

SUMMARY OF TOPICS

The following changes in requirements to the Standard for Electric Signs, UL 48, are being proposed:

- 1. Minimum AWG size, Selection and Installation of Class 2 Secondary Wiring***
- 2. Sign Receptacles Provided for Auxiliary Functions***
- 3. Standards and Requirements for Components used in PV Signs***
- 4. Editorial Revisions***

STP BALLOTS AND ALL COMMENTS DUE: OCTOBER 8th, 2018

For your convenience in review, proposed additions to existing requirements are shown underlined and proposed deletions are shown ~~lined-out~~.

1. Minimum AWG size, Selection and Installation of Class 2 Secondary Wiring

RATIONALE

Proposal submitted by: Joseph Frederic, UL

This proposal is intended to:

- a) Align the minimum conductor gauge size requirement for Class 2 circuit wiring with the 2017 NEC;
- b) Clarify and relocate requirements for the selection and installation of secondary Class 2 wiring;

Section 600.33(A) of the 2017 NEC was revised to require secondary wiring installed in Class 2 circuits to be sized no smaller than 18 AWG. Prior to the 2017 edition, both the NEC and UL 48 used to allow all Class 2 conductors to be sized not less than 22 AWG. This proposal clarifies that wiring (see proposed new 4.2.5.5.1.11B) and terminals (see proposed new 4.2.5.2.2.4) provided for field connections external to the sign body or sign enclosure must be sized at least 18 AWG in order to be compliant with the Code.

Currently requirements for Class 2 circuit wiring are covered both in the secondary wiring section (4.2.5) and in the Class 2 LED signs section (4.4.2) of the standard with the bulk of requirements for power-limited circuit cables covered in the LED sign section only. This proposal relocates the requirements from Clauses 4.4.2.5 and 4.4.2.6 in the LED sign section to new Clauses 4.2.5.5.1.11A to 4.2.5.5.1.11C under the Wiring section of the standard. This move is intended to convey that the requirements generally apply to Class 2 circuit wiring (e.g. including Class 2 controls) and not just to LED illumination systems. The move is also consistent with the renaming of section 600.33 in the 2017 NEC from “LED Sign Illumination Systems, Secondary Wiring” to “Class 2 Sign Illumination Systems, Secondary Wiring”.

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As part of the relocation of requirements from 4.4.2.6, sub-clauses a) to f) were revised as explained below:

- a) The content of a) was eliminated as it is now covered by the new 4.2.5.5.1.11A
- b) Content from sub-clause b) was clarified and revised to identify wiring securement parameters that can be included in the installation instructions. The original sub-clause a) was moved to 4.2.5.5.1.11B.
- c) Content from sub-clause c) was clarified and revised to identify wiring support parameters that can be included in the installation instructions. A typo was observed in that the stated value of 7.5 mm in sub-clause c) does not convert to 3 inches. The value was corrected to 75 mm in order to correspond with the converted value in inches.
- d) Sub-clauses d) and e) were combined and clarified to indicate that suitably rated insulated connections are only required in wet locations outside of the sign body or enclosure.
- e) The content was combined with sub-clause d) as explained above.
- f) No changes were made to the content of sub-clause f).

Clauses 4.4.2.5 and 4.4.2.6 are retained in the LED sign section of the standard but simply point to the applicable requirements in the wiring section. This also helps to avoid renumbering the subsequent paragraphs.

PROPOSAL

4.2.5.5.1.11 Class 2 circuits shall be wired ~~with~~ using a Power Limited Circuit cable that complies with the Standard for Power-Limited Circuit Cables, UL 13, or with other wiring/cable that is suitably rated for higher voltages.

4.2.5.5.1.11A Class 2 circuit wiring shall be rated for the environment in which it is to be used, sized for the load imposed, and except as noted in 4.2.5.5.1.11B, not smaller than 18 AWG. See also, Field Wiring terminal, 4.2.5.2.2.4.

4.2.5.5.1.11B A minimum of 22 AWG is permitted for Class 2 circuit wiring that are contained within the sign enclosure or sign body and not intended for connection to field wiring.

4.2.5.5.1.11C Power-limited circuit cable shall be installed in accordance with the following:

- a) All exposed cables shall be mechanically supported at the maximum interval specified in Table 4.5 and in accordance with 4.2.5.5.3. For cables that will be secured in the field, the maximum support interval shall be specified in the installation instructions;
- b) Connections and splices outside a sign body or enclosure shall be mechanically secured within 75 mm (3 in) of the connection point. This information shall be provided in the installation instructions if the connections are to be made or completed in the field;
- c) Connections and splices in a wet location, outside an enclosure or sign body, shall be made with insulating devices that are suitably rated for the environment; and
- d) Bends in the cable shall be made so as not to damage the cable and be no less than four times the overall diameter of the cable.

4.2.5.5.1.12 Cables and fittings that comply with the requirements of the Standard for Cable Assemblies and Fittings for Industrial Control and Signal Distribution, UL 2238 are considered to comply with this standard when used as interconnecting cables for signs, section signs, changing message signs, and outline lighting.

4.2.5.5.1.13 Types SO and STO flexible cord are permitted for wiring of a sign where essential flexibility is required and when the cord is exposed only during relamping or changing advertising material.

4.2.5.5.1.14 Types SO and STO flexible cord is permitted for wiring of a permanently connected sign to facilitate the use of sign modules that are not readily field serviceable and require field replacement, such as LED changing message modules. Flexible cord types SOW and STOW are required when the cord is exposed to water or sunlight.

4.2.5.2.2 Field-wiring terminals

4.2.5.2.2.1 A pressure wire type terminal or a wire binding screw shall be of the type suitable for field wiring.

4.2.5.2.2.2 A terminal intended for connection of a grounded conductor of an ac supply shall be metal substantially white or silver in color or be marked adjacent to the terminal with the words "NEUTRAL", "N", "W" or "White". No other terminal shall be substantially white or silver in color.

4.2.5.2.2.3 A terminal intended for connection of a dc supply shall be marked with the symbols "-" and "+" on or immediately adjacent to the supply terminals. The lettering and symbols shall be minimum 6.4-mm (0.025-in) high. Ink, paint, die stamping and other similar marking means are not prohibited from being used as the marking method.

4.2.5.2.2.4 A terminal intended for connection of secondary wiring external to the sign body or electrical enclosure shall be capable of accepting 18 AWG or larger conductors.

4.4.2 Signs using ~~class~~Class 2 LED illumination system

4.4.2.5 Wiring for use in the secondary of a Class 2 LED illumination system shall be selected in accordance with 4.2.5.5.1.11 to 4.2.5.5.1.11B~~Class 2 circuits shall be wired with Power Limited Circuit cable that complies with the Standard for Power-Limited Circuit Cables, UL 13, or with other wiring/cable that is suitably rated for higher voltages.~~

4.4.2.6 Power limited circuit cables installed in secondary circuits of Class 2 LED signs shall be in accordance with 4.2.5.5.1.11C.~~Class 2 circuits shall be wired with power limited circuit cable that complies with the Standard for Power-Limited Circuit Cables, UL 13, or with other wiring/cable that is suitably rated for higher voltages including:~~

- ~~a) Power limited circuit cable shall be rated for the environment in which it is to be used, and sized for the load imposed and not smaller than 22 AWG;~~
- ~~b) All exposed Power-limited circuit cables shall be mechanically secured to the mounting surface with a maximum distance between supports as specified in Table 4.5 and 4.2.5.5.3.1;~~
- ~~c) Connections in power limited cable outside a sign body or enclosure shall be mechanically secured within 7.5 mm (3 in) of a splice;~~
- ~~d) Connections, and connection of splices in power limited cable shall be made with insulating devices with no strain transmitted to the connection;~~

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e) ~~Connections of power limited cable in wet locations shall be in an enclosures or sign body; and~~

f) ~~Bends in the cable shall made so as not to damage the cable and be no less than four times the overall diameter of the cable.~~

2. Sign Receptacles Provided for Auxiliary Functions

BACKGROUND

As currently written section 4.3.5 allows receptacles to be provided on or with a sign either to power specific equipment provided as part of the sign (i.e. dedicated use) or to power separate equipment for servicing or repairing of the sign (i.e. convenience use). Both dedicated and convenience receptacles must be identified by a marking in accordance with either 7.2.10 or 7.2.11 as applicable. This is done to discourage unanticipated use of receptacles provided as part of a sign for general use functions.

We are now seeing sign constructions provided with receptacles and USB ports for use with different ITE equipment to provide supplementary functions or serve as charging ports. This Proposal is intended to address requirements for such auxiliary receptacles while preserving the same level of safety anticipated by the standard.

RATIONALE

Proposal submitted by: Joseph Frederic, UL

This Proposal clarifies the intent of section 4.3.5 and addresses sign constructions that are provided with receptacles providing auxiliary functions separate from the signage application.

The requirement that each receptacle must comply with either dedicated or convenience requirements has been moved out of clause 4.3.5.2.2 to the new 4.3.5.0.1 at the beginning of the section. The new clause now identifies all three options for receptacles used in signs including auxiliary receptacles. A new clause 4.3.5.0.2 identifies appropriate standards for new receptacles with USB ports.

The new subsection 4.3.5.3 preserves the requirement that each receptacle provided with a sign must be supplied from a circuit that provides supplementary overcurrent protection per 4.3.5.1.2, or supplied from a separate branch circuit independent from the sign circuits, per 4.3.5.2.4. A marking is required to indicate the maximum electrical rating and help identify auxiliary receptacles.

The other revisions included in this proposal are editorial in nature.

The revision to 4.2.5.2.3 corrects a discrepancy between the stated minimum distance of 365.8 mm that must exist between convenience receptacles and the equivalent value of 12 ft. shown in parenthesis. The requirement was introduced in the 15th Edition of UL 48 to align with section 210.52(A)(1) of the NEC that permits up to 12 feet of space horizontally between receptacles along a floor line (i.e. 6 ft. in either direction from a center point). However the stated value of 365.8 mm does not convert to 12 ft. Adding the correct metric value of 3.66 m will correct this discrepancy.

The revisions to 4.3.5.1.3 and 4.3.5.2.2 will fix the cross-reference paragraph numbers to point the correct markings for dedicated and convenience receptacles in section 7 of the standard.

PROPOSAL

4.3.5 Receptacles

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