

Intelligent Reversing Motor Controller

D.C. or Single-Phase A.C. Motors

Specifications

Input Power	2 W @ 12-24Vdc --- Class II / Limited Energy Power Supply
Max Switching Current	MX1i-AC: 6A @ 120Vac ~ MX1i-DC: 2A @ 24Vdc ---
Max Switching Voltage	MX1i-AC: 120Vac ~ MX1i-DC: 24Vdc ---
Full Load HP Rating	1/4HP
Status Indicators	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



Electrical Process Control Equipment
 File No.: E516807



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KEEP THESE INSTRUCTIONS

This product is intended for commercial use only.

REV 03/26

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.

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.

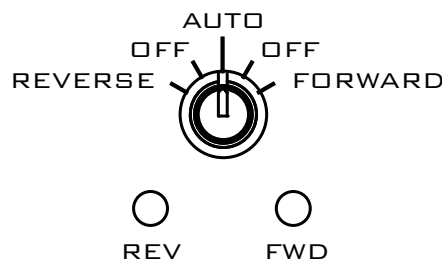
Position Control

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

⚠ 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 (0-80% RH non-condensing.)

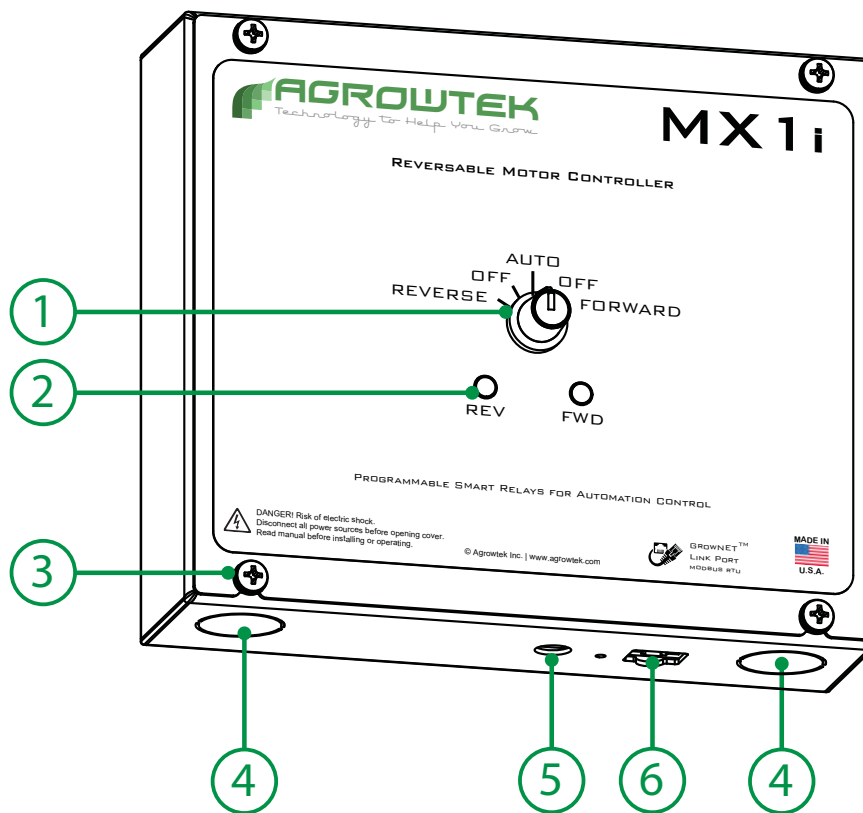
Replace serviceable parts only with those recommended by Agrowtek Inc.

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.

External Features



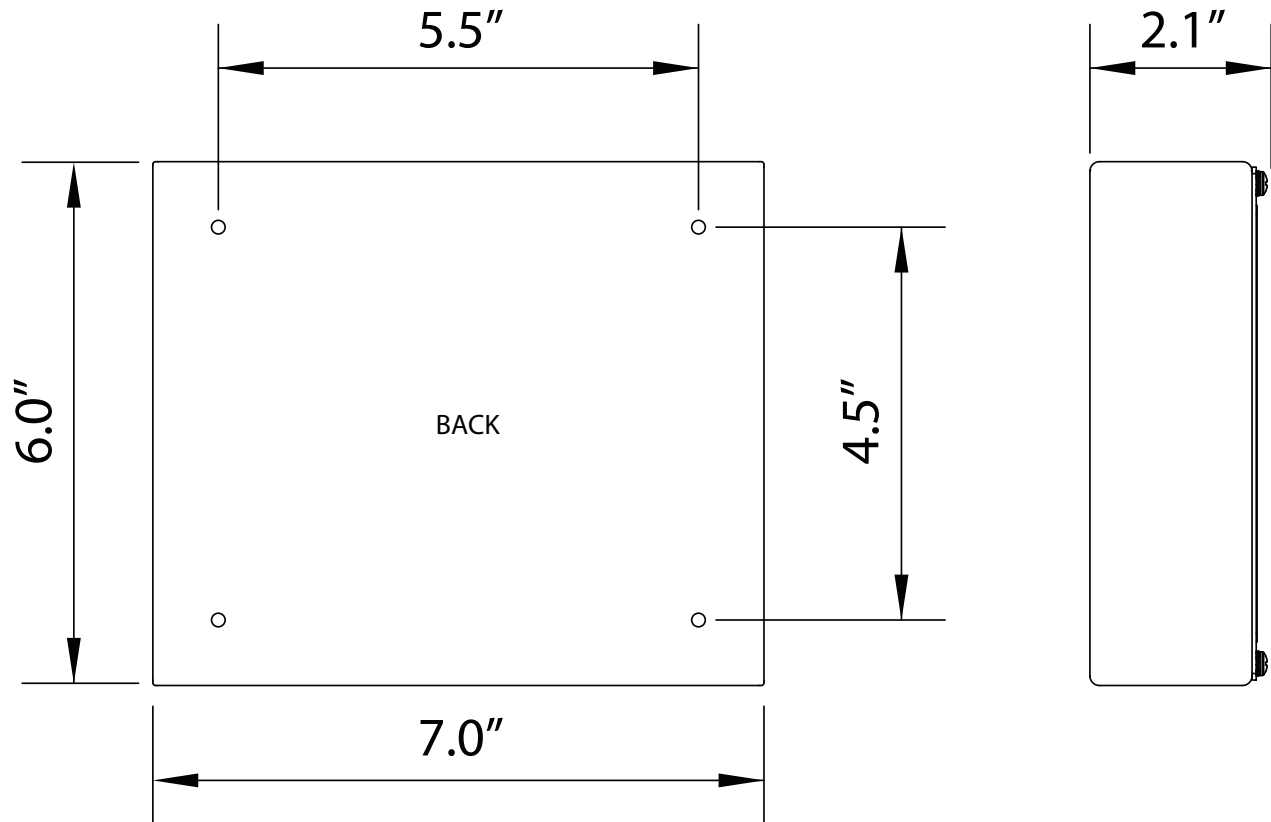
1. Manual Knob
2. LED's
3. Cover Screws

4. Knockout
5. DC Jack
6. GrowNET™ Port

Manually operate and disable the MX1 outputs, or set to Auto mode. Indicate forward/reverse output is active. Loosen bottom and remove top screws. Disconnect power and remove knob (1) prior to removing cover. 1/2" EMT conduit knock-outs for power in and power out to motor. Optional DC power input for backup or manual operation. RJ-45 connection for GrowNET™ digital communication.

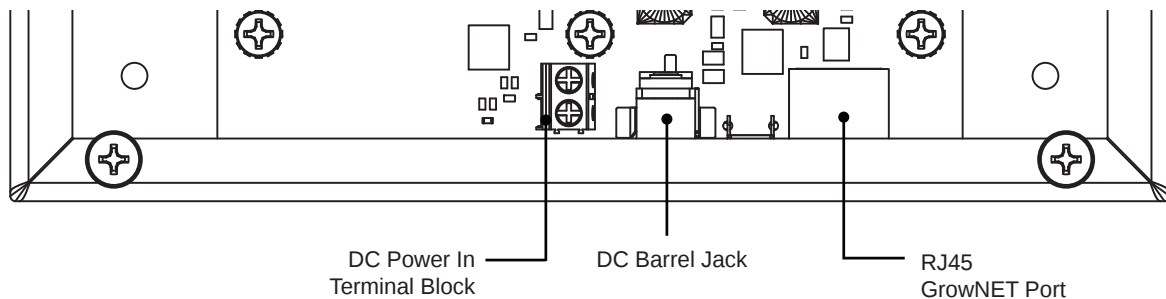
Dimensions

Mounting holes: dia. 0.201"



DC Power Connections

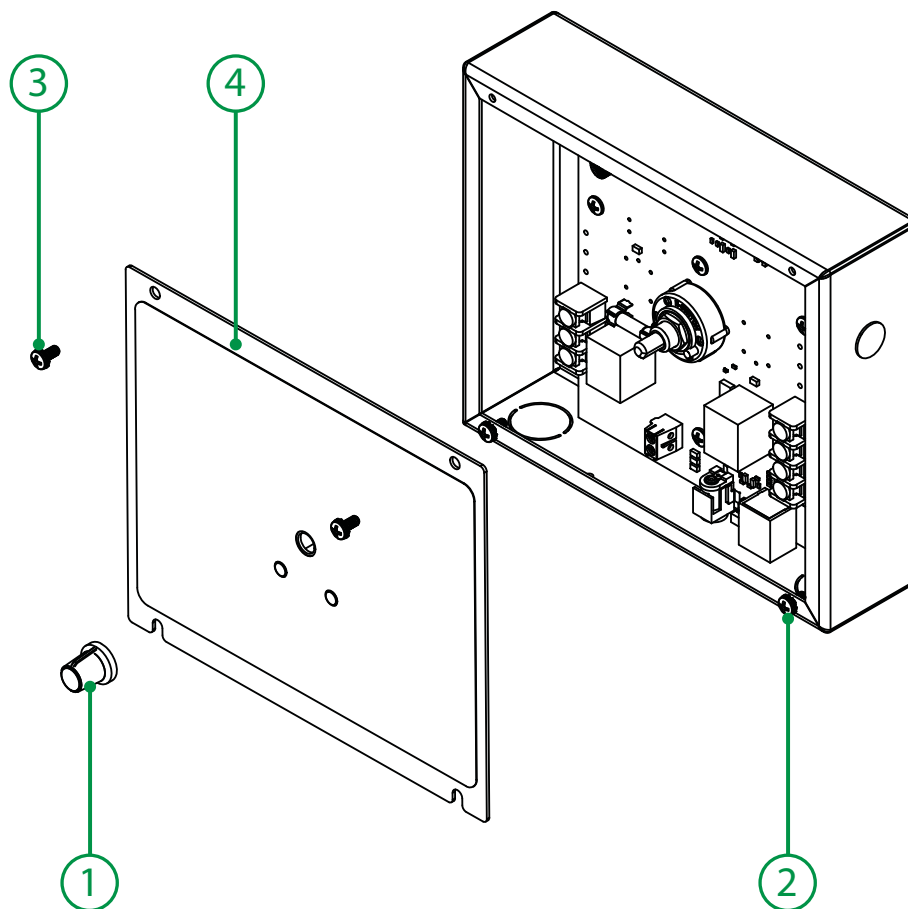
24Vdc is supplied to the MX1i via the RJ-45 cable when connected to a GCX control system or a GrowNET™ hub. A separate power supply is not required to operate the MX1i.



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

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.

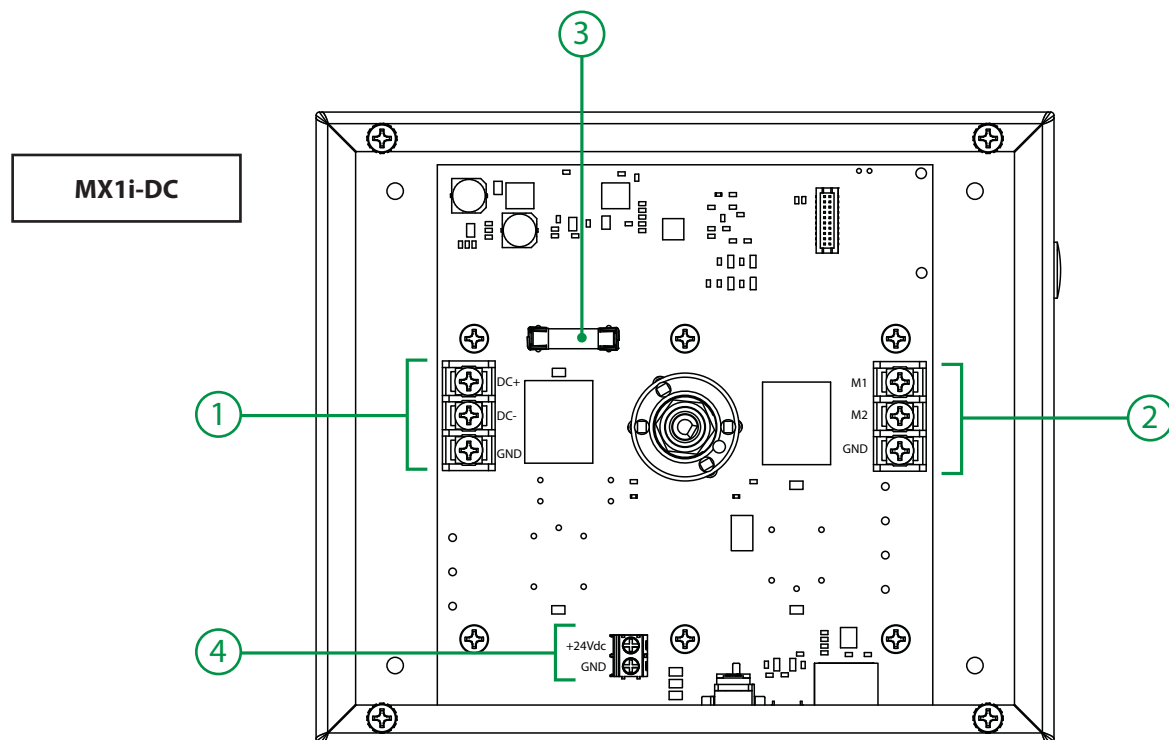
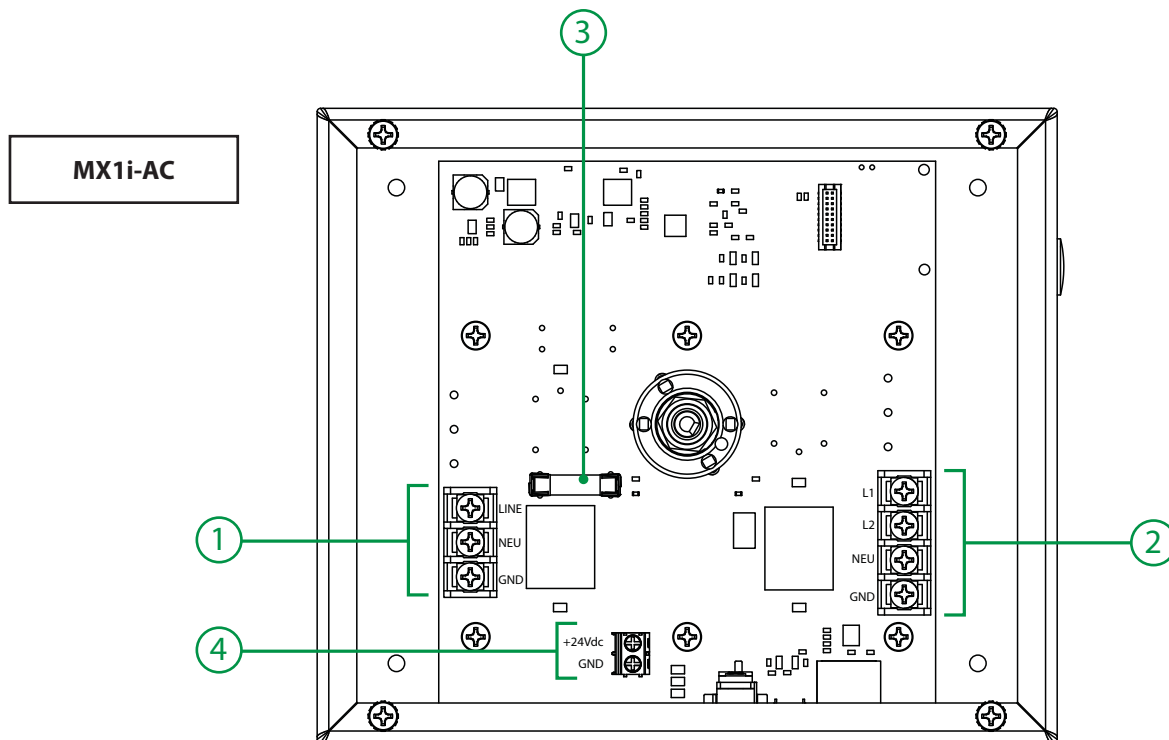


DANGER! Risk of injury or death from electric shock; disconnect all power before wiring or service.



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

Internal Component Locations

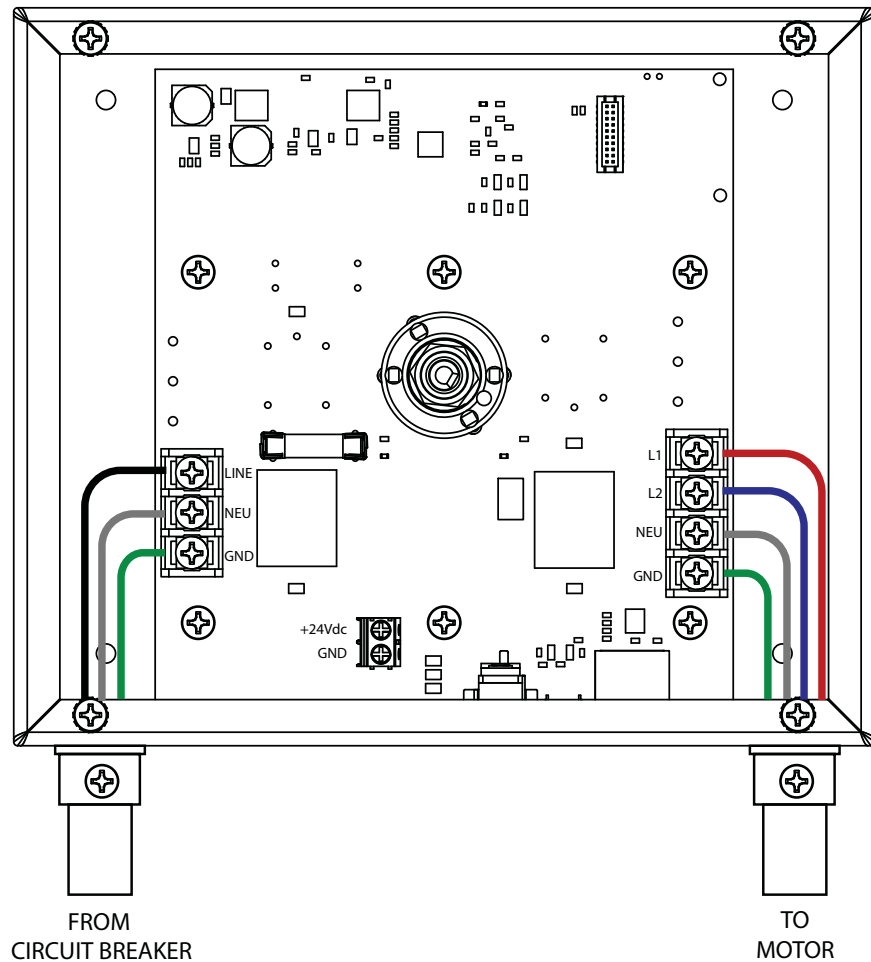


1. Power Input
2. Motor Outputs
3. Motor Fuse
4. DC Power

Input connections for motor power.
 Output connections for motor.
 Fuse sized according to specifications. Replace only with recommended fuse.
 Optional DC power connection for backup power.

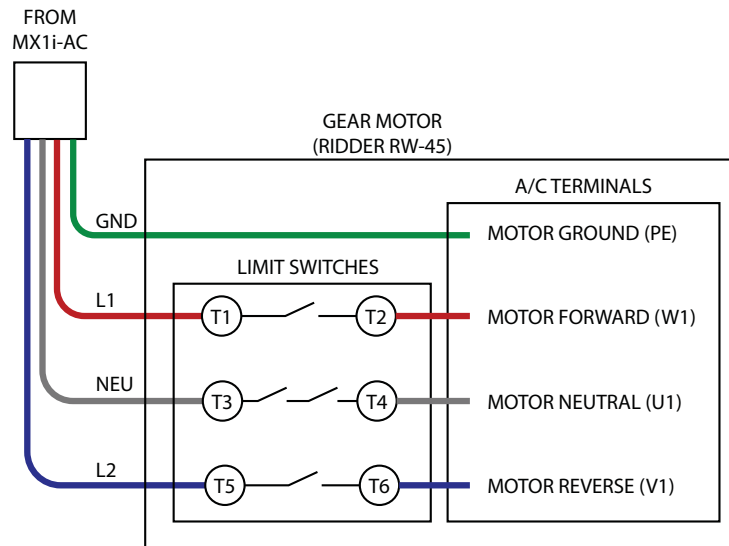
AC Motor Wiring

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.



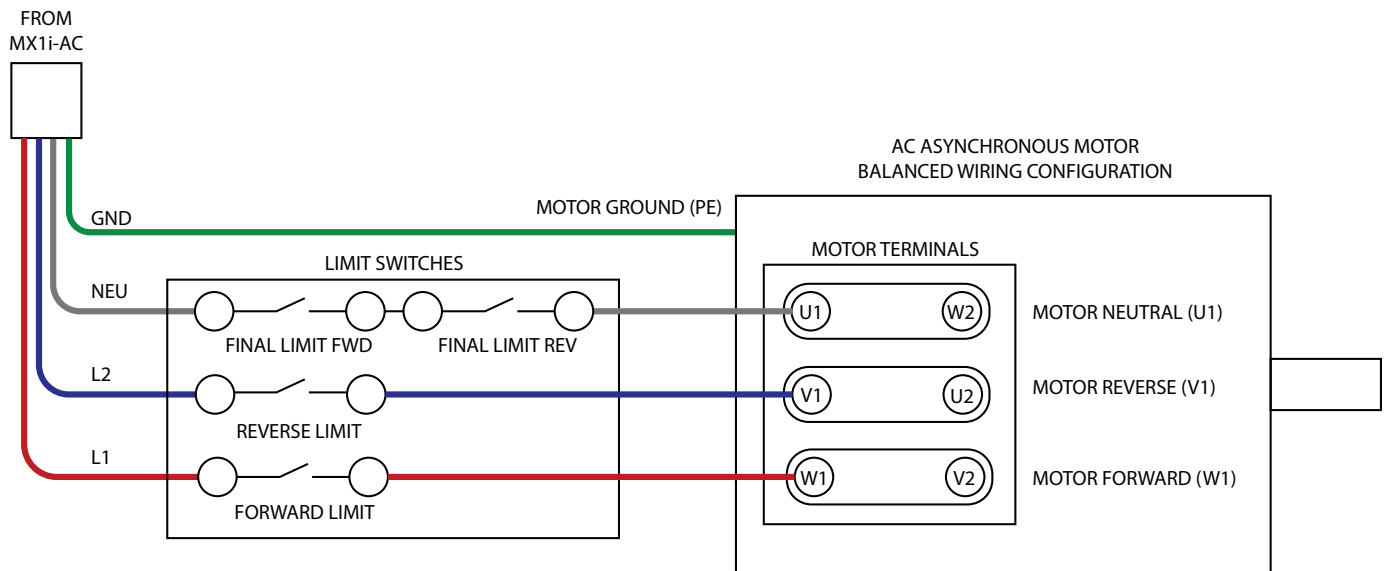
Ridder RW-45

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.



Asynchronous Single-Phase Motors

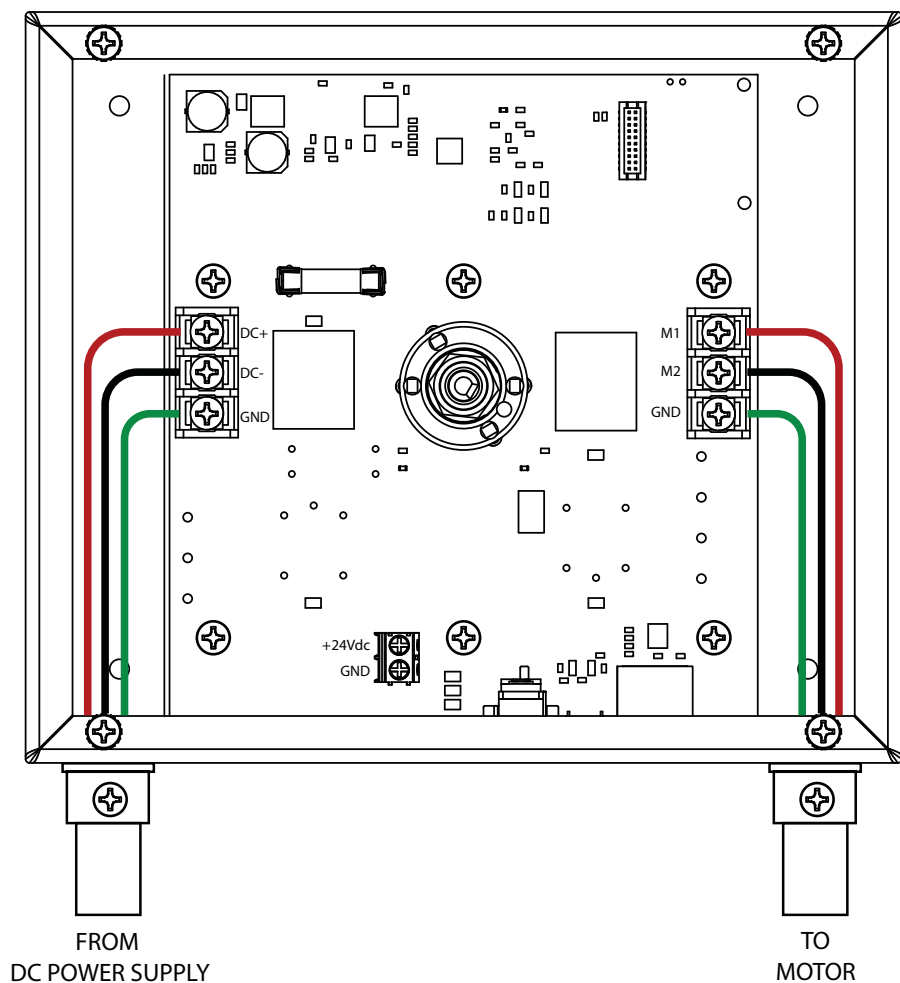
Single phase motors must be compatible with a balanced wiring configuration as shown below.



Confirm wiring compatibility with your motor manufacturer's data sheet or wiring instructions. Limit switches must be compatible with motor voltage and load ratings.

DC Motor Wiring

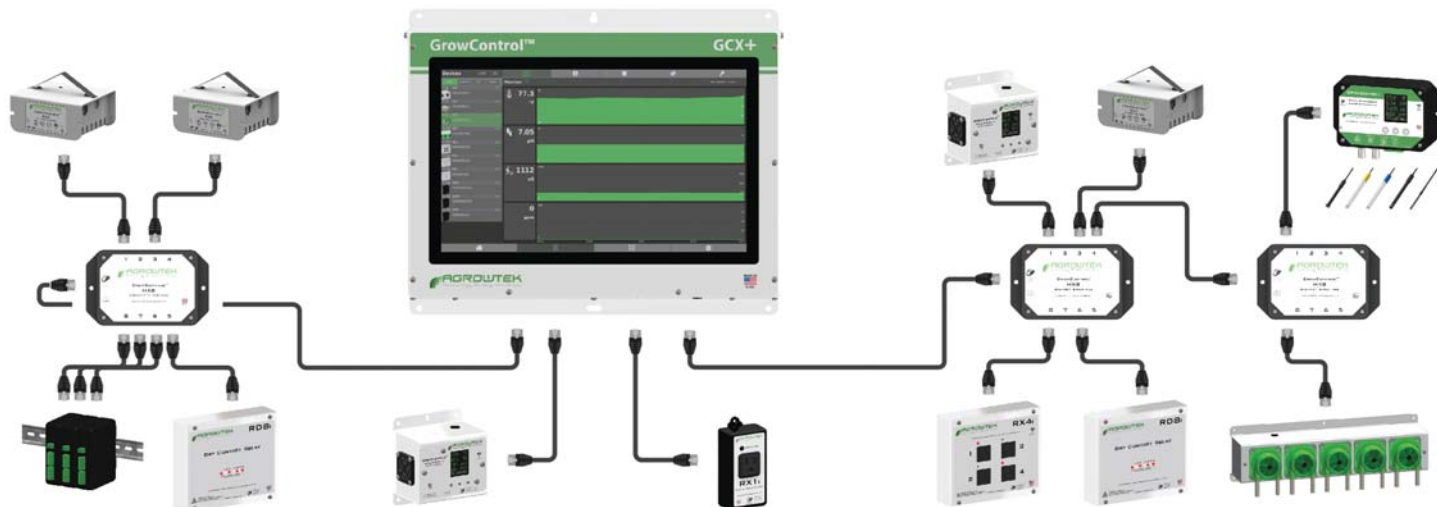
DC power must be supplied to the relay by a suitable external DC power supply such as an industrial DIN rail power supply. Power to the motor is switched by the relay to the output terminals. Limit switches on the motor are wired at the motor. Conduit is recommended for wiring connections.



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

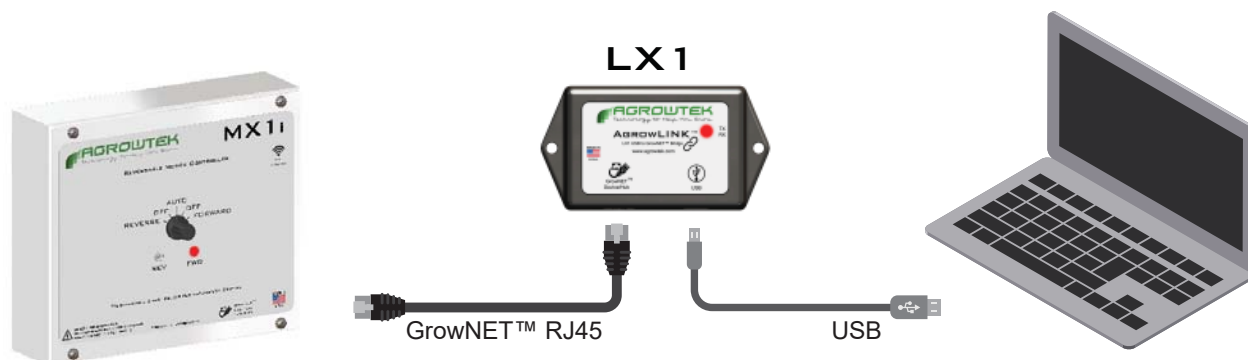
HX8 GrowNET™ hubs expand a single port into eight more ports. Hubs can be daisy-chained to form a network of up to 100 devices per GrowNET™ bus. Individually buffered port transceivers provide excellent signal integrity and extended communication strength and range.

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.



Connection to USB AgrowLINK

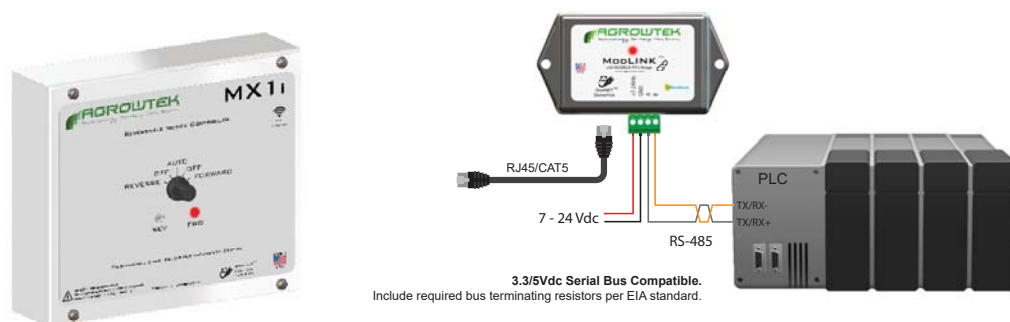
Agrowtek's intelligent relays may be connected to the LX1 USB AgrowLINK for firmware updates, communication protocol configuration, addressing and manual operation. Standard drivers automatically install in Windows for the LX1 USB AgrowLINK. GrowNET API is available for custom software applications.



Connection to MODBUS RTU

RS-485 / RS-422

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



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).

Technical Information

Troubleshooting

Problem	Solution
Setting the knob to the Forward (or reverse) position does not illuminate the Forward (or reverse) LED.	Check if any LED's are illuminated on the PCB. If there are no LED's illuminated, the PCB is not receiving power. In most applications the PCB receives power from the RJ-45 connection. Check the RJ-45 connection for damage. Test the RJ-45 cable with a tester tool. Check the upstream device (HX8 hub or GCX controller) that the device is connected to. It should be providing power. If connected to an HX8 hub, ensure the hub's LED is illuminated to indicate it has power. Try an alternate hub port to ensure there is not a problem with the hub port. Try an alternate RJ-45 cable to ensure there is not a problem with the cable.
The forward (or reverse) LED illuminates, but the motor does not move.	Check the power supply or circuit breaker that is supplying power to the MX controller power input terminals. Check voltage at input terminals. Check voltage at output terminals when activated in the forward (or reverse) condition to ensure power is relayed to the output terminals. If the MX controller is relaying power to the output terminals, check the motor limit switches to ensure they are not activated.
The motor travels in the wrong direction.	MX1-AC: Reverse the forward and reverse output terminals. MX1-DC: Reverse M+ and M- output terminals. MX3: Reverse A and B phase terminals.

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 purchase. Returns not purchased directly from Agrowtek Inc. must include proof of purchase date otherwise purchase date is considered as date of manufacture. This warranty does not cover damages from abuse, accidental breakage, or items 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 of any returns for a return authorization. No returns will be accepted without a return authorization. Customer is responsible for return shipment to Agrowtek Inc. for warranty service. Return authorization number(s) must be printed on the outside of the box or the return may be rejected and returned to the sender. Agrowtek Inc. is not responsible for supplying replacement products or parts in advance of return(s) for warranty claim. 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.