AGROWTEK
Technology to Help You Grow

GrowControl™ GC-Pro/XL

Cultivation Control System

Hardware & Installation Manual

⚠ *WARNING*

Read these requirements, installation and operating instructions very carefully.
Failure to follow the instructions could result in a controller malfunction.
A malfunction could result in serious equipment damage, property damage, bodily injury or death.

REV11-13

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Important Information

NOTICE

Agrowtek Inc. recommends professional installation by a qualified, licensed electrician. Failure to install this equipment in accordance with these instructions may result in equipment damage and/or voiding the warranty.

⚠ ***DANGER***

Electrocution Hazard

Always disconnect all electrical power to the controller and the electrical systems it may be connected to before wiring, service or maintenance. Disconnecting the controller's power supply may not remove power from the controlled circuits.

⚠ ***WARNING***

This system operates only on 24Vdc.

NEVER CONNECT AC POWER TO THE CONTROLLER.

All power must be switched with Agrowtek's RX/CX/RD relays only.

NOTICE

Protect the controller and power supply with a properly functioning surge suppressor.

IMPORTANT

DRY LOCATION USE ONLY

This control system, climate sensor, hydroponics transmitter, and other sensors that are not specifically designed for immersion in water, are for use in dry locations only.
(0-95% RH non-condensing)

Install controller, sensors, relay boxes and other electrical and electronic equipment where it will not be exposed to water or splashing.
Controller may be installed in a water-resistant enclosure; see installation instructions.

NOTICE

Install all electrical equipment and wiring in accordance with national and local electric codes.

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GrowControl™ GC-Pro Platform

GrowControl™ GC-Pro is a modular control system designed to be fully customizable to nearly any growing control requirements. The core of the system is the GC-Pro controller itself; this is where all of the controls functions and operations take place. The GC-Pro obtains information about the environment from climate sensors, hydroponics sensors, switch sensors and more. The controller uses this information, and based on the settings you enter into the controls functions, will turn equipment on or off via the controller's outputs. The controller and its outputs are low-voltage (24Vdc) so they are connected to Agrowtek's RX/CX relays to switch AC mains power to equipment. *Outputs can also be wired directly to an electrical panel with RD series dry-contact interface or Agrowtek's single 24Vdc relays to switch equipment power.*

24Vdc power supply operates controller, sensors and relays.

~AC Mains Power

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Installation Instructions

Setup Overview

The GrowControl™ controller can be operated as a stand-alone system (when ordered with the AgrowTouch™ touch-screen) and can also be used with a PC and the GrowControl™ software. The controller comes standard with a RS-232 serial port, and optionally a Ethernet port for connection to a local area network.

Quick Setup Instructions

1. Mount the controller and sensors.
2. Connect sensors with supplied sensor cables.
3. Wire RX/CX/RD/MX relays to the controller's outputs.
4. Wire discrete input sensors to the controller's inputs as desired.
5. Plug the included power supply into the controller's power input jack.
6. Plug the power supply into the AC wall outlet (surge suppressor recommended.)
7. Setup the controller modes, controls functions, etc.
8. Place the controller into "Run" mode.

Mounting the Controller

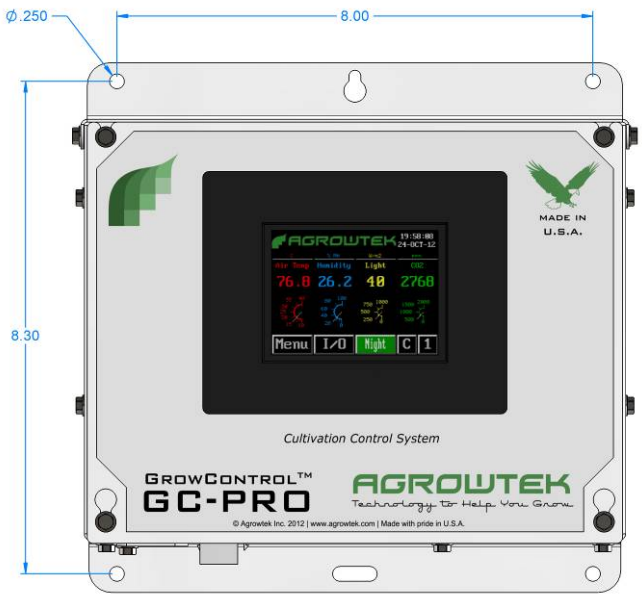
Your controller can be mounted to any wall using the holes in the mounting flanges. The controller must be mounted **upright** on a vertical wall or inside of an electrical enclosure to ensure maximum life. *Agrowtek recommends enclosing the controller in a NEMA type water-proof enclosure with the appropriate clearances around the controller as outlined below for harsh installations.*

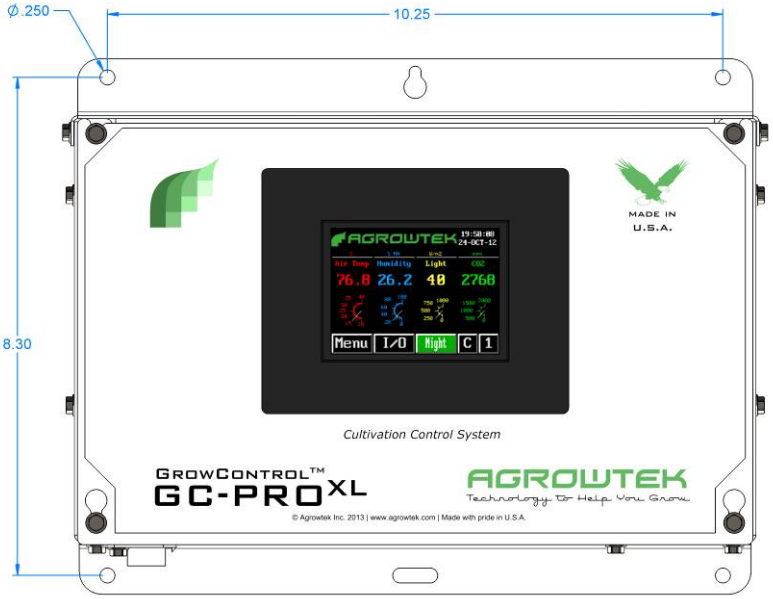
Allow adequate space for air convection through the cooling slots in the rear and on the bottom of the enclosure.

Minimum Clearances
Back: None; Mounted to flat surface
Front, Top & Sides: **2 Inches** [50mm]

Make sure the controller, sensors, and other controller accessories are not in a water contact location.

> ***NOTICE***
> FOR USE IN DRY LOCATIONS ONLY (0-80% RH NON-CONDENSING)
> If necessary, mount the controller in a rated enclosure with minimum clearances outlined above.





Sensors

> ⚠ ***IMPORTANT***
> Always disconnect the power before plugging or un-plugging a sensor cable.

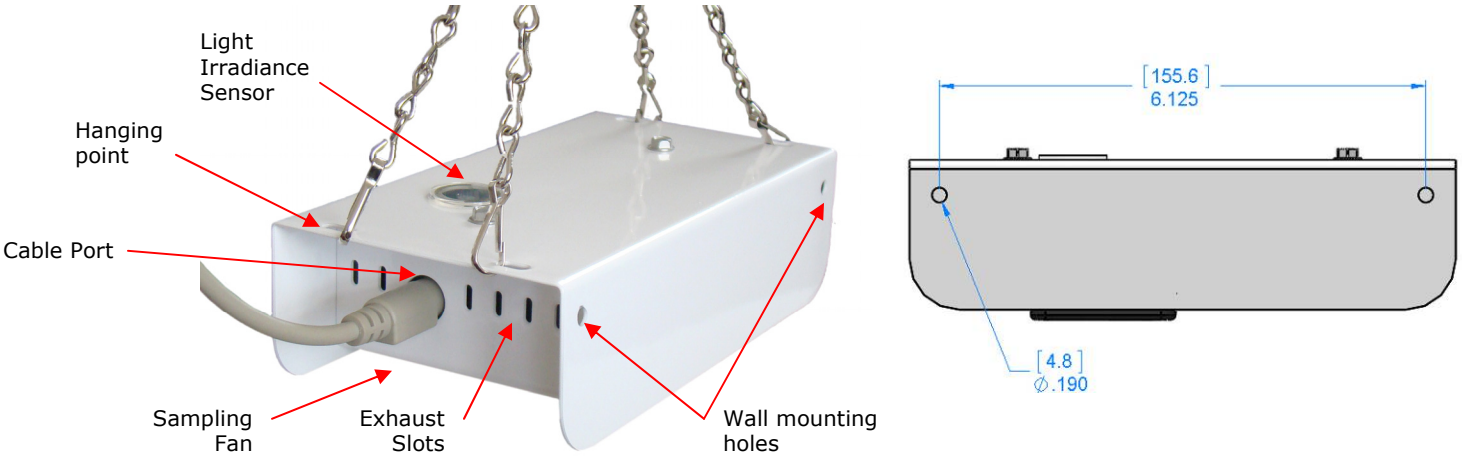
Sensor cables and extension cables are in-expensive and readily available in a variety of lengths from Agrowtek. Sensor cables can be extended using male-female extension cables (available from Agrowtek) up to 100ft.
Sensors can be operated up to 2,000 ft from the controller without signal loss or interference.

Climate Sensor

Locate the climate sensor(s) in a clean and dry location where it will sample non-stagnant air.
If you are utilizing the light sensor for sun sensing, ensure the light sensor has a clear path to the sun & sky.

The climate sensor is designed to be suspended and hanged horizontally with the light sensor facing up, and the fan facing down. The climate sensor can also be mounted to a wall with the wall-mounting holes.

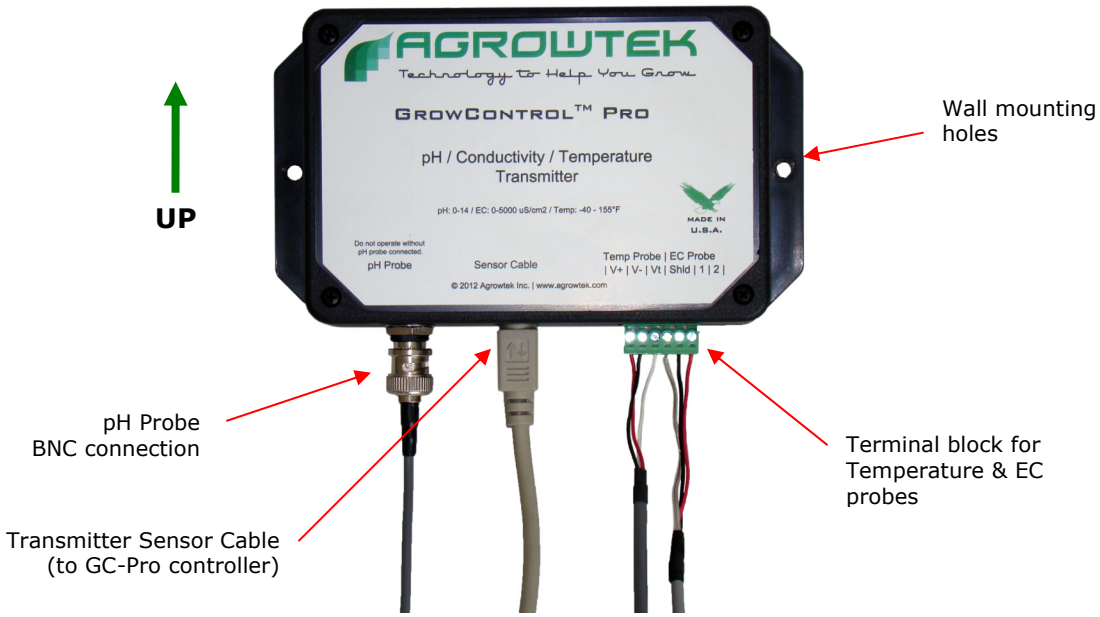
Climate Sensor



Hydro Sensor Transmitter

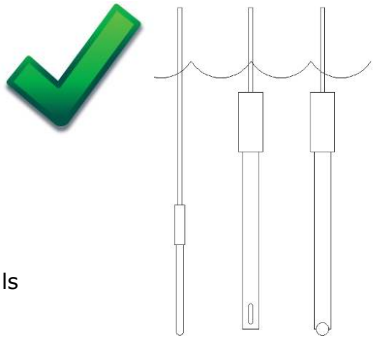
The hydro transmitter connects pH, conductivity and water temperature probes to the GC-Pro controller. The transmitter should be located near the hydroponics reservoir. Mount to a wall in a location where there is adequate air movement and where the transmitter will not be exposed to water.

Hydro Transmitter



Hydroponics Sensors

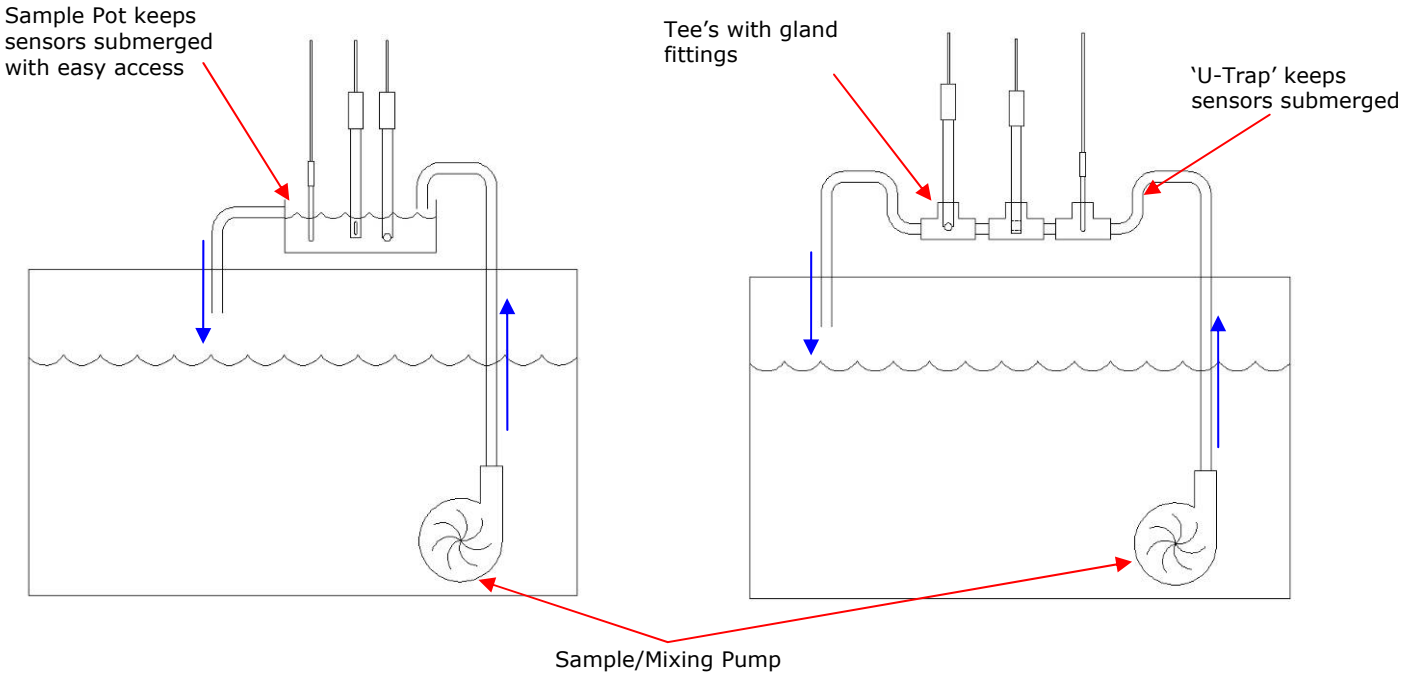
> ***NOTE***
> The pH, EC and Temperature probes can all be fully submersed in water.



The pH, EC and Temperature probes can all be installed directly into the hydroponics reservoir, a sample pot, or into a gland fitting for installation into a pipe tee. It is important that the location of the probes ensures they remain immersed at all times.

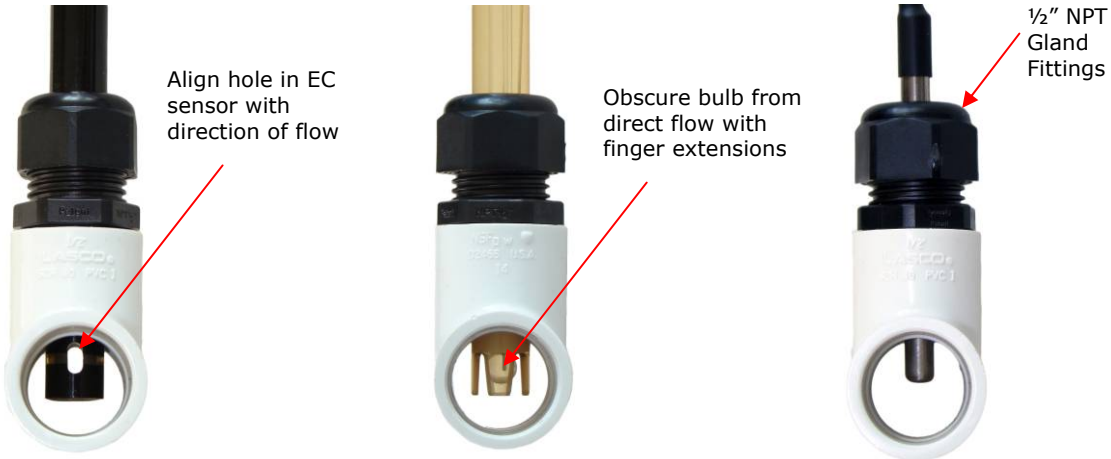
Placing the probes directly into the tank or a sample pot allows for easy access to the probes for calibration, while installation into a tee fitting will offer longer service intervals by keeping the probes cleaner due to the flow over the probe tips.

Gland fittings are available for water-tight connections into NPT pipe fittings.



> ***NOTE***
> A mixing pump if used should be operated continuously any time the dosing is enabled to ensure proper readings and dosing.
> **If heavy nutrients are used, larger pipe is recommended to prevent clogging the manifold.**

Gland Installation Recommendations
Note: It may be necessary to mark the alignment of the probes before inserting them into the glands.



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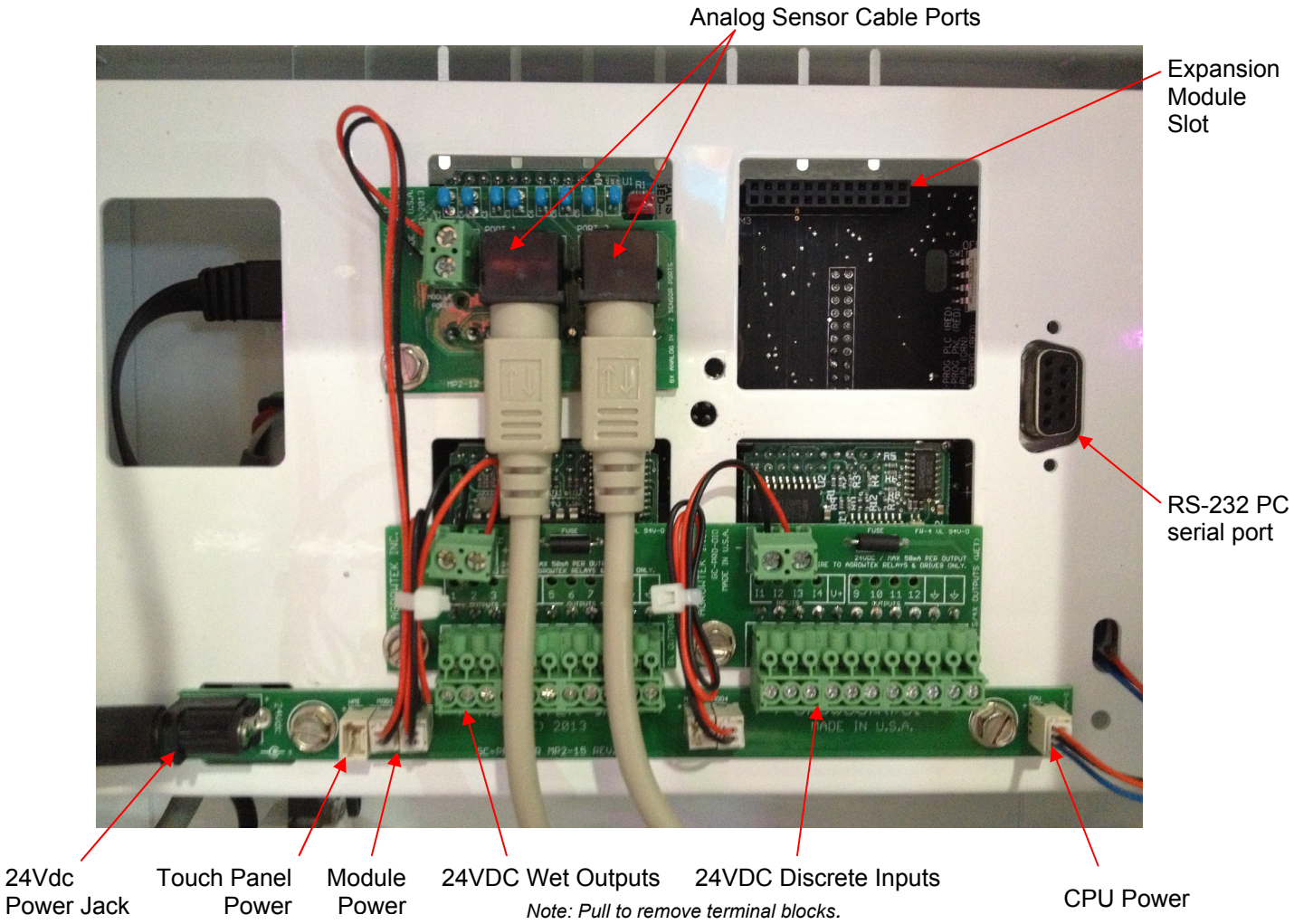
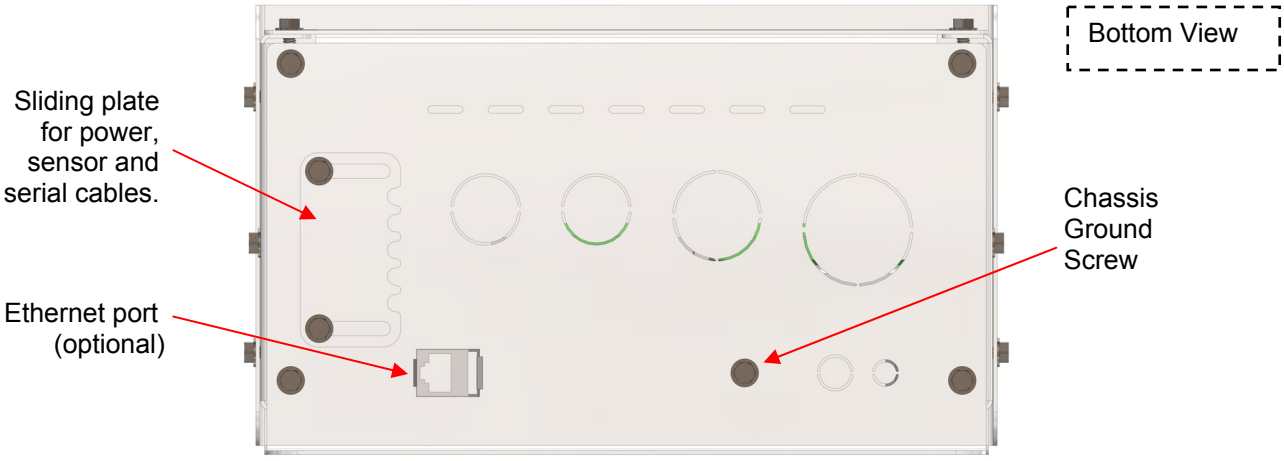
Sensor & Output Connections

GC-Pro

The basic GC-Pro is equipped with:

- 12 24Vdc outputs standard (expandable up to 20 total with XD expansion module.)
- Eight (4) discrete inputs are provided for switch sensors.
- Four (2) analog sensor ports (expandable up to 4 with XA module.)





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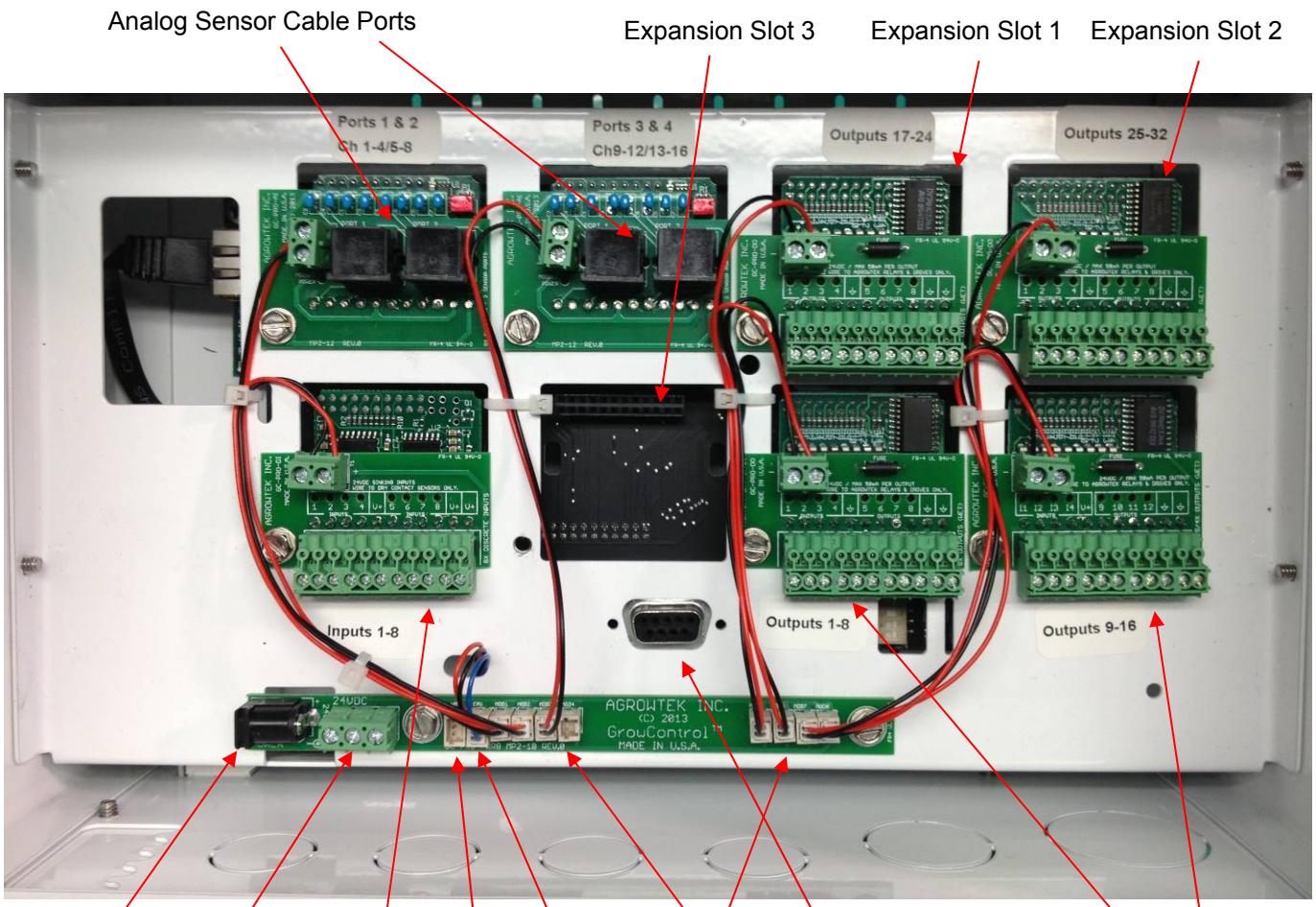
GC-ProXL

The basic GC-ProXL is equipped with:

- 16 24Vdc outputs standard (expandable up to 40 total with XD expansion modules.)
- Eight (8) discrete inputs are provided for switch sensors.
- Four (4) analog sensor ports (expandable up to 6 with XA module.)

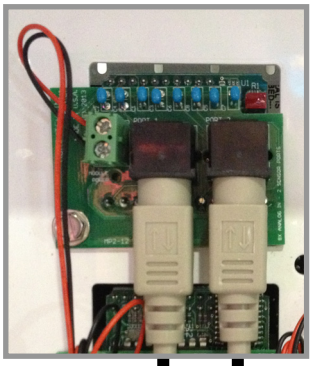


Note: Pull to remove terminal blocks.

**Note: GC-ProXL model has hard-wire terminals in addition to the standard DC power jack for optional hard-wired DC power supply.*

GC-Pro :: Typical Connection to Climate Sensor & Hydro Transmitter (Single Zone)

See Sensor Mapping section for details on sensor mapping.



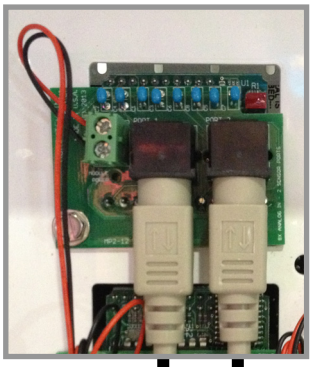
Module 1 (left most)
Ports 1 & 2

Climate Sensor Mapping:
Air Temp = 1
Humidity = 2
Light = 3
CO2 = 4 (optional)

Hydro Sensor Mapping:
pH = 5
EC = 6
Water Temp = 7

GC-Pro :: Typical Connection to Two Climate Sensors (Dual Zone)

See Sensor Mapping section for details on sensor mapping.



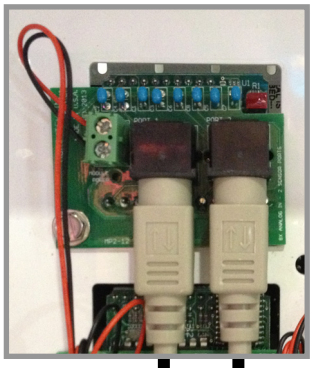
Climate Sensor #1 Mapping:
Air Temp = 1
Humidity = 2
Light = 3
CO2 = 4 (optional)

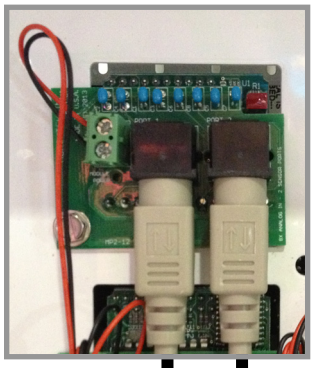
Climate Sensor #2 Mapping:
Air Temp = 5
Humidity = 6
Light = 7
CO2 = 8 (optional)

GC-Pro :: Typical Connection to Two Climate Sensors & Hydro Transmitters (Dual Zone)

See Sensor Mapping section for details on sensor mapping.

Module 1
Ports 1 & 2





Module 2
Ports 3 & 4

Climate Sensor #1 Mapping:
Air Temp = 1
Humidity = 2
Light = 3
CO2 = 4 *(optional)*

Climate Sensor #2 Mapping:
Air Temp = 9
Humidity = 10
Light = 11
CO2 = 12 *(optional)*

Hydro Sensor #1 Mapping:
pH = 5
EC = 6
Water Temp = 7

Hydro Sensor #2 Mapping:
pH = 13
EC = 14
Water Temp = 15

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Power Relays – Switching Power to Equipment

The GC-Pro is designed to have its 24Vdc "wet" outputs connected to Agrowtek's RX & CX series relay controlled outlets, or to Agrowtek's RD series dry-contact for interfacing with third party relays, contactors and electrical systems.

Relays take power from the controller's "wet" outputs and switch power on the relay's "dry contacts." Dry contacts can switch any voltage or power type such as low-voltage AC or DC for contactor coils or high-voltage 120-240VAC.

> ⚠ ***IMPORTANT***
> Disconnect all power from controller and relays before wiring or disconnecting outputs.
> Ensure all wiring connection are TIGHT and wiring is secure before connecting power.

> ⚠ ***WARNING***
> This system operates only on regulated 24vdc with 24vdc relays and components.
> **Do not connect AC power to the controller's inputs or outputs.**

Agrowtek's RX/CX Series Relays & Contactors

Agrowtek's RX and CX series relays are triggered by the low-voltage DC outputs then switch AC mains power to outlets where equipment is plugged in or terminal blocks where equipment is wired directly to.
See catalog for complete listing of relay and contactor models.

RX1

Single relay-controlled 120V outlet

RX6

Six individual relay-controlled 120V outlets

CX4

Four simultaneous controlled 120V outlets

Agrowtek's RD Series Dry-Contact Interface Relays

Agrowtek's RD series dry-contact interface provides a safe and reliable interface between the controller's wet output terminals and electrical power systems, relays and contactors. Simply connect the GrowControl's output terminals to the RD's coil input terminals to operate the relay coils.

The dry contacts can then be connected to any power source up to 24vdc and 120vac to power relay and contactor coils, light electrical loads and more. Each dry contact is rated for 5 amps.

RD series are available in the following models:
RD4 – 4 relays / dry contacts
RD6 – 6 relays / dry contacts
RD8 – 8 relays / dry contacts
RD12 – 12 relays / dry contacts

RD12

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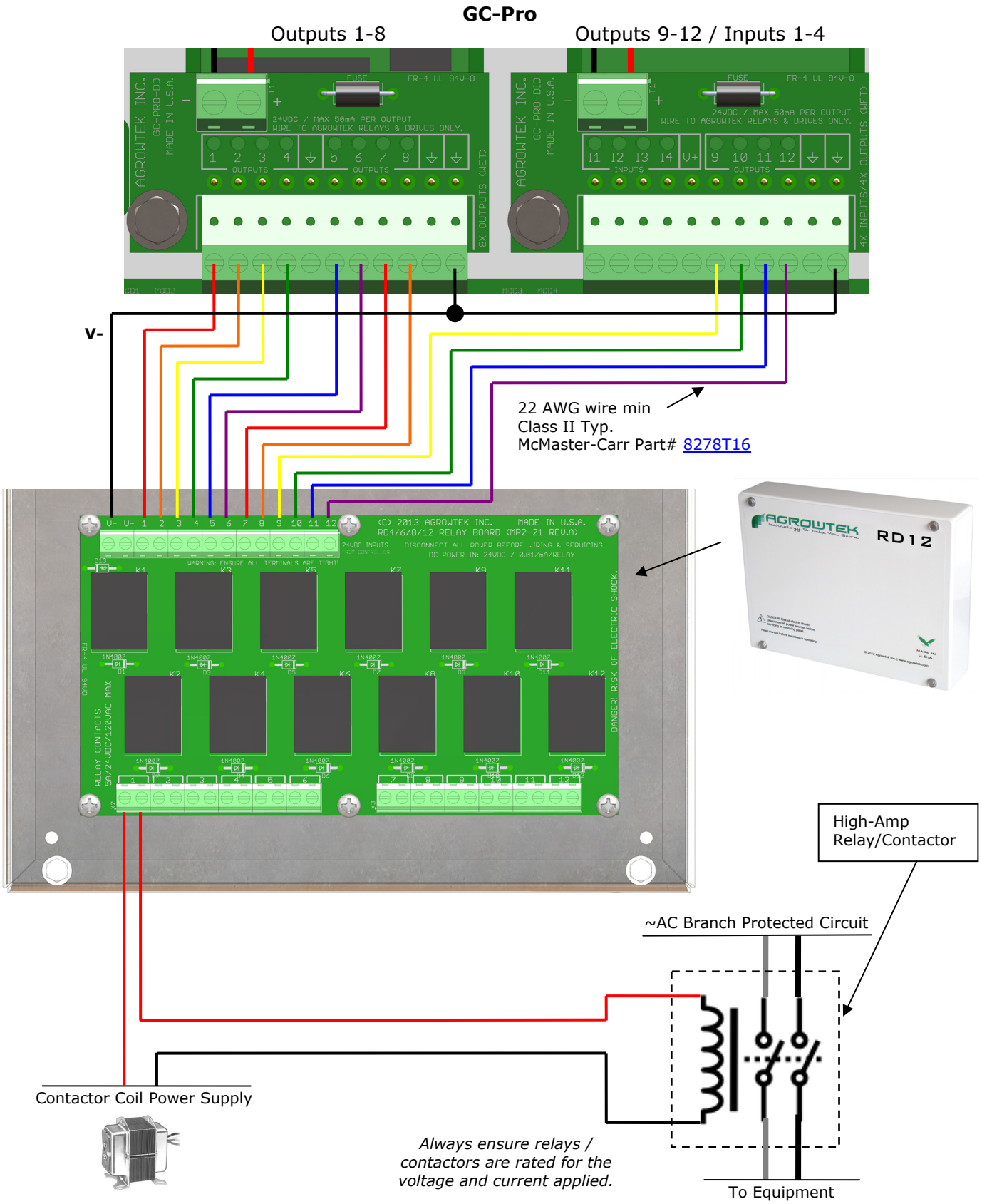
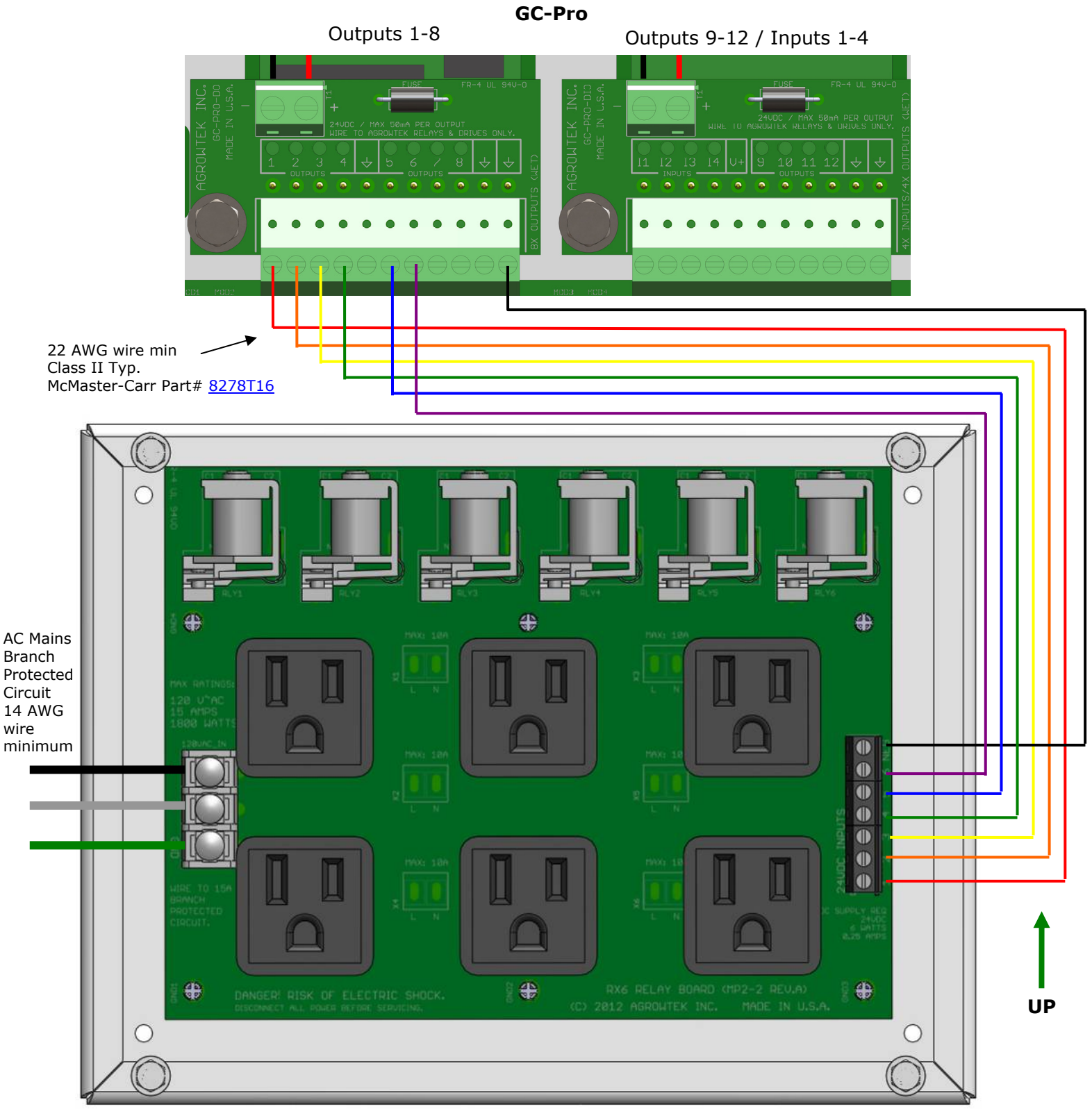
Wiring to Third-Party Relays, Contactors & Electrical Panels

Use Agrowtek's "RD series" dry contact relays to interface the GrowControl system to custom relays, contactors, etc. *Agrowtek does not recommend connecting third party relays directly to the controller's output terminals.*



RX6 Relay Box

The RX-6 relay box has six (6) individually controlled outlets. Each outlet has it's own relay to switch power from the power terminals to their respective outlet when activated by the GC-Pro's outputs. In the example below, the relays 1-6 are connected to the controller's outputs 1-6 (relays can be connected in any order desired.) In this example, when output #1 is activated on the controller, outlet #1 will turn on, etc.



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RX1 Relay Box

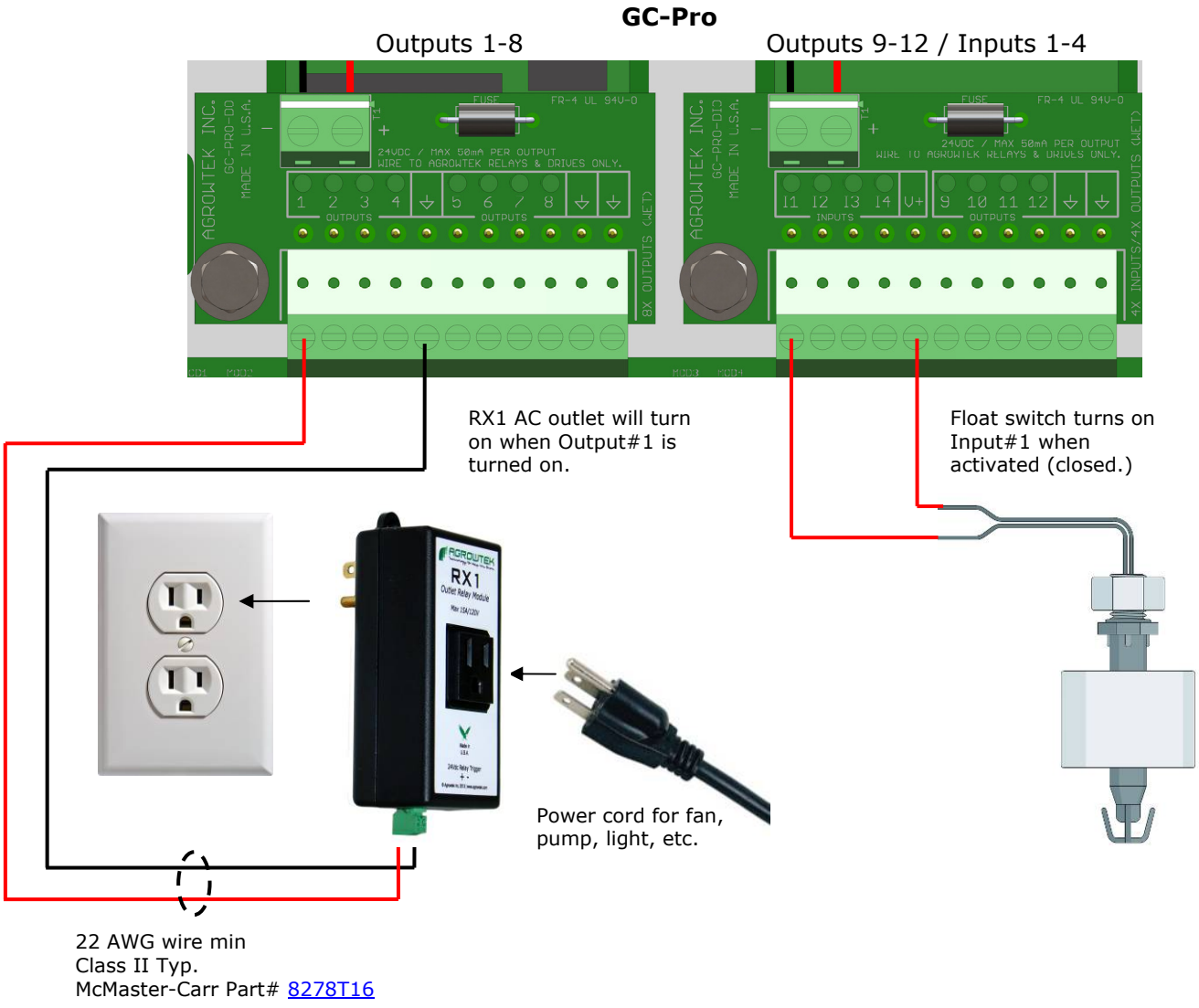
The RX-1 relay box is simply a single relay-controlled outlet; it operates in the same manner as the RX6 previously described but with only one relay/outlet combination. Simply plug the RX1 into a wall outlet and plug the equipment to control (such as a fan, pump, etc.) into the RX1's outlet.

Installation Instructions:

1. Connect the 24Vdc relay coil terminals on the RX1 to the desired output on the GrowControl controller.
2. Plug the equipment to be controlled into the RX1 such as a fan, light, pump, etc.
3. Plug the RX1 into a grounded outlet.

Discrete Inputs

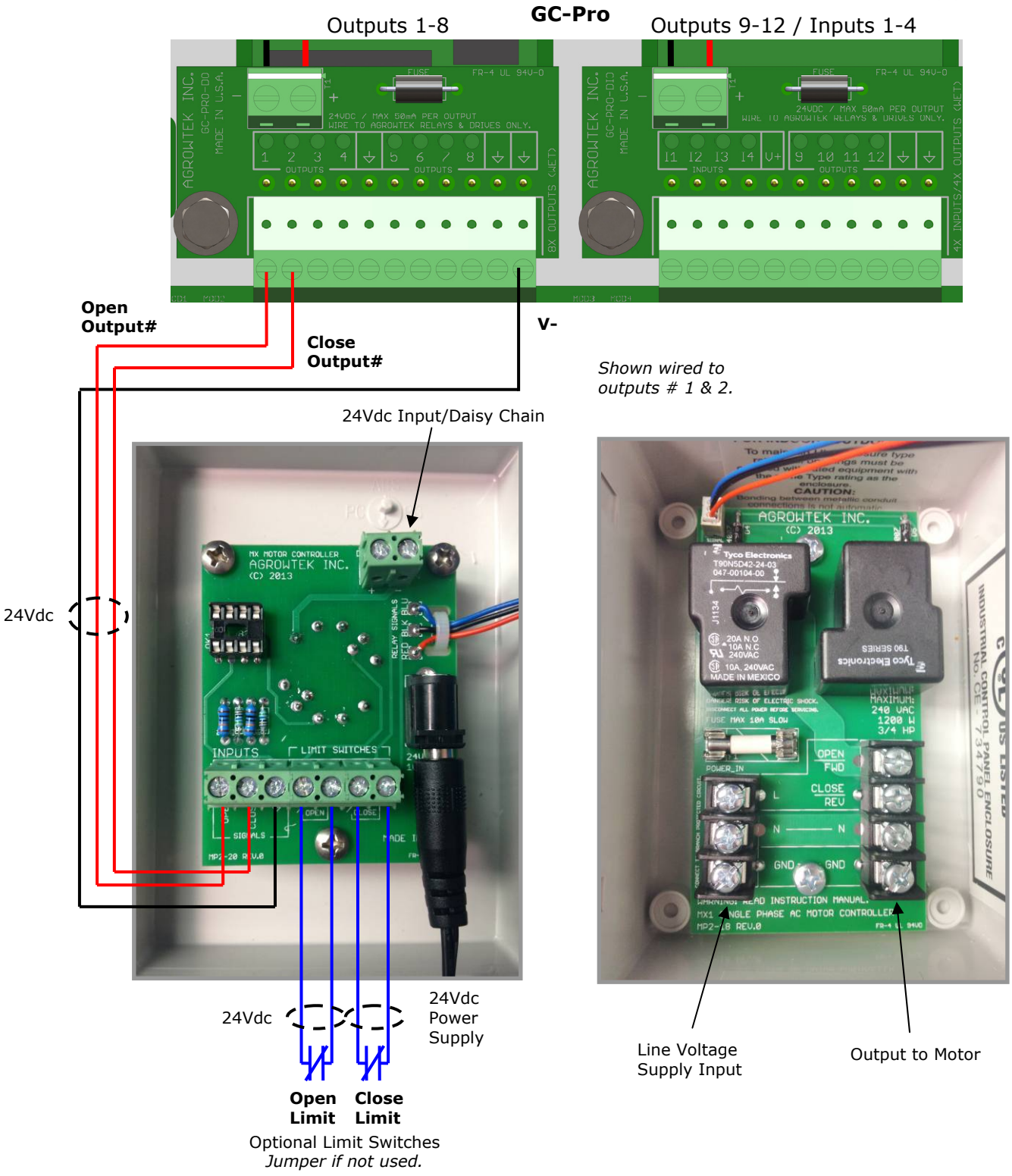
Discrete inputs are used to sense 'on' or 'off' conditions such as with a float switch, door switch, leak sensor, smoke detector, etc. Digital inputs are activated (true) when 24Vdc is supplied to them. The input terminal block has two V+ outputs to supply voltage to switch sensors; connect the return of the switch sensor to the input terminals as desired.



Motor Controllers

GC-Pro can be wired to Agrowtek's MX Motor Controllers, or to third-party motor controllers including the Link4 iDrive, Wadsworth VC1000/2000, etc. Motor controllers operate vent and curtain motors clockwise and counter-clockwise to open and close vent windows and shade curtains.

Agrowtek's MX1 motor controllers can be driven directly by the GC-Pro controller's wet outputs. Third party (non-Agrowtek) motor controllers require the use of 'dry contact' (RD) relays is required to interface the GC-Pro's wet contacts (24vdc) with the motor controller's 24vac inputs.



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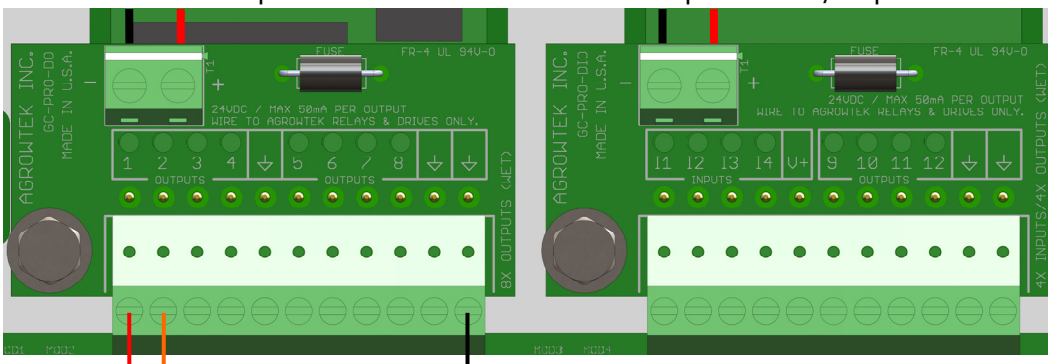
Link4 iDrive Wiring

> ⚠ ***WARNING***
> This system operates only on regulated 24vdc with 24vdc relays and components.
> Do not connect 24vac or any other AC power to the controller's inputs or outputs.

GC-Pro

Outputs 1-8

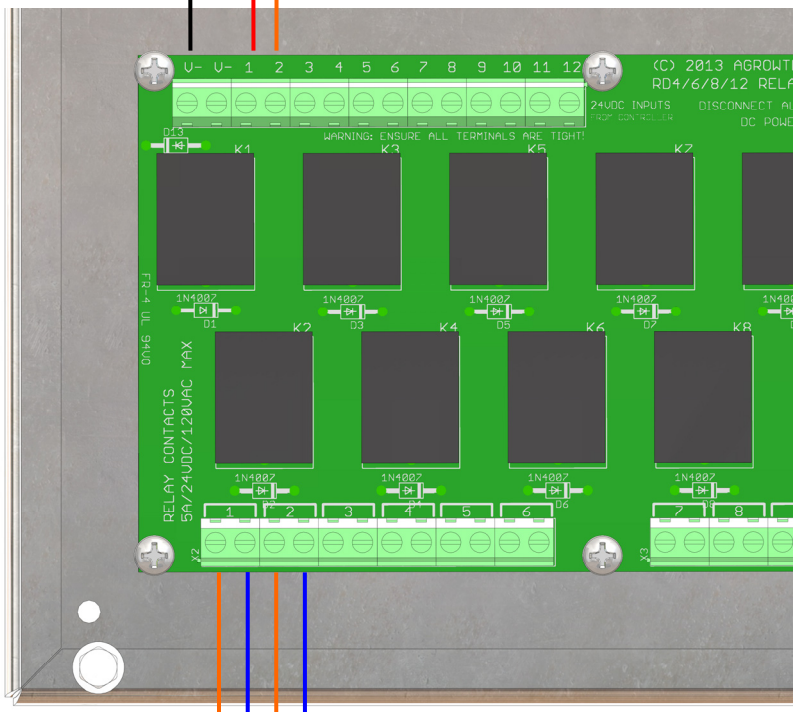
Outputs 9-12 / Inputs 1-4



Open Output#

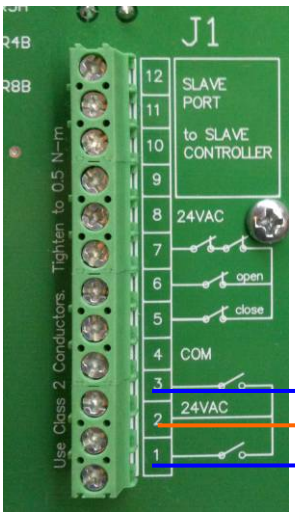
Close Output#

V-



"RD" Dry-Contact Pilot Relay

iDrive Connection Terminals



Terminal #1 (Close Signal on iDrive)

Terminal #2 (24Vac Common from iDrive)

Terminal #3 (Open Signal on iDrive)

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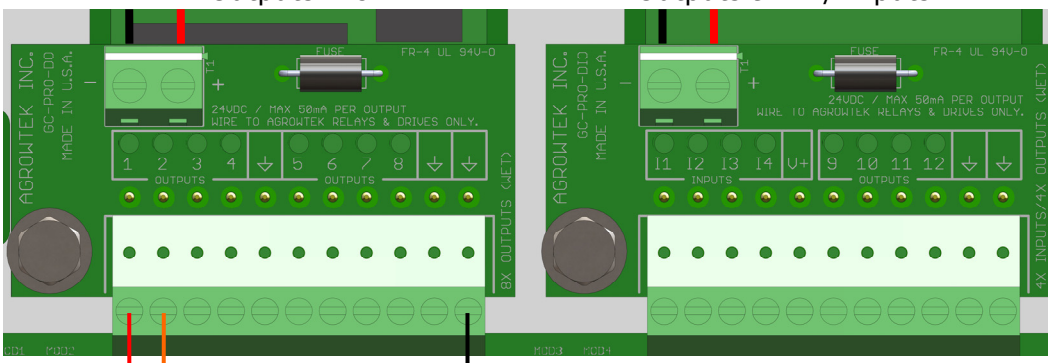
Wadsworth VC1000/2000 Wiring

> ⚠ ***WARNING***
> This system operates only on regulated 24vdc with 24vdc relays and components.
> Do not connect 24vac or any other AC power to the controller's inputs or outputs.

GC-Pro

Outputs 1-8

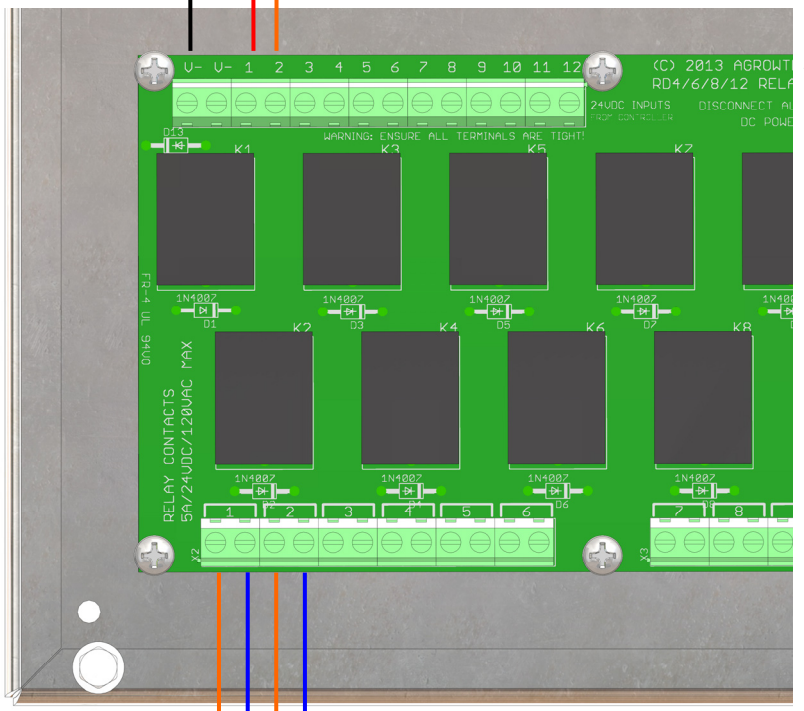
Outputs 9-12 / Inputs 1-4



Open Output#

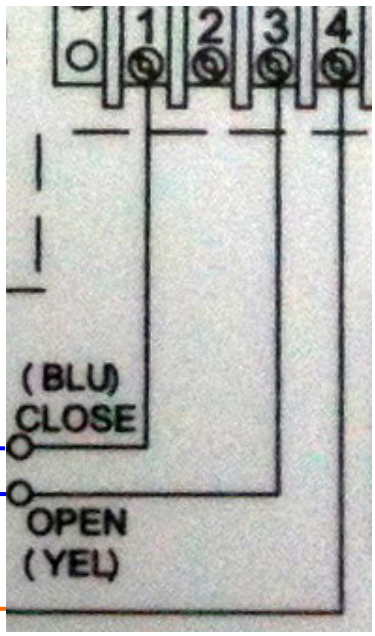
Close Output#

V-



"RD" Dry-Contact Pilot Relay

VC 1/2000 Control Terminals



Terminal #1 (Close Signal on VC)

Terminal #3 (Open Signal on VC)

Terminal #4 (Common from VC)

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Testing the Wiring

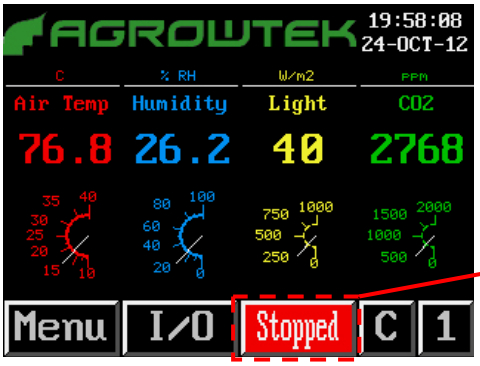
To test the wiring, the system must be powered up. The outputs can be activated on at a time to test the circuits or relays.

> ***NOTE***
> Before any outputs will activate, the system must be placed into "Run" mode.
> When the system is in "Run" mode, the outputs can be turned on. When in "Stop" mode, all outputs will be disabled.

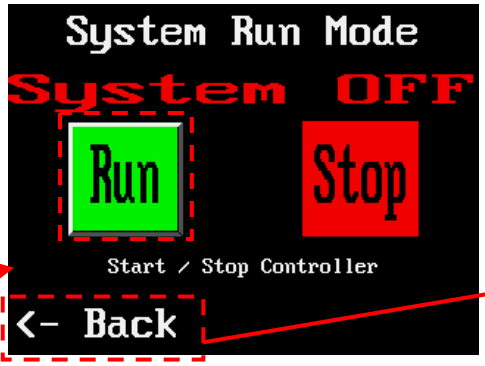
From the Panel

'Run' Mode

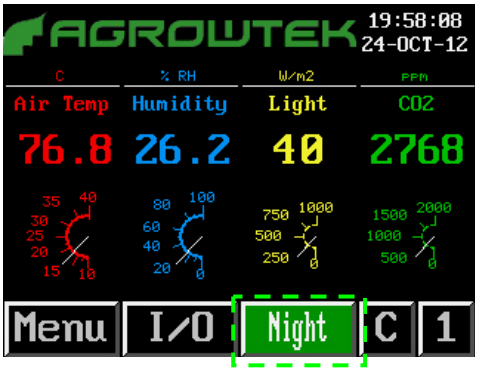
Once the system has initialized, the controller's home screen will be displayed.



1. Press "Stopped" button to enter system run mode screen.



2. Press "Run" to place the system into run mode or "Stop" to stop the controller. Press "Back" to return to the home screen.

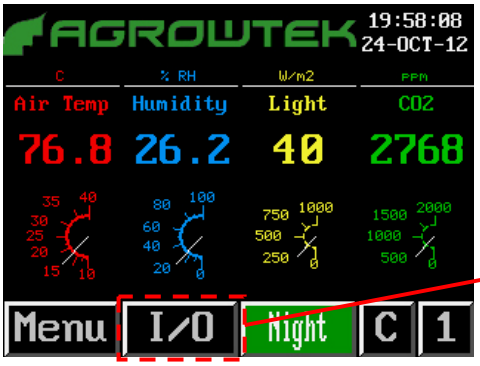


3. The system is now in "Run" mode. The run mode button has changed from red to green and shows "Run" with the day or night mode status.

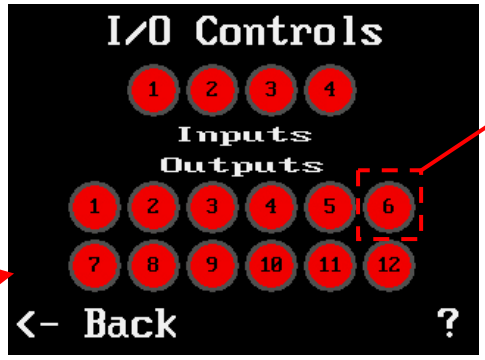
Manual Operation of Outputs

When the system is in "Run" mode, the outputs can be turned on.

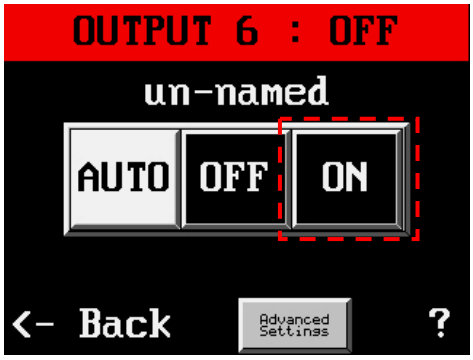
Open the I/O menu, select an output to operate, and then place it from "AUTO" into "ON" mode; this will activate power to the ouput.



1.Press the I/O button to access the Inputs and Outputs controls menu.



2. Press the output you want to manually control.



3. Press "ON" to turn the output on. The heading will turn from red to green and change from off to on. (Note: the output may take a few seconds to activate depending on the output sequence delay time that is set.)

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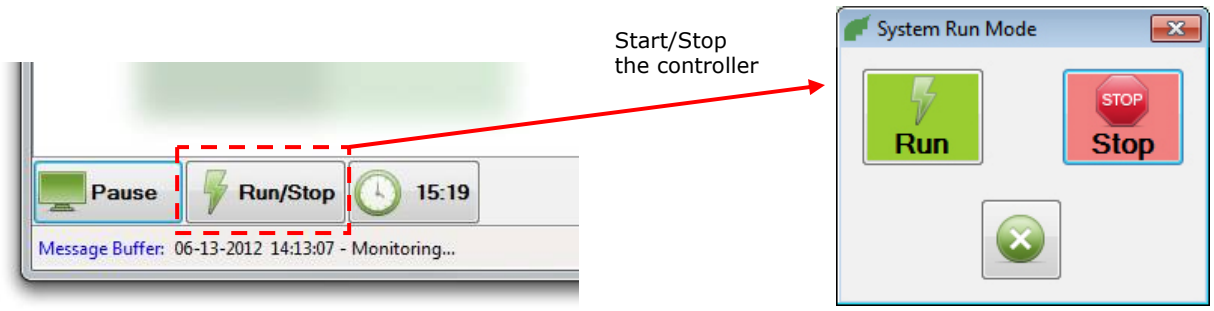
From the PC software

For information on installing and using the PC software, please see the GC-Pro Operation Manual.

The free PC software is included on a CD-ROM disc. You can download the latest version from our website: http://agrowtek.com/download/GrowControl.msi

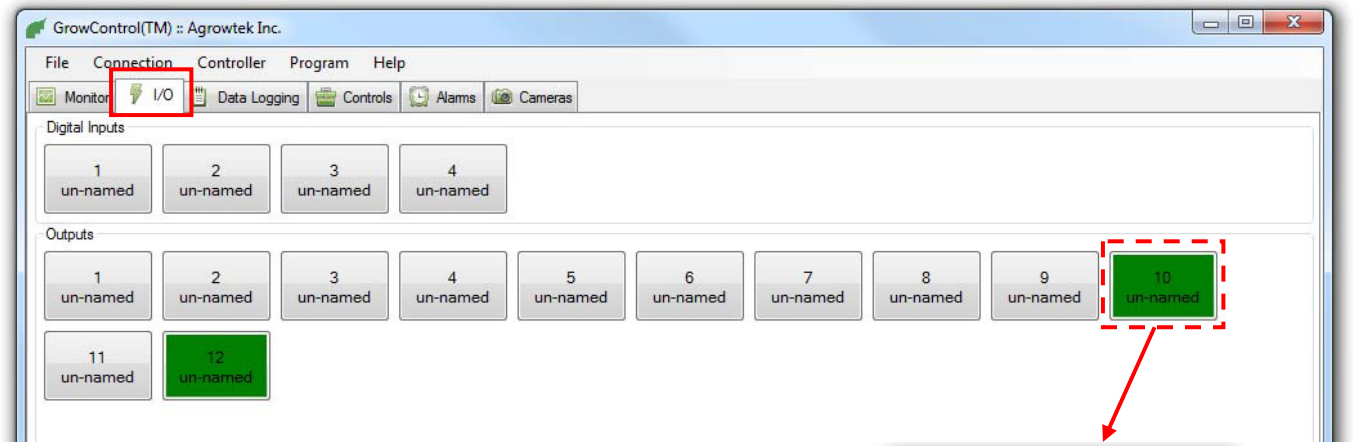
'Run' Mode

The controller can be started or stopped from the PC software by pressing the "Run/Stop" button in the lower left corner when connected to the controller.



Manual Operation of Outputs

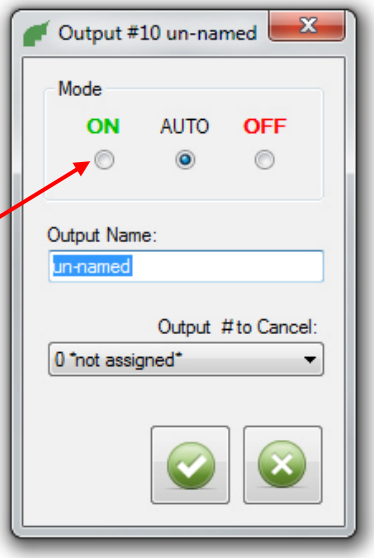
Once the system is in "Run" mode, the outputs can be turned on manually. Select the "I/O" tab and click an output to test. Set the output to "ON" and check that the relay, etc. functions properly then return to the "Auto" position.



When the software detects that the output is on, the output button turns green.

Note: The output may be delayed by the output sequence timer.

Select the "ON" radio button for the output you want to activate.



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Changing the IP address

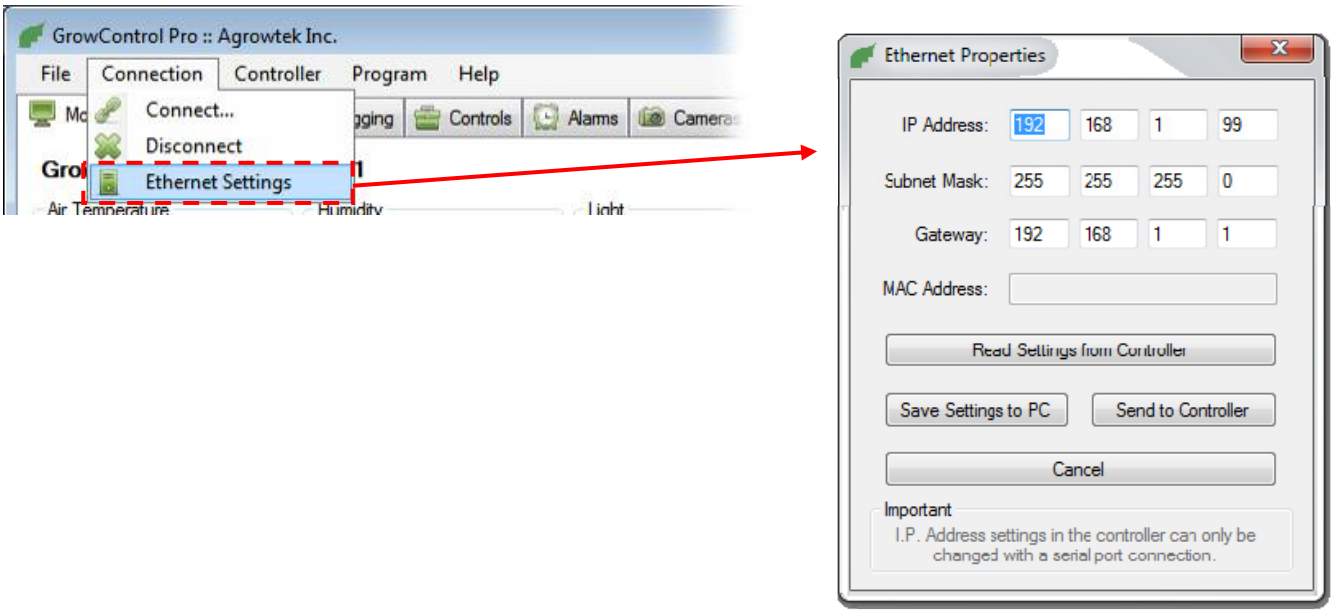
The default IP address as shipped is 192.168.1.99 and assumes a router gateway address of 192.168.1.1 and subnet mask of 255.255.255.0; these are defaults for many standard routers.

To determine the settings to use, log into your router and view the configuration for your network. You may also check the settings that a computer on the network is using to determine the gateway and subnet mask information.

> ***NOTE***
> Each controller must have it's own unique IP address which is not assigned to any other device on the network. The subnet mask and gateway must match that of the router that the controller is connected to.

Changing the Ethernet Settings

1. To change the IP address or Ethernet settings of the controller, you must first connect to the controller via the standard serial port.
2. Next, open the "Ethernet Settings" window from the "Connection" menu in the top menu strip. The current settings as loaded from the configuration file on the computer are shown (these may not match the settings in the controller.)
3. Update the values from the controller to determine what the settings are in the controller; press the "Read Settings from Controller" button. Modify the settings as required and then press "Send to Controller." This will send the settings to the controller and update the configuration file saved to the PC for future use.
4. Cycle the power to the controller (if necessary) to set the new Ethernet settings.



> ***NOTE***
> It is recommended to assign static IP addresses in the router so that the router does not automatically assign the controller's IP to another device.

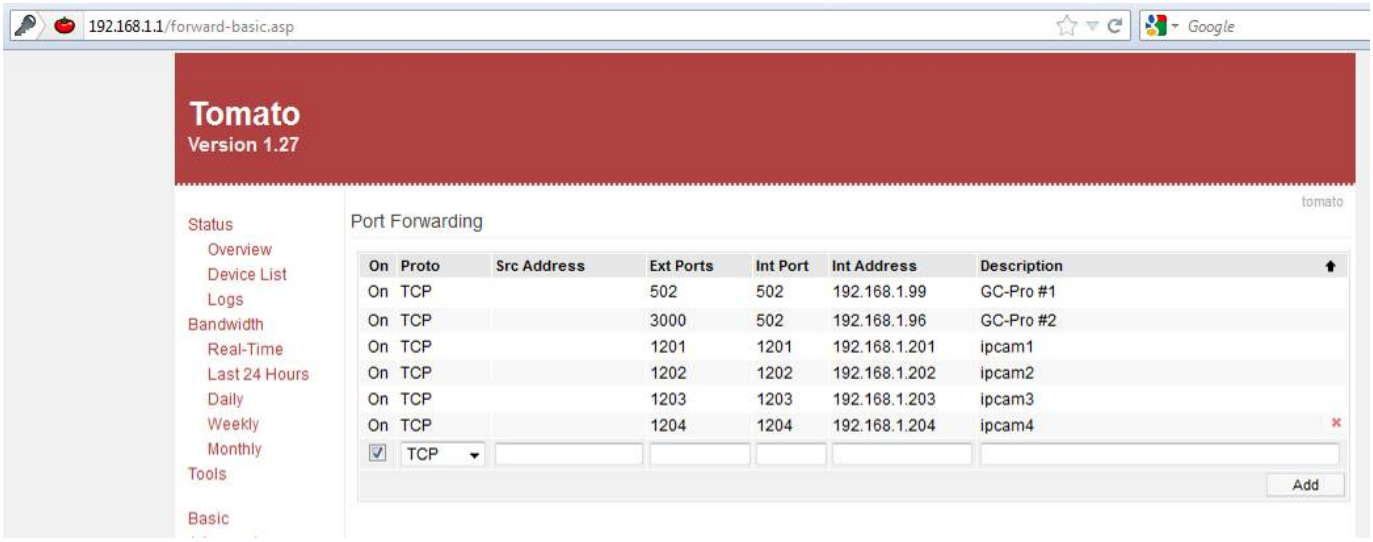
Port Forwarding

In order to access the controller from the internet, or outide of the local area network, the network router port forwarding must be configured. The GC-Pro controller requires TCP port 502 to be forwarded to the IP addresses of the controllers on the network.

The sample below shows two GC-Pro controllers on one network; "GC-Pro #1" with IP address 192.168.1.99 and "GC-Pro #2" with address 192.168.1.96.

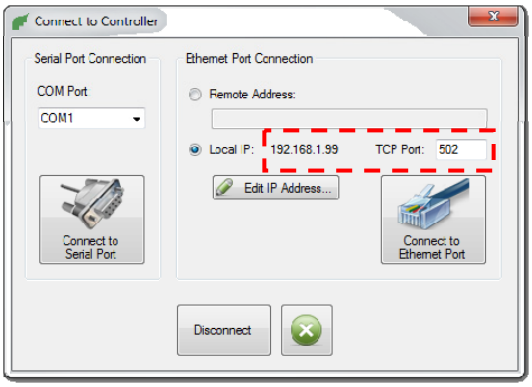
Both controllers have TCP port 502 forwarded to them from the router (internal port.)

The "External Port" can be left as 502 as shown with "GC-Pro #1," or can be modified to any port number desired as shown with "GC-Pro #2" set to external port 3000.

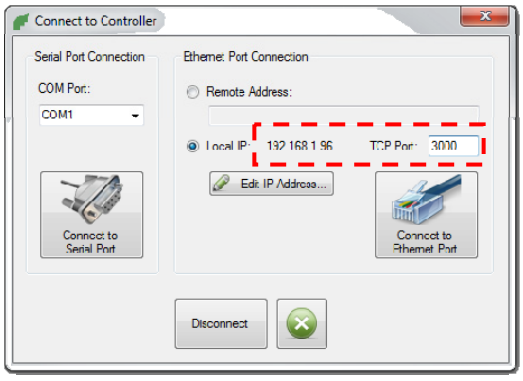


Settings to connect to each controller:

"GC-Pro #1" Ethernet Settings



"GC-Pro #2" Ethernet Settings



Dynamic DNS Forwarding

If your internet service is provided with a static IP address, your controller can be acessed by simply entering your IP address into the 'remote address' field. If you have a dynamic IP address (like most internet connections,) you will need to use a dynamic dns service to generate a web address for your dynamic IP; Agrowtek recommends **DynDNS.org**. Follow the instructions on the dynamic dns provider's website.

1. Select "Remote Address: and enter the URL web address from your DNS service into the 'remote address' field. For example: myaccount.dyndns.org ("myaccount" is your dyndns user name.)
2. Make sure the port number is correct; 502 is default. (Port forwarding must be properly setup in your router.)
3. Press "Connect to Ethernet Port" (in the Ethernet connection box.)

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Cleaning & Maintenance

The controller unit does **not** require maintenance.

The controller may require cleaning with a damp, soft cloth or sponge with a small amount of soap if necessary. Do not spray the controller with harsh cleaners or use cleaners which may be harmful to plastics. Do not use abrasive detergents, petrol, alcohol or solvents.

The sensor filters will require occasional cleaning or replacement.

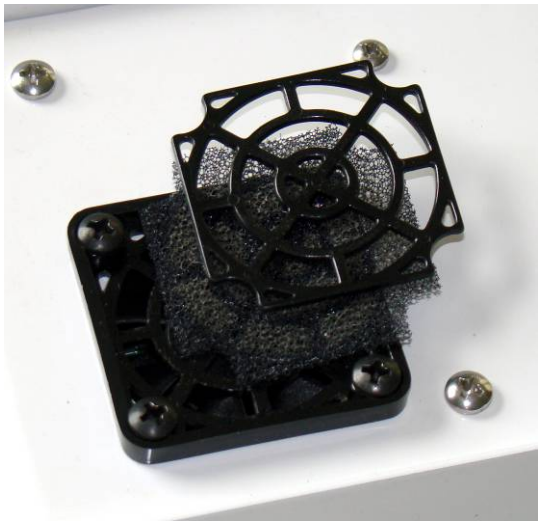
Cleaning the Climate Sensor Air Filter

The climate sensor contains a sampling fan which draws a continuous volume of air over the sensors to ensure fast, accurate readings. The fans are equipped with a 30ppi foam air filter to prevent debris particles from entering the sensor enclosure and damaging the sensors. When loaded, these filters require cleaning with mild soap and water.

DO NOT operate sensors without an air filter.
Heavy contamination due to poor filter maintenance will void your sensor's warranty.

To Clean the Foam Filter:

1. Stop the controller and disconnect the power source.
2. Disconnect the sensor cable from the controller.
3. Disconnect the sensor cable from the sensor.
4. Using a small screwdriver or similar device, carefully pry one corner of the filter grate and remove it.
   Use caution not to break the grate.
   It is not necessary to remove the four screws, simply pop out the plastic grate.
5. Remove the foam air filter and wash or replace.
   (*Wash with a mild detergent soap and water; dry thoroughly with towels before replacing.)*
6. Re-install the foam air filter and the grate.



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Warranty

Agrowtek Inc. warrants that all manufactured products are, to the best of its knowledge, free of defective material and workmanship and warrants the components for the following period from the date of purchase:

GrowControl™ GC-Pro, GC-ProXL Controllers: 3 Years

This warranty is extended to the original purchaser from the date of receipt.

This warranty does not cover damages from abuse, accidental breakage, or units that have been modified, altered, or installed in a manner other than that which is specified in the installation instructions.

Agrowtek Inc. must be contacted prior to return shipment for a return authorization. No returns will be accepted without a return authorization.

This warranty is applicable only to products that have been properly stored, installed, and maintained per the installation and operation manual and used for their intended purpose. This limited warranty does not cover products installed in or operated under unusual conditions or environments including, but not limited to, high humidity or high temperature conditions.

The products which have been claimed and comply with the aforementioned restrictions shall be replaced or repaired at the sole discretion of the Agrowtek Inc. at no charge.

This warranty is provided in lieu of all other warranty provisions, express or implied. It is including but not limited to any implied warranty of fitness or merchantability for a particular purpose and is limited to the Warranty Period.

In no event or circumstance shall Agrowtek Inc. be liable to any third party or the claimant for damages in excess of the price paid for the product, or for any loss of use, inconvenience, commercial loss, loss of time, lost profits or savings or any other incidental, consequential or special damages arising out of the use of, or inability to use, the product. This disclaimer is made to the fullest extent allowed by law or regulation and is specifically made to specify that the liability of Agrowtek Inc. under this limited warranty, or any claimed extension thereof, shall be to replace or repair the Product or refund the price paid for the Product.

This warranty provides the purchaser with specific rights but the claimant may have other rights which vary by jurisdiction.

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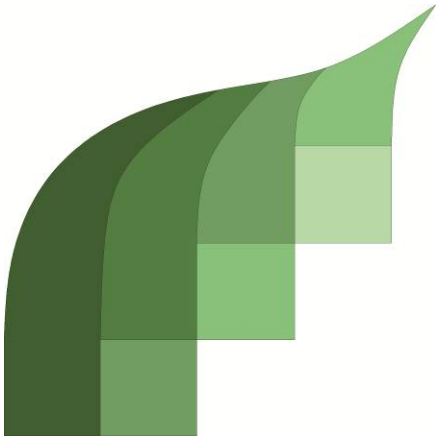

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