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February 21, 1996

Revision pages for

Standard for

Police Station Connected Burglar Alarm Units and Systems

UL 365, Third Edition

Attached to this transmittal notice is a revision of the third edition of UL 365.

A CHANGE ON A PAGE DATED FEBRUARY 21, 1996 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THESE NEW AND REVISED REQUIREMENTS ARE NOW IN EFFECT EXCEPT FOR THOSE PARAGRAPHS, SECTIONS, TABLES, AND FIGURES HAVING FUTURE EFFECTIVE DATES AS INDICATED IN THE SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM. TO RETAIN THE REQUIREMENTS IN EFFECT UNTIL THESE FUTURE EFFECTIVE DATES, DO NOT DISCARD THE PAGES REPLACED BY THOSE HAVING FUTURE EFFECTIVE DATES UNTIL THOSE DATES.

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

The new and revised requirements are substantially in accordance with UL's bulletin on Subjects 205 (681, 365, 609, 611, 1076) dated July 21, 1995. The bulletin is now obsolete and may be discarded.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 365-1994.

Revised and/or additional pages may be issued from time to time.

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

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UL 365

Standard for

**Police Station Connected Burglar
Alarm Units and Systems**

First Edition – March, 1975
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Third Edition

June 10, 1993

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated June 10, 1993 and October 19, 1993. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

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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 published set of revision pages.

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INTRODUCTION

1 Scope

1.1 These requirements cover construction, performance, and maintenance of police station connected 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 police station connected alarm system consists of protective circuits and devices, connected through control apparatus to an enclosed tamper-protected sounding device mounted on an outside or inside wall of the building in which the protected property is situated, and a constantly-manned police department (see 1.8 and 52.1). Intrusion into or disturbance of the units or wiring causes the sounding device to be actuated and a signal to be transmitted to the police department. The sounding device and signal to the police department continue 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 as defined by Article 725 of the National Electrical Code, NFPA 70.

1.3 The operation of a police station connected alarm system is partially under the control and domination of the owner or others interested in the property. However, it is required that police station connected systems be maintained under the care and regular inspection service of the installing company. The installing company is expected to respond promptly to troubles or calls for service on report of the owner or police department. See Mercantile Premises Alarm Systems, Maintenance, Section 65 and Bank Safe and Vault Alarm Systems, Maintenance, Section 75. 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 Police station connected mercantile burglar-alarm systems are designated as Grade AA or Grade A, and are designated as to their acceptability for use either on mercantile premises or on mercantile safes and vaults.

1.5 Police station connected bank burglar-alarm systems are designated as Grade AA, Grade A, Grade BB, or Grade B and are for use on bank safes and vaults.

1.6 Equipment intended for combination burglar-alarm and fire-protective signaling systems is also expected to comply, with the Standard for Control Units for Fire-Protective Signaling Systems, UL 864.

1.7 Regardless of the grade of equipment and service determined by this standard, 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 Mercantile and Bank Burglar-Alarm Systems, UL 681, which should be consulted by burglar-alarm installers.

1.8 The connection to a police department may be:

- a) Direct;
- b) Through a central station complying with the Standard for Central-Station Burglar-Alarm Systems, UL 611, or the Standard for Central-Stations for Watchman, Fire-Alarm, and Supervisory Services, UL 827; or
- c) Through a residential monitoring station complying with UL 611, UL 827, or both.

1.9 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

1.9 revised February 21, 1996

2 General

2.1 Terminology

2.1.1 The term "product" as used in this standard refers to all types of police station connected burglar alarm units and systems.

2.2 Components

2.2.1 Except as indicated in 2.2.2, 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.

2.2.2 A component need not comply with a specific requirement that:

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

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

2.2.4 Specific components are recognized as being 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 for which they have been recognized.

2.3 Units of measurement

2.3.1 If a value for a measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

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

2.4 Undated references

2.4.1 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.

3 Glossary

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

3.11 **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).

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

3.13 **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.

3.13 added February 21, 1996

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

3.14 added February 21, 1996

4 Installation and Operating Instructions

4.1 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.

4.2 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.

4.2 revised December 9, 1994

4.3 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 Marking, General, Section 108.

CONSTRUCTION

ASSEMBLY

5 General

5.1 Product assembly

5.1.1 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 5.1.2.

5.1.2 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.

5.2 Electrical protection

5.2.1 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 6.

5.2.2 Uninsulated high-voltage live parts shall be located, guarded, or enclosed as indicated in 5.2.3 – 5.2.5.

5.2.3 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 7.2 for top cover designs and Figure 7.3 for side openings, or the equivalent.

5.2.4 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 5.1, cannot be made to contact any uninsulated live part (other than low-voltage) when inserted through the opening in a straight or articulated position.

5.2.5 An opening that permits entrance of a 1 inch (25.4 mm) diameter rod is acceptable under the conditions described and illustrated in Figure 5.2.

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

64.8 The alarm sounding device, with its power supply, shall produce sound at the level specified in 64.5 for not less than 15 minutes.

64.9 An alarm cutoff feature shall not operate in less than 15 minutes.

64.10 The sounding of the protected premises audible alarm may be delayed by not more than 5 minutes, but the transmission of an alarm to the police station or central station shall be delayed not more than 45 seconds after the alarm has been initiated. See 53.5.

64.11 There shall be an indication, at the time of setting the system, that all protection up to the egress door is set for duty.

64.12 The system shall be such that the setting of closed-circuit wiring, detection devices, or alarm sounding device circuits is not dependent upon the operation of an egress-door-actuated switch or transfer mechanism on the door unless failure of these switches to operate as intended at closing time gives position indication to the user.

64.13 Key-operated controls located outside of the protected area shall employ high-security locking cylinders complying with the requirements for key locks, UL 437.

64.14 Switches other than the entrance door shunt, that permit convenient shunting of portions of the protection by the user, shall not be used unless audible or visual indicators, or both, are provided to remind the user to remove the shunt.

64.15 The length of the time delay intended to prevent an alarm during ingress, shall not exceed the time established in 68.2 and shall not, in any case, exceed 60 seconds.

64.16 There shall be constant indication to the user, of the condition of the protection circuit power supply.

64.17 Either a graduated milliammeter in the protection circuit or an underload device adjusted to operate a trouble signal when the current in the protection circuit drops to a certain value are acceptable methods of supervising the condition of the protection-circuit power supply.

64.18 The system shall be arranged to provide at least one daily automatic test of the sounding device and its source of energy.

65 Maintenance

65.1 Installations shall be maintained by the alarm service company under provisions of a service contract or agreement. They shall be inspected at intervals that will maintain the system in its intended operating condition. The interval between regular maintenance inspections shall not exceed 1 year. The regular maintenance inspection may be done in parts throughout the year.

65.1 revised February 21, 1996

65.2 In the case where the alarm receiving equipment is the responsibility of a company other than the operating company, that second company shall be a qualified alarm installer and there shall be an agreement between the two companies that will provide the same maintenance and service as though one company is responsible for all of the equipment.

65.3 The alarm service company shall maintain a means of receiving requests for service at all times and shall keep a permanent record of the time and date that:

- a) A request for service is received,

- b) Service begins, and
- c) The repairs are completed.

Requests for service shall be received by alarm service company personnel. Or, a method shall be devised that will result in the beginning of service within the time interval indicated in 65.5.

Revised 65.3 effective January 1, 1998

65.4 The alarm service company shall provide the alarm service subscriber with written instructions on how to contact the company for service. The method of communication shall allow the subscriber to promptly report trouble conditions.

Revised 65.4 effective January 1, 1998

65.5 Repairs to a mercantile alarm system shall begin within 18 hours after the receipt of a request for service. The maximum range of travel (driving time) from the company's main business location or service center to an alarm system installation shall not exceed 3 hours in a land-based vehicle.

Exception: The beginning of repair service may be extended to the time that the protected property is next open for business if the subscriber to the alarm service provides written or oral authorization. Authorization shall be given to alarm service company personnel when the subscriber makes the decision to delay service. If authorization is given, the alarm service company shall make a record of the:

- a) Time and date of the authorization,
- b) Name and identification code of the person giving the authorization, and
- c) Name and address of the company receiving alarm service.

Revised 65.5 effective January 1, 1998

65.6 The operating company shall maintain authorized service stations in sufficient number and distributed throughout the territory served as necessary to provide compliance with the requirement in 65.5. Service stations shall employ at least one expert repairman and shall maintain on hand a stock of such parts and materials as required to fully maintain all equipment in its territory.

66 Attack Tests

66.1 General

66.1.1 These tests are to be conducted as required to verify compliance with the requirements for Mercantile Premises Alarm Systems, Grade A Requirements, Tamper Protection, Section 68.

66.2 Test method

66.2.1 The tools used in the attack tests against control units, power-supply enclosures, alarm housings, or the like, are to include the type of tool intended for use with the fasteners used to assemble the product (excluding a key or lock pick), a blade type screwdriver not more than 8 inches (203 mm) in length from the blade tip to the handle and not more than 1/4 inch (6.4 mm) square or 9/32 inch (7.1 mm) diameter, and a wire cutter. The use of a wire cutter is to be restricted to the cutting of conductors inside the enclosure under attack.

66.2.2 The product under test is to be securely mounted in its intended position on a 3/4 inch (19.1 mm) thick plywood board that extends not less than 12 inches (305 mm) beyond each edge of the product and then to a substantial rack.

66.2.3 A single operator is to subject the product to:

- a) A disassembly attack using the tool intended for the fasteners used to assemble the product,
- b) A forcing attack using the blade type screwdriver, and
- c) A combination of disassembly and forcing attacks.

66.2.4 The forcing attack is to be directed against the enclosure cover, against any slot at least 1/8 inch (3.2 mm) wide, and against any other unobstructed opening having a dimension of 1/8 inch or more.

66.2.5 If the number of knockouts in an enclosure exceeds the number required for the connection of conduit in an installation, all knockouts are to be subjected to a forcing attack using the screwdriver described in 66.2.1.

66.2.6 Knockouts in the mounting surface of an enclosure are not to be subjected to attack. See 5.2.6.

66.2.7 The diameter of an opening provided in the control unit for conductors other than the alarm sounding-device power conductors, shall not exceed 3/8 inch (9.5 mm) and the opening shall not be subjected to attack if only one is provided. If more than one such opening is provided, each shall be subjected to attack using the screwdriver described in 66.2.1.

74.11 The sound power output of the alarm sounding device shall be measured in a reverberant room qualified for pure tones under Precision Methods for the Determination of Sound Power Levels of Broad-Band Noise Sources in Reverberation Rooms, ANSI S12.31-1990, or Precision Methods for the Determination of Sound Power Levels of Discrete-Frequency and Narrow-Band Noise Sources in Reverberation Rooms, ANSI S12.32-1990. The sound power in each 1/3 octave band shall be determined using the comparison method. The A-weighting factor shall be added to each 1/3 octave band. The total power shall then be determined on the basis of actual power. The total power shall then be converted to an equivalent sound pressure level for a radius of 10 feet (3.05 m) using the following formula:

$$L_p = L_w - 20\log_{10}R - 0.6$$

in which:

L_p is the converted sound pressure level,

L_w is the sound power level measured in the reverberation room, and

R is the radius for the converted sound pressure level (10 feet).

74.12 The output specified in 74.10 shall not be less than 84 decibels when the voltage is reduced to the minimum value specified in the Undervoltage Operation Test, Section 31.

74.13 The alarm sounding device, with its power supply, shall be capable of sounding at the level specified in 74.10 for:

- a) Not less than 15 minutes nor more than 30 minutes if the alarm condition has not cleared or
- b) Not less than 5 minutes if an automatic feature is provided to silence the alarm and reset the system if the alarm system has cleared.

74.14 A mechanical ringer shall give an indication automatically to the user when only 5 minutes operating power remains in the sounding device.

74.15 The sounding of the local alarm may be delayed by not more than 5 minutes, but the transmission of an alarm to the police station or central station shall be delayed not more than 45 seconds after the alarm has been initiated. See 53.5.

74.16 If the system design provides for two electrically powered alarm sounding devices, and one is to be mounted inside and one outside the building, the inside alarm shall have resistance to tampering and an audibility equal to that specified for a single outside alarm.

75 Maintenance

75.1 Repairs to a bank alarm system shall begin within 24 hours after the receipt of a service request. In cases where access to the protected property is controlled by a time lock not scheduled for release within 24 hours of the service request, service shall begin when the time lock releases. The maximum range of travel (driving time) from the company's main business location or service center to an alarm system installation shall not exceed 6 hours in a land-based service vehicle.

Exception: The beginning of repair service may be extended to the time that the protected property is next open for business if the subscriber to the alarm service provides written or oral authorization. Authorization shall be given to alarm service company personnel when the subscriber makes the decision to delay service. If authorization is given, the alarm service company shall make a record of the:

- a) *Time and date of the authorization,*
- b) *Name and identification code of the person giving the authorization, and*
- c) *The name and address of the company receiving alarm service.*

*Revised 75.1 effective January 1, 1998 *

75.2 Batteries shall be replaced or renewed by the operating company. However, in an emergency, the user may replace batteries, provided the cells are shipped from the factory, connected and sealed in containers as a complete unit, and provided that installation of the batteries does not require electrical skill.

75.3 The alarm service company shall maintain a means of receiving requests for service at all times and shall keep a permanent record of the time and date that:

- a) A request for service is received,
- b) Service begins, and
- c) The repairs are completed.

Requests for service shall be received by alarm service company personnel, or a method shall be devised that will result in the beginning of service within the time interval indicated in 75.1.

Added 75.3 effective January 1, 1998

75.4 The alarm service company shall provide the alarm service subscriber with written instructions on how to contact the company for service. The method of communication illustrated shall allow the subscriber to promptly report trouble conditions.

Added 75.4 effective January 1, 1998

75.5 Installations shall be maintained by the alarm service company under a service contract or agreement. They shall be inspected at intervals that will maintain the system in its intended operating condition. The interval between regular maintenance inspections shall not exceed 1 year. The regular maintenance inspection may be done in parts throughout the year.

75.5 added February 21, 1996

76 Attack Test

76.1 The tools used in the attack tests of 78.1 and 81.1 are to include hammers, chisels, adjustable wrenches, pry bars, punches, and screwdrivers. The hammers are not to exceed 3 pounds-mass (1.36 kg) in head weight, and no tool is to exceed 18 inches (45.7 mm) in length.

76.2 The tools used in the attack tests of 78.2 are to include those described in 76.1 and in addition, are to include drills, fish wires, firearms, hooks, and lines.

76.3 Drill bits are not to exceed 1/4 inch (6.4 mm) in diameter, are to be high-speed bits, and are to be used in a 1/4 inch capacity electric drill rated not greater than 2000 revolutions per minute.

76.4 The firearm used shall be a 38 special revolver with an 8-1/4 inch (210 mm) barrel, and shall be used to fire a 158 grain (10.2 g) lead 38 special bullet from a distance of 12 – 15 feet (3.7 – 4.6 m).

76.5 The measuring instruments and tools used in the attack tests described in 78.3 and 81.2 shall include not more than four multimeters, jumper wires with clips or needle point probes, wire cutters, wire strippers, needle point pliers, and knives.

76.6 Multimeters shall be capable of measuring volts, amperes, and resistance, and on the voltage ranges shall have an input impedance of 10,000 ohms/volts or higher.

76.7 The product under test is to be securely mounted in its intended position on a 3/4 inch (19.1 mm) thick plywood board that extends not less than 12 inches (305 mm) beyond each edge of the product and then to a substantial rack. The attack shall be carried out by a single operator.

GRADE A REQUIREMENTS

77 General

77.1 Grade A alarm systems for bank safes and vaults shall comply with the requirements specified in Sections 73 – 76, and the following requirements in Bank Safe and Vault Alarm Systems, Grade A Requirements, Tamper Protection, Section 78, and Circuit and Operation, Section 79.

78 Tamper Protection

78.1 The alarm housing shall be at least equal in mechanical strength and electrical protection to a 0.123 inch (3.12 mm) sheet steel enclosure with an electrically connected lining completely covering the interior of the housing. The housing shall resist for a period of 5 minutes all attempts to silence the alarm by use of the tools specified in 76.1. See Sections 110 – 122.

78.2 In addition to the requirements of 76.1, mechanical safeguards shall be placed around the ringing mechanism, sources of energy, and the like, to withstand for 15 minutes any attempt to defeat the alarm mechanism, by use of the tools specified in 76.1 and 76.2, before it has had an opportunity to initiate an alarm.

78.3 The cable connecting the safe or vault with the alarm housing shall employ balanced electrical circuits arranged to resist an attack on the cable by an expert having detailed knowledge of the circuit employed and equipped with the measuring instruments and tools specified in 76.5.

78.4 The provision for turning off the alarm from the control unit shall be guarded by a key lock or combination, except in systems where this control is inoperative during the closed periods.

116 Dust Test

116.1 The intended operation of a police station connected burglar alarm unit intended to be used outdoors shall not be impaired by an accumulation of dust.

116.2 To determine compliance with the requirement in 116.1, a de-energized sample in its intended mounting position is to be placed in an air tight chamber having an internal volume of at least 3 cubic feet (0.03 m^3), and approximately 2 ounces (0.06 kg) of cement dust, maintained at 20 – 50 percent relative humidity and capable of passing through a 200 mesh screen, is to be circulated for 1 hour by means of compressed air or a blower so as to completely envelop the sample in the chamber. The air flow is to be maintained at an air velocity of approximately 50 feet per minute (0.25 m/s).

116.3 Following the exposure to dust, the product is to be removed carefully, mounted in its intended position, energized from a source of supply in accordance with 25.3.1, and shall comply with the requirements of the Normal Operation Test, Section 26.

117 Variable Ambient Test

117.1 A police station connected burglar alarm unit intended for outdoor use shall function as intended at the test voltage, with its related equipment connected, and at ambient temperatures of minus 35 and plus 66°C (minus 31 and plus 151°F).

117.2 The exposure to either of the temperatures specified in 117.1 shall be 4 hours or more.

118 Metallic Coating Thickness Test

118.1 This test is to be used to determine coating thickness as described in 111.2.4(b) and 111.2.5 (b) and (c).

118.2 The solution to be used for this test is to be made from distilled water and is to contain 200 grams per liter of reagent grade chromic acid (CrO_3) and 50 grams per liter of reagent grade concentrated sulfuric acid (H_2SO_4). The latter is equivalent to 27 milliliters per liter of reagent grade concentrated sulfuric acid, specific gravity 1.84, containing 96 percent of H_2SO_4 .

118.3 The test solution is to be contained in a glass vessel, such as a separatory funnel, with the outlet equipped with a stopcock and a capillary tube of approximately 0.025 inch (0.64 mm) inside bore and 5.5 inches (140 mm) long. The lower end of the capillary tube is to be tapered to form a tip, the drops from which are to be approximately 0.05 milliliter each. To preserve an effectively constant level, a small glass tube is to be inserted in the top of the funnel through a rubber stopper and its position is to be adjusted so that, when the stopcock is open, the rate of dropping is 100 ± 5 drops per minute. If desired, an additional stopcock may be used in place of the glass tube to control the rate of dropping.

118.4 The sample and the test solution shall be kept in the test room long enough to acquire the room temperature, which shall be noted and recorded. The test is to be conducted at a room temperature of 70 to 90°F (21 to 32°C).

118.4 revised February 21, 1996

118.5 Each sample is to be cleaned before testing. All grease, lacquer, paint, and other nonmetallic coatings are to be removed completely by means of a suitable solvent. Samples are then to be thoroughly rinsed in water and dried with clean cheesecloth. The cleaned surface to be tested shall not be contacted.

118.6 The sample to be tested is to be supported 0.7 – 1.0 inch (17.8 – 25.4 mm) below the orifice. The surface to be tested should be inclined approximately 45 degrees from horizontal, so that the drops of solution strike the point to be tested and run off.

February 21, 1996

Standard for

Police Station Connected Burglar Alarm Units and Systems

UL 365, Third Edition

THE REQUIREMENTS SHOWN BELOW ARE THE CURRENT REQUIREMENTS THAT HAVE BEEN SUPERSEDED BY REQUIREMENTS IN REVISION PAGES DATED FEBRUARY 21, 1996. TO RETAIN THE CURRENT REQUIREMENTS, DO NOT DISCARD THE FOLLOWING REQUIREMENTS UNTIL THE FUTURE EFFECTIVE DATES ARE REACHED.

65.3 The operating company shall maintain at least one employee on duty to receive trouble calls during regular business hours and also during such other periods as experience may show to be necessary.

65.4 At least one individual telephone line (not a party line) shall be listed in the name of the alarm company.

65.5 Trouble calls received before 12:00 noon shall be responded to the same day, and troubles thereafter shall be responded to as soon as possible but in no case later than the following business day.

75 Maintenance

75.1 The maintenance organization of the operating company shall be distributed so that a repairman will normally reach any installation not later than the second day following the report of trouble sufficient to depreciate the protection of the system.



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April 25, 1995

Revision pages for

Standard for

Police Station Connected Burglar Alarm Units and Systems

UL 365, Third Edition

Attached to this transmittal notice is a revision of the third edition of UL 365.

A CHANGE ON A PAGE DATED APRIL 25, 1995 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THIS REVISION IS BEING ISSUED TO CORRECT THE WORDING OF THE REQUIREMENTS IN 64.1. THE REQUIREMENTS ARE NOW IN EFFECT.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 365-1994.

Revised and/or additional pages may be issued from time to time.

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

Page	Date
1	June 10, 1993 (Reprinted April 25, 1995)
2	-
3 - 9	June 10, 1993
10, 11	December 9, 1994
12	June 10, 1993
13, 14	December 9, 1994
15 - 27	June 10, 1993
28, 28A, 29	December 9, 1994
30 - 63	June 10, 1993
64, 64A	December 9, 1994
65 - 67	June 10, 1993
68, 68A	December 9, 1994
69	June 10, 1993
70	April 25, 1995
71, 72	June 10, 1993
73	December 9, 1994
74 - 114, A1	June 10, 1993

JUNE 10, 1993
(Title Page Reprinted: April 25, 1995)



1

UL 365

Standard for

**Police Station Connected Burglar
Alarm Units and Systems**

First Edition – March, 1975
Second Edition – July, 1982

Third Edition

June 10, 1993

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated June 10, 1993 and October 19, 1993. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Approved as ANSI SE2.13-1975, December 30, 1975
Approved as ANSI/UL 365-1983, April 22, 1983
Approved as ANSI/UL 365-1994, October 19, 1994

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 published set of revision pages.

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59.10 It is not required that an alarm signal caused by a compromise attempt be distinguishable from a normal alarm signal.

59.11 If a number of systems depend on one signaling line or communication channel, the system against which a compromise attempt is made in accordance with 59.3 shall be identified and the attempt shall not cause confusing signals from any of the other systems on that line or channel.

PROTECTED PREMISES EQUIPMENT

60 Subscriber's Control Units

60.1 The subscriber's control unit shall provide for the connection of protective wiring, conductors, and attachments, and shall provide for the transmission of an alarm signal to a police department. See Sections 53 – 59.

60.2 Control units and terminal panels intended to be located outside of a complete vault, a complete safe, or an extent number 1 stockroom shall be electrically protected so that no opening can be created of sufficient size to permit defeat of the system without signaling an alarm condition.

60.3 Control units mounted inside the protected area shall have the cover electrically supervised through the protective wiring circuit to protect against unauthorized opening. See 7.2.3 and 68.3.

61 Outside Alarm Devices

61.1 Outside sounding devices shall be of the enclosed type and shall comply with the Standard for Audible Signal Appliances, UL 464, for outdoor use and with audibility requirements given in 64.5 – 64.9 and 74.10 – 74.14. Also see Outdoor Use Equipment, Sections 110 – 122.

61.2 The construction of the outside alarm housing shall be such that it will shed water when mounted as intended. Sufficient drain openings shall be provided in the lowest part of the housing to prevent accumulation of water. See Rain Test, Section 115.

61.3 Protective linings employed in housings shall be sealed in a moisture-tight envelope unless of rust resisting material or treated to resist corrosion. If air is depended upon for insulation, "live" linings shall be spaced not less than 1/4 inch (6.4 mm) nor more than 1 inch (25.4 mm) from the housing or other parts that would result in an alarm if they contact the protective lining.

61.4 Instruments and connecting wire shall be located at a sufficient height above the bottom of the housing to avoid saturation with water, snow, and the like.

61.5 Ringing mechanisms and other apparatus in housings subject to vibration shall be mounted with lock washers or the equivalent to prevent loosening.

62 Intrusion Detection

62.1 Intrusion detection portions of a police station connected burglar alarm unit, such as a motion detector, proximity detector, sound detector, vibration detector, or the like, shall comply with the appropriate performance requirements of the Standard for Intrusion-Detection Units, UL 639.

MERCANTILE PREMISES ALARM SYSTEMS

GRADE A REQUIREMENTS

63 Construction

63.1 Alarm units shall comply with the applicable requirements for construction and performance in this standard and shall, in addition, comply with the requirements in Mercantile Premises Alarm Systems, Grade A Requirements, Circuit and Operation, Section 64, and Maintenance, Section 65.

64 Circuit and Operation

64.1 The protective circuits shall be of the electrically-supervised type, arranged to produce an alarm if the protective circuit is opened, if circuits of opposite polarity are crossed, or if an initiating device in the circuit transfers to the alarm condition.

64.1 revised April 25, 1995

64.2 A time delay of up to 1 second to prevent accidental alarms resulting from momentary breaks, crosses, leakage to ground, or the like, is acceptable in circuits where quick reaction to such alarm conditions is not required.

64.3 The circuit shall be constructed so that once an alarm is initiated from protective circuits it cannot be stopped by removing the cause thereof.

64.4 Provision shall be made for the user to conveniently test the operability of the protection circuit each time it is placed on duty for the closed period.

64.5 The alarm sounding device, mounted within its intended housing and in its intended mounted position, shall provide a sound output equivalent to that of an omnidirectional source with an A-weighted sound pressure level of at least 85 decibels at 10 feet (3.05 m) while connected to a source of rated voltage. See 25.3.1.

64.6 The sound power output of the alarm sounding device shall be measured in a reverberant room qualified for pure tones under Precision Methods for the Determination of Sound Power Levels of Broad-Band Noise Sources in Reverberation Rooms, ANSI S12.31-1990, or Precision Methods for the Determination of Sound Power Levels of Discrete-Frequency and Narrow-Band Noise Sources in Reverberation Rooms, ANSI S12.32-1990. The sound power in each 1/3 octave band shall be determined using the comparison method. The A-weighting factor shall be added to each 1/3 octave band. The total power shall then be determined on the basis of actual power. The total power shall then be converted to an equivalent sound pressure level for a radius of 10 feet (3.05 m) using the following formula:

$$L_p = L_w - 20\log_{10}R - 0.6$$

in which:

L_p is the converted sound pressure level,

L_w is the sound power level measured in the reverberation room, and

R is the radius for the converted sound pressure level (10 feet).

64.7 The output specified in 64.5 shall not be less than 82 decibels when the voltage is reduced to the minimum value specified in the Undervoltage Operation Test, Section 31.



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Subjects 205A (365, 609, 1023, 1076, 1610, and 1635)
 (In reply, refer to Subject 205A)

333 Pfingsten Road
 Northbrook, IL 60062
 January 26, 1995

TO: Burglary Council of Underwriters Laboratories Inc.,
 Electrical Council of Underwriters Laboratories Inc.,
 Subscribers to UL's Standards Service for:
 Police Station Connected Burglar Alarm Units and Systems, UL 365;
 Local Burglar Alarm Units and Systems, UL 609;
 Household Burglar-Alarm System Units, UL 1023;
 Proprietary Burglar Alarm Units and Systems, UL 1076;
 Central-Station Burglar-Alarm Units, UL 1610; and
 Digital Alarm Communicator System Units, UL 1635

SUBJECT: Report of the Meeting of the Industry Advisory Conference of UL for Burglary Protection Equipment

SUMMARY OF TOPICS

The following topics were discussed at the meeting:

1. Plain Language (Modular) Certificate Program
2. Reduction of Unwanted Burglar Alarm Systems
3. Proposed Revisions to UL 365, 609, 1023, 1076, 1610, and 1635
4. Control Unit Features for Reduction of Unwanted Alarms
5. Government Standards

COMMENTS DUE: March 9, 1995

A meeting of the Industry Advisory Council of UL for Burglary Protection Equipment was held on November 17, 1994 at UL's Northbrook office. The purpose of the meeting was to discuss the elimination of grade designations for alarm systems and equipment along with the other items noted in the "Summary of Topics."

Attached as Appendix A is a list of those who attended the meeting. Questions regarding interpretation of requirements should be directed to the responsible UL Staff. Please see Appendix B of this bulletin regarding designated responsibility for the subject product categories.

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AVA Documents
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Please note that proposed requirements are of a tentative and early nature and are for review and comment only. Current requirements are to be used to judge a product until these requirements are published in final form.

* * * * *

The following report is not intended to be a verbatim transcript of the discussions at the meeting, but is intended to record the significant features of those discussions.

1. INTRODUCTION

The IAC Committee was welcomed by the IAC Chairman. The IAC Chairman outlined the purposes and goals of the Industry Advisory Council (IAC) as representing an important step in UL's procedure for the development of requirements, test methods, standards, and related product evaluation programs. UL invites the members of the IAC on the basis of their technical expertise and involvement in UL's programs. It is intended that industry representatives, functioning in an advisory role, serve as individual representatives of industry. Therefore, UL calls upon the IAC members for discussion and review of proposals prior to submission for review by all expressing interest in the product category. The representatives of industry are also given an opportunity to present new ideas, modifications of existing ideas or requirements, and suggestions as to how UL may better serve its clients.

2. MODULAR CERTIFICATE PROGRAM

UL stated that it currently assigns Grades of Service for burglar alarm equipment and installations. The grade designation (A, AA, BB, C, CC) for the equipment depends on such factors as construction, alarm reporting time, supervision of initiating device and signaling circuits, central station ringback, and monitoring of the signaling channel against compromise. For the burglar alarm installations to be eligible for a certain grade, the burglar alarm equipment employed needs to be of the same or higher grade. In addition to employing the appropriate burglar alarm equipment, the grades of service designated on a Certificate depend on the timing of the alarm investigators response and on monitoring of openings and closing.

It was brought to UL's attention by the insurance and alarm industries that the packaging of service elements identified by letter codes designating the grades of service poses a barrier to acceptance and growth of standards complying services. In addition, some manufacturers indicated that there are certain systems that may not completely meet the highest grade of requirements but have more features than the lower grade requirements. The manufacturers indicated that the current grade designation format inhibits the marketability of certain systems.

Due to these concerns, UL proposes to develop a Plain Language (Modular) Certificate Service Program with existing categories restructured which will enable the insurance industry, authorities, and alarm system users to accept Certificates based on risk analysis, rather than the general groups of features combined into specific types of certificates. The intent of the revised Modular Certificate Program is to allow the user to understand, in plain language, the type of equipment that is installed and the monitoring service provided.

Elements of Service

The goal of the Modular Certificate Program is to modularize the elements of service so that each can be individually described on a certificate covering an installation. The insurance underwriter can then use the detailed alarm description information on the certificate along with other information such as ratings

of any safes or vaults, the existence of specifically rated doors and locks, and the insurance company's own evaluation of local law enforcement, etc. to develop an overall evaluation of any potential risk to security.

The attached Subject 205 (611, 681, 827) meeting report dated December 12, 1994 discusses each specific element listed below and which UL proposes to place on the installation certificate.

- | | |
|-------------------------------------|---------------------------------|
| a) system grade elimination | h) alarm sounding device |
| b) alarm investigator response time | i) line security |
| c) system description | j) method of alarm transmission |
| d) extent of protection | k) monitoring location |
| e) protected area | l) alarm investigator |
| f) holdup service | m) signal supervised |
| g) keys | n) maintenance agreements |

It should be noted that the more important of the elements and potentially of greater concern for equipment manufacturers are the system grade, alarm sounding device, line security, and method of alarm transmission.

SYSTEM GRADE ELIMINATION – UL proposes to eliminate the use of grades to describe the alarm equipment, response time, method of alarm transmission, and the existence of line security. The alarm equipment, therefore, no longer needs to be designated by a grade.

ALARM SOUNDING DEVICE – The options on the certificate will include inside and/or outside devices. The Standard for Police Station Connected Burglar Alarm Units and Systems, UL 365, and the Standard for Local Burglar-Alarm Units and Systems, UL 609, describe the requirements for the alarm sounding device itself regardless of whether it will be designated outside, inside/visible, or inside/concealed. Only audible alarm sounding devices that meet the outside requirements are Listed at this time for commercial installations.

LINE SECURITY – Line security is currently reflected by the use of the second letter in the grade (AA, BB, or CC). The second letter designates whether the system responds to compromise attempts within 6 minutes if the integrity of system is affected. UL will designate the type of line security on the equipment marking and installation instructions for the equipment. The proposed designations will be:

- a) Standard – Equipment that complies with minimum security requirements.
- b) High – Equipment that complies with the current line security requirements indicated in UL 365, UL 1076, and UL 1610.
- c) Encrypted – Equipment which employs DES (National Institute of Standards and Technology Data Encryption) or equivalent encryption algorithms in signal transmission and reception.

METHOD OF ALARM TRANSMISSION – As is the current practice, the Certificate will display the type and method of alarm transmission. The UL equipment Standards describe the requirements for the different transmission schemes.

Insurance Concerns

An industry member inquired as to how the insurance companies assess the adequate amount of protection.

UL stated that the determination is based in part on the burglar alarm equipment, monitoring and response time provided, line security, and monitoring of opening and closing signals. Other factors include building construction, location, etc. UL noted that at one time, a point system determined the amount of risk depending on the above factors.

Presently, the underwriter uses the Insurance Services Office (ISO) commercial lines manual (CLM) to determine the grades of service which include the factors that determine the rating as being A, AA, B, BB, C, and CC.

UL stated that it received confirmation from an ISO representative that they will revise the commercial lines manual to reflect the change to the plain language certificate. UL has agreed to provide assistance in this matter if requested.

Category Combination

The local mercantile category is one of the oldest in the program. It was originally created to include all non-central-station-type mercantile systems. In the early 1970's, UL established the police station connected category in response to concerns by the insurance industry that an outside sounding device by itself would provide little protection in a rural application where no one, other than the intruder, would be likely to hear the sounding device. The police station connected category was in effect an enhanced local mercantile category.

Over the years, this distinction has become somewhat clouded. Due to the wide use of digital communicators, long range radio transmitters, derived channel systems, and more recently, cellular transmitters, the vast majority of mercantile burglar alarm systems are monitored from a location. Thus, many of the burglar alarm systems that are certified as local mercantile could qualify for police connected certification. Further, the name of the police station connected category implies the systems are always monitored in a police station, when in fact the majority of these certificates are monitored in central stations. Finally, there is a tendency to confuse police connected certificates with central station certificate systems.

In light of the above, UL proposes to combine the local mercantile and police station connected categories. The new category would be known as mercantile burglar alarm systems. As is the case with the central station certificates, the format would be modular. Remote monitoring of such a system would be an optional element, which if employed, would be displayed on the certificate.

UL also proposes to combine the local bank and police station connected bank categories in a similar fashion. The Certificate will indicate if the system is for local mercantile, mercantile safe and vault, or bank safe and vault installation along with any type of line security. UL also contemplates combining UL 365 and UL 609 in the future.

Certificate Count

A representative of industry expressed interest in discovering the number of certificates issued in specific categories as it may be beneficial in understanding what equipment is needed in the marketplace.

UL stated that it will provide present certificate statistics (see Appendix C). UL noted that the Security Industry Association (SIA) may request and publish this information by contacting UL.

3. REDUCTION OF UNWANTED BURGLAR ALARM SIGNALS

The growing burden of false and unwanted alarms has become a major problem for the alarm industry in general and particularly for the alarm service companies that provide burglar alarm service. As discussed during the 205 IAC meeting, methods of reducing unwanted alarms include:

- a) A standardized check for the operation of the system by the installing companies.
- b) Improved record keeping.
- c) Improved user training.
- d) Periodic inspections of the operation of the system.
- e) Alarm verification.

The alarm verification features may have a more direct effect for the equipment manufacturers than the others noted above.

ALARM VERIFICATION

The alarm industry has identified alarm verification as a key component in the reduction of unwanted law enforcement dispatches. The industry noted that reducing unwanted alarms requires a multi-faceted approach. Even after equipment and better training, monitoring, and record keeping processes are in place, alarm verification techniques provide a valuable tool.

The alarm and insurance industries have discussed alarm verification in great length and the following proposals are a result of those discussions.

Central Station Systems, No-Line Security – The central monitoring station may verify all alarm signals by telephoning the protected property. The recipient of an alarm signal initiates the verification process. The monitoring station telephones and makes contact with personnel at the protected property within 1 minute or investigators are dispatched. A verbal pass code or number identifies an authorized user if contact has been made. Failure to obtain a valid pass code or number within 2 minutes results in dispatch of investigators as displayed on the Certificate.

Central Station Systems, Line Security – For systems with line security, verification techniques start with a telephone call to the protected property upon receipt of alarm signals. If telephone contact with the personnel at the protected premise property cannot be made within 1 minute, the monitoring station dispatches the investigators. The combination of a verbal pass code or number along with an electronically transmitted personnel identifier provides two means for the central station to identify the authorized user. The monitoring station dispatches investigators displayed on the Certificate upon failure to obtain both a correct pass code or number and personal identifier within 2 minutes of the contact.

UL proposes that for a period of three years from the date of publication, the electronically transmitted personal identifier could be a numerical code or the equivalent. Some control units to date have the capability of at least transmitting a single digit user code when arming/disarming the system. Following the three year period, the personal identification would need to be a measure of a physical attribute of that person.

UL hopes to develop a proposed Standard for biometric identification equipment in the near future so the equipment can be implemented by the alarm service providers with a target date of 1998.

Types of Alarm Signals to be Verified – During a subsequent meeting, members of the alarm and insurance industry suggested that it was not necessary to verify all alarm signals. An insurance industry representative noted that a subscriber who makes an error during arming or disarming the system can be expected to go through a rather predictable set of actions. For instance, the subscriber would normally come through a regular portal and make his way directly to the arm/disarm portion of the control panel. Thus, an alarm system can transmit zone information to the central monitoring facility that would tend to confirm the likelihood of an authorized person being on the premise.

In contrast, an alarm signal transmitted from a vault system without any additional signals from premise perimeter sensors would tend to signal the presence of an unauthorized person on the property.

The general consensus of the representatives of the alarm and insurance industries was that the proposal was reasonable. However, some members of the alarm industry noted that time would be needed to modify or replace nonzoned systems that are already installed. All concerned acknowledged this need.

Many systems available today provide the capability of separating the exit/entry zone from other burglar alarm detection zones and transmitting the zone information as part of the burglar alarm message. The central station monitoring will have to be able to determine which zone is affected if provided with the information from the protected premise installation.

4. PROPOSED REVISIONS FOR ELIMINATION OF GRADE OF SERVICE FOR BURGLAR ALARM EQUIPMENT

UL proposes that the present grades of service in the plain-language (modular) certificate program are eliminated for the burglar alarm control unit equipment in the following categories:

- A) Local alarm units (AOTX)
- B) Police station alarm units (APAW)
- C) Central station alarm units (AMCX)
- D) Proprietary alarm units (APOU)
- E) Household burglar system units (NBSX)

The charts attached to the end of this meeting report indicate the present grades of service for equipment system configurations for the above categories*.

- * Please note the correction to the present grades of service for central station multiplex transmission systems.

Over the years, UL has assigned grades to equipment and equipment combinations as they were submitted. As UL considered the ramifications of eliminating grades, it became apparent that a defined set of minimum desirable features would help define minimum equipment requirements. UL presented the following list as the defining set of features.

- A) The equipment should meet a single set of consistent requirements.
- B) Ringback – The central station and proprietary systems should provide positive feedback that closing signals were received.

- C) Multiple Transmission Lines – A system employing multiple transmission lines should signal the monitoring station if one of the means no longer can contact the monitoring station.
- D) Dual Alarm Systems – The systems should transmit alarm signals simultaneously (except for dual line digital alarm communicator transmitters (DACT)).
- E) Audible Indicating Device – The system power supply should have the capability of providing power to an audible indicating device for local systems and may have this capability for central station and proprietary systems.
- F) Line Security – The system should provide an appropriate level of line security.

In order to incorporate these changes, UL proposes the following revisions be made to the appropriate standards:

- A) Elimination of designation of all grades of service for burglar alarm standards.
- B) Removal of all Grade B performance, construction and installation requirements in burglar alarm equipment standards.
 - 1. For local and police station connect bank safe and vault systems, only the Grade A requirements shall remain.
 - 2. All initiating circuits shall be arranged so both an open or cross will cause an alarm signal when protection is set.
 - 3. For all central station and proprietary systems where the protection is set at the protected premises, the systems shall provide positive indication that the protected premise closing signal has been received at the central station (ringback signal).
- C) A system employing two separate signaling means for off premise transmission shall be capable of reporting to the central station failure of either of the signaling means.
- D) A system employing a DACT (land line or cellular) for off premise transmission shall have the system provide a check in signal once every 24 hours.
 - Exception: A system employing dual DACT lines need only provide 24 hours check in signal on one of the lines.
- E) A system employing the two separate signaling means throughout premise transmission shall provide for near simultaneous transmission for all alarm signals.
 - Exception: A system employing dual DACT lines need only provide an alarm signal on one line at a time.
- F) A system employing a DART (digital alarm radio transmitter) shall be used with a DACT. The transmitter of the DART does not need to be monitored.
- G) The off premise transmission shall be designated standard line security, high line security, or encryption.
- H) The system installation instructions shall indicate that the system can support a compatible audible alarm device.

The tables attached to the end of this meeting report indicate elimination of the grades of service. In addition, the attached central station wiring diagrams summarize these requirements.

In summary, the plain language (modular) certificates will indicate the type of off premise transmissions, whether the system can support a local audible device and any degree of line security. These features will simplify the understanding of the use of equipment more so than by current grade designations.

UL and the representatives of industry reached a consensus that a marking revision needs to distinguish between commercial and residential equipment.

The Standards which will need to be revised are as follows:

- a) Central Station Burglar Alarm Units, UL 1610
- b) Digital Alarm Communicator Systems Units, UL 1635
- c) Household Burglar Alarm Systems Units, UL 1023
- d) Local Burglar Alarm Units and Systems, UL 609
- e) Police Station Connected Burglar Alarm Units and Systems, UL 365
- f) Proprietary Burglar Alarm Units and Systems, UL 1076

Representatives of industry have requested a minimum two year effective date deadline for industry to comply with these new proposals if they are approved by industry. The industry also has requested UL to explore the feasibility of coordinating the effective dates for these revisions to standards with the effective date for other Standards revisions which affect the same control unit equipment.

5. REVISIONS TO REDUCE FALSE ALARMS

The Control Panel False Alarm Reduction Standards Committee of the Security Industries Association (SIA) proposes to develop a Standard for reduction of false alarms for control units. The proposed SIA Standard has a few requirements that conflict with the UL requirements. For example, the SIA Standard includes a requirement of a programmable default exit delay time that exceeds the UL requirements.

UL noted that its standards process involves many different concerns. The alarm services industry and the insurance industry may view changes to UL requirements in a different manner.

After some discussion, the SIA representative decided to try to discuss the issues with the alarm service industry and insurance industry in a Central Station Alarm Association (CSAA) Insurance Liaison Forum. UL representatives participate in this forum. If a consensus can be reached among the attendees, it is much more likely that UL can propose Standards revisions that will be acceptable to a wide range of concerned parties.

6. GOVERNMENT STANDARDS

UL noted that the General Services Administration (GSA) has sent a survey to UL to determine if UL could investigate security products to the WA450D Standard (a Federal specification for Components for Internal Alarm Systems). UL questioned the industry members if involvement with this Standard would simplify marketing of their products with the government.

One member indicated that the process of submitting products to the government was difficult and not easily understood. Others indicated that they sell products to the government and test to the WD540D Standard.

As the feedback from the majority of the industry members was positive, UL indicated that it would keep the industry informed of further progress.

REQUESTS FOR COMMENTS ON PROPOSALS

Please provide your comments concerning the meeting report.

Written comments should be sent to the attention of Alan Lim at UL's Santa Clara office, 1655 Scott Boulevard, Santa Clara, CA 95050-4169. Please reference all correspondence to Subject 205A.

All comments should be sent by March 9, 1995.

Unless specifically requested to do otherwise, UL will not acknowledge comments indicating concurrence with these proposals.

UNDERWRITERS LABORATORIES INC.

REVIEWED BY:

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A P P E N D I X A

ATTENDANCE AT THE NOVEMBER 17, 1994 MEETING
OF THE IAC FOR
BURGLARY PROTECTION EQUIPMENT, SU 205A

Industry Representatives

George A. Carrick
Allen Jones
David Lederer
Tom LeNay
Ted Simon
David S. Terret
Jack Turner

Diebold, Inc.
Litton Security Systems
Detection Systems Inc.
Wells Fargo Alarm Services, Inc.
Fire Burglary Instruments, Inc.
Sentrol, Inc.
Potter Electric Signal Co.

Invited Guests

George Behlke
Marcus Cobb
Martin Raphael
Jim Stevens

Detection Systems, Inc.
Sentrol, Inc.
ADEMCO
CADDX/CADDI Controls, Inc./
Representing SIA

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Northbrook
Northbrook
Northbrook
Northbrook
Northbrook
Santa Clara

APPENDIX B

DESIGNATED RESPONSIBILITY FOR UL PRODUCT CATEGORY

POLICE STATION ALARM UNITS,
AOTX, LOCAL ALARM UNITS
APAW, POLICE STATION ALARM UNITS
APAW2, POLICE STATION ALARM UNITS – COMPONENT
APOU, PROPRIETARY ALARM UNITS
APOU2, PROPRIETARY ALARM UNITS – COMPONENT
AMCX, CENTRAL STATION ALARM UNITS
AMCX2, CENTRAL STATION ALARM UNITS – COMPONENT
NBSX, HOUSEHOLD ALARM UNITS

The individuals shown on the back side of this sheet are involved with the investigation of products covered under the subject category. The Primary Designated Engineer (**shown in UPPERCASE letters**) coordinates the establishment and uniform interpretation of UL requirements applicable to the product category. The Designated Engineers (**shown in lowercase letters**) work with the Primary Designated Engineer to interpret requirements and maintain standards.

Should you have questions regarding the interpretation of the requirements proposed in this bulletin or any adopted requirements that affect your product, you are encouraged to contact the individual at the office to which you normally submit your products.

The Industry Advisory Conference (IAC) Chairman for the subject category is Isaac Papier at UL's Northbrook office. The IAC Chairman oversees the significant interpretations made by the Primary Designated Engineer and arbitrates any differences regarding interpretation of UL requirements.

Subjects 205A (365, 609, 1023,
1076, 1610, and 1635)

-B2-

January 26, 1995

CCN	Office/Subsidiary	Responsible Engineer	Extension
AOTX,APAW, APAW2	Melville	Gengler	22562
	Northbrook	SUCHY	43201
	Santa Clara	Mohajer	2863

CCN	Office/Subsidiary	Responsible Engineer	Extension
APOU, APOU2, AMCX, AMCX2	Melville	Gengler	22562
	Northbrook	LESNIAK	42162
	Santa Clara	Mohajer	2863

CCN	Office/Subsidiary	Responsible Engineer	Extension
NBSX	Melville	Gengler	22562
	Northbrook	WITTMAN	43490
	Santa Clara	Mohajer	2863

APPENDIX C

CERTIFICATE STATISTICS

Type of Certificate	No. of Certificate	Percent
Central Station Certificates (BCS)	21965	48.6% of active
Limited Mercantile Certificates (BCL)	95	0.2% of active
Police Mercantile Certificates (BPM)	14129	31.2% of active
Police Bank Certificates (BPB)	181	0.4% of active
Local Mercantile Certificates (BLM)	3470	7.7% of active
Local Bank Certificates (BLM)	1520	3.4% of active
Local Bank Certificates (BPR)	103	0.2% of active
Holdup Certificates (BHD)	19	0.0% of active
Residential Certificates (BRD)	96	0.2% of active
Central Station Fire Alarm Certificates (FCS)	2193	4.8% of active
Other Fire Alarm Certificates (FAL)	384	0.8% of active
Defense Industrial Security Certificates (DIS)	1085	2.4% of active
Total Number of All active Certificates Analyzed	45240	

**Underwriters Laboratories Inc.®**A not-for-profit organization dedicated to public safety
and committed to quality service**December 9, 1994****Revision pages for****Standard for****Police Station Connected Burglar Alarm Units and Systems****UL 365, Third Edition**

Attached to this transmittal notice is a revision of the third edition of UL 365.

A CHANGE ON A PAGE DATED DECEMBER 9, 1994 IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM, PRECEDED AND FOLLOWED BY AN ASTERISK.

THESE NEW AND REVISED REQUIREMENTS ARE NOW IN EFFECT.

The new and revised requirements are substantially in accordance with UL's bulletins on Subjects 291 (294, 365, 603, 609, 634, 639, 680, 752, 771, 983, 1023, 1034, 1037, 1076, 1610, 1635) dated February 24, 1994 and Subjects 1610 (365, 1076) dated March 3, 1994. These bulletins are now obsolete and may be discarded.

Attention is directed to the note on the title page of this standard outlining the procedure to be followed to retain the approved text of ANSI/UL 365-1994.

Revised and/or additional pages may be issued from time to time.

With the inclusion of the accompanying material, the standard consists of pages dated as shown in the following checklist:

Page	Date
1	June 10, 1993 (Reprinted December 9, 1994)
2	—
3 – 9	June 10, 1993
10, 11	December 9, 1994
12	June 10, 1993
13, 14	December 9, 1994
15 – 27	June 10, 1993
28, 28A, 29	December 9, 1994
30 – 63	June 10, 1993
64, 64A	December 9, 1994
65 – 67	June 10, 1993
68, 68A	December 9, 1994
69	June 10, 1993
70	December 9, 1994
71, 72	June 10, 1993
73	December 9, 1994
74 – 114, A1	June 10, 1993

**Documents**

Document Sharing Hub

JUNE 10, 1993
(Title Page Reprinted: December 9, 1994)



1

UL 365

Standard for

**Police Station Connected Burglar
Alarm Units and Systems**

First Edition – March, 1975
Second Edition – July, 1982

Third Edition

June 10, 1993

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated June 10, 1993 and October 19, 1993. These pages should not be discarded when revised or additional pages are issued if it is desired to retain the ANSI approved text.

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

Approved as ANSI SE2.13-1975, December 30, 1975
Approved as ANSI/UL 365-1983, April 22, 1983
Approved as ANSI/UL 365-1994, October 19, 1994

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 published set of revision pages.

ISBN 1-55989-409-1

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INTRODUCTION

1 Scope

1.1 These requirements cover construction, performance, and maintenance of police station connected 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 police station connected alarm system consists of protective circuits and devices, connected through control apparatus to an enclosed tamper-protected sounding device mounted on an outside or inside wall of the building in which the protected property is situated, and a constantly-manned police department (see 1.8 and 52.1). Intrusion into or disturbance of the units or wiring causes the sounding device to be actuated and a signal to be transmitted to the police department. The sounding device and signal to the police department continue 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 as defined by Article 725 of the National Electrical Code, NFPA 70.

1.3 The operation of a police station connected alarm system is partially under the control and domination of the owner or others interested in the property. However, it is required that police station connected systems be maintained under the care and regular inspection service of the installing company. The installing company is expected to respond promptly to troubles or calls for service on report of the owner or police department. See Mercantile Premises Alarm Systems, Maintenance, Section 65 and Bank Safe and Vault Alarm Systems, Maintenance, Section 75. 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 Police station connected mercantile burglar-alarm systems are designated as Grade AA or Grade A, and are designated as to their acceptability for use either on mercantile premises or on mercantile safes and vaults.

1.5 Police station connected bank burglar-alarm systems are designated as Grade AA, Grade A, Grade BB, or Grade B and are for use on bank safes and vaults.

1.6 Equipment intended for combination burglar-alarm and fire-protective signaling systems is also expected to comply, with the Standard for Control Units for Fire-Protective Signaling Systems, UL 864.

1.7 Regardless of the grade of equipment and service determined by this standard, 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 Mercantile and Bank Burglar-Alarm Systems, UL 681, which should be consulted by burglar-alarm installers.

1.8 The connection to a police department may be:

- a) Direct;
- b) Through a central station complying with the Standard for Central-Station Burglar-Alarm Systems, UL 611, or the Standard for Central-Stations for Watchman, Fire-Alarm, and Supervisory Services, UL 827; or
- c) Through a residential monitoring station complying with UL 611, UL 827, or both.

1.9 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

1.9 revised December 9, 1994

2 General

2.1 Terminology

2.1.1 The term "product" as used in this standard refers to all types of police station connected burglar alarm units and systems.

2.2 Components

2.2.1 Except as indicated in 2.2.2, 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.

2.2.2 A component need not comply with a specific requirement that:

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

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

2.2.4 Specific components are recognized as being 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 for which they have been recognized.

2.3 Units of measurement

2.3.1 If a value for a measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

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

2.4 Undated references

2.4.1 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.

3 Glossary

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

3.2 ALARM SOUNDING DEVICE – An audible signal appliance (bell, horn, siren, or speaker) complying with the requirements in the Standard for Audible Signal Appliances, UL 464, and this standard, that is used to signal unauthorized entry or attempted entry into a protected area or object.

3.3 ALARM SOUNDING DEVICE HOUSING – A housing, or the equivalent, that is used to protect an alarm sounding device from being silenced by physical attack. There are three versions:

- a) **Outside** – A housing intended to be located outside of the protected area. See 68.4 and 68.10.
- b) **Inside/Visible** – A housing intended to be located within the protected area where it can be seen by an intruder. See 68.8 and 68.10.
- c) **Inside/Concealed** – An alarm sounding device without an additional alarm housing intended to be located within the protected area where it will be concealed from being seen by an intruder or it is outside of easy reach. See 68.9 and 68.11.

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 76, Bank Safe and Vault Alarm Systems, Grade A Requirements, Tamper Protection, Section 78, and Grade B Requirements, Tamper Protection, Section 81.*

3.4 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 3.1 and 3.2. 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.

3.5 CORD-CONNECTED – 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.

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

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

3.8 POLICE DEPARTMENT – Any government-related law enforcement agency.

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

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

Table 3.1
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 30 to 100	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 – Reproduced from the National Electrical Code (ANSI/NFPA 70), 1993 Edition, copyright National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

^a $V_{\max}$: Maximum output voltage regardless of load with rated input applied. 0 – 20 V-rms, 0 – 28.3 V dc or ac peak; 20 – 30 V-rms, 28.3 – 42.4 V dc or ac peak.

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

Table 3.2
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 limitation (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 – Reproduced from the National Electrical Code (ANSI/NFPA 70), 1993 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 a, Table 3.1)

^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.

3.11 **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).

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

4 Installation and Operating Instructions

4.1 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.

4.2 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.

4.2 revised December 9, 1994

4.3 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 Marking, General, Section 108.

CONSTRUCTION

ASSEMBLY

5 General

5.1 Product assembly

5.1.1 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 5.1.2.

5.1.2 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.

5.2 Electrical protection

5.2.1 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 6.

5.2.2 Uninsulated high-voltage live parts shall be located, guarded, or enclosed as indicated in 5.2.3 – 5.2.5.

5.2.3 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 7.2 for top cover designs and Figure 7.3 for side openings, or the equivalent.

5.2.4 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 5.1, cannot be made to contact any uninsulated live part (other than low-voltage) when inserted through the opening in a straight or articulated position.

5.2.5 An opening that permits entrance of a 1 inch (25.4 mm) diameter rod is acceptable under the conditions described and illustrated in Figure 5.2.

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

11.5 If a knot in a flexible cord serves as strain relief, a surface against which the knot may bear or with which it may come in contact shall be free from projections, sharp edges, burrs, fins, and the like, which may cause abrasion of the insulation on the conductors.

11.6 Clamps of any material (metal or otherwise) are acceptable for use on cords and supply leads without varnished-cloth insulating tubing or the equivalent under the clamp unless the tubing or the equivalent is necessary to prevent the clamp from damaging the cord or supply leads.

11.7 The supply cord or supply leads shall be prevented from being pushed into the unit through the cord-entry hole if such displacement is likely to:

- a) Subject the cord or supply leads to mechanical damage or to exposure to a temperature higher than that for which the cord or supply leads are rated,
- b) Reduce spacings (such as to a metal strain-relief clamp) below the minimum acceptable values, or
- c) Damage internal connections or components.

12 Permanently Connected Products

12.1 General

12.1.1 A fixed product shall have provision for connection of one of the wiring systems that, in accordance with the National Electrical Code, ANSI/NFPA 70, would be acceptable for it.

12.1.2 A knockout provided for connection of a field-wiring system to a field-wiring compartment shall accommodate conduit of the trade size determined as specified in Table 12.1.

Table 12.1
Trade size of conduit in inches (mm OD)

Wire size		Number of wires				
AWG	(mm ²)	2	3	4	5	6
14	2.1	1/2 (21.3)	1/2 (21.3)	1/2 (21.3)	1/2 (21.3)	1/2 (21.3)
12	3.3	1/2 (21.3)	1/2 (21.3)	1/2 (21.3)	3/4 (26.7)	3/4 (26.7)
10	5.3	1/2 (21.3)	1/2 (21.3)	1/2 (21.3)	3/4 (26.7)	3/4 (26.7)
8	8.4	3/4 (26.7)	3/4 (26.7)	1 (33.4)	1 (33.4)	1-1/4 (42.3)
6	13.3	3/4 (26.7)	1 (33.4)	1 (33.4)	1-1/4 (42.3)	1-1/4 (42.3)

NOTE – This table is based on the assumption that all conductors will be of the same size and there will not be more than six conductors in the conduit. If more than six conductors will be involved or if all of them are not of the same size, the internal cross-sectional area of the smallest conduit that may be used is determined by multiplying by 2.5 the total cross-sectional area of the wires, based on the cross-sectional area of Type THW wire.

12.1.3 The location of a terminal box or compartment in which power supply connections are to be made shall permit the connections to be accessible without removal of parts other than a service cover or panel and the cover of the outlet box or compartment in which the connections are made.

12.1.4 A terminal compartment intended for the connection of a supply raceway shall be secured in position and shall be prevented from turning.

12.1.5 The product shall be provided with field-wiring terminals or leads for the connection of conductors having an ampacity not less than that required by the product. It is assumed that branch circuit conductors rated 60°C (140°F) will be used.

12.2 Field-wiring terminals

12.2.1 General

12.2.1.1 As specified in these requirements, field-wiring terminals are those terminals to which power supply (including equipment grounding) or control connections will be made in the field when the product is installed as intended.

12.2.1.1.1 A field wiring terminal shall comply with:

- a) 12.2.2.1 – 12.2.2.5;
- b) The field wiring requirements in the requirements for electrical quick-connect terminals, UL 310;
- c) The Standard for Wire Connectors and Soldering Lugs for Use With Copper Conductors, UL 486A;
- d) The Standard for Equipment Wiring Terminals for Use With Aluminum and/or Copper Conductors, UL 486E; or
- e) The field wiring requirements (Code 2) in the requirements for terminal blocks, UL 1059.

The current-carrying parts shall be silver, copper, a copper alloy, or a similar nonferrous conductive material. Securing screws and the like may be plated steel. Equipment provided with quick-connect terminals intended for field termination of electrical conductors to the equipment and complying with the requirements for electrical quick-connect terminals, UL 310, shall be provided with strain relief, and the installation instructions shall include instructions for effecting the strain relief and include reference to the specific connectors to be used.

12.2.1.1.1 added December 9, 1994

12.2.1.2 A field-wiring terminal shall be prevented from turning or shifting in position. This may be accomplished by means, such as two screws or rivets; by square shoulders or mortises; by a dowel pin, lug, or offset; or by a connecting strap or clip fitted into an adjacent part. Friction between surfaces is not acceptable for preventing movement of the terminals.

12.2.2 General application

12.2.2.1 Nonferrous soldering lugs or solderless (pressure) wire connectors shall be used for No. 8 AWG (8.4 mm²) and larger wires. If the connectors or lugs are secured to a plate, the plate thickness shall not be less than 0.050 inch (1.3 mm). Securing screws may be plated steel.

12.2.2.2 A wire binding screw intended for connection to the power supply (line voltage) source shall not be smaller than No. 10 (4.8 mm diameter). The screw may be of plated steel.

Exception: A No. 8 (4.2 mm diameter) screw may be used for the connection of one No. 14 AWG (2.1 mm²) or smaller conductor and a No. 6 (3.5 mm diameter) screw may be used for the connection of a No. 16 AWG (1.3 mm²) or smaller conductor.

12.2.2.3 For connection of other than power supply (line voltage) circuits using No. 10 AWG (5.3 mm^2) and smaller wires, a wire binding screw shall not be smaller than No. 8 (4.2 mm diameter).

Exception: A No. 6 (3.5 mm diameter) screw may be employed for the connection of one No. 14 AWG (2.1 mm^2) or smaller conductor and a No. 4 (2.8 mm diameter) screw may be used for the connection of one No. 19 AWG (0.65 mm^2) or smaller conductor.

12.2.2.4 Terminal plates tapped for wire binding screws shall:

a) Have not less than two full threads in the metal (the terminal plate metal may be extruded to provide the two full threads) and shall have upturned lugs, clamps, or the equivalent, to hold the wires in position. Other constructions may be employed if they provide equivalent thread security of the wire binding screw. However, two full threads are not required if fewer threads will result in a secure connection in which the threads will not strip with tightening torque in accordance with the values indicated in the Standard for Wire Connectors and Soldering Lugs for Use With Copper Conductors, UL 486A.

b) Be of a nonferrous metal not less than 0.050 inch (1.3 mm) thick if used with a No. 8 (4.2 mm diameter) or larger screw, and not less than 0.030 inch (0.76 mm) thick if used with a No. 6 (3.5 mm diameter) or smaller screw.

12.2.2.5 If two or more conductors are intended to be connected by wrapping under the same screw, a nonferrous intervening metal washer shall be employed for each additional conductor. A separator washer is not required if two conductors are separated and intended to be secured under a common clamping plate. If the wires protrude above terminal barriers, the nonferrous separator shall include means, such as upturned tabs or sides, to retain the wire.

12.2.3 Qualified application

12.2.3.1 Any of the following terminal configurations may be employed for connection of field wiring provided they comply with all of the requirements in 12.2.3.2.

- a) Telephone Type Terminals – Nonferrous terminal plates using a narrow V-shaped slot for securing of a conductor in a special post design. Requires special tool for wire connection.
- b) Solderless Wrapped Terminals – Solderless wrapped nonferrous terminals which require a special tool and terminal post design.
- c) Quick-Connect Terminals – Nonferrous quick-connect (push type) terminals consisting of male posts permanently secured to the device and provided with compatible female connectors for connection to field wiring. Requires special tool for crimping of field wires. Mating terminals shall be shipped with the product with instructions for their installation.
- d) Push-In Terminals – Nonferrous (screwless) push-in terminals of the type used on some switches and receptacles wherein solid conductors may be pushed into slots containing spring-type remaining contacts. The leads can be removed by means of a tool inserted to relieve the spring tension on the conductor. Push-in terminals are not acceptable for use with aluminum conductors. The marking adjacent to the terminal shall indicate that copper conductors only are to be used.
- e) Solder Terminals – Conventional nonferrous solder terminals.
- f) Other Terminals – Other terminal connections may be employed if found to be equivalent to (a) – (e) and limited to the same restrictions.

12.2.3.2 Any of the terminal configurations listed in 12.2.3.1 may be employed for connection of field wiring provided there is compliance with all of the following:

- a) If a special tool is required for connection, its use shall be indicated on the installation wiring diagram and the name of its manufacturer and its model number or equivalent shall also be indicated, along with information as to where the tool may be obtained.
- b) The range of wire sizes shall be indicated on the installation wiring diagram. The minimum permissible wire size shall not be smaller than No. 22 AWG (0.32 mm²).
- c) The wire size to be employed shall have the current-carrying capacity for the circuit application.
- d) The terminal configuration shall comply with the requirements in the Special Terminal Assemblies Tests, Section 51.

Exception: Terminals complying with the requirements in any of the standards specified in 12.2.1.1.1 (b) – (e) are not required to be subjected to the Special Terminal Assemblies Tests, Section 51.

12.2.3.2 revised December 9, 1994