CANADIAN STANDARDS ASSOCIATION

C22.2 No. 111-10
(reaffirmed 2015)

General-use snap switches

Legal Notice for Standards

Canadian Standards Association (CSA) standards are developed through a consensus standards development process approved by the Standards Council of Canada. This process brings together volunteers representing varied viewpoints and interests to achieve consensus and develop a standard. Although CSA administers the process and establishes rules to promote fairness in achieving consensus, it does not independently test, evaluate, or verify the content of standards.

Disclaimer and exclusion of liability

This document is provided without any representations, warranties, or conditions of any kind, express or implied, including, without limitation, implied warranties or conditions concerning this document's fitness for a particular purpose or use, its merchantability, or its non-infringement of any third party's intellectual property rights. CSA does not warrant the accuracy, completeness, or currency of any of the information published in this document. CSA makes no representations or warranties regarding this document's compliance with any applicable statute, rule, or regulation.

IN NO EVENT SHALL CSA, ITS VOLUNTEERS, MEMBERS, SUBSIDIARIES, OR AFFILIATED COMPANIES, OR THEIR EMPLOYEES, DIRECTORS, OR OFFICERS, BE LIABLE FOR ANY DIRECT, INDIRECT, OR INCIDENTAL DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES, HOWSOEVER CAUSED, INCLUDING BUT NOT LIMITED TO SPECIAL OR CONSEQUENTIAL DAMAGES, LOST REVENUE, BUSINESS INTERRUPTION, LOST OR DAMAGED DATA, OR ANY OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), OR ANY OTHER THEORY OF LIABILITY, ARISING OUT OF OR RESULTING FROM ACCESS TO OR POSSESSION OR USE OF THIS DOCUMENT, EVEN IF CSA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, INJURY, LOSS, COSTS, OR EXPENSES.

In publishing and making this document available, CSA is not undertaking to render professional or other services for or on behalf of any person or entity or to perform any duty owed by any person or entity to another person or entity. The information in this document is directed to those who have the appropriate degree of experience to use and apply its contents, and CSA accepts no responsibility whatsoever arising in any way from any and all use of or reliance on the information contained in this document.

CSA is a private not-for-profit company that publishes voluntary standards and related documents. CSA has no power, nor does it undertake, to enforce compliance with the contents of the standards or other documents it publishes.

Intellectual property rights and ownership

As between CSA and the users of this document (whether it be in printed or electronic form), CSA is the owner, or the authorized licensee, of all works contained herein that are protected by copyright, all trade-marks (except as otherwise noted to the contrary), and all inventions and trade secrets that may be contained in this document, whether or not such inventions and trade secrets are protected by patents and applications for patents. Without limitation, the unauthorized use, modification, copying, or disclosure of this document may violate laws that protect CSA's and/or others' intellectual property and may give rise to a right in CSA and/or others to seek legal redress for such use, modification, copying, or disclosure. To the extent permitted by licence or by law, CSA reserves all intellectual property rights in this document.

Patent rights

Attention is drawn to the possibility that some of the elements of this standard may be the subject of patent rights. CSA shall not be held responsible for identifying any or all such patent rights. Users of this standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.

Authorized use of this document

This document is being provided by CSA for informational and non-commercial use only. The user of this document is authorized to do only the following:

If this document is in electronic form:
- load this document onto a computer for the sole purpose of reviewing it;
- search and browse this document; and
- print this document if it is in PDF format.

Limited copies of this document in print or paper form may be distributed only to persons who are authorized by CSA to have such copies, and only if this Legal Notice appears on each such copy.

In addition, users may not and may not permit others to
- alter this document in any way or remove this Legal Notice from the attached standard;
- sell this document without authorization from CSA; or
- make an electronic copy of this document.

If you do not agree with any of the terms and conditions contained in this Legal Notice, you may not load or use this document or make any copies of the contents hereof, and if you do make such copies, you are required to destroy them immediately. Use of this document constitutes your acceptance of the terms and conditions of this Legal Notice.

CANADIAN STANDARDS ASSOCIATION

Update No. 1
C22.2 No. 111-10
February 2012

Note: *General Instructions for CSA Standards are now called Updates. Please contact CSA Information Products Sales or visit* ***shop.csa.ca*** *for information about the* ***CSA Standards Update Service****.*

Title: *General-use snap switches* — originally published May 2010

The following revisions have been formally approved and are marked by a vertical line in the margin on the attached replacement pages:

Revised	Copyright page, Preface, Clauses 5.1.1, 5.2.1, 5.5.3, 5.21.3, 5.25.1, 5.26.1, 7.1.1, 7.3.2, and 8.2.4.2 and Annex A
New	Clauses 2.8.1, 2.8.2, 2.18, 4.4.2.7, 4.4.2.8, 4.5A, 5.1.4, 5.20.2, 5.21.1.1, 5.25.1.1, 5.28, 5.29, 7.1.5.1, 7.1.6.1, and Figure 6
Deleted	None

- Update your copy by inserting these revised pages.
- Keep the pages you remove for reference.

Canadian Standards Association
CSA-C22.2 No. 111–10
Fourth Edition

Underwriters Laboratories Inc.
UL 20
Thirteenth Edition

General-Use Snap Switches

May 10, 2010

(Title Page Reprinted: February 17, 2012)

ANSI/UL 20–2012

Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (CSA) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA or UL at any time. Revisions to this standard will be made only after processing according to the standards development procedures of CSA and UL. CSA and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

ISBN 978-1-55491-403-6 © 2010 Canadian Standards Association

CSA Standards are subject to periodic review, and suggestions for their improvement will be referred to the appropriate committee. To submit a proposal for change to CSA Standards, please send the following information to inquires@csa.ca and include ″Proposal for change″ in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

To purchase CSA Standards and related publications, visit CSA's Online Store at shop.csa.ca or call toll-free 1-800-463-6727 or 416-747-4044.

This ANSI/UL Standard for Safety consists of the Thirteenth Edition including revisions through February 17, 2012. The most recent designation of ANSI/UL 20 as an American National Standard (ANSI) occurred on February 15, 2012. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

The Department of Defense (DoD) has adopted UL 20 on December 4, 1981. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at http://csds.ul.com.

To purchase UL Standards, visit Comm 2000 at http://www.comm-2000.com/help/how_to_order.aspx or call toll-free 1-888-853-3503.

CONTENTS

Preface 5

1 Scope 7
2 Definitions 8
3 General 8A
3.1 Components 8A
3.2 Units of Measurement 8A
3.3 Reference Publications 10
4 Construction 12
4.1 Enclosure 12
4.2 Lining 13
4.3 Bushings and Strain Relief 14
4.4 Bases and Bodies 14
4.5 Current-Carrying Parts 16
4.5A Separable Jumper Connector for Separable Terminals 20A
4.6 Separable Terminal Assembly 21
4.7 Insulating Material 21
4.8 Actuating Members 22
4.9 Creepage Distances, Clearances, and Distances Through Sealing Compounds 22
4.10 Assembly 24
4.11 Provision for Grounding 25
5 Testing 26
5.1 General 26
5.2 Test Sequence 26A
5.3 Tungsten-Filament-Lamp Load Characteristics 33
5.4 Assembly Test 35
5.5 Test Conditions 36
5.6 Overload Test 36
5.7 Endurance Test 39
5.8 Temperature Test 40
5.9 Dielectric Voltage-Withstand Test 42
5.10 Security of Switch Leads Test 43
5.11 Push-In Terminal Test 43
5.12 Effect of Heat on Actuating Members Test 44
5.13 Switching Mechanism Test 44
5.14 Strain-Relief Test 46
5.15 Fault Current Test 46
5.16 Crushing Test 47
5.17 Resistance to Heat Test 47
5.18 Door Switch Assembly Test 47
5.19 Retention of Tab Connection Test 47
5.20 Separable Connector Pull Test 48
5.21 Mold Stress Relief Test 48
5.22 Separable Terminal Assembly Humidity Conditioning Followed By Dielectric Test 49
5.23 Short Circuit Withstand Test 49
5.24 Latching Mechanism Test 50
5.25 Abnormal Overload Test 51
5.26 Temperature Test 52
5.27 Continuity Impedance Test 52
5.28 Bonding (Fault Current) Test 52

5.29 Mounting Yoke Resistance Test 52A
6 Ratings 52A
7 Markings 52B
7.1 General 52B
7.2 Supplementary Markings 54
7.3 Location 56
7.4 Tungsten 56A
7.5 AC-Only Identification 57
7.6 Switch Termination Restrictions 57
8 Self-Contained Switches for Use Without a Separate Outlet Box ....
8.1 General 59
8.2 Construction 59
8.3 Performance Testing 62
8.4 Markings and Instructions 69

ANNEX A (Normative)

Standards for Components

A1 Component Standards 74

Annex B (Informative)

Canadian Requirements for CO/ALR Switches

B1 General 75
B2 Heat Cycling with Wire Disturbance 77
B3 Heat Cycling with Vibration 78
B4 Environmental 79
B5 Stripping Torque 80

Preface

This is the harmonized CSA and UL Standard for General-Use Snap Switches. It is the fourth edition of CSA C22.2 No.111 and the thirteenth edition of UL 20. This edition of CSA C22.2 No. 111 supersedes the previous edition published in 2000.

This harmonized Standard was prepared by the Canadian Standards Association (CSA) and Underwriters Laboratories Inc. (UL). The efforts and support of NEMA (National Electrical Manufacturers Association), EFC (Electro-Federation of Canada), and the CANENA Technical Harmonization Committee are gratefully acknowledged.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This standard was reviewed by the CSA Integrated Committee on Wiring Devices for Household and General Use, under the jurisdiction of the CSA Technical Committee on Wiring Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee.

This standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

Where reference is made to a specific number of samples to be tested, the specified number shall be considered a minimum quantity.

Note: *Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.*

Level of Harmonization

This standard is published as an equivalent standard. An equivalent standard is a standard that is substantially the same in technical content, except as follows. Technical national differences are allowed for codes and governmental regulations and those recognized as being in accordance with NAFTA Article 905, for example because of fundamental climatic, geographical, technological, or infrastructural factors, scientific justification, or the level of protection that the country considers appropriate. Presentation is word for word except for editorial changes.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

CSA Effective Date

The effective date for CSA International will be announced through *CSA Informs* or a CSA certification notice.

UL Effective Date

As of February 17, 2012, all products Listed, Recognized, or Classified by UL must comply with the requirements in this Standard and is not part of the ANSI approved standard.

A UL effective date is one established by Underwriters Laboratories Inc.

1 Scope

1.1 The requirements of this Standard apply to manually operated, general-use snap switches for connection to copper (Cu) or copper-clad conductors used in accordance with the National Electrical Code(NEC), ANSI/NFPA 70, or the Canadian Electrical Code (CEC), Part I, and intended for connection to wiring systems recognized by the NEC or the CEC, Part I. In Canada, requirements for switches for connection to aluminum (Al) conductors used in accordance with the CEC, Part I, and intended for connection to wiring systems recognized by the CEC, Part I, are covered in Annex B.

1.2 This Standard applies to ac/dc rated switches for which the load ratings do not exceed 60 A at 25[illegible] V or less, 30 A at 251 V – 600 V, and 2 hp at 125 V – 600 V or less. This Standard also covers ac-only rated switches for which the load ratings do not exceed 30 A at 347 Vac or less.

1.3 This Standard applies to switches constructed to be installed readily in a flush device box or on an outlet-box cover and intended for connection to branch-circuit wiring.

1.4 This Standard applies to pendant and through-cord switches intended for field installation on flexible cord and provided with one “on” and one “off” position.

1.5 This Standard applies to switches intended for surface mounting and provided with a separable base and cover for connection to exposed wiring consisting of nonmetallic sheathed cable or open wiring on insulators (knob and tube).

1.6 This Standard applies to self-contained switches intended for flush mounting without a separate outlet box and for connection to branch-circuit wiring consisting of one or more non-metallic sheathed cables containing copper conductors.

1.7 This Standard applies to ac/dc fixture switches intended to be installed in fixtures to control incandescent lighting or fans for connection to branch-circuit wiring.

1.8 This Standard also applies to single-pole, momentary-contact door switches constructed to be installed readily in a special-purpose device box or on an outlet-box cover for connection to branch-circuit wiring.

1.9 This Standard does not apply to:

a) Clock operated switches specified in the Standard for Clock-Operated Switches, UL 917, and CSA Standard C22.2 No. 177;

b) Dimmer switches specified in the Standard for Solid-State Dimming Controls, UL 1472, and CSA Standard C22.2 No. 184.1;

c) Industrial control equipment specified in the Standard for Industrial Control Equipment, UL 508, and CSA Standard C22.2 No. 14;

d) Solid-state, single-phase motor speed controls specified in the Standard for Solid-State Fan Speed Controls, UL 1917, and CSA Standard C22.2 No. 156;

e) Special-use and ac-only fixture switches specified in the Standard for Special-Use Switches, UL 1054, and CSA Standard C22.2 No. 55; and

f) Switches for use in hazardous locations specified in the Standard for Switches for Use in Hazardous (Classified) Locations, UL 894, and CSA Standard C22.2 No. 159.