

STANDARD INFORMATION

Standard Number: UL 773A

Standard Name: Standard for Nonindustrial Photoelectric Switches for Lighting Control

Standard Edition and Issue Date: 6th edition Dated January 19, 2016

Date of Revision: January 19, 2016

Date of Previous Revision of Standard: November 19, 2013

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **March 21, 2020**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revise requirements and which products will require re-evaluation. **NOTE:** Effective immediately, this revised standard will be exclusively used for evaluation of new products unless the Applicant requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revise requirements.

Overview of Changes: Proposed 6th edition of the Standard for Nonindustrial Photoelectric Switches for Lighting Control, UL 773A. Specific details of new/revise requirements are found in table below.

If the applicable requirements noted in the table are not described in your report(s), these requirements will need to be confirmed as met and added to your report(s) such as markings, instructions, test results, etc. (as required).

Client Action Required:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revise paragraphs noted in the attached or explain why these new/revise requirements do not apply to your product (s).

Current Listings Not Active? – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records. We will do this at no charge as long as Intertek is notified in writing prior to the review of your reports.



STANDARD INFORMATION

CLAUSE	VERDICT	COMMENT
		<i>Additions to existing requirements are <u>underlined</u> and deletions are shown lined-out below.</i>
3	Info	Enclosures
		<i>New section added;</i>
3.4		Snap-on covers
3.4.1		Snap-on covers shall not permit access to live parts as described in 4.7. When snap on covers are required for compliance with other sections of this standard, they shall be evaluated to the Snap-On Cover Test, Clause 39.
3.4.2		The enclosure shall have provision for the connection of a wiring system suitable for the application.
4	Info	Accessibility of Uninsulated Live Parts
4.1		An uninsulated live part that may involve a risk of electric shock shall be located, enclosed, or guarded so that the part cannot be contacted by persons. <u>Construction shall be such that uninsulated live parts that may involve a risk of electric shock shall not be accessible to contact by user under conditions of normal use including use as described in 4.7.</u>
		<i>New clause added;</i>
4.3		Class 2 transformers shall comply with performance and marking requirements in the Standard for Low Voltage Transformers: General Requirements, UL 5085-1/CSA 66.1; and the Standard for Low Voltage Transformers: Class 2 Transformers, UL 5085-3/CSA 66.3. Class 2 power units shall comply with performance and marking requirements in the Standard for Class 2 Power Units, UL 1310 and CSA 223.
		<i>New clause added;</i>
4.4		Power supply circuits having accessible live parts shall comply with 4.3. Power supply circuits having accessible live parts complying with the tests of Clause 33, Power Supply Abnormal Tests, shall be considered to comply with the performance requirements of 4.3.
		<i>New clause added;</i>
4.10		If a marking or an operating instruction refers a user to a hole or opening in an enclosure through which a tool is to be inserted for adjustment or a similar



purpose, it shall not be possible to contact an un-insulated live part through the hole or opening with a 1.6-mm (1/16-inch) diameter rod. Maximum force shall not be greater than 10 N.

5 Info **Openings in Enclosure**

5.1 Openings in an enclosure shall not have any dimensions large enough to permit the entrance of a 25.4 mm (1 in) diameter rod, and shall comply with 5.2 – 5.6. The maximum force applied to the probe shall be 20 N (4.5 lb).

New clause added;

5.7 If a knockout is provided, it shall comply with Table 5.1 and Clause 36, Knockout Test.

New table added;

Knockout diameters and width of flat surface surrounding knockouts

Table 5.1

Trade size of conduit (metric designator)		Minimum width of flat surface surrounding knockout, mm (in)		Knockout diameters, mm (in)					
				Minimum		Nominal		Maximum	
1/2	(16)	3.38	(0.133)	21.84 ^a	(0.860)	22.23	(0.875)	22.61	(0.890)
3/4	(21)	3.68	(0.145)	27.79 ^b	(1.094)	28.17	(1.109)	28.96	(1.140)
1	(27)	4.72	(0.186)	34.52	(1.359)	34.93	(1.375)	35.71	(1.406)
1-1/4	(35)	6.45	(0.254)	43.66	(1.719)	44.04	(1.734)	44.83	(1.765)
1-1/2	(41)	7.80	(0.307)	49.73	(1.958)	50.39	(1.984)	51.20	(2.016)
2	(53)	8.97	(0.353)	61.80	(2.433)	62.71	(2.469)	63.50	(2.500)

^a In Canada, a reduced diameter of 21.46 mm (0.8 in) on a multiple knockout shall be allowed.
^b In Canada, a reduced diameter of 27.05 mm (1.065 in) on a multiple knockout shall be allowed.

6 Info **Provision for Mounting**

New clause added;

6.2 Bolts, screws, or other parts used for assembling the unit shall be independent of those used for securing component parts of the unit to the frame, base, or panel.

New clause added;

6.3 There shall be no more than four holes for mounting.

8 Info **Supply Connections**

8.1 Info **Permanently connected units**

New clause added;

8.1.1 Leads, except for bare bonding/grounding leads, shall have insulation of a type rated for the purpose and have following minimum characteristics:

- a) Minimum free length of a lead shall be 100 mm (4 in).
- b) Field connections shall be copper.



- c) Ampacity of the lead be in accordance with Table 8.1.
- d) Leads for Class 2 shall not be less than 22 AWG.
- e) Insulation except for bare ground lead.
- f) Insulation

Where leads are to be run through a strain relief, hub, nipple, tubing or conduit, insulation shall be suitable for raceway installation.

- g) Lead color

Green coloring, with or without one or more yellow stripes shall be used only for bonding/ grounding conductors. White or gray shall be used only for grounded (identified) conductors). Colors other than indicated above may be used for conductors other than grounding and grounded.

- h) Solder shall not be relied upon to be the only means of securement for leads.

New table added;

Minimum size of leads

Table 8.1

Lead rating (A)	Leads	
	AWG	(mm ²)
0 – 6	18	(0.82)
6.1 – 10	16	(1.3)
10.1 – 15	14	(2.1)
15.1 – 20	12	(3.3)

New clause added;

- 8.1.2 Lead sizes smaller than the ones shown in Table 8.1 are permitted if in compliance with the Temperature Test in Clause 22 and marking requirements in Table 42.1, item 26, but shall not be smaller than 18 AWG.

New section added;

8.4 Receptacles Incorporated in Equipment

This section contains requirements for receptacles (see standard for details).

New section added;

8.5 Direct Plug-in

This section contains requirements for outlets on direct lug-in devices (see standard for details).

New section added;

9.7 Bonding/Grounding lead requirements



		The size of a bonding/grounding lead shall be:
9.7.1		a) In accordance with Table 8.1 but not less than the size of the supply or load conductor; or b) Of a size in compliance with the tests in 30.2.
9.8		<i>New section added;</i> Bonding/Grounding lead securement
9.8.1		A bonding/grounding lead smaller than 18 AWG (0.824 mm ²) shall comply with the test in 30.2.
13	Info	Alternate Spacings – Clearances and Creepage Distances
		As an alternative to the requirements in Spacings, Clause 12, the following shall be applied:
13.1		a) <u>Class 2 Isolated transformer output: no spacing requirements are needed.</u> b) <u>Alternate spacings based on the Standard for UL 840/CSA 22.2 No. 0.2 Insulation coordination. See 13.2.</u> c) <u>Alternate Spacings based Limited power point determination (15W or 50W) see 13.4.</u> d) <u>Abnormal PWB trace faults. See 13.5.</u>
		<i>New clause added;</i>
13.3		The spacing requirements in the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840/CSA 22.2 No. 0.2 shall be amended as follows: Surge protective devices or systems rated above 120V nominal are permitted to have Maximum Continuous Operating Voltage (MCOV) equal to or greater than the line-to-neutral voltage
		<i>New section added;</i>
13.4		Limited power point determination This section contains requirements for limited power point determination (see standard for details).
		<i>New section added;</i>
13.5		Printed-wiring board abnormal operation test This section contains requirements for determining whether spacings at specific points on printed-wiring boards are required to comply with the spacings



requirements (see standard for details)

14 Info **Bonding of Internal Parts for Bonding/Grounding**

14.1 Info **General**

New clause added;

14.1.10 Such current shall not be conducted by the field equipment-grounding means, a metallic raceway, or other power-supply bonding/grounding means.



14.1.11		<p>A current not exceeding 0.5 mA conducted through an equipment-grounding or the equipment-bonding conductor or connection shall be <u>permitted and marked in accordance with item 25 in Table 42.1</u>. The maximum available current along the <u>equipment-grounding or equipment-bonding conductors or connection shall be verified and measured in accordance with 31.5 – 31.10 as described for leakage current, except S2 described in 31.9, need not be switched to the second position for this measurement. Switch S2 shall be maintained in the normal power setting for normal operation for this measurement.</u></p>
<hr/> <i>New section added;</i>		
15	Info	<p>Polymeric Materials</p> <p>This section contains requirements for polymeric materials (see standard for details).</p>
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17	Info	<p>Air-Gap Switches</p>
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17.1		<p>A permanently connected unit mounted remotely from the controlled load, such as an outlet box mounted unit, with a marked or implied off setting shall have an air-gap switch that performs the on/off function. A permanently connected unit mounted on the controlled load with a marked or implied off setting shall have an air-gap switch in series with the load that performs the on/off function. There shall not be an electrical connection or component in parallel with the air-gap switch. When the unit is in the marked or implied off position, the air-gap switch shall simultaneously open all ungrounded conductors. Devices that are marked “OFF” shall completely disconnect all ungrounded conductors in the load circuit when in the “OFF” (open) position. Devices that do not disconnect all ungrounded conductors, including devices that incorporate in-line components, such as neon indicators, that pass current through the load when the switch is in the open position, shall not be marked “OFF”.</p>
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18	Info	<p>Performance</p>
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18.2		<p>The various tests shall be conducted at rated frequency and at the maximum rated voltage. <u>voltage and frequency, unless specifically indicated. When a range is declared such as 50 – 60 Hz, testing shall be completed at the worst case.</u></p>
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<i>New clause added;</i>		
18.6		<p>If analysis of design and the intended operation indicates that a cycling rate based on increasing the light level from zero until the normal switching function is complete and then decreasing the light level is more applicable to the operation of the unit than is the 6 cycle of load interruption and restoration per minute rate, then the unit shall be cycled at the rate determined, but the rate shall not to exceed 6 cycle per minute.</p>
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The testing sequence shall be as follows:

18.7

- a) Overload Test, Clause 20;
- b) Endurance Test, Clause 21;
- c) Temperature Test, Clause 22; and
- d) Dielectric Voltage-Withstand Test, Clause 23.

New section added;

19

Overload and Endurance Testing - General

This section contains requirements for overload and endurance testing (see standard for details).

New section added;

20

Overload test

This section contains requirements for the overload test (see standard for details).

New section added;

21

Endurance Test

This section contains requirements for the endurance test (see standard for details).

New section added;

22

Temperature Test

This section contains requirements for the temperature test (see standard for details).

New section added;

25

Abnormal Switching Test

This section contains requirements for controls incorporating electronic circuitry to trigger the switching device during a more advantageous electrical condition that have not been tested for functional safety (see standard for details).

New section added;

26

Limited Short-Circuit Test for Solid-State Switching Control

This section contains requirements for solid-state switching controls (see standard for details).



30	Info	Bonding/Grounding Connection Tests
30.1	Info	Creep and mold stress relief
		<i>New clause added;</i>
30.1.1		Creep and mold stress-relief tests shall be conducted in accordance with the Standard for Polymeric Materials - Short Term Property Evaluations, UL 746A, and the Standard for Polymeric Materials - Use in Electrical Equipment Evaluations, UL 746C, followed by an overcurrent test as specified in 30.2.1.
30.2	Info	Overcurrent tests
		<i>New clause added;</i>
30.2.2		Three samples in the as-received condition shall be tested in series with a 20-ampere nonrenewable, non-time delay, cartridge fuse rated for branch circuit overcurrent protection on an a-c circuit at rated voltage capable of delivering 1000 amperes peak when the system is short-circuited at the testing terminals. A load with a 0.98 – 1.00 power factor shall be used to limit the current. One test shall be performed on the bonding/grounding lead, bonding conductor, or both the bonding/grounding lead and the bonding conductor of each dimmer sample.
30.3		<i>New section added;</i>
		Impedance Test
30.3.1		The test shall be conducted with the bond at normal operating temperature.
30.3.2		The impedance test shall be conducted by passing a 60 Hz current from a part to be bonded to the bonding/grounding terminal means and measuring the potential drop between them at the end of the period. The current shall be as specified in 30.2.1.
		The current used for the measurement specified in 30.3.3 shall have the following characteristics:
30.3.3		<ul style="list-style-type: none"> a) For cord-connected equipment, twice the rating of the attachment plug cap, but not less than 40 A; b) For equipment for permanent connection to the supply, twice the rating of the fuse that is required by the National Electrical Code, NFPA 70, Part I of the CE Code or NOM-001-SEDE for the branch circuit to which the equipment is connected, up to 250 A; and c) 500 A for equipment for permanent connection to the supply when a branch circuit fused at over 250 A is required.
		The following additional requirements shall apply:
30.3.4		<ul style="list-style-type: none"> a) For test currents up to 500 A, the measured potential drop shall not exceed 4 V; b) For equipment that requires branch circuit fusing over 250 A, the measured



potential drop multiplied by the required fusing and divided by 250 shall not exceed 4 V; and

c) There shall be no melting of any metal in the bond and no heating or burning that is likely to create a risk of fire.

31 Info **Leakage Current Test**

New clause added;

31.1 Equipment rated “Raintight”, “outdoor”, or “wet locations” shall be humidity conditioned as specified in Clause 32 before the leakage current test.

New clause added;

31.2 The leakage current of a fixed wired device provided with a bonding/grounding conductor but not a grounded (neutral) conductor, regardless of the rated voltage or current path, when tested in accordance with 31.5 – 31.10 shall not be more than 0.5 mA.

New section added;

33 **Power Supply Abnormal Tests**

This section contains requirements for abnormal tests (see standard for details).

35 Info **Strain Relief and Lead Securement Tests**

New section added;

35.2 **Lead securement - for self enclosed devices with nipples**

35.2.1 A pigtail lead intended for field connection extending through a nipple or hub shall withstand without damage and without displacement sufficient to damage the termination a direct pull of 89 N (20 lb) for 1 minute.

New section added;

36 **Knockout Test**

36.1 The knockout test shall be performed in accordance with the test, Strength of Knockouts, in CSA 18.1/ the Standard for Metallic Outlet Boxes, UL 514A/ NMX-J-023/1 except that the total number of knockouts tested shall be six (six boxes shall be required if only one knockout is provided per box).

New section added;

37 **Mechanical integrity**

This section contains requirements for the impact test and crush test (see standard for details).



		<i>New section added;</i>
38		Conduit Connection to Enclosure Tests This section contains requirements for enclosure tests (see standard for details).
		<i>New section added;</i>
39		Snap-On Cover Test
39.1		Snap-on cover that provides environmental protection and does not require a tool for removal shall be subjected to the tests in 39.2 and 39.3.
39.2		Cover that can be removed with one hand shall not be released when a squeezing force of 6.4 N is applied to any two points, the distance between which shall not exceed 127 mm, as measured by a tape stretched tightly over that portion of the surface of the cover that can be covered by the palm of the hand. The test shall be performed before and after ten removal and replacement operations.
39.3		A cover shall not become disengaged from the enclosure when a direct pull of 6.4 N is applied. For this test, the cover shall be gripped at any two convenient points. The test shall be performed before and after ten removal and replacement operations.
		<i>New section added;</i>
40		Tests on 120V Devices with Varistors This section contains requirements for 129 V devices with varistors (see standard for details)
	Info	RATINGS, MARKINGS AND INSTRUCTIONS
		<i>New section added;</i>
42		Details This section contains requirements for markings (see standard for details).
43	Info	Instructions
		<i>New clause added;</i>
43.2		Hubs provided separately shall have instructions stating that the hub shall be connected to the conduit before the hub is connected to the enclosure
		<i>New section added;</i>
44		Marking requirements for minimum outlet box volume
44.1		A device requiring installation in an outlet box with a volume larger than required



by the National Electrical Code (NEC), NFPA 70, the Canadian Electrical Code (CE Code), Part I, or the Standard for Electrical Installations, NOM-001-SEDE, shall provide the required volume of the outlet box on the device, or in the instruction sheet, or both.

44.2

The volume of the smallest suitable box shall be indicated to the lower full integer or rounded up one decimal point. The marked volume shall be rounded to the nearest cm³ or the nearest 1/4 cubic inch. Volumes of 1/4 cubic inch shall be marked as 0.3 cubic inch, and volumes of 3/4 cubic inch shall be marked as 0.8 cubic inch. In Canada and Mexico, the volume markings shall be in cm³ or ml. In the United States, the volume markings shall be in cm³ or cubic inches. Such marking shall also appear on the instruction sheet.

CUSTOMERS PLEASE NOTE: This Table and column “Verdict” can be used in determining how your current or future production is or will be in compliance with new/revised requirements.
