

## DESIGN OVERVIEW

A Low Voltage Lighting (LVL) system is the ideal way to install and operate landscape light fixtures. The two components of a LVL System is the cable and transformer.

## 12V TRANSFORMER SIZING

Transformers reduce 120V to a safe 12V needed for low voltage lamps. The total lamp wattage of all fixtures connected to a transformer must be less than the capacity of transformer. To determine the size, add up wattage of all lamps and add 10% more for safety factor.

## LOW VOLTAGE CABLE LENGTH

Voltage drop has an important impact on LVL systems. Voltage drop occurs along the length of cable and lamps at the end of run dimmer than beginning. Voltage drop is a function of cable length, cable size, and total fixtures wattage. Voltage drop can be minimized in several different ways.

- Use heavier gauge cable.
- Shorten cable length or runs.
- Reduce wattage of each fixture.
- Use multiple transformers.
- Reduce total number of fixtures on a run.

Cable is measured by gauge. The lower gauge, the thicker cable and the more current it carries. Cable is available in 3 popular sizes of 12-2, 10-2 and 8-2. Refer to Cable Length Guide in below to estimate the maximum allowable cable length.

## LOW VOLTAGE CABLE LENGTH GUIDE

Cable Size	Cable Constant	50W	100W	150W	200W	250W	300W
12-2	7500	300'	150'	100'	75'	60'	50'
10-2	11920	475'	240'	160'	120'	100'	80'
8-2	18960	750'	380'	250'	190'	150'	120'

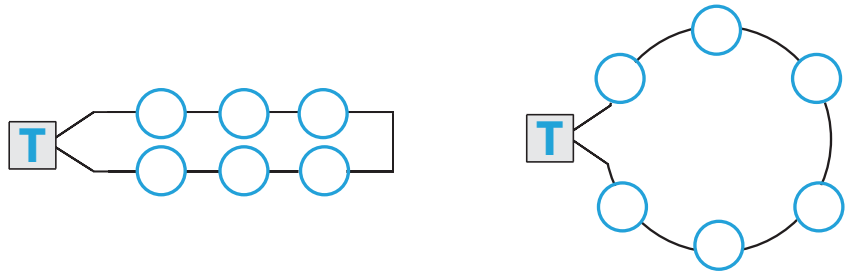
**Formula:** MAX Cable Length =  $\frac{\text{Cable Size Constant}}{\text{Total Fixture Watts}} \times 2$

**Example:**  $\frac{7500}{150W} \times 2 = \underline{100'}$

## 12V CABLE LAYOUT OPTIONS

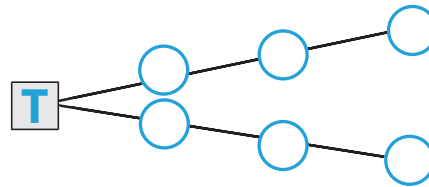
### Loop Installation:

Fixture are arranged in a loop, reducing voltage drop.



### Split Load Installation:

Fixtures run in 2 or more directions from the transformer. Locating transformer in the center reduces voltage drop.



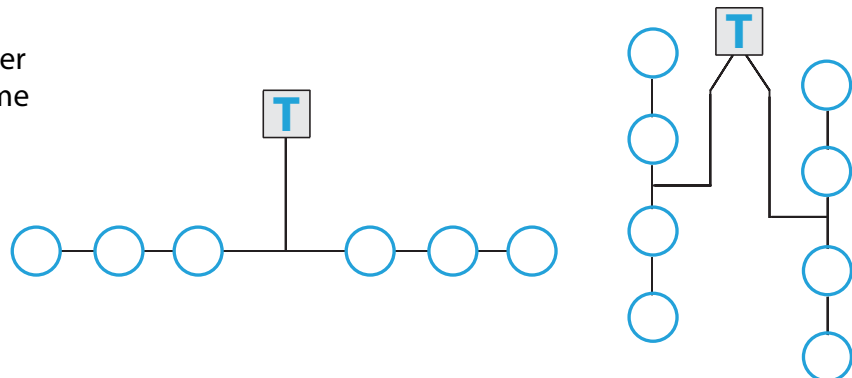
### Straight Run Installation:

Fixtures run in sequence directly from the transformer



### "T" Installation:

Allows more equal distribution of power to the center of the run, or to a run some distance away. Main cable must be heavier gage (10-2 or 8-2).



## TROUBLESHOOTING CHECKLIST

### Entire System will Not Operate.

1. Check 120V outlet to ensure power is on.
2. Check or re-set circuit breaker on transformer.
3. Check cable connection at transformer.
4. Check transformer by disconnecting cable from output terminals.  
By-pass timer and/or photocell.

### Circuit Breaker in Transformer trips.

1. Check cable for any short circuit.
2. Check connection of cable at transformer.
3. Recalculate total wattage to ensure its not exceeding wattage of transformer or wire length of each run.

### Fixture has moisture build up inside

1. Check if shrouds and rings are installed correctly.
2. Check for missing or torn gaskets.
3. Check draining hoels for blockage.

### Fixture turns on but dims

1. Check connection point at power cable.
2. Recalculate total watts and max. cable length to insure voltage drop does not excess 2 volts.

### Fixture will not light.

1. Check if lamp it properly placed in socket.
2. check fixture connection at power cable.