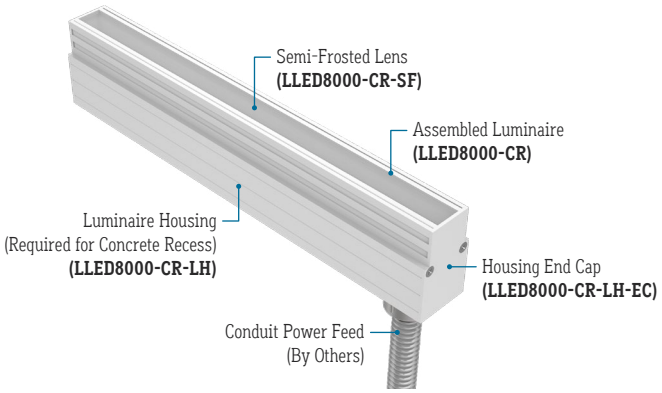
CALIFORNIA ACCENT LIGHTING INC

LLED8000-CR

INSTALLATION INSTRUCTIONS

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.

GENERAL FEATURES

APPLICATIONS	Ingrade Walk-Over, Accent, Decorative, Recessed Lighting
LENS	Clear, 50% Semi-Frosted, or 100% Frosted
LENGTH	Built to Order (± 0.25" Tolerance)
CONSTRUCTION	Aluminum Extrusion
DRIVER	Remote (Sold Separately)
WEIGHT	0.22 lbs per foot
MOUNTING	Mounting Channel (8' Segments)
LISTING	Wet (IP67) Location UL8750, CSA250 UL2108, CSA C22.2 #9
TEMPERATURE RATINGS	**Operating / Startup:** -20° to 48°C (-4° to 120°F)
	Storage: -40° to 76°C (-40° to 170°F)

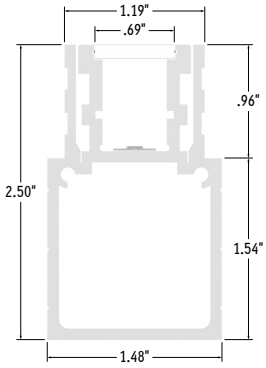
ELECTRICAL

DIMMING	0-10V, Forward / Reverse Phase, Lutron, DMX, DALI
MAXIMUM RUN (Class 1 Applications)	18' (6.5W), 21' (5.5W), 26' (4.5W), 33' (3.6W), 36' (1.5W, 2.5W)
MAXIMUM RUN (Class 2 Applications)	14' (6.5W), 17' (5.5W), 21' (4.5W), 26' (3.6W), 36' (1.5W, 2.5W)
LUMINAIRE VOLTAGE	120V - 277V (UNV)
	120V (Lutron LTEA Only)

PRODUCT INFORMATION

- For ingrade walk-over, accent, decorative, and recessed lighting.
- 24 Volts DC for easy and safe installation.
- Long life, energy efficient LEDs.
- Available in 1.5, 2.5, 3.6, 4.5, 5.5, or 6.5 Watts per Foot.
- Plug and light system.
- Lead wires are typically 36" long and exit on one end.

END VIEW / DIMENSIONS



ELECTRICAL REQUIREMENTS

- This product requires a 24 Volt DC remote driver.
- Drivers are 120V - 277V AC (UNV) Input Voltage and 24V DC Output Voltage
- To calculate driver size, determine Watts per Foot.
  Example: 3.6W per Foot
- Determine Length in Feet.
  Example: 12'6"
- Calculate Load: Multiply Watts per Foot x Length in Feet.
  Example: 3.6W x 12'6" = 45W
- Choose a driver from catalog.
  Example: 60 Watt Driver (DRV-E)
- Determine maximum wiring distance from driver to lightstrip.
  See Maximum Wire Length table on page 10.
  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 TOOL REQUIRED

- Electric Hammer Drills (optional)
- 14.4 to 28 Volt Cordless Drills
- Phillips Bits - Sufficient Quantity
- Utility Knife
- Electrical Cords
- Marker
- Wire Strippers
- Long Nose Pliers
- Drill Bits - Concrete or Wood
- Electrical Three Ways
- Safety Glasses
- Measuring Tapes
- Chalk Line

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lipLEDs™ Specification Grade

CALIFORNIA ACCENT LIGHTING INC

LLED8000-CR

INSTALLATION INSTRUCTIONS

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

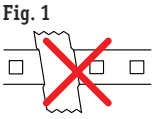


Fig. 2

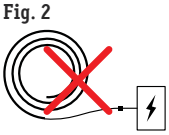


Fig. 3

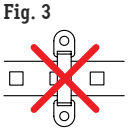


Fig. 4

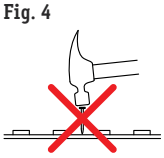


Fig. 5

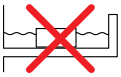


Fig. 6

Fig. 7

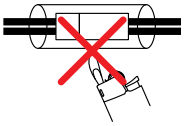


Fig. 8

Fig. 9

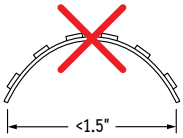


Fig. 10

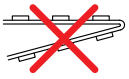


Fig. 11

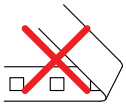


Fig. 12

Fig. 13

Fig. 14

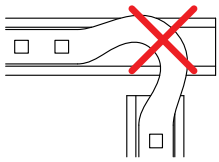
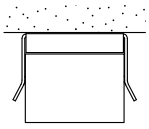


Fig. 15



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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5 / 28 / 2021 / Rev 4

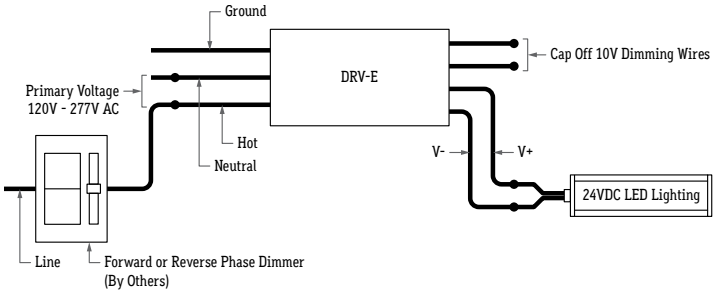
FORWARD / REVERSE PHASE DIMMING (PH)

Technical Requirements For Control Equipment

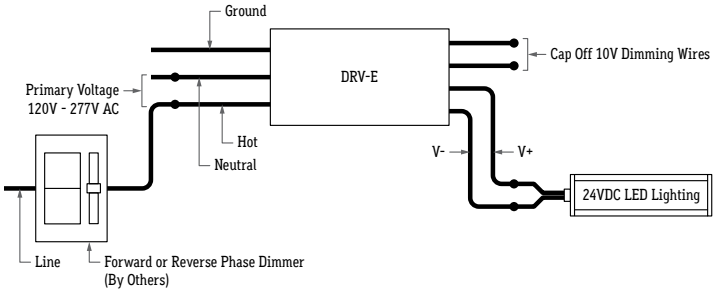
- Magnetic Low Voltage (MLV): Magnetic (core and coil, toroidal) transformer-supplied low voltage lighting.
- Electrical Characteristic: Inductive
- Special Requirements: Symmetric cycles (VDC ≤ 2), smooth turn off (positive and negative periods are equal for safe MLV transformer operation).

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.



PHASE DIMMING WIRING DIAGRAM



Notes: Wire colors vary based on model. See individual submittal for more information, or refer to wiring diagram on driver label. Confirm wire colors before connecting to power source.
Cap off dimming wires individually for non-dimming applications.
For best dimming performance, use a minimum load of 50% and a maximum load of 80%.

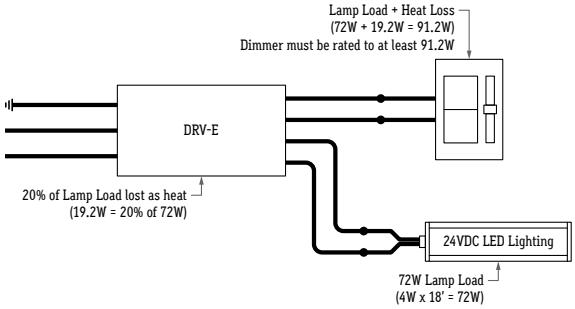
0-10V DIMMING (10V)

Technical Requirements For Control Equipment

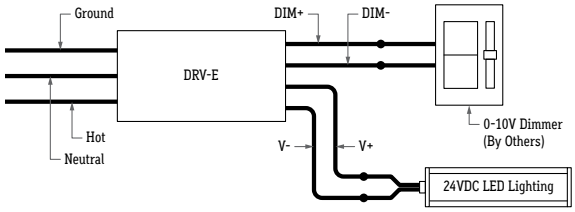
- The light output of the LEDs operated by the controllable LED driver is controlled by DC voltage applied to the control input leads (gray and violet). The actual response curve of LED driver current versus control voltage.
- The control device must be capable of accepting or sinking the DC current 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 DIMMING WIRING DIAGRAM



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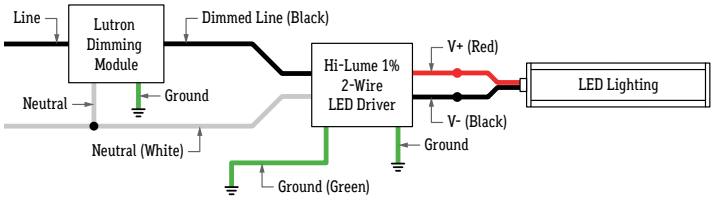
LUTRON HI-LUME 2-WIRE DIMMING (LTEA)

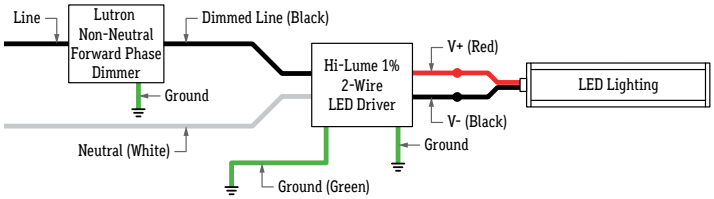
Technical Requirements For Control Equipment

- The Hi-lume 1% 2-Wire LED Driver (LTEA) 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%. Compatible with selected Maestro Wireless, RadioRA 2, HomeWorks QS, GRAFIK Eye QS, GRAFIK Systems, Quantum, and C•L Dimmers.
- The driver is California Title 24 JA8 Compliant.

Wiring Diagram for Controls Requiring Neutral (JA8 Compliant)



Wiring Diagram for Controls Not Requiring Neutral (JA8 Compliant)

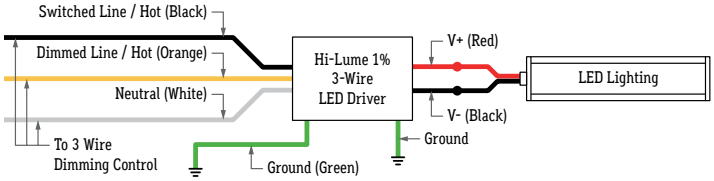


LUTRON HI-LUME 3-WIRE DIMMING (L3DA)

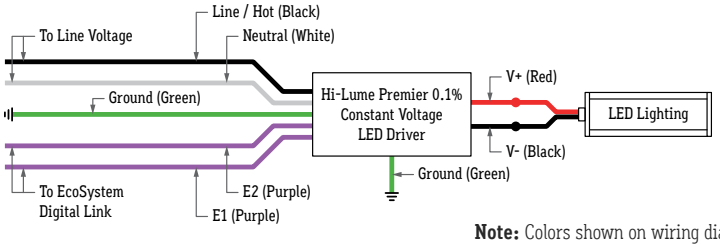
Technical Requirements For Control Equipment

- 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.

Wiring Diagram for 3-Wire Controls



Wiring Diagram for EcoSystem Digital Controls

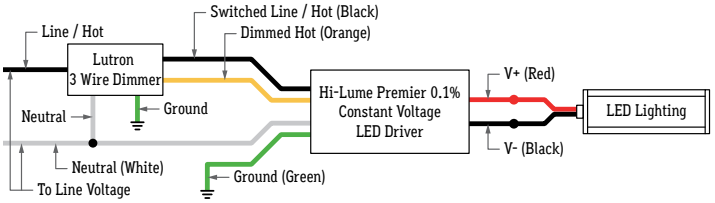


LUTRON HI-LUME 3-WIRE PREMIER DIMMING (L3D0)

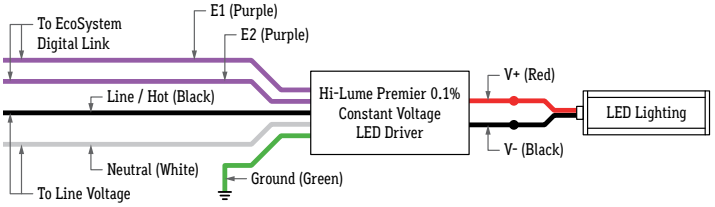
Technical Requirements For Control Equipment

- 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 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 dimming 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 max load.
- FCC Part 15
  - Class A (277 V~)
  - Class B (120 V~)
- The driver is California Title 24 JA8 Compliant.

Wiring Diagram for 3-Wire Controls (JA8 Compliant)



Wiring Diagram for EcoSystem Digital Controls (JA8 Compliant)



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

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DIAGRAM OF DRIVER

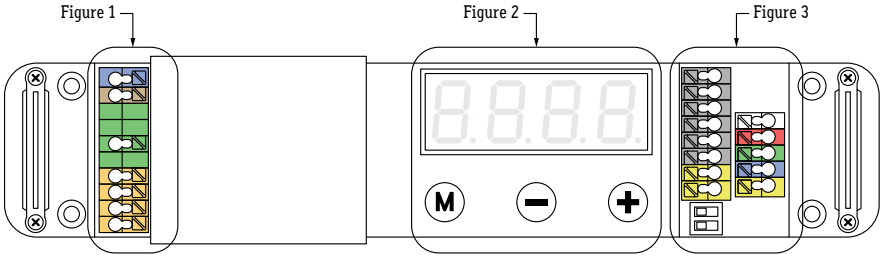


FIGURE 1 (Input)

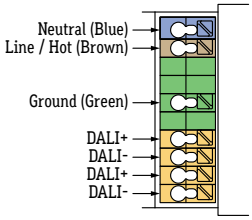


FIGURE 2 (Interface)

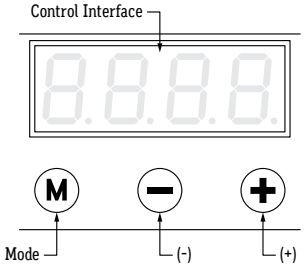


FIGURE 3 (DMX Output)

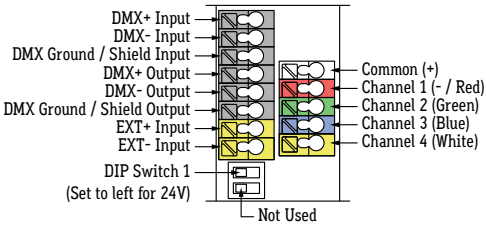
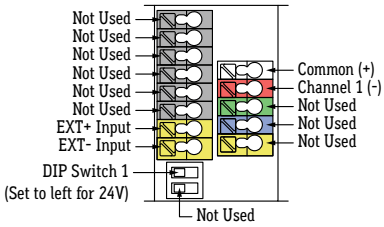
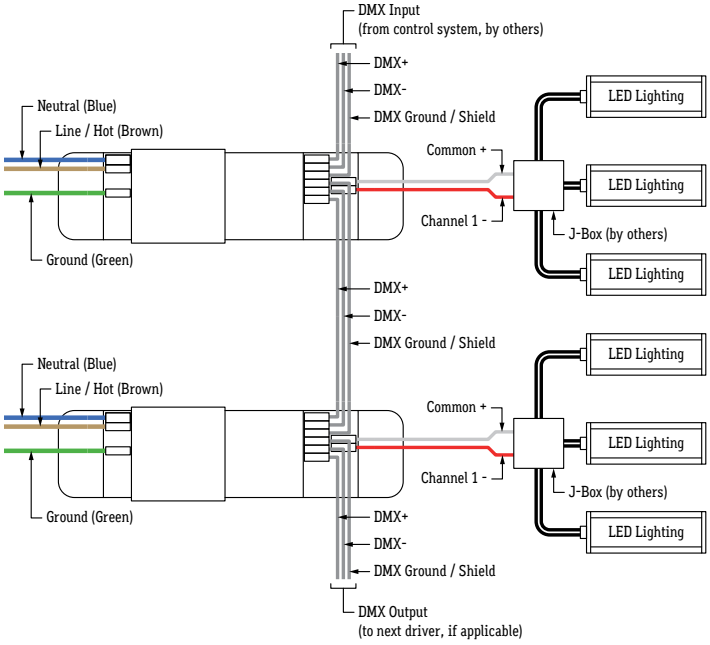


FIGURE 4 (DALI Output)



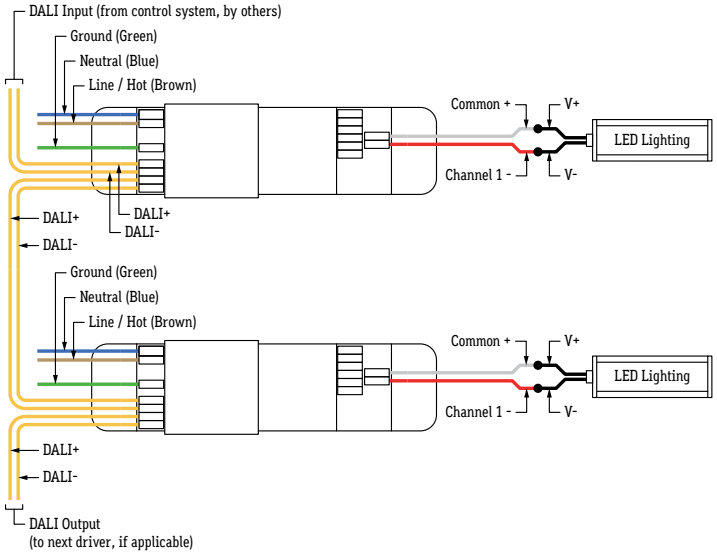
TYPICAL DAISY CHAIN LAYOUT (DMX STATIC COLOR)



NOTES (DMX)

- Default DMX address of each luminaire is 001. Consult third party DMX commissioner to modify at time of installation. CALI does not provide DMX commissioning.
- DMX Address must be set for each driver. Default DMX address for each driver is 001.
- A DMX Control System (by others) must be used to operate the system.
- The last driver in a daisy chain sequence must be terminated.
- Up to 28 drivers may be daisy chained together using shielded cable specified for DMX wiring.
- Wire colors on diagram correspond to colors of driver terminals.
- Driver load not to exceed 96W.
  It is recommended to only load drivers to 80% for best dimming performance.
- Ensure DIP Switch 1 is set to ON (Left) to activate 24V operation.

TYPICAL DAISY CHAIN LAYOUT (DALI STATIC COLOR)



NOTES (DALI)

- 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.

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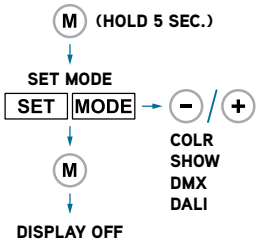
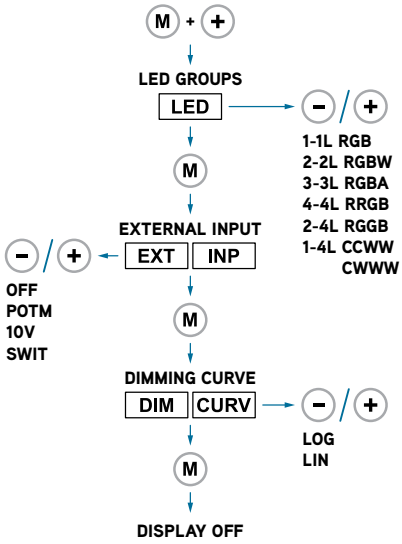
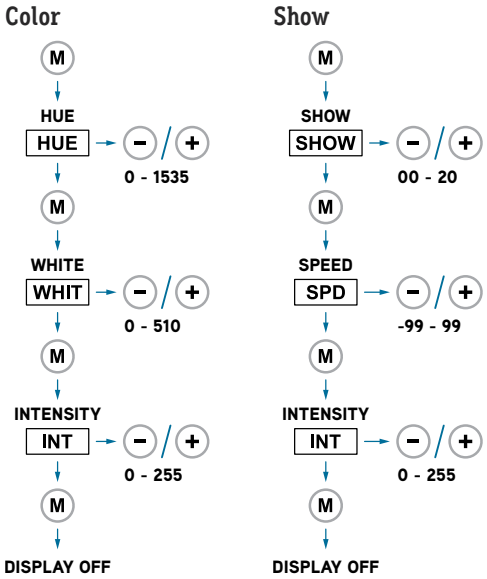
MODE OF OPERATION



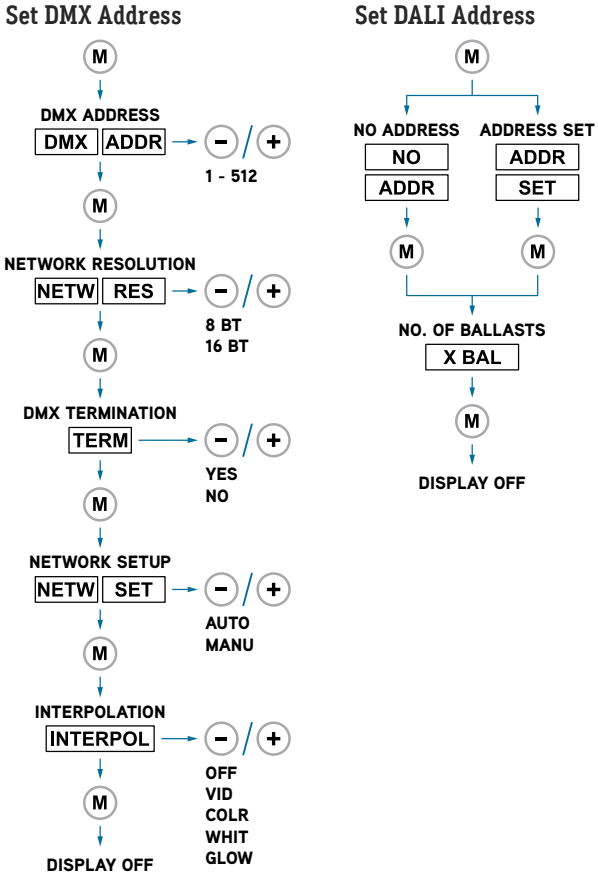
SET LED GROUPS



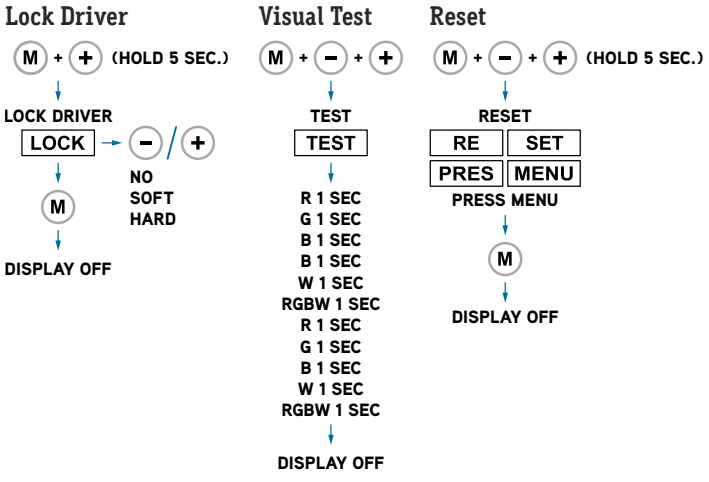
STANDALONE OPERATION (Color / Show)



STANDALONE OPERATION (Network Operation)



OTHER FUNCTIONS



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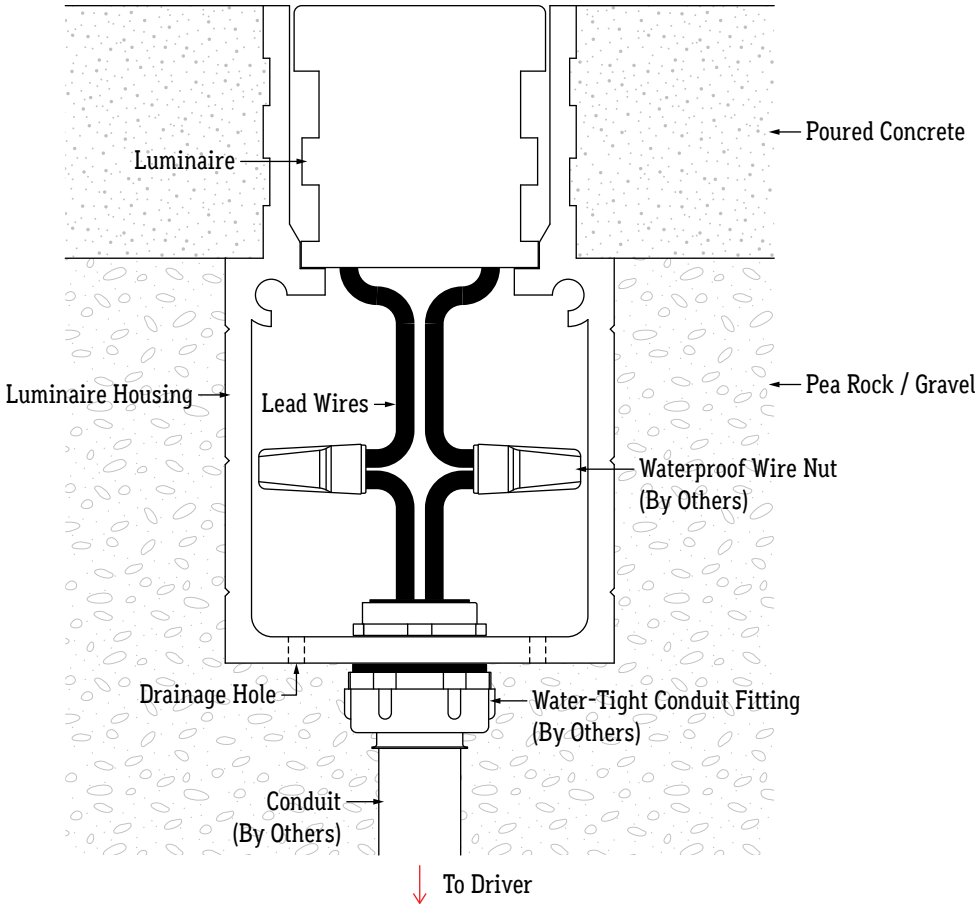

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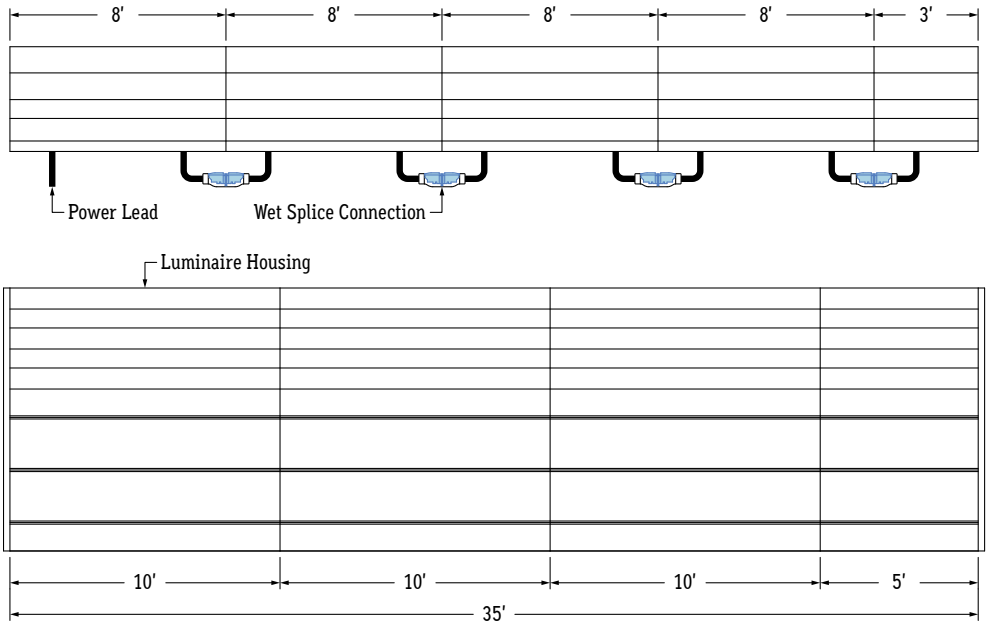
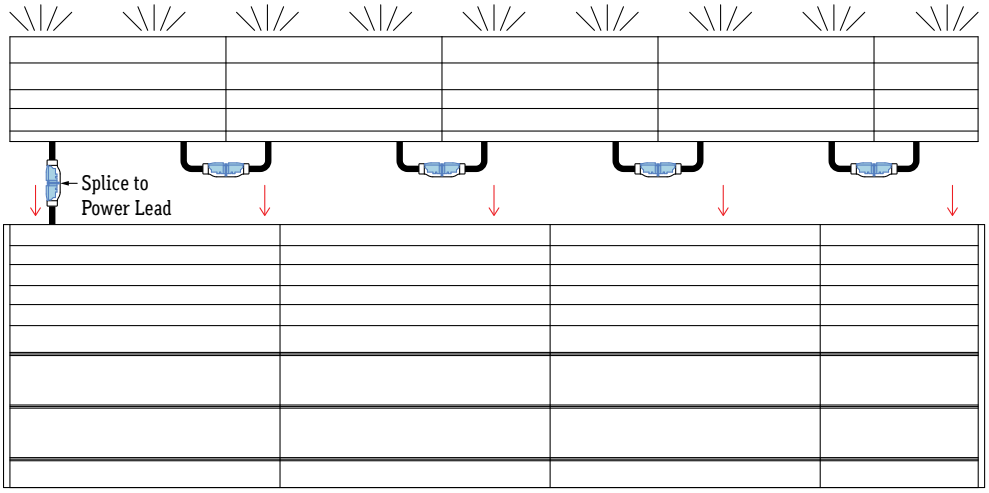
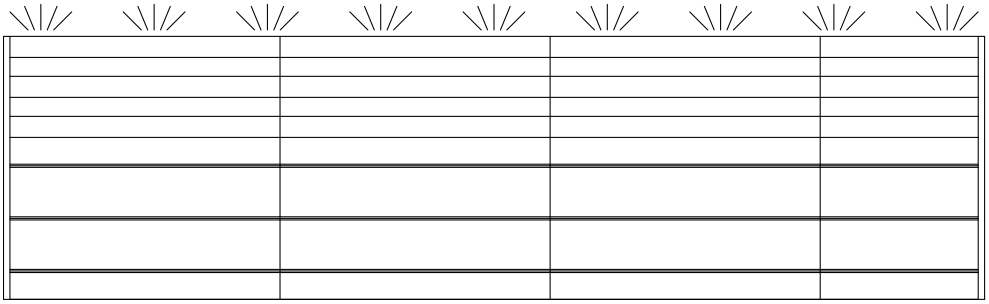
1 Lay luminaire segments along mounted luminaire housing and make wiring connections, connecting each segment that makes up a run.



2 Make power lead connections from the first luminaire segment to remote driver power source. Refer to applicable wiring diagrams for details.



2 Install luminaires into luminaire housing.



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1 Prepare installation area.

a Install anchor studs along installation area where luminaire will be installed. These will be used to secure the luminaire housing to the mounting surface.
Note: Size and style of anchor studs (by others) to be determined by installer.

b Luminaire housing must be surrounded by at least 6" of pea rock or gravel to allow any water inside the housing to adequately drain.
Note: Refer to Diagram of Assembly on previous page for details.

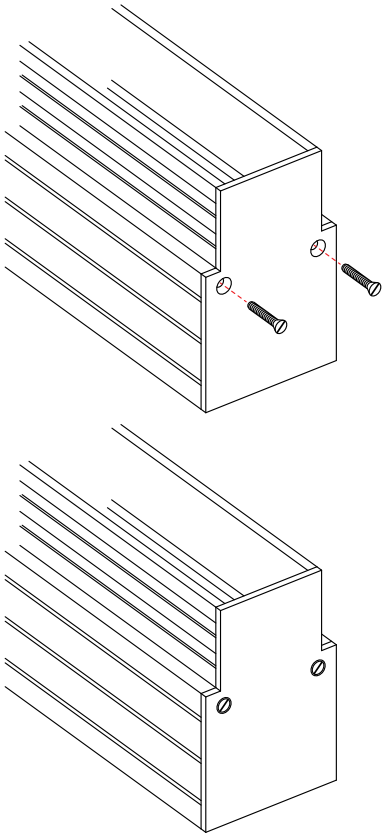
2 Prepare luminaire housing for mounting.

a Drill a hole in the bottom face of luminaire housing where the conduit feed will be installed.
Note: Size and location of conduit fitting to be determined by installer. Weatherproof conduit fittings must be used. Conduit and fitting by others.

b Drill holes in luminaire housing for surface mounting to anchor studs.
Note: Size, location, and style of mounting to be determined by installer.

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

4 Lay luminaire housing extrusions along reference line, then install end caps at the end of each run.



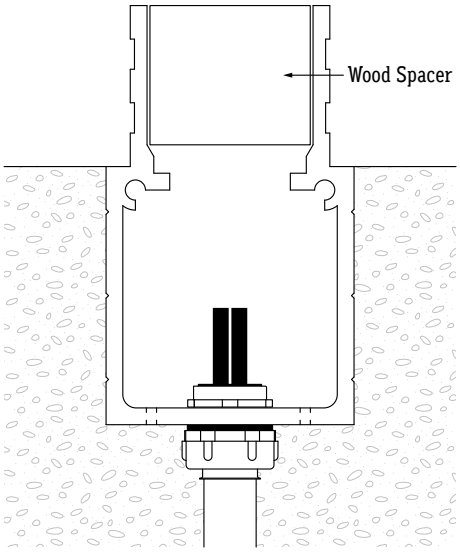
5 Pour a 6" base layer of pea rock or gravel, the mount luminaire housing to surface using anchor studs. Trim conduit stubs and secure conduit fittings to housing when applicable.

6 Ensure all extrusions are aligned. Misalignment will prevent luminaire from fitting properly. Pour additional pea rock around housing after mounting. Refer to Diagram of Assembly for details.

7 Prepare mounted luminaire housing for concrete pouring.

a Secure all power leads so they are not damaged during the pour.

b Install a spacer block every 2' to ensure weight of concrete will not push the walls of the luminaire housing inward. Spacers must be 1" wide by 3/4" deep. Use wood scraps to make the spacers.



c After securing power leads and installing spacers, cover the opening of the entire run with a protective masking to prevent any spillover into the channel.

8 Pour concrete into installation area, surrounding luminaire housing. Ensure the final surface is level with the top of luminaire housing.
Note: Concrete pouring process to be determined by installer.

9 After concrete is completely dry, remove protective masking from run and remove wood spacer blocks from luminaire housing. Clear channel of any debris before continuing.

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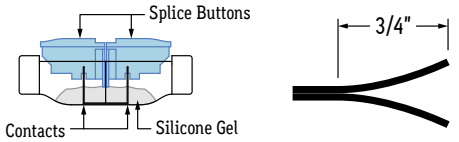
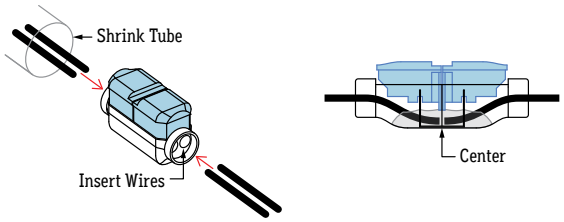
10 Lay assembled luminaires along run and make wiring connections between segments. Use wet splice connectors (sold separately) or waterproof wire nuts (by others) to make wiring connections.
Note: Ensure polarity of luminaire segments is aligned throughout the run. Refer to Continuous Run Assembly for additional details.

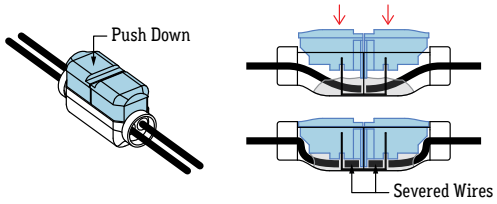
11 If applicable, make connections using wet splice connectors. Slide shrink tube over wires and connector. Part wires 3/4" for insertion into the connector. Wires do not need to be stripped prior to insertion.



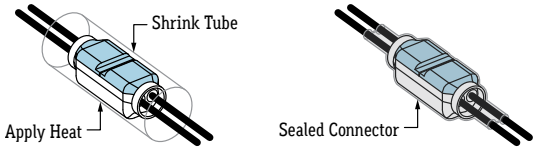
a Push wires into connector until they stop at the center point. Repeat process for the other side.
Note: Positive wires has ridges on the jacket. Neutral wire has a smooth jacket.



b Use pliers to push splice buttons down until they sever the wire and snap into place. Ensure each button is fully compressed before continuing.



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



12 Perform a continuity test before connecting luminaires to power source.

13 Connect luminaire to conduit power feed, then test to ensure it is in proper working order. If there is a problem with one of the segments, such as flickering, dimness, or outage, check wiring connection and perform continuity test again.

14 After entire run is confirmed to be working, push assembled luminaires into luminaire housing one segment at a time, starting with the power-fed side.

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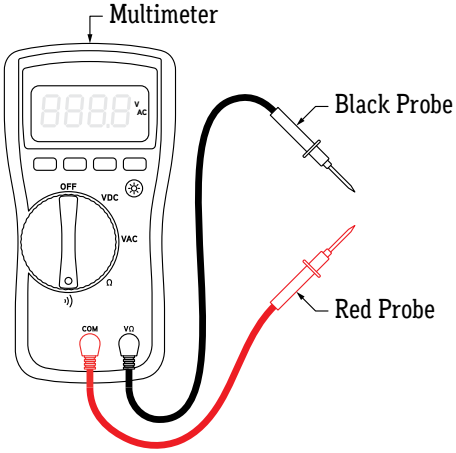
CONTINUITY TEST

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.

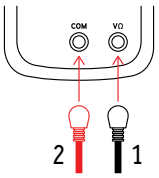
- Always perform a continuity test before connecting to power source.
- Malfunctions are not always as obvious as the lights not turning on.
- A short or malfunction in the line or luminaire will cause damage over time, irreparably damaging the lighting and voiding warranty.

EXAMPLE OF MULTIMETER (By Others)



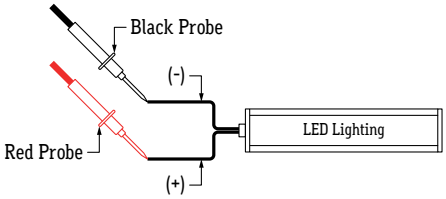
1 Turn off power before beginning. Verify power is off by using a non-contact circuit tester (by others). Touch the probe of the tester to the positive wire of the power source. The tester will light up if an electrical current is detected.

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.

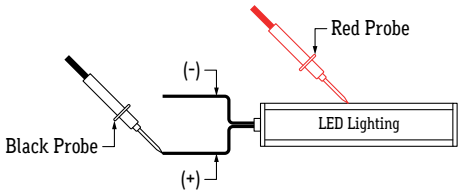


3 Verify multimeter is functional by touching probes together. The multimeter should beep, flash, or read 0Ω (ohms) of resistance.

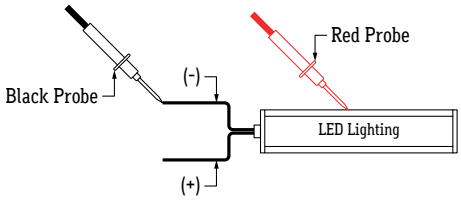
4 Touch the red probe to the positive (+) wire and the black probe to the negative (-) wire of the luminaire. If a conductive path is formed between the positive and negative wires, the multimeter will beep, flash, or read 0Ω (ohms) of resistance. Troubleshoot to identify the malfunction in the line. 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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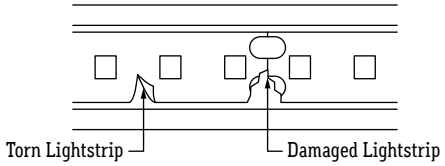
TROUBLESHOOTING TIPS

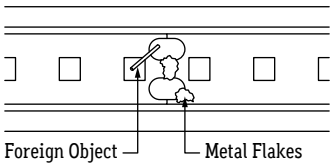
- Do not reset the breaker multiple times.
- If the unit is overloaded, the breaker will trip, shutting off the driver and lights.
- If the breaker reset button has been held down by hand or any type of pressure, such as duct tape, or if the breaker has been reset multiple times without troubleshooting, the unit will:
  - Burn the driver bobbin.
  - Burn the thermal or magnetic breaker.
  - Burn the driver lead 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. Verify power is off by using a not contact circuit tester (by others).

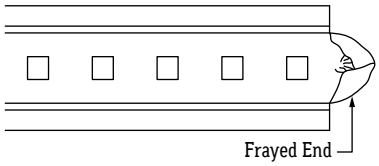
2 Check lightstrip for damage, such as cuts, punctures, twisting, or crushing. If there is excessive damage to the lightstrip, the lightstrip must be replaced.



3 Check the run for any particles that may cause a short. Check the end cap, power connector, and lightstrip for any metal flakes or shavings. Clear the run of any shavings or particles if present, then perform a continuity test to confirm the short has been eliminated.



4 Check lightstrip cuts to ensure they are clean. Frayed, split, or sloppily cut lightstrip can cause the positive and negative contacts to touch, causing a short.



5 Check connections in the line. Ensure all splice connections are secure and properly sealed with shrink tube and silicone for outdoor applications. Ensure that wiring is not bent past the permitted wiring bend radius (1.5").

6 Check the run for any water inside end cap, power connector, or lightstrip. If water or condensation is present, the lightstrip must be replaced.

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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'
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'

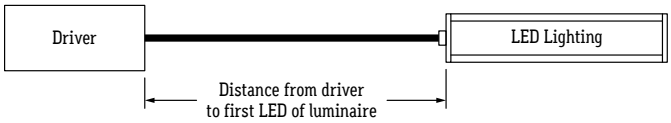
Note: Maximum Run refers to the total length of lighting that can be connected to a single driver. Maximum Runs for individual products still apply.

MAXIMUM 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'

MAXIMUM WIRING DISTANCE OF DRIVER TO 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 to determine appropriate wiring distances based on wire gauge and the LED 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 conduit fittings when applicable

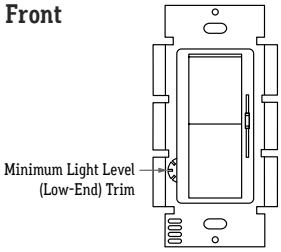
DRIVER CARE

- 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

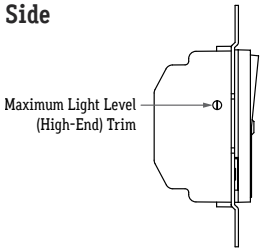
DIMMER TRIM VALUES

Set dimmer trim value as needed to prevent flickering and irregular dimming. Review dimmer specifications for trim value adjustment. Dimmers by others.

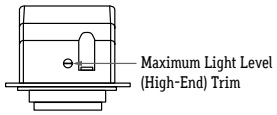
Front



Side



Bottom



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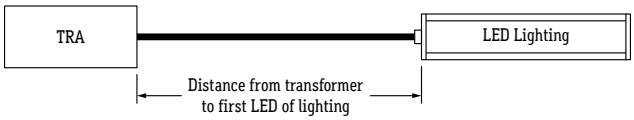
MAXIMUM RUN BASED ON 80% LOAD OF MAGNETIC TRANSFORMER (TRA) MAXIMUM WATTAGE

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)

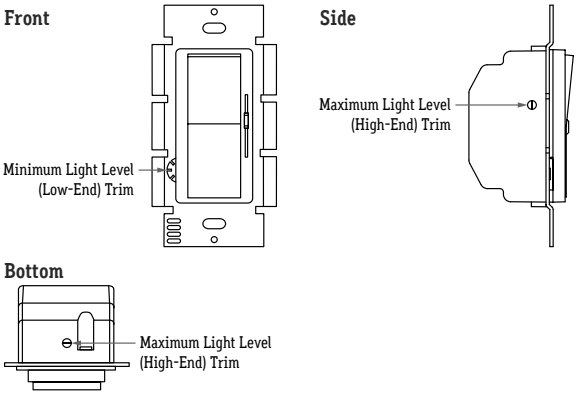
WIRE SIZE	VOLTAGE	5 VA	10 VA	20 VA	35 VA	40 VA	50 VA	60 VA	75 VA	90 VA	150 VA	200 VA	250 VA	300 VA	500 VA	600 VA
14GA	12V	51'	49'	44'	39'	37'	35'	32'	30'	25'	18'	14'	9'	7'		
14GA	24V	103'	98'	89'	80'	75'	70'	66'	61'	51'	37'	28'	18'	14'		
12GA	12V	81'	76'	70'	63'	59'	55'	52'	48'	40'	29'	22'	14'	11'		
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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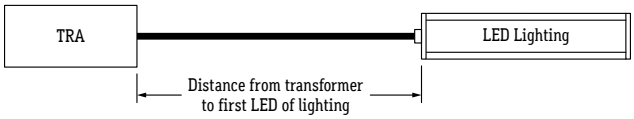
MAXIMUM RUN BASED ON 80% LOAD OF ELECTRONIC TRANSFORMER (TRA-E) MAXIMUM WATTAGE

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

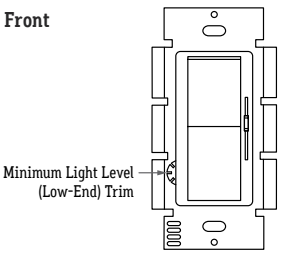
MOUNTING INSIDE AN ENCLOSURE

- 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

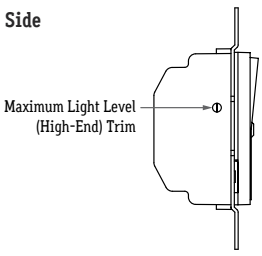
DIMMER TRIM VALUES

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

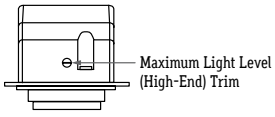
Front



Side



Bottom



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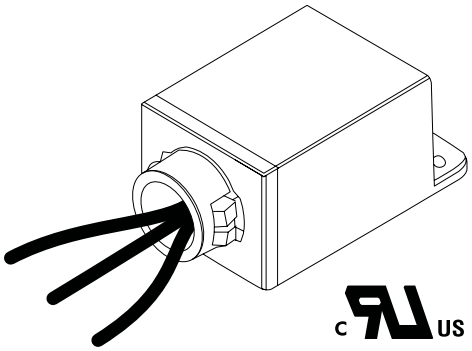
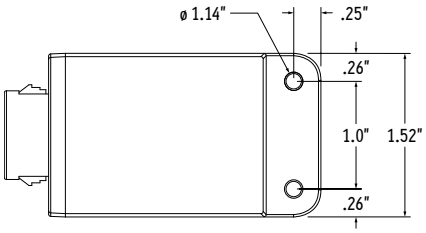
LLED8000-CR

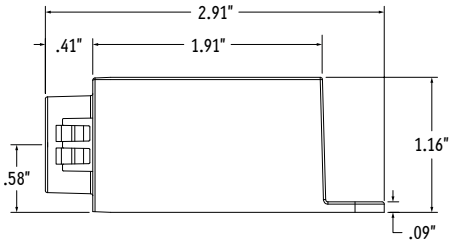
INSTALLATION INSTRUCTIONS

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

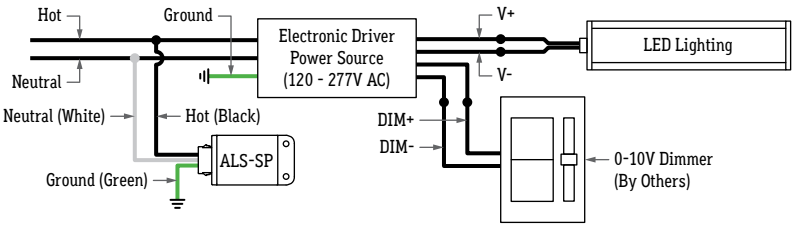
PRODUCT FEATURES

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.

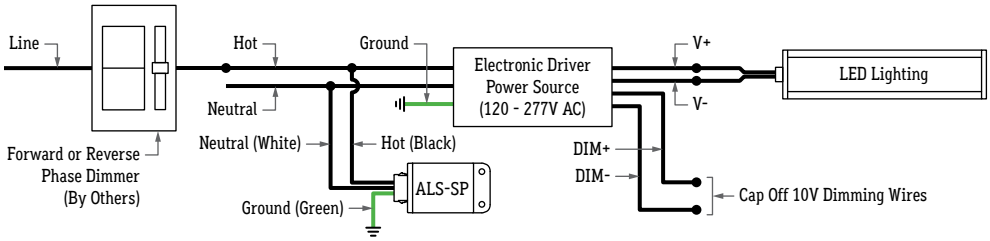
PRODUCT SPECIFICATIONS

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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