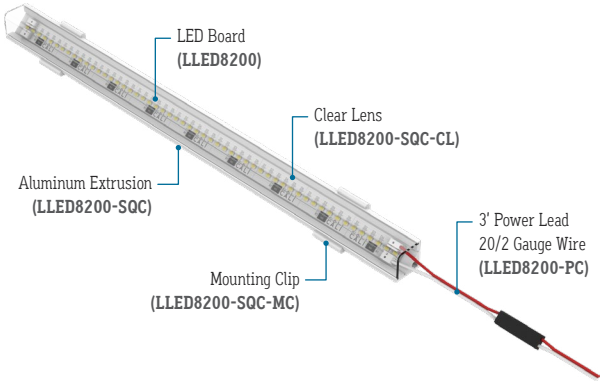
CALIFORNIA ACCENT LIGHTING INC

# LLED8200-SQC | INSTALLATION

Overview




| FEATURES | |
|---|---|
| APPLICATIONS | Accent, Decorative, Surface, Recessed, Pendant Lighting |
| LAMP TYPE | LEDs |
| CRI | > 90 |
| LENS | Clear, 50% Semi-Frosted, or 100% Frosted |
| VIEWING ANGLE | 120° |
| MOUNTING | Mounting Channel or Mounting Clips (Sold Separately) |
| WEIGHT | 0.166 lbs per foot |
| CONSTRUCTION | Aluminum Extrusion |
| LENGTH | Built to Order |
| LISTING | Dry, Wet, or IP67 Location<br>UL2108, CSA C22.2 #9<br>UL8750, CSA250 |
| INSTALLATION | Link to Installation Instructions |
| ELECTRICAL | |
| DIMMING | Forward Phase, 0-10V, Lutron, DALI |
| MAXIMUM RUN (Based on 5 Amps) | 20' (6W), 30' (4W), 36' (3W, 2W) |
| MAXIMUM RUN (Based on 4 Amps for Class II) | 14' (6W), 24' (4W), 32' (3W), 36' (2W) |
| VOLTAGE | 24VDC |
| DRIVER | Remote (Sold Separately) |
| TEMPERATURE RATINGS | **Operating / Startup:** -20° to 48°C (-4° to 120°F) |
| | **Storage:** -40° to 76°C (-40° to 170°F) |

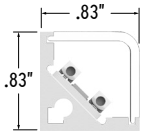
## PRODUCT INFORMATION

- For accent, decorative, surface, recessed, or pendant lighting
- 24 volts DC for easy and safe installation
- Long life, energy efficient LEDs
- Can be ordered to specific lengths for when exact dimensions are known
  **Example:** 10 x 10'6"
- Plug and light system
- Lead wires are typically 36" long and exit on one end

## READ ENTIRE GUIDE BEFORE STARTING INSTALLATION

**IMPORTANT NOTICE:** VERIFY CORRECT LUMINAIRE WAS RECEIVED WITH CORRECT COLOR TEMPERATURE, VOLTAGE, AND WATTAGE BEFORE CUTTING OR INSTALLING. CALI WILL NOT BE RESPONSIBLE IF INCORRECT LUMINAIRE IS INSTALLED.

## END VIEW




Clear Lens **(CL)**
50% Semi-Frosted Lens **(SF)**
100% Frosted Lens **(F)**

## ELECTRICAL

- LipLEDs products require a 24 Volt DC remote transFORMER (TRA or TRA-E)
- To calculate transformer size, determine Watts per Foot.
  **Example:** 3W per Foot
- Determine Length in Feet.
  **Example:** 15'
- Calculate Load: Multiply Watts per Foot x Length in Feet
  **Example:** 3W x 15'= 45W
- Choose a transFORMER from catalog.
  **Example:** TRA50
- Determine maximum distance using Maximum Wire Length Table on transformer page.
  **Example:** 45 watts is between 40W and 60W. Using #14 wire, maximum distance is 37' from transFORMER to first LED

## INSTALLATION RECOMMENDATIONS

- LipLEDs LED tape must be mechanically attached directly to mounting surface using mounting clips or channels.
- Conduit raceway should be sleeved at one end for low voltage wires going to transFORMER.

## INSTALLATION TOOLS REQUIRED

- Electric Hammer Drill
- 14.4 to 28 Volt Cordless Drill
- Phillips Bits
- Utility Knife
- Electrical Cord
- Marker
- Wire Stripper
- Long Nose Pliers
- Drill Bits - Concrete or Wood
- Electrical Three Ways
- Safety Glasses
- Measuring Tape
- Chalk Line

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# LLED8200-SQC | INSTALLATION

Product Care & Maintenance

## WARNING

**When using lipLEDs for any application, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and personal injury.**
**LipLEDs must be installed in accordance with the NEC or CEC as applicable.**
**CALI will not be responsible for any damage or malfunction caused by the following:**

- Ensure power is off before installation begins, during replacements, additions, or repairs.
- Do not use lipLEDs if damaged, such as broken boards, loose connections, or frayed wire insulation. Inspect before installing.
- Do not install lipLEDs in hazardous locations.
- Do not cover lipLEDs with any material, as it may cause LEDs to overheat, melt, or ignite. **(Fig. 1)**
- Do not paint on or over fixture lens or LEDs. Paint or any other substance on lens or LEDs will cause a shift in color temperature.
- Soffit must be evenly painted with a neutral white to avoid color shift.
- Do not modify lipLEDs in the field.
- Do not overlap lipLEDs luminaires in any way.
- Only use lipLEDs with specified rated voltages. Do not exceed the specified voltage for any lipLEDs luminaire.
- Do not use lipLEDs extrusion as a raceway for additional wire. Non-factory feed through wires inside lipLEDs will void warranty.
- Ground Fault Circuit Interrupter (GFCI) protections should be provided on circuits or outlets when lipLEDs is used for outdoor applications.
- Surge protector must be set up for electrical power system to avoid damaging lipLEDs lighting system.
- Do not connect wires together, follow provided wiring diagrams.
- Do not cut wire while energized.
- Do not exceed maximum run lengths.
- Do not mount lipLEDs with staples, nails, or like means that might damage the insulation. Mount with double-sided tape and mounting clips.
- Do not install mounting clips over LED diodes or resistors.
- Do not penetrate lipLEDs board with any foreign object. **(Fig. 2)**
- Do not mount lipLEDs inside tanks or enclosures of any kind.
- Do not use improper screw head type on mounting clips. It will cause the mounting clip to open up and become dysfunctional.
- Do not modify mounting clips.
- Do not mount fixture with less than the minimum number of mounting clips required. See mounting clips section for details.
- Do not force lipLEDs into a space that is too small.
- Do not force lipLEDs with cord grip into soffit.
- Do not install lipLEDs at an angle within a cove. Only install fixtures straight within a cove.
- Do not bend extrusion around radius.
- Do not submerge dry or wet location lipLEDs in any liquid.
- Do not install wet location in outdoor coves without proper drainage. (**Fig. 3)**
- Do not install lipLEDs in any area that is continuously exposed to flowing or pooling water, such as underneath drain pipes, sprinklers, fountains, misters, etc.
- Do not install connectors without shrink tube for wet location. **(Fig. 4)**
- Do nut use a lighter or open flame to heat shrink tube. **(Fig. 5)**
- Do not cut, puncture, or penetrate lipLEDs aluminum housing, end caps, or lens covers.
- Do not drop, bang, or rest weight upon lipLEDs.
- Do not apply excessive pressure to any part of lipLEDs board or LEDs. **(Fig. 6)**
- Do not bend lipLEDs power cord or continuous connector past permitted bend radius. Bending past permitted bend radius will break the seal of the cordgrip or damage the insulation. 1.5" minimum bend radius.
- Do not bend board in any direction. **(Fig. 7)**
- Do not overlap lipLEDs at any location. **(Fig. 8)**
- Do not install lipLEDs in places where the power cord is subject to continuous flexing.
- Do not twist continuous connector or power cord.
- Do not hold, carry, or suspend lipLEDs by the power cord.
- Do not install lipLEDs on ceilings without mounting clips. **(Fig. 9)**

## FIGURES

**Fig. 1**

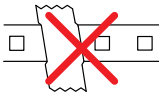


**Fig. 2**

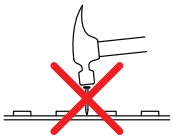


**Fig. 3**

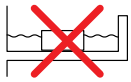


**Fig. 4**

**Fig. 5**

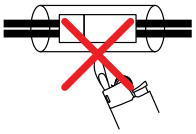


**Fig. 6**

**Fig. 7**

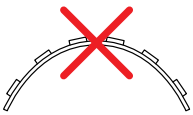
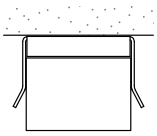


**Fig. 8**

**Fig. 9**



## CLEANING MATERIALS

The use of solvents and/or cleaners which are not compatible with polycarbonate will result in the softening, crazing, and/or cracking of the plastic part. This is especially true of polycarbonate lamps and mounting bases which may be under stress in their normal applications.

## COMPATIBLE WITH POLYCARBONATE

- Mild soap and water
- Mineral Spirits
- Isobutyl alcohol
- VM and P Naphtha
- Varsol No.2
- Mexane
- Freone TF and TE-35
- Ethanol
- Dirtex
- 2% Sol. Reg. Joy
- 10% Sol Bon Ami
- White Kerosene
- Methyl alcohol
- Heptane
- Petroleum Ether/65 degrees C
- Isopropyl alcohol
- Lacryl PCL-2035 polycarbonate cleaner

## NOT COMPATIBLE WITH POLYCARBONATE

- Trichlor
- Gasoline
- Liquid Detergents
- Acetone
- Carbon Tetrachloride
- Pink Lux (Phosphate free)
- Triclene
- Chlorinated Hydrocarbons
- #1 & #3 denatured alcohol
- Methyl Ethyl Keytone (MEK)
- Texize-8006, 8129, 8758
- MIBK
- Liquid Cleaner – 8211
- Toluol
- Agitene
- Benzol
- Ajax
- Kleenol Plastics
- Lysol
- Stanisol Naphtha
- Oils
- Lemon Joy (phosphate free)
- Diversol
- Lestoil

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# LLED8200-SQC | INSTALLATION

Dimming Protocol & Wiring Diagrams (Forward Phase & 10V)

## FORWARD PHASE (FP) DIMMING PROTOCOL

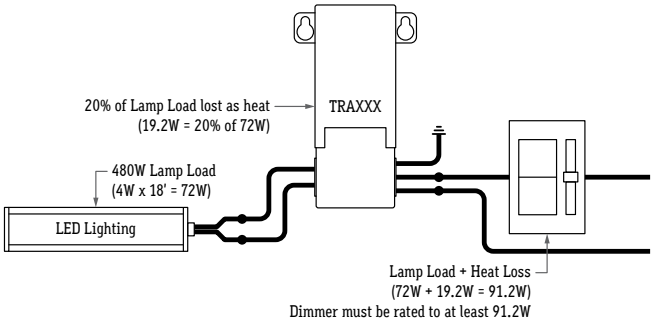
**Technical Requirements For Control Equipment (Phase Dimming)**

- Magnetic Low Voltage (MLV): Magnetic (core and coil, toroidal) transformer-supplied low voltage lighting.
- Electrical Characteristic: Inductive
- Special Requirements: Symmetric cycles (VDC ≤ 2), smooth turn off (positive and negative periods are equal for safe MLV transformer operation)

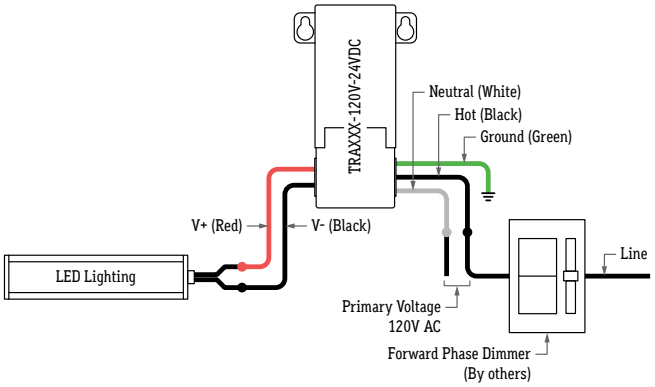
Symmetric Forward Phase-Control

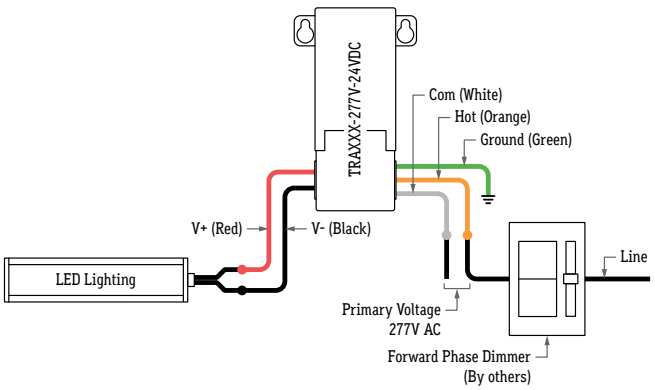
## FORWARD PHASE DIMMER RATINGS

The stated VA (volt-ampere) rating is the rated capacity of the dimmer which includes the magnetic transformer heat losses and the lamp load. A transformer dissipates less than 20% of the connected load as heat. The lamp load plus the transformer loss determine the dimmer capacity required. See the example below.




## FORWARD PHASE WIRING DIAGRAMS




## 0-10V (10V) DIMMING PROTOCOL

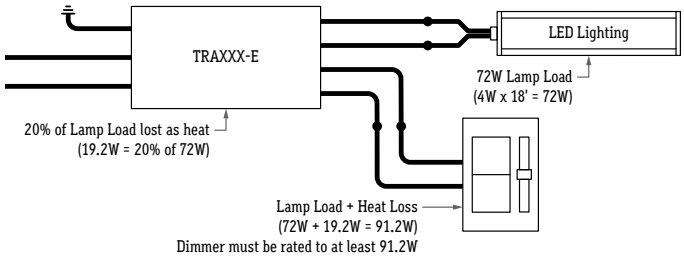
Available in 120 or 277 volts with either a dimmable integral or remote driver. The remote driver is available with 0-10V dimming capabilities. Consult factory for other dimming protocols available. The following applies to 0-10V dimming interfaces.
A 0-10V fluorescent dimmer will not dim the LEDs.

**Technical Requirements For Control Equipment (0-10V Dimming)**

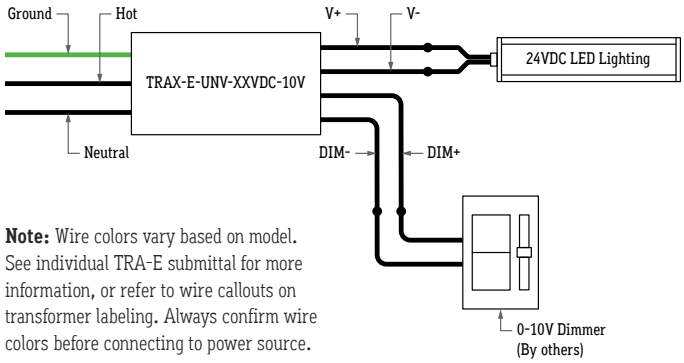
- The light output of the LEDs operated by the controllable LED driver is controlled by DC voltage applied to the control input leads (gray and violet). The actual response curve of LED driver current versus control voltage.
- The control device must be capable of accepting or sinking the DC current flow from the driver. The DC current from the driver that must be sinked by the control circuit is approximately 150uA (+/50% for isolated dim interfaces, up to 1.5mA for non-isolated dim interfaces).
- If the control bus is opened, or if the control device internally opens the control bus under some conditions, the voltage on the control bus will then be a function of the drivers, which is 10-15V. Maximum light output will be delivered under this condition.
- If the control bus is shorted either by a mechanical switch in the control or by the circuitry of the control device, or inadvertently in the wiring, the current on the control bus will be less than 1.5mA.
- As can be determined from the two items, simple two-level operation of the drivers can be achieved by proper usage and application of a simple open/closed switch on the control bus with maximum light being achieved when the switch is open and minimum light with the switch is closed.
- The driver is intended to be used with control voltages between 0-10VDC volts peak maximum on the driver control leads.
- Control equipment intended to control more than one driver must be capable of sinking the current supplied tot the control bus by the maximum number of drivers specified for the control device. At any given level setting it must maintain control bus voltage constant within a range of ±5% as the number of drivers connected to the control bus varies from a minimum of one driver up to the maximum number specified for the control device.
- Driver of various ratings may be mixed on the same control system.

## 0-10V DIMMER RATINGS

The stated VA (volt-ampere) rating is the rated capacity of the dimmer which includes the electronic transformer heat losses and the lamp load. A transformer dissipates less than 20% of the connected load as heat. The lamp load plus the transformer loss determine the dimmer capacity required. See the example below.




## 0-10V WIRING DIAGRAM




**Note:** Wire colors vary based on model. See individual TRA-E submittal for more information, or refer to wire callouts on transformer labeling. Always confirm wire colors before connecting to power source.

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# LLED8200-SQC | INSTALLATION

Dimming Protocol & Wiring Diagrams (Lutron Hi-lume)

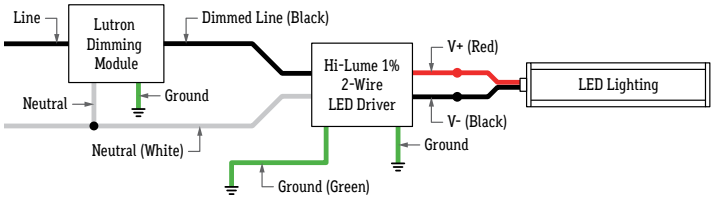
## 2-WIRE DIMMING PROTOCOL (Lutron LTEA)

**Technical Requirements For Control Equipment (2-Wire Dimming)**

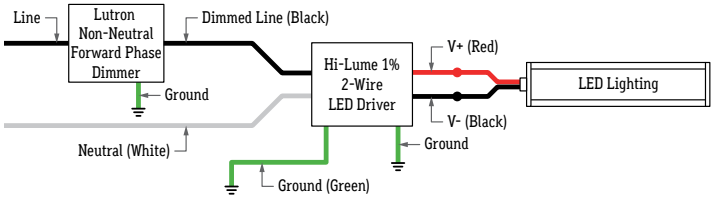
- The Hi-lume 1% 2-Wire LED Driver (LTEA2W) is a high performance LED driver that provides a smooth, continuous, flicker-free 1% dimming for virtually any LED fixture. Primary voltage is 120V and secondary side is 12VDC or 24VDC. A rated life time of 50,000 hours @tc -149°F (65°C). Inrush current: < 2A. Minimum operating temperature ta = 32°F (0°C).
- Continuous, flicker-free dimming from 100% to 1%. Guaranteed compatibility with selected Maestro Wireless, RadioRA 2, HomeWorks QS, GRAFIK Eye QS, GRAFIK Systems, Quantum, and C•L Dimmers.

## LTEA 2-WIRE WIRING DIAGRAMS (JA8 Compliant)

**Controls Requiring Neutral**




**Controls Not Requiring Neutral**



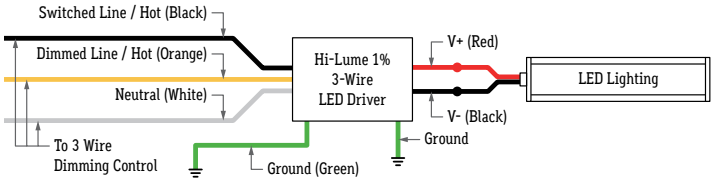

## 3-WIRE DIMMING PROTOCOL (Lutron L3DA)

**Technical Requirements For Control Equipment (3-Wire Dimming)**

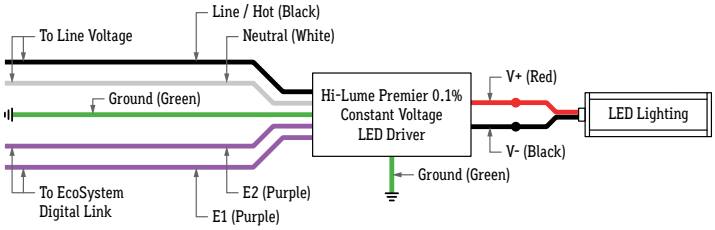
- Hi-lume 1% EcoSystem/3-Wire Driver (L3DA) is a high-performance LED driver that provides smooth, continuous 1% dimming for virtually any LED fixture, primary voltage is 120–277 V~ at 50/60 Hz and secondary side is 12VDC or 24VDC. A rated life time of 50,000 hours @tc -149°F (65°C). Inrush current: < 2A. Minimum operating temperature ta = 32°F (0°C).
- Continuous, flicker-free dimming from 100% to 1%. Compatible with Energi Savr Node unit with EcoSystem, GRAFIK Eye QS control unit, PowPak dimming module with EcoSystem, and Quantum systems, allowing for integration into a planned or existing EcoSystem lighting control solution. Standard 3-wire, line-voltage phase-control technology for consistent dimming performance and compatibility with all Lutron 3-wire fluorescent controls.

## L3DA 3-WIRE WIRING DIAGRAMS

**3-Wire Controls**




**EcoSystem Digital Controls**



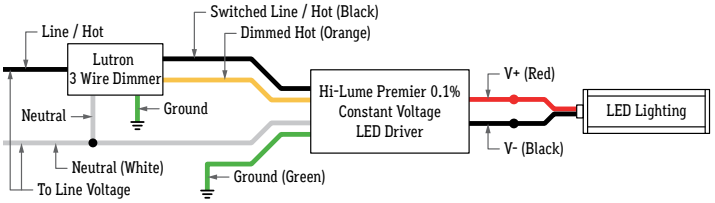

## 3-WIRE DIMMING PROTOCOL (Lutron L3D0)

**Technical Requirements For Control Equipment (3-Wire Dimming)**

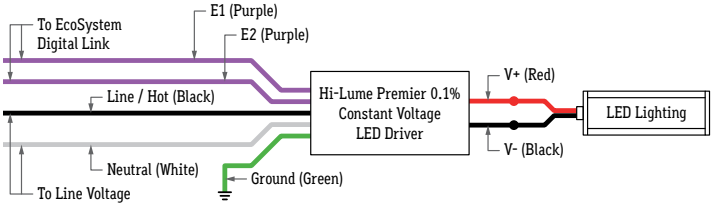
- Hi-lume Premier 0.1% EcoSystem / 3 Wire constant voltage 24V LED driver with Soft-on, Fade-to-Black. The Hi-lume Premier 0.1% Constant Voltage Driver (L3D0E) is a high-performance LED driver capable of controlling up to 96W of 24V constant voltage loads. This driver provides smooth and continuous dimming down to 0.1% low-end. It is ideal for use with strip lighting in applications such as coves, under or over cabinet lighting and pathway lighting. The driver is UL Listed with an integrated wiring compartment and can be mounted up to 150'away from the load.
- Continuous, flicker-free dimming from 100% to 0.1%
- Soft-on, Fade-to-Black operation for EcoSystem controls: fades smoothly between 0% and 0.1% when turned on and off for an incandescent like experience.
- PWM dimming meets IEEE1789 over the entire dimming range.
- UL Listed for United States and Canada (cULus®).
- NOM certified for Mexico.
- Field Adjustment Knob offers customer low-end light output tuning for better fixture-to-fixture matching.
- Guaranteed dimming performance when used with Lutron controls:
  - HomeWorks QS, Energi Savr Node units with EcoSystem controls, GRAFIK Eye QS with EcoSystem controls, PowPak with EcoSystem dimming modules, PowPak with EcoSystem wireless fixture controls, and Quantum systems, allowing for integration into a planned or existing EcoSystem lighting control solution.
  - Lutron 3-wire controls and interfaces.
- Protected from miswires of input power, up to 277 V~, to EcoSystem control inputs.
- Rated lifetime of 50,000 hours at 40 °C (104 °F) ambient temperature and maximum loading.
- FCC Part 15
  - Class A (277 V~)
  - Class B (120 V~)

## L3D0 3-WIRE WIRING DIAGRAMS

**3-Wire Controls**




**EcoSystem Digital Controls**




**Note:** Colors shown on diagrams correspond to terminals on driver

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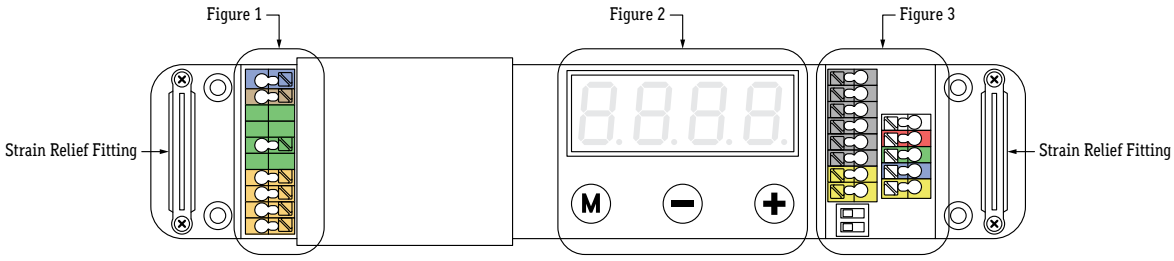
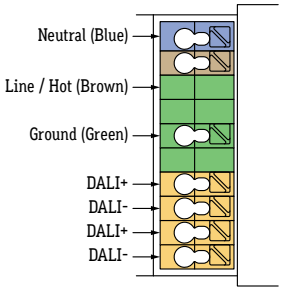
# LLED8200-SQC | INSTALLATION

Operation of Driver (DALI)

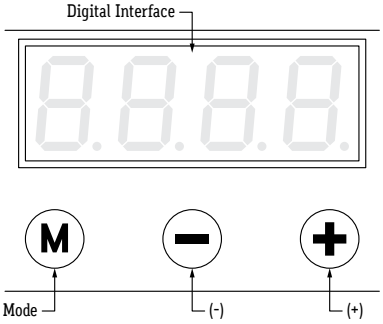
## DIAGRAM OF DRIVER



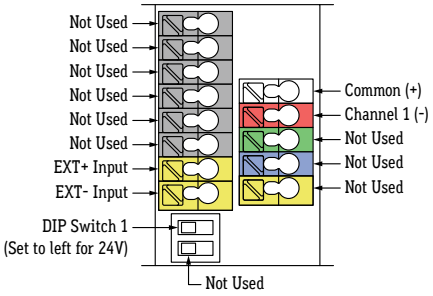

## FIGURE 1 (120V - 277V Input)




## FIGURE 2 (Digital Interface Control)

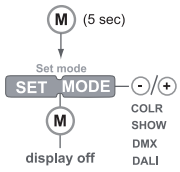



## FIGURE 3 (Output)

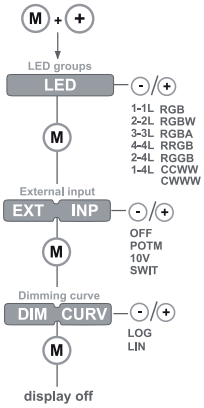



## OPERATION OF DIGITAL INTERFACE CONTROLS

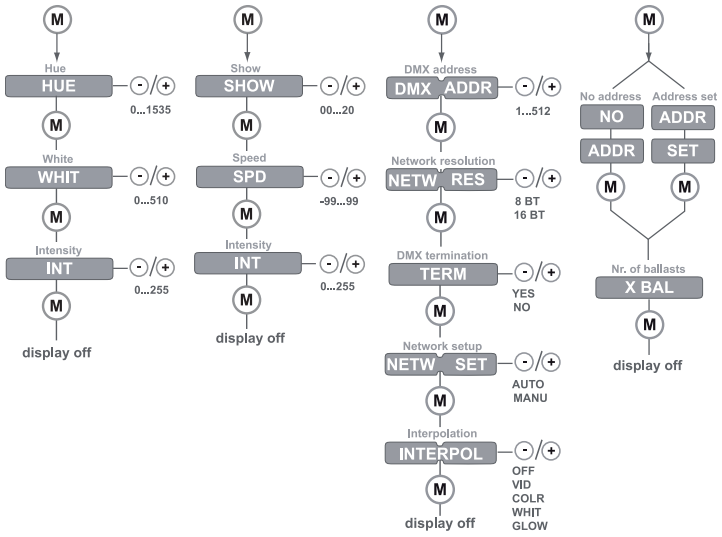
**1.** Select mode of operation.



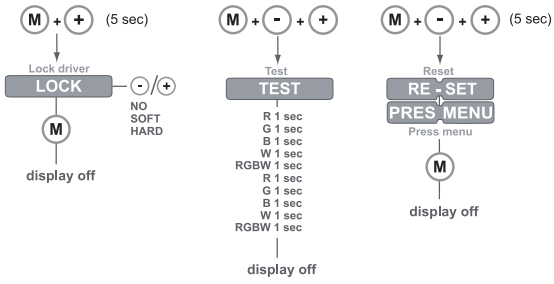

**2.** Set LED groups.




**3.** Standalone Operation (Color or Show) and Networked Operation (DMX or DALI)




**4.** Other functions (Lock Configuration, Visual Test, and Reset to Default)

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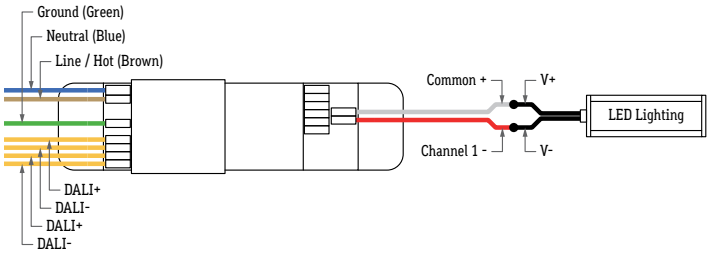
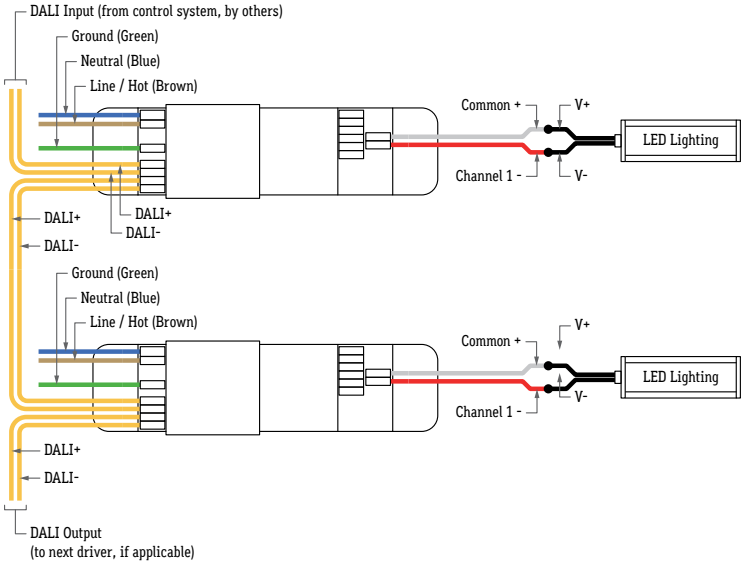
# LLED8200-SQC | INSTALLATION

Wiring Diagrams (DALI)

## WIRING WITH A SINGLE RUN




## WIRING WITH DAISY CHAIN




## NOTES

- Wire colors on diagram correspond to colors of driver terminals
- Driver load not to exceed 96W
- A DALI Control System (by others) must be used to operate the drivers
- Ensure DIP Switch 1 is set to ON (Left) to activate 24V operation
- DALI Address must be set for each driver.
- Up to 28 drivers may be daisy chained together using shielded cable specified for DALI wiring

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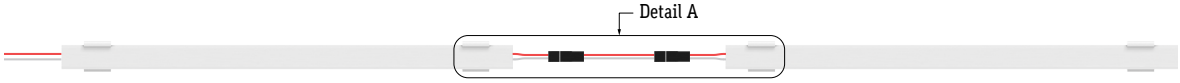
Design Guidelines

## INDIVIDUAL FIXTURE (UP TO 8')

## RUNS WITH CONTINUOUS CONNECTOR

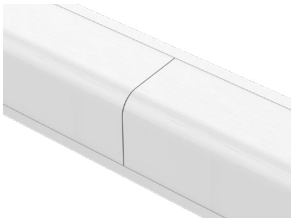



## CONTINUOUS RUN (DRY LOCATION)

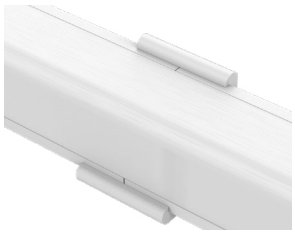
## CONTINUOUS RUN (WET LOCATION)

## DETAILS

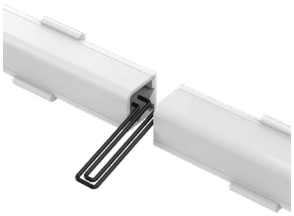
**Detail A**
Continuous Connector
(**LLED8200-CC**)



**Detail B**
Two Lenses Meet
(Dry Location)



**Detail C**
Continuous Connection
(Dry Location)



**Detail D**
Continuous Connection
(Wet Location)

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# LLED8200-SQC | INSTALLATION

Application Guidelines

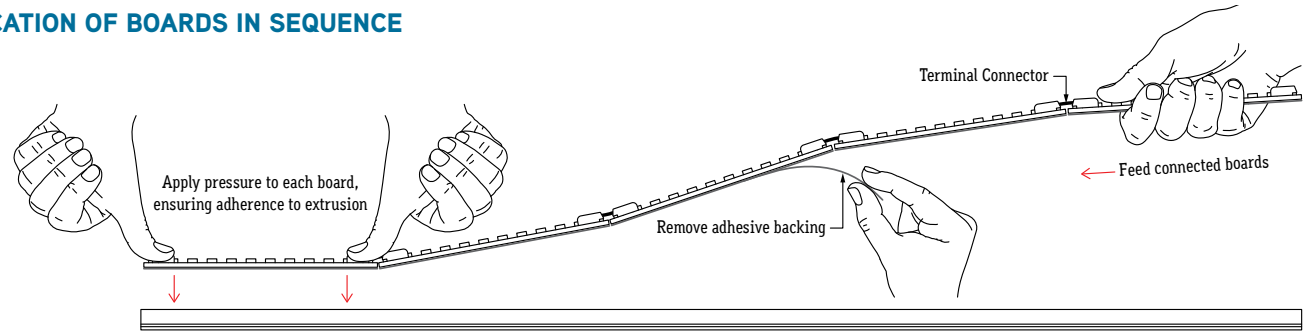
## APPLICATION GUIDELINES

- Follow the below diagrams and steps if applicable to your installation.
- Breakable LED Board requires a team effort to ensure a secure and correct installation.
- Terminal Connectors must be used between each LED board when used in sequence

## NOTE

- Extrusions are shipped to exact length of specified measurements.
- Due to increment restrictions (1", ± 0.125" Tolerance), the board is shipped to the closest measurement ordered. The board must be centered inside the extrusion.

## APPLICATION OF BOARDS IN SEQUENCE

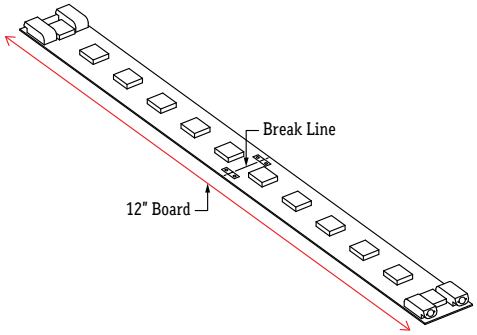



One person applies pressure to LED boards, adhering them to extrusion

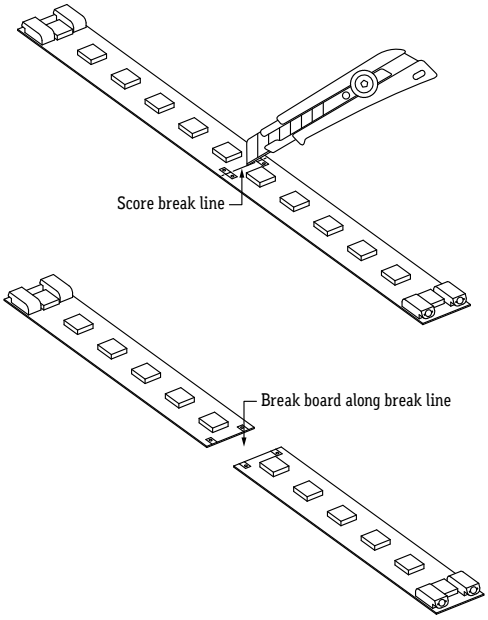
Another person feeds connected LED boards while removing adhesive backing

## OPERATION OF BOARD

**1.** Each board is 12" long and is breakable in 1" increments. Wire terminals are located at each end of the board. If terminals are broken off, wires must be soldered directly to the board.

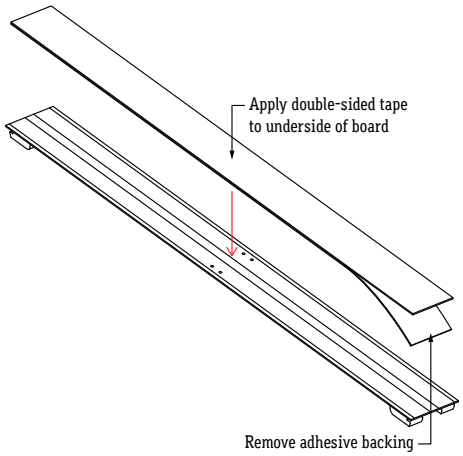



**2.** Size LED board to desired length. Score along the break line between segments, then cut board carefully with shears or sharp scissors so that it separates along the break line.
**Note:** Ensure not to damage LEDs or solder contacts

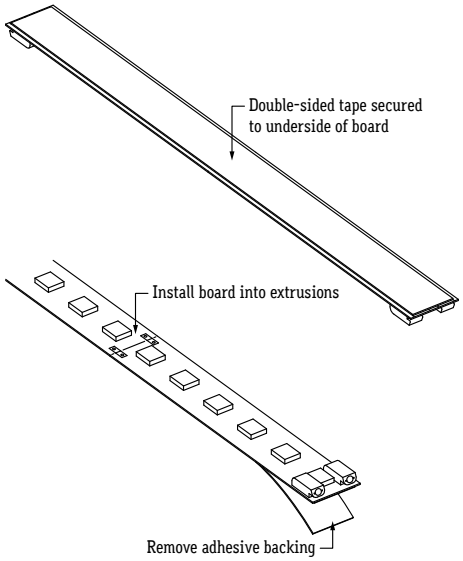



## INSTALLATION OF BOARD

**1.** If applicable, apply double-sided tape (by others) to underside of each LED board.




**2.** Ensure double-sided tape is secured to underside of LED board, then remove adhesive backing and install board into extrusions.

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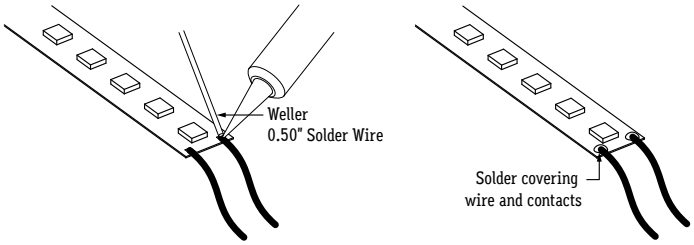
# LLED8200-SQC | INSTALLATION

Soldering Guide & Connectors

## SOLDERING GUIDE

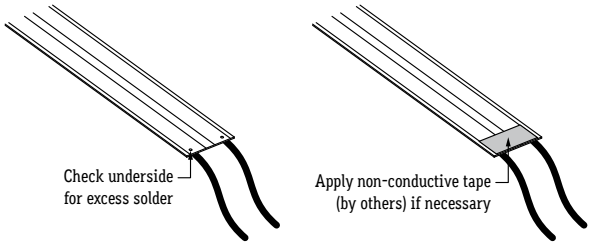
**1.** If applicable, prepare wires by stripping 1/8" from the end of each wire, then tin the tips of the wire with solder. Apply heat to stripped portion of wire, then add a small amount of solder until stripped portion of wire is fully covered in solder.

**2.** Solder lead wires to solder contacts on the end of board. Solder the positive wire (red) to the contact marked "+". Solder the neutral wire (white) to the contact marked "-".
**Note:** Solder iron not to exceed 720°F. Heat joint with tip of iron. Heat both the solder pad and the wire. Add a small drop of solder on the tip of solder iron to transfer the heat to joint quickly; it should melt and flow smoothly, covering the wire and pad. Remove iron once enough solder has been added to the components. Allow 5 seconds for the joint to cool.



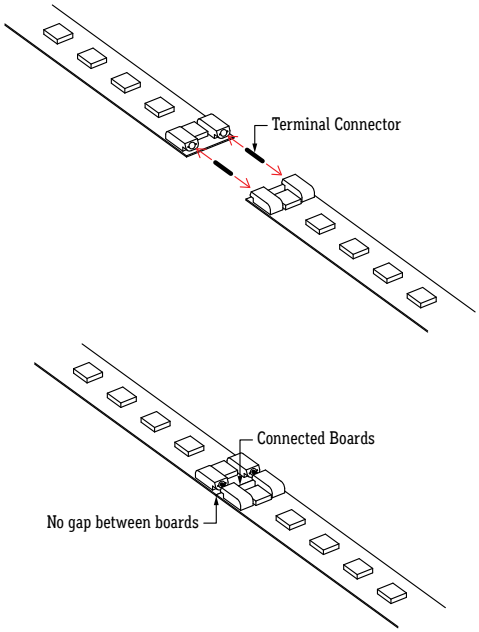

**Note:** Appearance of LED board may differ from example shown.
Refer to wiring diagrams from installation instructions before soldering any wires.

**3.** After soldering, check underside of LED board to ensure excess solder is not present. If present, cover it with non-conductive electrical tape (by others).



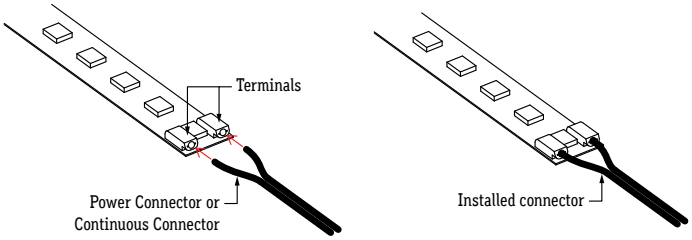

## CONTINUOUS RUNS

**1.** Insert terminal connectors into each terminal where two LED boards will be joined. Push boards together leaving no gap.
**Note:** Ensure + and - terminals are aligned throughout the entire run.




## CONNECTORS

**1.** Insert power connector or continuous connector lead wires into LED board terminals. Insert the positive wire (red) into the terminal marked "+". Insert the neutral wire (white) into the terminal marked "-".
**Note:** Ensure + and - terminals are aligned throughout the entire run.

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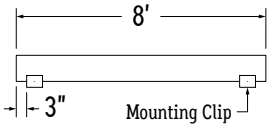
# LLED8200-SQC | INSTALLATION

## Mounting Clips

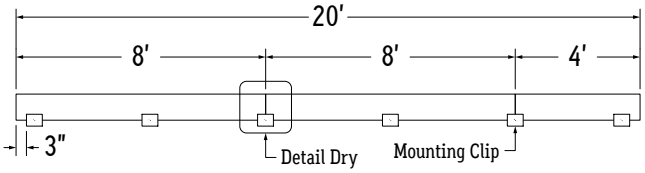
### DRY LOCATION

**1.** Measure area where luminaire will be installed. Use a chalk line to ensure a straight installation. Mark location where mounting clips will be installed along chalk line.

**2.** Use 1 mounting clip every 4' or 2 if fixture is shorter than 8'.
**Note:** For outward or downward facing applications, use 1 mounting clip every 2'.
**Note:** For vertical applications, use a stopper at the bottom to prevent fixture from sliding.



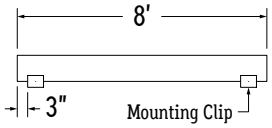

**3.** Use 1 mounting clip every 4' +1 if fixture is longer than 8'.
**Example:** 8' + 8' + 4' = 2 MC + 2 MC +1 MC +1 MC = 6 MC total.
Use a mounting clip at the joint between two fixtures.
**Note:** For applications facing outward or downward, use 3 mounting clips per fixture segment.



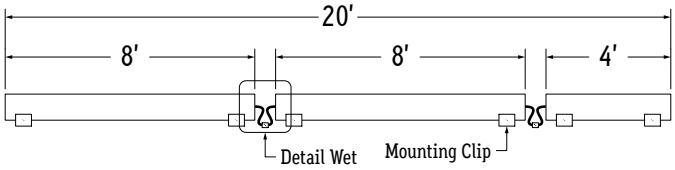

### WET LOCATION

**1.** Measure area where luminaire will be installed. Use a chalk line to ensure a straight installation. Mark location where mounting clips will be installed along chalk line.

**2.** Use 1 mounting clip every 4' or 2 if fixture is shorter than 8'.
**Note:** For outward or downward facing applications, use 1 mounting clip every 2'.
**Note:** For vertical applications, use a stopper at the bottom to prevent fixture from sliding.

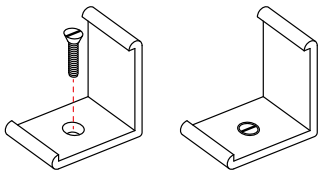



**3.** Use 2 mounting clips per fixture.
**Example:** 8' + 8' + 4' = 2 MC + 2 MC + 2 MC = 6 MC total.
Push fixtures together at each wet location connection, leaving a 0.5" gap between fixtures.
**Note:** For applications facing outward or downward, use 3 mounting clips per fixture segment.

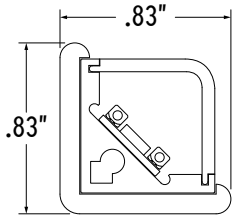



**4.** Lay mounting clips and pre-drill using proper drill bit for surface and screw size.
**Recommendation:** 8/32 x 1" screw.
**Note:** Allow 0.25" clearance for lateral expansion of assembled mounting clips.
Only install mounting clips on flat, even surfaces.

**5.** Screw MC mounting clips to surface, then snap fixture into mounting clips.



### ASSEMBLED END VIEW




LLED8200-SQC-MC

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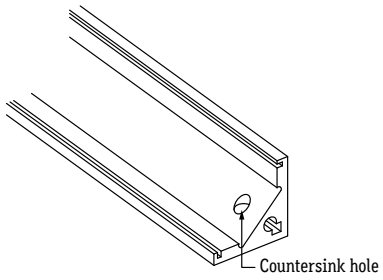
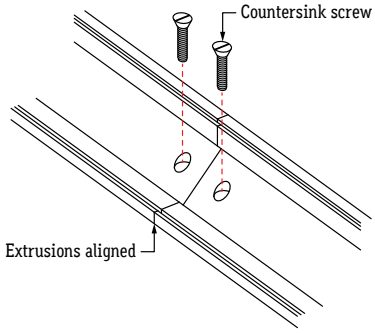
## Mounting Fixture (Dry Location Mounting Channel)

**1.** Measure area where fixtures will be installed. Use a chalk line to ensure a straight installation.

**2.** Lay extrusions along chalk line and drill at least 3 countersink holes per extrusion. Drill additional holes as needed.

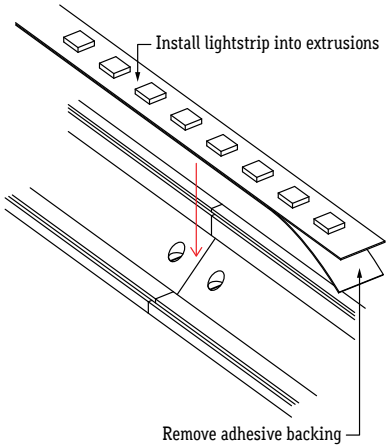



**3.** Screw extrusions to surface using countersink screws.
**Note:** Ensure extrusions are aligned. Misalignment will prevent lens from snapping in.



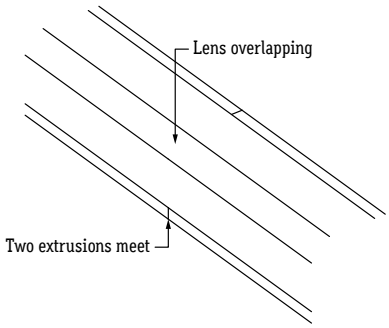

**4.** If applicable, size LED boards, then connect each LED board together using provided Terminal Connectors.
**Note:** Refer to Operation of Board on page 8 and Continuous Runs on page 9 for details on sizing and connecting LED boards.

**5.** After all extrusions have been securely mounted, remove adhesive backing from LED board and stick in place along extrusion channel, ensuring LED board is secure inside extrusion.
**Note:** Refer to Application Guidelines on page 8 to ensure correct installation.




**6.** If applicable, connect disconnects between fixtures or solder connectors using the steps from Soldering Guide & Connectors on page 9.

**7.** Install lens into extrusion, overlapping where two extrusions meet. Plan your cuts so that the lens will always overlap where two extrusions meet. Overlapping lenses helps keep extrusions aligned and prevents light leaks.




**8.** Perform continuity test steps on page 14 before connecting fixture to power source.

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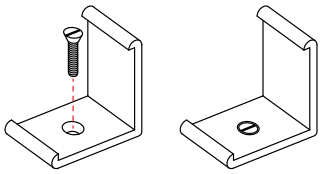
# LLED8200-SQC | INSTALLATION

## Mounting Fixture (Dry Location Mounting Clips)

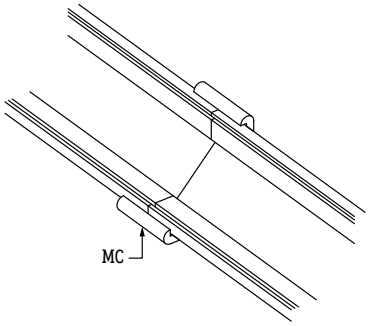
**1.** Measure area where fixtures will be installed. Use a chalk line to ensure a straight installation.

**2.** Mark location where mounting clips will be installed.
**Note:** The number of required mounting clips differs for dry and wet location products. Verify number of mounting clips is appropriate for installation environment before installing. Do not install fixtures with inadequate number of mounting clips.

**3.** Lay mounting clips and pre-drill using proper drill bit for surface and screw size.
**Recommendation:** 8/32 x 1" screw.
**Note:** Allow 0.25" clearance for lateral expansion of assembled mounting clips. Only install mounting clips on flat, even surfaces.

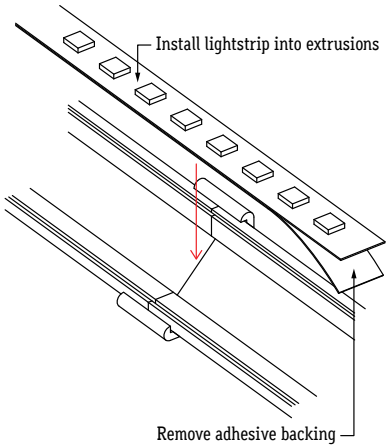


**4.** Screw mounting clips to surface, then snap extrusions into mounting clips.
**Note:** Ensure extrusions are aligned. Misalignment will prevent lens from snapping in.



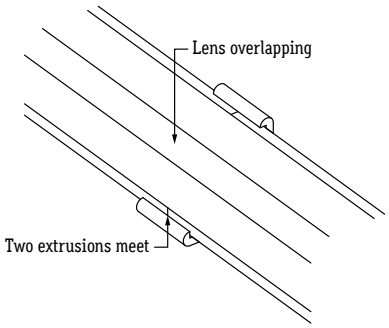

**5.** If applicable, size LED boards, then connect each LED board together using provided Terminal Connectors.
**Note:** Refer to Operation of Board on page 8 and Continuous Runs on page 9 for details on sizing and connecting LED boards.

**6.** After all extrusions have been securely mounted, remove adhesive backing from LED board and stick in place along extrusion channel, ensuring LED board is secure inside extrusion.
**Note:** Refer to Application Guidelines on page 8 to ensure correct installation.




**7.** If applicable, connect disconnects between fixtures or solder connectors using the steps from Soldering Guide & Connectors on page 9.

**8.** Install lens into extrusion, overlapping where two extrusions meet. Plan your cuts so that the lens will always overlap where two extrusions meet. Overlapping lenses helps keep extrusions aligned and prevents light leaks.




**9.** Perform continuity test steps on page 14 before connecting fixture to power source.

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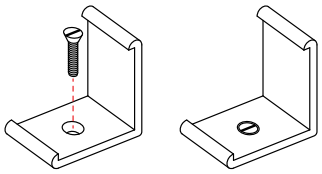
# LLED8200-SQC | INSTALLATION

## Mounting Fixture (Wet Location)

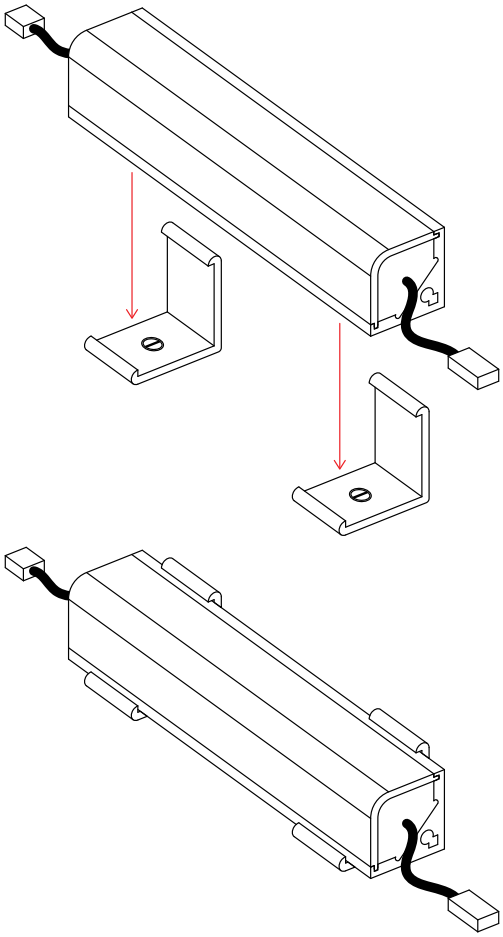
**1.** Measure area where fixtures will be installed. Use a chalk line to ensure a straight installation.

**2.** Mark location where mounting clips will be installed.
**Note:** The number of required mounting clips differs for dry and wet location products. Verify number of mounting clips is appropriate for installation environment before installing. Do not install fixtures with inadequate number of mounting clips.

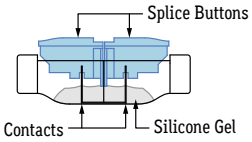
**3.** Lay mounting clips and pre-drill using proper drill bit for surface and screw size.
**Recommendation:** 8/32 x 1" screw.
**Note:** Allow 0.25" clearance for lateral expansion of assembled mounting clips. Only install mounting clips on flat, even surfaces.

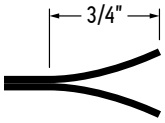


**4.** Screw mounting clips to surface, then snap fixtures into mounting clips.

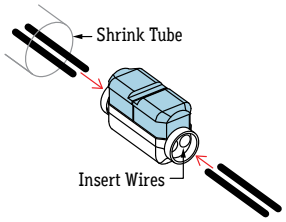


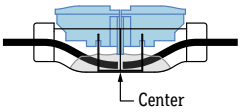
**5.** If applicable, make connections between fixtures using wet location connectors. Slide shrink tube over wires and connector. Part wires 3/4" for insertion into the connector.



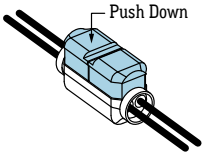



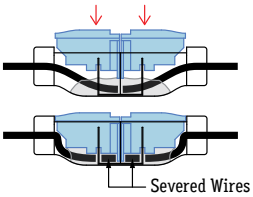

**a.** Push wires into connector until they stop at the center point. Repeat process for other side.
**Note:** Positive wire has ridges on the jacket. Neutral wire has a smooth jacket.



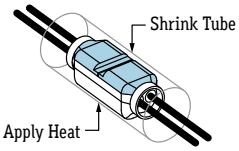



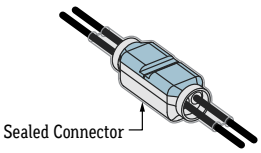

**b.** Use pliers to push splice buttons down until they sever the wire and snap into place.




**c.** Slide shrink tube over connector and apply heat. The shrink tube will shrink down around the connector. Apply silicone around the ends to create a stronger seal.




**6.** Perform continuity test steps on page 14 before connecting fixture to power source.

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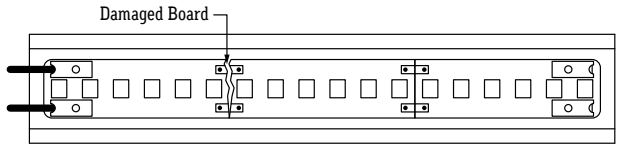
# LLED8200-SQC | INSTALLATION

## Troubleshooting & Continuity Test

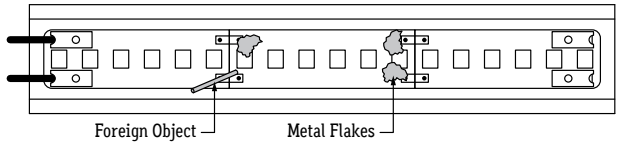
## TROUBLESHOOTING TIPS

- Do not reset the breaker multiple times
- If the unit is overloaded, the breaker will trip, shutting off the transformer and lights
- If the breaker reset button has been held down by hand or any type of pressure, such as duct tape, or if the breaker has been reset multiple times without troubleshooting, the unit will:
  - Burn the transformer bobbin
  - Burn the thermal or magnetic breaker
  - Burn the primary or secondary wires due to high amperage caused by overload
  - Short circuit in line which will not allow the breaker to reset
  - Damage the lighting

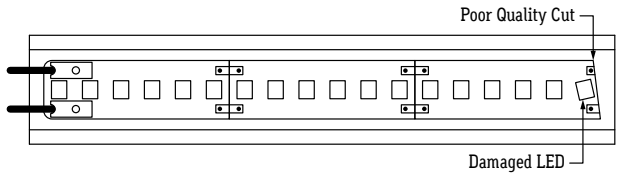
**1.** Turn off power before beginning. Check for any damage to the circuit in the LED board. If there is excessive damage and the circuit is broken, the board must be replaced.



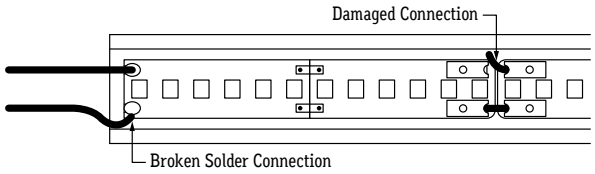

**2.** Check for metal particles or other foreign objects causing the short.




**3.** Check to make sure cuts in the board are clean. Poor quality cuts to the LED board will cause damage to the circuit, resulting in dim, flickering, or lightless LEDs.




**4.** Check connections between LED terminals and, if applicable, check soldered connections.



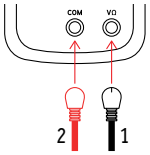

## CONTINUITY TEST

A continuity test is performed to determine if electricity can pass through two points on an electrical circuit. This helps identify shorts or malfunctions in the line or fixture. Use a multimeter or continuity tester to perform the steps below.

- Always perform a continuity test before connecting lighting to power source.
- Malfunctions are not always as obvious as the lights not turning on.
- A short or malfunction in the line or fixture will cause damage over time, ultimately damaging the lighting and voiding warranty.

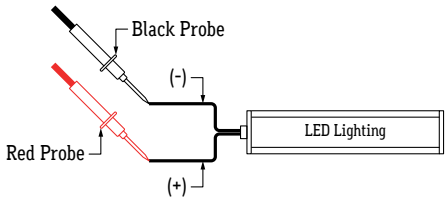
**1.** Turn power off before beginning. Verify power is turned off by using a non-contact circuit tester. Touch the probe of the tester to positive wire of the power source. The tester will light up if an electrical current is detected.

**2.** Setup your tester. First insert the black probe lead into the COM jack, then insert the red probe lead into the VΩ jack.

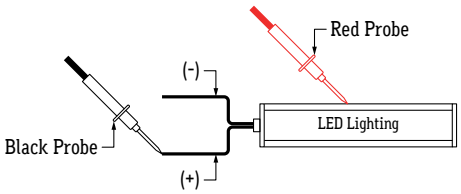



**3.** Verify that your tester is functional by touching probes together. The tester should light up, beep, or read 0Ω (ohms) of resistance.

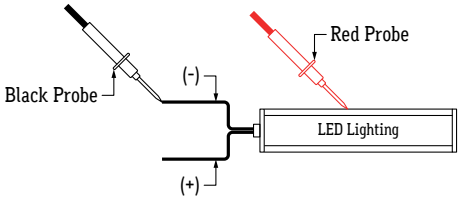
**4.** Touch the red probe to the positive (+) wire and the black probe to the negative (-) wire. If a conductive path is formed between the positive and negative wires, the multimeter will beep, flash, or read 0Ω (ohms). Troubleshoot to identify the malfunction in the line. If there is no conductive path, the multimeter will not show any feedback.




**5.** Touch the red probe to the fixture extrusion and the black probe to the positive (+) wire. If a conductive path is formed between the extrusion and the positive wire, the multimeter will beep, flash, or read 0Ω (ohms). Troubleshoot to identify the malfunction in the line. If there is no conductive path, the multimeter will not show any feedback.




**6.** Touch the red probe to the fixture extrusion and the black probe to the negative (-) wire. If a conductive path is formed between the extrusion and the negative wire, the multimeter will beep, flash, or read 0Ω (ohms). Troubleshoot to identify the malfunction in the line. If there is no conductive path, the multimeter will not show any feedback.




**7.** Set voltmeter to DC voltage and test power source. Confirm the correct voltage before connecting lighting to power source. If voltage reading is more than 1 volt higher than the marked output voltage, there is a problem with the power source or driver.

**8.** Connect power connector to power source. If LEDs do not turn on, flip polarity (+ -) or power source connection to power connector.

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# LLED8200-SQC | INSTALLATION

Magnetic Transformer Remote Driver (TRA)

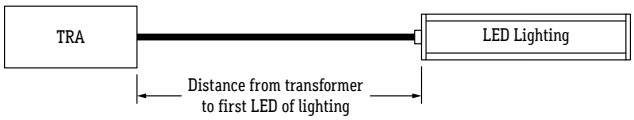
**MAXIMUM RUN BASED ON 80% LOAD OF MAGNETIC TRANSFORMER (TRA) MAXIMUM WATTAGE**

| TRANSFORMER WATTAGE | 80% LOAD | 1.5W MAX RUN | 2W MAX RUN | 2.5W MAX RUN | 3W MAX RUN | 3.6W MAX RUN | 4W MAX RUN | 4.5W MAX RUN | 5W MAX RUN | 5.5W MAX RUN | 6W MAX RUN | 6.5W MAX RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 4W | 2.6' | 2' | 1.6' | 1.3' | 1.1' | 1' | 0.8' | 0.8' | 0.7' | 0.6' | 0.6' |
| 10 | 8W | 5.3' | 4' | 3.2' | 2.6' | 2.2' | 2' | 1.7' | 1.6' | 1.4' | 1.3' | 1.2' |
| 20 | 16W | 10.6' | 8' | 6.4' | 5.3' | 4.4' | 4' | 3.5' | 3.2' | 2.9' | 2.6' | 2.4' |
| 35 | 28W | 18.6' | 14' | 11.2' | 9.3' | 7.7' | 7' | 6.2' | 5.6' | 5.1' | 4.6' | 4.3' |
| 40 | 32W | 21.3' | 16' | 12.8' | 10.6' | 8.8' | 8' | 7.1' | 6.4' | 5.8' | 5.3' | 4.9' |
| 50 | 40W | 26.6' | 20' | 16' | 13.3' | 11.1' | 10' | 8.8' | 8' | 7.2' | 6.6' | 6.1' |
| 60 | 48W | 32' | 24' | 19.2' | 16' | 13.3' | 12' | 10.6' | 9.6' | 8.7' | 8' | 7.3' |
| 75 | 60W | 40' | 30' | 24' | 20' | 16.6' | 15' | 13.3' | 12' | 10.9' | 10' | 9.2' |
| 90 | 72W | 48' | 36' | 28.8' | 24' | 20' | 18' | 16' | 14.4' | 13.1' | 12' | 11.1' |
| 150 | 120W | 80' | 60' | 48' | 40' | 33.3' | 30' | 26.6' | 24' | 21.8' | 20' | 18.4' |
| 200 | 160W | 106.6' | 80' | 64' | 53.3' | 44.4' | 40' | 35.5' | 32' | 29.1' | 26.6' | 24.6' |
| 250 | 200W | 133.3' | 100' | 80' | 66.6' | 55.5' | 50' | 44.4' | 40' | 36.3' | 33.3' | 30.7' |
| 300 | 240W | 160' | 120' | 96' | 80' | 66.6' | 60' | 53.3' | 48' | 43.6' | 40' | 36.9' |

## PREVENTING VOLTAGE DROP

The maximum wire length to prevent voltage drop refers to the wire that is used between the transformer and 1st LED of the lighting fixture. If the gauge wire is too small, the fixture will not receive correct voltage.

**Example:** LED luminaire requires 24VDC to operate effectively. If the wire gauge is too small to carry the 24VDC current from the transformer, the voltage can shrink to 16VDC, which is insufficient to power the lighting.




**WATTS (VA) PER CIRCUIT (Maximum wire length to prevent voltage drop)**

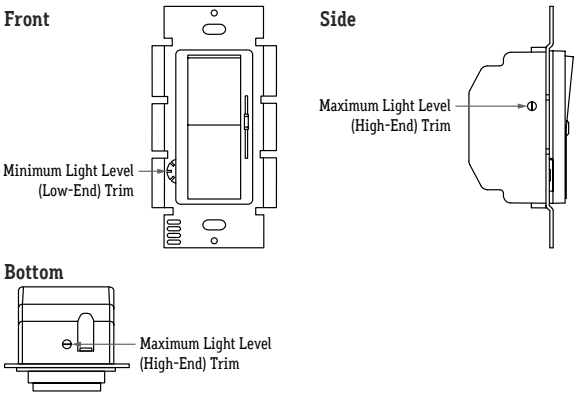
| WIRE SIZE | VOLTAGE | 5 VA | 10 VA | 20 VA | 35 VA | 40 VA | 50 VA | 60 VA | 75 VA | 90 VA | 150 VA | 200 VA | 250 VA | 300 VA | 500 VA | 600 VA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14GA | 12V | 51' | 49' | 44' | 39' | 37' | 35' | 32' | 30' | 25' | 18' | 14' | 9' | 7' | | |
| 14GA | 24V | 103' | 98' | 89' | 80' | 75' | 70' | 66' | 61' | 51' | 37' | 28' | 18' | 14' | | |
| 12GA | 12V | 81' | 76' | 70' | 63' | 59' | 55' | 52' | 48' | 40' | 29' | 22' | 14' | 11' | | |
| 12GA | 24V | 162' | 155' | 140' | 125' | 118' | 111' | 103' | 96' | 81' | 59' | 44' | 29' | 22' | | |
| 10GA | 12V | 129' | 123' | 112' | 100' | 94' | 88' | 82' | 76' | 65' | 47' | 35' | 24' | 18' | 7' | 4' |
| 10GA | 24V | 258' | 247' | 223' | 200' | 188' | 176' | 165' | 153' | 129' | 94' | 71' | 48' | 36' | 15' | 9' |
| 8GA | 12V | 205' | 196' | 177' | 158' | 149' | 140' | 130' | 121' | 102' | 74' | 55' | 37' | 27' | 12' | 7' |
| 8GA | 24V | 411' | 392' | 355' | 318' | 299' | 280' | 262' | 243' | 205' | 149' | 112' | 75' | 55' | 24' | 14' |

## TRANSFORMER CARE

- Do not submerge transformers in any liquid
- Do not leave any exposed wires
- Do not cover transformer without proper ventilation
- Do not install damaged transformer
- Do not exceed maximum load

## DIMMER TRIM VALUES

- Set dimmer trim value as needed to prevent flickering and irregular dimming
- **Note:** Review dimmer specs for trim value adjustment

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# LLED8200-SQC | INSTALLATION

Electronic Transformer Remote Driver (TRA-E)

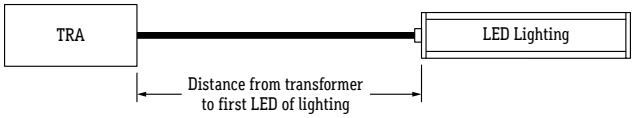
**MAXIMUM RUN BASED ON 80% LOAD OF ELECTRONIC TRANSFORMER (TRA-E) MAXIMUM WATTAGE**

| TRANSFORMER WATTAGE | 80% LOAD | 1.5W MAX RUN | 2W MAX RUN | 2.5W MAX RUN | 3W MAX RUN | 3.6W MAX RUN | 4W MAX RUN | 4.5W MAX RUN | 5W MAX RUN | 5.5W MAX RUN | 6W MAX RUN | 6.5W MAX RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 12.8W | 8.5' | 6.4' | 5.1' | 4.2' | 3.5' | 3.2' | 2.8' | 2.5' | 2.3' | 2.1' | 1.9' |
| 25 | 20W | 13.3' | 10' | 8' | 6.6' | 5.5' | 5' | 4.4' | 4' | 3.6' | 3.3' | 3.1' |
| 40 | 32W | 21.3' | 16' | 12.8' | 10.6' | 8.8' | 8' | 7.1' | 6.4' | 5.8' | 5.3' | 4.9' |
| 60 | 48W | 32' | 24' | 19.2' | 16' | 13.3' | 12' | 10.6' | 9.6' | 8.7' | 8' | 7.3' |
| 80 | 64W | 42.6' | 32' | 25.6' | 21.3' | 17.7' | 16' | 14.2' | 12.8' | 11.6' | 10.6' | 9.8' |
| 90 | 72W | 48' | 36' | 28.8' | 24' | 20' | 18' | 16' | 14.4' | 13.1' | 12' | 11.1' |
| 96 | 76.8W | 51.2' | 38.4' | 30.7' | 25.6' | 21.3' | 19.2' | 17.1' | 15.36' | 13.9' | 12.8' | 11.8' |
| 120 | 96W | 64' | 48' | 38.4' | 32' | 26.6' | 24' | 21.3' | 19.2' | 17.4' | 16' | 14.7' |
| 150 | 120W | 80' | 60' | 48' | 40' | 33.3' | 30' | 26.6' | 24' | 21.8' | 20' | 18.4' |
| 185 | 148W | 98.6' | 74' | 59.2' | 49.3' | 41.1' | 37' | 32.8' | 29.6' | 26.9' | 24.6' | 22.7' |
| 240 | 192W | 128' | 96' | 76.8' | 64' | 53.3' | 48' | 42.6' | 38.4' | 34.9' | 32' | 29.5' |
| 320 | 256W | 170.6' | 128' | 102.4' | 85.3' | 85.3' | 64' | 56.8' | 51.2' | 46.5' | 42.6' | 39.3' |

## PREVENTING VOLTAGE DROP

The maximum wire length to prevent voltage drop refers to the wire that is used between the transformer and 1st LED of the lighting fixture. If the gauge wire is too small, the fixture will not receive correct voltage.

**Example:** LED luminaire requires 24VDC to operate effectively. If the wire gauge is too small to carry the 24VDC current from the transformer, the voltage can shrink to 16VDC, which is insufficient to power the lighting.




**WATTS (VA) PER CIRCUIT (Maximum wire length to prevent voltage drop)**

| WIRE SIZE | VOLTAGE | 16 VA | 25 VA | 40 VA | 60 VA | 80 VA | 90 VA | 96 VA | 120 VA | 150 VA | 185 VA | 240 VA | 320 VA |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14GA | 12V | 46' | 42' | 37' | 32' | 28' | 25' | 23' | 21' | 18' | 16' | 11' | 4' |
| 14GA | 24V | 93' | 84' | 75' | 66' | 56' | 51' | 47' | 42' | 37' | 33' | 23' | 9' |
| 12GA | 12V | 74' | 66' | 59' | 52' | 44' | 40' | 37' | 33' | 29' | 26' | 18' | 7' |
| 12GA | 24V | 147' | 132' | 118' | 103' | 89' | 81' | 74' | 67' | 59' | 52' | 37' | 15' |
| 10GA | 12V | 117' | 106' | 94' | 82' | 71' | 65' | 59' | 53' | 47' | 41' | 30' | 12' |
| 10GA | 24V | 235' | 211' | 188' | 165' | 141' | 129' | 118' | 106' | 94' | 83' | 59' | 24' |
| 8GA | 12V | 186' | 168' | 149' | 130' | 112' | 102' | 93' | 84' | 74' | 65' | 46' | 18' |
| 8GA | 24V | 374' | 336' | 299' | 262' | 224' | 205' | 187' | 168' | 149' | 131' | 93' | 37' |

## TRANSFORMER CARE

- Do not submerge transformers in any liquid
- Do not leave any exposed wires
- Do not cover transformer without proper ventilation
- Do not install damaged transformer
- Do not exceed maximum load

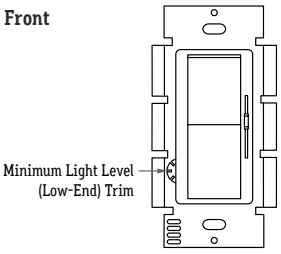
## MOUNTING INSIDE AN ENCLOSURE

- Only mount drivers inside enclosures rated for your application
- Always ground drivers to enclosure
- Do not mount drivers without an enclosure
- Use enclosure knockouts and water-tight cordgrips when applicable

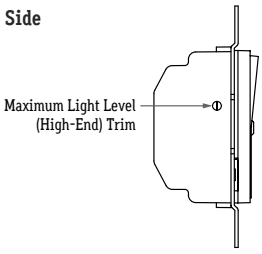
## DIMMER TRIM VALUES

- Set dimmer trim value as needed to prevent flickering and irregular dimming
- **Note:** Review dimmer specs for trim value adjustment

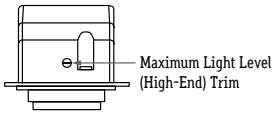
**Front**




**Side**




**Bottom**

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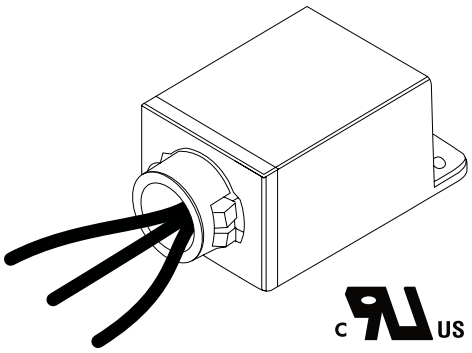
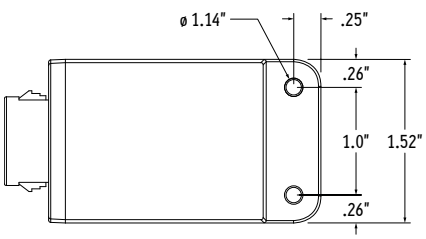
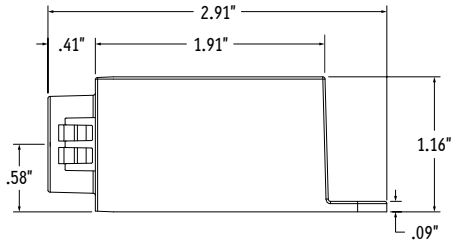
# LLED8200-SQC | INSTALLATION

Surge Protector



## CASE DIMENSIONS




### SURGE PROTECTOR SPECIFICATIONS

| MODEL | INPUT VOLTAGE | SURGE PROTECTION LEVEL | MOUNTING | ENCLOSURE MATERIAL | INPUT LEADS | INPUT FREQUENCY |
|---|---|---|---|---|---|---|
| ALS-SP | 120V - 277V | 10kV, 10kA, ANSI C62.41 Category C | SnapLOCK / Footed | Polycarbonate | 6", 18AWG stranded, 105°C stripped, 3/8" tinned | 60Hz |

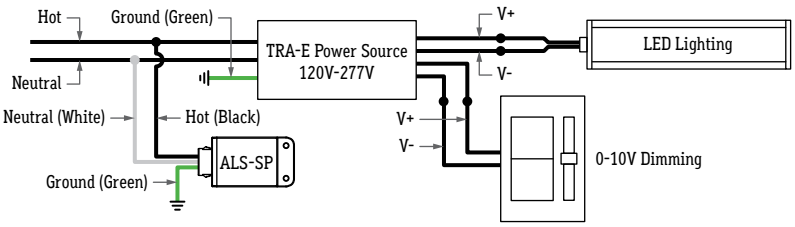
## PRODUCT FEATURES

The Surge Series are 3-leaded devices that protect Line-Ground, Line-Neutral, and Neutral-Ground in accordance with IEEE / ANSI C62.41.2 guidelines. Protects against surges according to IE EE C62.41.2 C High (10kA and 10kV). Surge current rating = 10,000 Amps using industry standard 8/20 µSec wave. Surge Location Rated Category C3. UL Recognized Component in the United States and Canada (UL1449). Type 4 Surge Protection Device. High temperature, flame retardant plastic enclosure, 85°C maximum surface temperature rating. Thermally Protected Transient Over-voltage Circuit.

## PRODUCT SPECIFICATIONS

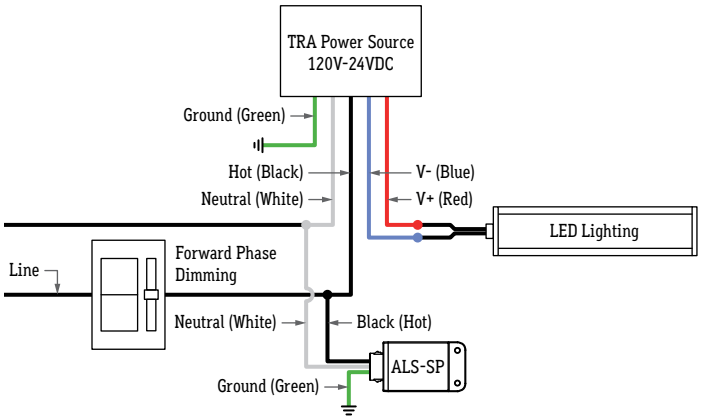
The Surge series of products are designed to be used in conjunction with LED Drivers and fixtures to provide an additional level of protection against powerline disturbances in industrial, commercial and residential applications where surge protection to IEEE C62.41.2 is required.

## 0-10V WIRING DIAGRAM (10V Dimming)

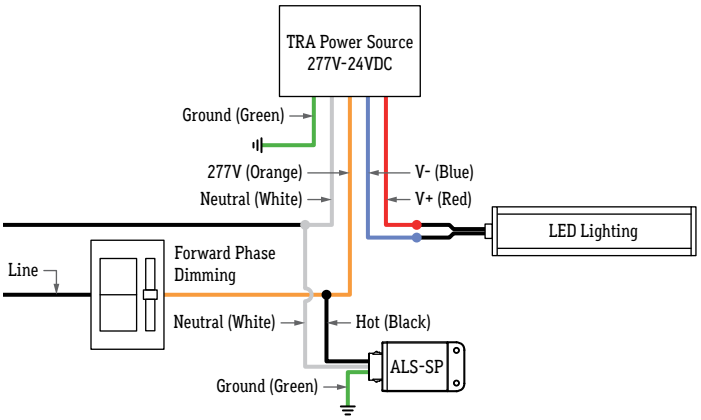



**Note:** Wire colors vary based on model. See individual TRA-E submittal for more information, or refer to wire callouts on transformer labeling. Always confirm wire colors before connecting to power source.

## 120V WIRING DIAGRAM (Forward Phase Dimming)




## 277V WIRING DIAGRAM (Forward Phase Dimming)

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