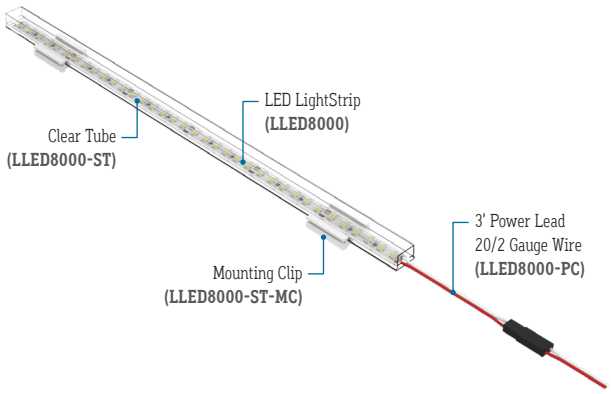
CALI CALIFORNIA ACCENT LIGHTING INC

LLED8000-ST | INSTALLATION

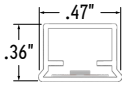
Overview



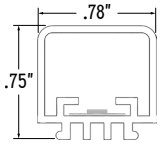
READ ENTIRE GUIDE BEFORE STARTING INSTALLATION

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 VIEWS



Clear Lens **(CL)**
50% Semi-Frosted Lens **(SF)**
100% Frosted Lens **(F)**
(1.5W - 4.5W)



Clear Lens **(CL)**
50% Semi-Frosted Lens **(SF)**
100% Frosted Lens **(F)**
(5.5W - 6.5W)

FEATURES	
APPLICATIONS	Accent, Decorative, Surface, Recessed, Pendant Lighting
LAMP TYPE	LEDs
CRI	> 95
LENS	Clear, 50% Semi-Frosted, or 100% Frosted
VIEWING ANGLE	120°
MOUNTING	Mounting Channel or Mounting Clips (Sold Separately)
WEIGHT	0.049 lbs per foot
CONSTRUCTION	Polycarbonate Extrusion
LENGTH	Built to Order
LISTING	Dry, Wet, or IP67 Location UL2108, CSA C22.2 #9 UL8750, CSA250
INSTALLATION	Link to Installation Instructions
ELECTRICAL	
DIMMING	Forward / Reverse Phase, 0-10V, Lutron, DMX, DALI
MAXIMUM RUN (Based on 5 Amps)	18' (6.5W), 21' (5.5W), 26' (4.5W), 33' (3.6W), 36' (1.5W, 2.5W)
MAXIMUM RUN (Based on 4 Amps for Class II)	14' (6.5W), 17' (5.5W), 21' (4.5W), 26' (3.6W), 36' (1.5W, 2.5W)
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

ELECTRICAL

- LipLEDs products require a 24 Volt DC remote driver
- To calculate driver size, determine Watts per Foot.
  Example: 1.5W per Foot
- Determine Length in Feet.
  Example: 30'
- Calculate Load: Multiply Watts per Foot x Length in Feet
  Example: 1.5W x 30'= 45W
- Choose a driver from catalog.
  Example: 60 Watt Driver
- Determine maximum distance using Maximum Wire Length Table on drivers page.
  Example: 45 watts is between 40W and 60W. Using #14 wire, maximum distance is 37' from driver 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 driver.

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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lipLEDs™ Specification Grade

CALIFORNIA ACCENT LIGHTING INC

LLED8000-ST | 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 connect lipLEDs lightstrip to power source while spooled or coiled. **(Fig. 2)**
- 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. **(Fig. 3)**
- Do not penetrate lipLEDs lightstrip with any foreign object. **(Fig. 4)**
- 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. 5)**
- 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. 6)**
- Do nut use a lighter or open flame to heat shrink tube. **(Fig. 7)**
- 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 lightstrip or LEDs. **(Fig. 8)**
- 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. **(Fig. 9)**
- Do not install lipLEDs lightstrip in a zig zag fashion. **(Fig. 10)**
- Do not fold, crease, or twist lipLEDs lightstrip. **(Fig. 11)**
- Do not bend lightstrip along a horizontal plane. **(Fig. 12)**
- Do not overlap lipLEDs at any location. **(Fig. 13)**
- Do not cross or overlap extrusions and twist lightstrip to overlap. **(Fig. 14)**
- 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. 15)**

FIGURES

Fig. 1

Fig. 2

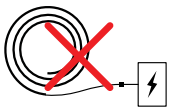


Fig. 3

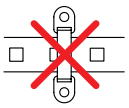


Fig. 4

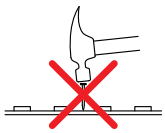


Fig. 5

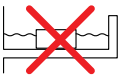


Fig. 6

Fig. 7

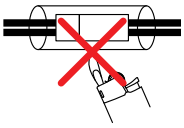


Fig. 8

Fig. 9

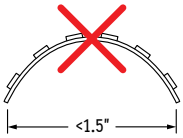


Fig. 10

Fig. 11

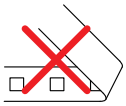


Fig. 12

Fig. 13

Fig. 14

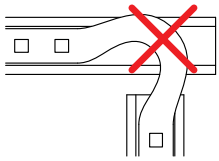
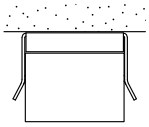


Fig. 15



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

FORWARD PHASE (FP) DIMMING PROTOCOL

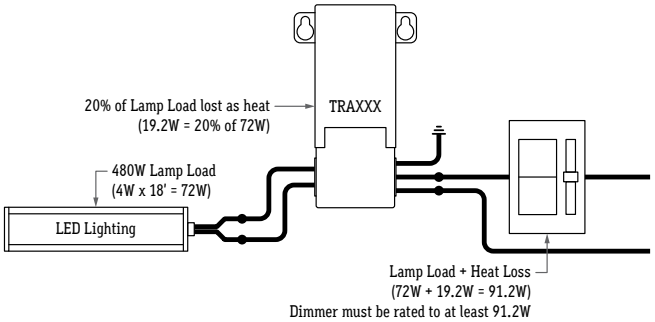
Technical Requirements For Control Equipment

- 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)

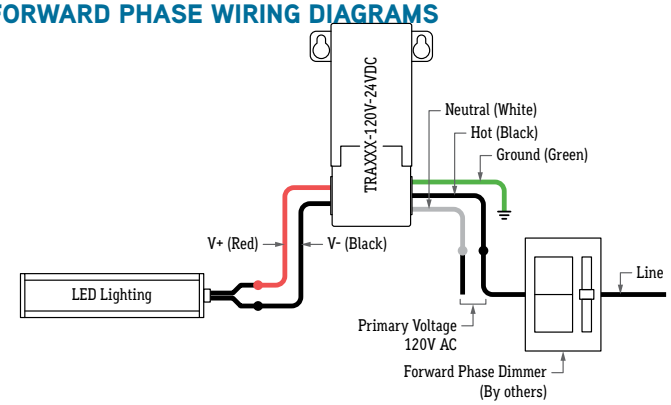
Symmetric Forward Phase-Control

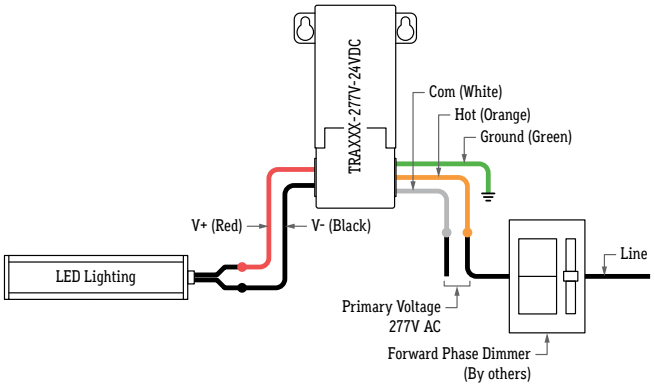
FORWARD PHASE DIMMER RATINGS

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

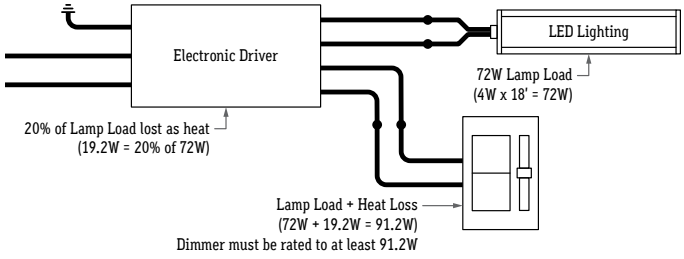
Available in 120 or 277 volts with either a dimmable integral or remote driver. The remote driver is available with 0-10V dimming capabilities. Consult factory for other dimming protocols available. The following applies to 0-10V dimming interfaces.
A 0-10V fluorescent dimmer will not dim the LEDs.

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

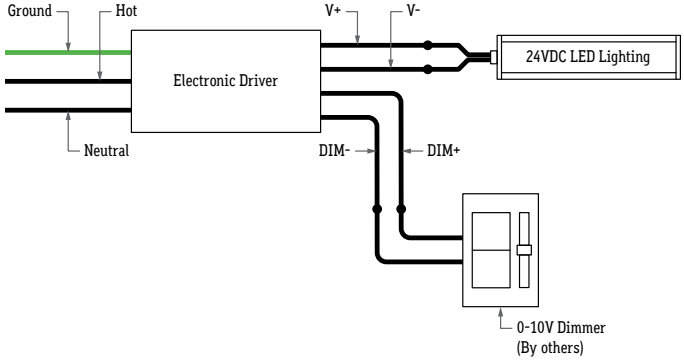
- The light output of the LEDs operated by the controllable LED driver is controlled by DC voltage applied to the control input leads (gray and violet). The actual response curve of LED driver current versus control voltage.
- The control device must be capable of accepting or sinking the DC current 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 driver 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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Dimming Protocol & Wiring Diagrams (Lutron Hi-lume)

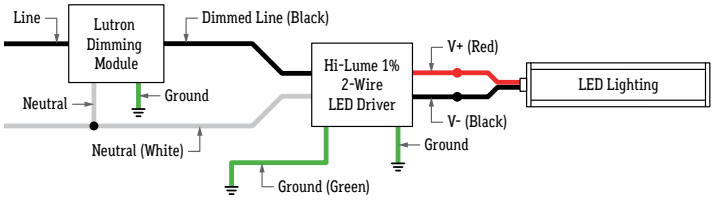
2-WIRE DIMMING PROTOCOL (Lutron LTEA)

Technical Requirements For Control Equipment (2-Wire Dimming)

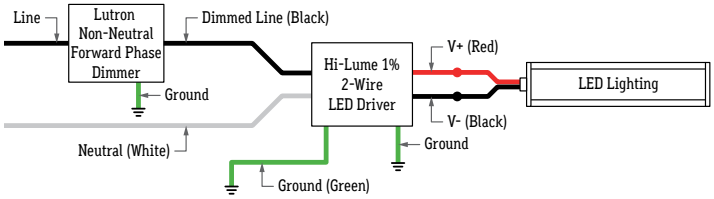
- The Hi-lume 1% 2-Wire LED Driver (LTEA2W) is a high performance LED driver that provides a smooth, continuous, flicker-free 1% dimming for virtually any LED fixture. Primary voltage is 120V and secondary side is 12VDC or 24VDC. A rated life time of 50,000 hours @tc -149°F (65°C). Inrush current: < 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



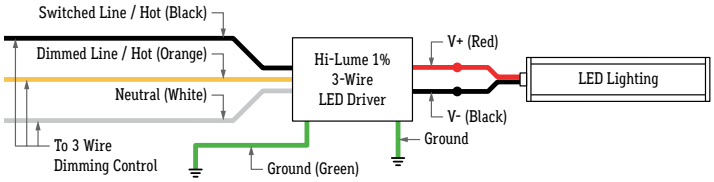
3-WIRE DIMMING PROTOCOL (Lutron L3DA)

Technical Requirements For Control Equipment (3-Wire Dimming)

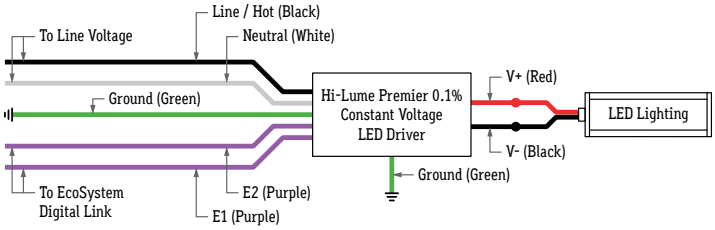
- Hi-lume 1% EcoSystem/3-Wire Driver (L3DA) is a high-performance LED driver that provides smooth, continuous 1% dimming for virtually any LED fixture, primary voltage is 120–277 V~ at 50/60 Hz and secondary side is 12VDC or 24VDC. A rated life time of 50,000 hours @tc -149°F (65°C). Inrush current: < 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



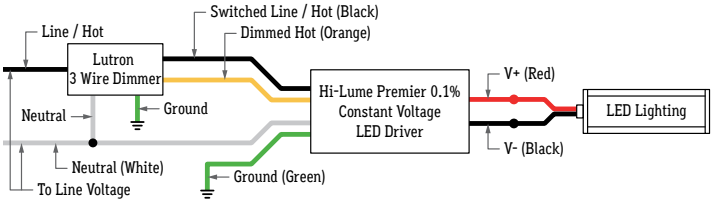
3-WIRE DIMMING PROTOCOL (Lutron L3D0)

Technical Requirements For Control Equipment (3-Wire Dimming)

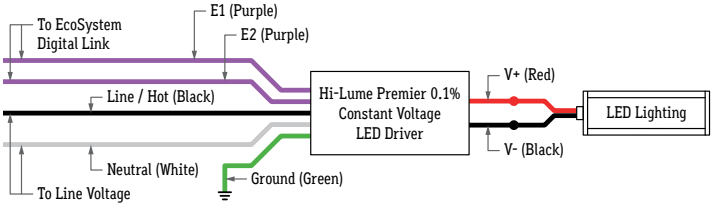
- Hi-lume Premier 0.1% EcoSystem / 3 Wire constant voltage 24V LED driver with Soft-on, Fade-to-Black. The Hi-lume Premier 0.1% Constant Voltage Driver (L3D0E) is a high-performance LED driver capable of controlling up to 96W of 24V constant voltage loads. This driver provides smooth and continuous dimming 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 (JA8 Compliant)

3-Wire Controls



EcoSystem Digital Controls



Note: Colors shown on diagrams correspond to terminals on driver

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Diagram of Driver and Typical Layouts (DALI)

DIAGRAM OF DRIVER

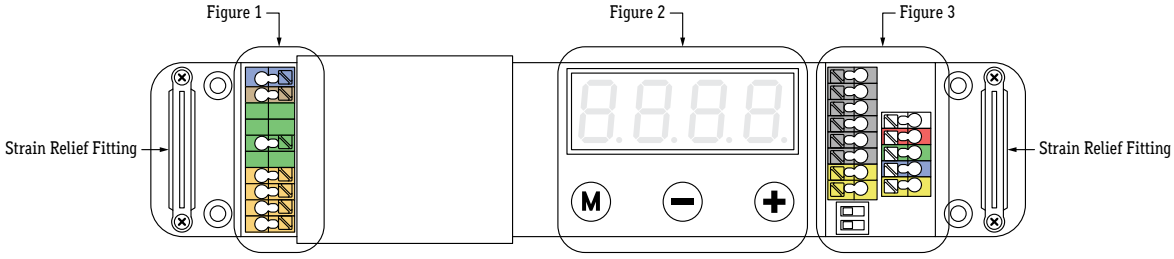


FIGURE 1 (120V - 277V Input)

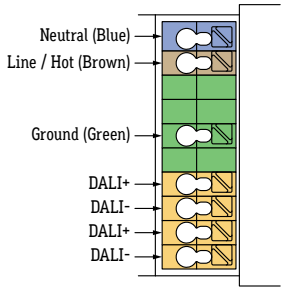


FIGURE 2 (Digital Interface Control)

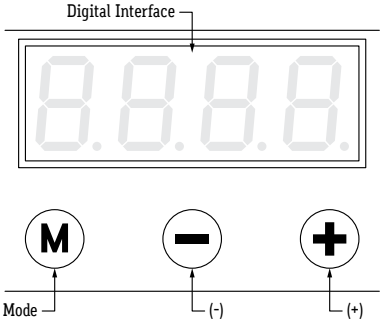
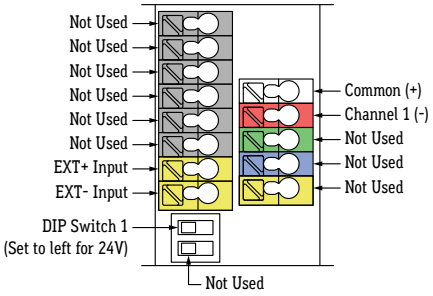
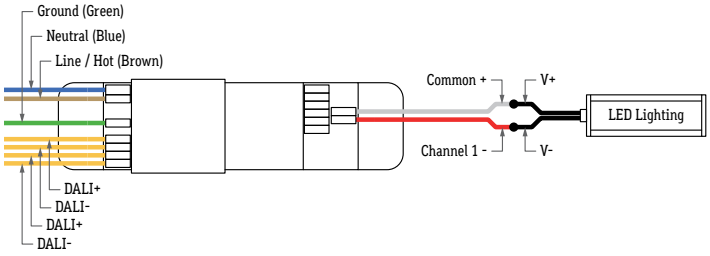


FIGURE 3 (Output)



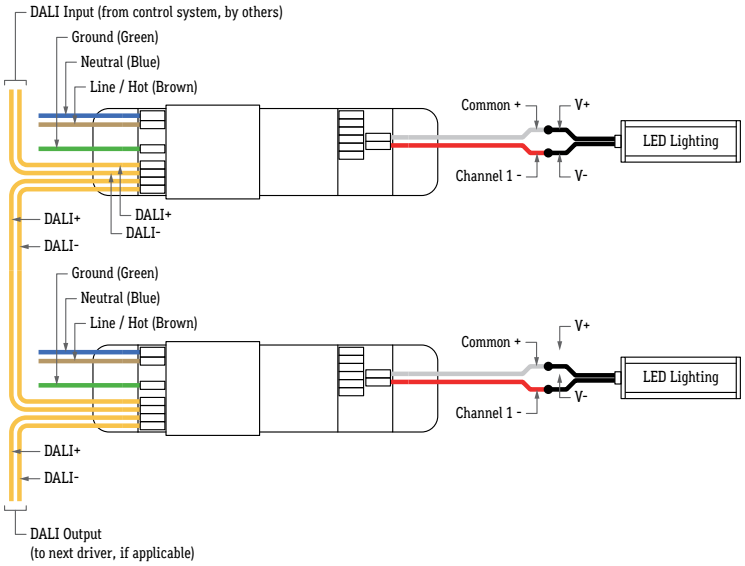
TYPICAL SINGLE RUN WIRING



NOTES

- DALI commissioning to be performed by a third party at time of installation. CALI does not provide DALI commissioning
- Wire colors on diagram correspond to colors of driver terminals
- Driver load not to exceed 100W
  It is recommended to only load drivers to 80% for best dimming performance.
- 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

TYPICAL DAISY CHAIN WIRING



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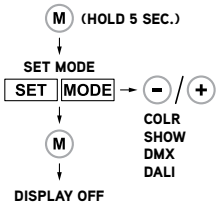
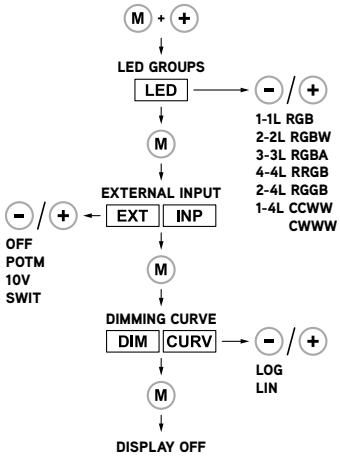
Operation of Driver Functions (DALI)

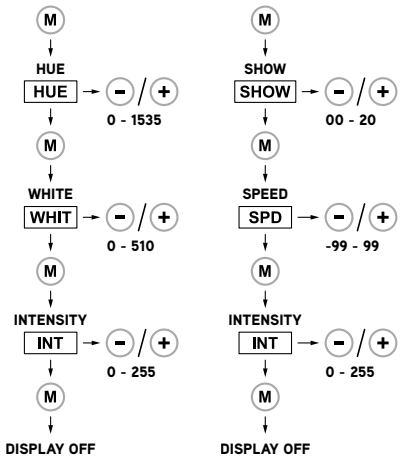
MODE OF OPERATION



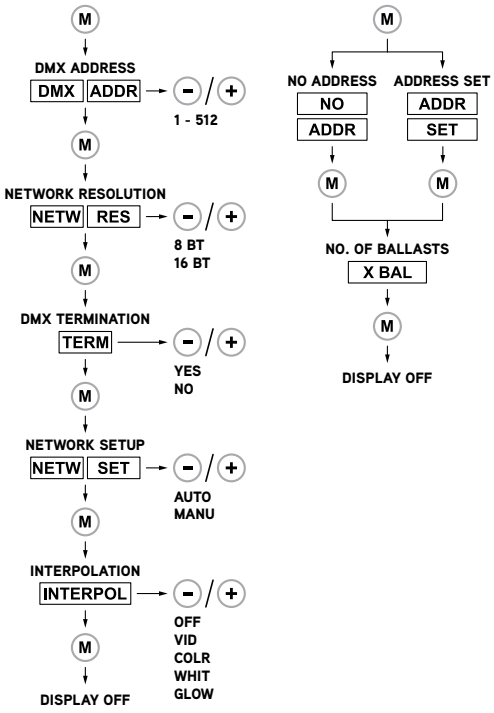
SET LED GROUPS



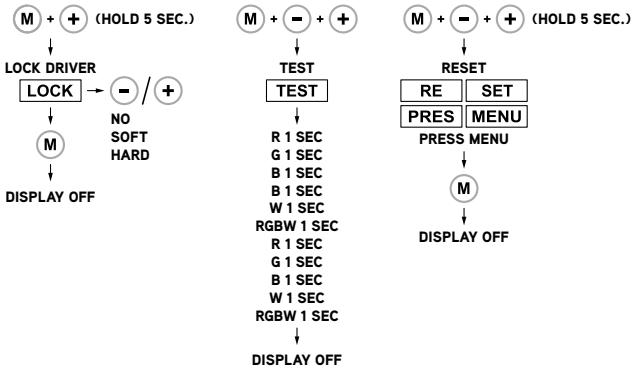
STANDALONE OPERATION (Color / Show)



STANDALONE OPERATION (DALI Network Operation)



OTHER FUNCTIONS (Lock Configuration, Visual Test, Reset)



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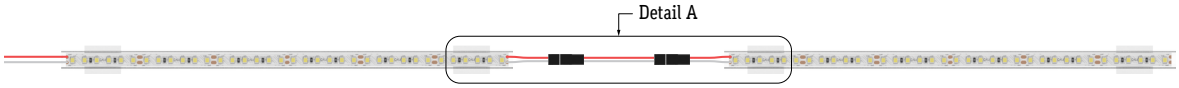
Design Guidelines

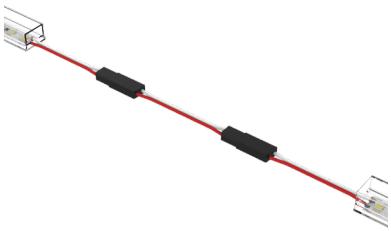
INDIVIDUAL FIXTURE (UP TO 8')

RUNS WITH CONTINUOUS CONNECTOR



CONTINUOUS RUN (DRY OR WET LOCATION)

DETAILS



Detail A
Continuous Connector
(**LLED8000-CC**)

Detail B
Continuous Connection
(Dry or Wet Location)

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Application Guidelines

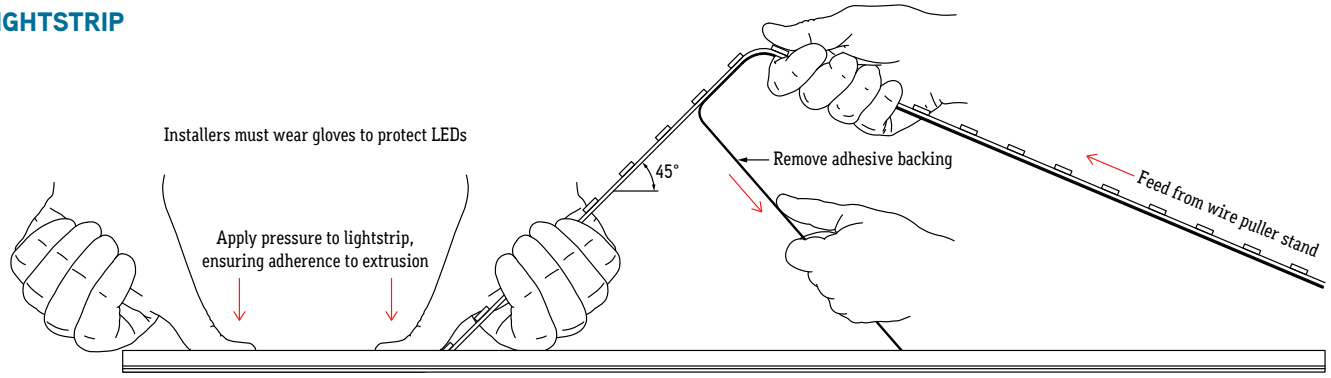
APPLICATION GUIDELINES

- Follow the below diagrams and steps if applicable to your installation.
- LED lightstrip and modules require a team effort to ensure a secure and correct installation.
- Use a wire puller stand to prevent tangles, twists, and snags when installing.
- For Mud-In applications, start lightstrip from power source side and allow up to 2" of excess lightstrip to exit through end cap.

NOTE

- Extrusions are shipped to exact length of specified measurements.
- Due to cut increment restrictions (2", ± 0.125" Tolerance), lightstrip is shipped to the closest measurement ordered. The lightstrip must be centered inside the extrusion.

LED LIGHTSTRIP

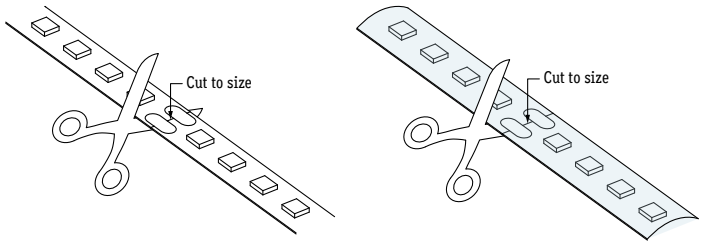


One person applies pressure to lightstrip, securing it to extrusion

Another person unreels lightstrip from spool, holding at a 45° angle.

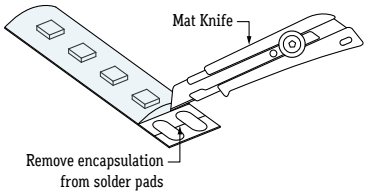
SOLDERING GUIDE

1. Cut lightstrip to desired length. Include both sets of solder pads by cutting to the left or right of designated markings, allowing more space for a stronger solder connection.



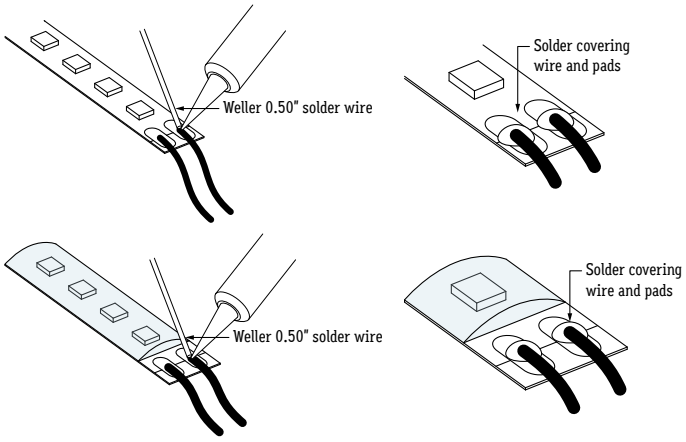
2. Prepare wires by stripping 1/8" from the end of each wire, then tin the tips of the wire with solder. Apply heat to stripped portion of wire, then add a small amount of solder until stripped portion of wire is fully covered in solder.

3. If applicable, use a mat knife to remove encapsulation from the section of lightstrip with solder pads. If lightstrip is not encapsulated, skip this step.

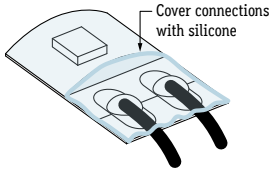


4. Solder lead wires to solder pads on the end of lightstrip. Solder the positive wire (Red or Black with ridged jacket) to the pad marked "+24V". Solder the neutral wire (White or Black with smooth jacket) to the pad marked "-".

Note: Solder iron to not 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.



5. If applicable, apply silicone over soldered connections. All connections must be completely covered with silicone to create weatherproof seal. Only use outdoor rated silicone. If lightstrip is not encapsulated, skip this step.



Note: Appearance of lightstrip may differ from example shown. Refer to wiring diagrams before soldering any wires.

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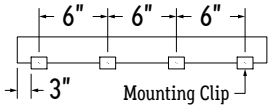
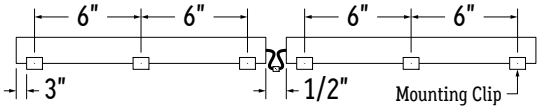
Mounting Clips

1. Measure area where luminaire will be installed. Use a laser line to create a reference line along installation area, ensuring consistent alignment of mounting clips. Mark location where each mounting clip will be installed along reference line.

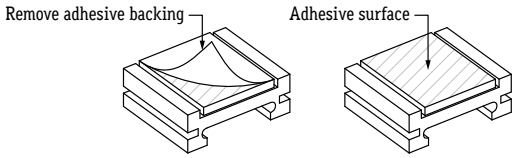
2. Use 1 mounting clip every 6".
Note: For vertical applications, use a stopper at the bottom to prevent fixture from sliding.



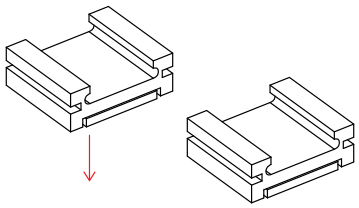
3. For continuous runs, use 1 mounting clip every 6".
Note: For vertical applications, use a stopper at the bottom to prevent fixture from sliding.



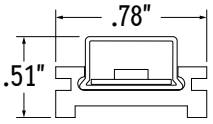
4. Prepare for mounting by removing adhesive backing from mounting clips.



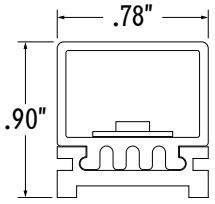
5. Adhere mounting clips to surface, then snap luminaire into mounting clips.



ASSEMBLED END VIEWS



1.5W, 2.5W, 3.6W, 4.5W



5.5W, 6.5W

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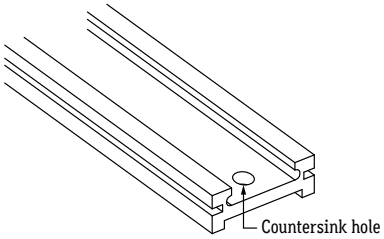
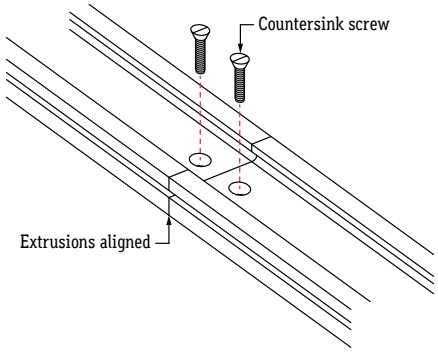
Mounting Fixture (Dry Location Mounting Channel)

1. Measure area where luminaire will be installed. Use a laser line to create a reference line along installation area, ensuring consistent alignment of mounting channels.

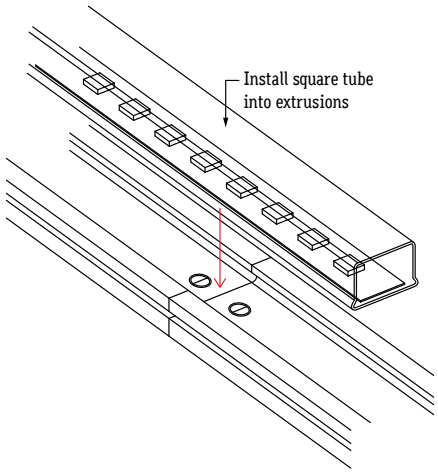
2. Lay extrusions along chalk line and drill at least 3 countersink holes per extrusion. Drill additional holes as needed.



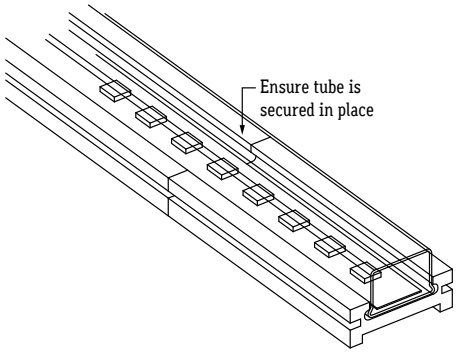
3. Screw extrusions to surface using countersink screws.
Note: Ensure extrusions are aligned. Misalignment will prevent lens from snapping in.



4. Install tube into extrusions, overlapping where two extrusions meet. Plan your cuts so that the tube will always overlap where two extrusions meet. Overlapping tubes helps keep extrusions aligned and prevents light leaks.



5. Ensure tube is secured in place.



6. If applicable, connect disconnects between luminaires or solder connectors using the steps from **Application Guidelines.**

7. Perform a continuity test before connecting luminaire to power source.

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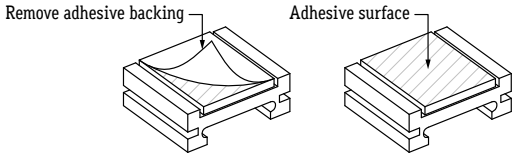
Mounting Fixture (Dry Location Mounting Clips)

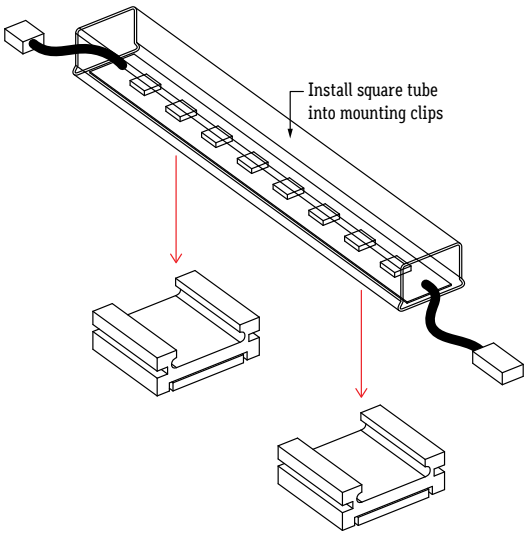
1. Measure area where luminaire will be installed. Use a laser line to create a reference line along installation area, ensuring consistent alignment of mounting clips. Mark location where each mounting clip will be installed along reference line.

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 luminaires with inadequate number of mounting clips.

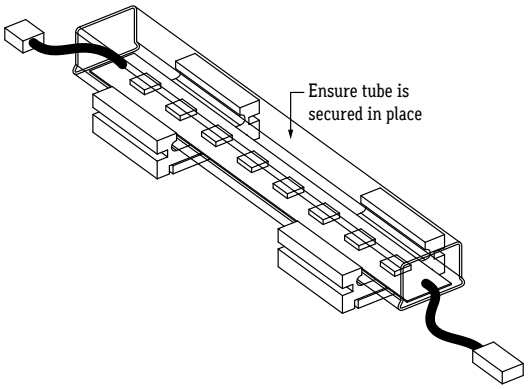
3. Prepare for mounting by removing adhesive backing from mounting clips.



4. Adhere mounting clips to surface, then snap luminaires into mounting clips.



5. Ensure tube is secured in place.



6. If applicable, position jumper wires between luminaire segments as needed.
Note: Refer to Design Guidelines - Continuous Run (Wet Location) for details.

7. If applicable, connect disconnects between luminaires or solder connectors using the steps from **Application Guidelines**.

8. Perform a continuity test before connecting luminaire to power source.

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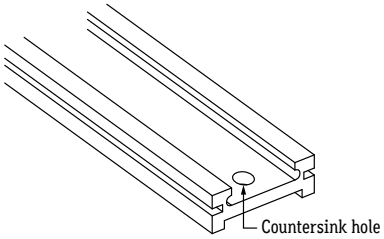
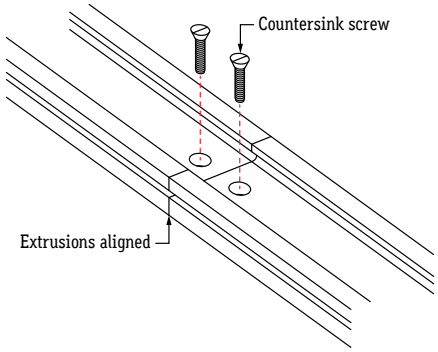
Mounting Fixture (Wet Location Mounting Channel)

1. Measure area where luminaire will be installed. Use a laser line to create a reference line along installation area, ensuring consistent alignment of mounting channels.

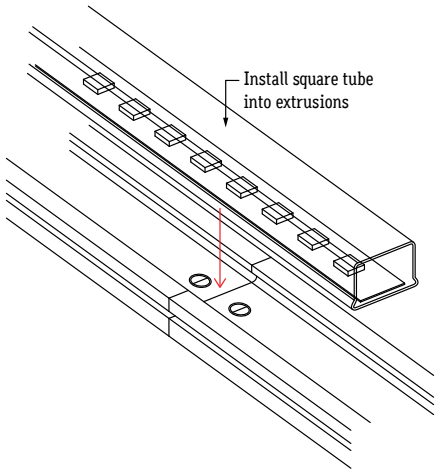
2. Lay extrusions along chalk line and drill at least 3 countersink holes per extrusion. Drill additional holes as needed.



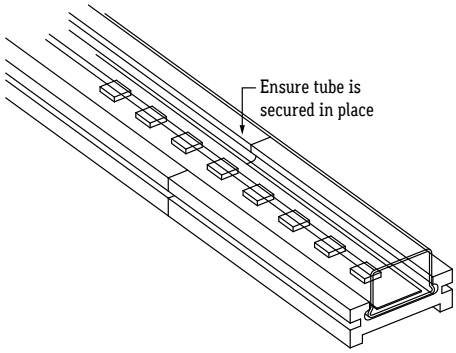
3. Screw extrusions to surface using countersink screws.
Note: Ensure extrusions are aligned. Misalignment will prevent lens from snapping in.



4. Install tube into extrusions, overlapping where two extrusions meet. Plan your cuts so that the tube will always overlap where two extrusions meet. Overlapping tubes helps keep extrusions aligned and prevents light leaks.

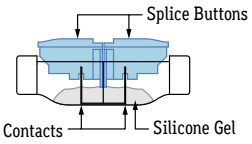


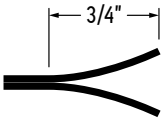
5. Ensure tube is secured in place.



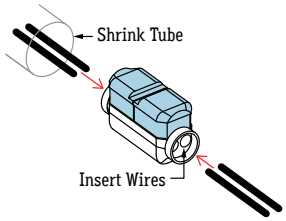
6. If applicable, position jumper wires between luminaire segments as needed.
Note: Refer to Design Guidelines - Continuous Run (Wet Location) for details.

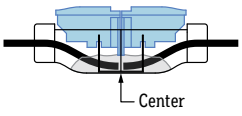
7. If applicable, make connections between luminaires using wet location splice connectors. Slide shrink tube over wires and connector. Part wires 3/4" for insertion into the connector.



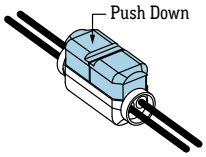


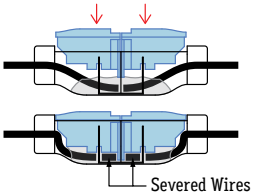
a. Push wires into connector until they stop at the center point. Repeat process for other side.
Note: Positive wire has ridges on the jacket. Neutral wire has a smooth jacket.



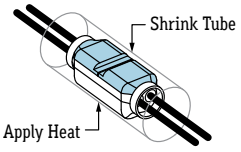


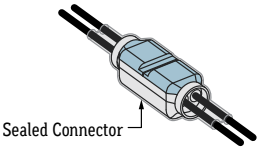
b. Use pliers to push splice buttons down until they sever the wire and snap into place.





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.





8. Perform a continuity test before connecting luminaire to power source.

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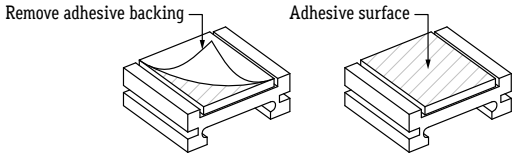
Mounting Fixture (Wet Location Mounting Clips)

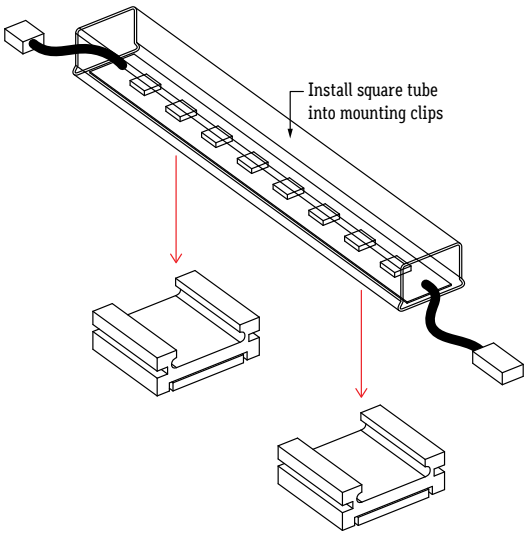
1. Measure area where luminaire will be installed. Use a laser line to create a reference line along installation area, ensuring consistent alignment of mounting clips. Mark location where each mounting clip will be installed along reference line.

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 luminaires with inadequate number of mounting clips.

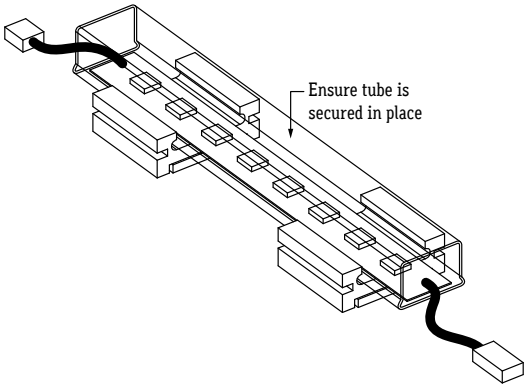
3. Prepare for mounting by removing adhesive backing from mounting clips.



4. Adhere mounting clips to surface, then snap luminaires into mounting clips.

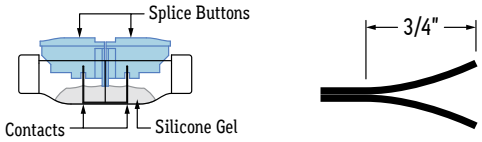


5. Ensure tube is secured in place.

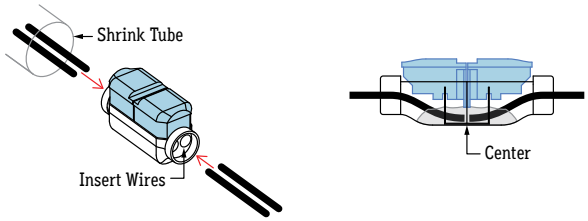


6. If applicable, position jumper wires between luminaire segments as needed.
Note: Refer to Design Guidelines - Continuous Run (Wet Location) for details.

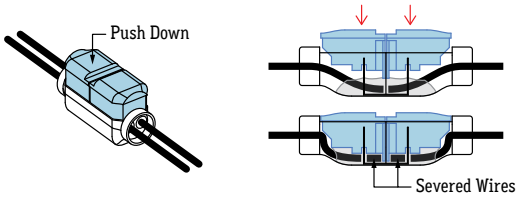
7. If applicable, make connections between luminaires using wet location splice connectors. Slide shrink tube over wires and connector. Part wires 3/4" for insertion into the connector.



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.

8. Perform a continuity test before connecting luminaire to power source.

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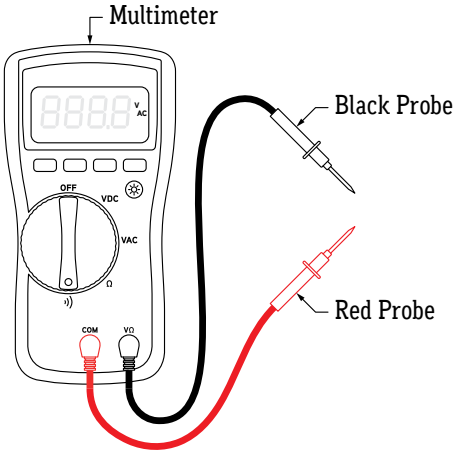
Troubleshooting & Continuity Test

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 luminaire. Use a multimeter or continuity tester to perform the steps below.

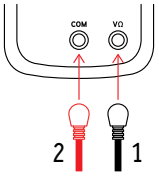
- Always perform a continuity test before connecting to power source.
- Malfunctions are not always as obvious as the lights not turning on.
- A short or malfunction in the line or luminaire will cause damage over time, irreparably damaging the lighting and voiding warranty.

EXAMPLE OF MULTIMETER (By Others)



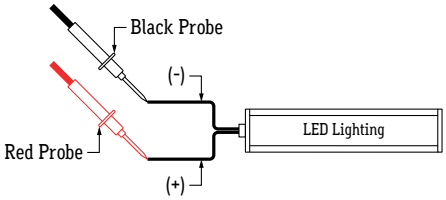
1 Turn off power before beginning. Verify power is off by using a non-contact circuit tester (by others). Touch the probe of the tester to the positive wire of the power source. The tester will light up if an electrical current is detected.

2 Setup your multimeter tester (by others). First, insert the black probe lead into the COM jack, then insert the red probe lead into the VΩ jack.

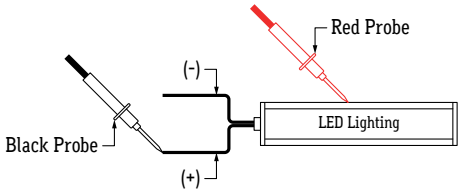


3 Verify multimeter is functional by touching probes together. The multimeter should beep, flash, or read 0Ω (ohms) of resistance.

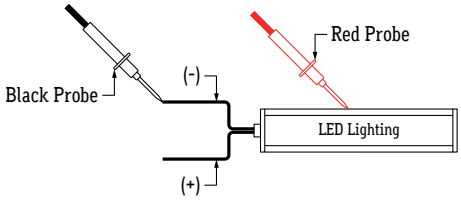
4 Touch the red probe to the positive (+) wire and the black probe to the negative (-) wire of the luminaire. If a conductive path is formed between the positive and negative wires, the multimeter will beep, flash, or read 0Ω (ohms) of resistance. Troubleshoot to identify the malfunction in the line. If there is no conductive path formed, 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 multimeter to DC voltage and test power source. Confirm the correct voltage before connecting luminaire to power source. If the voltage reading is more than 1 volt greater than the marked output voltage, there is a problem with the power source or driver.

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

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LLED8000-ST | INSTALLATION

Electronic Remote Driver (DRV-E)

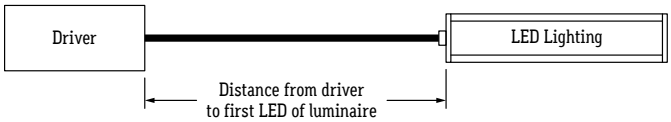
MAXIMUM RUN BASED ON 80% LOAD OF ELECTRONIC DRIVER (DRV-E) MAXIMUM WATTAGE

DRIVER 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
30	24W	16'	12'	9.6'	8'	6.6'	6'	5.3'	4.8'	4.36'	4'	3.69'
60	48W	32'	24'	19.2'	16'	13.3'	12'	10.6'	9.6'	8.7'	8'	7.3'
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'
200	160W	106.6'	80'	64'	53.3	44.4'	40'	35.5'	32'	29'	26.6'	24.6'
300	240W	160'	120'	96'	80'	66.6'	60'	53.3'	48'	43.6'	40'	36.9'

Note: Maximum Run refers to the total length of lighting that can be connected to a single driver. Maximum Runs for individual products still apply.

MAXIMUM WIRING DISTANCE OF DRIVER TO LED LIGHTING

The maximum wiring distance of driver to LED Lighting refers to the wire used between the driver and first LED of the luminaire. If the wire gauge is inadequate for the wiring distance, the luminaire will receive decreased voltage, insufficient to power the LEDs.
Refer to the table on the right to determine appropriate wiring distances based on wire gauge and the LED load of the luminaire.



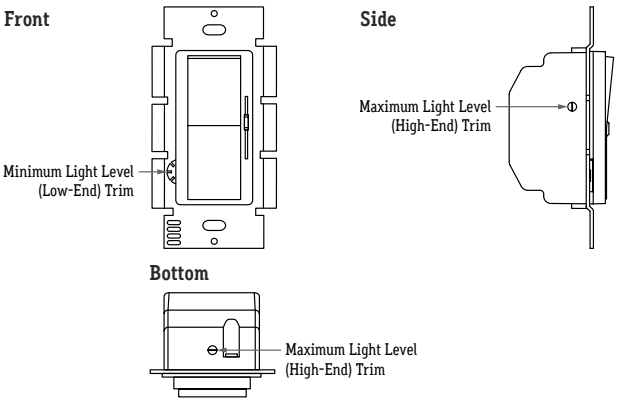
Maximum Wire Length to Prevent Excess Voltage Drop

WIRE SIZE	LOAD WATTAGE (W)												
	15	24	30	48	60	76	96	120	150	160	200	240	300
20 AWG	79'	49'	39'	25'	20'	16'	12'	10'	8'	7'	6'	5'	4'
18 AWG	125'	78'	63'	39'	31'	25'	20'	16'	13'	12'	9'	8'	6'
16 AWG	199'	125'	100'	62'	50'	39'	31'	25'	20'	19'	15'	12'	10'
14 AWG	317'	198'	158'	99'	79'	63'	50'	40'	32'	30'	24'	20'	16'
12 AWG	504'	315'	252'	157'	126'	100'	79'	63'	50'	47'	38'	31'	25'
10 AWG	801'	501'	400'	250'	200'	158'	125'	100'	80'	75'	60'	50'	40'
8 AWG	1273'	796'	637'	398'	318'	252'	199'	159'	127'	120'	96'	80'	64'

DIMMER TRIM VALUES

- Set dimmer trim value as needed to prevent flickering and irregular dimming

Note: Review dimmer specs for trim value adjustment. Dimmers by others.



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 conduit fittings when applicable

DRIVER CARE

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

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LLED8000-ST | INSTALLATION

Magnetic Transformer Remote Driver (TRA)

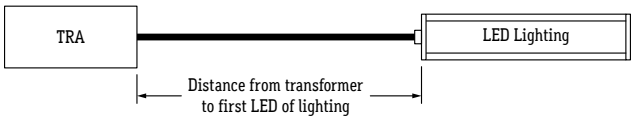
MAXIMUM RUN BASED ON 80% LOAD OF MAGNETIC TRANSFORMER (TRA) MAXIMUM WATTAGE

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)

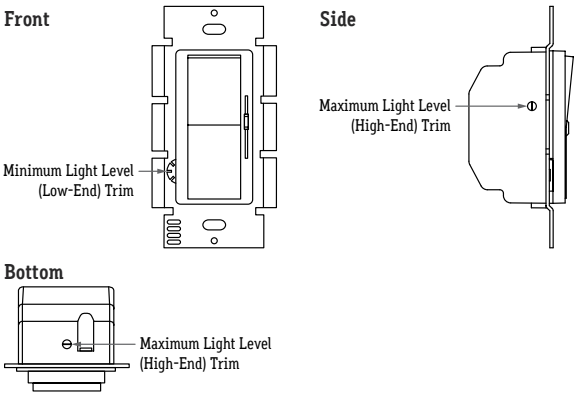
WIRE SIZE	VOLTAGE	5 VA	10 VA	20 VA	35 VA	40 VA	50 VA	60 VA	75 VA	90 VA	150 VA	200 VA	250 VA	300 VA	500 VA	600 VA
14GA	12V	51'	49'	44'	39'	37'	35'	32'	30'	25'	18'	14'	9'	7'		
14GA	24V	103'	98'	89'	80'	75'	70'	66'	61'	51'	37'	28'	18'	14'		
12GA	12V	81'	76'	70'	63'	59'	55'	52'	48'	40'	29'	22'	14'	11'		
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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LLED8000-ST | INSTALLATION

Electronic Transformer Remote Driver (TRA-E)

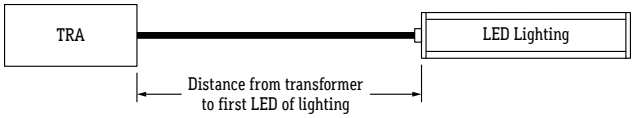
MAXIMUM RUN BASED ON 80% LOAD OF ELECTRONIC TRANSFORMER (TRA-E) MAXIMUM WATTAGE

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

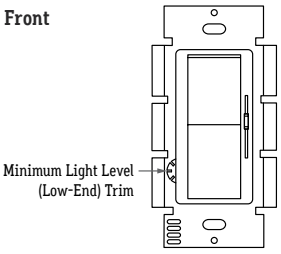
MOUNTING INSIDE AN ENCLOSURE

- 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

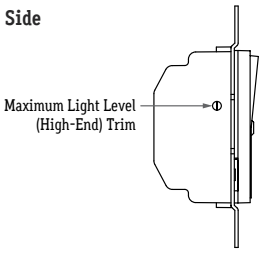
DIMMER TRIM VALUES

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

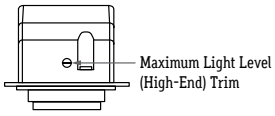
Front



Side



Bottom



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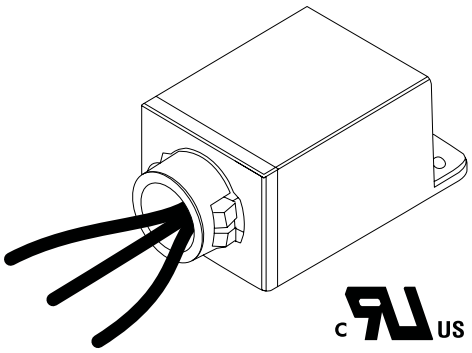
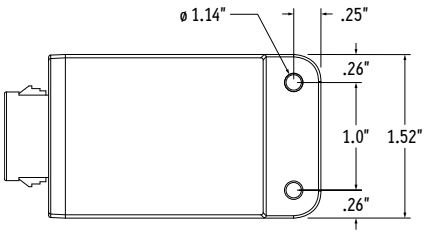
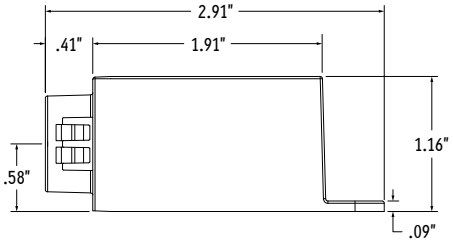
LLED8000-ST | INSTALLATION

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

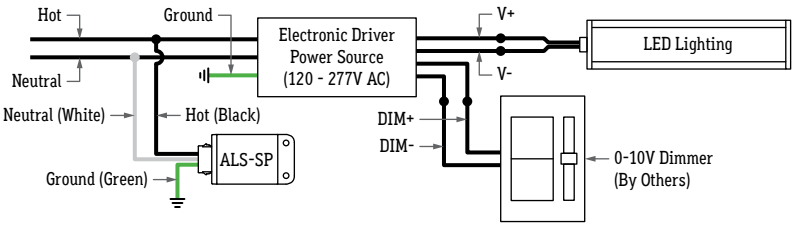
PRODUCT FEATURES

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.

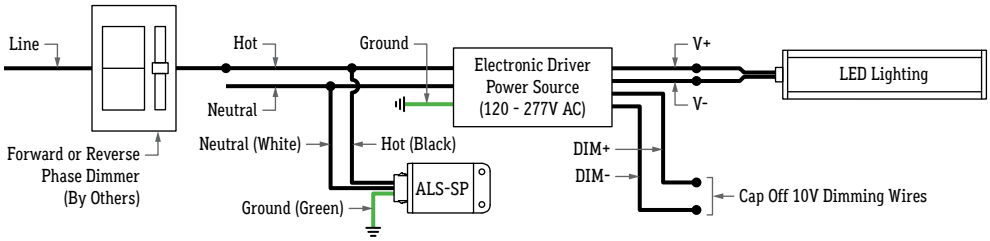
PRODUCT SPECIFICATIONS

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)



FORWARD / REVERSE PHASE WIRING DIAGRAM (Phase Dimming)



Note: Driver wire colors vary based on model. See individual submittal for more information, or refer to wire callouts on driver labeling. Always confirm wire colors before connecting to power source.

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