TOP QUESTIONS REGARDING LEDS AND ELECTRICAL WORK EVERY SIGN COMPANY SHOULD KNOW ANSWERS TO



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Disclaimer: The Sign Association of Canada is not an electrical authority. Please consult with your local Authority Having Jurisdiction to ensure that the information is true in your province.

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Electrical compliance is a mandatory requirement in all Canadian provinces and territories. Having a clear understanding of the Canadian Electrical Code (CEC) and the standards is key to correct specification, installation and operation of signs.

To ensure that SAC-ACE is on track with its strategic objectives to build relationships with electrical authorities across Canada, in 2016, the association formed the Electrical Authority Outreach Task Force with representation from each chapter and region.

In our experience, one of the most abused and misunderstood parts of electrical signs is the power supply as the majority of rules around electrical sign installations concern the power supply. The current knowledge product is a list of questions we know come up every day in manufacturing electrical signs. Our objective is to provide information to our members so that they, in turn, can make better decisions about how and what they install.

A big thank you to the following Electrical Authority Outreach Task Force members:

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1 Can we use Class 2 12 V dc power supplies exceeding 60 watts (5a nominal)?

There are two thresholds for a low voltage circuit that affect the sign industry. Class 2 circuit has a voltage less than 42.4 V and a maximum wattage of 100 watts. In the sign industry, we commonly use 12 volt - 60 watt maximum and 24 volts - 100 watts maximum. Therefore, it is possible to have a 12 volt 240 - watt power supply but it would have 4 – 60 watt secondary outputs, a 12 volt 120-watt power supply would have 2 – 60 watt secondary outputs.

For further information, refer to Canadian Electrical Code Section 16-222:

"Equipment located on the load side of overcurrent protection, transformers, or current-limiting devices for Class 2 circuits (see Appendix B)

(1) Equipment located on the load side of overcurrent protection, transformers, or current-limiting devices for
Class 2 circuits shall:

(a) for Class 2 circuits operating at not more than 42.4 V peak or dc, be acceptable for the particular application; and

(b) for Class 2 circuits operating at more than 42.4 V peak or dc, be arranged so that no live parts are accessible to unauthorized persons.

(2) Notwithstanding Sub-rule (1), lighting products, electromedical equipment, equipment for hazardous locations, and thermostats incorporating heat anticipators shall be approved."

A. Why do LED suppliers specify Class 2 power supplies of 60 watts for 12 V and 100 watts for 24 V?

To maintain a Class 2 rating for the system. Having a Class 2 rating allows the use of low voltage Power Limited Tray Cable or PLTC. It also allows connections to be made outside of junction boxes with no "special" connectors.

Note on Remote Installations: Check with your Authority Having Jurisdiction (AHJ) for cable requirements for remote installation as some jurisdictions look for FT4 or FT6 graded cable.

B. What is a Class 2 power supply?

A power supply that recognizes the rules of limiting the amount of power that can be used on the secondary side. This allows the rules of Class 2 circuits to be used.

If you are exceeding these parameters, you have to go to Class 1.

C. Can we use Class 2 power supplies of higher wattage and amperage in typical illuminated sign applications?

Yes, if they have multiple independent outputs that allow the secondary side to maintain Class 2 rules. For example, 2 – 60 watt output = 120 watts, 3 – 60 watt outputs = 180 watts, 4 - 60 watt outputs = 240 watts.

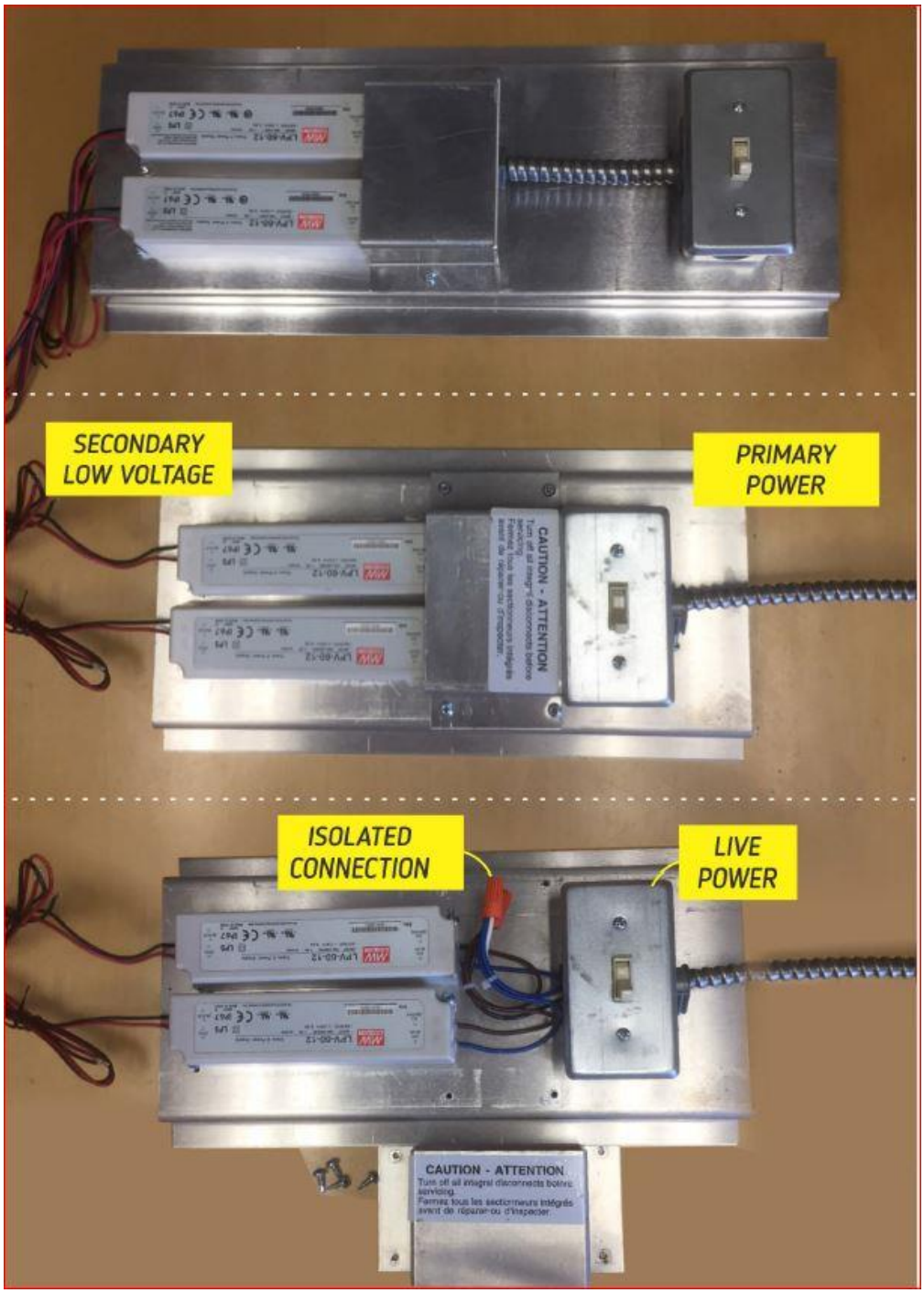
D. Where would it be reasonable or allowable to use power supplies beyond the 12 V – 60 watts, 24 V - 100 watt threshold?

This would take the installation outside of the Class 2 environment and would require all of the protections of a **class 1 installation**. It would also require product that was rated for this level of power to be used. It also requires factory assembly. These larger power supplies are typically seen in manufactured fixtures such as street and parking lot lighting fixtures.

2 Does the primary feed to the power supply need to be protected or run in a raceway? Why?

Can a Class 2 power supply be installed in a light box, sign cabinet or channel letter without any enclosure?

A separate disconnect is needed to isolate the power supply from the live electrical in the switch to replace safely.



3 Is there a difference between grounding and bonding? If so what is the difference?

Yes, there is a difference. Grounding is at the main service. Anything beyond that is bonding. For the purposes of sign industry, we mainly do bonding by connecting the ground wire in the power supplies to the main service.

Here are the definitions from the Canadian Electrical Code:

Bonding — a low impedance path obtained by permanently joining all non-current-carrying metal parts to ensure electrical continuity and having the capacity to conduct safely any current likely to be imposed on it.

Bonding conductor — a conductor that connects the non-current-carrying parts of electrical equipment, raceways, or enclosures to the service equipment or system grounding conductor.

Ground — a connection to earth obtained by a grounding electrode.

Grounding — a permanent and continuous conductive path to the earth with sufficient ampacity to carry any fault current liable to be imposed on it, and of a sufficiently low impedance to limit the voltage rise above ground and to facilitate the operation of the protective devices in the circuit.

Grounding conductor — the conductor used to connect the service equipment or system to the grounding electrode.

4 Can we run the primary line and 12 V dc (or 24 V dc) into same raceway, enclosure or does it need to be separate?

Check with your local Authority Having Jurisdiction as this requirement differs from province to province.

For the specific rule, please refer to *Canadian Electrical Code Rule 16-212 (1)*

“Conductors of Class 2 circuits shall be separated at least 50mm from insulated conductors of electric lighting, power, or Class 1 circuits operating at 300V or less, and shall be separated at least 600mm from any insulated conductors of electric lighting, power, or Class 1 circuits operating at more than 300V, unless both conditions for both condition effective separation is afforded by use of:

(a) metal raceways for Class 2 circuits or for the electric lighting, power and Class 1 circuits subject to the metal raceway being bonded to ground
(b) metal-sheathed or armoured cable for the electric lighting, power and Class 1 circuit conductors subject to the sheath or armour being bonded to ground
(c) Non-metallic-sheathed cable for the lighting, power, and Class 1 circuits operating at 300V or less; or,

(d) Non-metallic conduit, electrical non-metallic tubing, or equivalent, in addition to the insulation on the Class 2 circuit conductors or the electric lighting, power, and Class 1 circuit conductors."

5 Does retrofitting a sign or luminaire 'void' the CSA/UL (or any internationally-accredited standards development and testing & certification organization) listing?

Yes, it voids the listing. Changing or retrofitting a sign from its original lighting source and original certification to a new lighting source would require a new certification which would need to be acquired through local electrical Authority Having Jurisdiction.

6 Does the Authority Having Jurisdiction need to be notified when a sign is retrofitted?

Yes. Please note that **all** primary connections done in the field require an electrical permit and inspection by the local Authority Having Jurisdiction.

7 Is it ok for installers to build their own retrofit kit using the off the shelf pieces and parts? If so what steps must be followed?

Yes, providing they use products that are classified for retrofit (listed components) and follow the instructions of the manufacturer. Anything added to the kit like, wire nuts, cable ties etc. will be evaluated by the Authority Having Jurisdiction. Keeping in mind that not all LED products are classified for retrofit.

Definition for Sign retrofit kit (retrofit assembly) from Standard Tools CSA 207-15:

"All components used to replace existing parts of an original sign for the purposes of retrofit conversion. The components of a retrofit assembly consist of but are not limited to reflectors, drivers, lamp holders, wiring, mounting hardware, wire connectors, and installation instructions."

8 Where should the retrofit certification mark be located?

The LED manufactures will place the ULc mark on the power supply and the product information instructions. Due to differences in provincial requirements, check with your Authority Having Jurisdiction about where the retrofit certification mark is to be located.

9 Why are both a CSA/UL (or any internationally-accredited standards development and testing & certification organization) mark and a classification mark on the power supply?

Having an accredited testing laboratory mark on a power supply insures the product has been tested for use in a particular application and is safe to use in that application. Having multiple approval marks only verifies that the product is approved for use in more than one jurisdiction or environment.

Various jurisdictions recognize and approve product for use using different standards so testing laboratories like CSA, UL, ETL and approximately 50 others test products and certify or approve that they meet these various standards. Many of the product evaluating laboratories do not recognize each other or the test results each other produce. If test lab A determines that a product meets the requirements of a particular standard, test lab B may or may not approve it for use and will want to do their own tests. Most manufactures who are building product for a global market need to test to many standards and have approvals of many testing bodies.

10 Are certified electrical components allowed to be painted without compromising their electrical certification? I.E. Lamp sockets, ballasts, wire, power supplies, etc.

Generally, it is believed that painting electrical components will impact their certification. This is based on the assumption that painting the approved product will “alter” it. There are rules about altering certified products. Sign makers should confirm with the product manufacturer if painting a product would alter the certification or impact the operation of the product.



















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