Intelligent Reversing Motor Controller
for D.C. or Single-Phase A.C. Motors

Specifications

Input Power	2 W @ 12-24Vdc ---
	Class II / Limited Energy Power Supply
Max Switching Current	8A @ 120Vac ~
	2A @ 24Vdc
Max Switching Voltage	120 Vac ~ / 24Vdc ---
HP Rating	1/2HP (8FLA @ 120Vac ~)
Status Indicators	Red LEDs, Forward/Reverse
Enclosure Knock-Outs	(2) dia. 7/8"
Enclosure Rating	TYPE 12K NEMA
Interface	GrowNET™, MODBUS
Relay Ratings	100,000 cycles
Relay Cycle Counters	Up to 4 billion cycles per relay

Contents

KEEP THESE INSTRUCTIONS

Introduction

MX1i intelligent motor controllers are designed to operate reversing gear motors for ridge vents, shade curtains, roll-up side walls and other similar applications. Models are available for both AC (single phase) and DC current.

The relays in the MX1i are designed in interlocking circuitry such that it is physically impossible to activate both the forward and reverse direction at the same time even under conditions of a cpu failure, contact weld, or other component failure.
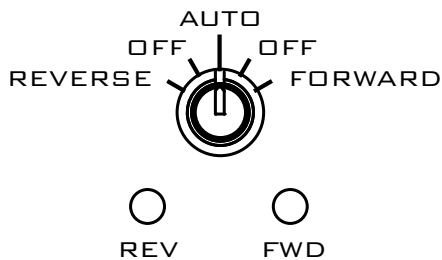
Position Control

Position is controlled in terms of "percent open" (% open) and is based on the amount of time that is required to operate a motor between a fully closed position and a fully open position. The total amount of time required to open from a close (or vice-versa) is referred to as the "travel time." Travel time is set in the MX1i by the GCX control system on the device configuration page (see configuration.)

The position is stored in the MX1i's local memory every time the travel stops. In the event that an operator changes the position by using the manual knob on the front of the unit, the position will continue to be tracked and stored accurately in the MX1i's memory.

Integrated Feedback

The local position (% open) as well as the override knob's selection is transmitted to the GCX control system. The GCX control system can send a target position to the MX1i, however, if the physical/manual knob is not in the "Auto" position, the MX1i can not be controlled by the GCX control system.

Installation Instructions

External Features

1. Manual Knob — Manaully operate and disable the MX1 outputs, or set to Auto mode.
2. LED's — Indicate forward/reverse output is active.
3. Cover Screws — Loosen bottom and remove top screws.
Disconnect power and remove knob (1) prior to removing cover.
4. Knockout — 1/2" EMT conduit knock-outs for power in and power out to motor.
5. DC Jack — Optional DC power input for backup or manual operation.
6. GrowNET™ Port — RJ-45 connection for GrowNET™ digital communication.

Dimensions

Mounting holes: dia. 0.201"

5.5"

2.1"

6.0"

BACK

4.5"

7.0"
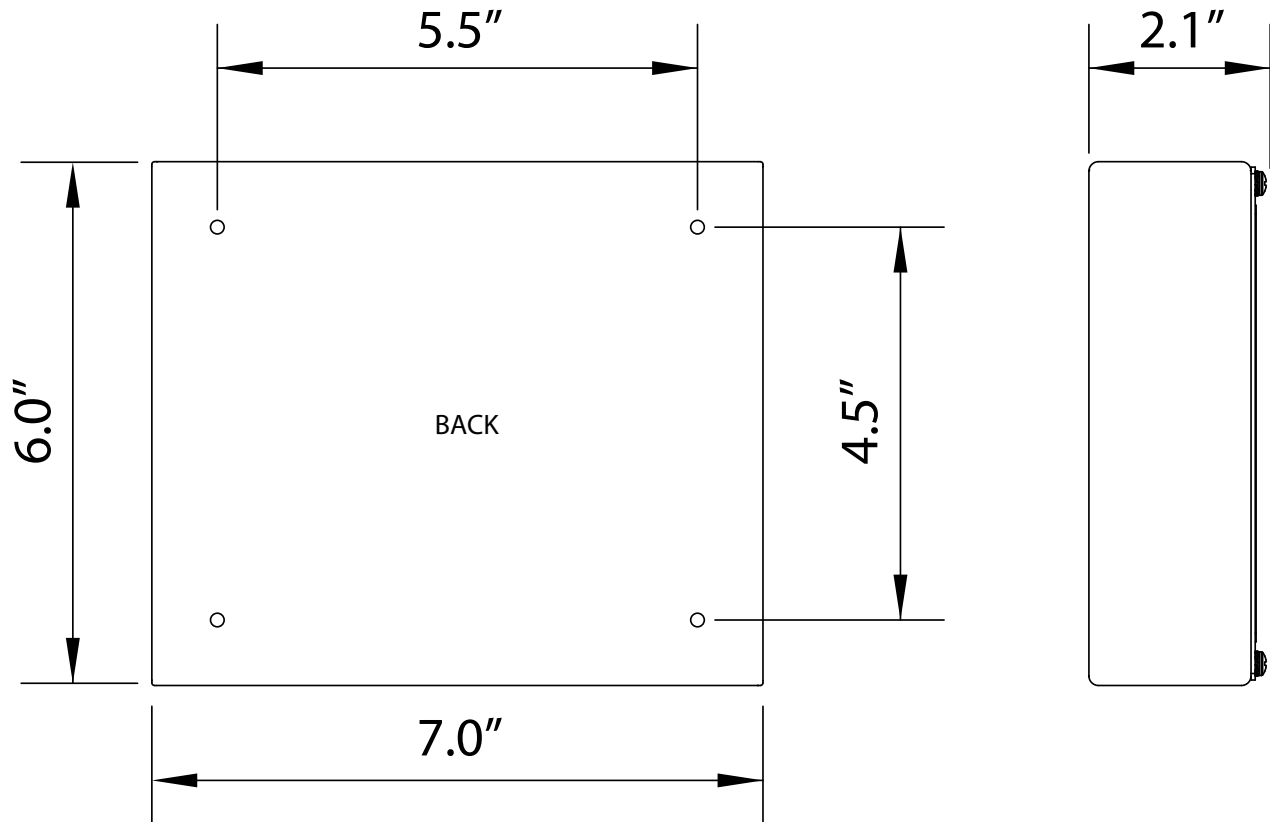
DC Power Connections

12 - 24Vdc is required to operate the relay's processor and contacts which may be supplied via:

a) the **GrowNET™ RJ-45 port** from a GCX control system or HX8 hub,
b) the 2.1mm DC barrel jack and included power supply, or
c) the Vin terminal block on the circuit board for DIN rail power supplies.

DC Power In
Terminal Block

DC Barrel Jack

RJ45
GrowNET Port

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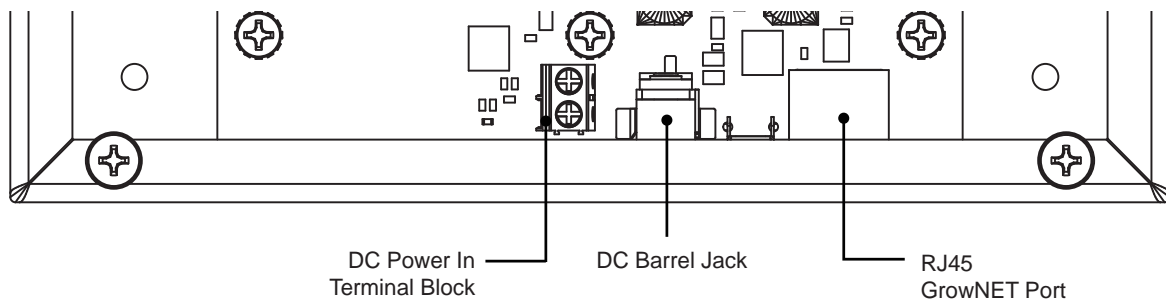
Mounting the Relay

The MX1 intelligent relay is to be securely installed to a vertical wall surface using the four mounting holes provided in the rear of the enclosure. Removing the front cover is required to mount and wire the relay.

Remove Cover
1. Loosen set screw on bottom of knob (1/8" flat screw driver) and remove the knob.
2. Loosen bottom two cover screws 1/4".
3. Remove top cover screws.
4. Tilt cover to clear knob shaft and lift off cover.

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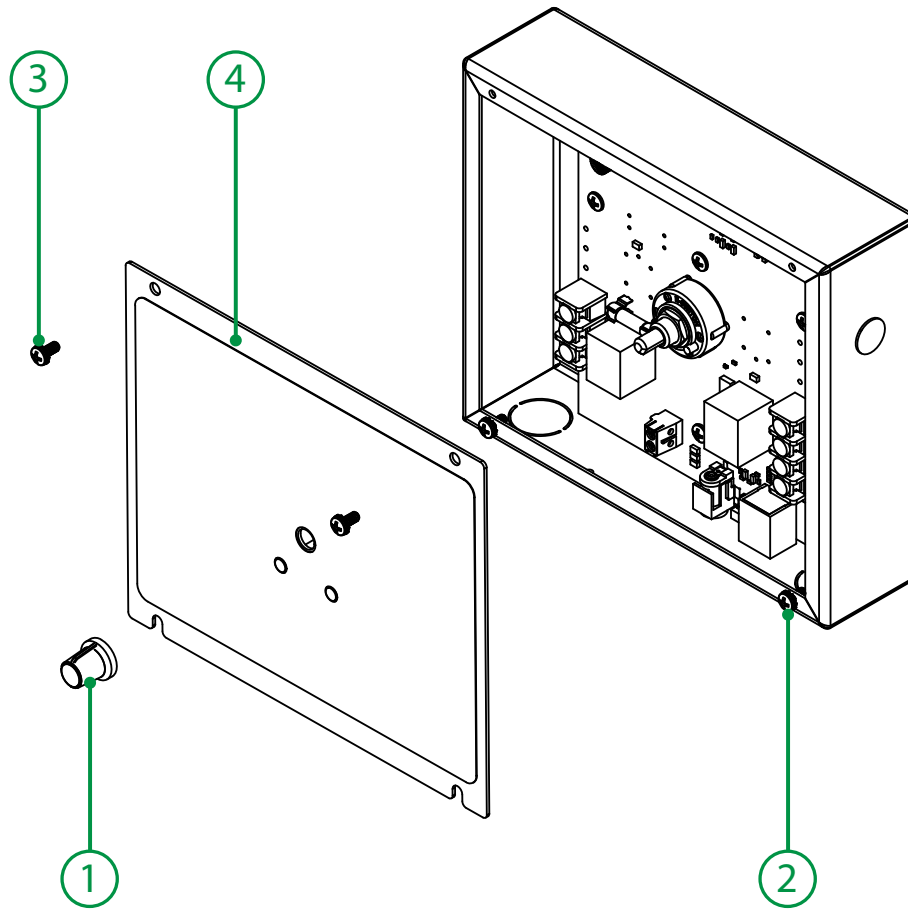2. Locate the relay box and mark the mounting hole locations or use the dimensions below.
3. Pre-drill and install anchors if necessary. Keep dust and debris away from the circuit board.

Mounting hardware is not provided; drywall or deck screws of sufficient length are recommended.

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

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

Internal Component Locations

MX1i-AC

MX1i-DC
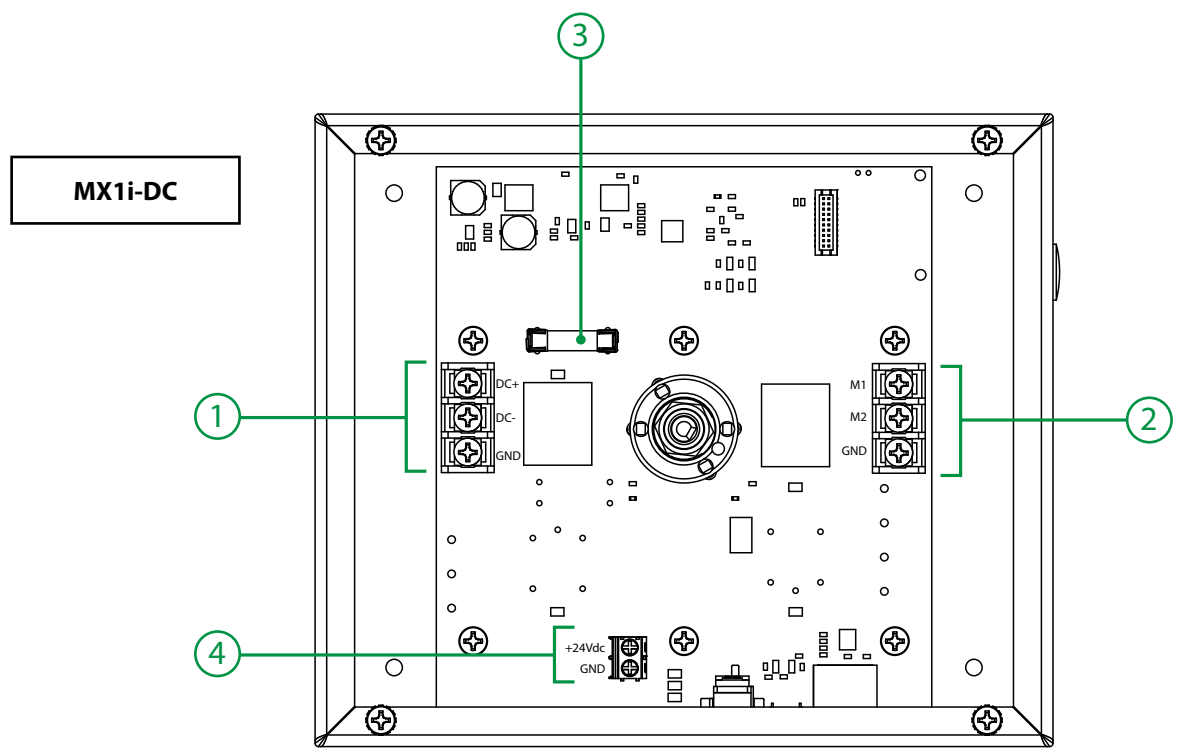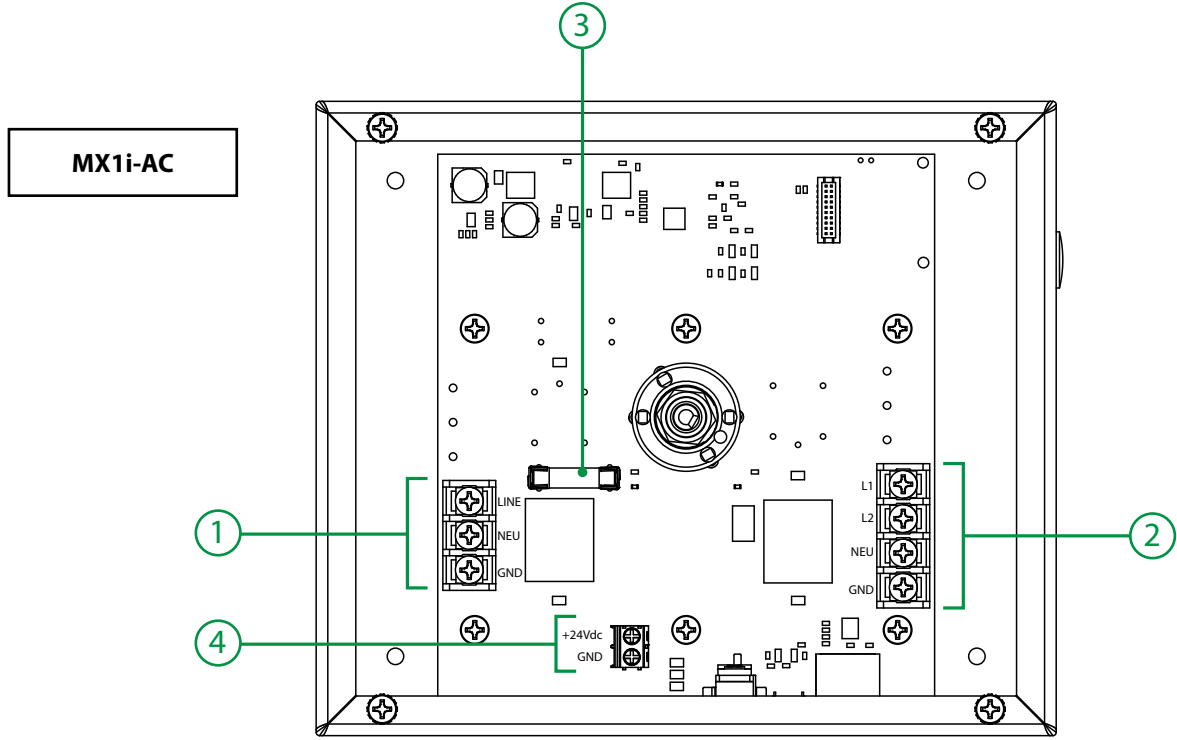
1. Power Input — Input connections for motor power.
2. Motor Outputs — Output connections for motor.
3. Motor Fuse — Fuse sized according to specifications. Replace only with recommended fuse.
4. DC Power — Optional DC power connection for backup power.

AC Motor Wiring

AC power (120V) must be supplied to the relay by a branch protected circuit (circuit breaker) panel. Power to the motor is switched by the relay to the output terminals. Limit switches on the motor are wired at the motor. Conduit is recommended for wiring connections.

FROM
CIRCUIT BREAKER

TO
MOTOR
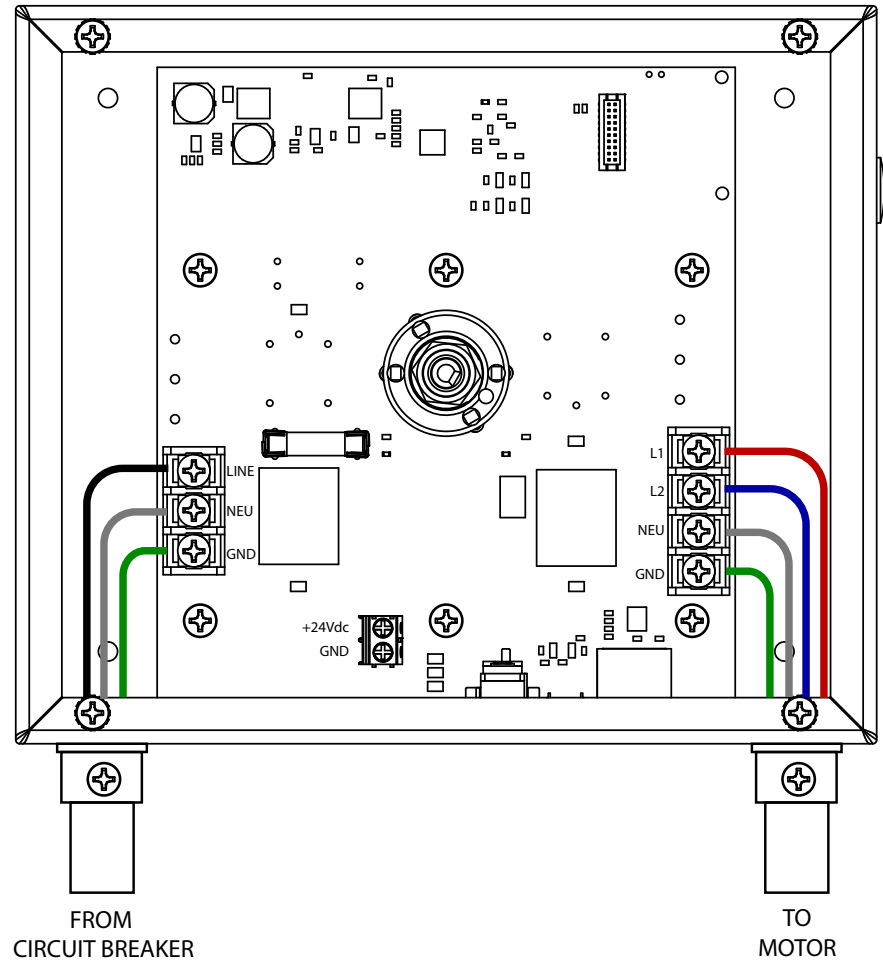
AC motors must be wired to include the limit switches in the motor to terminate operation and prevent damage to a structure in the event the controls have a failure.

FROM
MX1i-AC

GEAR MOTOR
(RIDDER RW-45)

A/C TERMINALS

GND — MOTOR GROUND (PE)

LIMIT SWITCHES

L1 — T1 — T2 — MOTOR FORWARD (W1)

NEU — T3 — T4 — MOTOR NEUTRAL (U1)

L2 — T5 — T6 — MOTOR REVERSE (V1)
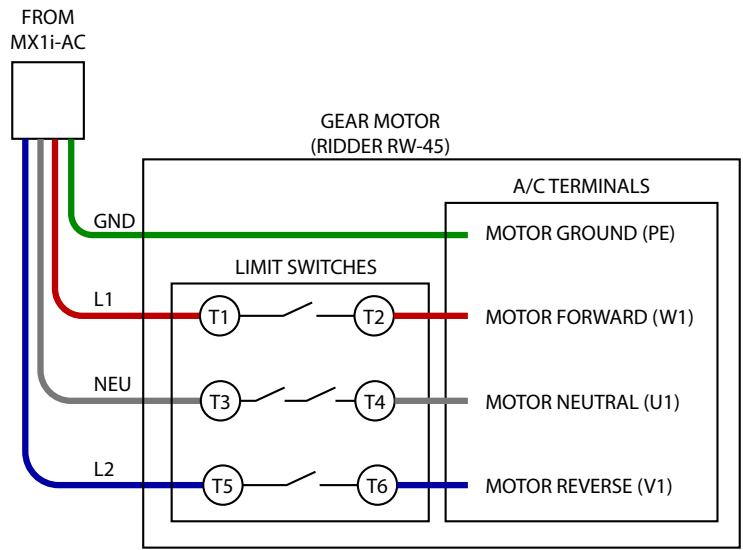
DC Motor Wiring

DC power must be supplied to the relay by a suitable external DC power supply such as an industrial DIN rail power supply. Power to the motor is switched by the relay to the output terminals. Limit switches on the motor are wired at the motor. Conduit is recommended for wiring connections.

FROM
DC POWER SUPPLY

TO
MOTOR

Connection to GrowControl™ GCX

All GrowNET™ devices are connected using standard CAT5 Ethernet cable with RJ-45 connections.
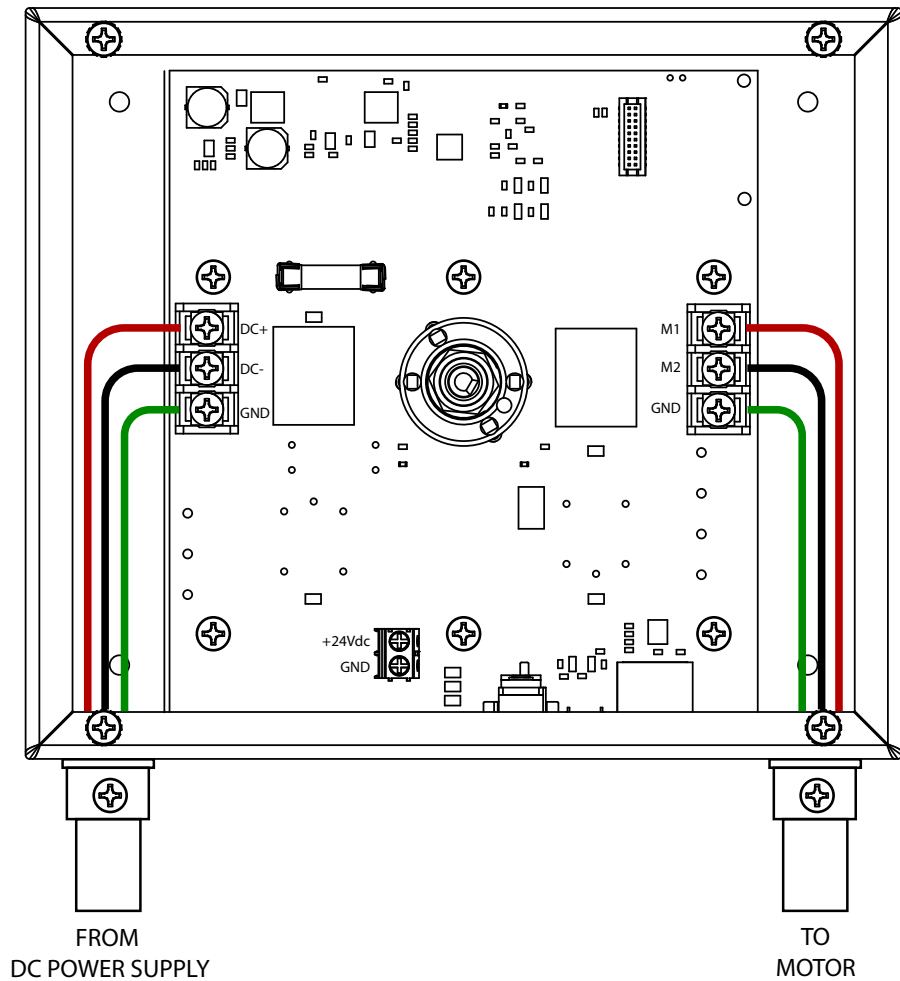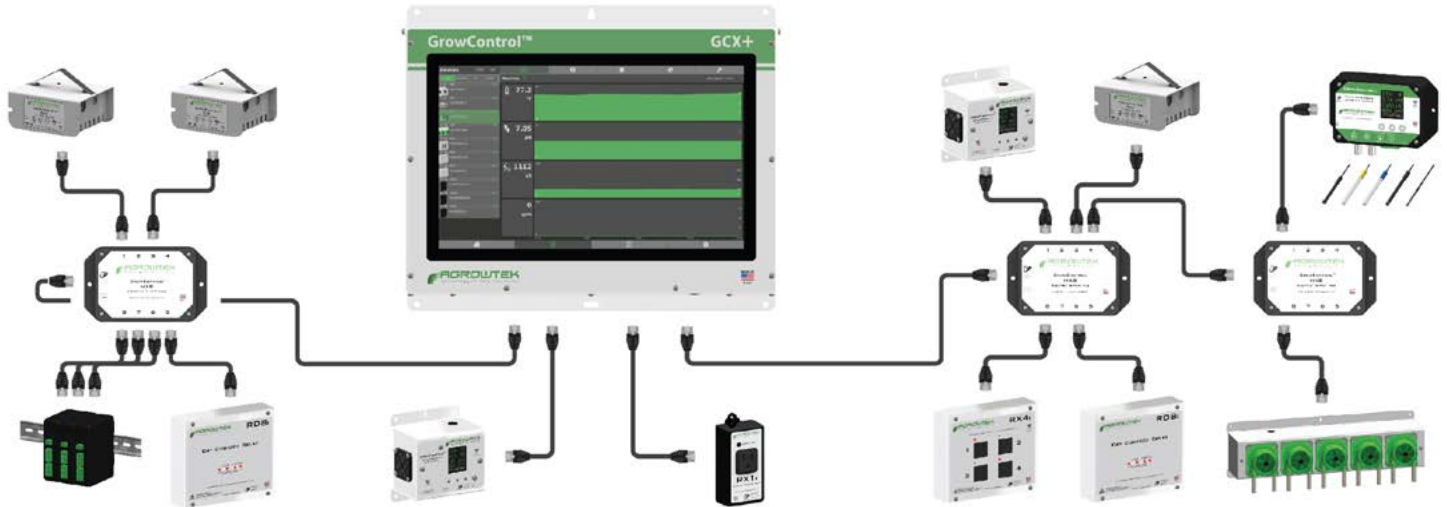
Devices can be connected directly to the GrowNET™ ports on the bottom of the controller, or through HX8 GrowNET™ hubs. It is typical to simplify cabling by locating hubs centrally in hall ways and rooms allowing single runs from an 8-port device hub back to a central hub or back to the controller.

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 transcievers 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 USB AgrowLINK

Agrowtek's intelligent relays may be connected to the LX1 USB AgrowLINK for firmware updates, commu-
nication 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.
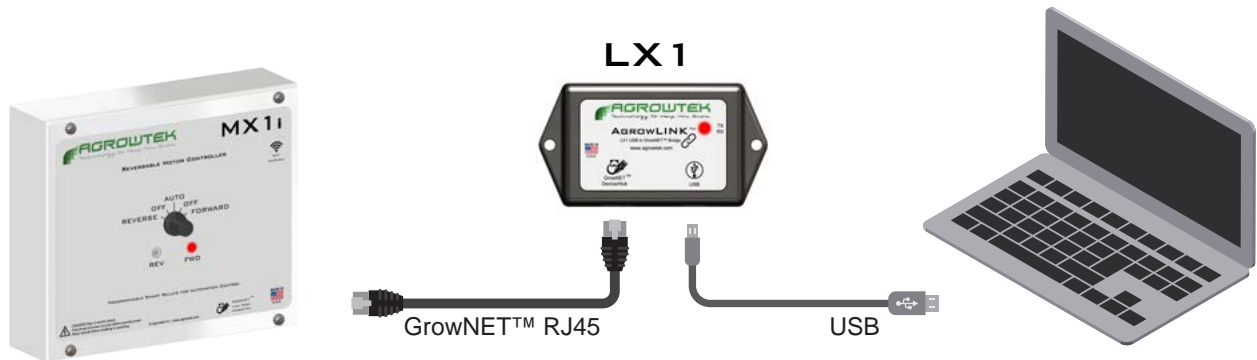
Connection to MODBUS RTU

RS-485 / RS-422
Use the LX2 ModLINK to connect MODBUS devices to the GrowNET™ port.
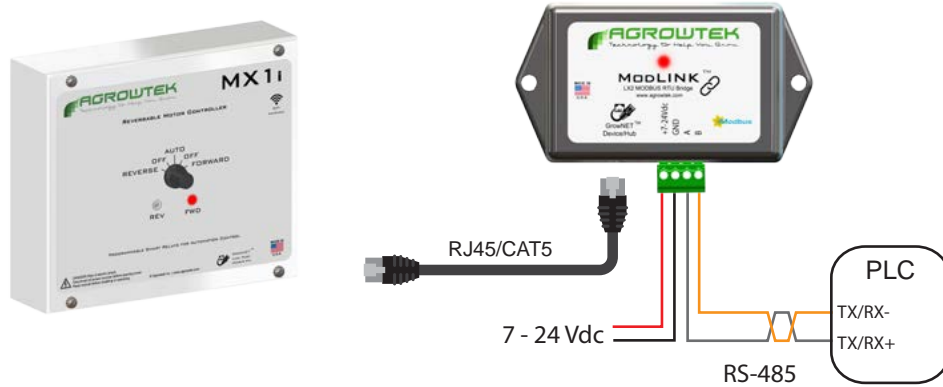
3.3/5Vdc Serial Bus Compatible.
Include required bus terminating resistors per EIA standard.

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 (Forward)	R/W	1
Relay 2 (Reverse)	R/W	2

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

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

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Technical Information

Troublshooting

Relays are not activating, no power LED on PCB
Ensure the relay input power has 12-24Vdc and are correctly wired for polarity. A dimliy lit red LED should illuminate when the circuit board has power.

Maintenance & Service

Exterior Cleaning
Exterior may be wiped with a damp cloth wish 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 between10-50°C.

Disposal
This indsutrial 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 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. 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.