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# Landscape Lighting How-To

You may have spent a lot of money on landscaping. You may be meticulous about your yard's appearance. However when night falls you may not be able to appreciate your efforts as you do during the day. A low voltage lighting system is a surprisingly easy addition to any yard and can bring life to your exterior at night. In this tutorial, you will learn all of the necessary steps to design and install a professional looking landscape lighting system. Most small to large yards can be equipped with low voltage lighting, and we will give you the appropriate considerations to take for any application.



## Why Install a Landscape Lighting System?

1. Security
2. Functionality at night
3. Increase value of home
4. Safely and easily installed - does not require an electrician or Inspection
5. Extremely flexible, can be changed or added to very easily

## Why Low Voltage?

A common misconception is that low voltage lighting (12V) isn't as bright as the standard voltage (120v) that runs through your home. This is simply not true. You can always achieve your desired illumination with a low voltage system. In fact, most of the bulbs used in low voltage lighting are more than twice the brightness of a regular incandescent bulb of the same wattage. Additionally, a line voltage (120V) setup requires an electrician and the cable must be buried 1.5 - 2 feet (local codes may vary) below the ground. Low Voltage Landscape Lighting does not require an electrician for install, and the cable only needs to be buried a few inches. This allows for flexibility later should you decide to move your fixture. Furthermore, because low voltage system cable only runs between 10-13 volts, it is safe to touch and does not pose the safety hazard that line voltage can.

## 5 Steps to Buying a Low Voltage Landscape Lighting System

- I Design your layout
- II Choose your transformer
- III Plan your installation
- IV Installation
- V Maintenance

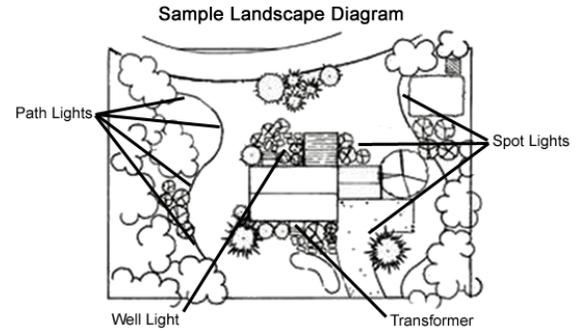


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## STEP I. Design your Layout

With careful planning, you can eliminate any problems that might arise during the installation process. The first step in designing your system is to look at your yard at night and decide where you want more light. Making a detailed sketch of the yard can help. When deciding what to illuminate, consider your existing outdoor lighting (as these areas might not need additional light), then start with lighting your walkways and other functional and transitional areas. Beyond that, the sky is literally the limit!



### Other Design Considerations



There are many professional looking techniques you can use to create a dramatic and attractive design. Lighting the front of the house has a very dramatic effect and can make your house inviting at night, except to unwanted guests. Trees and plants are very popular to illuminate. They can be back-lit to create a silhouetted effect or front lit to light the plant itself. If you have a tall tree, you can place a light at the base and shine it up through the branches. You can also hide a tree mount fixture and have it shine down on a lawn or garden. If you have other objects of interest like a birdbath or bench, you may consider lighting them. It is generally a good idea to spread out your lighting to create even illumination throughout the yard, but the secret is to be creative, and truly light what you want.

### What kind of lights are available?

**Path Lights**—Used for Walkways & Driveways



**Pole Lights**



**Hanging Path Lights**

**Accent Lights**—Silhouetting, spot lighting, grazing of textured surfaces



**Spot Lights**



**Flood Lights**



**Tree / Wall Mount**

Lights continued on next page...

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## Types of lighting continued....

**Well / Pond Lights** —Up lighting through trees out of a well or pond



**Pond Light**



**Submersible Underwater Light**

**Hanging Lights** —Lighting a covered patio or gazebo



**Hanging Light**



**Hanging Planter Light**

**Deck / Rail Lights**—Functional light for decks and patios



**Rail Mount**



**Column Mount**



**Step Lights**

**Specialty Lights**—Miscellaneous lighting for specific functions



**Barbecue Light**



**Sculpture Lights**



**Birdbaths**

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## STEP II. Choose your Transformer

After you have chosen your lights and your layout, add the total watts of all fixtures. The transformer must be equal to or higher than the total watts. If you think you may add fixtures to your system in the future, a higher wattage transformer is recommended. There are many kinds and qualities of transformers. Many are available with an optional photocell for dusk-till-dawn operation and/or timer. Most transformers are installed on an outside wall and can be either hardwired or plugged into an outlet. There are also models that can be buried in the ground for an out of site application (K15IG300).



Manual Transformer



Transformer with Timer and Photocell

## STEP 3. Plan your installation

There are many wiring configurations that can be used depending on the layout of your lights and location of your transformer. To understand why there are different wiring methods, first here is an explanation of voltage drop and why it is a major factor in the wiring design.

### Voltage Drop

Voltage drop will occur on any run of low voltage cable run and will cause a light to dim. How much voltage drop is dependant on:

1. Number of fixtures on a run
2. The distance from the transformer
3. Gauge of the cable
4. Wiring method

Your transformer will most likely have multiple “taps”: 12V, 13V, 14V, 15V, or some other combination. The higher tap allows for compensation where voltage drop might occur within a system. To the right is an image of what the taps on a transformer might look like. **Note the “com” terminal.** The common is for the return wires to ground the system. On transformers capable of handling 600 watts or more, there will be multiple common terminals for each 300W circuit. You cannot put more than 300 watts onto any common; this must be taken into consideration when designing your layout.



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### STEP III Continued... Voltage Drop

Voltage drop can be measured with a volt meter at the light source. For example, if you run a 12V line 20ft. with 12 gauge wire, the voltage at the fixture will be approximately 11.9V and is not cause for concern. However, with more lights and longer runs, voltage drop can become an issue if any lights are 10.8V or lower.

#### Things to do to help boost the voltage!

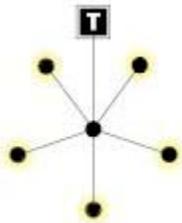
1. Decrease wire gauge – thicker gauge wire can carry more voltage
2. Increase voltage tap – Multi-tap transformers have higher voltage outputs to compensate for voltage drop. A 13V or 14V run can cause the voltage drop to occur around 12V for normal operation
3. Below is a brief explanation of each layout and where it would be used Use shorter cable or minimize distance from Transformer
4. "The Enhancer" [K15520](#) - Great for if you need to increase the voltage of just one light, this item boosts voltage by approximately 20%. Example: a light with affected by voltage drop and is at 10V, by using "the Enhancer" it will boost the voltage to 12-12.5V

**Note:** Voltage drop can actually work to your advantage if differences in light bulb brightness levels are not objectionable. Lower voltage will extend the life of a light bulb, requiring less frequent replacement

#### Wiring Methods



**Straight:** The straight wiring method is a "straight" run of fixtures connected directly to the transformer tap in a "daisy chain". The furthest fixture from the transformer will experience the largest voltage drop and therefore will be the dimmest; likewise, the fixture closest to the transformer will be the brightest. Use this method when it is not practical to loop it back to the transformer. If any of the fixtures are rated at less than 10.8V, please see the section above on methods to boost the voltage.



**Junction:** The Junction wiring method represents a group of fixtures that are each connected to a hub, which is then connected to the transformer. This hub would need to be buried in a location central to all fixtures; however fixtures do not need to be equal-distant from this hub, so long as the wire length is uniform. Any extra wire should be buried near the fixture, and never cut. This allows for complete distribution of power to each fixture ensuring even brightness in all fixtures. This type of install is ideal for circular drive ways or paths where voltage drop among fixtures might be noticeable.

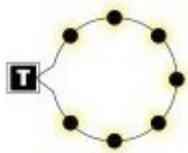
Kichler Model # K15901 Junction Box - [Click Here](#)

Wiring methods continued on next page...

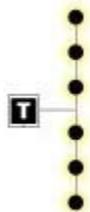
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## STEP III Continued... Wiring Methods



**Loop:** The loop method is similar to the straight method, except there is an extra length of wire connecting the last fixture in the run back to the transformer. Since voltage drop is coming from both sides of the run, it will produce a **more uniform light output**. It is important that you connect the same wire leads to the same transformer terminals on the same circuit by noting the ridge or marking on one side of the cable.

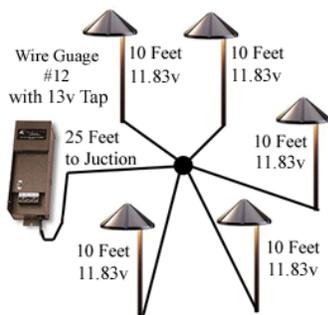


**Split - T:** The split-T wiring method represents two straight runs of wire that are connected to a T-junction, which is then connected to the transformer. This allows for **more equal distribution** of power to the center of a run, or to a run some distance away. The cable running from the transformer should be of a heavier gauge (8-10 gauge) than the two cables the fixtures on which the fixtures will be installed.

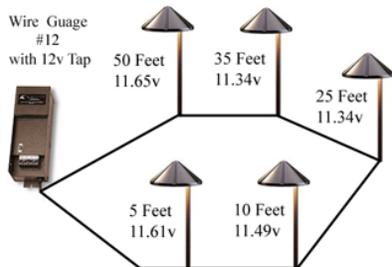
### Sample Straight Wiring Method with noticeable Voltage Drop



### Sample Junction Wiring Method - No Noticeable Voltage Drop



### Sample Loop Wiring Method - No Noticeable Voltage Drop

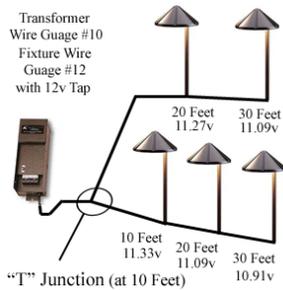


**Note:** You can use one to many wiring methods in your landscape install, it should be determined on a "per run" basis which method should be used. If you need help deciding on a wiring method, please feel free to [contact us](#) for assistance.

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## Sample Split-T Wiring Method - More Equal Distribution



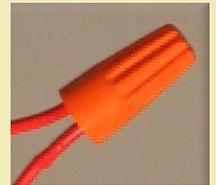
### STEP IV. Installation

When you have a design and system selected, installation can be a snap if you follow some simple step by step instructions.

**Note:** Remember that landscape lighting is very flexible, so if you are not sure about a location of a light, it is easy to move it at any time.

#### 4 Step by Step Instructions

1. You will first want to choose the location of your transformer. This is where all the cables from the lights will be routed underground. There are plug-in and hardwire transformer models available. The transformer should be mounted near an outside grounded outlet when using the “plug-in” model.
2. Next, place the fixtures near where they will be installed. Lay out your cable from your transformer to the fixtures according to the wiring method notated in your design, then install the lights to the cable and mount them as necessary. Wires are connected together either by a quick connect, or by twisting them and using a Wire Nut. To ensure a proper connection, put a small amount of sealant in the Wire Nut and use electrical tape to seal the connection. You may also solder the wires together if able..



**Note:** After all fixtures are connected, you should test the voltage at each fixture to ensure the voltage is between 10.8V – 12.5V. You might also want to look at the system at night before completing step 3.

3. Dig trenches for the cable, they should be 4-6” deep. Use some sort of landscape material (soil, dirt, pebbles, etc.) to cover the cable. If running cable through bushes, you do not necessarily need to bury it, so long as it is out of sight.
4. Turn on the system to ensure proper operation. Be sure to test any timers and photo cells.



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## STEP V. Maintenance

There are a few easy things you can do to increase the life of your landscape lighting system.



- **Cleaning:** We suggest simple maintenance about once every 6 months using a damp cloth, wipe the dust and debris away from each light fixture, including the lens. If your fixture has excess debris around it, you might consider moving it to a different location.
- **Replacing Bulbs:** To prevent shorts and increase the life of your lights and bulbs, spray a small amount of silicone sealant in the sockets before installing bulbs.
- **Over Growth:** Be sure to watch for plants that will grow and block light. You will also want to keep your lights free from excess growth with necessary trimming.
- **Environmental Conditions:** Some areas with air salt content or highly acidic soils can decrease the life of some landscape lighting fixtures. We suggest using non-metallic and non-corrosive lights when installing a system in these conditions.

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