UL 609

STANDARD FOR SAFETY

Local Burglar Alarm Units and Systems

UL Standard for Safety for Local Burglar Alarm Units and Systems, UL 609

Twelfth Edition, Dated March 9, 2018

Summary of Topics

The twelfth edition of the Standard for Local Burglar Alarm Units and Systems, UL 609, was issued to expand media to include website.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated October 23, 2015.

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UL 609

Standard for Local Burglar Alarm Units and Systems

Previous unnumbered editions of standards covering this material have been published prior to 1928. The standards were titled ″Local Mercantile Burglar Alarm Systems″ and ″Local Burglar Alarm Systems for Bank Vaults and Safes.″

The first through fourth editions were titled ″Local Burglar Alarm System,″ and numbered both UL 609 and UL 610.

First Edition – April, 1942
Second Edition – November, 1947
Third Edition – November, 1950
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Twelfth Edition

March 9, 2018

This ANSI/UL Standard for Safety consists of the Twelfth Edition.

The most recent designation of ANSI/UL 609 as an American National Standard (ANSI) occurred on March 9, 2018. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

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 https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements cover construction, performance, and maintenance of local burglar-alarm units and systems for use in mercantile premises, mercantile safes and vaults, and bank safes and vaults.

1.2 As covered by these requirements, a local alarm system consists of protective circuits and devices, connected through control apparatus to an enclosed tamper-protected sounding device mounted on an outside wall of the building in which the protected property is situated. Intrusion into or disturbance of the units or wiring causes the sounding device to be actuated. The sounding device continues to operate until it is stopped by using the proper control key, by exhaustion of the power supply, or by action of an automatic timing element that is preset for a definite operating period. These systems usually operate within the limits of Class 2 remote control and signal circuits of Class 2 remote control and signal circuits as defined by Article 725 of the National Electrical Code, NFPA 70.

1.3 The operation of a local alarm system is partially under the control and domination of the owners or others interested in the property. However, it is required that systems be maintained under the care and regular inspection service of the installing company. The installing company is expected to respond to troubles or calls for service promptly on report of the owner. See Maintenance, Sections 61 and 69. It is the responsibility of the owner to switch the system ON and OFF duty and to report malfunctioning of the system to the service company.

1.4 Local mercantile burglar-alarm systems are intended for the protection of mercantile premises or mercantile safes and vaults.

1.5 Local bank burglar-alarm systems are intended for the protection of bank safes and vaults.

1.6 Equipment intended for combination burglar-alarm and fire-protective signaling systems shall comply with the Standard for Control Units and Accessories for Fire Alarm Systems, UL 864.

1.7 Devices installed on individual properties are further classified as to extent of protection at each location. Rules covering installation and classification (of extent) of alarm equipment at individual locations are published in the Standard for Installation and Classification of Burglar and Holdup Alarm Systems, UL 681, which should be consulted by burglar-alarm installers.

2 Components

2.1 Except as indicated in 2.2, 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.

2.2 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.

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

2.4 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.

3 Units of Measurement

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

4 Undated References

4.1 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.

5 Terminology

5.1 The term ″product″ as used in this standard refers to all types of local burglar alarm units and systems.

5.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are rms.

6 Glossary

6.1 For the purpose of this standard, the following definitions apply.

6.2 ALARM SOUNDING DEVICE – An audible signal appliance (bell, horn, siren, or speaker), complying with the requirements in the Standard for Audible Signaling Devices for Fire Alarm and Signaling Systems, Including Accessories, UL 464, and this standard, that is used to signal unauthorized entry or attempted entry into a protected area or object.

6.3 ALARM SOUNDING DEVICE HOUSING – A housing, or the equivalent, that is used to protect an alarm sounding device from being silenced by physical attack. They are rated at two levels:

a) Outside – A housing intended to be located outside of the protected area. See 63.4 and 63.10.

b) Inside – A housing intended to be located within the protected area. See 63.8 and 63.10.

Exception: These requirements are for alarm sounding device housings used in mercantile burglar alarm systems. For requirements for alarm sounding device housings used in bank alarm systems, see Attack Test, Section 70, or Tamper Protection, Section 71.

6.4 BASIC INSULATION (FORMERLY FUNCTIONAL INSULATION) – The insulation applied to live parts to provide basic protection against the risk of electric shock. Basic insulation does not necessarily include insulation used exclusively for functional purposes. See also the Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097.

6.5 CIRCUITS, ELECTRICAL:

a) High-Voltage – A circuit involving a potential of not more than 600 volts and having circuit characteristics in excess of those of a low-voltage power limited circuit.

b) Low-Voltage – A circuit involving a potential of not more than 30 volts AC rms, 42.4 volts DC or AC peak.

c) Power Limited – A circuit whose output is limited as specified in Tables 6.1 and 6.2. The power limitation shall be provided by the construction of the transformer, a fixed impedance, a noninterchangeable fuse, a nonadjustable manual reset circuit protective device, or a regulating network.

Table 6.1
Power limitations for inherently limited power source (Overcurrent protection not required)

Circuit voltage V_{max}[a] AC-DC (Volts)	Maximum nameplate ratings		Current limitation I_{max}[b] (Amperes)
	VA (Volt amperes)	Current (Amperes)	
0 to 20	$5.0 \times V_{max}$[a]	5.0	8.0
over 20 to 30	100	$100/V_{max}$[a]	8.0
over 100 to 30	100	$100/V_{max}$[a]	$150/V_{max}$[a]
over 100 to 250 DC[a] only	$0.030 \times V_{max}$[a]	0.030	0.030

NOTE – Adopted in part from the National Electrical Code (NFPA 70), 1990 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

[a] V_{max}: Maximum output voltage regardless of load with rated input applied.

[b] I_{max}: Maximum output current after 1 minute of operation under any noncapacitive load, including short circuit.

Table 6.2
Power limitations for power sources not inherently limited (Overcurrent protection required)

Circuit voltage V_{max}[a] AC-DC (Volts)	Maximum nameplate ratings		Current limitation I_{max}[b] (Amperes)	Power imitation $(VA)_{max}$[c] (Volt amperes)	Maximum overcurrent protection (Amperes)
	VA (Volt Amperes)	Current (Amperes)			
0 to 20	$5.0 \times V_{max}$[a]	5.0	$1000/V_{max}$[a]	250[d]	5.0
over 20 to 100	100	$100/V_{max}$[a]	$1000/V_{max}$[a]	250[d]	$100/V_{max}$[a]
over 100 to 150	100	$100/V_{max}$[a]	1.0	NA	1.0

NOTE – Adopted in part from the National Electrical Code (NFPA 70), 1990 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

[a] V_{max}: Maximum output voltage regardless of load with rated input applied. (See note b, Table 6.1)

[b] I_{max}: Maximum output after 1 minute of operation under any noncapacitive load, including short circuit, and with overcurrent protection bypassed.

[c] $(VA)_{max}$: Maximum volt-ampere output regardless of load with overcurrent protection bypassed.

[d] If the power source is a transformer $(VA)_{max}$ is 350 or less when V_{max} is 15 or less.

6.6 CORD-CONNECTED UNIT – A unit intended for connection to the power source by means of a supply cord. Such a unit is intended to be moved for reasons of interchange or realignment of the units of a system.

6.7 DEAD METAL PART – A metal or other electrically conductive part, accessible or inaccessible, that is not conductively connected to a live part.

6.8 LINE VOLTAGE – The voltage at any field connected source of supply, nominally 50 – 60 hertz and either 115, 208, or 230 volts.

6.9 LIVE PART – A part:

a) That is conductively connected either

1) To the power-supply circuit or

2) To a secondary circuit that operates at more than 42.4 volts peak with reference to ground or accessible metal and

b) In which the available current measured through a 1500-ohm resistor shunted with a 0.15-μF capacitor connected from the part to ground or to any other accessible part exceeds 0.25 milliamperes.

6.10 NORMAL STANDBY CONDITION – The ready-to-operate condition of the product existing prior to its being tripped or operated by an intrusion.

6.11 PRIMARY BATTERY – A battery that by construction is not intended to be recharged.

6.12 RADIO FREQUENCY – Electromagnetic radiation, nominally above 20 kilohertz.

6.13 REINFORCED INSULATION – An improved basic (formerly functional) insulation with such mechanical and electrical qualities that it, in itself, provides the same degree of protection against the risk of electric shock as double insulation. It may consist of one or more layers of insulating material. See, also, the Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097.

6.14 SAFETY CIRCUIT – Any primary or secondary circuit that is relied upon to reduce the risk of fire, electric shock, or unintentional contact with moving parts that may cause injury to persons (an interlock circuit, for example).

6.15 SECONDARY BATTERY – A battery that by construction, is intended to be recharged.

6.16 SERVICE CENTER – A location that may be separate from the alarm service company's main business location providing installation, maintenance, and repair service to systems served by the company. The service center is to keep maintenance records for the systems that it serves unless the records can be accessed from another location.

6.17 SERVICE VEHICLE – A vehicle used to provide installation, maintenance, and repair service to systems served by the company.

6.18 SUPPLEMENTARY INSULATION – An independent insulation provided in addition to the basic (formerly functional) insulation to protect against the risk of electric shock in case of mechanical rupture or electrical breakdown of the basic insulation. An enclosure of insulating material may form a part or the whole of the supplementary insulation. See, also, the requirements in the Standard for Double Insulation Systems for Use in Electrical Equipment, UL 1097.

7 Installation and Operating Instructions

7.1 A copy of the installation and operating instructions intended to accompany each product or component as produced, the related schematic wiring diagrams, and the installation drawings is to be furnished with the sample submitted for investigation, to be used as a guide in the examination and test of the product or component. For this purpose, a final printed edition is not required.

7.2 The instructions and drawings shall include at least the following:

a) Typical installation drawing layouts and a complete representative installation wiring diagram(s) for the product(s) indicating recommended locations and wiring methods that shall be in accordance with the National Electrical Code, ANSI/NFPA 70, and the Standard for Installation and Classification of Burglar and Holdup Alarm Systems, UL 681. Locations where installations are not recommended shall also be included.

b) Concise description of the operation, testing, and maintenance procedures for the product(s), and recommended testing frequency (that shall be at least once a year).

c) Identification of replacement parts, such as lamps or batteries, by a part number, manufacturer's model number, or the equivalent.

d) A description of the conditions that might be expected to result in false alarms or impaired operation of the product(s).

e) A description of any features provided to reduce the risk of fire, electric shock, or injury to persons and a warning against bypassing such features.

7.3 The instructions may be incorporated on the inside of the product, on a separate sheet, or as part of a manual. If not included directly on the product, the instructions or manual shall be referenced in the marking information on the product. See Section 95, Marking.

8 Installation and Operating Instructions Physical Media

8.1 The installation diagram(s) and any special field installation instructions shall be attached to the unit or, when separate, shall be provided in printed hardcopy format. A copy shall be supplied with each individual product or with each single shipment when multiples of the same products are shipped directly (to an end customer) in a single shipment.

8.2 The following sections contain information that shall be provided in printed hardcopy format and supplied with the unit(s):

a) 7.2(a);

b) 16.2.9(c);

c) 16.2.10(a);

d) 16.2.10(b);

e) 16.2.10(c);

f) 16.3;

g) 95.1, Exception No. 1;

h) 95.3;

i) 95.4;

j) 111.3;

k) 111.4; and

l) 113.3.

8.3 Other installation instructions, operating and test instructions shall be made available by printed hardcopy or by electronic media such as a CD, DVD, website, or equivalent. Optionally, a copy may be supplied with each individual product or with each single shipment when multiples of the same products are shipped directly (to an end customer) in a single shipment.

9 Electric Shock

9.1 Any part that is exposed only during operator servicing shall not present the risk of electric shock. See the Electric Shock Current Test, Section 40.

9.2 Each terminal provided for the connection of an external antenna shall be conductively connected to the power 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

a) If 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 employing an isolating power transformer, the resistance of the conductive connection between the supply circuit and chassis does not exceed 5.2 megohms.

9.3 The maximum value of 5.2 megohms mentioned in 9.2 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 is acceptable. 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.

9.4 The insertion of any socket of any vacuum tube or its glass or metal equivalent of like designation used in the product shall not result in a risk of electric shock.

CONSTRUCTION

ASSEMBLY

10 General

10.1 Product assembly

10.1.1 The product shall be factory built as a complete assembly and shall include all the components necessary for its intended function when installed (used) as intended. The product may be shipped from the factory as two or more major subassemblies. See 10.1.2.

10.1.2 If the product is not assembled by the manufacturer as a complete unit, it shall be arranged in major subassemblies. Each subassembly shall be capable of being incorporated into a complete assembly without requiring alteration, cutting, drilling, threading, welding, or similar tasks by the installer. Two or more subassemblies, which must bear a definite relationship to each other for the correct installation or operation of the product, shall be arranged and constructed to permit them to be incorporated into the complete assembly only in the correct relationship with each other without need for alteration or alignment, or such subassemblies shall be assembled, tested, and shipped from the factory as one element.

10.2 Electrical protection

10.2.1 Louvers and other openings in the enclosure shall be constructed and located to reduce the risk of unintentional contact with uninsulated high-voltage live parts. In determining compliance with this requirement, parts such as covers, panels and grilles used as part of the enclosure are to be removed unless tools are required for their removal or an interlock is provided. See also Protection of Service Personnel, Section 11.

10.2.2 Uninsulated high-voltage live parts shall be located, guarded, or enclosed as indicated in 10.2.3 – 10.2.5.

10.2.3 Openings directly over uninsulated high-voltage live parts shall not exceed 0.187 inch (4.75 mm) in any dimension, or shall be of a configuration as illustrated by Figure 12.2 for top cover designs and Figure 12.3 for side openings, or the equivalent.

10.2.4 An opening in an electrical enclosure that does not permit entrance of a 1 inch (25.4 mm) diameter rod shall be sized and arranged so that a probe, as illustrated in Figure 10.1, cannot be made to contact any uninsulated live part (other than low-voltage) when inserted through the opening in a straight or articulated position.

10.2.5 An opening that permits entrance of a 1 inch (25.4 mm) diameter rod is acceptable under the conditions described and illustrated in Figure 10.2.

Figure 10.1
Accessibility probe

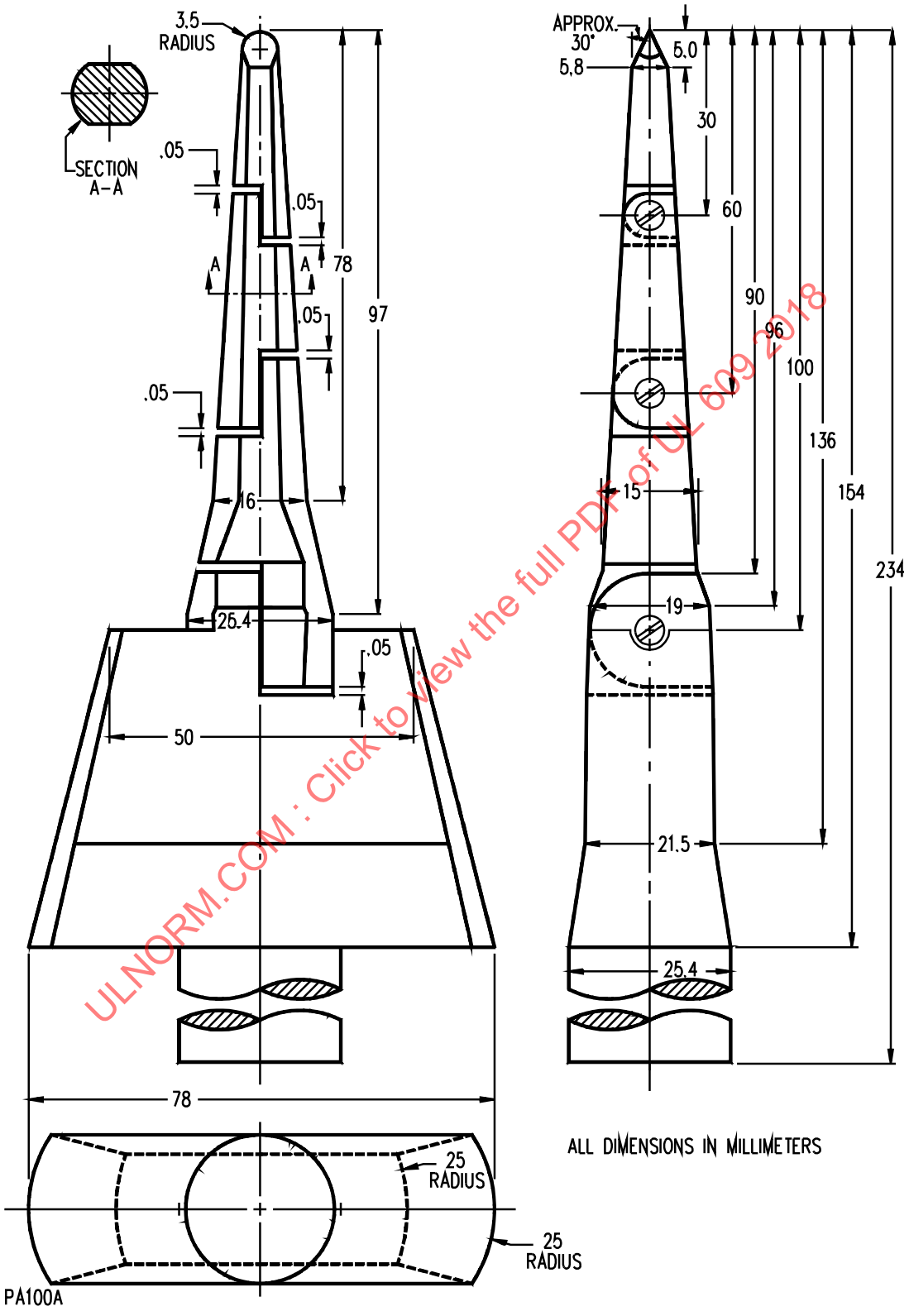
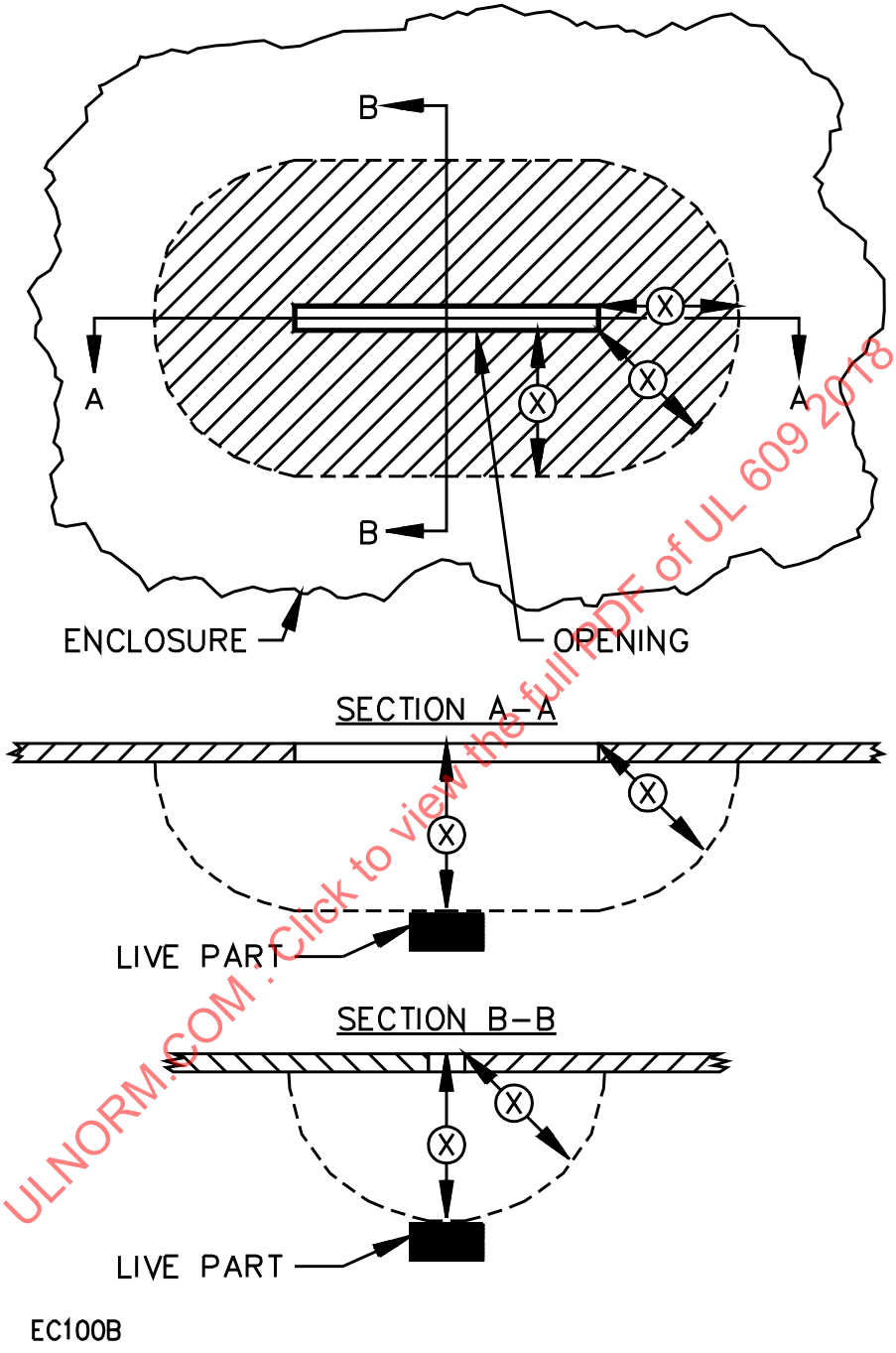


Figure 10.2
Opening in enclosure



NOTE – The opening is acceptable if, within the enclosure, there is no uninsulated live part or enamel-insulated wire less than X inches (mm) from the perimeter of the opening, as well as within the volume generated by projecting the perimeter X inches (mm) normal to its plane. X equals five times the diameter of the largest diameter rod that can be inserted through the opening, but not less than 6-1/16 inches (154 mm).

10.2.6 Knockouts or openings in an alarm housing for the connection of circuits, shall be in the mounting surface only.

11 Protection of Service Personnel

11.1 An uninsulated live part of a high-voltage circuit within the enclosure shall be located, guarded, or enclosed so as to reduce the risk of accidental contact by persons performing service functions that may be performed while the equipment is energized.

11.2 During the examination of a product in connection with the requirements of 11.1, a part of the outer enclosure that may be removed without the use of tools, or part of the outer enclosure that may be removed by the user to allow access for making routine operating adjustments, is to be disregarded; and it is to be assumed that the part in question does not afford protection against the risk of electric shock.

11.3 An electrical component that may require examination, replacement, adjustment, servicing, or maintenance while the product is energized shall be located and mounted with respect to other components and with respect to grounded metal so that the component is accessible for such service and risk of electric shock to the serviceperson from adjacent uninsulated high-voltage live parts is reduced.

11.4 The following are not considered to be uninsulated live parts:

a) Coils of relays and solenoids, and transformer windings, if the coils and windings are provided with insulating overwraps rated for the potentials encountered,

b) Terminals and splices with insulation rated for the potential encountered, and

c) Insulated wire.

12 Enclosures

12.1 General

12.1.1 The enclosure of a product shall have the strength and rigidity to resist total or partial collapse and the attendant reduction of spacings, loosening or displacement of parts, or other defects. See the Mechanical Strength Tests for Enclosures, Section 54.

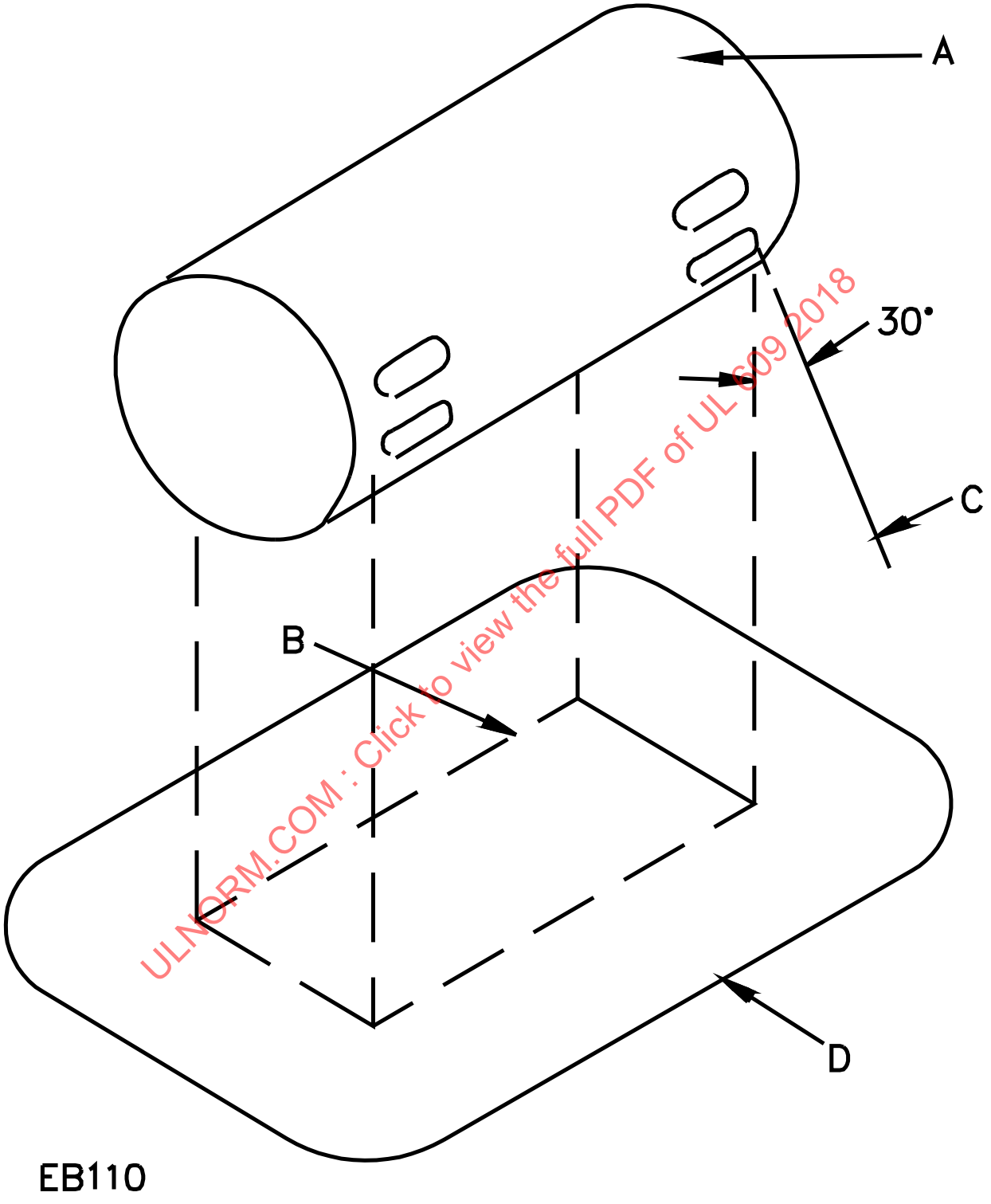
12.1.2 Operating parts, such as gear mechanisms, light-duty relays, and similar devices, shall be enclosed to protect against malfunction due to dust or other material which may impair their intended operation.

12.1.3 An enclosure containing other than power limited circuits shall be constructed to reduce the possibility of emission of flame, molten metal, flaming or glowing particles, or flaming drops. See the Ignition Through Bottom-Panel Openings Tests, Section 53.

12.1.4 The requirement in 12.1.3 necessitates either a nonflammable bottom in accordance with the requirements in 12.3.2, or a protective barrier as illustrated in Figure 12.1 under all areas containing combustible materials.

Exception: See 12.3.3.

Figure 12.1
Protective pan



12.1.5 A construction employing individual barriers under components, groups of components or assemblies, as illustrated in Figure 12.1 is considered to comply with the requirement in 12.1.3.

a) The entire component under which a barrier (flat or dish with or without a lip or other raised edge) of nonflammable material is to be provided. The sketch above is of a metal enclosed component with ventilating openings to show that the protective barrier is required only for those openings from which flaming parts might drop. If the component or assembly does not have its own nonflammable enclosure, the area to be protected would be the entire area occupied by the component or assembly.

b) Projection of the outline of the area of (A) which requires a bottom barrier vertically downward onto the horizontal plane of the lowest point on the outer edge (D) of the barrier.

c) Inclined line that traces out an area (D) on the horizontal plane of the barrier. Moving around the perimeter of the area (B) which requires a bottom barrier, this line projects at a 30-degree angle from the line extending vertically at every point around the perimeter of (A) and oriented to trace out the largest area, except that the angle may be less than 30-degrees if the barrier or portion of the bottom cover contacts a vertical barrier or side panel of nonflammable material, or if the horizontal extension of the barrier (B) to (D) would exceed 6 inches (152 mm).

d) Minimum outline of the barrier, except that the extension B – D need not exceed 6 inches (152 mm) (flat or dished with or without lip or other raised edge). The bottom of the barrier may be flat or formed in any manner provided that every point of area (D) is at or below the lowest point on the outer edge of the barrier.

12.2 Doors and covers

12.2.1 An enclosure cover shall be hinged, sliding, or similarly attached so it can not be removed:

a) If it gives access to fuses or any other overcurrent protective device, the intended functioning of which requires renewal or

b) If it is necessary to open the cover in connection with the intended operation of the unit.

Exception: If its position is supervised by a tamper contact that is connected in the closed protective circuit, an enclosure need not comply with the requirements of this paragraph.

12.2.2 Fasteners requiring the use of a tool or key shall be used for the assembly of all enclosures if access is not required for operation of the product.

12.2.3 The cover of an enclosure shall be provided with a supervisory contact, connected in the closed protective wiring circuit, if it gives access to any relays, terminals, controls, or related components that might be subject to tampering without causing an alarm signal.

Exception: An enclosure located inside of a completely protected safe or vault does not require tamper protection.

12.3 Enclosure openings

12.3.1 Openings in the enclosure shall be so constructed and of such size that direct entry of foreign objects is prevented. See also 10.2.3. See Figure 12.2 for examples of acceptable top cover constructions that are deemed to prevent direct entry. See also Figure 12.3 for acceptable side opening constructions.

Figure 12.2
Cross sections of top cover designs

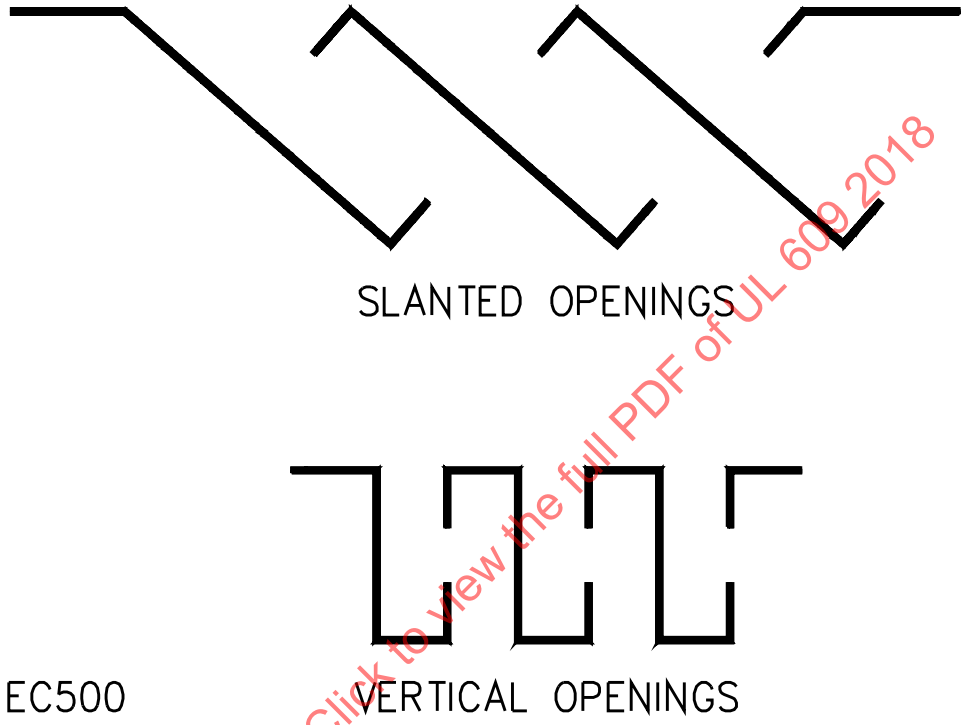
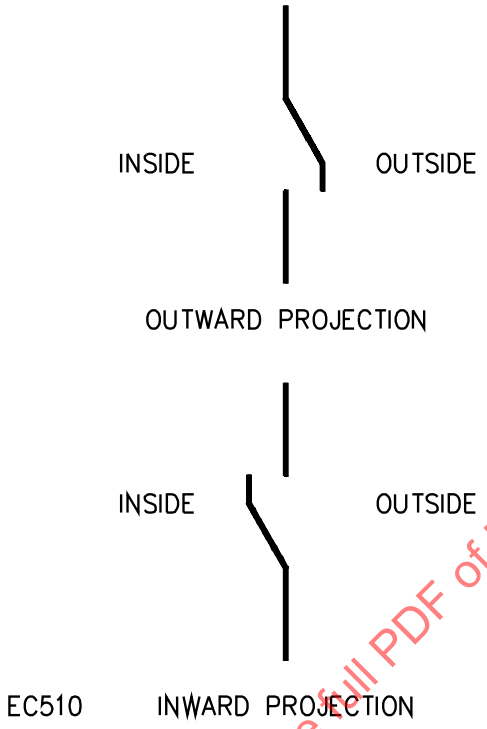


Figure 12.3
Louvers



12.3.2 Openings may be provided in the bottom panels or protective pans under areas containing materials not classified as V-1, in accordance with the Standard for Tests for Flammability of Plastic Material for Parts in Devices and Appliances, UL 94, if constructed in a manner that prevents materials from falling directly from the interior of the product onto the supporting surface or onto any other location under the product. Figure 12.4 illustrates a type of baffle that meets this requirement. A second construction that meets this requirement is a 0.040 inch (1.02 mm) sheet steel bottom panel in which round holes of 5/64 inch (2.0 mm) maximum diameter are spaced not closer together than 1/8 inch (3.2 mm) center-to-center. Constructions other than these two are acceptable if they comply with the Ignition Through Bottom-Panel Openings Tests, Section 53.