

low voltage hardscape lighting installation guide



Integral[®]
LIGHTING

800.861.1364

integral-lighting.com

instructions

READ CAREFULLY BEFORE INSTALLING

This fixture is intended for installation in accordance with the National Electrical Code (NEC) and local code specifications. Failure to adhere to these codes and instructions may result in serious injury and/or damage to the fixture and will void the warranty. These instructions do not cover all details or variations in equipment, nor provide for every possible contingency related to installation, operation, maintenance, or mounting situation. Please call for assistance in alternate circumstances.

Tested and listed by



UL1838 low voltage landscape lighting

Technical Assistance
Toll free 1.800.861.1364

Integral[®]
L I G H T I N G

Integral Lighting fixtures are designed, manufactured and supported in the USA.

installation

Step by Step Instructions

1. Make sure power is turned OFF before installing or servicing this fixture.
2. Insert Stainless Steel Mounting plate between layers of hardscape material.
3. Gluing in place with cap stone is optional.
4. Route wire through break in wall to low voltage power cable.
5. Connect fixture wires to power supply using direct burial kit or other suitable means.

SAFETY WARNING:

ALWAYS TURN FIXTURE OFF/DISCONNECT POWER AND ALLOW TO COOL BEFORE PERFORMING ANY MAINTENANCE, INCLUDING RELAMPING AND CLEANING!

This fixture can become very HOT! The fixture housing can become hot enough to blister hands.

FOR USE ONLY WITH LOW VOLTAGE POWER UNITS...MAX 25 AMPS, 15 VOLTS PER CIRCUIT.

Secondary wiring is intended for shallow burial less than 6 inches (152mm).

Do not install fixture within 10 feet of a pool, spa or fountain.
The fixture shall not be installed within 2" of ground level.

**Do not install incandescent fixture on wood surfaces.
For use in hardscapes only.**

transformer

Add the total wattage of the lamps you are using. This determines the output required.

Quantity of fixtures	_____
Wattage per fixture (Total wattage)	x 11.5watts
Transformer size (Total wattage)	_____

Transformers reduce standard house voltage at an approximate ratio of 10 to 1. Consider, house current at 128 volts...your transformer reduces the power to 12.8 volts. In the case of a home powered by 120 volts, the result is 12.0 volts. When using a multi-tap transformer, this would be on the 12 volt tap.

Whatever the situation...transformers are not voltage regulators... they do not restrict electric and deliver a constant 12 volts.

Most landscape lighting power packs are AC because they use magnetic transformers to step the voltage down. By contrast, electronic transformers are typically DC and are solid state.

Multi-tap transformers are useful in voltage control, particularly in long runs.

Use a voltmeter to confirm correct voltage.

cabling

As a general rule....

When your run of cable from the transformer to the last fixture in the run is within 100' use a minimum gauge of 12/2.

Voltage Drop Calculation

Length of run in feet	_____
Multiply by wattage of fixtures (Total)	x _____
Divide by Cable constant	_____
Equals voltage drop	_____

Cable Constants	12 gauge	7500
	10 gauge	11920
	8 gauge	18960

If your installation will require few fixtures and/or cover a short overall distance, consider routing wire to the fixture farthest from the transformer first to create voltage drop and enhance lamp life.

A minimum of 25 feet of wire should be installed between transformer and first fixture.

splicing to feed cable

Using a waterproof connector is recommended.

How To...

1. Strip wires 5/8" (15.9mm).
2. Align any frayed strands or conductors.
3. Pre-twisting unnecessary. Place stripped wires together with ends of insulation even.
4. Twist connector onto wires pushing firmly until hand-tight. Do not over torque.
5. Wipe sealant in and around conductors and connector opening while tightening. Do not reuse.



Always test your connection before burying connector.

fixture & wiring layout

Conventional vs. Hub

Hub systems attempt to overcome voltage drop.

Hub style installations rely on equal lengths of secondary wiring to the fixture.

A hub style installation does equalize voltage. Assuming of course that all the bulbs burn forever. When ONE lamp burns out, the remaining voltage is distributed equally to the remaining lamps. **All remaining lamps are treated equal, generally over-powered, resulting in bulb failure.**

Standard parallel or "T" cable runs will provide the installation with adequate voltage and a reduction in the "voltage effect on lamps" as referenced above.

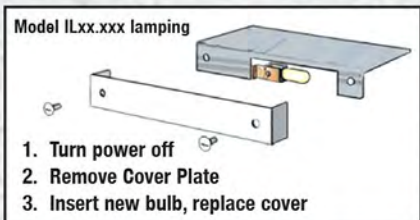
Depending on the installation, either method can be successful and provide a professional job.

We recommend that the voltage at the first lamp does not exceed 11.5 volts.

servicing the lamp

Lamps - Push In / Pull Out

Do not turn....Pull straight out of socket



This fixture is rated for 11.5 watt lamps.

Replacement Bulbs

#1001430 11.5 watt long life Xenon

#1211X 10 watt Xenon

#1236X 4 watt Xenon

Xenon lamps do not require additional shielding

If you are experiencing shortened bulb life please consult details of voltage effects.

voltage effects

Lamp life is directly related to the voltage supplied to the fixture. Excessive voltage creates excess temperature and will shorten lamp life.

Voltage Effect on Lamp Life

13.2 volts	2/3 rated life
12.6 volts	3/4 rated life
12.0 volts	as rated
11.5 volts	2x rated life
11.0 volts	3x rated life

(approximate values, actual life varies on many factors including but not limited to manufacturer)

Maintaining voltage of 11.0 volts or less in splash/spray areas will reduce bulb failure.

Excessive voltage by as little as 1/4 volt will reduce lamp life by 40%.

voltage factors

Common issues regarding voltage variations ...

Input voltage to transformer...

Primary voltage in homes today range from 115v to 125v... a variance of 8% to 10%.

Amount of load to transformer...

As the load increases, voltage drop increases.
When one fixture burns out...voltage increases.

Length of wire or run...

As the run of wire from transformer to last fixture becomes longer, voltage drop increases.

Bulbs burn out...

When ONE fixture burns out...voltage increases.
The result is higher voltage affecting the remaining lamps.

Gauge of wire used...

Smaller wire increases voltage drop (14 gauge -)
Larger wire provides more consistent voltage (12 gauge +).

technical support

Phone:

800.861.1364

M-F 8am – 4pm EST

E-Mail:support@integral-lighting.com**Text:**support@integral-lighting.com**Web: frequently asked questions**integral-lighting.com/faq

scan to link directly
to our Integral Lighting
FAQs



innovation. performance. efficiency.

The IL LED 12v AC fixture is designed to operate with your magnetic or electronic transformer.

For optimum performance in both light output and life, please observe our recommended voltage not to exceed 11.5 volts at first fixture.

Always confirm voltage with digital voltmeter to insure proper voltage is present at first lamp upon installation.

The operating range is 8.0v AC to 12.0v AC.

Optional filters available to customize your lighting effects with look and feel of incandescent (2700K) or cool white light output (4200K)

**Continuous operation above 12v AC
will void the warranty.**

LED comparison

Our Xenon vs. **State of the Art LED** fixtures at a glance

Engineered for **magnetic and electronic transformers** without additional electronics

	IL6 Original	IL6 LED	IL4 LED	IL300 LED	IL600 LED
Light Source	Xenon Lamp	Light Emitting Diode	Light Emitting Diode	Light Emitting Diode	Light Emitting Diode
Color Appearance	2800K	3000K	3000K	2400K	2400K
2700K Filter Option	NO	YES	YES	NO	NO
4200K Filter Option	NO	YES	YES	NO	NO
Voltage	12v AC	11.5v AC	11.5v AC	11.5v AC	11.5v AC
Life Expectancy	10,000 Hours	40,000 Hours	40,000 Hours	40,000 Hours	40,000 Hours
Brightness in Lumens	120 Lumen	120 Lumen	60 Lumen	40 Lumen	80 Lumen
Brightness Common Factor	11.5 Watts	10.0 Watts	5.0 Watts	4.0 Watts	8.0 Watts
Dimmable	YES	YES	YES	YES	YES
Energy Used	11.5 Watts	2.0 Watts	1.0 Watt	.25 Watt	1.0 Watt

Recommended voltage is 11.5v at first fixture to ensure maximum LED life

A voltmeter should be used to confirm correct voltage.

LED and voltage

The 12v AC LED platform has similar voltage concerns as a standard incandescent installation.

LED life is directly affected by supplied voltage.

Excess voltage generates heat.

Excess heat is the main factor in reducing the life of an LED.

Voltage effects on LED life

12.5 volts	3/4 rated life
12.0 volts	as rated
11.5 volts	1.5 x rated life
10.0 volts	2 x rated life

(approximate values, actual life varies on many factors)

Estimated life is 40,000 hours at 12.0 volts

11.5v is recommended at the first fixture

Since your primary power is constantly changing, allowance should be made for variations in voltage.

LED dimming

Installation advice for power supplies and compatible dimmers with **Integral Lighting LEDs**

Desired System Controls	Timer	Photocell	Dimmer	Recommended Dimmer	Dimmer Location
Landscape 12vAC Magnetic Transformer Automatic Control ONLY (Most common type of landscape lighting system is powered by the 12 volt AC transformer to use photocell and timer configured for on and off automatically)	YES	YES	NO	None Required	N/A
Magnetic 12vAC Transformer** Dimmer ONLY Control (Typically a 12 volt AC magnetic transformer without controls or a unit set to "ON" overriding the onboard controls using a wall switch to control system)	NO	NO	YES	MLV series by Lutron	120v side before transformer
Electronic 12vAC Transformer Dimmer ONLY Control (Typically a 12 volt AC electronic transformer without controls utilizing a wall switch/dimmer to control system on and off)	NO	NO	YES	ELV series by Lutron model Skylark or Maestro	120v side before transformer
Electronic 12vAC Transformer Wireless ONLY Control (Typical 12 volt AC electronic transformer without controls utilizing a wall switch/dimmer and remote add-on to control system on and off)	NO	NO	YES	ELV series by Lutron model Maestro w/ Diva Add-on	120v side before transformer
Magnetic 12vAC Transformer Automatic Control with Dimmer (Common landscape lighting system is powered by the 12 volt AC transformer to use photocell/timer configured automatically with ability to dim on 12 volt side after transformer)	YES	YES	YES	Zane Dimmer	12v side after transformer

* All Integral Lighting LED installations require 12vAC power supply NOT 12vDC

** Some magnetic landscape transformers may be switched to "ON" overriding the onboard controls allowing the installation of a dimmer ONLY control of the system
(When dimming a transformer utilizing onboard controls you are reducing required current to photocell and timer which may result in damage to electronics of those add-ons)

Be sure to use a dimmer that is compatible with your transformer.

LED power supply

LED power supply sizing for
our direct drive LED

Quantity of fixtures	_____
Energy Consumption per IL6 LED fixture	x 2.0 watts
Power supply size	_____

IL4 uses 1.0 watts

IL18 uses 4.0 watts

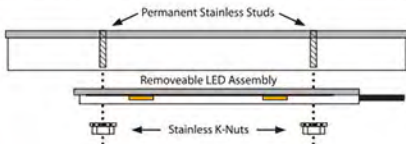
Example...

30 IL6 LED fixtures x 2.0 watts each =

Requires a transformer capable of supplying 60 watts

Our 12v AC LED platform has similar voltage concerns as a standard incandescent installation.

LED service

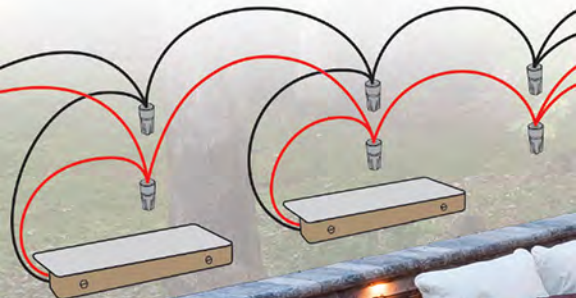


1. Remove Stainless Nuts
2. Remove entire sealed LED assembly (includes heat sink/PCB/board/wire and lens)
3. Cut 18/2 fixture wires
4. Replace entire LED assembly
5. Replace stainless nuts (do not over-tighten)
6. Attach 18/2 wires to new assembly with crimp connectors (supplied)

Do not disassemble LED assembly

Be sure to allow some extra wire within the wall to make future service easier.

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