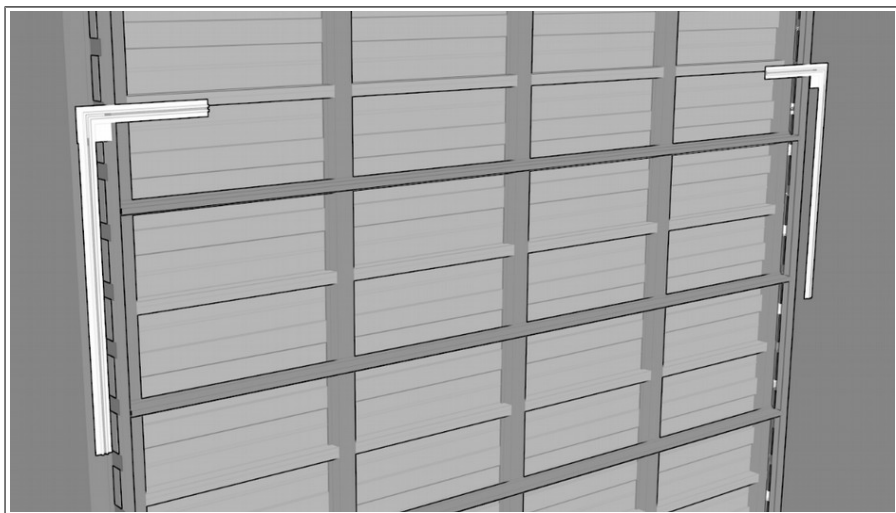


# INSTALLATION MANUAL



Models 'R-CAS-3' and 'R-CAS-1'

**⚠ 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.novalocks.com](http://www.novalocks.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 [www.novalocks.com](http://www.novalocks.com) at 800-236-7325.

### 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.

---

## Table of Contents

|  |    |
|--|----|
| 1. BEFORE YOU BEGIN.....                         | 4  |
| 1-1. Included Components.....                    | 4  |
| 1-2. Required Components Not Supplied.....       | 7  |
| 1-3. Recommended Tools.....                      | 7  |
| 1-4. Site Checklist.....                         | 8  |
| 2. INSTALLATION WORK.....                        | 9  |
| 2-1. LED Controller Programming.....             | 9  |
| 2-2. Turn Off Operator Power.....                | 10 |
| 2-3. Assemble LED Retainer Tracks.....           | 10 |
| 2-4. Install LED Strips in LED Retainers.....    | 11 |
| 2-5. Connect LED Strips to Corner Plate PCB..... | 11 |
| 2-5. Install LED Supply Cables.....              | 12 |
| 2-6. Attach Zip-Tie Mounting Plate.....          | 12 |
| 2-7. Install NEMA Enclosure Box.....             | 13 |
| 2-8. Install Wall Brackets.....                  | 14 |
| 2-9. Install Door Limit Switch.....              | 15 |
| 2-10. Connect to restraint relay.....            | 16 |
| 2-11. Bring 110VAC into NEMA Box.....            | 17 |
| 2-12. Install & Route Signal Wires.....          | 18 |
| 2-13. (Optional) Install LEDs Outdoors.....      | 19 |
| 2-14. Confirm Wiring.....                        | 20 |
| 2-15. Turn On 110VAC Power.....                  | 20 |
| 2-16. Turn LED Controller On.....                | 21 |
| 2-17. Ensure Correct LED Behaviors.....          | 21 |
| 2-18. Finalize.....                              | 22 |
| 3. TROUBLESHOOTING.....                          | 23 |

# 1. BEFORE YOU BEGIN

## 1-1. Included Components

### WARNING

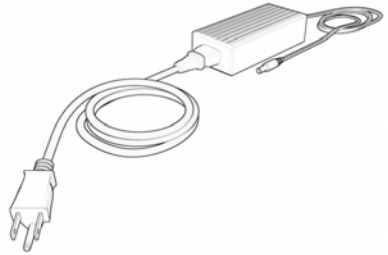
For installation purposes, be sure to use the parts supplied by the manufacturer or other prescribed parts unless directed otherwise. The use of non-prescribed parts can cause serious accidents such as the unit to fall, electric shock, or fire.

The following installation parts are furnished. Use them as instructed. Do not discard any components until the installation work has been completed.

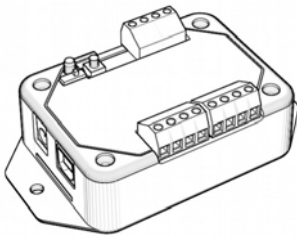
#### (1) Instruction Manual



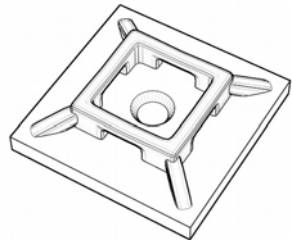
#### (1) 110V to 12VDC Power Brick with Cables



#### (1) LED Controller



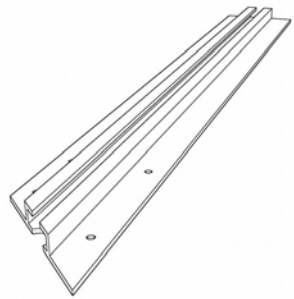
#### (2) Zip-Tie Mounting Base



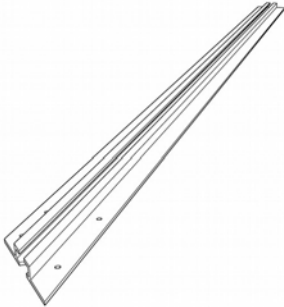
**(1) 1 ft or 3 ft Right-Hand LED Retainer Track**



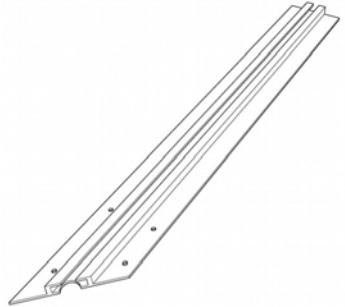
**(1) 1 ft Right-Hand LED Retainer Track**



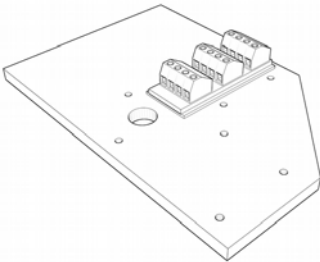
**(1) 1 ft or 3 ft Left-Hand LED Retainer Track**



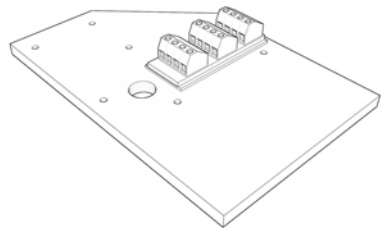
**(1) 1 ft Left-Hand LED Retainer Track**



**(1) Left-Hand Corner Plate**



**(1) Right-Hand Corner Plate**



The following components are also included:

- (2) 1 ft LED Strip
- (2) 3 ft LED Strip
- (1) NEMA Enclosure Box
- (1) Signal Cable
- (2) Cable Strain Relief Fitting PG9 for 110v & LED wires
- (1) Cable Strain Relief Fitting PG7 for signal wire
- (16) Stainless Machine Screw #6-32 x 3/4"
- (16) Stainless Nylon Lock Nut #6
- (16) #6 Stainless Flat Washer
- (2) Zip Tie
- (4) Wall Mount Clip
- (4) Wall Mount Screws 3/16" x 3/8"
- (3) Wire Nut
- (6) 4-pin Press-on Header

---

## 1-2. Required Components Not Supplied

These parts must be supplied by the installer.

- Door Limit Switch (for fully-open) and associated wiring.
- Wall brackets, bolts, washers, locknuts used to attach the brackets to the Corner Plates and to the wall.
- 22 AWG / 4 conductor wire: Used to connect LED Controller to Corner Plate PCB boards, Restraint relay, and Door Limit Switch relay – 100' minimum, prefer Black, Red, Green, Blue conductors
- Tap-cons: Used for attaching NEMA box, wall brackets, and limit switch to the wall

## 1-3. Recommended Tools

We recommend that installers have these tools available:

- 5/16" Open end wrench
- Philips screwdriver, medium
- Flat screwdriver, very small
- Wire stripper
- Multimeter (AC / DC)
- Drill & drill bits: For attaching bracket and box to wall
- 5/8" drill bit (Cable strain relief – double)
- 1/2" drill bit (Cable strain relief – single)

## **1-4. Site Checklist**



## 2. INSTALLATION WORK

### 2-1. LED Controller Programming

The LED controller comes pre-programmed for a standard restraint + fully-open door limit switch scenario.

| Door           | Dock        | Inside Light   | Outside Light | Description  |
|----------------|-------------|----------------|---------------|--|
| Not fully Open | Unlocked    | Red            | Red           | Door is not receiving trucks at this time  |
| Fully Open     | Unlocked    | Red            | Green         | Door is ready to receive a truck at this time  |
| Fully Open     | Locked      | Green          | Flashing Red  | It is safe to load or unload the truck at this time  |
| Not fully Open | Locked      | Flashing Red   | No Change     | Warning: Restraint is engaged while door is not fully opened. Perhaps door-creep. Danger Situation.                                      |
| Open or not    | Failed Lock | Flashing Amber | Flashing Red  | Warning: Restraint is not properly engaged. Perhaps truck does not have lock bar, or restraint was engaged too soon.<br>DANGER SITUATION |

As an additional safety feature of the LED controller, the outside light will not turn green until about 5 seconds after the lock is disengaged and it is safe to drive away.

Most aspects of the LED Controller programming can be modified by users like you using our software, or custom programmed by [www.novalocks.com](http://www.novalocks.com) per request.

## 2-2. Turn Off Operator Power



**WARNING:** Serious injury could occur if door operator power is not disconnected prior to installation.

## 2-3. Assemble LED Retainer Tracks

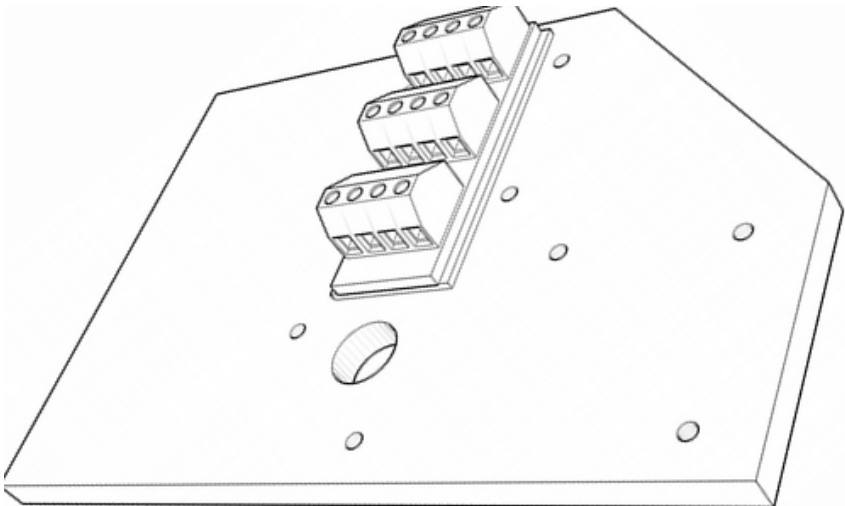
1. Connect aluminum LED tracks to the Corner Plate using #6-32 machine screws. The screw heads should be on same side of Corner Plate as the LED track.
  - a) Position the Corner Plate so the large hole is under the junction of the 2 LED tracks. The LED wires will pass through that hole.
  - b) Connect the 3' LED Retainer Track in VERTICAL position (use 1' Track if using the R-CAS-1)
  - c) Connect the 1' LED Retainer Track in HORIZONTAL position.
2. Insert a flat washer and lock nut on the opposite side of the Corner Plate's exposed screw threads and tighten the nuts loosely.
3. Ensure LED Retainers are positioned properly, then tighten all lock nuts.

## 2-4. Install LED Strips in LED Retainers

1. Slide the LED strips into the LED Retainer Tracks from outside to inside. Put the 1' LED into the horizontal retainer, and put the 3' LED in the vertical retainer.
2. Pass the LED wires through the large hole in the Corner Plate to the back side.

## 2-5. Connect LED Strips to Corner Plate PCB

1. Corner Plate might not have PCB installed yet. This is to allow you to drill the Corner Plate for installing the Wall Brackets. Install PCB by removing the tape cover and applying it to the side of the Corner Plate facing the wall.



2. Attach a Press-On Header to each LED strip's wire ends. They are removable for easy assembly.

3. Push the Press-on Headers onto the Corner-Plate PCB, ensuring the wire colors match the colors shown on the PCB.
  - Note that LED strips are polar. The black wire connects to positive 12VDC and the colored wires connect to negative (ground).

## **2-5. Install LED Supply Cables**

1. Attach a Press-On Header to the end of a 22-4 cable reel. This will be 1 of 2 LED Supply Cables (Left and Right) connecting the LED strips to the LED Controller's main LED header.
2. Push the Press-on Header onto the Corner-Plate PCB, ensuring the cable's conductor wire colors match the colors shown on the PCB.
3. Route the LED Supply Cable to the NEMA Box and prepare to pass the cable into the NEMA Box through a cable strain relief fitting.
4. Repeat 1 to 3 above for the LEDs on the other side of the door. Connect both Left and Right LED Supply Cables to the same Press-on Header in the Nema Box so they will share the LED STRIP MAIN port.

## **2-6. Attach Zip-Tie Mounting Plate**

1. Attach the Zip-Tie Mounting Plate to the back of the Corner Plate in the open area by the corner.
2. Use a zip-tie to secure the LED Supply Cable tightly to the Mounting Plate to provide strain-relief.

---

## 2-7. Install NEMA Enclosure Box

1. Decide whether to mount box vertically or horizontally. If horizontal, you may want the hinge on bottom so the door hangs down when open for convenient access.
2. You will need access to 110VAC power, so install the box close enough to an available electrical source to use the enclosed 110V power cable. Alternatively, you could run new 110VAC wiring in conduit directly into the NEMA Box.
3. Consider where you want to drill penetration holes into the NEMA Box. You'll drill at least 3 holes in the box, for 110VAC power, 2 signal cables, 2 LED Supply cables
  - Loosely connect 4 wall-mount clips to back of NEMA Box by passing the 4 small machine screws through round section of clips. Orient clips properly so box can be secured to the wall. Tighten screws when clips are positioned.
4. Position box on wall and mark drill-points where you will use tap-cons or other methods to adhere the box to the wall.
5. Drill holes in wall for mounting box, then attach box to the wall with tap cons.

## 2-8. Install Wall Brackets

1. Drill the Corner Plates as needed to provide bolt-holes through which you can mount your wall brackets.
2. Mark the wall where you intent to mount the brackets.
3. Connect the Corner Plates to the brackets loosely.
4. Hold the Corner Plates + brackets up to the wall and confirm you like the location, you'll be able to drill safely, and you'll be able to mount the bracket successfully.
5. Drill the holes in the wall for the brackets
6. Attach the brackets to the wall tightly using tap-cons.
7. Tighten the bolts mounting the Corner Plates to the brackets
  - You might prefer to wait on finalizing the Corner Plate mounting until you confirm that all the wiring and lights are working correctly.

---

## 2-9. Install Door Limit Switch

1. Open dock door to proper fully-open position.
2. Determine where on the door and frame to mount the limit switch and reflecting-device.
  - Consider door-creep issues
3. Mount the device on the door and door frame
4. Route a cable (the “Limit Switch Signal Cable”) from the Limit Switch into the NEMA Box. See section 2-12
  - Ensure the Green Signal conductor is on one side of the “Fully-Open” relay.
  - Ensure the Black Signal conductor is on the opposite side of the “Fully-Open” relay than the other wire.
5. If you want control over the exterior LED strip so it can be Green despite the door being closed, then install a manual bypass switch that shorts the Green wire to the Black wire when closed. This will trick the LED Controller into thinking the door is OPEN and the outdoor LEDs will go green while the indoor LEDs will remain red (until the restraint is engaged).
6. If you do not want to use the Door Limit Switch functionality, install a bypass jumper on the LED Controller between “Open” and “GND” instead of the signal cable mentioned in this section.

## 2-10. Connect to Restraint relay

1. Route a cable (the “Restraint Signal Cable”) from the restraint signal relay (from Traffic-light switch or other dock switching mechanism) into the NEMA Box.
2. Connect the Restraint Signal Cable to your restraint’s signaling relays.
  - Connect the Red Signal conductor to one side of the “Restraint-Engaged” relay.
  - Connect the Black Signal conductor to the opposite side of the “Restraint-Engaged” relay than the other wire.
  - Connect the Yellow Signal conductor to one side of the restraint’s “Restraint-Failed Alert” relay. This way when the alarm sounds and the Restraint indicates the lock has been over-extended and has failed to engage the truck, the Restraint-Failed signal will be sent to our LED Controller.
  - Connect a Black Signal conductor to the opposite side of the “Restraint-Failed Alert” relay. You can run a jumper to the “Restraint-Engaged” black signal wire to join them in a common circuit.



## 2-11. Bring 110VAC into NEMA Box

The power adapter mounted in the NEMA Box converts 110VAC to 12VDC, which powers the LED Controller. You must provide a 110VAC supply (<1 Amp needed).

### **IMPORTANT**

The LED Controller can only accept power voltage of 12 VDC. Higher voltage may irreversibly damage the LED Controller.

**THIS WILL VOID WARRANTY**

1. Ensure that LED Controller's power switch is OFF.
2. Cut the 110V power cable (supplied) near the female plug, leaving 3 inches of slack. Strip the wire ends on both sides of cut.
3. Drill a 5/8" hole in NEMA Box near the 110VAC power input on power supply.
4. Install large cable strain relief fitting in that hole.
5. Route 110VAC cable through that strain-relief fitting.
6. Inside the Box, reconnect the 110VAC cable using wire nuts.
7. Drill 2 – 1/2" holes in the NEMA Box for signal wires
8. Install 2 cable strain-relief fitting in those holes.
9. Install 12VDC adapter and LED Controller in the NEMA Box with double-sided tape.
10. Connect 12V power plug to LED Controller.

## 2-12. Install & Route Signal Wires

1. Route your LED Supply cables through one strain-relief fitting and connect them to a Press-On Header.
  - a) Ensure the cable's wires are oriented according to the LED STRIP MAIN header on the LED Controller (L-R BLK, RED, GRN, BLU).
  - b) Remember the press-on header wires must face away from the center of the LED Controller.
2. Push the Press-on Header onto the LED Controller's LED STRIP MAIN port.
3. Route your signal cables from restraint, restraint-failed, and limit switch through the second strain-relief fitting.
4. Attach a Press-On Header to your signal wire ends. Push Header onto to the LED Controller's Signal header.
  - a) Connect the red Restraint Signal Cable to the "CLOSE" pin (Red wire).
  - b) Connect the yellow Restraint Failed Signal Cable to the "AUX" pin (Yellow wire)
  - c) Connect the green Limit Switch Signal Cable to the Signal header's "OPEN" port (Green wire).
  - d) Connect the black Restraint & Switch Signal Cables to the GND/Common pin (Black wire).
5. Push the press-on header onto the LED Controller Signal header (GND, CLOSE, OPEN, AUX).

---

## 2-13. (Optional) Install LEDs Outdoors

1. Install the 3 foot LED Retainer track on the Right side of the door as your are facing it. The truck drivers will see the LEDs through their left-side mirrors while backing. Ensure LED is visible even when truck is dock-locked.
2. Install the Retainer Track vertically. We believe the bottom of the LED should be at least 6' off the ground to enhance visibility.
3. Once the LED Retainer Track is mounted to the building, feed the LED strip into the track from the bottom. Crimp the entry and exit of the Retainer Track to hold the LED strip in place and prevent it from sliding out of the Track.
4. The LED includes a 20' cable ("Outdoor Supply Cable").
5. Route the Outdoor Supply Cable through the wall and into the NEMA Box through a cable strain relief fitting.
6. Connect a Press-on Header to the 4 wires of the Outdoor Supply Cable.
7. Push the press-on header onto the LED Controller STRIP/AUX DEVICE header.
8. Ensure the wire colors correspond to the colors noted on the LED Controller case cover.

## 2-14. Confirm Wiring

Take a moment to reconfirm all connections on the cables.

- Check both sides of the power cable.
- Retrace the Signal Cables from the restraint relay and the Door Limit Switch relay. Ensure you are tied into the correct relays for this purpose. Ensure Commons (Ground) are well-connected.
- Check the indoor and outdoor LED Supply Cables and LED strip(s) to ensure the wire colors correspond correctly to the colors printed on the LED Controller.
- Ensure all wiring is well out of the way of moving parts, including pulleys and belts.
- Make the wiring look neat and professional.

## 2-15. Turn On 110VAC Power

- Plug 110VAC power cable from the NEMA Box into a 110VAC outlet or power source and turn on the power.
- Immediately disconnect if you sense any problems.
- Ensure restraint is in fully open (unlocked) position.
- Ensure Door is closed (Limit Switch disengaged).
- Restore power to door operator.

---

## 2-16. Turn LED Controller On

1. Move the LED Controller power switch to the “ON” position. The LED by the switch should immediately illuminate as solid amber.
2. If the amber LED doesn’t turn on, turn the switch off and re-check power connections. LED strips should turn red upon powerup. If not, turn off Controller and review wiring.

## 3-17. Ensure Correct LED Behaviors

1. Ensure dock is UNLOCKED and dock door is CLOSED. The inside LEDs are RED and the outside LEDs are RED (dock is closed for business).
2. OPEN the dock door fully. Ensure dock is UNLOCKED. The Inside LEDs are RED and the outside LEDs are GREEN (dock is open for business).
3. LOCK the restraint mechanism with door fully OPEN. The inside LEDs are GREEN and the outside LEDs are FLASHING RED (it’s safe to enter dock-locked truck).
4. UNLOCK the restraint mechanism (with door fully OPEN still). The inside LEDs will immediately turn Red. The outside LEDs will remain flashing red for 5 seconds, then will turn GREEN (it’s safe for truck to leave).
5. LOCK the restraint mechanism with door fully open. Now partially CLOSE the door. The inside and outside lights will begin FLASHING RED (warning of door coming down prematurely, door-strike danger).

- 
6. Perform these tests several times to ensure functionality.

## **2-18. Finalize**

- Close and secure NEMA enclosure case.
- Apply [www.novalocks.com](http://www.novalocks.com) sticker to outside of case (upright).
- Clean your work space removing all wire cuttings or evidence that you were there.

---

## 3. 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!

*[sales@novalocks.com](mailto:sales@novalocks.com)*

### No Lights On

---

**Possible Issue:** Power Supply Problems

- Check LED Controller. Is its amber LED on?
- Is the 12V power adapter's LED on? If no, check 110V power wiring at power source.
- Trace the 12VDC wire from the LED controller to power.
- Check the Press-on Headers on the LED Controller's LED header(s). Check Press-on Headers on the corner plate PCB. Are their wires well-secured? Are they pressed in horizontally all the way?
- Ensure all wire colors were correctly followed from LED Controller to Corner Plate PCBs and LED strips.