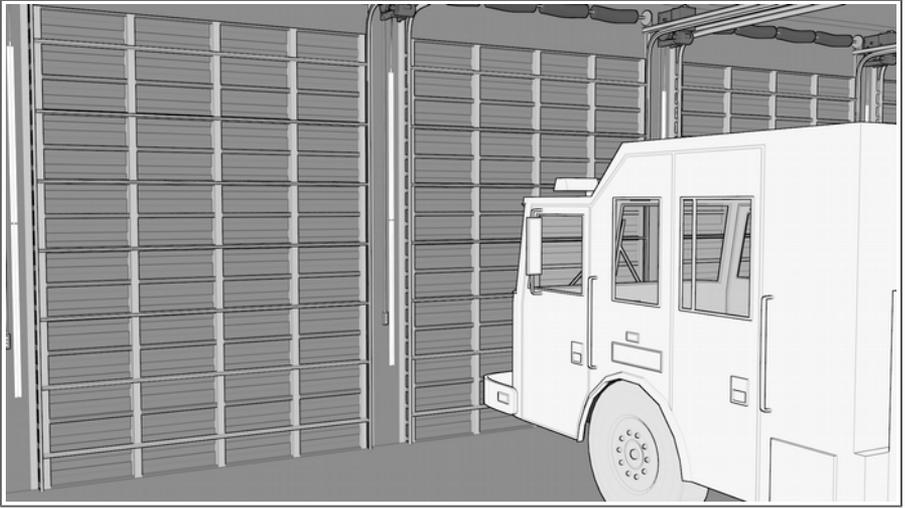


INSTALLATION MANUAL



 **IMPORTANT**

Read all instructions in this manual before installing. Perform steps in the order given. Failure to comply could result in property damage or personal injury. Keep manual for future reference. Download the latest manual from www.GateArms.com.



SAFETY PRECAUTIONS

For safe installation and trouble-free operation, you must:

- Carefully read this instruction booklet before beginning.
- Follow each installation step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all danger, warning, and caution notices given in this manual.

If necessary, Get help

These instructions are all you need for most installation sites. If you require help for a special situation, contact GateArms.com at 844-428-3276.

When Wiring

ELECTRICAL SHOCK CAN CAUSE SEVERE PERSONAL INJURY OR DEATH. ONLY A QUALIFIED EXPERIENCED TECHNICIAN SHOULD ATTEMPT TO WIRE THIS SYSTEM.

- Do not supply power to the unit until all wiring and connections are completed or reconnected and checked.
- Highly dangerous electrical voltages and moving parts are used in the operator. Carefully refer to the wiring diagram and these instructions when performing any wiring.
- Ground the unit following local electrical codes.
- Connect all wiring tightly. Loose connections can become disconnected due to vibrations from the heavy door equipment.
- Do not modify the components, or install differently than what is described in this manual.

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1. BEFORE YOU BEGIN

1.1. Included Accessories

WARNING

For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts unless directed otherwise. The use of non-prescribed parts can cause serious accidents such as the unit to fall, electric shock, or fire.

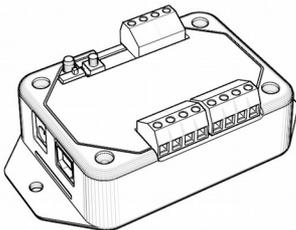
The following installation parts are furnished. Use them as required.

Check that the following components are included with your kit. Do not discard any components until the installation work has been completed.

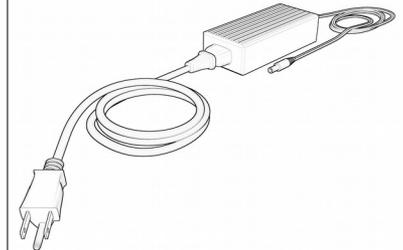
(1) Instruction Manual



(1) LED Controller

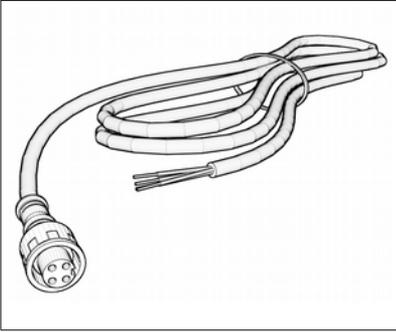


(1) 110V to 12VDC Power Supply with Cables

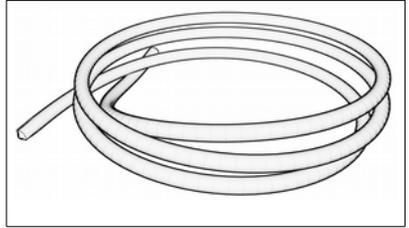


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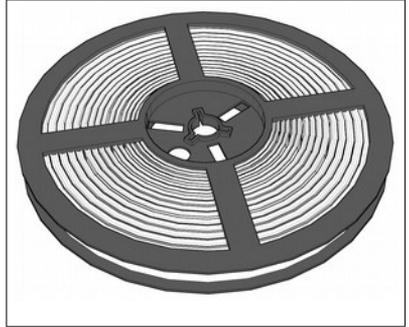
(1) 20 ft LED Wiring Harness



(1) 3 ft Signal Wire

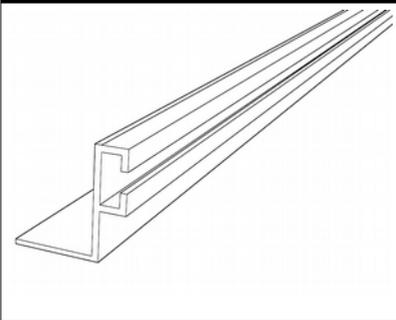


(1) 10 ft LED Strip

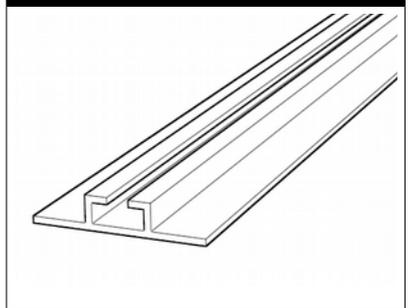


You should also have one of the following pair of retainers

**(2) 5 ft 90°
LED Retainer Track**



**(2) 5 ft Standard
LED Retainer Track**



1.2. Recommended Tools and Supplies

General

- ◆ Ladder
- ◆ Screwdrivers
 - Mini Pocket Slotted
 - ¼" Slotted
 - #1 Philips
 - #2 Philips
- ◆ Wire Stripper
- ◆ Multi Meter
- ◆ Level
- ◆ Utility Knife
- ◆ Cleaner or Degreaser
- ◆ Clean Rags
- ◆ Double-sided Foam tape or Velcro
- ◆ Wire Ties
- ◆ Marker

Liftmaster or Limit Switch Installation

- ◆ Terminal Crimper
- ◆ Red Crimp Terminals – Spade and Female Quick Disconnect 3/16" & 1/4"
- ◆ LM-brand AUXCARD

Overhead Door Installation

- ◆ ¼" Socket
- ◆ Socket Wrench
- ◆ Long Wrench Extension
- ◆ OHD-brand Auxiliary Expansion Module

90° Track

- ◆ Drill
- ◆ Drill Bit

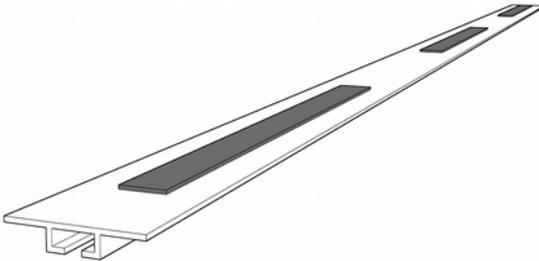
2. INSTALL LED RETAINER

The installation method of the LED retainer depends on whether you are installing the standard LED retainer (rolling steel door) or the 90° retainer (sectional door).

2.1. Standard LED Retainer Installation (Rolling Steel Doors)

The standard retainer is designed to be installed directly onto the wall or door guide. You could use screws or double-sided foam tape. In most cases, double-sided foam tape is appropriate.

When using tape, be sure the contact surfaces have been thoroughly cleaned with a degreaser and dried to ensure maximum adhesion. We recommend attaching 3 pieces of double-sided foam tape (1 foot long each) on the back of each retainer, two on the far ends and one in the middle as shown below.

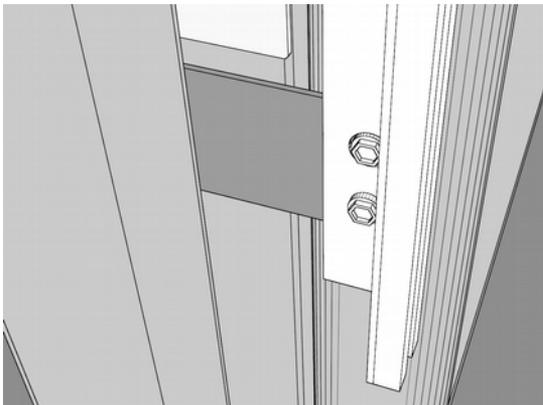


Ensure that all pieces of the retainer are installed straight, preferably by using a level. Install pieces with only a small gap between them.

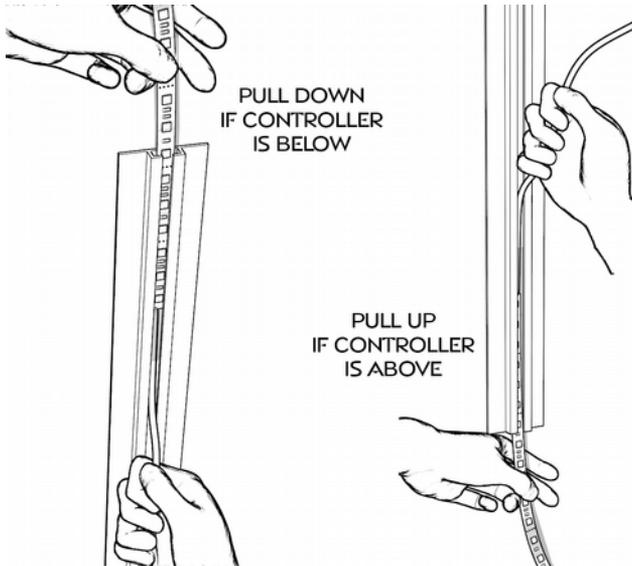
2.2. 90° Retainer Installation (Sectional Doors)



The 90° LED retainer is typically installed on the door track itself. Drill out 3 large holes in the LED retainer's flange (just over the diameter of your existing screws) where the door track screws or nuts are located. Connect the retainer to the door guide tracks using the 3 existing screws.



2.3. Installing the LED Strip



If the LED Controller is installed above the retainers, insert the wire end of the LED strip into the bottom end of the lower retainer. With one hand guiding it from the bottom, pull the wire straight up along the length of the track. If the LED Controller is installed below the retainers, do the same in the other direction. Once you get far enough, you will need an assistant to continue pulling the LED strip through the track until you have reached the desired length.

When fully-installed, use a pliers to crimp both ends of the LED retainer track. This will ensure the LED strip doesn't slide downwards in the track due to time or vibrations.

2.4. Connect LED Strip to LED Harness Wire

Connect the LED harness wire to the LED strip.

Note there are arrows on either side of the connector that should point at each other to align the notch.

Tighten the connector cap firmly once fully seated.

2.5. Run Harness Wire to Door Operator

Route the 20' (or 30' or 40') LED harness wire from the LED strip to the top of the Door Operator (or wherever you will mount the LED Controller), ensuring clean cabling.

2.6. Using A/C or D/C Signals?

Determine whether your signal sources use A/C or D/C. This LED Controller is built for D/C signals. A/C signals will damage the LED Controller. We manufacture an A/C Signal Converter (optional accessory) for when an A/C signal is used (maximum 120VAC). If you have a mixed scenario where some signal wires use A/C and others use D/C, please call GateArms.com technical support and we will guide you through the programming. If all signals are D/C, do not use the A/C Signal Converter board.

HOW TO USE THE A/C SIGNAL CONVERTER

1. Slide A/C Signal Converter onto the LED Controller's 4-pin signal pins, resting in the middle of the LED Controller.
2. Ensure all DIP switches are down (set to A/C).
3. Remove the upper press-on header and connect your signal wires to that header. Do not install the press-on header yet.
4. Turn LED Controller on.
5. Press and hold the LED Controller's programming button for 3 seconds. The LED on top of the Controller will begin to fast-blink, indicating it is in "A/C Signal" mode.
6. Push the press-on header (with your wires attached) onto the top pin-header, ensuring the wires match the silkscreen labels.

2.7. Turn Off Operator Power

Turn off all power to the overhead door equipment.

WARNING

Serious injury could occur if power is not disconnected prior to installation.

3. LED CONTROLLER

3.1. LED Controller Programming

The LED Controller can be configured in the field to work with various commercial door operators.

There are three primary configurations. They are selected by holding down the Mode button (located next to the LED Controller power switch) for 3+ seconds. Repeating this will cycle between the 3 modes.

	Primary Configurations	Status LED	Page
1	Standard Operator	Steady Light	15
2	Monitored Safety	Slow Blinking	17
3	Direct-to-Motor	Fast Blinking	18

If the door has a safety device such as an electric eye or laser presence detector installed, its output can be connected to the Aux Signal port of the LED Controller so that the LED strip can flash white when the safety is tripped (optional). If you are not using such a device, leave this port disconnected.

Safety Device Condition	Door Status	LED Strip Color
All Clear	Fully Closed	Red
All Clear	Fully Opened	Green
Doorway Blocked	Fully Closed	Blinking White
Doorway Blocked	Fully Opened	Green for 20 sec then Blink White

3.2. Resetting the Controller to Factory Configuration

If you made changes to the configuration of the LED Controller and want to revert to factory configuration, follow the steps listed below. This will revert to the Standard Operator Configuration.

Resetting the Controller:

1. Turn on the Controller. Having live wires attached is not a problem.
2. Hold down the Mode button for more than 3 seconds until the pattern of the amber Status LED changes. If the Status LED is a steady unchanging amber light, you have reset the Controller to factory defaults. If not, repeat step 2 again until it becomes steady.
3. Power cycle the Controller.

3.3. Standard Operator Configuration

The LED Controller ships with the Standard Operator configuration. We define “Standard” as a newer door operator, preferably with an optional auxiliary relay expansion card installed.

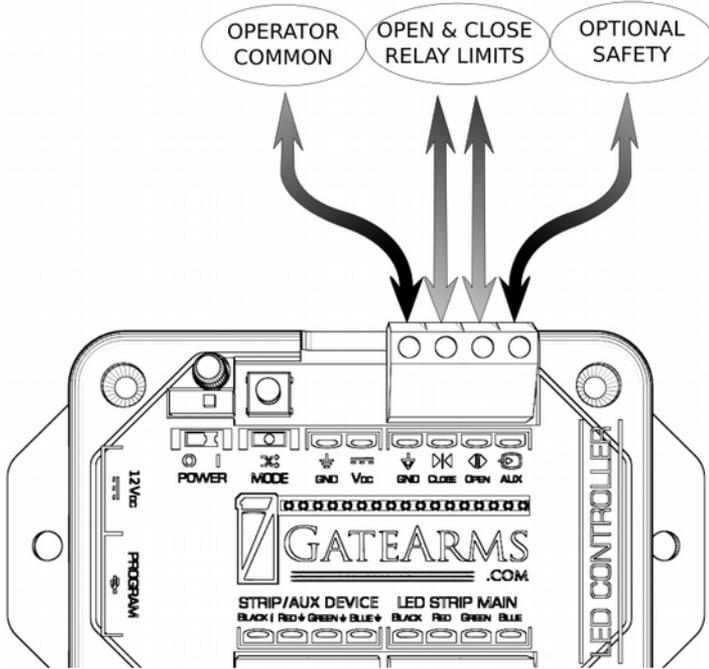
	Open Signal	LED Strip Color	Door Status
1	Not Grounded	Blinking Red	Door in Motion
2	Grounded	Solid Green	Door Fully Opened

	Close Signal	LED Strip Color	Door Status
1	Not Grounded	Blinking Red	Door in Motion
2	Grounded	Solid Red	Door Fully Closed

One can also attach directly to unused spade contacts on the operator’s cam limit switches. Use a multimeter to verify the voltage conditions when attaching directly to limit switches. If you are dealing with A/C signals, you **MUST** use our A/C Signal Converter board. D/C switches should close to Ground.

If your operator has a safety device in use, the Standard Operator Configuration supports monitoring simple “non-monitored” devices.

	Aux (Safety) Signal	LED Strip Color	Door Status
1	Not Grounded	Not Affected	Normal Operation
2	Grounded	Blinking White	Safety Eye Blocked



If the safety device can operate at 12VDC, it is possible to continuously monitor the device’s existence and functionality by using the LED Controller as its power source. Simply attach the safety eye’s power wire (positive) to the “AUX DEVICE / BLACK” terminal and its ground wire (negative) to the “AUX DEVICE / BLUE” terminal. If the LED Controller notices an unusual drop in the current consumption of the safety device, the LED strip will flash white rapidly to indicate an unsafe malfunction condition of the safety device.

	AUX DEVICE / BLUE	LED Strip Color	Door Status
1	Higher than ~10mA	Not Affected	Normal Operation
2	Lower than ~10mA	Rapid Flash White	Safety Eye Disconnected

3.4. Monitored Safety Configuration

The Monitored Safety Configuration supports a “monitored” safety device (compliant with UL325) that puts out a heartbeat.

If the heartbeat is lost, the LED strip will flash white rapidly to indicate an unsafe malfunction condition of the safety device.

	Aux (Safety) Signal	LED Strip Color	Door Status
1	~300Hz pulse	Not Affected	Normal Operation
2	~300ms pulse	Slow Flash White	Safety Blocked
3	No pulse	Rapid Flash White	Safety Disconnected

Some monitored safety devices such as the Vitector do not put out a heartbeat while the safety is blocked. In this situation, use the “Half-Monitored Safety Configuration” described on page 22.

To enable the Monitored Safety Configuration:

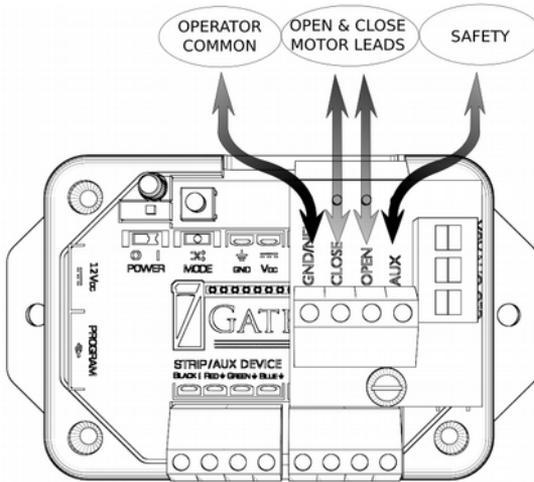
1. Turn on the Controller.
2. Hold down the mode button for over three seconds until the status LED starts flashing. Then let go.

In this configuration, the AUX DEVICE port will duplicate the behavior of the LED STRIP MAIN port to allow installation of an additional LED strip (clone-mode).

3.5. Direct-to-Motor Configuration

This configuration allows you to wire directly to 110VAC motor control leads for AC motors whose direction is determined by which motor lead is powered. These are typically found in Manaras brand pre-UL325 relay-driven door operators.

CRITICAL: DO NOT attach any A/C signal wires directly to the LED Controller’s signal header. Doing so will cause irreparable damage to the Controller. You **MUST** use the A/C Signal Converter Board.



	Open Signal	LED Strip Color	Door Status
1	0VAC to 8VAC	Steady Red or Green	Door not moving
2	8.5VAC to 120VAC	Blinking Red	Door opening

	Close Signal	LED Strip Color	Door Status
1	0VAC to 8VAC	Steady Red or Green	Door not moving
2	8.5VAC to 120VAC	Blinking Red	Door closing

In the Direct-to-Motor Configuration, the color of the LED strip is determined by the most recent direction the door was moving. The LED Controller knows that the door has stopped moving by waiting for the motor voltage to drop close to zero.

It may be necessary and is generally recommended that when installing an operator with isolated A/C signal sources, the operator's common should be connected directly to the operator's chassis (true ground). Not doing this may cause the LED Controller to unreliably detect the door motor signals.

If a safety device is not installed you should still attach Signal Aux to the Safety terminal of the operator. If the operator does not have such a terminal input see the next section titled "Direct-to-Motor Configuration without Safety".

	Aux (Safety) Signal	LED Strip Color	Door Status
1	8.5VAC to 120VAC	Not Affected	Normal Operation
2	0VAC to 8VAC	Blinking White	Safety Eye Blocked or Door is Closed

If the safety device can operate at 12VDC, it is possible to continuously monitor the device's existence and functionality by using the LED Controller as its power source. For more information on how to set this up see page 16.

To enable the Direct-to-Motor Configuration:

1. Turn on the Controller.
2. Hold down the mode button for over three seconds until the status LED starts slow-flashing. Then let go.
3. Hold down the mode button for over three seconds until the status LED starts fast-flashing. Then let go.

3.6. Direct-to-Motor Configuration without Safety

In order to turn off the Safety input for the Direct-to-Motor configuration, you must first be in the Direct-to-Motor profile.

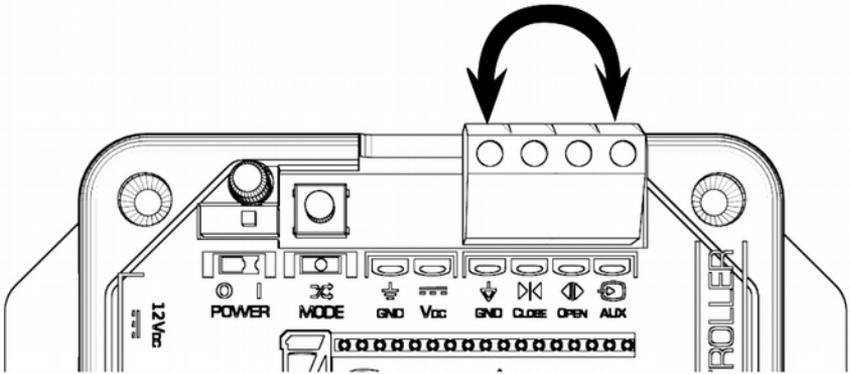
To enable the Direct-to-Motor Configuration:

1. Turn on the Controller.
2. Hold down the mode button for over three seconds until the status LED starts slow flashing. Then let go.
3. Hold down the mode button for over three seconds until the status LED starts fast flashing. Then let go.

To learn more about the Direct-to-Motor Configuration read page 18.

Disabling the Signal Aux terminal:

1. Power off the Controller with the power switch.
2. Disconnect the A/C signal converter board.
3. Remove any live signal wires if attached.
4. Jumper the Signal Ground and Aux together.



5. Hold down the Mode button and, while it's being held down, turn on the Controller.
6. If done correctly, the status LED will flash rapidly for a few seconds, then turn off. If this didn't happen, repeat step 5.
7. Remove the jumper wire.
8. Turn off the Controller.
9. Reattach the live wires to the signal header if previously removed.
10. Reconnect the A/C Signal Converter Board. At this point the Aux port should have no wire attached.
11. Turn on the Controller. The status LED should be slowly fading in and out. If you quickly press and release the Mode button, the LED should read out the code 4, 2, 2, 1.

3.7. Half-Monitored Safety Configuration

Some monitored safety devices such as the Vitector do not put out a heartbeat while the safety is tripped. These special cases will require the use of the Half-Monitored Safety Configuration.

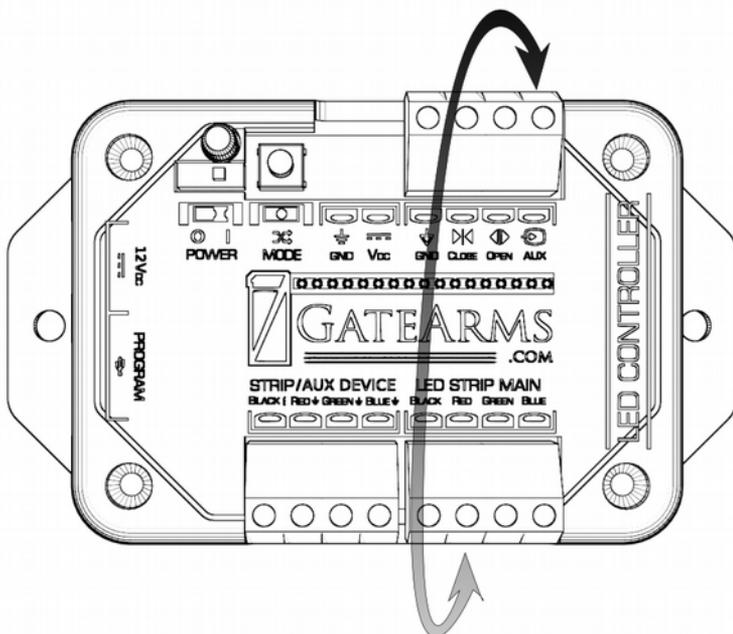
	Aux (Safety) Signal	LED Strip Color	Door Status
1	No pulse	Not Affected	Normal Operation
2	~300ms pulse	Slow Flash White	Safety Blocked

This mode works nearly exactly the same as the Monitored Safety Configuration (see page 17) except that the “Fast-Flash White” is disabled. This disables the ability to detect a power disruption or critical malfunction with the safety device unless you use the current sense feature described in page 16.

To enable the Half-Monitored Safety Configuration:

1. Turn the LED Controller on. Ensure that the Status LED is a steady amber. If it isn't steady, reset the Controller (Page 14).
2. Turn off the Controller.
3. Disconnect the A/C Signal Converter Board if applicable.
4. Remove any live signal wires if attached.

5. Jumper the Signal AUX and the LED STRIP MAIN RED together.



6. Hold down the Mode button and, while it's being held down, turn on the Controller. If done correctly the status LED would flash rapidly for a few seconds then turn off. If this didn't happen try step 6 again.
7. Remove the jumper wire.
8. Turn off the Controller.
9. Reattach the live wires to the signal header if previously removed.
10. Turn on the Controller. The status LED should be slowly fading in and out. If you quickly press and release the Mode button the LED should read out the code 2, 4, 1, 3.

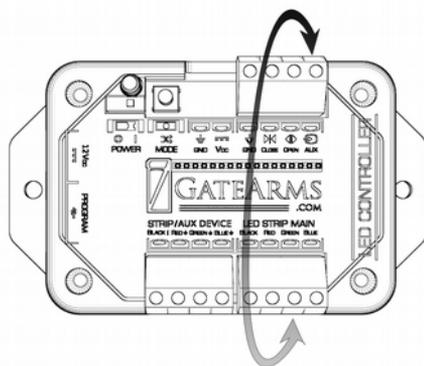
3.8. Manaras Digital Logic Configuration

The following table describes how to wire to a UL-325 listed Manaras-brand door operator. The A/C Signal Converter Board is not used on this type of operator.

Signal Input	Door Status
Ground	Terminal Block "COM" on 3, 8, or 14
Close	The unused closed limit switch male spade
Open	The unused open limit switch male spade
Aux	Terminal Block "SNS" on 5

To enable the Manaras Digital Logic Configuration:

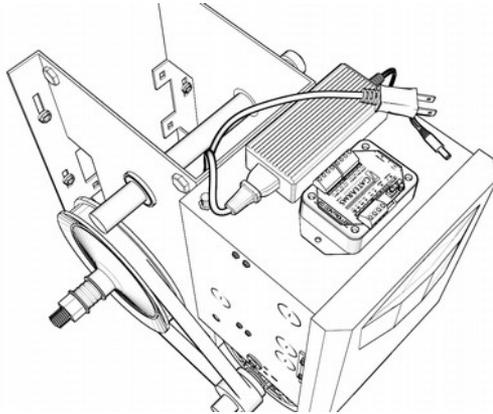
1. Turn the LED Controller on. Ensure that the Status LED is a steady amber. If it isn't steady, reset the Controller (Page 14).
2. Turn off the Controller.
3. Remove any live signal wires if attached.
4. Jumper the Signal Aux and the LED STRIP MAIN GREEN together.



-
5. Hold down the Mode button and, while it's being held down, turn on the Controller.
 6. If done correctly, the status LED will flash rapidly for a few seconds, then turn off. If this didn't happen, repeat step 5 again.
 7. Remove the jumper wire.
 8. Turn off the Controller.
 9. Reattach the live wires to the signal header if previously removed.
 10. Turn on the Controller. The status LED should be slowly fading in and out.
 11. If you quickly press and release the Mode button, the LED should read out the code 4, 2, 2, 3.

3.9. Stage the LED Controller

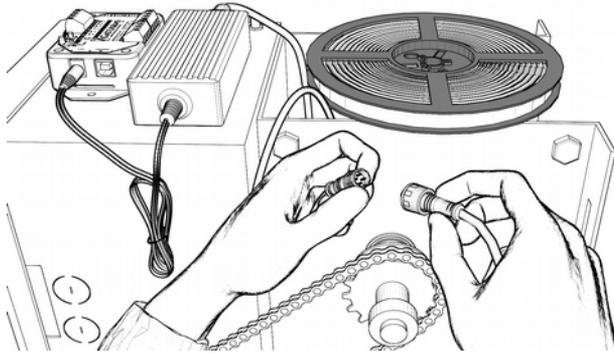
1. Ensure the LED Controller's power switch is in the OFF position.
2. Use Velcro or double-sided foam tape to secure the LED Controller and external power supply to the control box. Before applying adhesive to any surfaces, clean the contact areas thoroughly with a degreaser, then dry.



3. Ensure that heat and humidity will not affect your attachment method.
4. Plug-in the power supply's 12V plug to the Controller.

3.10 Attaching the LED Strip

1. Connect the harness wire to the LED strip and tighten the connector firmly.



2. Install the other end of the harness wire to the LED Controller "LED STRIP MAIN" header. Match the colors on the wire to the colors described on the cover corresponding to each header port. Screw headers should always face outwards from center.
3. Make sure all temporary wiring is secured and a safe distance from moving parts.
4. Plug in the 12V external power supply into an 110VAC electrical outlet.

4. CONNECT TO DOOR OPERATOR

4.1. Connect Signal Cable to LED Controller

- ➔ Connect one end of the 4-conductor Signal Cable to the LED Controller's Signal Header.
 1. Connect the Black Wire to the Controller's GND port.
 2. Connect the Green Wire to the Controller's OPEN port.
 3. Connect the Red Wire to the Controller's CLOSE port.
 4. Connect the 4th Wire (Yellow, White or Blue) to the Controller's AUX signal port.

4.2. Pass Cable thru hole into housing

- ➔ Pass the Signal Cable through the operator housing through an existing punch-out or by drilling a hole.
- ➔ Consider using a cable strain-relief gland in the hole.

4.3. Connect Signal Cable to Operator

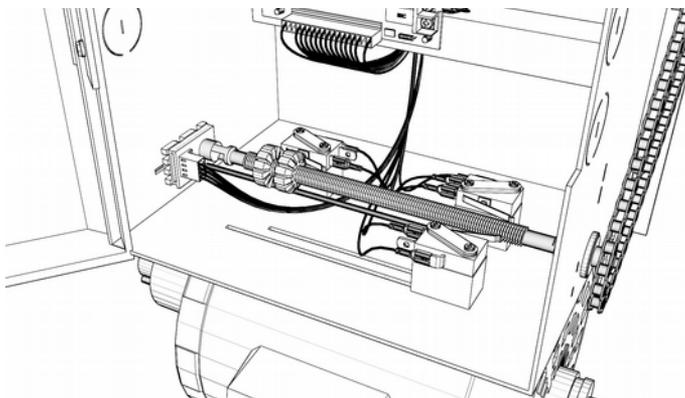
- ➔ Connect the other end of the 4-conductor Signal Cable to the door operator. It should connect to the fully-open and fully-closed relays. These relays might be available in an auxiliary card or programmable output ports. Alternatively you can connect to the operator's limit switches, or even directly to the motor power posts.

4.4. Liftmaster Installation

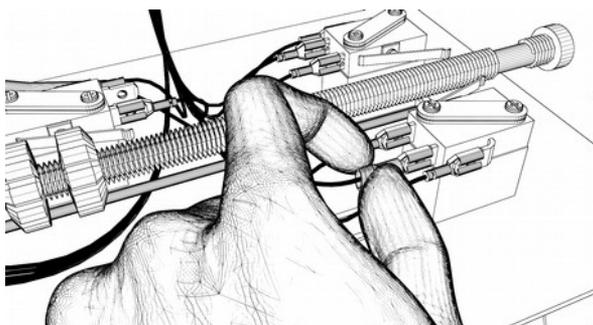
1. If using an L3 or older model, use “Standard Safety Configuration” on page 15.
If using an L4 or L5 with an LMEP port, use the “Monitored Safety Configuration” on page 17.
2. Pass the Signal Cable through a hole on the sides of the operator box. If none can be found, use one of the available punch-outs.
 - 2.1. Note: If the supplied Signal Cable is too short to reach between the inside of the operator and the LED Controller box, use any 4+ conductor wire. The signal wire can be 100+ feet long if you prefer to mount the LED Controller a distance away from the CDO. That could make power cabling simpler.
3. AUXCARD OPTION: We strongly recommend using the Liftmaster AuxCard (Auxiliary Contacts Option Board), which provides highly-accessible fully-open and fully-closed relays.
 - 3.1. Connect Green wire to fully-open, Red wire to fully-closed, Black wire to Common.
 - 3.2. Skip ahead to #9 in this section.
4. LIMIT SWITCH OPTION: Open the operator cover and locate the limit switches.
Most Liftmaster CDOs use limit switches which trigger on “Fully Closed” or “Fully Open” states. Those switches generally have an extra spade receptacle available for

your use. This is where you will attach two of your signal wires.

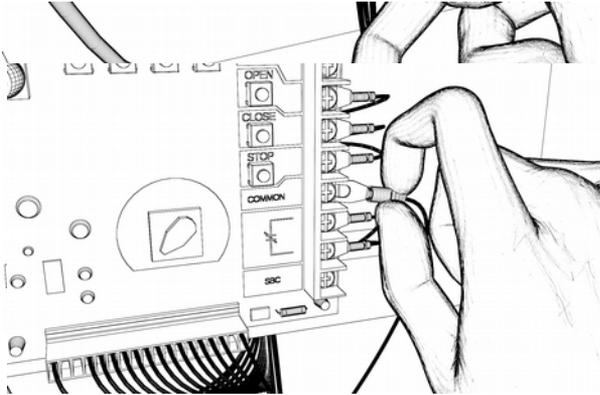
- 4.1. Be sure to confirm voltages on tripped/not-tripped states for both switches. Normally the untripped switch is floating, and closes to ground. If your switch closes to voltage, or if you see A/C voltage instead of D/C voltage, contact GateArms.com for technical support.



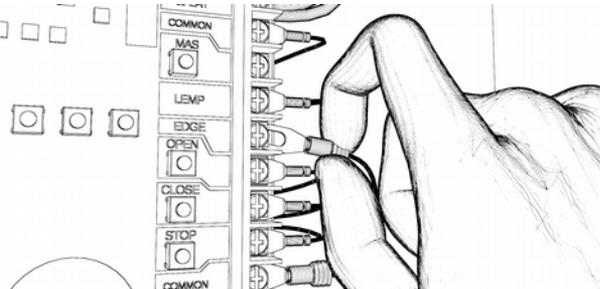
5. Attach and crimp small spade connectors to the Signal Cable's green and red wires.
6. Attach the red spaded wire to the "Fully Closed" limit switch's available spade terminal.



7. Attach the green spaded wire to the “Fully Open” limit switch’s available spade terminal.

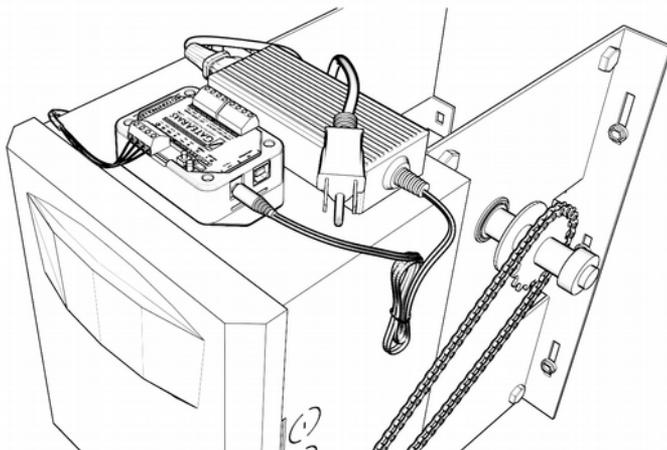


8. Attach the black wire to the operator’s common / ground.
9. If the operator is using a safety device, you may attach the fourth conductor (yellow, blue or white) to the same terminal used by your safety eye’s N/O circuit (grounded on trigger).



10. Attach the other end of the signal wire to the LED Controller signal header. Review the colors of the wires you have chosen carefully so not to mix up the connections.

LED Controller	Door Operator
Ground	Common
Open	Open Limit Switch
Close	Close Limit Switch
Aux	Safety Eye Device



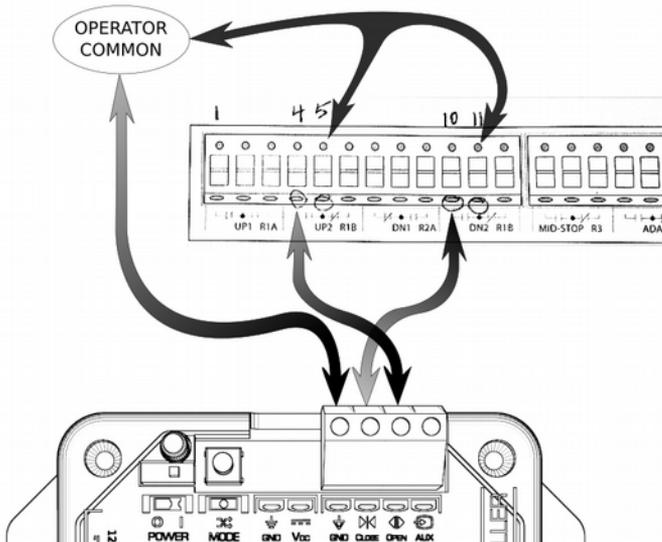
4.5. Overhead Door Corp. Installation

1. Use “Standard Safety Configuration” on page 15.
2. OHD Corp CDOs typically require use of the Auxiliary Output Expansion module. Install it using a ¼” socket wrench with a long extension to install 2 hex screws. Ensure that its ribbon cable is connected as instructed in the Expansion Module installation manual.

HINT

You may find it easier to connect the Signal and common wires to the Expansion Module relay ports prior to installing that module since clearance space is limited once it's installed.

3. Attach the signal wire between the LED Controller and the Operator as shown below.



4.6. Direct-to-Motor type operator Installation

Some door operators do not use circuit boards or provide output relays that can be used to determine fully-open and fully-closed statuses. We connect directly to the motor control leads to determine door movement and direction.

1. Program the LED Controller, using the “Direct-to-Motor Configuration” instructions on page 18.
2. Determine if motor uses A/C or D/C power. If A/C, be sure to use the A/C Signal Converter.
3. Locate the Common/Ground terminal post. It should be labeled “COM”.
4. Trace the power wires for the motor and locate the 2 power connection terminal posts.
5. Locate the Safety terminal post. It should be labeled “Safety”.
6. Connect the cable from the Signal Header on the LED Controller to the terminal posts you located.
 1. Connect LED GND to Operator COM
 2. Connect LED Close to Operator power terminal that is powered during closing.
 3. Connect LED Open to Operator power terminal that is powered during opening.
 4. Connect LED Aux to Operator Safety terminal.

5. POWER UP & TEST THE CONFIGURATION

1. Connect the 12VDC power cable to the LED Controller.
2. Power-up the LED Controller using the top power switch.
3. LEDs should illuminate immediately. If not, turn power off and check all connections.

5.1. Test the LED configuration

Open and close the garage door several times.

- ◆ LEDs should be solid red when door is fully closed.
- ◆ LEDs should flash red whenever the door is in motion.
- ◆ LEDs should be solid green when the door is fully open.
- ◆ If a safety device is installed and it is triggered, the LEDs should be blinking white. There is a 20 second delay before blinking white if the LEDs were green.

If there are any problems with the LED behavior during these events, turn off the door operator and review your wiring. Additionally you may refer to the troubleshooting section of this manual.

6. TROUBLESHOOTING

Call or email us. The LED Controller is extremely versatile, and can probably be configured to work for your unique situation. There are many subtle configuration settings that can be tweaked to get your project working. We're happy to help you!

No Lights On

Possible Issue: Power Supply Problems

- ◆ Check LED Controller. Is it's amber LED on?
- ◆ Is the 110V power adapter LED on? Check 110V power wiring at power source. Trace the wire from the LED Controller.
- ◆ Check the Press-on headers on the LED Controller's LED header(s). Are their wires well secured? Are they pressed in horizontally all the way?

Lights Don't Change Colors

Possible Issue: Signal Wire Problems

- ◆ Use a multimeter to determine what type of signals exist for fully-open and fully-closed. Use the tables starting on page 13 to determine which profile you should be using.

Possible Issue: Grounding Problems

- ◆ Check if the LED Controller is properly grounded to the same common in use by the Operator. If an A/C system, ensure Common is attached to the Operator's chassis and is truly grounded.

7. POWER EXTERNAL DEVICES

The LED Controller's 2nd LED header (called "LED STRIP AUX") can serve as a power supply for external devices that use 12VDC and less than 2Amp. We offer a variety of special firmware options to enable various scenarios.

1. POWERING & TRIGGERING ALARMS

The LED Controller can power audio alarms. The alarm beeper can be powered on fully-open, fully-closed, or while LED is flashing (in motion or safety-eye triggered).

This option can be enabled with help from GateArms.com technical support staff.

2. MONITORING SAFETY EQUIPMENT

The LED Controller can power safety-eye type devices. The LED Controller can sense if a device is no longer drawing current from the LED Controller. In that case, the LED Controller fires a visual alarm signal (a fast-blinking white light we call the "Migraine Mode") to notify users that the safety-eye is no longer functioning correctly. See the Standard Operator Configuration on page 16 for more information on configuring this function.