

DESIGN OF LOW VOLTAGE LIGHTING SYSTEM

DESIGN OVERVIEW:

LVL system is a creative and flexible alternative for landscape lighting. It is easy to install, safe to operate and maintain longer lamp life and significant energy savings. The two components of LVL system are direct burial cable and transformer.

12 VOLT TRANSFORMER SIZING:

Transformer reduces 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.

TRANSFORMER SIZE = TOTAL FIXTURES WATT X 1.1

Select a transformer that matches as close as to your total lamp wattage. If total wattage is too great, either divide the load between two transformers or use a more powerful model.

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 at the 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 fixtures
- 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	MAXIMUM CABLE LENGTH PER TOTAL FIXTURE WATTS					
		50W	100W	150W	200W	250W	300W
12-2	7500	300'	150'	100'	75'	60'	-----
10-2	11920	475'	240'	160'	120'	100'	80'
8-2	18960	750'	380'	250'	190'	150'	125'

CABLE LENGTH FORMULA:

$$\text{MAX. CABLE LENGTH: } \frac{\text{CABLE SIZE CONSTANT}}{\text{TOTAL FIXTURE}} \times 2$$

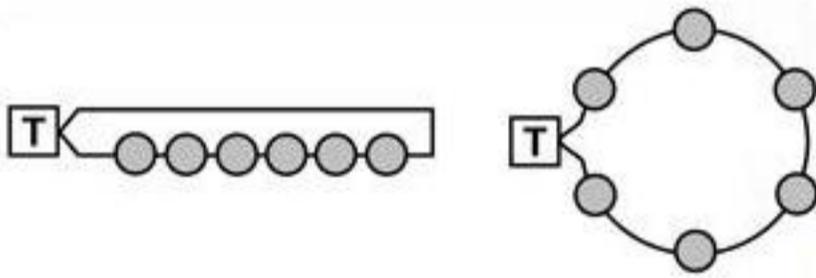
TIP: Expect a voltage drop of greater than 2 volts when cable length is longer than recommended. Use the above chart of formula to calculate max. cable length.

12 VOLT CABLE LAYOUT OPTIONS

TIP: Connect all lamps in parallel. Connect one side to "COM" and other side to "12V" terminal.

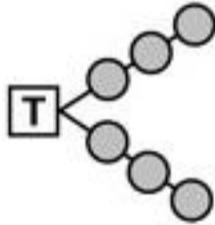
LOOP INSTALLATION:

Fixtures are arranged in a loop, reducing voltage drop.



SPLIT LOAD INSTALLATION:

Fixtures run in two or more directions from transformer. Locating the transformer in the center of run reduces the effect of voltage drop.



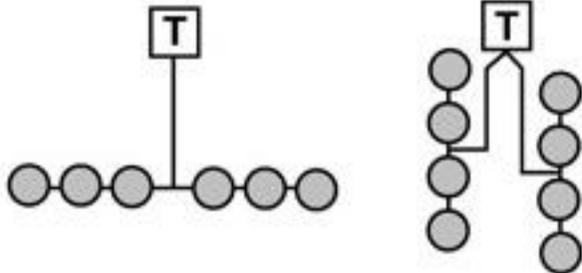
STRAIGHT RUN INSTALLATION:

Fixtures run in sequence directly from transformer



"T" INSTALLATION:

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



TROUBLE SHOOTING CHECKLIST

Solutions to most common problems

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 ON TRANSFORMER TRIPS

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

FIXTURES HAS MOISTURE BUILT-UP INSIDE

- 1-Check shrouds and lens rings installed properly.
- 2-Check for missing or torn gaskets.
- 3-Check drainage holes for blockage

FIXTURES ON, BUT DIMS

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

FIXTURE WILL NOT LIGHT

- Check lamp for broken filament.
- Check lamp for proper fit in socket.
- Check fixture connection at power cable.