

TRANSFORMERS

Low voltage lighting systems use transformers to step down and isolate standard high line voltages (e.g. 120VAC, 240VAC and 277VAC, etc) to safe-to-touch low voltages such as 12VAC.

There are two categories of transformer styles to choose from: **remote** or **surface mount** transformers.

REMOTE TRANSFORMERS are installed at a distance from the lighting system. This allows the transformer to be placed out of view from the aesthetically pleasing lighting system. Since remote transformers are placed at some considerable distance from the lighting system, the installer must be aware of voltage drop issues; there will be less voltage at the lighting system than there is at the output of the remote transformer. LBL lighting remote transformers easily overcome this standard industry problem by providing four boost taps at the output of the transformers (12V, 13V, 14V, 15V). Since the power company only guarantees 120VAC \pm 10%, our boost taps also can be used to overcome any variation in the line voltage. The best approach for achieving optimum lamp voltage on the lighting system is to observe the wiring instructions accompanied with our remote multitap transformers in conjunction with the appropriate wire gauge specified in our voltage drop table.

In general, to obtain a minimum voltage drop of 3% from the output of the remote transformer to the power feed canopy, please use the appropriate wire gauge specified in our voltage drop table (below).

VOLTAGE DROP TABLE

TRANSFORMER WATTAGE	WIRE SIZE FOR 5 FT.	WIRE SIZE FOR 6-15 FT.	WIRE SIZE FOR 16-20 FT.	WIRE SIZE FOR 21-40 FT.	WIRE SIZE FOR 40-60 FT.	WIRE SIZE FOR 61-90 FT.
150 watt	#12 GA	#8 GA	#6 GA	#4 GA	#2 GA	#1 GA
250 watt	#10 GA	#6 GA	#4 GA	#2 GA	#1 GA	#2/0 GA
300 watt	#10 GA	#6 GA	#4 GA	#1 GA	#1/0 GA	#3/0 GA

NOTE: The THHN wire sizes are for 3% drop in voltage based on 150, 250, and 300 watt loads. Lengths are the distance from the transformer to the system power feed canopy.

SURFACE MOUNT TRANSFORMERS are installed local to the lighting system usually to a junction box in a ceiling. Since surface mount transformers are visible we have designed our surface mount transformers to aesthetically complement our lighting systems. Surface mount transformers will not experience voltage drop issues to the degree and severity of remote transformers and hence do not have or need boost taps.

Transformers can further be broken down into two types: magnetic or electronic transformers.

MAGNETIC TRANSFORMERS operate at standard low frequencies (50/60 Hz). They offer very reliable operation and are very durable. Since magnetic transformers operate at low frequencies, they experience much less voltage drop over a long distance compared to high frequency electronic transformers. For optimum performance, all our magnetic transformers must be loaded to a minimum of 80% of the transformers maximum output wattage. For example, a 300W transformer must be loaded to a minimum of 240W in order for the output voltage to be equal to or less than 12VAC. Otherwise the output voltage will be greater than 12VAC and cause lamps to burn out prematurely. **All Fusion magnetic transformers are designed to carry a full load.**

ELECTRONIC TRANSFORMERS are very compact and much smaller than their magnetic counterparts. They provide built in protection against electrical shorts applied at the outputs and to the lighting system. **In order for electronic transformers to operate properly, the output must be loaded to a minimum of 50% of the rated wattage of the transformer.** Any output load below 50% may result in lamps flickering and premature lamps burning out. Since electronic transformers operate at much higher frequencies, most standard volt and amp meters intended for 60hz type measurements cannot be used to accurately measure the outputs of these transformers. To measure the output, we recommend using a Fluke digital multimeter model number 189.

Electronic transformers may cause interference with appliances such as TVs and radios. If interference is a problem, a line filter may be installed either at the transformer or at the appliance input. Another option is to use a magnetic transformer, which operates at a lower frequency and will not cause any interference.