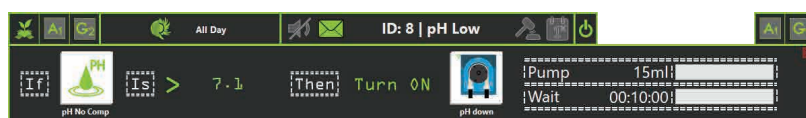


Figure 2 - Low pH Alarm Example

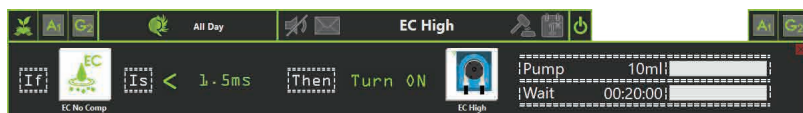


Figure 3 - Low EC Alarm Example

▶ Figure 3 shows a scheduled alarm that if the EC value is higher than 1.5 millisiemens (mS), will activate a peristaltic pump for 10 seconds, and then it will stop for 20 minutes so that the solution can be mixed and the values measured again. The process is repeated until the value is lower.

▶ Figure 4 shows a scheduled 10-minute irrigation which is repeated every 50 minutes. This schedule is programmed to send an e-mail when it starts and finishes. Also, it is consistent with some irrigation systems, like Flood & Drain. The blue background on this schedule means, that it's configured but it's currently disabled.



Figure 4 - Irrigation Schedule Example



Figure 5 - Security Alarm Example

▶ Figure 5 shows a security alarm programmed to automatically turn OFF all devices from the grow when a leak is detected by the flood sensor. This will emit a sound and send a warning e-mail, in this way all automation procedures related to the grow will be suspended until user validation, preventing the problem escalation.

▶ Figure 6 illustrates an alarm where if the level of water is low it will turn OFF the water pump. This alarm has an active persistence action that forces the action to work constantly, whenever there are conditions for this.

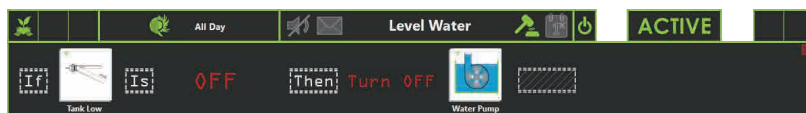
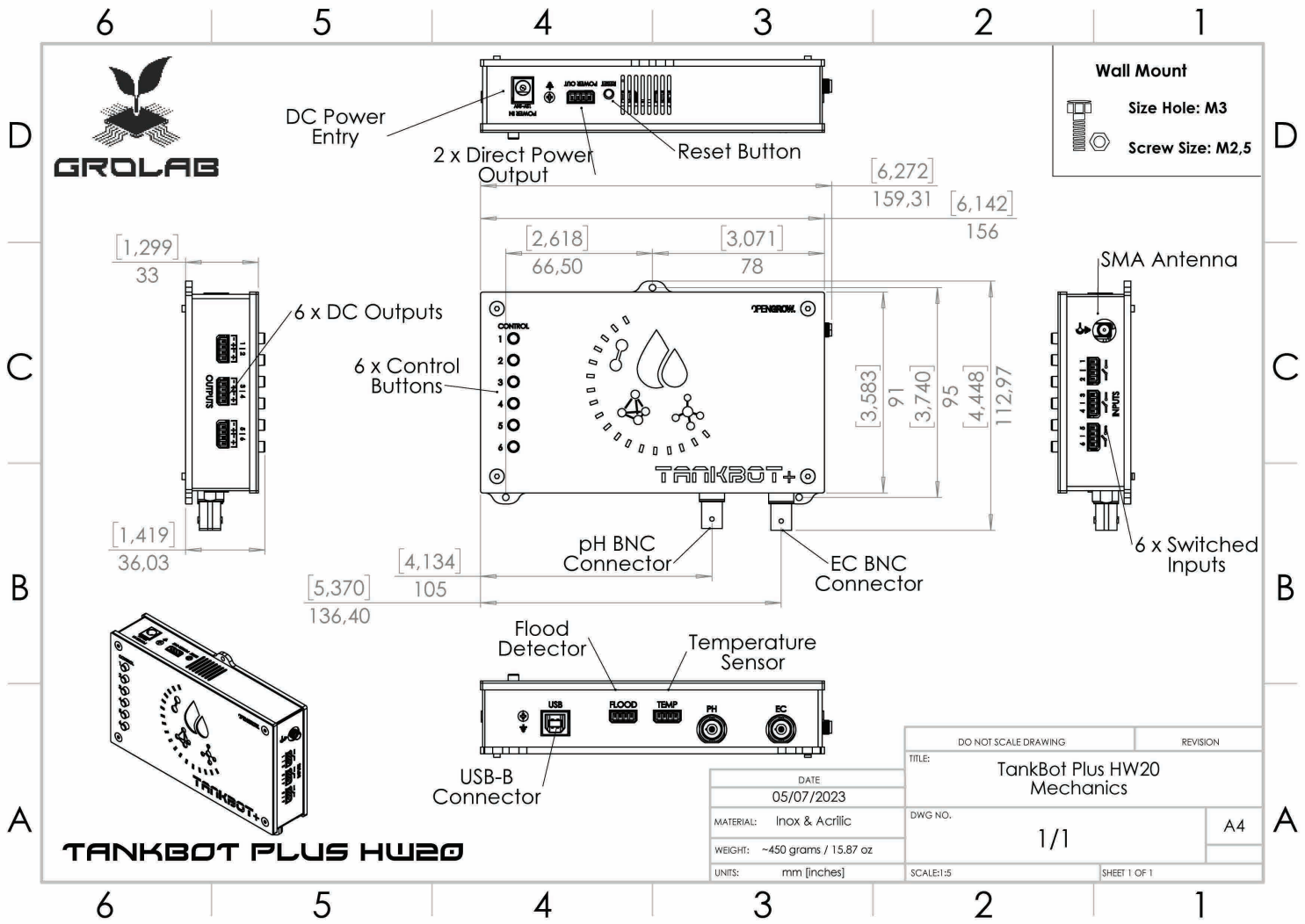


Figure 6 - Low-Level Water Alarm Example

MECHANICS



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COMPLIANCE



This symbol on the product or packaging means that according to local laws and regulations, this product should not be disposed of in household waste but sent for recycling. Please take it to a collection point designated by your local authorities once it has reached the end of its life, some will accept products for free. By recycling the product and its packaging in this manner you help to conserve the environment and protect human health.



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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