

# Voltage Drop Information

## Voltage Loss and low voltage lighting for landscape systems

There are a lot of common misunderstandings when addressing the installation of low voltage landscape lighting. The most common complaint is that the first light fixture in a run is much brighter than the last one. This is especially true when you are doing a long run over 80' in length. Most people understand that the longer the run the more voltage loss there is. It is common to measure 12volts at the transformer, but only 5 volts at the end of the run. Many engineers will tell you to increase the size of the wire gauge. This may or may not solve the problem. If it doesn't you will be unhappy with the installation and most likely still have dim lights. . Many engineers will not take into account that it is not only the length of the wire, the wire gauge, but also the total load, or number of fixtures on the line. For example a run of 100', 12 gauge wire with a load of 5 fixtures of 11 watts each will not experience much in the way of voltage loss. If you add to this run, a load of 150 watts, by just adding fixtures, you will experience significant voltage loss and the fixtures will run very dim.

As a first example of acceptable levels of loading your transformer lets look at this chart. On a 12volt output transformer (common transformer) using a #12 wire gauge you can run 129' with a load of 50watts with minimal voltage loss and dimming of fixtures. When you increase the load to 100watts your wire run should not exceed 65 feet. If it does, you will again experience voltage loss and dim fixtures near the end of the run.

Voltage Drop Chart

	Wattage:	50W	100W	150W	200W	250W	300W
	Wire Gauge						
12 Volt Output	14 ga.	81'	40.6'	27'	20'	16.3'	13.5'
	12 ga.	129'	65'	43'	32'	26'	21.6'
	10 ga.	204.5'	102	68	51	41	34
	8 ga.	317'	158'	105'	79'	63.4'	52.8'

\* Note: Min. Volts on the load is 10.5V @ 20 ° C; Distance in FT. ' indicates feet

Look at the situation when you have a 300watt transformer with only one output (12volts) If you load the transformer with 300watts worth of fixtures you can only run 21' without voltage loss.

So what will you do if you have a large load and a long run? We suggest that you split your load onto 3 separate runs of 100watts at 65' long each for the same total of 300watts. This will work if you do not have any really long runs or runs longer than 65'

A better way would be to use one of our mult tap output transformers. These transformers have a variety of outputs for longer runs. Please review this chart.

## Voltage Drop Chart

	Wattage:	50W	100W	150W	200W	250W	300W
	Wire Gauge						
12 Volt Output	12 ga.	129'	65'	43'	32'	26'	21.6'
	10 ga.	204.5'	102'	68'	51'	41'	34'
13 Volt Output	12 ga.	216'	108'	72'	54'	43.3'	36'
	10 ga.	340'	170'	114'	85'	68.2'	56.8'
14 Volt Output	12 ga.	303'	151'	101'	75.5'	60.6'	50.5'
	10 ga.	477'	238.5'	159'	120'	95.4'	79.5'
15 Volt Output	12 ga.	390'	195'	130'	97'	78'	65'
	10 ga.	613'	307'	204.5'	153'	123'	102'

\* Note: Min. Volts on the load is 10.5V @ 20 ° C; Distance in FT. ' indicates feet

Our multi-tap transformers you could easily set up four runs, each one balanced with 12volts at the start of each light position.

Run #1 set at 12volts 100watts 12 gauge wire 65' long run first fixture at 15'

Run #2 set at 13volts 100watts 12 gauge wire 108' long run first fixture at 70'

Run #3 set at 14volts 50watts 12 gauge wire 303' long run first fixture at about 110'

Run #4 set at 15volts 50watts 12 gauge wire 390' long run. first fixture at 300'

When setting the fixtures you want to check the voltage at the first fixture on the run and make sure it does not exceed 12volts. If it does, move the feed wire down to the next voltage tap. On large projects we suggest the use of an inexpensive voltage meter (not a voltage tester) We found one for \$12 at Radio Shack.

Using these special transformers for larger projects will help you avoid voltage loss and dim lights. We offer these transformers up to 1200watts. Be careful to note that the larger transformers are usually divided. For example the 1200watt transformer has two 600watt sections divided into the 4 taps, 12,13,14,15volts.