Green-X Greenhouse Control System (GCS-1) User Manual

OVERVIEW

Congratulations on purchasing the GCS-1 Green-X Greenhouse Control System!

The GCS-1 is a state-of-the-art, modular control system designed to manage irrigation, climate control, CO2 detection, lighting, and advanced sensor integration in greenhouses. This manual will guide you through installation, setup, and operation to optimize your greenhouse environment.

The GCS-1 controller provides a comprehensive solution for monitoring and controlling various aspects of greenhouse operations. It integrates with multiple devices and sensors to ensure precise environmental control, promoting optimal plant growth.

The GCS-1 features an Replacment 4-in-1 Sensor for Green-X Controller (MBS-GH) for precise real-time monitoring of temperature, humidity, CO2 concentration, and light levels. For outdoor conditions, the controller can monitor outdoor temperature and wind speed through **Weather Station Sensor (MBS-WS)** and curtain & glass control through **24V DC Greenhouse Roll Up Motor Controller (DMC-1), Single/Three Phase Curtain Motor Controller (100-277V) (AMC-1),** enhancing environmental monitoring and control by addressing external temperature and weather conditions.

PACKAGE CONTENTS

- 1x Green-X Greenhouse Control System (GCS-1)
- 1x Replacement 4-in-1 Sensor for Green-X Controller (MBS-GH)
- 1x RJ12 Cable Set for Light Connection
- 1x 12V Power Adapter
- 1x RJ12 T-Splitter
- 1x 4ft M12 Cable

INSTALLATION

1. Mounting the GCS-1 Controller

- Attach the back plate to the wall using the provided screws.
- Secure the controller onto the back plate until it clicks into place.

2. Connecting Sensors and Devices

- Connect the sensors to the RJ12 ports labeled "**SENSORS**" on the bottom of the unit; connect all environmental modules to the RJ12 ports labeled "**DEVICES**"; connect all irrigation modules to the RJ12 ports labeled "**IRRIGATION**".
- Use the provided RJ12 cables and Y-splitter for multiple sensors/device connections.
- For larger setups, consider using a TrolMaster splitter hub (SPH-1) to simplify connections.

INITIAL SET UP

1. Powering On

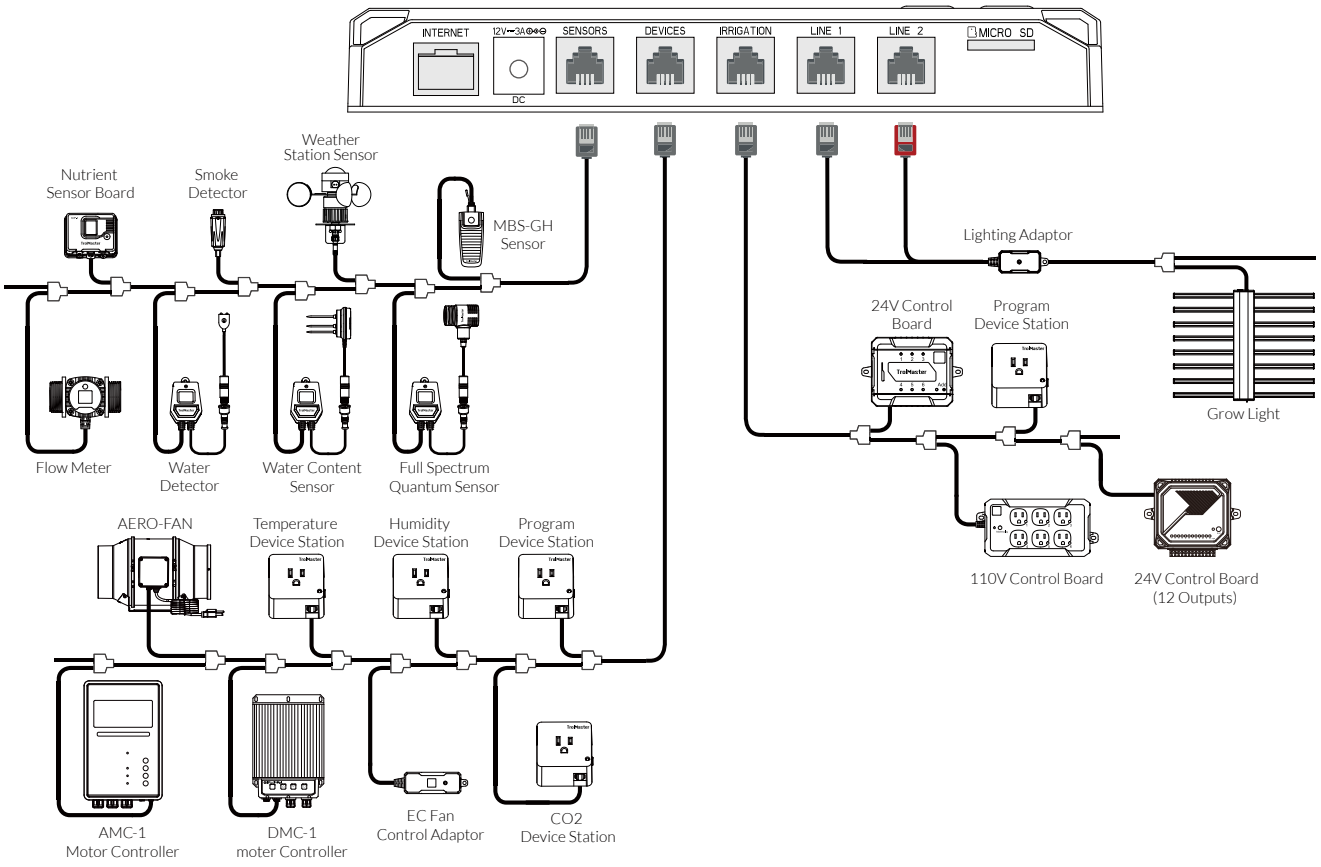
Connect the power supply to the GCS-1 and plug it into a power source. The LCD display will show the homepage.

2. Navigating the Interface

Use the arrow buttons to switch between the main pages: Climate Parameters, Nutrient Monitoring, Device Status, and Alarm Notifications.

INSTRUCTION

Install the GCS-1 on a wall using the included back plate that comes in the package with the controller. It is a simple fixed wall bracket. Simply release the controller from the bracket by pulling the controller from the bracket, then mount the bracket on the wall using screws. You can then place the controller back into the bracket by simply pushing the controller into the bracket. It will lock itself into place. Then you can start installing and connecting your sensors and device modules to the GCS-1 using our standard RJ12 cables. The interconnecting RJ12 communication cables come in various lengths. It's crucial to choose the right length that suits your application. When purchasing the GCS-1 Control System, you'll receive an RJ12 cable set consisting of a 4ft and 16ft RJ12 cable and Y-splitter as part of the package. Each device module and optional sensor you purchase will also come with the standard RJ12 cable set. Additional ECS-1 cable sets can be purchased.



1. Sensor Connections

a) Connecting Sensors

All of the sensors used with the Green-X (GCS-1) will be connected to the RJ12 port labeled **SENSORS,** at the bottom of the unit. First, connect an RJ12 cable to the port, then connect the other end to either a Y-splitter or TrolMaster's splitter hub (SPH-1). If using the Y-splitter, you can connect the first sensor and then use additional Y-splitters to add each additional sensor. When connecting multiple sensors, it can be easier to use a single 8-port SPH-1 instead of multiple Y-splitters. Below are all of the sensor types that can be connected to the GCS-1 and the maximum number that can be connected.

- 1 x MBS-SD (Smoke Detector)
- 1 x MBS-PAR (Full Spectrum Quantum Sensor)
- 2 x WD-1 (Water Detector)
- 1 x MBS-GH (Replacement 4-in-1 Sensor for Green-X Controller)
- 1 x MBS-WS (Weather Station Sensor for Green-X Controller)
- 8 x WCS-2 / WCS-3 (Substrate Sensor (Temp,EC&WC) / Water Content Sensor 3)
- 1 x AMP-3 (Sensor Board)
- 1 x DFM-1 (1" Digital Flow Meter) / DFM-2 (1.25" Digital Flow Meter) / DFM-3 (1.5" Digital Flow Meter)

Once the sensors are all connected to the **SENSORS** port on the GCS-1, some of the sensors require you to press the small button on the sensors to link or "address" each sensor to the GCS-1 controller. The GCS-1 controller will then automatically assign an address to the sensors sequentially. Once the sensors are addressed, the addresses will be saved unless the user completes a factory or sensor reset within the system setting menu.

b) Addressing Sensors

After connecting, press the addressing button on each sensor to link it to the GCS-1 if necessary. The GCS-1 will assign a unique address to each sensor for future recognition.

2. Device Module Connections

There are multiple device modules that can be used with the GCS-1. All of the device modules used with the GCS-1 will be connected to the RJ12 port at the bottom of the controller, labeled DEVICES. First, connect an RJ12 cable to the port, then connect the other end to either a Y-splitter or TrolMaster' s splitter hub (SPH-1). If using the Y-splitter, connect a device module to one of the two ports and another device module to the second port, or connect another Y-splitter to the second port to create a daisy-chain connection to connect more device modules. Repeat the procedure to connect all of the device modules to the DEVICES RJ12 port on the GCS-1 controller. When connecting multiple device modules, it can be easier to use a single 8-port SPH-1 instead of multiple Y-splitters. Once the devices are all connected, press the small button on the device modules to link or "address" each module to the GCS-1 controller. The GCS-1 controller will assign an address to the device modules sequentially. Once the device modules are addressed, the addresses will be saved unless the user completes a factory or device reset in the system setting menu. There are individual limits to how many device modules can be connected to the GCS-1.

- **DST-1, DSD-T, ARS-1, ARS-2:** A total of 4 units.
- **DSH-1, DSD-H, HS-1:** A total of 4 units.
- **DSC-1, DSD-C:** A total of 2 units.
- **DSP-1:** A total of 2 units.
- **EFC-1, FRC-1:** A total of 4 units.
- **Direct Control to AERO Fan.**
- **DMC-1, AMC-1:** A total of 4 units.

a) Addressing Device Modules

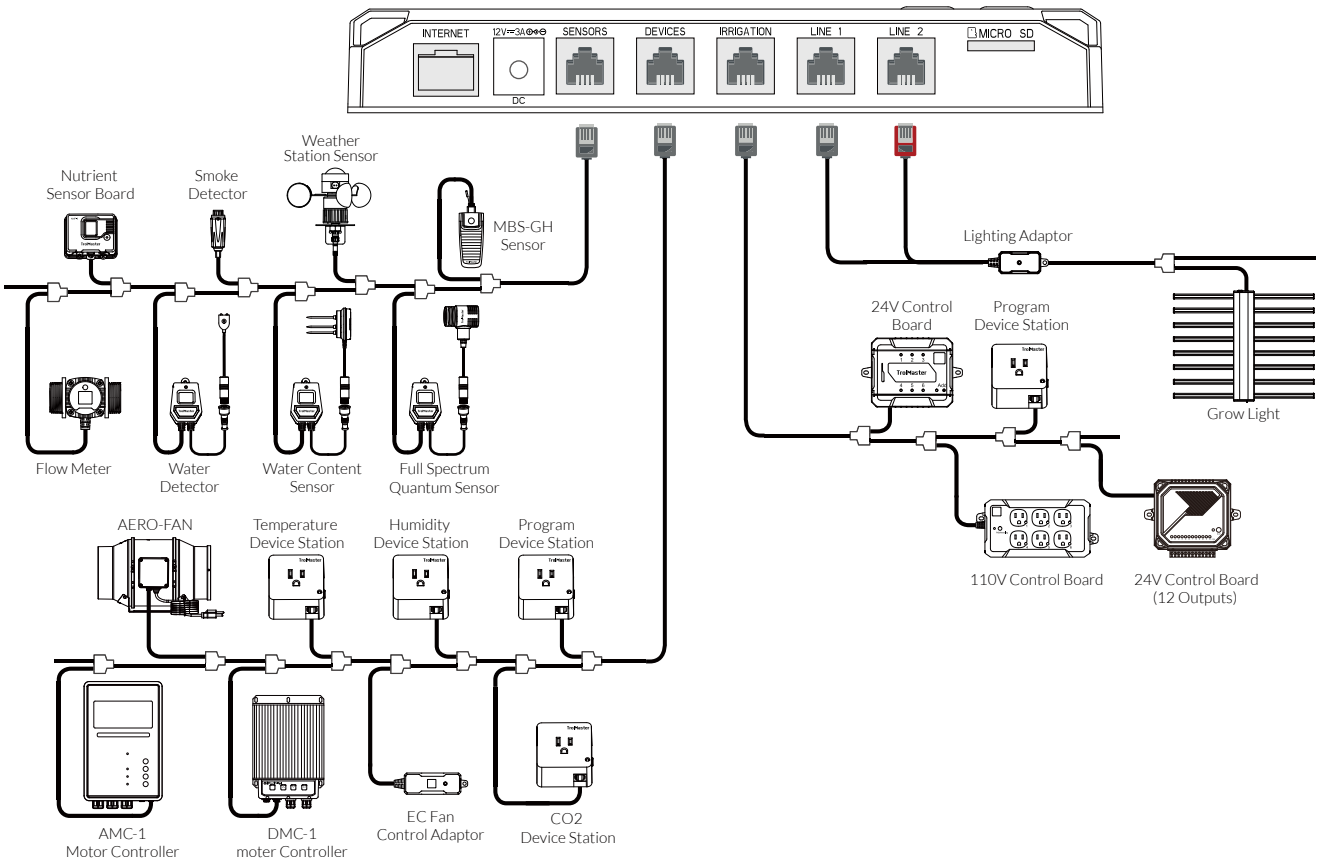
Press the small button on each device module to link it to the GCS-1. The controller will assign addresses to the device modules sequentially.

3. Irrigation Control

To connect irrigation device modules to the GCS-1 controller, start by connecting an RJ12 cable to the port labeled IRRIGATION at the bottom of the controller. Next, attach the other end of the RJ12 cable to either a Y-splitter or TrolMaster's splitter hub (SPH-1). If you choose to use a Y-splitter, you can connect one irrigation device module to each of the two ports or daisy-chain additional modules by connecting another Y-splitter to one of the ports. For a more streamlined setup, consider using a single 8-port SPH-1, which can accommodate multiple devices more efficiently than several Y-splitters. Once all irrigation device modules are connected, press the small button on each module to link or address them to the GCS-1 controller; the controller will assign addresses sequentially. These addresses will be saved unless you perform a factory reset through the system settings menu. Remember that there are specific limits on how many irrigation device modules can be connected to the GCS-1 controller, so be sure to check those limits for optimal performance.

Once the device modules are addressed, the addresses will be saved unless the user completes a factory or device reset in the system setting menu. There are individual limits to how many device modules can be connected to the GCS-1.

- OA6-24/OA6-110/DSP-1/DSD-1/OAT-24: **A total of 8 units**



4. Lighting Control

a) Connecting Lights

The GCS-1 can control most brands of LED or HID lights using the two built-in lighting control channels on the GCS-1. Each of the two channels can operate independently of each other to allow two different types or brands of lights to be controlled. In order to control your lights, you must first plug in one of TrolMaster's LMA Lighting Adapters into the RJ12 ports on the bottom of the controller, labeled **Line 1** and **Line 2**. TrolMaster offers several types of lighting adapters for different brands and types of lights. If you have questions about which adapter is correct for your lights, contact Tech Support or go to the GCS-1 page on TrolMaster's website at www.trolmaster.com.

b) Configuring Light Settings

Since each of the two lighting control channels is independent, each control line can be set up to have its own timer settings and dimming temperature setpoints, as well as the dimming and power percentage that each group of lights will operate at.

5. EC Fan Control

The GCS-1 can control EC fans, which are divided into two categories: standard EC fans and Aerofan EC fans.

Standard EC Fans

Standard EC fans that can be controlled using a 0-10 volt or PWM signal can be connected to the GCS-1 using the optional EFC-1 fan interface module. Users can control four EC fans at the same time. Each fan will be connected to a separate EFC-1 that is connected to the device RJ12 port.

Aerofan EC Fans

Aerofan branded EC fans do not require the optional EFC-1 as they can be connected directly to the device module RJ12 port on the GCS-1. The GCS-1 can control either a single Aerofan or multiple Aerofans using the same user settings for all connected fans. Multiple Aerofans can all be connected together using the provided daisy-chain cables, and then that group of fans can be connected to the GCS-1 device port. Once connected, the user can select the settings for the Aerofans to operate.

Controlling Aerofan EC Fans

Aerofan fans can be connected to the GCS-1 in one of two ways. Aerofans do not require any type of adapter to control them using the GCS-1 controller. The simplest way to connect Aerofan fans to the GCS-1 is to plug in the communication cable from the fan(s) directly into the DEVICE port on the GCS-1. All of the fans to be controlled would be daisy-chained together using the provided cables and then connected to the device port on the GCS-1. Once connected, those fans will be controlled based on the settings within the EC Fan page, allowing for adjustable fan speed from 0% to 100% in 1% increments.

You can also choose to use the optional FRC-1 Fan Remote Control module. The FRC-1 provides an easy and manual method to adjust the Aerofan speeds. The FRC-1 is connected inline with the fans using the supplied Y-cable, and the other end of the Y-cable connects to the GCS-1. Normally, the GCS-1 will control the fan speed based on the user's settings within the GCS-1. However, when the FRC-1 is connected, turning the manual knob on the FRC-1 will temporarily allow it to control the fan speed based on the user's manual speed setting. After 30 minutes of inactivity on the FRC-1, the Aerofans that are connected to both the FRC-1 and GCS-1 will revert to being controlled by the GCS-1 again. This revision emphasizes that Aerofan fans have adjustable speed capabilities while maintaining clarity on how they can be controlled.

6. Internet Connection

To connect your GCS-1 to the internet for remote monitoring, notifications, and control, TrolMaster recommends using a hard-wired Cat 5/6 cable plugged into the Ethernet port located at the bottom of the GCS-1. Once you have connected your GCS-1 to the internet, download TrolMaster' s app, TM+ Pro, on your smartphone. This app allows you to access real-time data and remotely control the devices connected to the GCS-1, giving you the freedom to travel while managing your growing environment. TrolMaster users can also share their progress, interact with other growers, access historical data, and utilize many useful features within the app.

*NOTE : There is no built-in Wi-Fi on the GCS-1. Contact TrolMaster Tech Support for options related to using a Wi-Fi connection as most commercially available Wi-Fi range extenders (with Ethernet ports) are NOT compatible with TrolMaster controllers.

7. System Settings

Climate Settings
Configure day and night temperature, humidity, and CO2 levels.

Device Settings
Set up connected devices such as fans, heaters, and irrigation systems.

Alarm Notifications

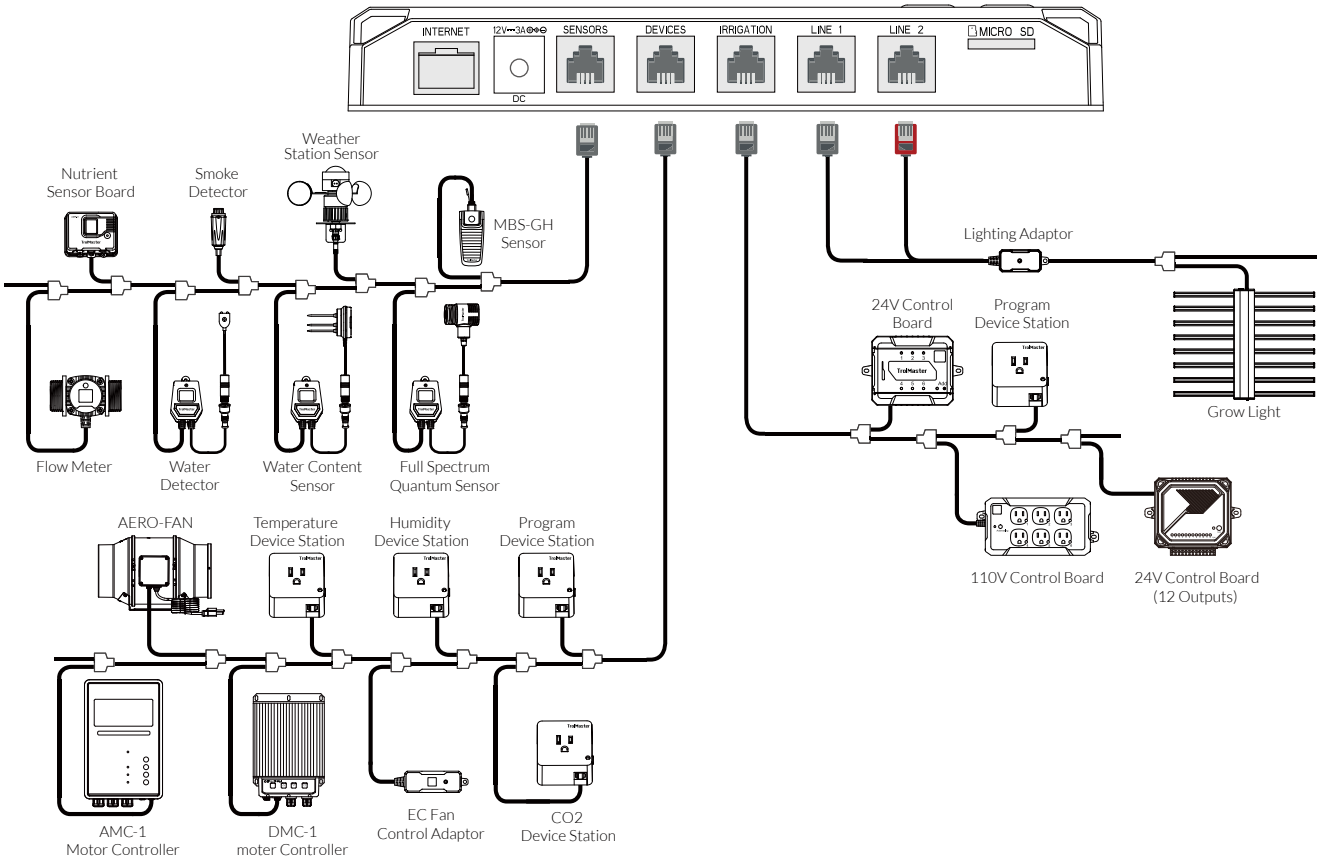
Manage alarm settings and view notification history.

Maintenance

Regularly check connections and cables for wear and tear.
Ensure sensors and devices are clean and functioning correctly.
Update firmware as needed to maintain optimal performance

Connection Diagram

Below is a detailed connection diagram illustrating how to connect various devices and sensors to the GCS-1 controller:



Device Port Connections

- CO2 Regulator Module
- humidity Module
- Temperature Module
- EC Fan Control Module
- Motor Controller

Sensor Port Connections

- Temperature Sensor
- Humidity Sensor
- Light Sensor
- PAR Sensor
- Water Detector
- Weather Station Sensor
- pH Probe
- EC Probe
- Water Content Sensor
- Flow Meter

Irrigation Port Connections

- OA6-24
- OAT-24
- OA6-110
- DSP-1
- DSD
- DSV

LINE1 and LINE2 Ports

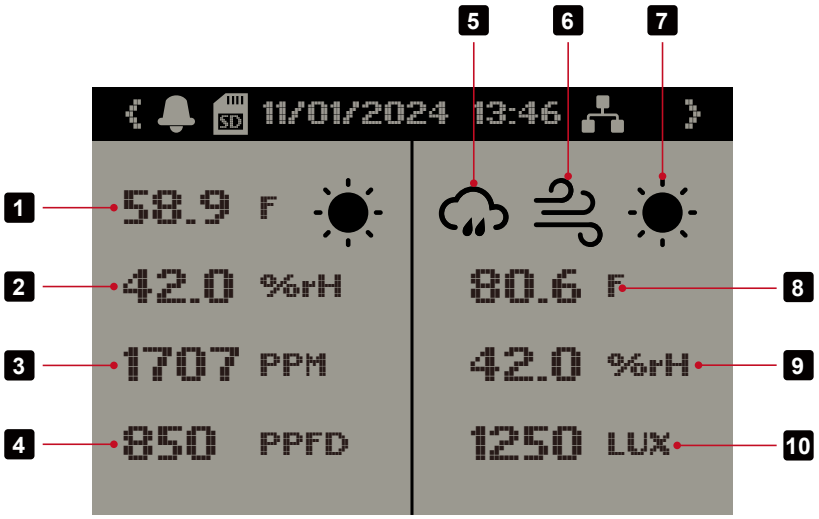
Lighting Adapters for LEDs or HIDs

Installation Note

Install the GCS-1 on a wall using the included back plate that comes in the package with the controller. It is a simple fixed wall bracket. Simply release the controller from the bracket by pulling the controller from the bracket, then mount the bracket on the wall using screws. You can then place the controller back into the bracket by simply pushing the controller into the bracket. It will lock itself into place. Then you can start installing and connecting your sensors and device modules to the GCS-1 using our standard RJ12 cables. The interconnecting RJ12 communication cables come in various lengths. It's crucial to choose the right length that suits your application. When purchasing the GCS-1 Control System, you'll receive an RJ12 cable set consisting of a 4ft and 16ft RJ12 cable and Y-splitter as part of the package. Each device module and optional sensor you purchase also comes with the standard RJ12 cable set. Additional ECS-1 cable sets can be purchased.

MAIN INTERFACE

When you power up the GCS-1 for the first time, the homepage will display on the LCD. Use the “LEFT” and “RIGHT” arrows to switch between pages: climate data, nutrients and growing medium data, device status, and alarm notifications. Each page contains specific information about the GCS-1, which continuously monitors climate conditions and nutrient levels in real-time.



This interface indicates greenhouse and outdoor status, Left side indicates greenhouse status and right side indicates outdoor status.

Greenhouse Status

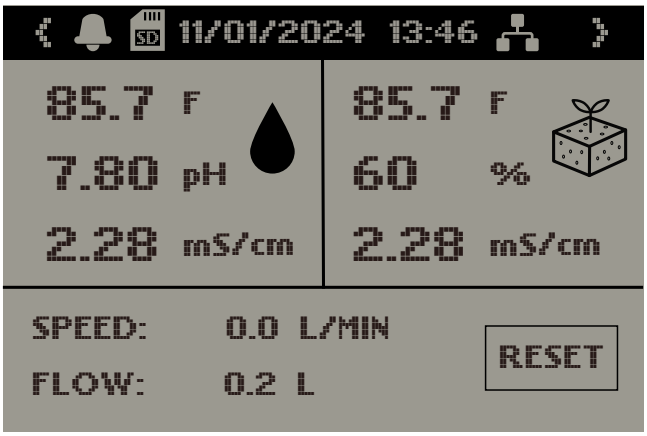
1 Indoor Temperature 2 Indoor Humidity 3 Indoor CO2 Level 4 Photosynthetic Photon Flux Density

Outdoor Status

5 Rainfall Condition
6 Wind Velocity
7 Day/Night Condition
8 Outdoor Temperature
9 Outdoor Humidity
10 Outdoor LUX Level

The main screen displays several weather condition icons that provide real-time status updates, including Wind Speed, Rainfall, and Day/Night Status.

These icons dynamically update to reflect current environmental conditions, allowing users to monitor changes in real time at a glance.



This indicates the soil and water status.

Water Status

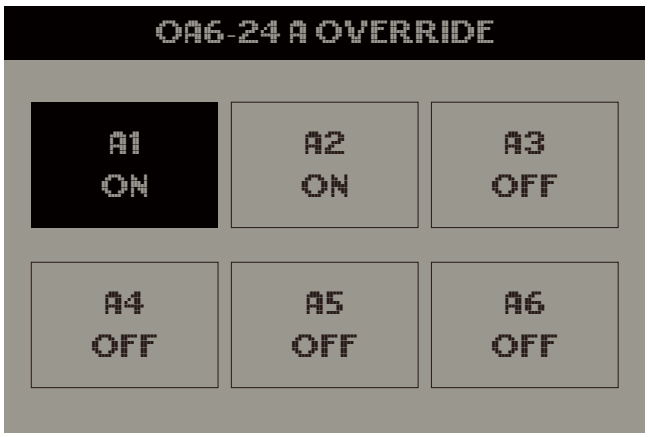
- Water Temperature
- Water pH
- Water EC

Soil Status

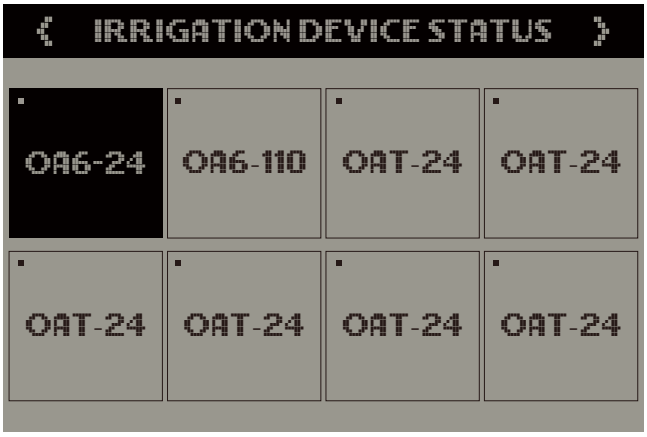
- Temperature
- Soil Moisture Level
- Soil EC Level

Water Flow Meter Status

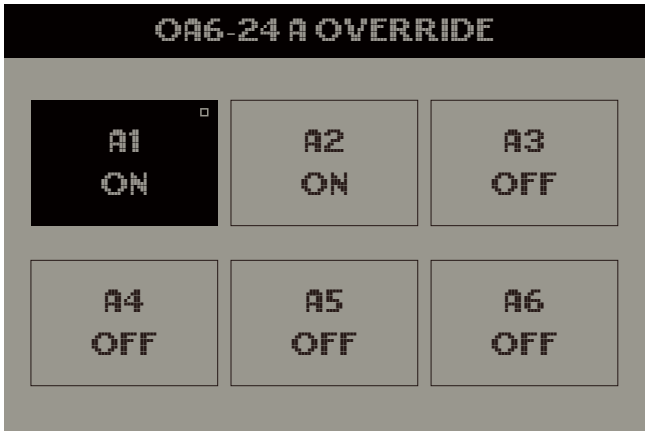
- Water Volume Per Minute
- Water Flow Level



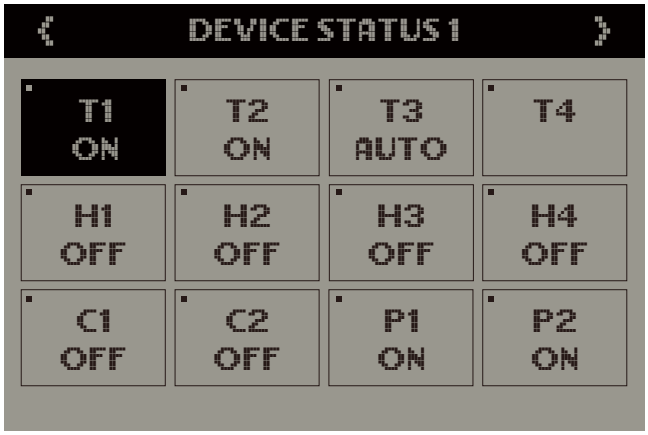
This is Irrigation Devices status, press **ENTER** to select irrigation device for override, user can either choose **ON** and **OFF**.



The **AUTO RESUME TIME** can be set up to 60mins, by pressing ▲ ▼ to select the time, then press ENTER to confirm. The next page will show **SETTING SAVED in __Min.**



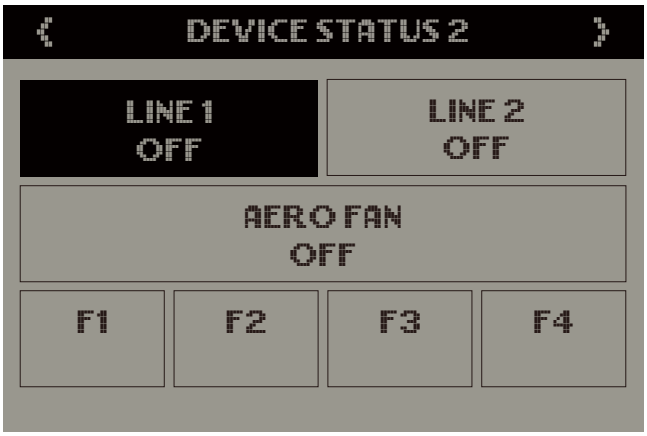
Once you have selected **ON to the selected device (e.g. A1),** the setting is confirmed.



The DEVICE STATUS 1 indicates the device plug for DST, DSH, DSP, DSC status.

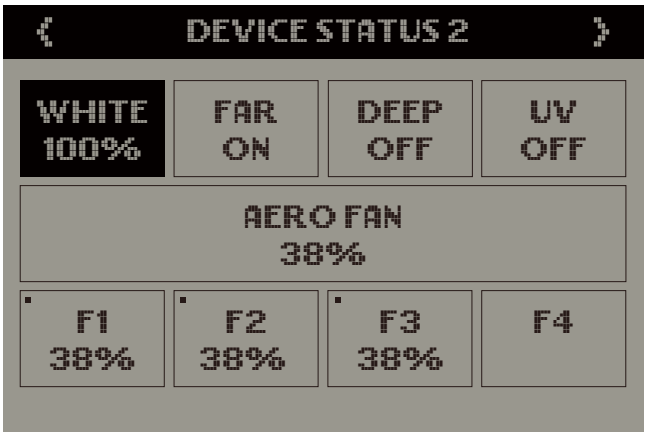
The **DEVICE** can be set up to 60mins, by pressing ▲ ▼ to select the time, then press ENTER to confirm. The next page will show **SETTING SAVED in __Min.**

Manual Override: You can also manually override your controller device modules on this page. That allows you to test and make sure all of the device modules are connected and working properly with the controller.

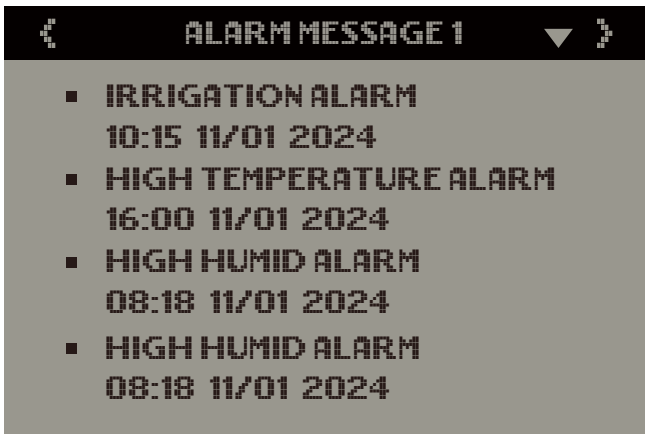


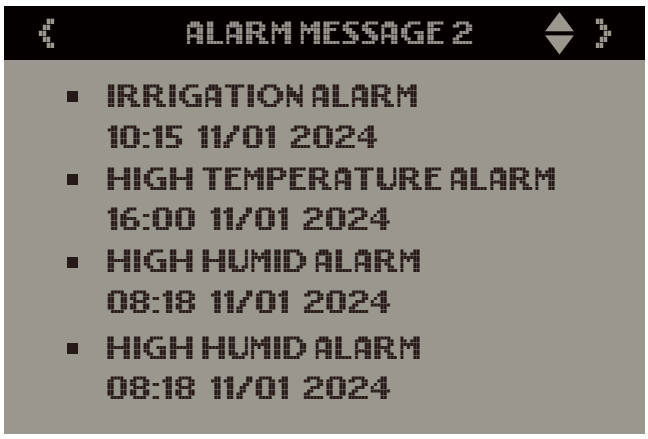
The DEVICE STATUS 2 indicates lighting status, Aerofan status, and/or EC fan status. This page indicates the 2 channel LED lighting (LINE 1 & LINE 2) status, Fan (F1-F4) status and AeroFan status.

Manual Override: You can also manually override your controller device modules on this page. That allows you to test and make sure all of the device modules are connected and working properly with the controller.



The DEVICE STATUS 2 indicates lighting status, Aerofan status, and/or EC fan status.

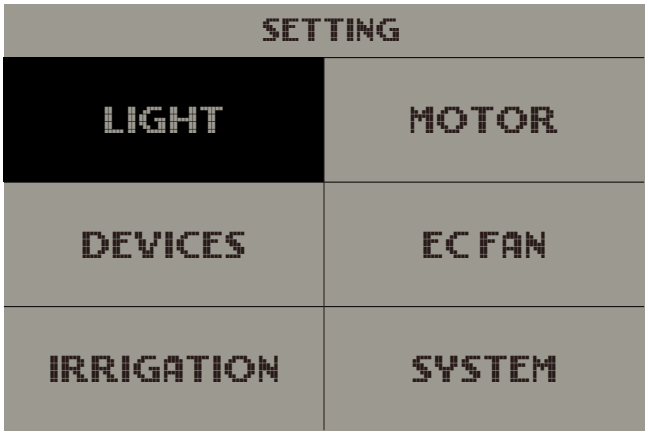




The alarm message page consolidates all your alarm notifications, allowing you to check missed alerts and adjust your settings accordingly.
The Alarm Message 1 / 2 will show the date and time for below:

- TEMP SENSOR ERR
- HIGH TEMP ALARM
- LOW TEMP ALARM
- HUMID SENSOR ERR
- HIGH HUMID ALARM
- LOW HUMID ALARM
- CO2 SENSOR ERR
- HIGH CO2 ALARM
- LOW CO2 ALARM
- LOW CO2 PRESSURE
- LIGHT ALARM
- SMOKE 1 ALARM
- SMOKE 1 OFFLINE
- WD-1 1 SENSOR ERR
- LEAKING ALARM 1
- IRRIGATION-A1 ALARM
- AMP-3 TEMP ERR
- HIGH TEMP AMP-3
- LOW TEMP AMP-3
- pH SENSOR ERR
- LOW pH ALARM
- HIGH pH ALARM
- AMP-3 EC ERR
- HIGH EC AMP-3
- LOW EC AMP-3
- MEDIUM 1 TEMP ERR
- HIGH TEMP MEDIUM 1
- LOW TEMP MEDIUM 1
- MEDIUM 1 MOIST ERR
- HIGH MEDIUM 1 MOIST ALARM
- LOW MEDIUM 1 MOIST ALARM
- MEDIUM 1 EC ERR
- HIGH EC MEDIUM 1
- LOW EC MEDIUM 1
- WEATHER STATION OFFLINE
- DMC-1 1 OFFLINE
- DMC-1 1 OVERLOADED

MAIN MENU

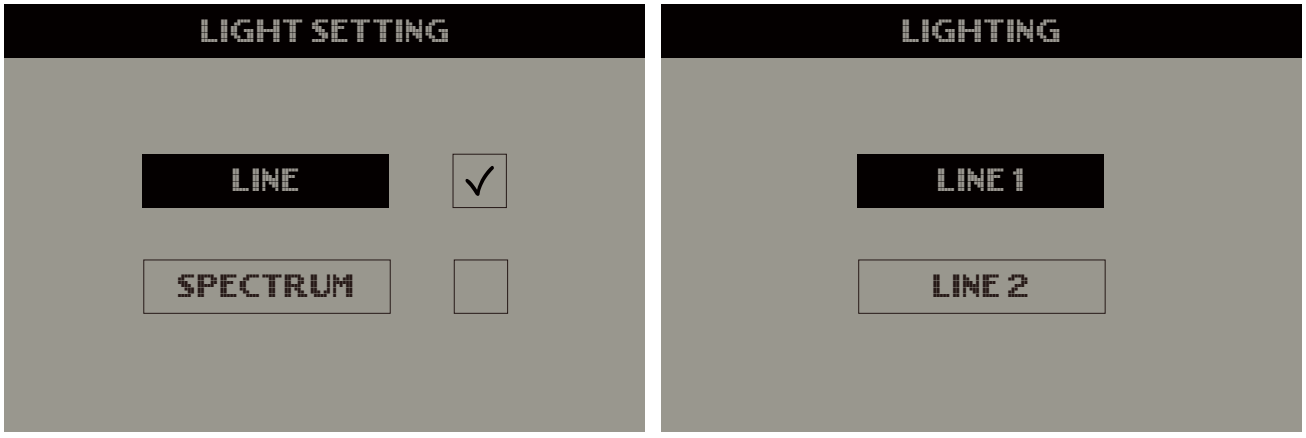


There are 6 Setting pages on the GCS-1 main menu. The setting pages are as follows:

1. **Light:** Provides information on lighting settings.
2. **Motor:** Manages motorized devices.
3. **Devices:** Displays the status (On / Off) of each device connected to the GCS-1.
4. **EC Fan:** Allows you to manage fan settings.
5. **Irrigation:** Shows the current irrigation conditions.
6. **System Settings**

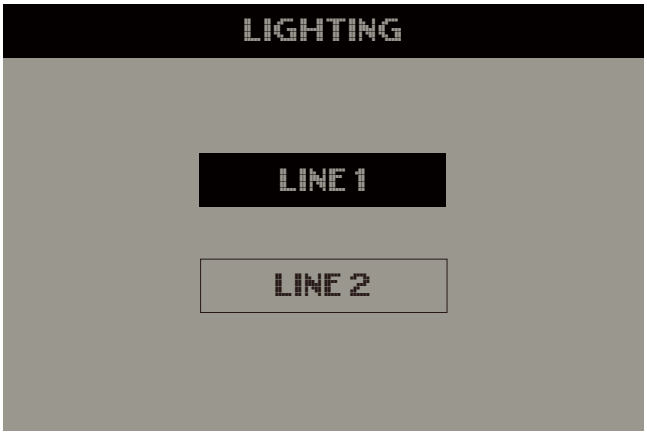
You can navigate through these pages using the left and right arrow buttons. The Alarm Messages page will show the most recent alarm messages.

LIGHTING CONTROL

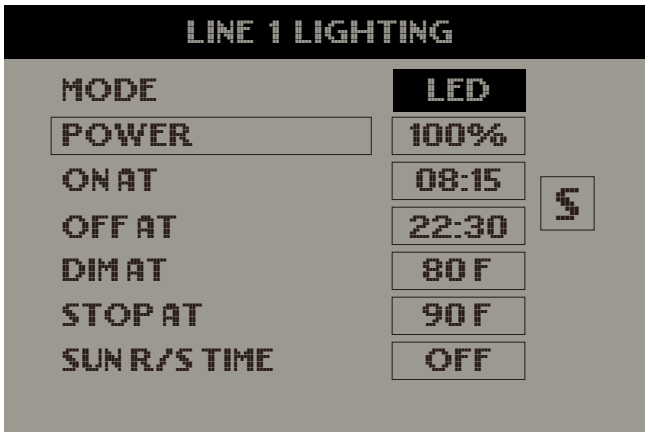


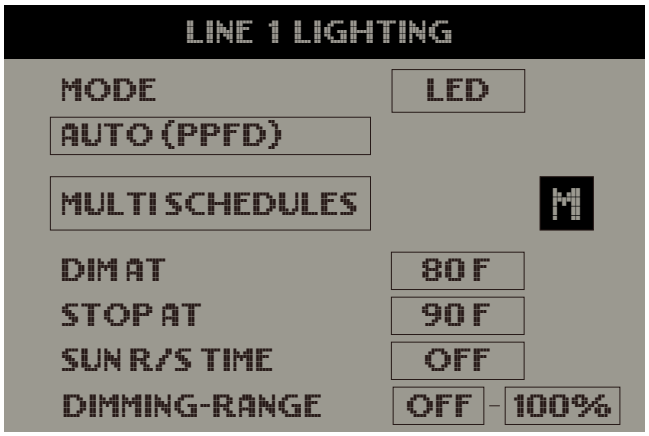
After pressing **ENTER** on the **Light Setting**, the screen will display the Line tab and Spectrum tab. Use the ▲ and ▼ arrows to select between the Line tab and Spectrum tab, and press **ENTER** to navigate to the page where you can make changes to the selected option.

Regular Light Settings



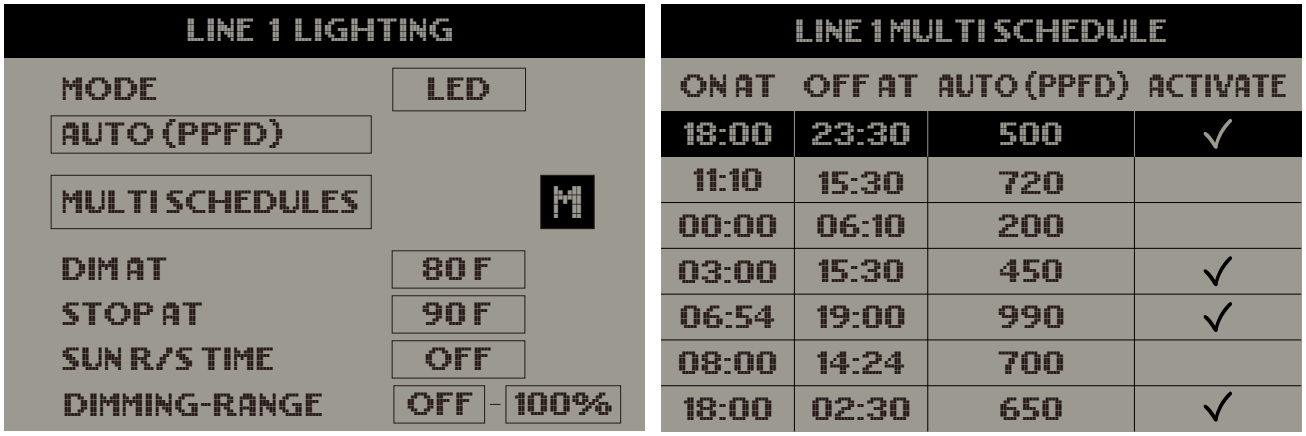
Pressing **ENTER** on “Line” will reveal options of two separate light lines: Line 1 and Line 2, allowing you to configure 2 separate light schedules.





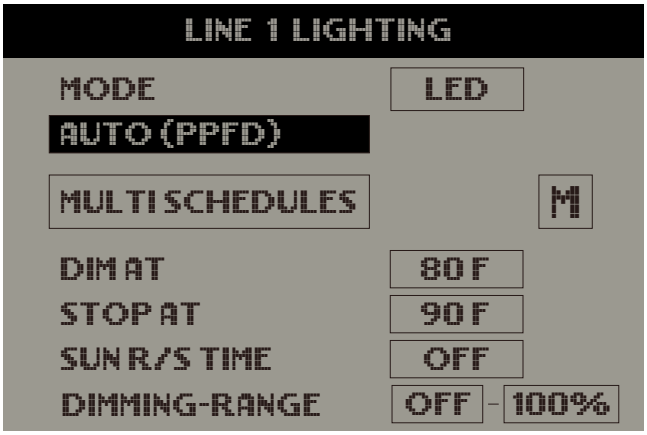
On the Line 1 / Line 2 settings, you can make changes to the light schedules. Use the ▲ and ▼ buttons to navigate the options on this page and press **ENTER** on an item to change it. When you see the item blinking, you can switch between the selections using the ▲ and ▼. When you have selected your item, press **ENTER** again to confirm the selection and make changes to different settings below:

1. **MODE :** Select whether you're using HID or LED lights.
2. **POWER / AUTO :** Set your lighting preferences to either POWER or AUTO(PPFD). Press ENTER on an item to change it. When you see the item blinking, you can switch between the selections using the UP and DOWN arrows. When you have selected your item, press ENTER again to confirm the selection. Select whether you're using PPFD or POWER lights. When in AUTO(PPFD) setting.
3. **ON AT :** Set the time to turn on the lights in the daily cycle.
4. **OFF AT :** Set the time to turn off the lights in the daily cycle.
5. **[S]INGLE / [M]ULTIPLE :** By switching the daily schedule from Single [S] to Multiple [M], it will unlock the “MULTISCHEDULES” menu for further settings. Within 24 hours, users can adjust multiple time ranges with a specific light brightness during the day.



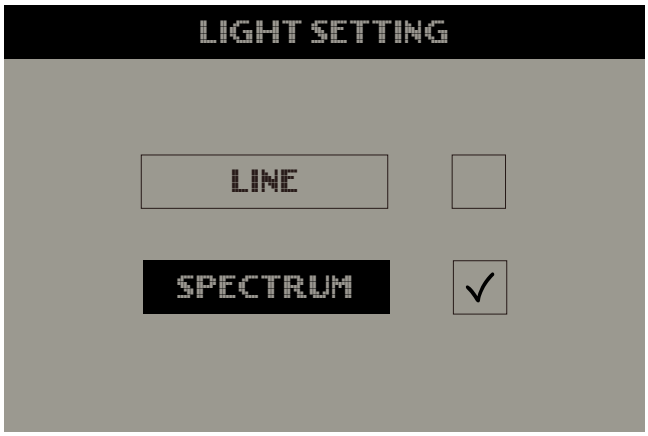
6. **DIM AT :** Set the temperature set point to dim the lights in order to decrease the room temperature.
7. **STOP AT :** Set the temperature set point to shut off the lights in order to decrease the room temperature.
8. **SUN [R]ISE / [S]ET TIME :** Slowly dim on/off the brightness from zero to your light set point to simulate sunrise & sunset in the daily light cycle.
9. **DIMMING-RANGE : [Requires MBS-PAR addressed to GCS-1 Controller]** users can be selected within OFF-100% range.

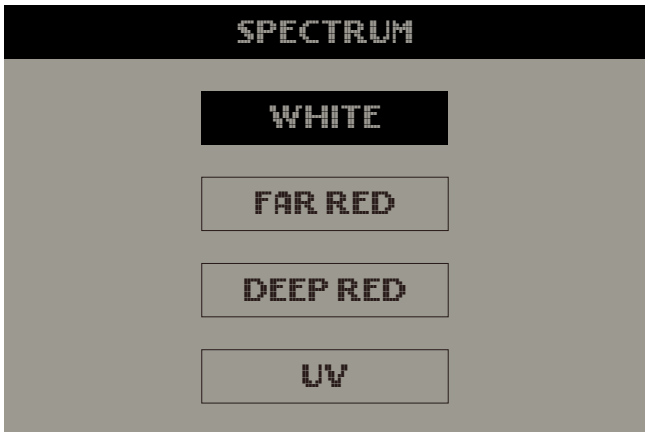
Control by lighting output - AUTO (PPFD)



On this page, you can set your lighting preferences to either **POWER** or **AUTO(PPFD)**.
Press on an item to change it. When you see the item blinking, you can switch between the selections using the and arrows. When you have selected your item, press again to confirm the selection. Select whether you're using PPFD or POWER lights. When in AUTO(PPFD) setting, there's a DIMMING-RANGE setting on the bottom (Requires MBS-PAR inserted to GCS-1 Controller) whether users can be selected within OFF-100% range.

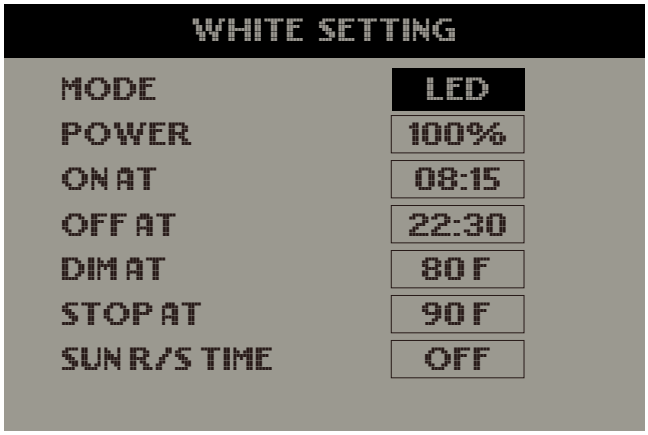
Spectrum Control Settings

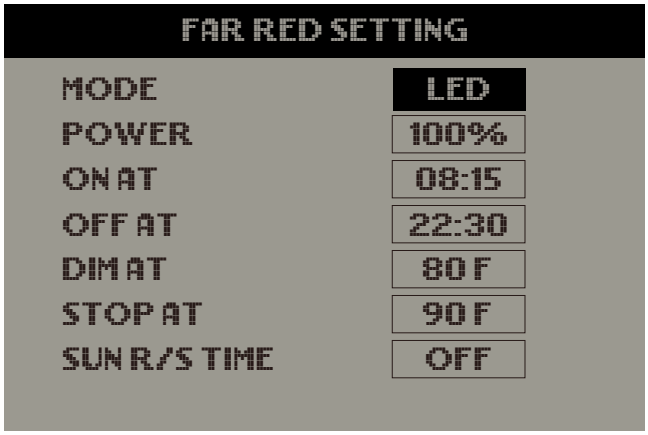


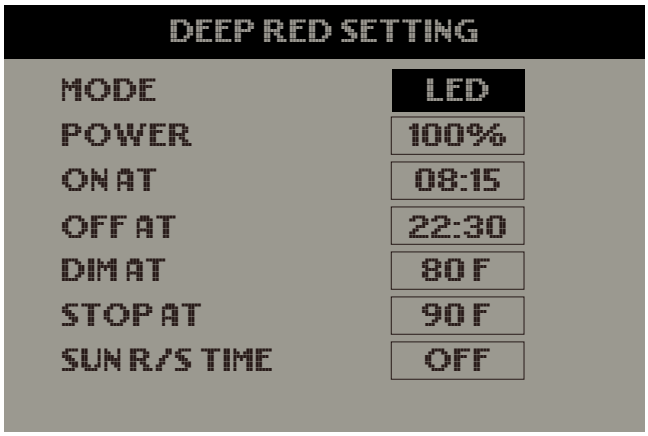


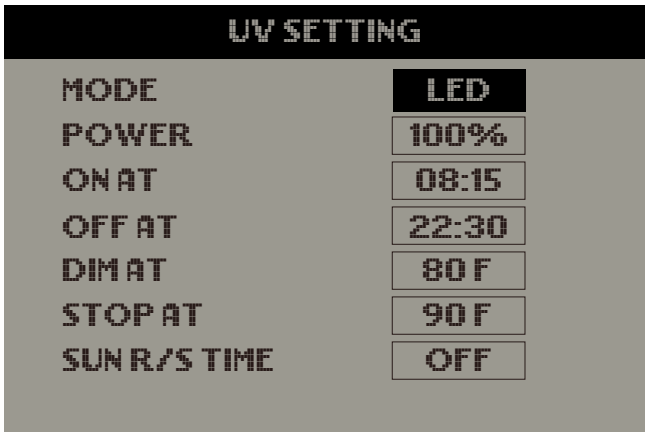
When you select the spectrum control page, you can create your Spectrum settings :

- White light
- Deep Red
- Far Red
- UV



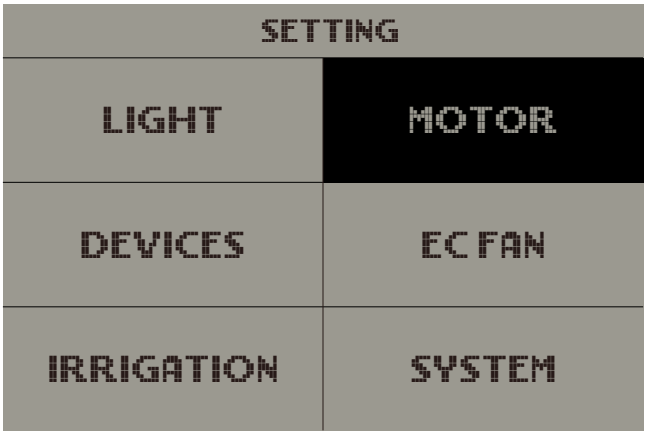


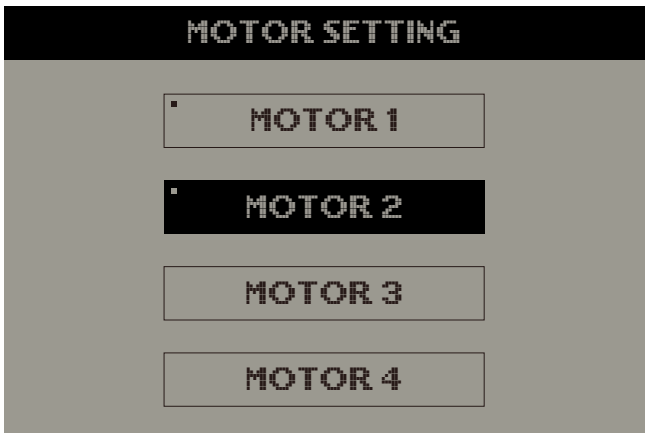




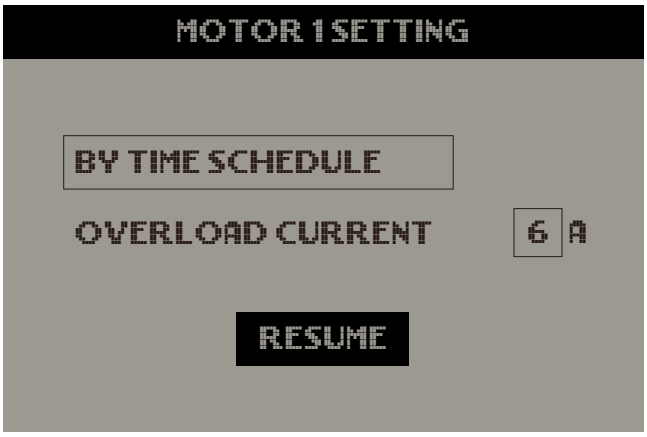
Use the UP and DOWN buttons to navigate the options on this page and press **ENTER** on an item to change it. When you see the item blinking, you can switch between the selections using the **UP** and **DOWN** arrows. When you have selected your item, press **ENTER** again to confirm the selection. You can also select the On/Off time for your lights, the temperature at which the lights will dim, the Sunrise and Sunset time, and more.

MOTOR CONTROL



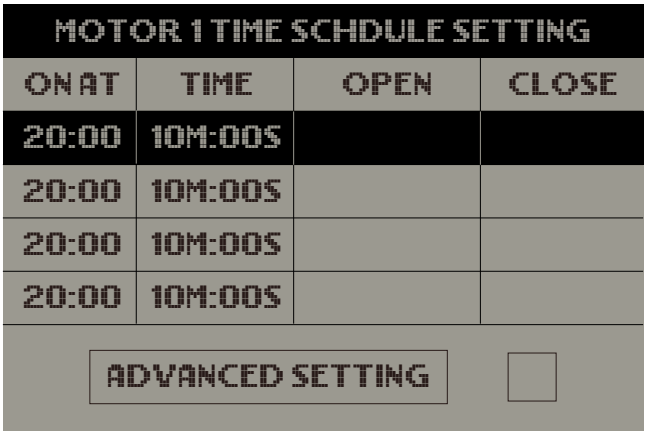


The Motor Setting page on the GCS-1 controller allows you to schedule motor operations to control curtains based on specific environmental conditions.

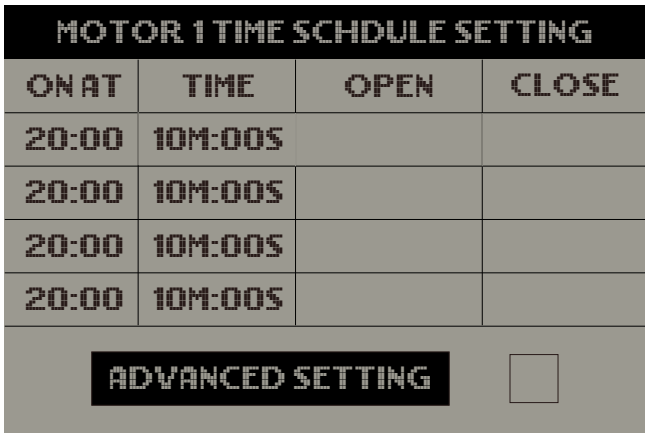


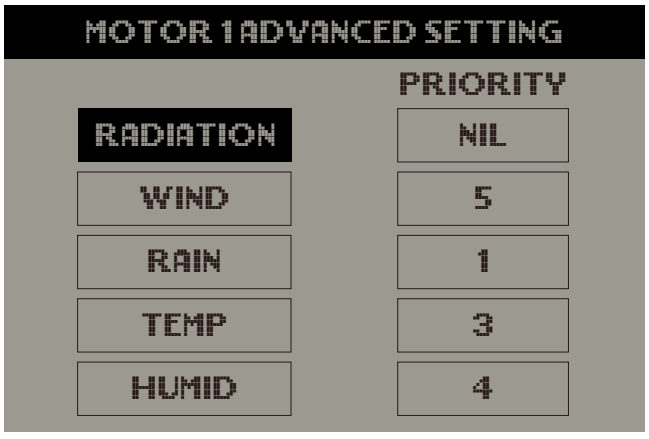
Motor Setting Options:

SYNC MOTOR 1/2/3/4	Synchronize the same schedule with a specific motor (Only available when multiple motors are addressed)
BY TIME SCHEDULE	Setup the time schedule for the motor
OVERLOAD CURRENT	Assign current amperage to the motor (2-10 amps)
RESUME	Manually resume control after overcurrent offload



- **BY THE SCHEDULE:** User can be set up the schedule time for open and close, by press the button ENTER to adjust the **ON AT & TIME** and selecting the **OPEN & CLOSE** slot for ✓



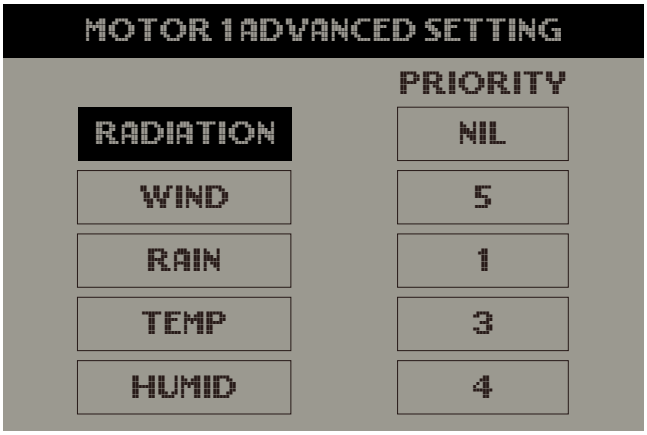


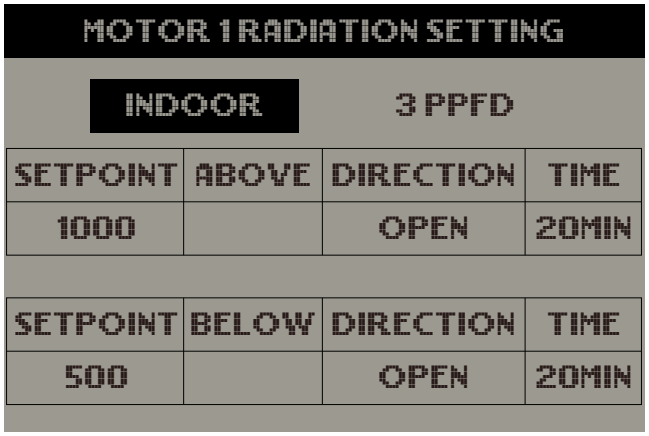
ADVANCED Setting

To access advanced settings, press ENTER. You will see five options on the left side:

- **RADIATION**
- **WIND**
- **RAIN**
- **TEMP**
- **HUMID**

On the right side, you can set the **PRIORITY** from 1 to 5, where 1 is the highest priority and 5 is the lowest.





RADIATION Settings

Press ENTER to select **RADIATION**.

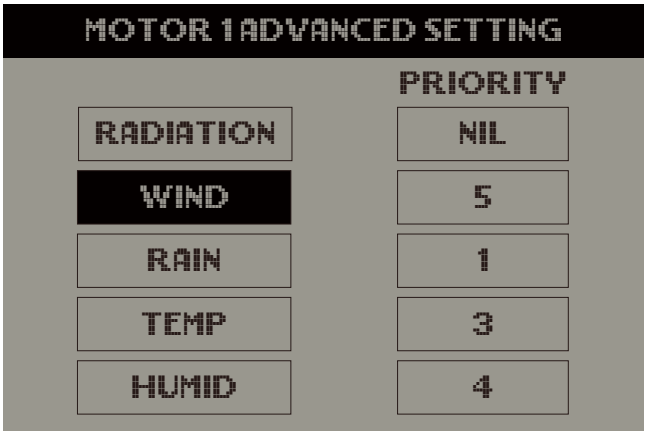
You can set:
INDOOR / OUTDOOR: View PPFD / LUX levels inside and outside the greenhouse. Press ENTER to switch between indoor and outdoor settings.

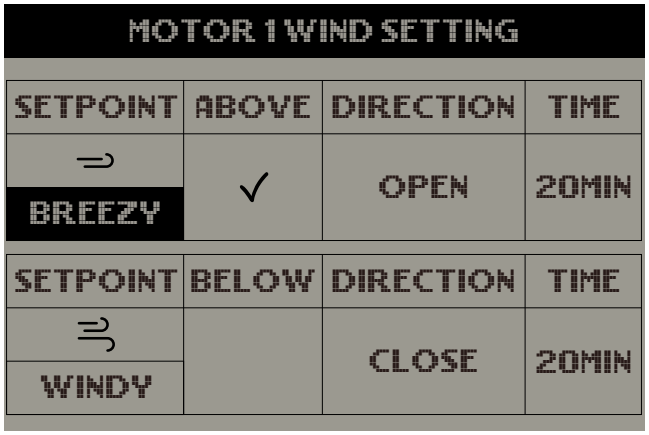
SETPOINT for **INDOOR / OUTDOOR**: Set up to a maximum of 1000 PPFD. Press ENTER , use ◀ ▶ to select **SETPOINT**, then press ENTER again. Use ▲ ▼ to adjust your optimal PPFD settings, then press ENTER to confirm.

ABOVE and **BELOW**: Press ENTER **(✓)** these options to control the motor. Press ENTER to confirm.

DIRECTION: Press ENTER , then use ▲ ▼ to choose **OPEN** or **CLOSE**. Press ENTER to confirm.

TIME: Press ENTER , then use ▲ ▼ to choose a time in __MIN. Press ENTER to confirm.





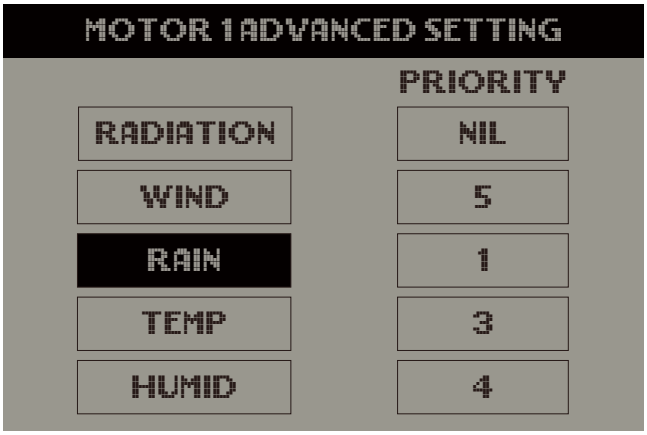
WIND Settings
Press ENTER to select **WIND**.

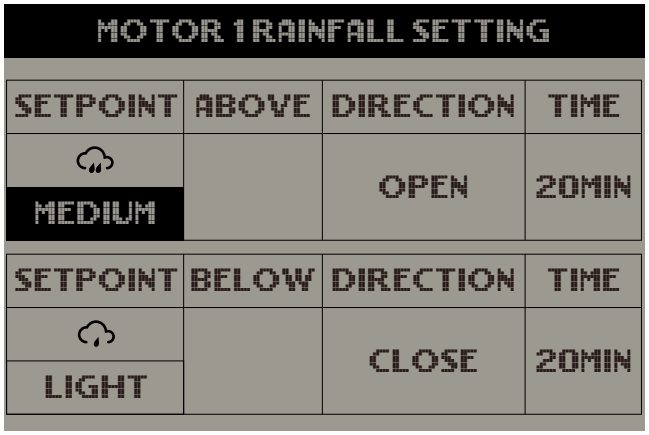
You can set:
SETPOINT for **ABOVE**: Choose from 4 modes: **MILD / BREEZY / WINDY / STRONG**. Press ENTER , use ◀ ▶ to select SETPOINT, then press ENTER again. Use ▲ ▼ to adjust your wind settings, then press ENTER to confirm.

SETPOINT for **BELOW**: Same as **SETPOINT** for **ABOVE**.

DIRECTION: Press ENTER , then use ▲ ▼ to choose **OPEN** or **CLOSE**. Press ENTER to confirm.

TIME: Press ENTER , then use ▲ ▼ to choose a time in __MIN. Press ENTER to confirm.





RAIN Settings

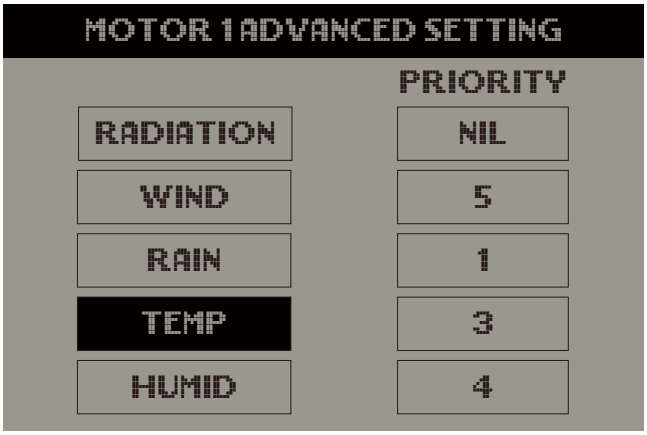
Press ENTER to select **RAIN**.

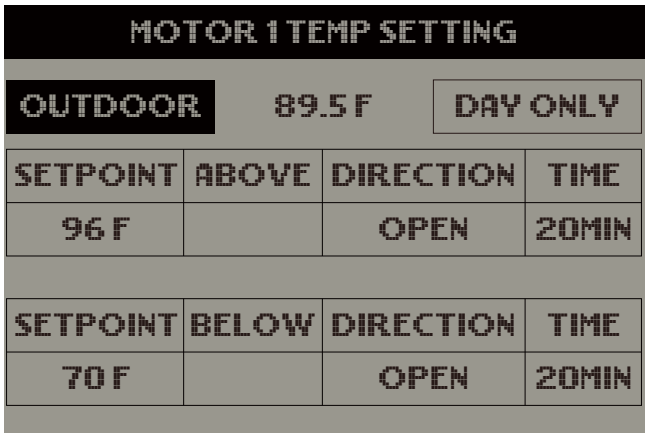
You can set:

SETPOINT for **ABOVE DIRECTION**: Choose from 3 modes: **MEDIUM / LIGHT / HEAVY**. Press ENTER, use ◀ ▶ to select **SETPOINT**, then press ENTER again. Use ▲ ▼ to adjust your rain settings, then press ENTER to confirm.

SETPOINT for **BELOW DIRECTION**: Same as **SETPOINT** for **ABOVE DIRECTION**

TIME: Press ENTER, then use ▲ ▼ to choose a time in __MIN. Press ENTER to confirm.





RADIATION Settings

Press ENTER to select **TEMP**.

You can set:

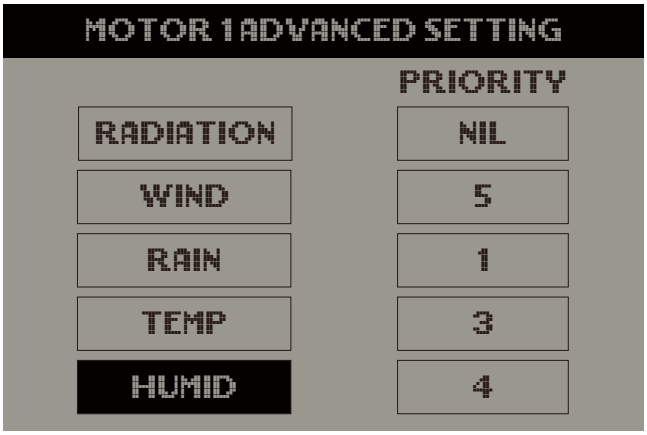
Choose from **DAY ONLY**, **NIGHT ONLY**, or **ALWAYS** by pressing ENTER, then using ▲ ▼ to select an option. Press ENTER to confirm.

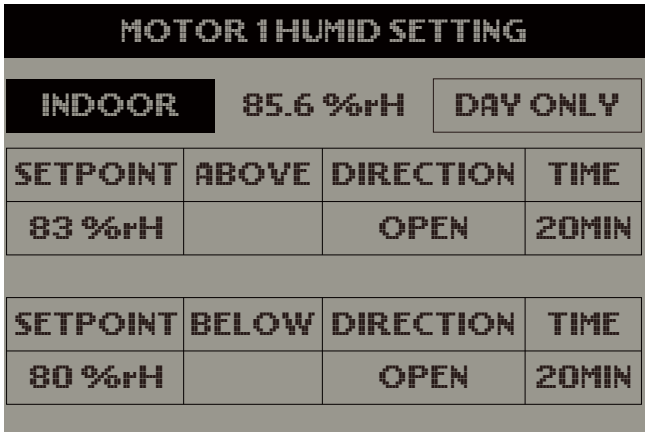
For **SETPOINT** for **OUTDOOR**: Press , use to select **SETPOINT**, then press , and use to adjust your temperature settings **(__F)**. Press to confirm.

Press **(✓) ABOVE / BELOW** by pressing and confirming.

For **OUTDOOR DIRECTION**: Press , use for **SETPOINT**, then press and use for **OPEN** or **CLOSE**. Press to confirm.

TIME: Press , then use for **__MIN.** Press to confirm.





HUMID Settings

Press to select **HUMID**.

There are two types of **HUMID** settings: **INDOOR / OUTDOOR**.

You can set:

Choose **DAY ONLY**, **NIGHT ONLY**, or **ALWAYS** by pressing and using for selection. Confirm with .

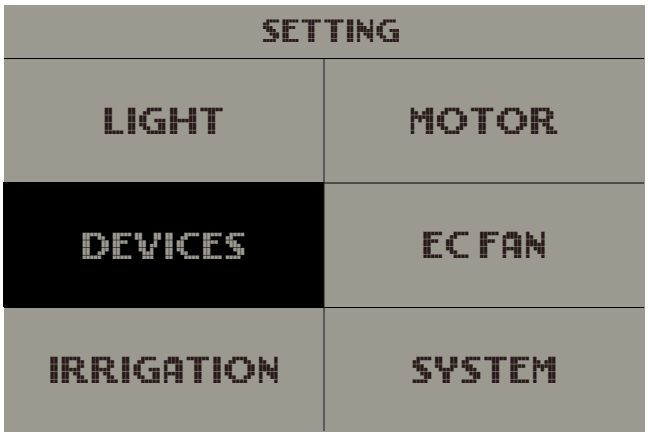
For **SETPOINT** for **OUTDOOR**: Press , use for **SETPOINT**, then press and use for adjusting humidity settings **(__%rH)**. Confirm with .

Check **(✓) ABOVE / BELOW** by pressing and confirming.

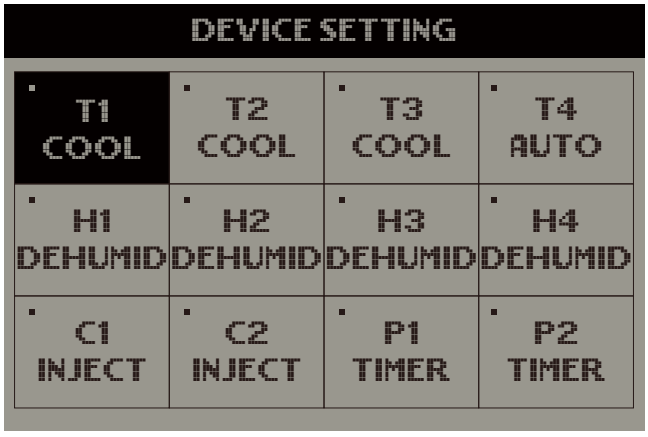
For **OUTDOOR DIRECTION**: Press , use for **SETPOINT**, then press and use for **OPEN** or **CLOSE**. Confirm with .

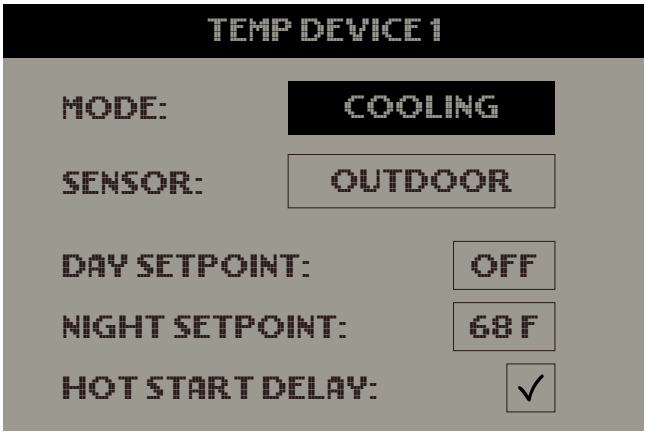
TIME: Press , then use for **__MIN**. Confirm with .

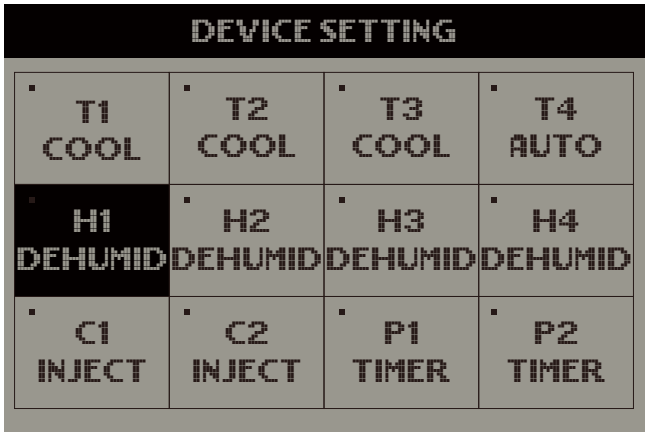
DEVICE CONTROL

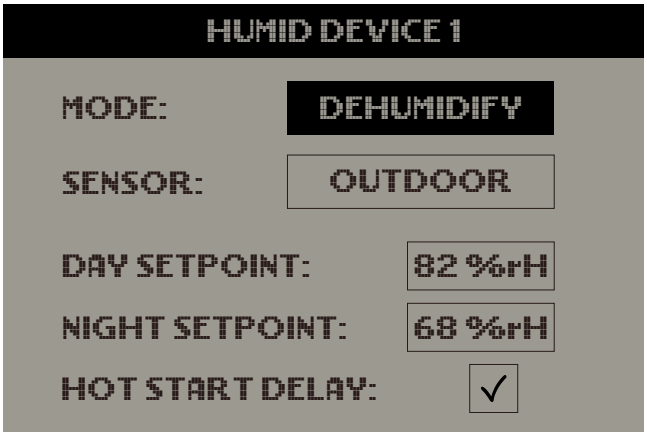


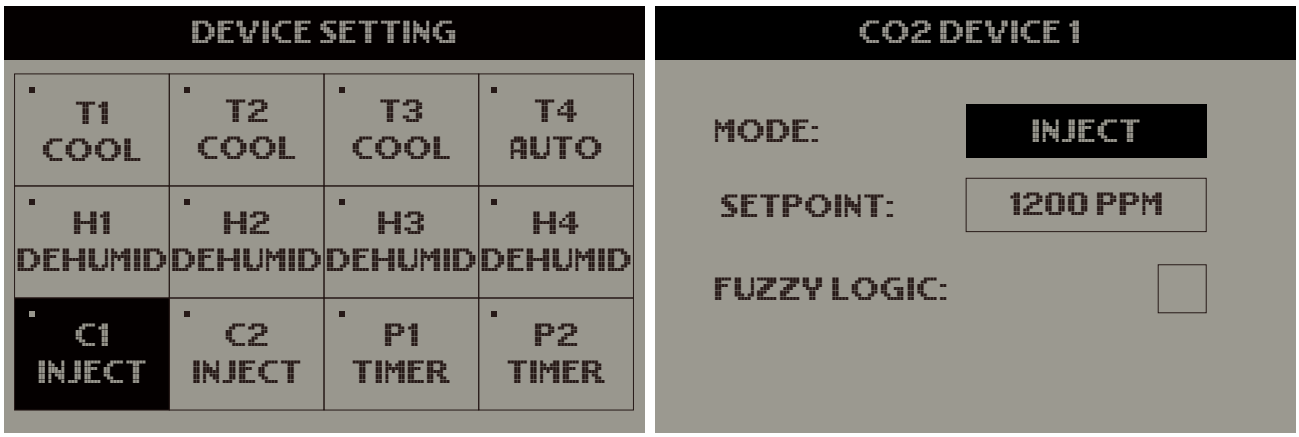
The Devices tab is where you will set up your climate control devices. With the use of our plug-in DS modules, you can connect and control the devices via the controller. TrolMaster's Green-X can control multiple device modules.





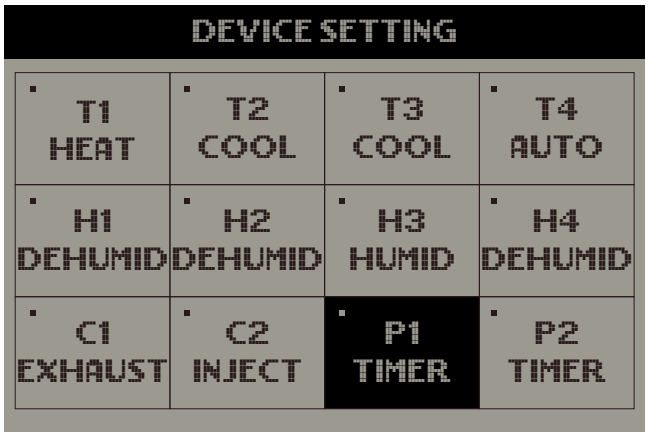






When you open the Devices page, you can select what each of your connected device modules will be controlling. You have 4 device slots available each for temperature T1,T2,T3,T4, humidity H1,H2,H3,H4; and 2 device slots available each for CO2 C1 & C2, programmable timer P1 & P2.

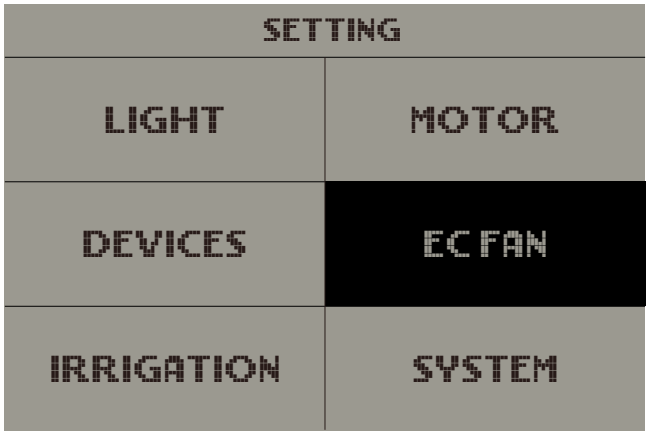
Press the ▲ ◀ ▶ ▼ to the device module setting you want to change. Press ENTER to access the device's settings. You can then use the ▲ or ▼ arrows to select what kind of device is connected to the Green-X. When you have finished selecting the device you've connected for each device module, press ENTER again to confirm the selections.

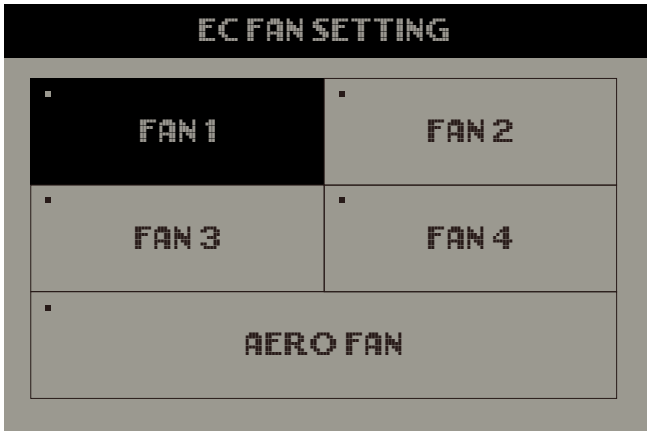


The program device modules can be used to connect either more climate devices or timer-based irrigation devices like solenoids and pumps. If you want to connect irrigation devices to set up irrigation schedules, you can use the DSP1 or 2 modules (120 or 240v), or the DSV-1 (12-24v AC/DC), to set up your preferred schedules. In order to program a device by schedule, press ENTER on any of the program tabs from P1 and P2. The LCD screen will then display 3 options, where you can set what kind of schedule you'd like to set.

If you choose the single schedule setting, there are only 2 timers you will have to set. You simply input when you want the device to turn on, and when it turns off. If you choose the multi-schedule setting, you can set up to 12 individual On and Off times for each device to follow within a 24-hour “day” . If you choose to use the recycle timer mode, you will be able to determine the On and Off time duration, and the recycle timer mode will then repeat that same On/Off duration schedule as many times as you’ d like, working as a repeat-cycle timer. You will also be able to select the time of day for the repeat-cycle to begin, as well as be able to determine how many cycles will be repeated before the timers are shut off until the next day. The Green-X controller will handle the rest once you've set up your preferred irrigation schedule. Your timer-controlled devices will be controlled automatically with the GCS-1 according to the settings you specified.

EC FAN CONTROL



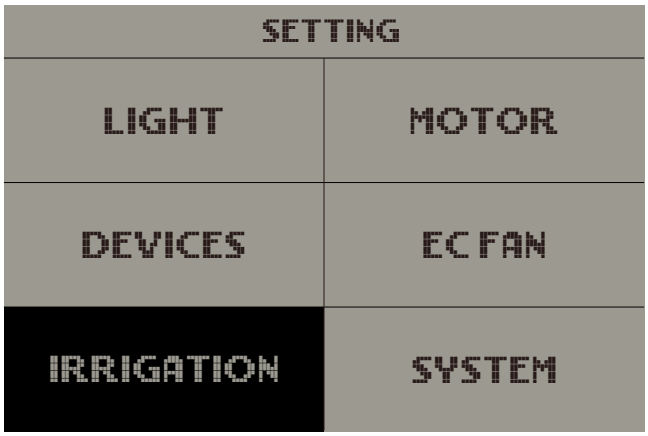


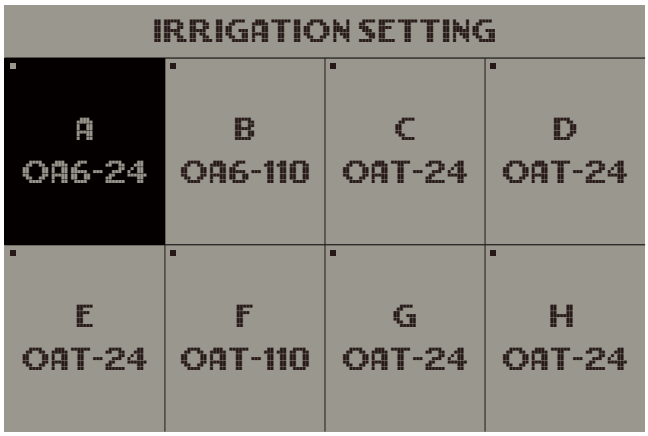
Fan F1 to F4: There are 7 modes for the F1 fan with separate settings for Day and Night. These 7 modes include:

- **Cool only mode:** The exhaust fan is controlled by the temperature in the Greenhouse.
- **Speed only mode:** The exhaust fan is controlled by the fan speed in the Greenhouse.
- **Dehu only mode:** The exhaust fan is controlled by the humidity levels in the Greenhouse.
- **CO2 only mode:** The exhaust fan is controlled by CO2 level in the greenhouse.
- **Dehu Priority mode:** The exhaust fan is controlled by both temperature and humidity, however, it will prioritize humidity to be within the defined range if both can’ t be achieved.
- **Cool priority mode:** The exhaust fan is controller by both temperature and humidity, however, it will prioritize temperature to be within the defined range if both can’ t be achieved.

Use ▲ ▼ ◀ ▶ to select Fan1/Fan2/Fan3/Fan4/AERO FAN. Press ENTER on “Fan1/Fan2/Fan3/Fan4/AERO FAN” and you will land on the page where you can set the fan settings. The first thing to select is the mode you want the fan to operate. Press ENTER and then use the ▲ ▼ arrows to select the desired mode, then press ENTER . Next, you can set the Minimum fan speed. Then you can set the Maximum fan speed. You can also choose to interlock the CO2 to be disabled when the fan is running. Move the cursor on the screen down to CO2 Interlock, then use the or arrow to allow the check mark √ to appear on the screen, and press again to confirm the selection. Depending on how you set it up, the fans will increase their speed as the temperature or humidity rises, and they will slow down (or stop) as the temperature and humidity decrease. When GCS-1 is connecting to MBS-WS, you can also check on the last option to stop the fan to operate when out door status exceeds indoor status.

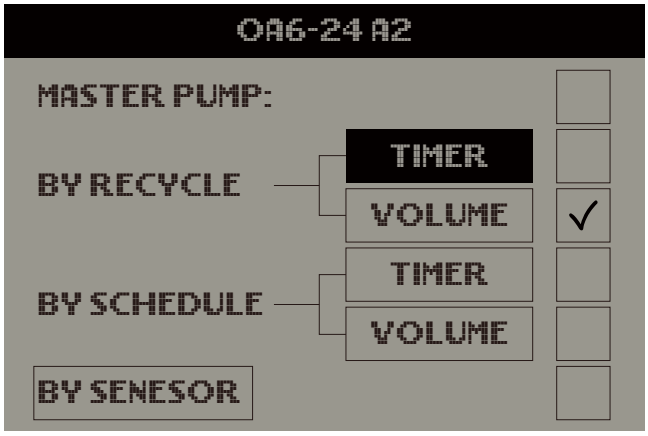
IRRIGATION CONTROL





After pressing **ENTER** on the **IRRIGATION** tab, you will access the page where you can configure the settings for the irrigation devices. There are eight hubs available, allowing users to select either **Trolmaster's 6 Outputs 24V Control Board (OA6-24)** or the **110V Control Board (OA6-110)**. You can set up to a maximum of eight hubs.

After selecting the **A1 SENSOR** tab, you will access the page where you can check the types and settings of your irrigation devices. When you click on the **A1 SENSOR** settings, you will find the master pump settings available for configuration.



After Pressing ENTER on the A2 tab, the page shows these settings:

- MASTER PUMP
- BY RECYCLE
- BY SCHEDULE
- BY SENSOR

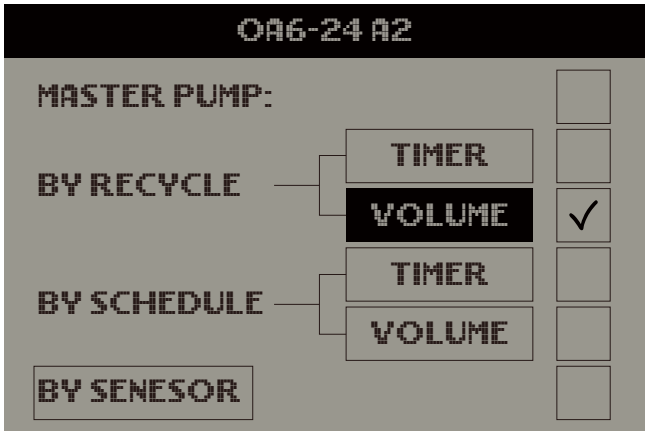
By Recycle

Operates the pump based on a recurring cycle, with adjustable timing and volume settings.

Configuration Parameters:

1. Start Time

Sets the time when the pump will begin its first cycle each day, establishing a starting point for the recurring operation.



2. Volume/L

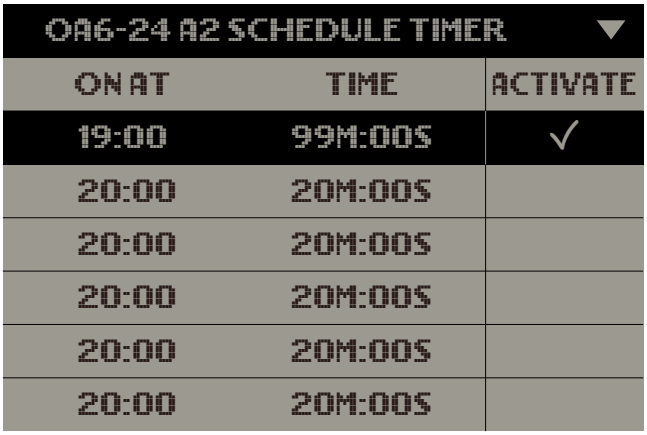
Specifies the amount of fluid to be pumped during each cycle, measured in liters. This setting ensures consistent distribution of the designated volume per cycle.

3. Interval Time

Defines the time interval between each cycle, allowing users to control how frequently the pump operates. For instance, setting this to "23H:59M" means the pump will activate nearly once a day.

4. Times

Determines the number of cycles to be executed within each defined time window. For example, setting this to "1" will perform a single cycle at the specified interval. This parameter allows flexibility in adjusting the frequency of recycling based on application needs.



By Schedule

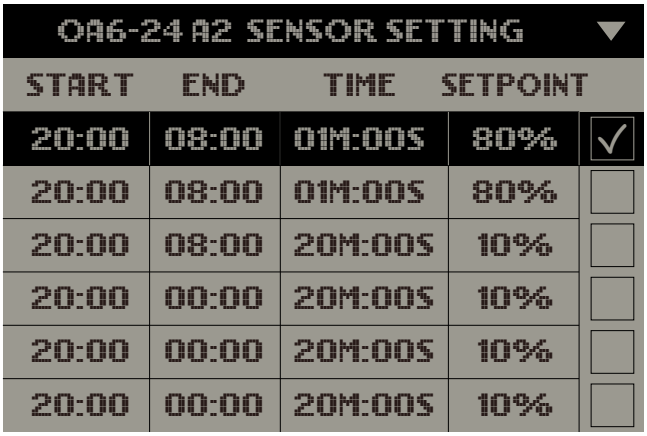
Activates the pump according to a pre-set schedule, ideal for specific times and tasks.

1. ON AT

Specifies the exact times for the pump to operate, offering control over daily schedules.

2. Volume/L

Determines the volume of water or fluid to be pumped during each scheduled activation.



By Sensor Control Mode

The By Sensor control mode allows the Master Pump to operate based on specific time intervals and environmental thresholds. Users can configure this mode to define precise conditions for pump activation, ensuring it responds effectively to varying needs.

Configuration Parameters:

1. Start Time

Sets the beginning of the control window, specifying when the sensor-based pump operation should be active each day.

2. End Time

Defines the end of the control window, after which the sensor-based control ceases for the day. This parameter allows users to limit the sensor-based operation to specific hours.

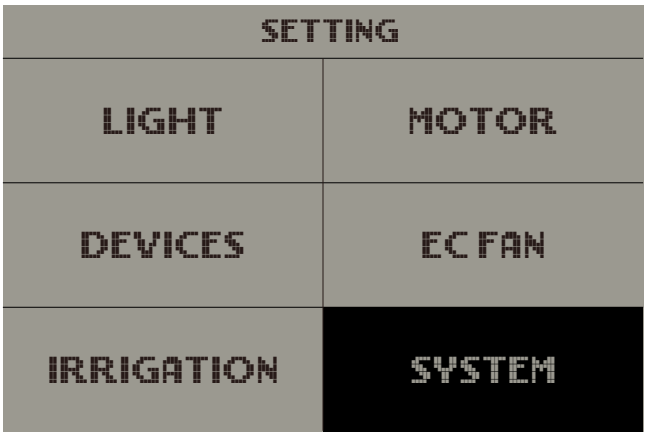
3. Duration (Time)

Determines the cycle duration during which the pump will run each time the setpoint condition is met within the defined time window. This cycle duration can be adjusted as needed to control the length of each activation.

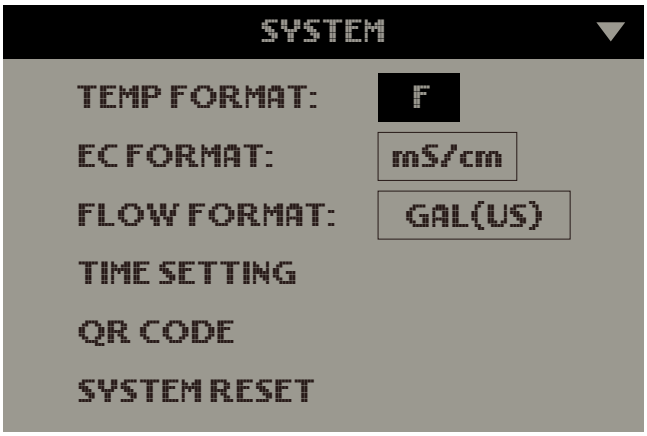
4. Setpoint

Specifies the target threshold that triggers pump activation. For example, a humidity or moisture setpoint of "80%" means the pump will activate when the sensor reading meets or exceeds this value.

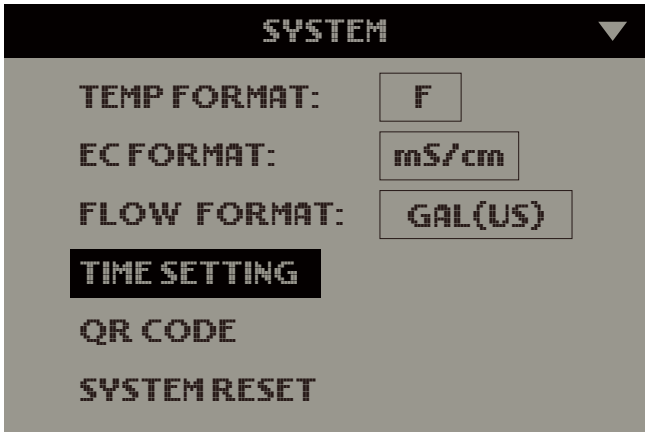
SYSTEM SETTING

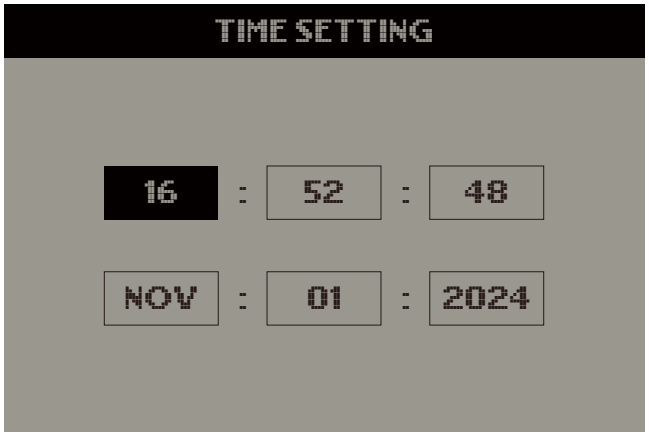


The “System” tab is where you will set your miscellaneous internal settings for your Green-X Controller. There are many settings within the System Settings.

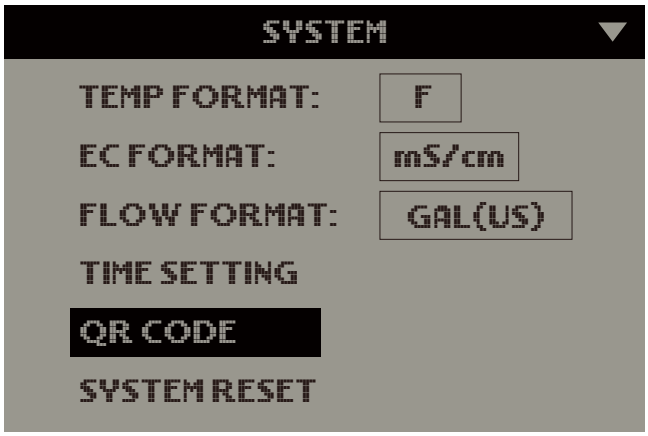


- **Unit of Measure:** Set what format you’d like your unit of measurements to be for temperature, EC.

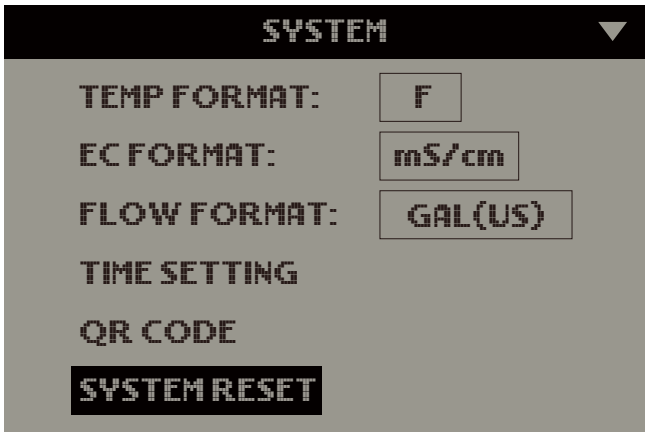




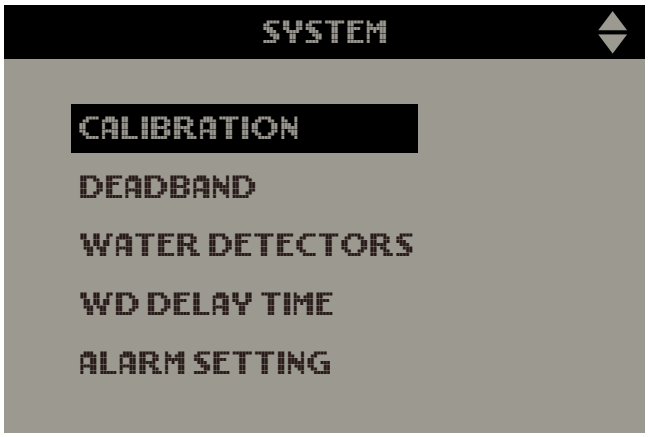
- **Time Setting:** You can set the time and the date for the controller.

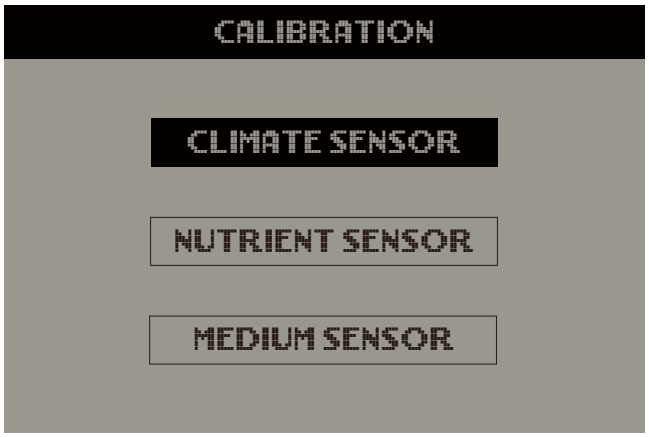


- **QR Code:** You can scan the QR code to pair your smart device (app) with the controller.

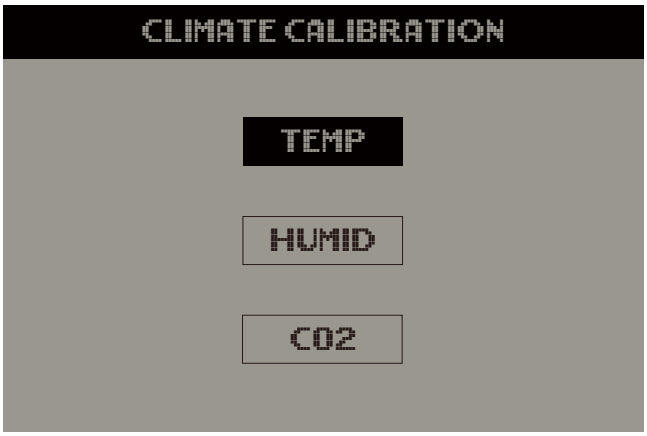


- **System Reset:** There are three options to choose from within the System Reset menu. Device Reset allows the user to reset ONLY the device module addressing. The Factory Reset can be used to resolve some major problems within the controller, or if the user just wants to return the unit to factory settings. You can also update the GCS-1 internal firmware by selecting Firmware update.



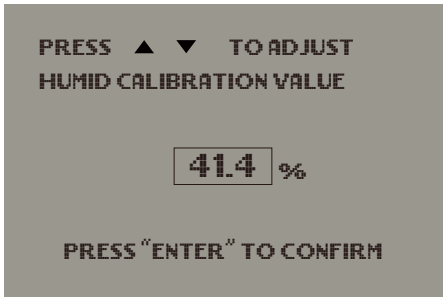


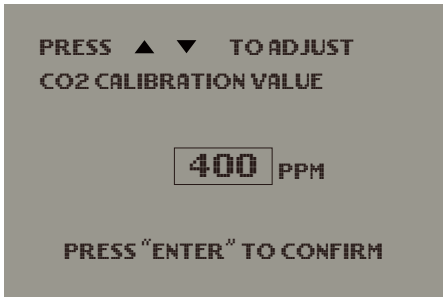
- **Calibration:** You can calibrate the various sensors you are using inside the grow tent by selecting the Calibration page. There you will find options to calibrate the environmental sensors and water monitoring sensors.



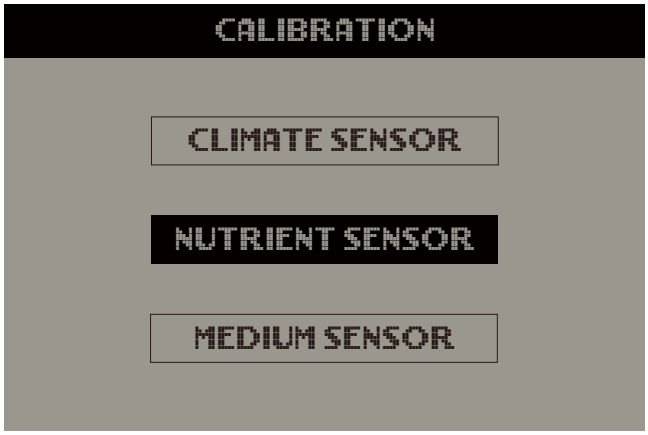
There are 3 categories can chooses for calibration:

- **TEMP**
- **HUMID**
- **CO2**



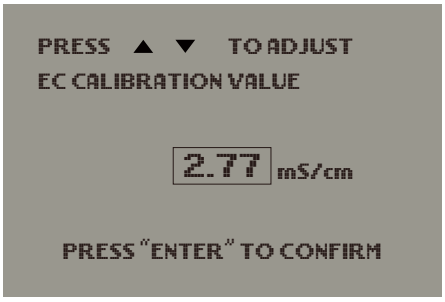


After selecting either **TEMP**, **HUMID** or **CO2**, users can adjust the calibration value by presse ▲ ▼ , the press ENTER to confirm.

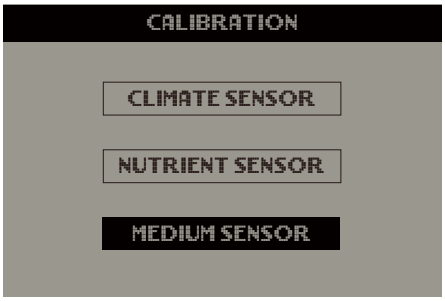


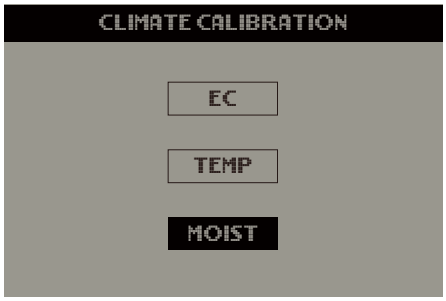
For Nutrient Calibration, press ENTER into the calibration page, there's 4 options to select:

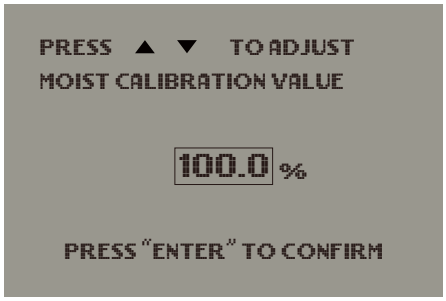
- **EC**
- **pH 7.00**
- **pH 4.00**
- **TEMP**



Users can adjust all EC,pH,pH,TEMP calibration value by press ▲ ▼ , the press ENTER to confirm.

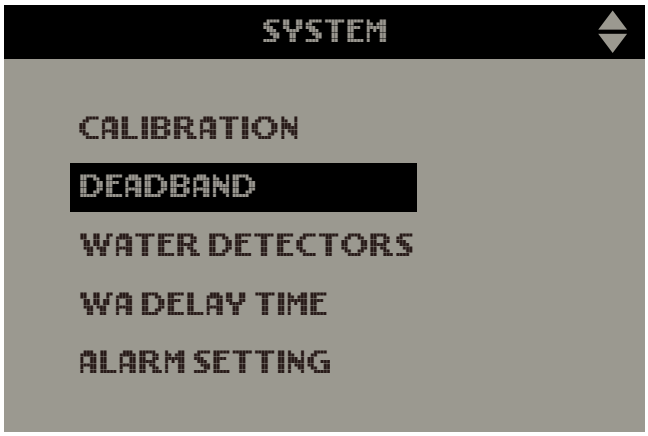


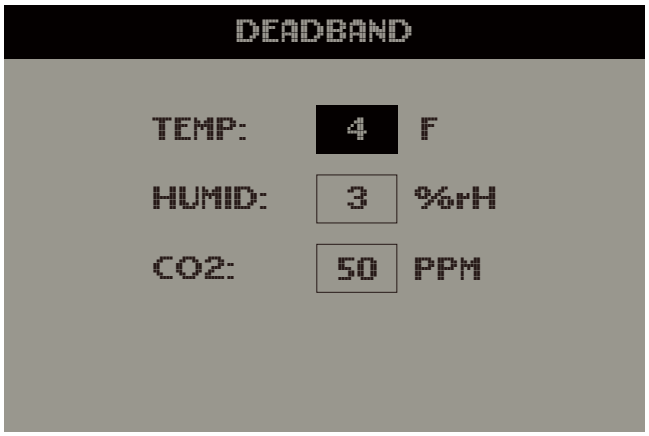




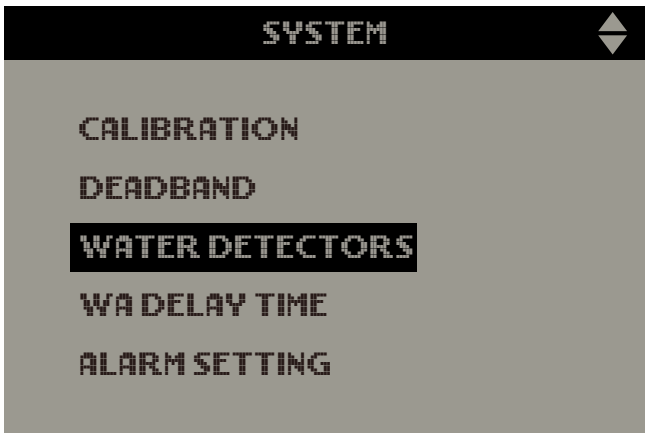
For medium Sensor Calibration, Users can adjust calibration value by press ▲ ▼ , the press ENTER to confirm.

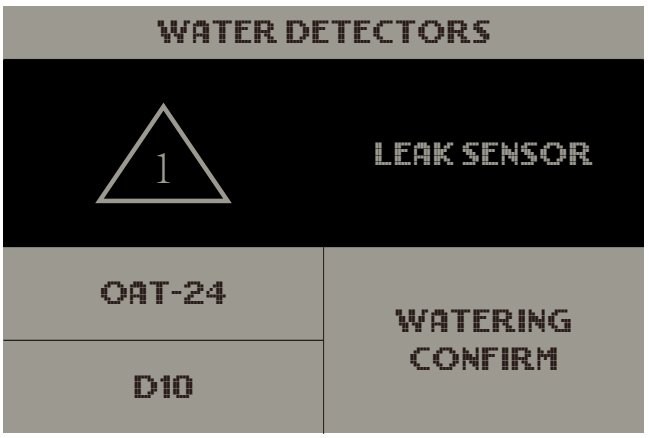
***Note:** The MBS-PAR sensor does not require calibration.



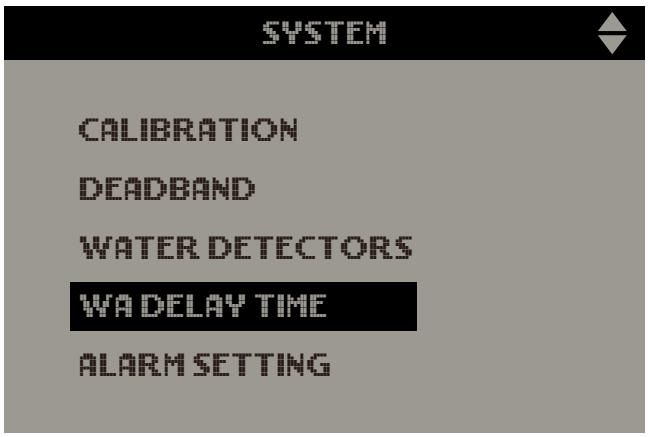


- **DeadBand:** You can set your deadband setpoints that will be used with your connected device modules. The deadband settings determine the temperature or humidity level that each module will turn on, and turn off again.

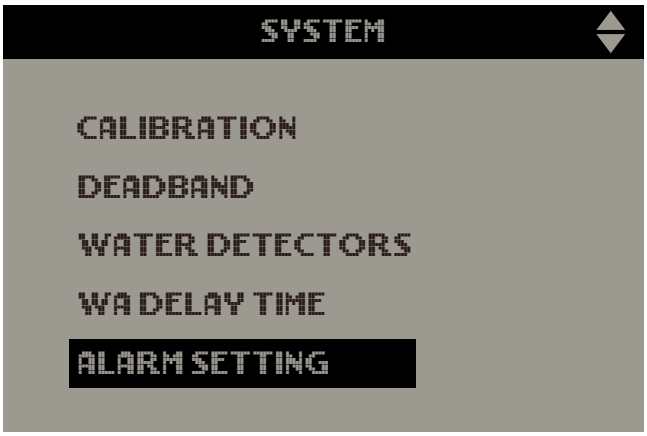




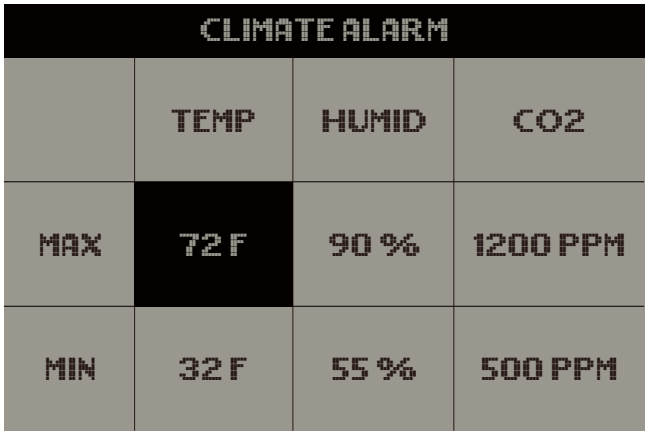
- **Water Detectors:** This page will show you the status of the optional Water Detectors.Here you can select one of two modes for the Water Detectors, Leak sensor or water confirmation sensor.



- **WD Delay Time:** Here you can set your Water detectors delay time.

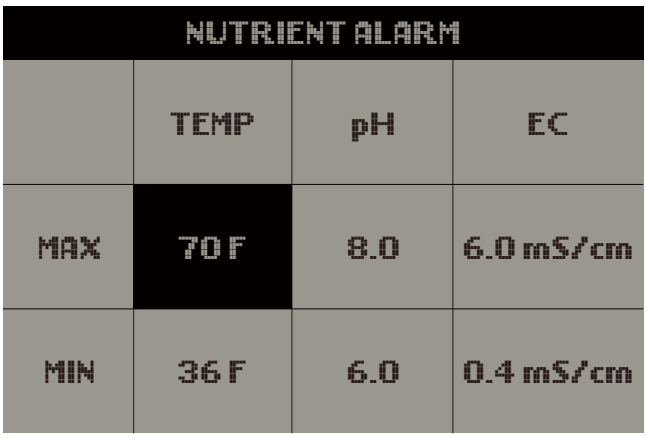


- **Alarm Settings:** On the Alarm setting page, you can set your high and low limit alarm settings for your climate, nutrients, and grow medium. When the values exceed or drop below the defined Maximum and Minimum setpoint in the alarm settings, you will immediately be notified on the controller and through TrolMaster's app, TM+ Pro.



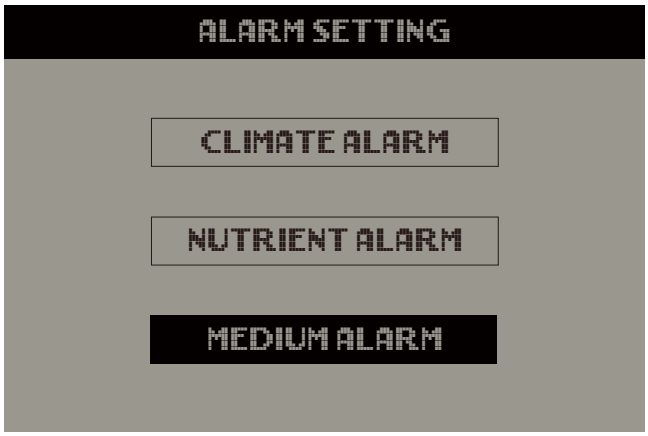
The Climate Alarm setting

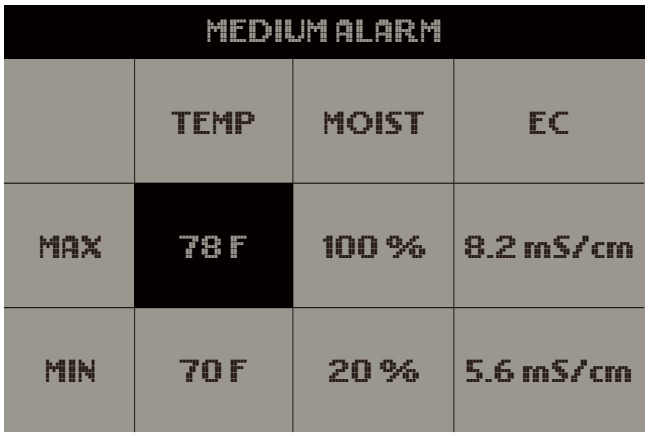
Press ▲ ◀ ▶ ▼ and ENTER to select the Temperature, Humid and CO2, press ENTER to confirm.



The Nutrient Alarm setting

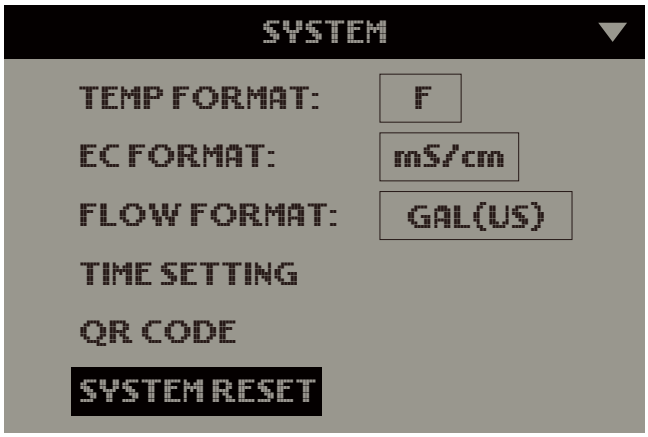
Press ▲ ◀ ▶ ▼ and ENTER to select the Temperature, pH and EC, press ENTER to confirm.





The Medium Alarm setting

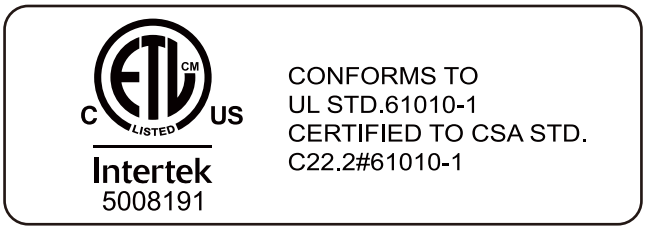
Press ▲ ◀ ▶ ▼ and ENTER to select the Temperature, Moist and EC, press ENTER to confirm.



- **Firmware Update:** When initially setting up your GCS-1 controller, ensure it is running the most recent version of the operating system/firmware to benefit from the latest bug fixes and features. Start by visiting our website to find the latest firmware version available. Save the firmware file to a MicroSD card with a capacity of 32 GB or less. Insert the MicroSD card into the GCS-1's designated slot. On the controller's interface, navigate to the System Settings page and select "System Reset" to check the current firmware version. To perform the update, choose "Firmware Update" and follow the on-screen instructions to select and apply the new firmware file.

SPECIFICATIONS

Input Voltage	100-240VAC, 50/60Hz
Output Voltage	12V⎓3A
Temperature Range	32-122°F (0-50°C)
Operating Humidity	≤90% RH (non-condensing)
LCD Resolution	256x160



IMPORTANT!

DO NOT allow the Green-X to be exposed to water or excessive heat. **Do not** open or attempt to open the Green-X to repair or disassemble the controller, as there are no user-serviceable parts inside. Opening the controller will void the warranty. If you'd like to clean the surface of the controller, wipe it with a damp cloth. The Green-X operates under natural ventilation conditions and is suitable to receive power from a conventional household outlet.

Thank you for choosing the GCS-1 Greenhouse Control System!
For further assistance, please contact our customer support or visit our website.

WARNING: DO NOT allow the GCS-1 to be exposed to water or excessive heat, DO NOT open or attempt to repair or disassemble the controller, as there are no user-serviceable parts inside. Opening the controller will void the warranty. If the surface of GCS-1 is dirty, wipe it with a dry towel. The GCS-1 operates under natural ventilation conditions.

AVERTISSEMENT: N'exposez PAS le régulateur de zone GCS-1 à de l'eau ou à une chaleur excessive. NE l'ouvrez PAS, NE tentez PAS de le réparer ou de le démonter, car il ne contient aucune pièce réparable par l'utilisateur. Louverture du régulateur entraine l'annulation de la garantie. Si la surface du GCS-1 est sale, essuyez-la à l'aide d'un chiffon sec. Le GCS-1 fonctionne sous des conditions de ventilation naturelle.

For any issues or concerns with our products, DO NOT return them to the store. Please contact our tech support department at **support@trolmaster.com** or call **877-420-9876**.

August 2025