

### Digital Intelligent Dry-Contact Relay

#### Specifications

Input Power	4 W @ 24Vdc --- Class II / Limited Energy Power Supply
Max Switching Current	3.5A per point @ 120Vac ~ 3.5A per point @ 24Vdc ---
Max Switching Voltage	120 Vac ~ or 24Vdc ---
Independent Contacts	8x Normally Open
Status Indicators	LEDs
Enclosure Knock-Outs	(2) dia. 7/8"
Enclosure Rating	TYPE 12K NEMA
Minimum Cycle Time	1 second
Interface	GrowNET™, MODBUS
Relay Ratings	100,000 cycles
Relay Cycle Counters	Up to 4 billion cycles per relay



Electrical Process Control Equipment  
File No.: E516807



#### Contents

<b>Introduction</b>	<b>2</b>	<b>Connection to Intelligent Sensor</b>	<b>13</b>
How "Dry-Contact" Relays Work	2	Cross-Over Cable	13
What Relays Control	2	<b>Connection to USB AgrowLINK</b>	<b>13</b>
<b>Manual Toggle Switches</b>	<b>3</b>	<b>Connection to MODBUS RTU</b>	<b>14</b>
<b>Warnings &amp; Notices</b>	<b>4</b>	Serial Speed & Format	14
<b>Installation Instructions</b>	<b>5</b>	Supported Commands	15
Installing the RD8i Relay	5	Register Types	15
DC Power Connections	6	MODBUS Coil Registers	15
Dry Contact Terminals	7	MODBUS Holding Registers	15
Example Connections, General	8	<b>Technical Information</b>	<b>16</b>
Example Connections, HVAC	9	Troubleshooting	16
Example Connections, Quest Dehumidifiers	10	Maintenance & Service	17
Example Connections, Anden Dehumidifiers	11	Storage and Disposal	17
<b>Connection to GrowControl™ GCX</b>	<b>12</b>	<b>Warranty</b>	<b>17</b>
GrowNET™ Hubs	12		

**KEEP THESE INSTRUCTIONS**

REV 11/24

This product is intended for commercial use only.

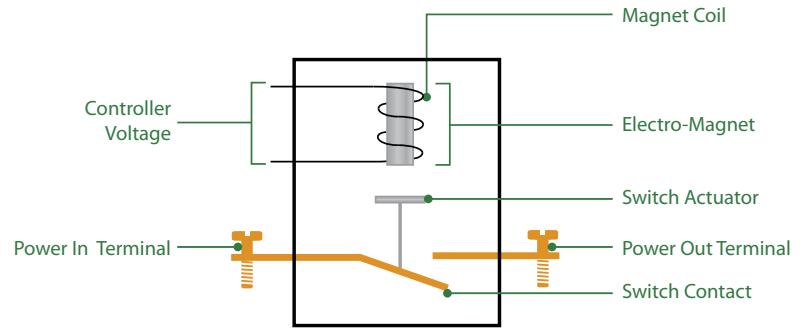
# Introduction

GrowControl RD series dry-contact relays interface Agrowtek’s intelligent controllers to devices in your growing environment to control lighting, ventilation, irrigation, HVAC and much more. Dry-contacts allow many different types of equipment to be controlled.

## How “Dry-Contact” Relays Work

A relay consists of a mechanical switch and an electro-magnet to turn-on (close) a switch contact. A spring opens the switch when the electromagnet is no longer powered.

The microprocessor controls power to the magnet coil to open or close the switch contact as required by the controller program.



Dry-contact relays can be thought of like a wall-switch:

- Each relay “contact” has a pair of screw terminals just like a wall-switch does.
- A wall-switch (or relay contact) does not supply power, it only allows it through.
- Each switch is independent and can operate different circuits or voltages.



A dry-contact relay is exactly the same as a wall switch, however, instead of operating the switch manually with your finger, an electromagnet operates the switch.



## What Relays Control

Many types of devices can be operated with a dry-contact switch. A dry-contact interface allows Agrowtek controls to integrate with building controls, high amperage loads and other custom devices such as:



High-Amp  
Relays & Contactors



HVAC Control



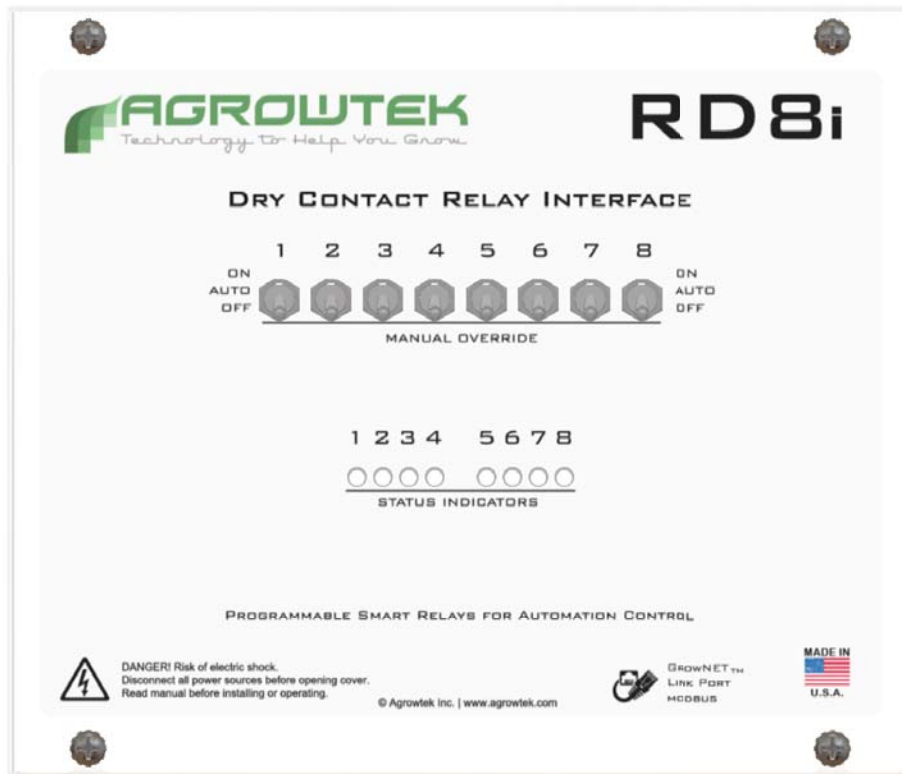
Irrigation / Gas  
Solenoids



120V Receptacles  
& Equipment

# Manual Toggle Switches

Manual toggle switches are an option available on RD8i relay interfaces. Toggle switches allow a relay to be manually fired on, or forced off, in addition to being automatically operated by a control system. The toggle switches will operate the RD8i's contacts as long as power is available to operate the coils even if the relay's processor has been damaged or communication has been broken to the master controller.



To force an output on, move the toggle UP and the corresponding indicator will illuminate.

To force an output off, move the toggle DOWN and the corresponding indicator will extinguish.

To allow automatic operation of an output, move the toggle to the CENTER position.

*Units with serial numbers 2111xxxx are field upgraded to manual toggles.*

# Warnings & Notices

This is a precision electronic instrument which requires proper installation and care to maintain reliability.

## **READ & UNDERSTAND ENTIRE MANUAL PRIOR TO INSTALLATION OR OPERATION.**

Failure to read, understand and comply with warnings and installation requirements may result in property damage, personal injury or death.

### **DANGER Electrocutation Hazard**

Disconnect all power sources before servicing or wiring. For continued protection against electric shock ensure the enclosure is properly grounded at the marked chassis ground terminal. Install all electrical equipment and wiring in accordance with national and local electric codes. For indoor use in dry locations only (0-75% RH non-condensing.) Replace serviceable parts only with those recommended by Agrowtek Inc.

### **DANGER Risque d'électrocution**

Débranchez toutes les sources d'alimentation avant l'entretien ou le câblage. Pour une protection continue contre les chocs électriques assurer l'enceinte est correctement reliée à la borne de terre du châssis marquée. Installez tous les équipements électriques et le câblage conformément aux codes électriques nationaux et locaux. Pour une utilisation en intérieur dans des endroits secs seulement (0-80% RH sans condensation.) Remplacer les pièces réparable seulement avec ceux recommandés par Agrowtek Inc.

## **THIS PRODUCT IS NOT INTENDED FOR LIFE SAFETY APPLICATIONS.**

Do not install in hazardous locations or rely solely on this equipment for control over life safety.

## **INSTALL IN ACCORDANCE with all national and local plumbing and electrical codes.**

Information in this manual is intended for use by individuals possessing adequate backgrounds of electrical and mechanical experience and who comply with all federal, state, and local laws, rules, orders, or regulations related to the installation, service, or repair of electrical, HVAC and related equipment. Any attempt to install, service, or repair equipment may result in personal injury and/or property damage. The manufacturer or seller cannot be responsible for the interpretation of the information contained herein, nor can it assume any liability in connection with its use.

## **DANGER: ELECTROCUTION HAZARD**

Disconnect power before maintenance or service on the system or system components to prevent equipment damage or electrical shock. Use caution when servicing plumbing to drain the system off away from electrical components and connections. Connect the system and components to GFCI fault protected energy sources to reduce risk of electric shock.

## **INDOOR LOCATIONS ONLY**

This system is designed for indoor mounting only and must be protected from weather and direct sunlight.

## **PREVENT OVER HEATING**

Keep air space around the system cool and ventilated to prevent overheating of system components.

## **WARNING**

This product may contain chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

# Installation Instructions

It is recommended to install relays and other switching equipment outside of a grow room in the hallway when ever possible for improved access to the equipment without entering the growing space. Locating equipment in lower humidity areas will also extend the life of the equipment.

## General Notes:

1. Install with the connections facing down to reduce the risk of water permeating the enclosures.
2. For indoor installation only. Enclosures are not water-proof.
3. Do not place sensor in direct sunlight.

**⚠️ Disconnect power from all devices before connecting or disconnecting cables to prevent damage to components.**

## Installing the RD8i Relay

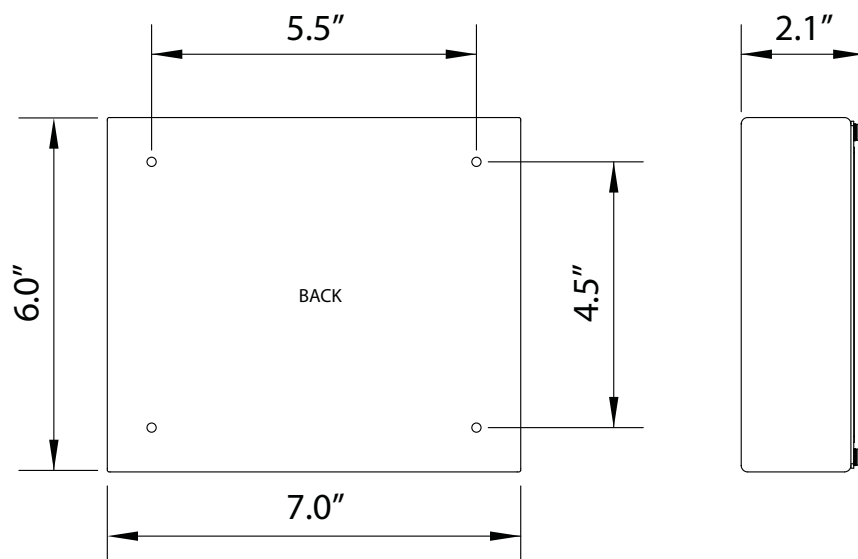
The RD8 intelligent relay is to be securely installed to a vertical wall surface using the four mounting holes provided in the rear of the enclosure.

1. Remove the front cover panel using caution not to damage the LED light pipes.
2. Locate the relay box and mark the mounting hole locations or use the dimensions below.
3. Pre-drill and install anchors if necessary. Keep dust and debris away from the circuit board.

Ensure all dust and contaminants have been blown out of the enclosure.

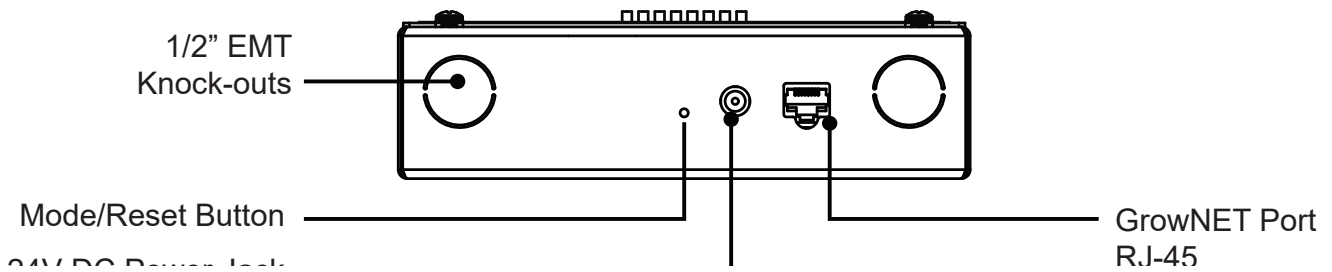
*Hardware is not provided. Drywall screws are recommended.*

**⚠️ Do NOT drill holes into the enclosure or enlarge holes. Metal chips from drills can cause short circuits on the PCB.**

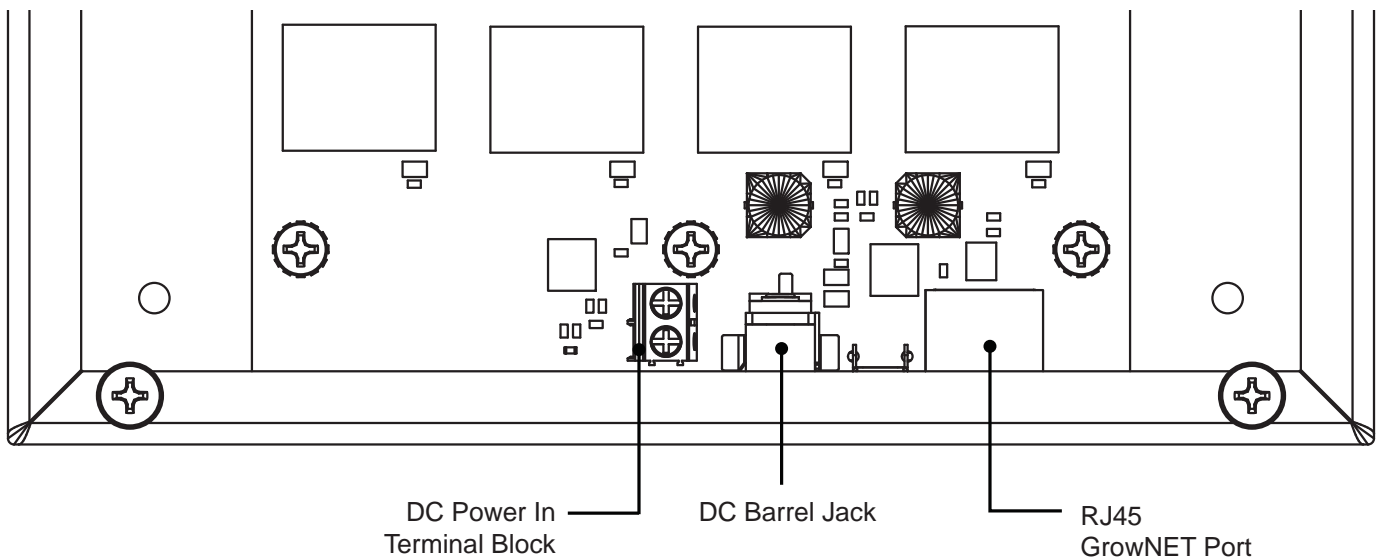


## DC Power Connections

An external DC power jack and GrowNET power are located on the bottom of the relay. Standard 7/8" diameter knock-outs are provided on either side for standard 1/2" EMT conduit fittings.



24Vdc is supplied to the RD8i via the RJ-45 cable when connected to a GCX control system or a GrowNET™ hub. If the relay is used with a SXE sensor in a MCX mini controller, then a DC power supply is required to be plugged into the barrel jack to power the relay.



**⚠ Do not connect AC power to the DC Power-In terminal block or the barrel jack; damage will occur to the unit.**

# Dry Contact Terminals

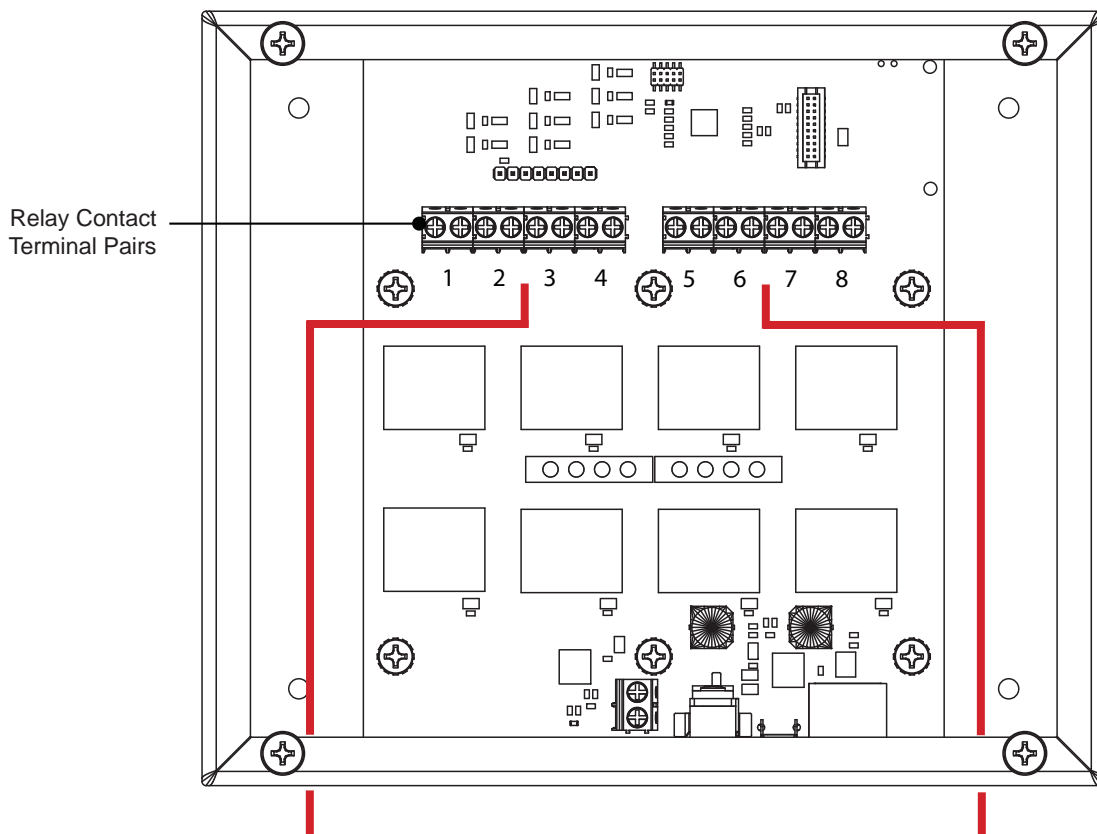
**⚠ DANGER! Risk of injury or death from electric shock; disconnect all power before wiring or service.**

Each relay has one pair of normally-open contacts which are labeled below each contact. Each relay terminal pair is independent allowing mixed signal control.

## Routing Wires

Route wires from the conduit fittings along each side of the relay pcb and above the relays to the terminal blocks as indicated by the red lines in the diagram below.

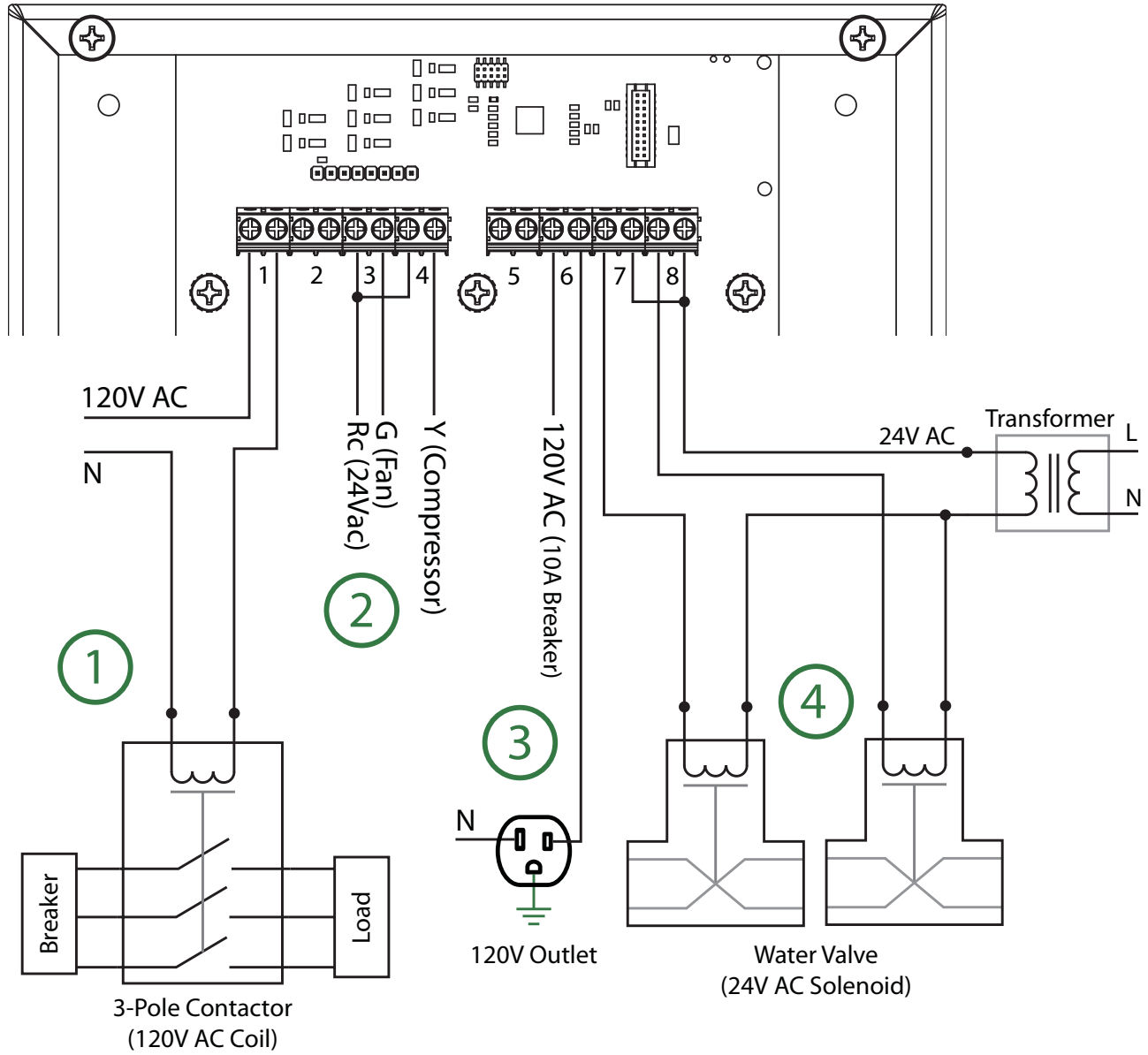
**⚠ Do NOT route wires above the green terminal blocks; keep the processor area free of excess wiring.**



General wire routing path shown by the bold red lines..

**NOTICE: Install and connect equipment in accordance with all national and local electrical codes.**

# Example Connections, General



## 1. High-Amp Contactors

High amp contactors and relays are operated by controlling the power to the magnet coil. When the magnet is energized, high current/voltage is switched on from a breaker panel to load receptacles.

## 2. HVAC Control Signals

24VAC HVAC control signals may be operated by dry contact. Use jumper wires for relays with a common source connection.

## 3. 120V Outlets

Contacts can switch up to 3.5A to directly feed receptacles or other 120V equipment. It is recommended to fuse contacts which can be overloaded beyond the current rating (as is the case with a receptacle.)

## 4. Solenoid Valves

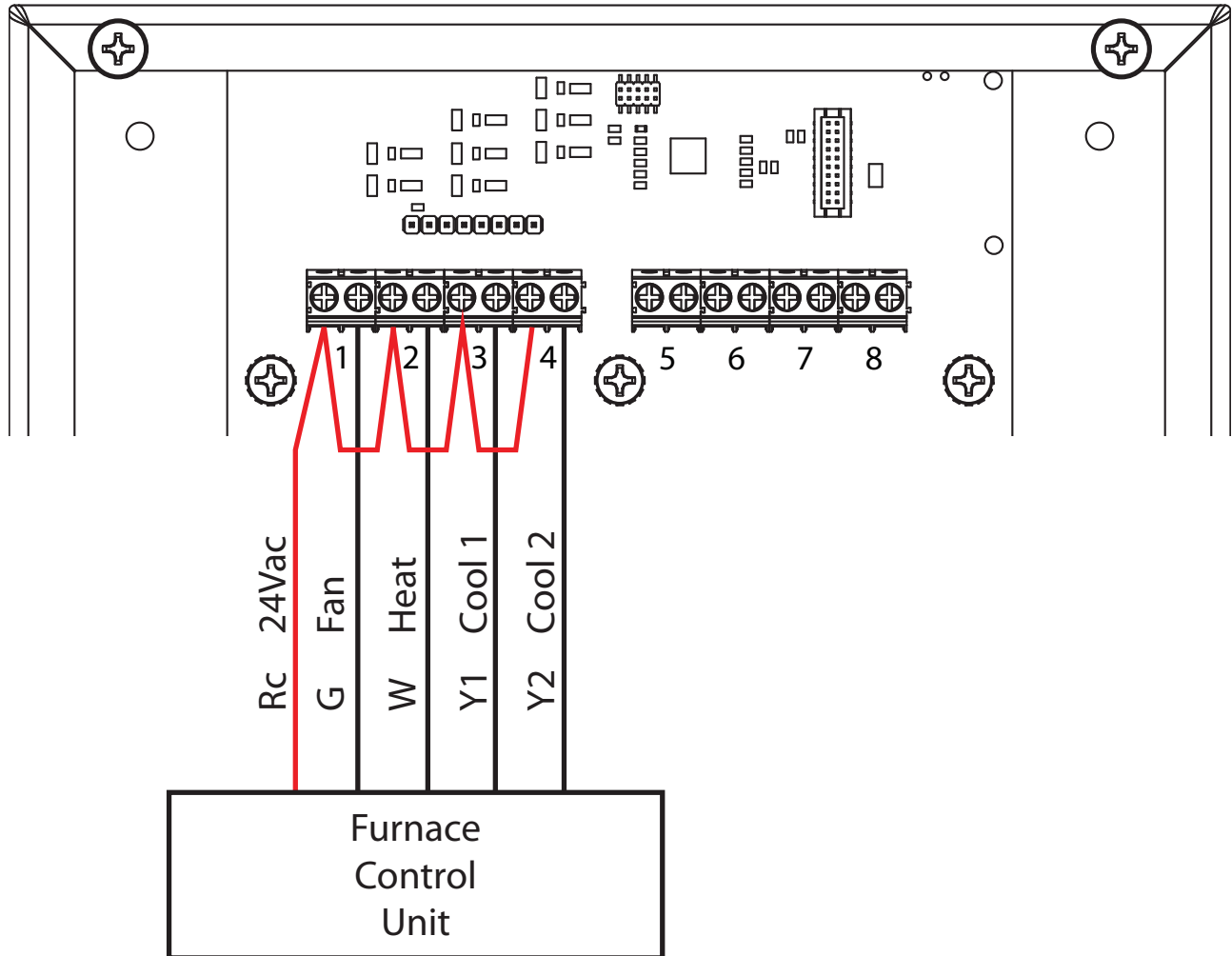
24VAC irrigation and gas valves can be controlled by switching power supplied by a step-down transformer. *24VAC is safer and more common than line-voltage for water/irrigation solenoids.*



## Example Connections, HVAC

Standard A/C units and HVAC heating and cooling control units that are operated by low-voltage (24Vac) control signals can be connected to the RD8i for programmable control.

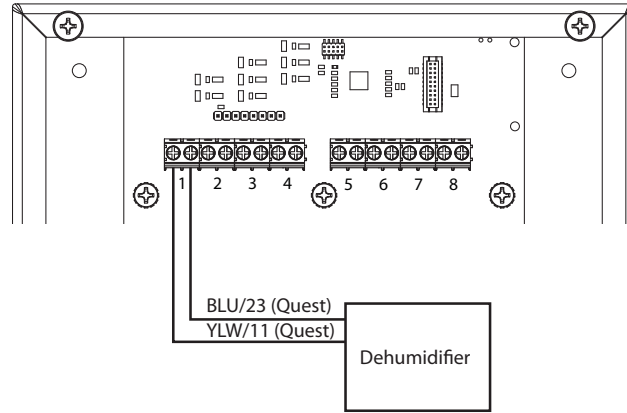
Land each control signal (G, W, Y1, etc.) on a separate relay contact, then jumper the Rc (red) 24Vac power lead to each terminal. When any of the relays are energized, the 24Vac will be connected to the control signal to activate the HVAC system.



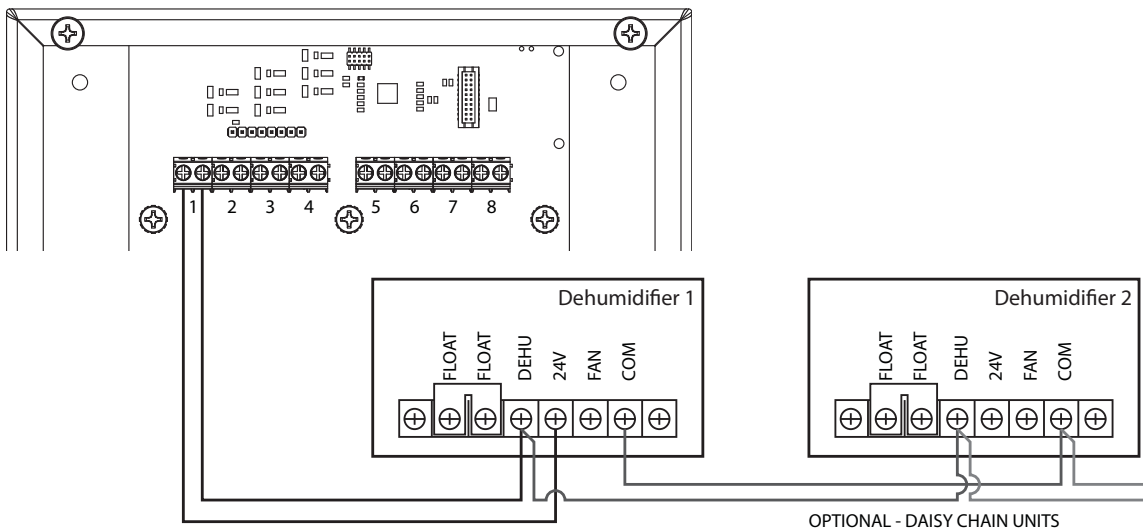
# Example Connections, Quest Dehumidifiers

24VAC humidifier/dehumidifier control signals may be operated by dry contact. Simply connect the low voltage control signals to any contact. When the contact is activated, the control signal is connected and activates the humidity equipment. Check the equipment cycles properly by connecting the control wires together to verify the equipment turns on as expected before wiring to a relay contact.

## Models with Wire Controls Leads

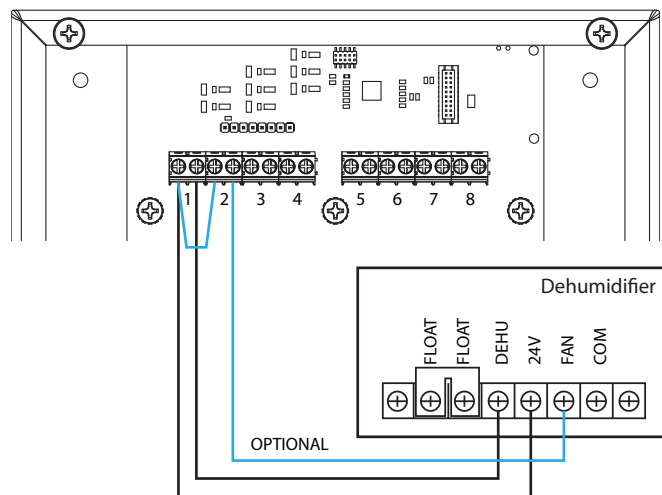


## Models with Terminal Blocks



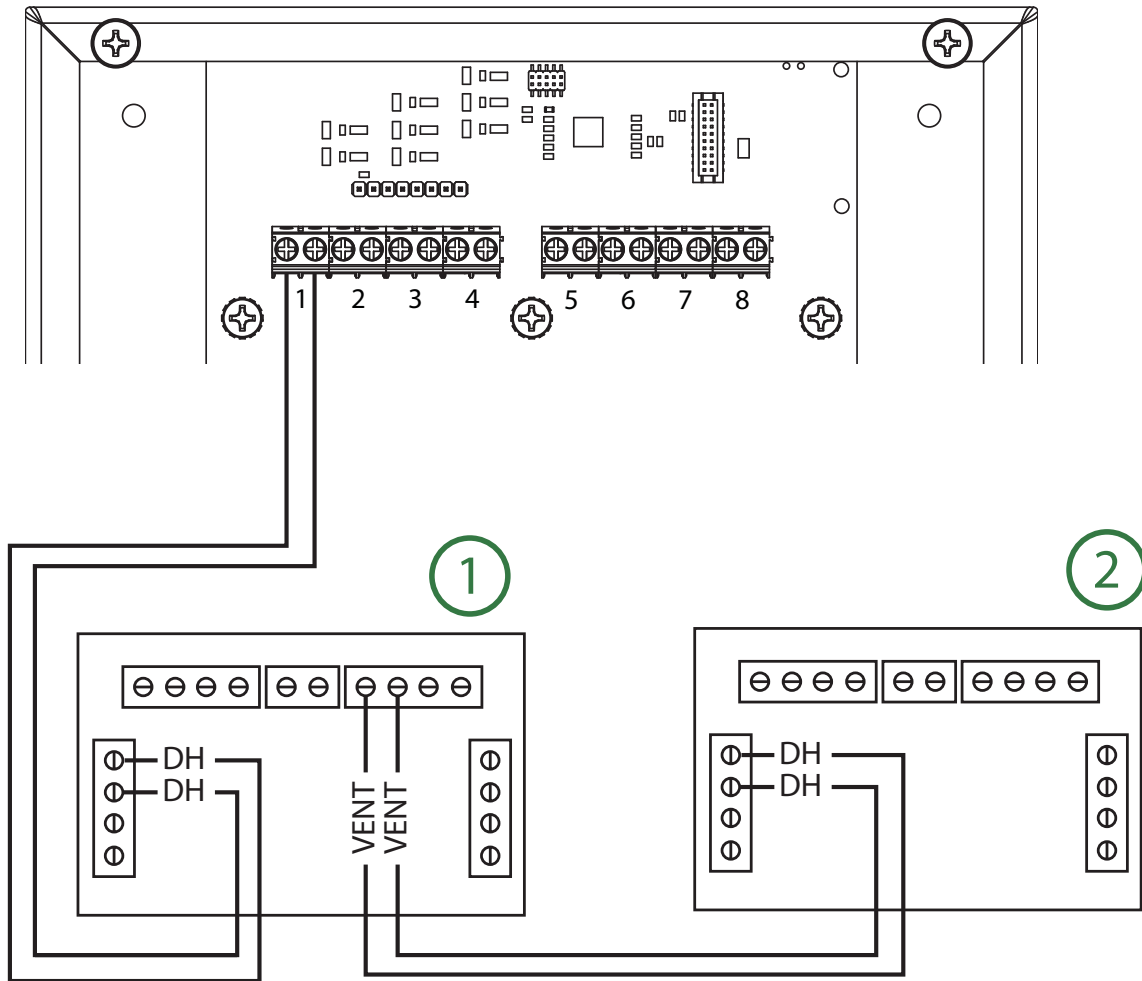
## Optional

Models with separate fan control can use a second relay contact to operate only the fan for air circulation purposes if desired, otherwise, only the DEHU and 24V terminals are required on a single contact.



# Example Connections, Anden Dehumidifiers

Anden dehumidifier units can be connected to a low-voltage dry-contact for external control. Multiple units can be daisy-chained together as shown in the diagram below.



## 1. Dehumidifier Unit #1

Connect a dry-contact from the RD8i relay to the “DH” contacts on the first unit.

## 2. Dehumidifier Unit #2

Connect the “DH” contacts of unit #2 to the “VENT” contacts of unit #1.

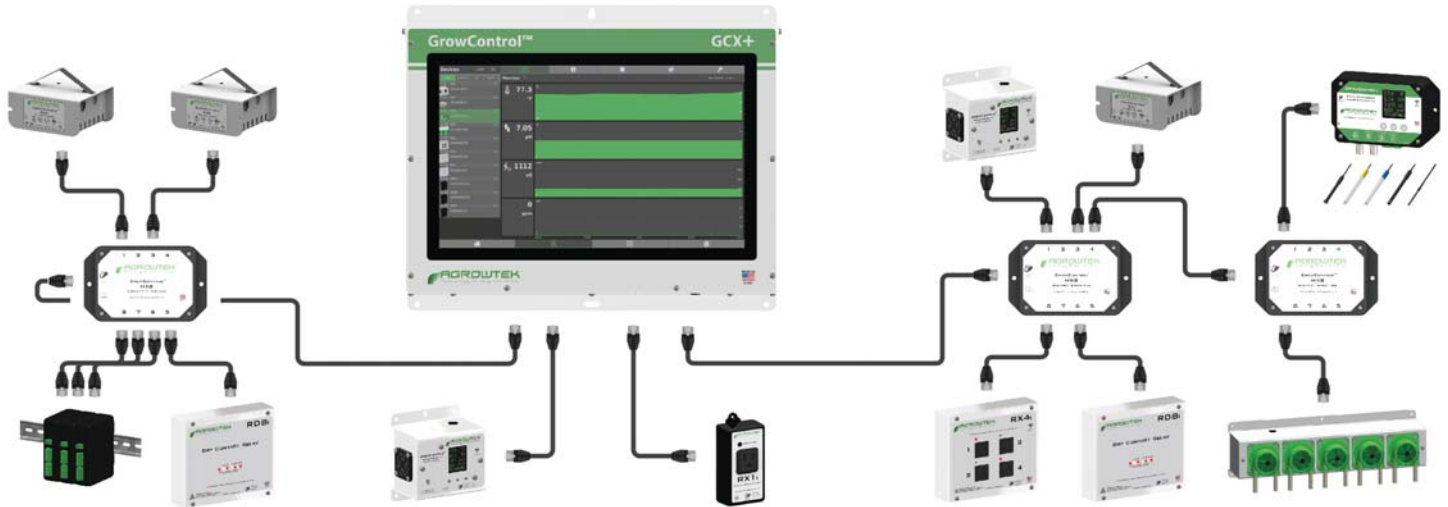
### Setup Procedure for External Control:

1. Press any button to activate the display and ensure the unit is set to “OFF”
2. Hold the “MODE” button for three (3) seconds to enter the installer setup menu.
3. “Remote” will be displayed on the screen.
4. Press the “MODE” button until “External Disabled” is shown on the screen.
5. Press “Up” or “Down” to set the display to “External Enabled.”
6. Press “MODE” until “Done” is shown on the screen.
7. Press the “ON” button; “External” should be shown on the screen.

# Connection to GrowControl™ GCX

All GrowNET™ devices are connected using standard CAT5 Ethernet cable with RJ-45 connections.

Devices can be connected directly to the GrowNET™ ports on the bottom of the controller, or through HX8 GrowNET™ hubs. It is typical to simplify cabling by locating hubs centrally in hall ways and rooms allowing single runs from an 8-port device hub back to a central hub or back to the controller.



Refer to the GCX controller manual for details on adding the device to the system.

## GrowNET™ Hubs

HX8 GrowNET™ hubs expand a single port into eight more ports. Hubs can be daisy-chained to form a network of up to 100 devices per GrowNET™ bus. Individually buffered port transceivers provide excellent signal integrity and extended communication strength and range.

Hubs provide up to 1A of power for operating sensors and most relays directly over the CAT5 cable. A DC jack on the hub provides 24Vdc power to the ports from the included wall power supply. A terminal block power option is also available.



## Installation Notes

### ⚠ NOTICE

GrowNET™ ports use standard RJ-45 connections but are NOT compatible the Ethernet network equipment. *Do not connect GrowNET™ ports to Ethernet ports or network switch gear.*

### ⚠ DIELECTRIC GREASE

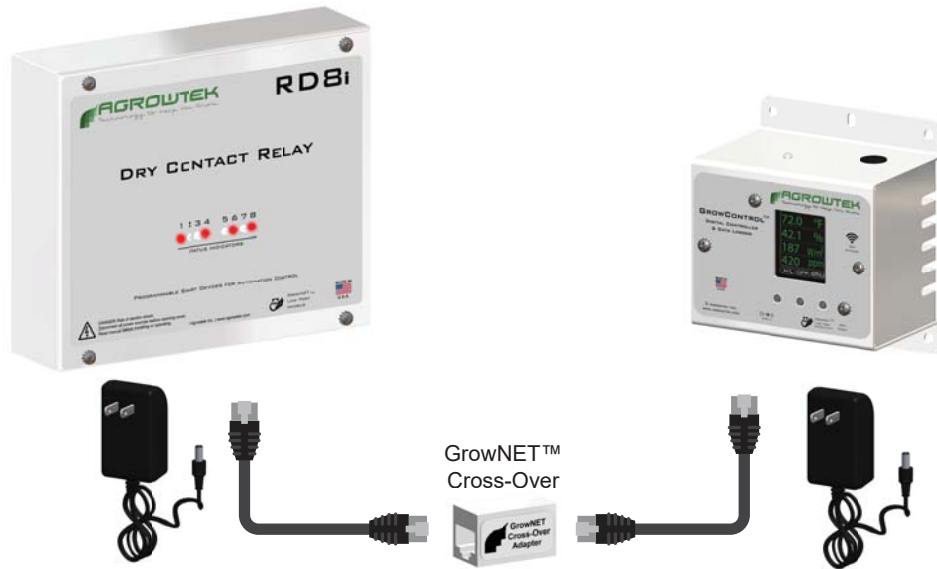
Dielectric grease is recommended on RJ-45 GrowNET™ connections when used in humid environments. Place a small amount of grease onto the RJ-45 plug contacts before inserting into the GrowNET™ port. *Non-conductive grease is designed to prevent corrosion from moisture in electrical connectors.*

- Loctite LB 8423
- Dupont Molykote 4/5
- CRC 05105 Di-Electric Grease
- Super Lube 91016 Silicone Dielectric Grease
- Other Silicone or Lithium based insulating grease

# Connection to Intelligent Sensor

A direct-link connection between a SXE sensor and intelligent relay requires Agrowtek's cross-over adapter.

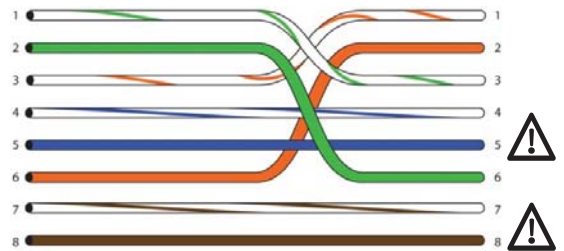
**⚠ IMPORTANT! ONLY use cross-over adapters provided by Agrowtek.**  
Incorrect cross-over adapters or cables can cause damage to the equipment.



## Cross-Over Cable

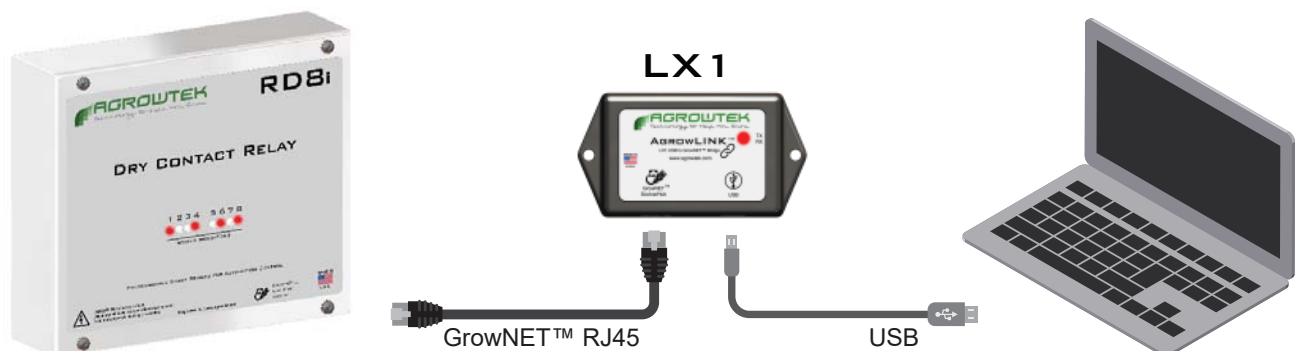
A custom cross-over cable can be constructed as an *alternative* to using the cross-over adapter and two standard, straight Ethernet cables as shown in the diagram above. The cross-over wiring **MUST** match the diagram.

Pins 7 & 8 carry 24Vdc power and must be straight through or damage may result to the equipment.



## Connection to USB AgrowLINK

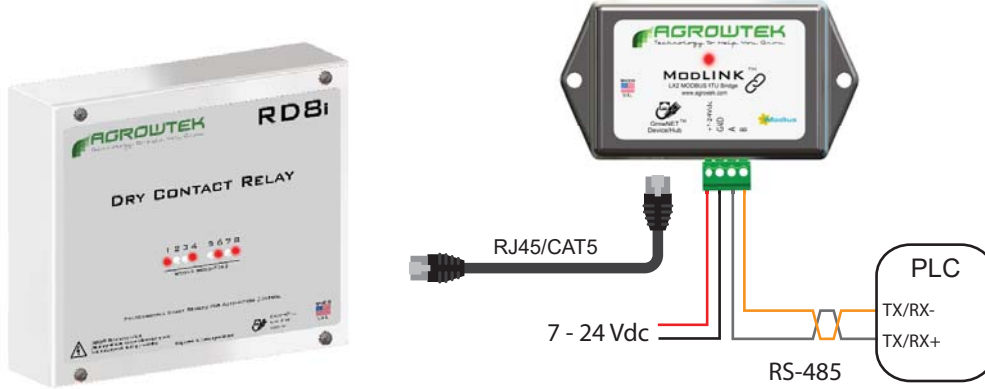
Agrowtek's intelligent relays may be connected to the LX1 USB AgrowLINK for firmware updates, communication protocol configuration, addressing and manual operation. Standard drivers automatically install in Windows for the LX1 USB AgrowLINK. GrowNET API is available for custom software applications.



# Connection to MODBUS RTU

RS-485 / RS-422

Use the LX2 ModLINK to connect MODBUS devices to the GrowNET™ port.

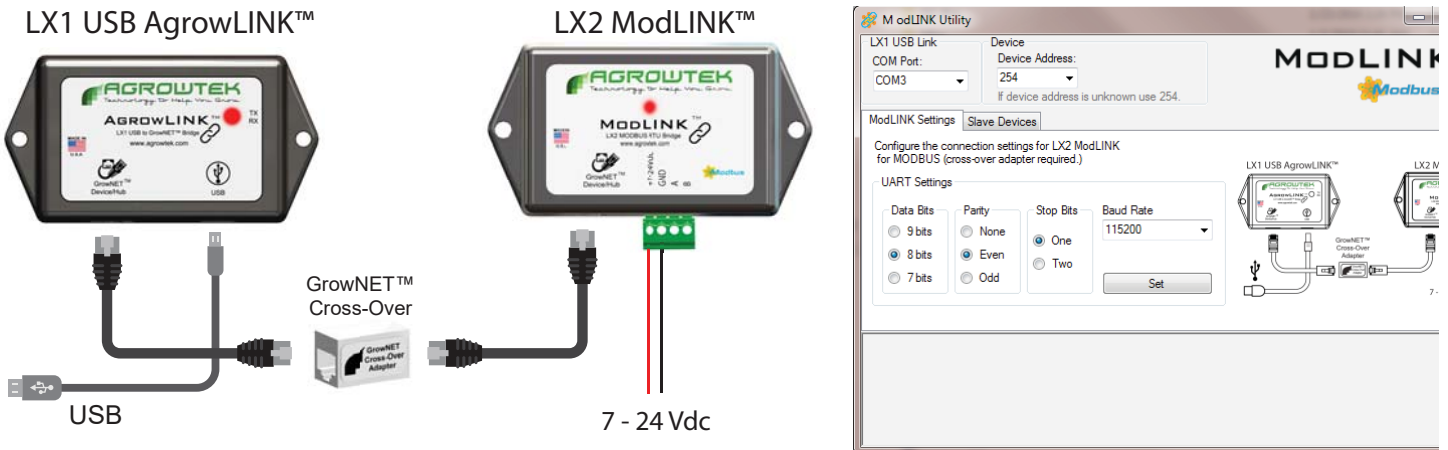


**3.3/5Vdc Serial Bus Compatible.**  
Include required bus terminating resistors per EIA standard.

## Serial Speed & Format

The default serial data format for the LX2 ModLINK interface is: **19,200 baud, 8-N-1.**

Alternate speeds and formats between 9,600 - 115,200 baud may be configured with the free AgrowLINK PC utility using a LX1 USB AgrowLINK and the cross-over adapter supplied with the LX2 ModLINK.



See MODBUS manual for more information.



## Supported Commands

0x01 Read Coils  
 0x03 Read Multiple Registers  
 0x05 Write Single Coil  
 0x06 Write Single Register  
 0x15 Write Multiple Coils

A request to use a function that is not available will return an illegal function error (0x01).

## Register Types

Data registers are 16 bits wide with addresses using the standard MODICON protocol. Floating point values use the standard IEEE 32-bit format occupying two contiguous 16 bit registers. ASCII values are stored with two characters (bytes) per register in hexadecimal format. Coil registers are single bit values which control and indicate the status of a relay; 1 = on, 0 = off.

## MODBUS Coil Registers

Parameter	Access	Address
Relay 1	R/W	1
Relay 2	R/W	2
Relay 3	R/W	3
Relay 4	R/W	4
Relay 5	R/W	5
Relay 6	R/W	6
Relay 7	R/W	7
Relay 8	R/W	8

A request to read or write coils that are not available will return an illegal address error (0x02.)

## MODBUS Holding Registers

Parameter	Description	Range	Type	Access	Address
Address	Device Slave Address	1 - 247	8 bit	R/W	40001
Serial#	Device Serial Number	ASCII	8 char	R	40004
DOM	Date of Manufacture	ASCII	8 char	R	40008
HW Version	Hardware Version	ASCII	8 char	R	40012
FW Version	Firmware Version	ASCII	8 char	R	40016
Timeout (seconds)	Turn off relays if no communication	0 - 32767	16 bit, unsigned	R/W	41001
Relay Closure Count	Relay 1	Unsigned Int	32 bit, unsigned	R	49001
	Relay 2				49003
	Relay 3				49005
	Relay 4				49007
	Relay 5				49009
	Relay 6				49011
	Relay 7				49013
	Relay 8				49015

A request to read or write a register that is not available will return an illegal address error (0x02).

# Technical Information

---

Dry contact relays are generally reliable when they are used in accordance with the load limitations. Overloading a relay will shorten its life and can cause the relay to fail. Overloading causes excess heat and arcing on the relay contacts which can either burn them so that they no longer connect, or can permanently weld the contacts closed so that the relay can never be turned off.

## Troubleshooting

---

### Relays are not activating, none of the output LED's turn on.

Ensure the relay input power has 24Vdc and are correctly wired for polarity. To check a RJ-45 cable, meter between pins 7&8. One or more dimly lit LED's should illuminate on the pcb when the circuit board has power.

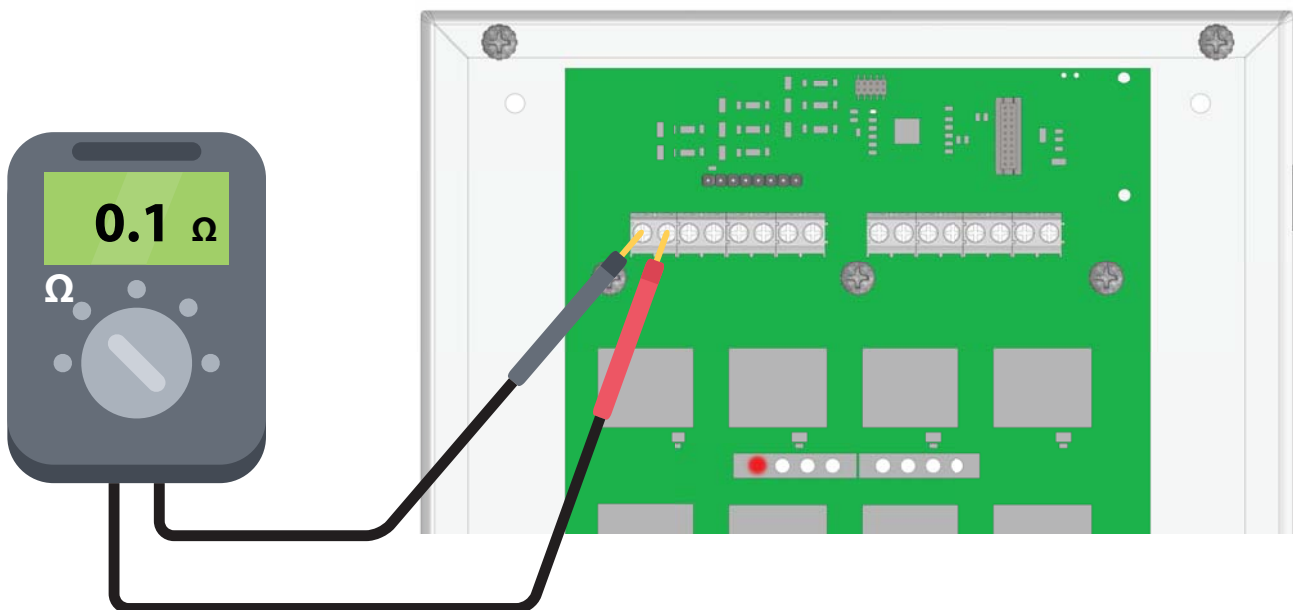
### Relays are clicking & output LED's are ON but the connected device is not operating.

Check for continuity between the relay terminals when the relay is turned on. If the relay is conducting when energized, the problem lies with the device or power source that is connected to the relay output terminals, not with the relay.

### Checking continuity of a relay:

A multimeter that can measure resistance (ohms  $\Omega$ ) is required to check continuity of a relay.

1. Set your volt meter to resistance (ohms  $\Omega$ ) mode.
2. Verify that the meter reading changes to 0  $\Omega$  when the red and black leads are connected together.
3. With the relay output turned off, check that the resistance reads greater than 1  $\Omega$ .
  - a. If the resistance is less than 1  $\Omega$ , remove the wires from the terminals and check resistance again.
  - b. If resistance is still less than 1  $\Omega$ , the contact may be physically stuck together.
4. With the relay turned on, check that the resistance is less than 1  $\Omega$ .
  - a. If the resistance is greater than 1  $\Omega$ , ensure the screws are tight on the terminals and check again.
  - b. If resistance is still greater than 1  $\Omega$ , the relay may not be closing due to failed coil or burned contacts.





## Maintenance & Service

---

### Exterior Cleaning

Exterior may be wiped with a damp cloth with mild dish detergent, then wiped dry. Disconnect power before cleaning the enclosure to prevent electrical shock.

## Storage and Disposal

---

### Storage

Store equipment in a clean, dry environment with ambient temperature between 10-50°C.

### Disposal

This industrial control equipment may contain traces of lead or other metals and environmental contaminants and must not be discarded as unsorted municipal waste, but must be collected separately for the purpose of treatment, recovery and environmentally sound disposal. Wash hands after handling internal components or PCB's.

## Warranty

---

Agrowtek Inc. warrants that all manufactured products are, to the best of its knowledge, free of defective material and workmanship and warrants this product for one (1) year from the date of purchase. 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. 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, excessive humidity or extreme temperature conditions outside of the specified limits. Agrowtek Inc. must be contacted prior to return shipment for a return authorization. No returns will be accepted without a return authorization. Returns not purchased directly from Agrowtek Inc. must include proof of purchase date otherwise purchase date is considered date of manufacture. 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.