



UL 228

Underwriters Laboratories Inc. Standard for Safety

Door Closers-Holders, With or Without Integral Smoke Detectors



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UL Standard for Safety for Door Closers-Holders, With or Without Integral Smoke Detectors, UL 228

Fifth Edition, Dated January 26, 2006

Revisions: This Standard contains revisions through and including November 20, 2008.

Summary of Topics

These revisions to UL 228 are being issued to address universal upkeep of UL Standards for Safety. These revisions are considered to be non-substantive and not subject to UL's STP process.

Text that has been changed in any manner is marked with a vertical line in the margin. Changes in requirements are marked with a vertical line in the margin and are followed by an effective date note indicating the date of publication or the date on which the changed requirement becomes effective.

The revisions dated November 20, 2008 include a reprinted title page (page1) for this Standard.

As indicated on the title page (page1), this UL Standard for Safety has been adopted by the Department of Defense.

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: <http://ulstandardsinfo.net/ulforeword.html>

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New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing, Recognition, and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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This Standard consists of pages dated as shown in the following checklist:

Page	Date
1	November 20, 2008
2-10	January 26, 2006
11	November 20, 2008
12-42	January 26, 2006
A1-A2	November 20, 2008

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JANUARY 26, 2006

(Title Page Reprinted: November 20, 2008)

1

UL 228

**Standard for Door Closers-Holders, With or Without Integral Smoke
Detectors**

The first edition was titled "Electromagnetic and Electromechanical Door Holder-Releasers and Combination Door Closer-Holders (With or Without Integral Smoke Detectors)".

First Edition – September, 1974

Second Edition – October, 1979

Third Edition – April, 1993

Fourth Edition – April, 1997

Fifth Edition

January 26, 2006

The Department of Defense (DoD) has adopted UL 228 on October 3, 1994. 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>.

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CONTENTS

INTRODUCTION

1 Scope	5
2 General	5
2.1 Components	5
2.2 Units of measurement	6
2.3 Undated references	6

CONSTRUCTION

3 General	6
4 Frame and Enclosure	6
5 Mounting of Parts	8
6 Corrosion Protection	9
7 Insulating Material	9
8 Current-Carrying Parts	9
9 Wiring Methods	10
10 Internal Wiring	10
10.1 General	10
10.2 Semiconductors	11
11 Installation Wiring Methods	11
11.1 General	11
11.2 Strain relief	12
11.3 Bushings	12
12 Spacings	12

PERFORMANCE

13 General	14
14 Normal Operation	14
15 Endurance Test	14
16 Jarring Test	16
17 Input Test	17
18 Temperature Test	17
19 Holding Power Test	21
20 Dielectric Voltage-Withstand Test	21
21 Abnormal Operation Test	22
22 Fire Tests of Swinging Door Closer-Holders With Integral Smoke Detectors	22
22.1 Corridor test	22
22.2 Paper fire – test A	22
22.3 Wood fire – test B	23
22.4 Gasoline fire – test C	24
22.5 Polystyrene fire – test D	24
22.6 Igniter assembly	25
22.7 Limited open-area test (optional)	30
22.8 Paper fire – test A	30
22.9 Wood fire – test B	30
22.10 Gasoline fire – test C	31
22.11 Polystyrene fire – test D	31
23 Smoldering Smoke Test	33

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24 Insulating Materials Test	41
------------------------------------	----

MARKING

25 General	41
------------------	----

APPENDIX A

Standards for Components.....	A1
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INTRODUCTION

1 Scope

1.1 These requirements apply to swinging door closers equipped with integral electromechanical or electromagnetic holders and which may be provided with integral smoke detectors. These requirements also apply to electromagnetic door holder units which are for use with a separate door closer and separate automatic fire detector.

1.2 When integral smoke detectors are provided with the combination door closer-holder, the smoke detectors shall comply with requirements for smoke detectors of the photoelectric or combustion products type.

1.3 Requirements for the installation of these combination door closers-holders with or without smoke detector units are included in the Standards for Fire Doors and Fire Windows, NFPA 80, and National Fire Alarm Code, NFPA 72.

1.4 The combination door closers-holders (with or without integral smoke detectors) described in this Standard provide one of the following types of hold open functions:

- a) Single point hold open.
- b) Multiple point hold open. (Two, three, four, etc. discrete hold open points as set at the manufacturer's plant.)
- c) Infinite hold open points with one as set by the user.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.1.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.1.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

2.2 Units of measurement

2.2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

CONSTRUCTION

3 General

3.1 The combination door closer-holder shall be designed so that the held door is capable of being released manually by simple and obvious operation, such as pulling on the door knob with a maximum force of 50 pounds (223 N), and upon release the door becomes self-closing and then latches closed.

3.2 The separate holder release device shall be designed so that the held door is capable of being released manually by simple and obvious operation, such as pulling on the door knob or leading edge with a maximum force of 50 pounds (223 N).

3.3 Combination door closer-holders (with or without integral smoke detectors) designed for National Electrical Code Class 1 circuits shall be for door frame mounting only.

3.4 Combination door closer-holders (with or without integral smoke detectors), intended for mounting within or on a door, shall be limited in design to a National Electrical Code Class 2 circuit.

3.5 For the purposes of this standard, a Class 2 circuit is defined as one that has a maximum of 30 volts alternating-current RMS (42.4 volts peak or direct current) and 100 volt-amperes.

4 Frame and Enclosure

4.1 A unit shall resist the abuses to which it is subjected without adversely affecting its performance due to total or partial collapse with resulting reduction of spacings, loosening or displacement of parts, or other serious defects.

4.2 Electrical parts of a unit shall be located or enclosed so that protection against unintentional contact with uninsulated hazardous live or dead metal parts is provided.

4.3 Operating parts shall be protected against fouling by dust or by other material which affects their normal operation.

4.4 An enclosure shall have means for mounting which shall be accessible without disassembling any operating part of the unit.

4.5 With reference to the requirement in 4.4, removal of a completely assembled panel is not considered to be disassembly of any operating part.

4.6 Connectors and switches, which have a means for adjustment, shall also have a method by which that adjustment is positively locked in position.

4.7 Metallic combinations shall be such as to resist galvanic corrosion.

4.8 The thickness of cast metal for an enclosure shall be as indicated in Table 4.1, except that cast metal of lesser thickness is not prohibited from being used when, consideration being given to the shape, size, and function of the enclosure, it provides equivalent mechanical strength.

Table 4.1
Cast-metal electrical enclosures

Use, or dimensions of area involved ^a	Minimum thickness			
	Die-cast metal,		Cast metal of other than the	
	inch	(mm)	die-cast type,	(mm)
Area of 24 square inches (155 cm ²) or less and having no dimension greater than 6 inches (152 mm).	1/16	1.6	1/8	3.2
Area greater than 24 square inches or having any dimension greater than 6 inches.	3/32	2.4	1/8	3.2
At a threaded conduit hole.	1/4	6.4	1/4	6.4
At an unthreaded conduit hole.	1/8	3.2	1/8	3.2
^a The area limitation for metal 1/16 inch (1.6 mm) thick may be obtained by the provision of reinforcing ribs subdividing a larger area.				

4.9 Among the factors which are taken into consideration when evaluating a nonmetallic enclosure are the following, all of which are considered with regard to aging:

- a) The mechanical strength;
- b) Resistance to impact;
- c) Moisture-absorptive properties;
- d) Combustibility; and
- e) Resistance to distortion at temperatures to which the material is capable of being subjected under conditions of normal or abnormal use.

4.10 The thickness of sheet metal employed for the enclosure of a unit shall not be less than that indicated in Table 4.2; except that sheet metal of lesser thickness is not prohibited from being used when, consideration being given to the shape, size, and function of the enclosure, it provides equivalent mechanical strength. At any point where conduit or metal-clad cable is to be attached, sheet metal shall be of such thickness or shall be formed or reinforced so that it has stiffness at least equivalent to that of an uncoated flat sheet of steel having a minimum thickness of 0.053 inch (1.35 mm) (No. 16 MSG).

Table 4.2
Sheet metal electrical enclosures

Maximum enclosure dimensions				Minimum thickness of sheet metal					
				Steel					
Any linear dimensions,		Area of any surface,		Zinc coated,		Uncoated,			
inch	(mm)	inch ²	(cm ²)	inch	(mm)	inch	(mm)	inch	(mm)
				[CSG]		[MSG]		[AWG]	
12	305	90	584	0.034	0.86	0.032	0.81	0.045	1.14
				[20]		[20]		[16]	
24	610	360	2322	0.045	1.14	0.042	1.07	0.058	1.47
				[18]		[18]		[14]	
48	1219	1200	7742	0.056	1.42	0.053	1.35	0.075	1.91
				[16]		[16]		[12]	
60	1524	1500	9678	0.070	1.78	0.067	1.70	0.095	2.41
				[14]		[14]		[10]	
Over 60	1524	Over 1500	9678	0.097	2.46	0.093	2.36	0.122	3.10
				[12]		[12]		[8]	

4.11 Assembly screws that hold essential working parts and which must be loosened or removed in order to wire or install a connector or switch shall not thread into material other than metal.

5 Mounting of Parts

5.1 All parts shall be securely mounted in position and prevented from loosening or turning when such motion affects the performance of the equipment or affects the risk of fire or injury to persons incident to the operation of the equipment.

5.2 Uninsulated live parts shall be secured to their supporting surfaces so that they are prevented from turning or shifting in position when such motion results in a reduction of spacings to less than those indicated in 12.2 – 12.6.

5.3 Friction between surfaces is not to be used as a means to prevent turning, loosening, or shifting of a part as required in 5.1 and 5.2; however, a toothed-lock washer or equivalent means is not prohibited from being used.

6 Corrosion Protection

6.1 Iron and steel parts, other than bearings, etc., where such protection is impractical, shall be protected against corrosion by enameling, galvanizing, plating, or other equivalent means.

6.2 The requirement of 6.1 applies to all enclosing cases of sheet steel or cast iron and to all springs and other parts upon which proper mechanical operation depends. It does not apply to washers, screws, bolts, and other minor parts, when failure of such unprotected parts is not capable of resulting in a hazardous condition or in the equipment's operation being affected. Parts made of stainless steel, polished or treated, when required, do not require additional protection against corrosion. Bearing surfaces shall be of such materials and design as to resist binding due to corrosion.

7 Insulating Material

7.1 A base for the support of live parts shall be of moisture-resistant insulating material such as porcelain, phenolic, or cold-molded composition.

7.2 A base mounted on a metal surface which may be grounded shall be provided with an insulating barrier between the mounting surface and all live parts on the underside of the base which are not staked, upset, sealed, or equivalently prevented from loosening so as to prevent such parts and the ends of replaceable terminal screws from contacting the supporting surface.

7.3 Hard fiber is not prohibited from being used for insulating bushings, washers, separators, and barriers, but not for the sole support of live parts where shrinkage, current leakage, or warping of the fiber introduces a hazard.

7.4 A countersunk sealed live part shall be covered with a waterproof insulating compound which will not melt at a temperature of 15°C (27°F) higher than the maximum normal operating temperature of the assembly, and at not less than 65°C (149°F) in any case. The depth or thickness of sealing compound shall not be less than 1/8 inch (3.2 mm).

8 Current-Carrying Parts

8.1 A current-carrying part shall be of silver, copper, a copper alloy, or equivalent.

8.2 Bearings, hinges, etc., are not acceptable for carrying current between fixed and moving parts.

8.3 A wire-binding screw shall thread into metal.

8.4 A wiring terminal shall be prevented from turning.

8.5 Except as noted in 8.6, a terminal plate tapped for a wire-binding screw shall be of metal not less than 0.050 inch (1.27 mm) in thickness for a No. 8 (4.2 mm diameter) or larger screw, and not less than 0.030 inch (0.76 mm) in thickness for a No. 6 or a No. 4 (3.5 or 2.8 mm diameter) screw, and shall have no fewer than two full threads in the metal.