

Subject 751

June 29, 2018

SUMMARY OF TOPICS

The following changes in requirements to the Standard For Safety For Vending Machines, UL 751 are being proposed.

- 1. Proposed Revisions To Update Requirements For Controls***
- 2. Proposed Revision To And Addition Of Requirements To Prevent Remote Shut-Off Of Vending Machines***
- 3. Proposed Revisions To Clarify The Scope Of The Standard***
- 4. Proposed Revisions To And Addition Of Requirements To Address Switch Mode Power Supply Units Increasingly Used In Vending Machines***
- 5. Proposed Revisions To Clarify Requirements For Vending Machines Having Two Supply Cords***
- 6. Proposed Revisions To Marking Requirements To Clarify Application Of UL 969 Requirements***
- 7. Proposed Revisions To EMI Filter Requirements To Specify An Alternate Compliance Option***
- 8. Proposed Editorial Revisions To Clarify The Compliance Criteria Of the Leakage Current Test***

STP BALLOTS AND ALL COMMENTS DUE: August 13, 2018

UL's goal is to have no interest category comprise more than one-third of the STP membership balance. To improve the current balance for STP 751, UL is looking for participants in the AHJ, Commercial / Industrial Users, Consumer, General Interest, Government, Producer interest categories. Definitions for these interest categories are available on the Standards STP Internet site:

<http://ulstandards.ul.com/develop-standards/participation/interest-categories/>

If you are interested in applying for STP 751 membership or are aware of potential candidates for this STP, please contact the STP Project Manager, Elizabeth.Northcott@ul.com.

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

1. Proposed Revisions To Update Requirements For Controls

RATIONALE

Proposal submitted by: Barry Karnes, UL LLC

On June 23, 2015, UL 1054, Standard for Special Use-Switches, was withdrawn and replaced with the UL 61058 series of standards (Standard for Safety for Switches for Appliances). In like manner, in October 2018, UL 353, Standard for Safety for Limit Controls, and UL 873, Standard for Safety for Temperature-Indicating and -Regulating Equipment, will be withdrawn and replaced by the UL 60730 series of standards (Standard for Safety for Automatic Electrical Controls for Household and Similar Use).

The proposals in this topic reflect the deletion of the option to use controls certified to UL 353, UL 873 and UL 1054. It also removes the references to UL 991 (Standard for Safety for Tests for Safety-Related Controls Employing Solid-State Devices) and UL 1998 (Standard for Safety for Software in Programmable Components), since UL 60730 and the UL 60335-1 based circuit requirements presently within UL 751 include the relevant requirements for electronic circuits and software.

In the proposed revisions to Paragraph 24.3.2, the 3 V/m field strength value for radiated electromagnetic fields was chosen years ago because UL 60730-1, 3rd edition required this value and it was also the default value in UL 991. Over the years, enhanced technology used in communication circuits and for common household appliances (such as cellular telephones and wireless devices) have pushed the need for higher levels. Therefore, safety standards such as UL 60730-1 and UL 60335-1 have revised their requirements to consider different values based on a wider range of frequencies that are presently in use. Likewise, a proposal to update Paragraph 76.3.4 is being made for this same reason.

The proposals in this topic are intended to align the requirements in UL 751 with those in UL 60730-1 and UL 60335-1, accordingly.

Revisions to Paragraph 24.3.2 are also being proposed to document the calibration requirements for motor protective electronic circuits.

Revisions to Paragraph 26.20 and Paragraph 54.9 are being proposed to clarify the intent of these requirements.

The proposed revisions reflect present practice.

NOTE: This topic is similar to and directly correlates with Topic No. 1 of the UL 541 bulletin dated June 29, 2018 and Topic No. 1 of the UL 756 bulletin dated June 29, 2018.

PROPOSAL

24.3.1 A protective electronic circuit providing motor protection in accordance with Overload Protection, Section 24.2 shall comply with one of the following:

a) ~~Item (a) deleted. Standard for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991; or~~

b) Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the specific applicable UL 60730 Part 2 Standard.

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- c) Paragraph 26.25 and the Protective Electronic Circuits Tests, Section 76; or,
- d) Not create any risk of fire, electric shock or injury to persons under abnormal conditions with the protective electronic circuit rendered ineffective (open or short-circuited), e.g. use of a redundant circuit or control.

24.3.2 With reference to 24.3.1, the following items shall be considered when evaluating judging the acceptability of a motor protective electronic circuit; ~~when applying the Standard for Tests for Safety-Related Controls Employing Solid-State Devices, UL 991 the following Items (a) — (h) shall be considered. When applying the Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1, or the requirements in 26.22 and Protective Electronic Circuit Tests, Section 76 the following Items (a) — (k) shall be considered.~~

- a) A failure-mode and effect analysis (FMEA);
- b) Electrical supervision of critical components resulting in a trouble indication;
- c) Temperature ranges are as follows:
 - 1) Indoor Use: $32.0 \pm 3.6^{\circ}\text{F}$ ($0.0 \pm 2^{\circ}\text{C}$) and $104 \pm 3.6^{\circ}\text{F}$ ($40.0 \pm 2^{\circ}\text{C}$);
 - 2) Protected Locations and Outdoor Use: $-31.0 \pm 3.6^{\circ}\text{F}$ ($-35.0 \pm 2^{\circ}\text{C}$) and $104 \pm 3.6^{\circ}\text{F}$ ($40.0 \pm 2^{\circ}\text{C}$);
- d) Cycling Test duration shall be 14 days;
- e) Endurance Test duration shall be 100,000 cycles;
- f) Radio-frequency electromagnetic field immunity: radiated electromagnetic fields – Evaluate in accordance with 76.3.4 and 76.3.2 ~~field strength of 3 V/m;~~
- g) Exposure to humidity with the following conditions:
 - 1) Indoor use: $70 - 80^{\circ}\text{F}$ ($21.1 - 26.7^{\circ}\text{C}$) and minimum 50 percent relative humidity;
 - 2) Protected Locations and Outdoor Use: minimum 98 percent relative humidity;
- h) Electrical Fast Transient/Burst Immunity Test:
 - 1) Indoor Use: Test Level 3;
 - 2) Protected Locations and Outdoor Use: Test Level 4;
- i) Radio-frequency electromagnetic field immunity: conducted disturbances – Test Level 3;
- j) Surge Immunity Test:
 - 1) Indoor Use: Class 3;
 - 2) Protected Locations and Outdoor Use: Class 4;
- k) Electrostatic Discharge Test – Severity Level 3 for:

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- 1) Control discharge of up to 6 kV for accessible metal;
- 2) Air discharge of up to 8 kV for accessible metal parts of insulating material.

- i) Voltage Dips and Interruptions – Evaluate in accordance with 76.3.8 and 76.3.2;
- m) Harmonics and Interharmonics - Evaluate in accordance with 76.3.9 and 76.3.2; and
- n) Calibration (deviation and drift): Evaluate in accordance with 26.13 for a temperature protective control or 26.14 for a pressure protective control.

24.3.3 Software in a protective electronic circuit required as part of a motor protective device or system shall comply with one of the following standards:

- a) Item (a) deleted. The Standard for Software in Programmable Components, UL 1998 and be software Class 1;
- b) The Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 as well as the specific applicable Part 2 and be software Class B.
- c) The Standard for Software Evaluation, Annex R of the Standard for Safety of Household and Similar Electrical Appliances, Part 1: General Requirements, UL 60335-1 and be software Class B; or
- d) Not create any risk of fire, electric shock or injury to persons under abnormal conditions with the software rendered ineffective, e.g. use of independent redundant protective devices.

26.8 Except as specified in 26.11, a protective control shall comply with one of the following standards:

- a) Item (a) deleted. The Standard for Temperature Indicating and Regulating Equipment, UL 873. The control shall comply with the endurance cycle requirements for safety controls in Table 46.1 of UL 873.
- b) The Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Automatic Electrical Pressure Sensing Controls Including Mechanical Requirements, UL 60730-2-6. The endurance cycle requirements in Table AA.1DV of UL 60730-2-6 for cut-outs shall be applied.
- c) The Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9. The endurance cycle requirements in Table CC.2 of UL 60730-2-9 for cut-outs shall be applied.
- d) Item (d) deleted. The Standard for Limit Controls, UL 353.
- e) Standard for Industrial Control Equipment, UL 508.
- f) Item (f) deleted; Standard for Special-Use Switches, UL 1054; or
- g) Standard for Switches for Appliances – Part 1 General Requirements, UL 61058-1; or

h) Paragraph 26.25 and the Protective Electronic Circuits Tests, Section 76.

26.20 An operating control complying with 26.15 shall also comply with the following:

- a) For electronic controls – Installation Class 2 for electromagnetic compatibility (EMC) shall be in accordance with the voltage surge testing in 76.3.6 and comply with the results specified in 76.3.2 Electromagnetic Compatibility (EMC) – Part 4-5: Testing and Measurement Techniques – Surge Immunity Test, IEC 61000-4-5;
- b) Category II shall be the overvoltage category;
- c) Insulating materials shall have a minimum comparative tracking index (CTI) of 100 (Material Group III);
- d) The applicable pollution degree shall be as specified in 46.3.3 (a) – (d); and
- e) The endurance cycle requirements specified by:
 - 1) Table CC.2 of the Standard for Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls, UL 60730-2-9, with the operating control (limiters) endurance cycle requirements being applied; or
 - 2) The Overload and Endurance Test – Switching Devices, Section 66, if the operating control is used to control a load other than a single motor or the Overload of Motors Switches or Controllers Test, Section 65, if the operating control is used to control a single motor.

54.9 If a pressure relief device is required, the pressure-limiting control responsible for limiting the pressure in the vessel shall comply with 26.8(b) and 26.14 perform under rated load for 100,000 cycles of operation in accordance with the Standard for Temperature Indicating and Regulating Equipment, UL 873. It shall also prevent the pressure from exceeding 90 percent of the relief device setting under any condition of normal operation.

Exception: A pressure-limiting control is not required to comply with UL 873 if it complies with the Standard for Automatic Electrical Controls for Household and Similar Use, Part 1: General Requirements, UL 60730-1 and the specific applicable UL 60730 Part 2 Standard.

76.3.4 Radiated fields shall be applied in accordance with the Standard for Electromagnetic compatibility (EMC) – Part 4-3: Testing and Measurement Techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test, IEC 61000-4-3, test level 3 being applicable. The frequency ranges tested shall be 80 MHz to 1000 MHz test level 3; and 1.4 GHz to 2.0 GHz test level 3; and 2.0 GHz to 2.7 GHz, test level 2. The dwell time for each frequency shall be sufficient to observe a possible malfunction of the protective electronic circuit.

2. Proposed Revision To And Addition Of Requirements To Prevent Remote Shut-Off Of Vending Machines

RATIONALE

Proposal submitted by: Barry Karnes, UL LLC