

STANDARD INFORMATION

Standard Number: UL 20 / CSA C22.2 No. 111 / NMX-J-005-ANCE
Standard Name: General-Use Snap Switches
Standard Edition and Issue Date: 14th / 5th / 1st Edition Dated July 20, 2018
Date of Revision: July 20, 2018
Date of Previous Revision of Standard: February 17, 2012

EFFECTIVE DATE OF NEW/REVISED REQUIREMENTS

Effective Date: **July 20, 2020**

IMPACT, OVERVIEW, AND ACTION REQUIRED

Impact Statement: A review of all Listing Reports is necessary to determine which products comply with new/revised 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requests in writing that current requirements be used along with their understanding that their listings will be withdrawn on Effective Date noted above, unless the product is found to comply with new/revised requirements.

Overview of Changes:

- Flush Switches Employing a Combination Wire Binding/Pressure -Type Terminal Construction
- AC Only Flush Switch with Integral Power Supply with Class 2 Output Connectors
Accommodate Electronic Ballasts up to 347V

Specific details of new/revised 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:

Information – To assist our Engineer with review of your Listing Reports, please submit technical information in response to the new/revised paragraphs noted in the attached or explain why these new/revised 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 – Please immediately identify any current Listing Reports or products that are no longer active and should be removed from our records.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>
4	Info	Construction
4.4	Info	Bases and Bodies
4.4.1	Info	General
		<i>New clause added;</i>
		The body of a switch employing a combination wire binding/pressure-type terminal shall employ integrally formed channels/guides within the body to:
4.4.1.4		a) Properly position the individual conductor; and b) Provide a means to reduce the likelihood of the conductor(s) being displaced from under the terminal ring when conductor(s) are installed.
		Compliance is determined by the Compliance Wire Binding/Pressure-Type Terminal Assembly Test described in Clause 5.30.
4.5	Info	Current-Carrying Parts
4.5.3	Info	Terminals and Leads
		<i>New clause added;</i>
4.5.3.8		Switches employing a combination wire binding/pressure-type terminal shall be limited to 10, 12 or 14 AWG conductors. The terminals shall comply with the applicable performance requirements as specified in UL 486E. See also Clause 1.10 for terminals intended for use with aluminum conductors.
5	Info	Testing
		<i>New section added;</i>
5.30		Combination Wire Binding/Pressure-Type Terminal Assembly Test
		A flush switch employing combination wire binding/pressure-type terminals shall not exhibit:
5.30.1		a) Damage to the switch, including but not limited to breakage of the housing or stripping of the terminal; and b) Visible displacement of the conductors following the pull test described in Clause 5.30.5.
5.30.2		A flush switch employing a combination wire binding/pressure-type terminal shall be wired as outlined in Table 15.



CLAUSE	VERDICT	COMMENT
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Terminal testing configurations

Table 15

Terminal type	No. of devices	Terminals to be wired on each device
Combination wire-binding screw and pressure-wire terminal	1	Two pressure-wire terminals wired using Configuration No. 1 ^a
	1	Two pressure-wire terminals wired using Configuration No. 2 ^a
	1	Two pressure-wire terminals wired using Configuration No. 3 ^a
^a The wiring configurations are shown in Figure 7.		

5.30.3

Each terminal shall be wired with each conductor size and type as specified by the manufacturer. The conductors shall be wired by applying the tightening torque as specified in Table 16 to the terminal screw. The wire shall be stripped to the length specified in the manufacturer’s installation instructions. Terminals shall be wired by placing the stripped conductor into the terminal. The conductor shall be positioned to follow any wire guides or other openings provided to align the conductor with the back of the switch housing. The terminal screw shall be tightened with a clutch-type torque screwdriver which has been calibrated and preset to release at the specified value. The switch shall comply with Clause 5.30.1 upon completion of this procedure.

Terminal screw tightening torque

Table 16

Screw size	Tightening torque – pound-inches (N-m)
No. 6 or less	12 (1.4)
No. 8 or greater	14 (1.6)

5.30.4

Each termination shall then be disassembled and the assembly and torquing repeated once using newly stripped wire. The switch shall comply with Clause 5.30.1 upon completion of this procedure.

5.30.5

Following the last torquing, each terminal shall be subjected to a straight 20-lbf (89-N) pull applied to each wire for 1 minute perpendicular to the plane of the back cover of the switch. The switch shall comply with Clause 5.30.1 upon completion of this procedure.

5.31

Inrush Current

A switch intended for general use with electronic ballasts, self-ballasted compact fluorescent lamps, and LED drivers shall be tested to withstand the ballast inrush current. The test shall be done with the synthetic load described in Clauses 5.31.2 – 5.31.4. The test shall consist of 10,000 cycles of operation, at a rate of operation of 6 – 10 cycles per minute.

5.31.1

Exception No. 1: For an ac-only door switch or ac-only through-cord switch, the number of cycles shall be 6000.

Exception No. 2: General-use AC only flush switches and self-contained snap switches rated up to 30 A at 347 VAC or less, that comply with the test requirements of Clause 5.7.8 for 120 V tungsten inrush at their rated current are considered to comply with this requirement.



CLAUSE	VERDICT	COMMENT
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5.31.2

The test circuit, as shown in Figure 8, shall have inrush characteristics meeting or exceeding the requirements of Table 17 in parallel with an AC resistive load based on the steady-state current rating of the switch being tested. Test methods using the circuit shown in Figure 8 apply to loads such as ballasts or electronic devices with a maximum allowable input capacitance as specified in Table 18 and not in excess of peak inrush current values in Table 17.

Peak inrush current values

Table 17

Steady-state current, A	Peak current (120 VAC), A	Pulse width ^a , ms	I ² t (120 VAC), A ² /sec ^b	Peak current (277 VAC), A	Pulse width (277 VAC), ms ^a	I ² t (277 VAC), A ² sec ^b	Peak current (347 VAC), A	Pulse width (347 VAC), ms ^c	I ² t (347 VAC), A ² sec ^d
0.5	75	0.34	11	77	0.50	11	198	0.34	92
1	107	0.48	24	131	0.71	27	270	0.47	173
2	144	0.70	41	205	0.85	76	354	0.70	294
3	166	0.89	51	258	0.98	111	396	0.86	369
5	192	1.20	74	320	1.20	205	450	1.15	476
8	221	1.25	98	370	1.25	274	492	1.5	569
10	230	1.50	106	430	1.50	370	508	1.67	606
12	235	1.80	110	440	1.80	387	529	1.86	658
15	239	2.00	114	458	2.00	420	550	2.05	711
16	242	2.10	117	480	2.10	461	552	2.10	716

^a Pulse widths shown above are documented in Figures 3 through 14 of NEMA 410 and are adequate to use with electronic devices having pulse widths up to 2 ms, in accordance with ANSI C82.11 or ANSI C82.14.

^b The values used to calculate I²t are the peak current shown above and a pulse duration of 2 ms (t).

^c Pulse widths shown above are documented in NEMA 410 and are adequate to use with electronic devices having pulse widths up to 2.35 ms, in accordance with ANSI C82.11 or ANSI C82.14.

^d The values used to calculate I²t are the peak current shown above and a pulse duration of 2.35 ms (t).

Maximum allowable input capacitance

Table 18

System (VAC)	120	277	347
Bulk energy capacitance, µF per A of steady-state current	175	125	125

5.31.3

The series coil values shall be adjusted according to the characteristics of input line at the test laboratory so as to achieve the peak currents listed in Table 17. The series coil shall be sized such that it does not saturate during testing and shall be able to handle the resulting power dissipation with less than a 10°C temperature rise. Peak inrush current amplitude and duration for each value of steady state current as specified in Table 17.

5.31.4

The circuit shall have means of discharging the capacitor bank between test cycles without influencing the performance of the device under test. These means shall be a capacitor discharge switch and a bleeder resistor as shown in Figure 8 (S2 and R2). The capacitor discharge switch should be switched alternately with the device under test, and the bleeder resistor should be sized to allow for complete discharge of the capacitor load bank during the period that the device under test is open.

5.31.5

Devices rated 20 A (or equivalent) for use on 20 A branch circuits shall be tested with a 16 A load, representing 80 percent of the branch circuit rating.



CLAUSE	VERDICT	COMMENT
7	Info	Markings
7.1	Info	General

New clause added;

7.1.12 A flush switch rated 20 A or less and employing a combination wire binding/pressure-type terminal shall be provided with installation instructions for assembly of conductors to the terminals. These Instructions shall include a pictorial representation of the placement of the stripped conductor within the channels/guides of the body. The instructions shall be attached to the switch in such fashion that they cannot be accidentally removed or torn free from the flush switch during shipment, distribution, or normal handling. A blister package or an equivalent means of securing the installation instructions to the switch may be used. Friction alone shall not be used for attaching the installation instructions to the flush switch. The installation instructions may appear on a stuffer sheet packaged with each individual switch or printed on its individual unit shipping carton.

New section added;

7.7

For Use with Electronic Ballasts

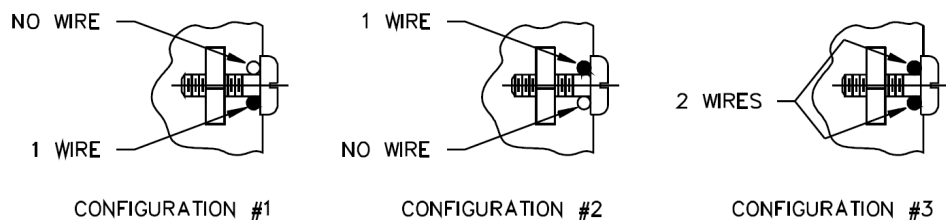
7.7.1 A general-use switch that is intended for the control of electronic ballasts, self-ballasted compact fluorescent lamps, and LED drivers, tested in accordance with Clause 5.31.1, shall be permanently and legibly marked with the statement "For Control of Electronic Ballast, CFLs, and LED drivers" or the equivalent. The marking shall also be provided on the packaging and instruction sheet. The mark "ELB" is acceptable.

Exception: General-use AC only flush switches and self-contained snap switches rated up to 30 A at 347 VAC or less, that are required to comply with Clause 5.31.1 need not be marked on the product.

New figure added

Wiring configurations for combination wire binding/pressure-type terminals

Figure 7



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.