



UL 38

Underwriters Laboratories Inc. Standard for Safety

Manual Signaling Boxes for Fire Alarm Systems



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Underwriters Laboratories Inc. (UL)
333 Pfingsten Road
Northbrook, IL 60062-2096

UL Standard for Safety for Manual Signaling Boxes for Fire Alarm Systems, UL 38

Eighth Edition, Dated July 3, 2008

Revisions: This Standard contains revisions through and including December 11, 2008.

Summary of Topics

This update is issued to reflect that the ANSI approval of this standard has been reaffirmed.

UL Standards for Safety are developed and maintained in the Standard Generalized Markup Language (SGML). SGML -- an international standard (ISO 8879-1986) -- is a descriptive markup language that describes a document's structure and purpose, rather than its physical appearance on a page. Due to formatting differences resulting from the use of UL's new electronic publishing system, please note that additional pages (on which no requirements have been changed) may be included in revision pages due to relocation of existing text and reformatting of the Standard.

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 are substantially in accordance with UL's Proposal(s) on this subject dated October 24, 2008.

The revisions dated December 11, 2008 include a reprinted title page (page1) for this Standard.

As indicated on the title page (page 1), this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this Standard outlining the procedures to be followed to retain the approved text of this ANSI/UL Standard.

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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The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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	December 11, 2008
2-44	July 3, 2008
A1-A2	July 3, 2008

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JULY 3, 2008
(Title Page Reprinted: December 11, 2008)



ANSI/UL 38-2005 (R2008)

1

UL 38

Standard for Manual Signaling Boxes for Fire Alarm Systems

First Edition – June, 1964
Second Edition – December, 1969
Third Edition – March, 1974
Fourth Edition – July, 1981
Fifth Edition – June, 1987
Sixth Edition – January, 1994
Seventh Edition – March, 1999

Eighth Edition

July 3, 2008

The most recent designation of ANSI/UL 38-2005 (R2008) as a Reaffirmed American National Standard (ANS) occurred on December 11, 2008. The ANSI approval for this standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

This ANSI/UL Standard for Safety, which consists of the Eighth edition with revisions through December 11, 2008 is under continuous maintenance, whereby each revision is ANSI approved upon publication.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc. and is not part of the ANSI standard.

Revisions of this Standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest set of revised requirements. 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 Enclosures	6
3.1 General	6
3.2 Cast metal enclosures	7
3.3 Sheet metal enclosures	8
3.4 Nonmetallic enclosures	9
4 Electric Shock	9
5 Corrosion Protection	10
6 Field-Wiring System Connection	10
6.1 General	10
6.2 Field-wiring compartment	11
6.3 Field-wiring terminals or leads	11
6.4 Grounding terminals and leads	12
6.5 Grounded supply terminals and leads	12
6.6 Strain relief	13
7 Internal Wiring	13
7.1 General	13
7.2 Wireways	14
7.3 Splices	14
7.4 Barriers	14
7.5 Bushings	14
8 Bonding for Grounding	15
9 Components	16
9.1 Current-carrying parts	16
9.2 Coil windings	17
9.3 Insulating material	17
9.4 Printed-wiring boards	18
9.5 Switches	18
9.6 Lampholders and lamps	18
9.7 Protective devices	18
9.8 Mounting of components	18
9.9 Operating components	20
9.10 Capacitors	20
10 Spacings	20
11 Servicing Protection	22
12 Outdoor-Use Signaling Boxes	22

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PERFORMANCE

13	General	23
14	Normal Operation Test	23
14.1	General	23
14.2	Coded signaling boxes	24
14.3	Non-coded signaling boxes	25
14.4	Watchman's suppressed-signaling tour devices	26
15	Circuit Emergency Operation	27
16	Overcurrent and Undercurrent Operation Test	27
17	Overload and Endurance Test	27
17.1	General	27
17.2	Watchman's suppressed-signaling tour devices	29
18	Jarring Test	29
19	Drop Test	30
20	Temperature Test	30
21	Electric Shock Current Test	33
22	Corrosion Tests	37
22.1	General	37
22.2	Indoor-use signaling boxes	37
22.3	Outdoor-use signaling boxes	37
23	Transient Test	38
24	Dielectric Voltage-Withstand Test	39
25	Abnormal Operation Test	40
26	Burnout Test	40
27	Impact Test for Enclosures	41
28	Polymeric Materials Tests	41
29	Outdoor-Use Signaling Box Tests	41
29.1	General	41
29.2	Water spray test	41
29.3	Variable temperature test	41
29.4	Humidity test	42

MANUFACTURING AND PRODUCTION-LINE TEST

30	Production-Line Dielectric Voltage-Withstand Test	42
----	---	----

MARKING

31	General	43
32	Installation Wiring Diagram	44

APPENDIX A

Standards for Components.....	A1
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INTRODUCTION

1 Scope

1.1 These requirements cover manual signaling boxes for fire alarm systems intended for permanent installation and used in ordinary locations in accordance with the National Electrical Code, NFPA 70, and the National Fire Alarm Code, NFPA 72.

1.2 A manual signaling box is an assembly of a mechanism having electrical contacts designed to transmit a signal when an integral part is operated manually. The signaling contacts are intended to be connected to circuits of fire alarm systems. The types of boxes covered by these requirements are coded boxes and non-coded boxes, including signaling boxes, fire and guard's tour reporting stations, and guard's tour reporting stations for suppressed-signal tour combinations.

1.3 A manual signaling box having a pre-wound signaling mechanism and equipped with a tripping electromagnet to permit automatic actuation by separate detectors, and similar combination devices, shall be evaluated with regard to compliance with the applicable requirements for both manual signaling boxes and electrically-actuated transmitters.

1.4 A manual signaling box shall be constructed for use with system-control units, electrically-actuated transmitters, or similar units that will permit its application in compliance with applicable codes and standards of the National Fire Protection Association.

1.5 These requirements do not cover electrically-actuated transmitters.

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 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 Enclosures

3.1 General

3.1.1 Electrical parts of a signaling box shall be located or enclosed so as to provide protection against contact with uninsulated live parts.

3.1.2 Operating parts, such as contacts, gear mechanisms, and similar devices, shall be protected against mechanical damage and fouling by dust or other material that may impair their intended operation.

3.1.3 Provision shall be made for mounting a signaling box in position. Bolts, screws, or other parts used for mounting a signaling box shall be independent of those used for securing component parts of the assembly.

3.1.4 An opening for a winding shaft or similar part shall not be larger than is necessary (with sufficient clearance) for the intended operation of the signaling box.

3.1.5 Except as noted in 3.1.6, a signaling box intended for either flush or surface mounting in a back box shall be provided with a back box that has provision for the connection of metal-clad cable or conduit. A back box without provision for the connection of metal-clad cable or conduit may be used if:

- a) Definite instructions are furnished with the box indicating the sections of the unit that are intended to be drilled in the field for the connection of raceways or
- b) The unit is intended for mounting on an outlet box.

3.1.6 A signaling box is not required to be furnished with a back box if:

- a) Means for attachment to a standard outlet box are provided and
- b) The spacings required in this standard are provided while the signaling box is mounted in such a back box.

See Spacings, Section 10.

3.1.7 Space shall be provided within a terminal or wiring compartment to permit the use of a standard conduit bushing on conduit connected to the compartment, if a bushing would be required for installation.

3.1.8 The operating lever of a signaling box shall be guarded by a door, recess, or by some equivalent arrangement. A door provided to protect a pull lever or similar part shall be held closed by a latch, catch, spring, or similar device. The device used shall not interfere with the operation of the box in accordance with the instructions marked upon it.

3.1.9 A signaling box using a part intended to be broken during its operation shall be equipped with a breaking device. A door held closed by a break-glass type of latch and intended to be opened during operation of the signaling box shall have a handle, tab, spring, or similar part to facilitate opening the door after the glass is broken.

3.2 Cast metal enclosures

3.2.1 The thickness of cast metal for an enclosure shall be as indicated in Table 3.1.

Exception: Cast metal of lesser thickness may be used if, consideration being given to the shape, size, and function of the enclosure, it provides equivalent mechanical strength. See the Impact Test for Enclosures, Section 27.

Table 3.1
Cast-metal enclosures

Use, or dimensions of area involved ^a	Minimum thickness			
	Die-cast metal,		Cast metal of other than the die-cast type,	
	inch	(mm)	inch	(mm)
Area of 24 square inches (155 cm ²) or less 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) in thickness may be obtained by the provision of reinforcing ribs subdividing a larger area.

3.2.2 Die-cast metal for other than flush boxes may be used if it complies with one of the alloy specifications given in Specification for Zinc-Alloy Die Castings, ASTM B86-88.

3.2.3 If threads for the connection of conduit are tapped all the way through a hole in an enclosure wall, or if an equivalent construction is used, there shall not be less than 3-1/2 nor more than five threads in the metal, and the constructions shall be such that a standard conduit bushing can be attached.

3.2.4 If threads for the connection of conduit are tapped only part of the way through a hole in an enclosure wall, there shall not be less than five full threads in the metal and there shall be a smooth, rounded inlet hole that shall afford protection to the conductors equivalent to that provided by a standard conduit bushing.

3.3 Sheet metal enclosures

3.3.1 The thickness of sheet metal used for the enclosure of a signaling box shall not be less than that indicated in Table 3.2, except that sheet metal of two gauge sizes lesser thickness may be used if the surface under consideration is curved, ribbed, or otherwise reinforced, or if the shape, size, or both shape and size of the surface is such that equivalent mechanical strength is provided.

Table 3.2
Sheet-metal electrical enclosures

Minimum average thickness of sheet metal					
Uncoated steel, ^a		Zinc-coated steel, ^a		Aluminum, copper, or brass, ^a	
inch	(mm)	inch	(mm)	inch	(mm)
0.053	(1.35)	0.057	(1.42)	0.075	(1.91)
	(16)		(16)		(12)

^a The figures in parentheses are the Galvanized Sheet Gage numbers (GSG) (for zinc-coated steel), the Manufacturer's Standard Gage numbers (MSG) (for uncoated steel), and the American Wire Gage (AWG) numbers (for a nonferrous metal) which provide the required minimum average thickness of metal.

3.3.2 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 will have a stiffness at least equivalent to that of an uncoated flat steel sheet having a minimum thickness of 0.053 inch (1.35 mm) (No. 16 MSG).

3.3.3 A plate or plug closure for an unused conduit opening or other hole in the ultimate enclosure shall not be less than 0.027 inch (0.69 mm) thick if of steel, or 0.032 inch (0.81 mm) thick if of nonferrous metal, for a hole having a 1-3/8 inch (35 mm) maximum dimension.

3.3.4 A closure for a hole larger than 1-3/8 inch (35 mm) diameter shall have a thickness equal to that required for the enclosure of the device; otherwise, a standard knockout seal shall be used. Such plates or plugs shall be mechanically secured.

3.3.5 A knockout in a sheet metal enclosure shall be secured but shall be capable of being removed without deformation of the enclosure.

3.3.6 A knockout shall be provided with a flat surrounding surface intended for seating of a conduit bushing and shall be located so that installation of a bushing at any knockout likely to be used during installation will not result in spacings between uninsulated live parts and the bushing of less than those indicated in Spacings, Section 10.

3.4 Nonmetallic enclosures

3.4.1 An enclosure or parts of an enclosure of nonmetallic material shall have the mechanical strength and durability and be formed so that operating parts will be protected against damage. The mechanical strength of the enclosure shall be at least equivalent to a sheet metal enclosure of the minimum thickness specified in Table 3.2. See the Impact Test for Enclosures, Section 27, and the Polymeric Materials Test, Section 28.

3.4.2 Among the factors to be taken into consideration when determining the acceptability of a nonmetallic enclosure or parts are:

- a) The mechanical strength;
- b) Resistance to impact;
- c) Moisture absorptive properties;
- d) Combustibility and resistance to ignition from electrical sources;
- e) Dielectric strength, insulation resistance, and resistance to arc tracking; and
- f) Resistance to distortion and creeping at temperatures to which the material may be subjected under conditions of normal or abnormal usage.

All these factors are to be considered with regard to aging.

3.4.3 The continuity of the grounding system shall not rely on the dimensional integrity of the nonmetallic material.

4 Electric Shock

4.1 Any part that is exposed only during operator servicing shall not present the risk of electric shock. See the Electric Shock Current Test, Section 21.

4.2 Each terminal provided for the connection of an external antenna shall be conductively connected to the supply circuit grounded conductor. The conductive connection shall have a maximum resistance of 5.2 megohms, a minimum wattage rating of 1/2 watt, and shall be effective with the power switch in either the on or off position.

Exception: The conductive connection need not be provided if:

- a) Such a connection is established in the event of electrical breakdown of the antenna isolating means;*
- b) The breakdown does not result in a risk of electric shock; and*
- c) In a construction using an isolating power transformer, the resistance of the conductive connection between the supply circuit and chassis does not exceed 5.2 megohms.*

4.3 The maximum value of 5.2 megohms specified in 4.2 is to include the maximum tolerance of the resistor value used; that is, a resistor rated 4.2 megohms with 20 percent tolerance or a resistor rated 4.7 megohms with a 10 percent tolerance may be used. A component comprised of a capacitor with a built-in shunt resistor that complies with the requirements for antenna isolating capacitors may be rated a minimum of 1/4 watt.

5 Corrosion Protection

5.1 An iron or steel part, other than a bearing or similar part for which such protection is impracticable, shall be protected against corrosion by enameling, galvanizing, sherardizing, plating, or other equivalent means. Parts such as washers, screws, bolts, and similar parts shall be protected against corrosion, if corrosion of such unprotected parts is likely to result in a risk of fire, electric shock, or unintentional contact with moving parts that can cause injury to persons.

Exception: Parts made of stainless steel, polished or treated, if necessary, do not require additional protection against corrosion.

5.2 The requirement of 5.1 applies to all enclosures of sheet steel or cast iron, and to all springs and other parts upon which intended mechanical operation may depend. Bearing surfaces shall be of materials and construction that reduce the risk of binding due to corrosion.

6 Field-Wiring System Connection

6.1 General

6.1.1 A wiring terminal or lead shall be used for the connection of conductors of at least the size required by the National Electrical Code, ANSI/NFPA 70, corresponding to the electrical rating of the unit.

6.1.2 Duplicate terminals or leads, or equivalent means to achieve electrical supervision, shall be provided for each incoming and outgoing alarm-initiating-circuit connection. A common terminal may be used for connection of both incoming and outgoing wires, when the construction of the terminal does not permit an uninsulated section of a single conductor to be looped around the terminal and serve as two separate connections, thereby precluding supervision of the connection in the event that the wire becomes dislodged from under the terminal. A notched clamping plate under a single securing screw, in each notch of which separate conductors of an initiating circuit are intended to be inserted, may be used, but this arrangement shall be supplemented by additional marking in the wiring area or on the installation wiring diagram specifying the intended connections to the terminals.