



Underwriters Laboratories Inc.®

A not-for-profit organization dedicated to public safety
and committed to quality service

January 18, 1995

Revision pages for

Standard for

Surveillance Camera Units

UL 983, Fifth Edition

Attached to this transmittal notice is a revision of the fifth edition of UL 983.

A CHANGE ON A PAGE DATED NEW DATE 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 bulletin for Subjects 291 (294, 365, 603, 609, 634, 639, 680, 752, 771, 983, 1023, 1034, 1037, 1076, 1610, 1635) dated February 24, 1994. The bulletin is now obsolete and may be discarded.

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 22, 1993 (Reprinted January 18, 1995)
2	-
3	June 22, 1993
4	January 18, 1995
5, 6	June 22, 1993
7, 8, 8A	January 18, 1995
9 - 21	June 22, 1993
22 - 24, 24A	January 18, 1995
25 - 50	June 22, 1993
51, 52, 52A	January 18, 1995
53, 54	June 22, 1993
55 - 60, A1	June 22, 1993

JUNE 22, 1993

(Title Page Reprinted: January 18, 1995)

1

UL 983

Standard for

Surveillance Camera Units

The First, Second, and Third editions were titled Standard for Surveillance Cameras.

First Edition – June, 1972

Second Edition – May, 1973

Third Edition – August, 1978

Fourth Edition – July, 1979

Fifth Edition

June 22, 1993

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

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 1-55989-413-X

COPYRIGHT © 1978, 1995 UNDERWRITERS LABORATORIES INC.

CONTENTS

FOREWORD

INTRODUCTION

1 Scope	7
2 General	7
3 Glossary	8
4 Instructions and Drawings	9

CONSTRUCTION

ASSEMBLY

5 General	9
6 Protection of Service Personnel	9
7 Test Feature	10
8 Enclosure	10
9 Electric Shock	19
10 Corrosion Protection	20
11 Lens, Mounting, and Film	20

FIELD WIRING

12 Field Wiring Connections	22
13 Polarity Identification	25

INTERNAL WIRING

14 General	25
15 Separation of Circuits	26
16 Bonding for Grounding	26

ELECTRICAL COMPONENTS

17 General	27
18 Bushings	28
19 Overcurrent Protection	28
20 Semiconductors	29
21 Switches	29
22 Transformers, Coils, and Relays	29

SPACINGS

23 General	29
------------------	----

PERFORMANCE**ALL UNITS**

24	General	31
25	Operation Test	32
26	Current Protection Test	32
27	Input Test	32
28	Electrical Supervision Test	33
29	Voltage Variation Test	33
30	Variable Ambient Test	33
31	Humidity Test	33
32	Leakage Current Tests for High-Voltage Cord-Connected Products	33
33	Electric Shock Current Test	36
34	Overload Test	40
35	Endurance Test	40
36	Jarring Test	41
37	Power Supply Test	41
38	Dielectric Voltage-Withstand Test	42
39	Temperature Test	43
40	Abnormal Operation Test	48
41	Polymeric Materials Test	48
42	Strain Relief Test	49
43	Ignition Through Bottom-Panel Openings Test	49
44	Mechanical Strength Tests for Enclosures	50
45	Special Terminal Assemblies Tests	51
46	Marking Permanency Tests	52
47	Noise of Operation Test	52

OUTDOOR USE EQUIPMENT

48	General	52
49	Rain Test	52
50	Dust Test	55

RADIO FREQUENCY OPERATED INITIATING DEVICES

51	General	55
52	Test Feature	55
53	Range	55
54	Drop Test	55

MANUFACTURING AND PRODUCTION TESTS

55	General	56
56	Production Line Dielectric Voltage-Withstand Tests for High-Voltage Products	56
57	Production Line Grounding Continuity Tests for High-Voltage Cord Connected Products	57

MARKING

58	General	57
----	---------	----

INTRODUCTION

1 Scope

1.1 These requirements cover surveillance cameras and accessories intended for use at mercantile and banking premises to provide a means of recording images of holdup attempts or other activities in the area.

1.2 A surveillance camera may be designed to operate automatically, by manual actuation, or have dual capability. It is intended to record images of the area covered by its field and may take single frame, rapid sequence, or motion pictures.

1.3 Video and television products used as surveillance camera units shall also comply with the Standard for Low-Voltage Video Products Without Cathode-Ray-Tube Displays, UL 1409, or the Standard for Television Receivers and High-Voltage Video Products, UL 1410.

1.4 These requirements cover equipment intended for installation in accordance with the requirements of the National Electrical Code, NFPA 70.

1.5 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.

1.5 revised January 18, 1995

2 General

2.1 Terminology

2.1.1 The term "product" as used in this standard refers to all types of surveillance cameras and their control units and accessories.

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 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 root-mean-square (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 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 (POWER LIMITED)** — A circuit involving a potential of not more than 30 volts RMS [42.4 volts peak or direct current (dc)] and providing not more than 100 volt-amperes (VA) rated output. The 100 VA limit shall be provided by the design of the transformer, a fixed impedance, a noninterchangeable fuse, a nonadjustable manual reset circuit protective device, or a regulating network.

3.3 **CORD-CONNECTED UNIT** — A unit intended for connection to the power source by means of a supply cord is a cord-connected unit. By the nature of its design, such a unit is intended to be moved for reasons of interchange or realignment of the units of a system.

3.4 **LINE-VOLTAGE** — The voltage at any field connected source of supply, nominally 50 – 60 hertz (Hz); 115, 208, or 230 volts.

3.5 OPERATION —

a) **AUTOMATIC** — The film camera or video recorder will record images continuously without external actuation.

b) **DUAL CAPABILITY** — The film camera or video recorder will record images as an automatic time-lapse camera or video recorder during nonholdup conditions and can be changed to a higher rate of recording under holdup conditions by means of manually actuated initiating devices.

c) **MANUAL** — The film camera or video recorder will record images only when actuated by an initiating device.

3.6 "SAFETY" CIRCUIT — Any circuit that is relied upon to prevent the likelihood of fire, electric shock, or unintentional contact with hazardous moving parts (an interlock circuit, for example).

3.7 STANDBY CONDITION — The ready-to-operate condition. The condition that exists prior to being tripped or operated by the manual actuation of an initiating device.

11.2 Mounting means

11.2.1 The camera mount shall provide sufficient flexibility so that it may be adjusted over a range of 90 degrees in the horizontal direction and 45 degrees in the vertical direction.

Exception: This requirement does not apply to a camera designed to manually or automatically pan (rotate in the horizontal axis) or tilt (rotate in the vertical axis) or both, to allow observation of the area covered.

11.2.2 The camera shall be provided with a means for establishing intended physical alignment.

11.3 Film camera capacity

11.3.1 A film camera shall use a standard size film and be provided with loading instructions.

11.3.2 A continuously running sequence camera shall have a film capacity sufficient to operate for 5 business days (minimum 40 hours). It may be provided with means for manual activation of a rapid sequence mode under emergency conditions.

11.3.3 A manually-actuated sequence or motion picture camera shall have a film capacity for not less than 3 minutes of continuous operation at maximum rated speed.

11.3.4 An indicator shall be provided on the camera or control unit to show the available supply of unexposed film. The indicator shall prominently indicate by visual or audible means when the remaining capacity of the recording medium, when operating at the intended holdup recording speed, has reached 3 minutes.

11.4 Video recorder capacity

11.4.1 A video cassette recorder (tape) shall use a standard size video cassette and shall be provided with loading instructions. An open reel type video tape recorder shall use a standard size video tape and shall be provided with loading instructions.

11.4.2 A video disc recorder shall use a standard size disc or be provided with a permanently installed disc.

11.4.3 A time lapse video recorder shall have a capacity of 12 hours at its maximum intended rate of time lapse operation and shall be provided with means for manual activation to a normal or real time speed, stop action, or slow motion mode of operation under emergency conditions.

11.4.4 A continuously running video recorder, operating at its maximum intended speed, shall have a 12 hour capacity.

11.4.5 A manually-actuated video recorder shall have a tape or disc capacity of not less than 3 minutes of continuous operation at normal or real time speed, stop action speed, or slow motion speed.

11.4.6 An indicator shall be provided on a video recorder to show the available supply of tape or disc space. The indicator may be remote.

11.4.7 The indicator shall prominently indicate by visual or audible means when the remaining capacity of the recording medium, when operating at the intended holdup recording speed, has reached 3 minutes.

FIELD WIRING

12 Field Wiring Connections

12.1 General

12.1.1 Wiring terminals or leads shall be provided for connection of conductors of at least the size required by the National Electrical Code, ANSI/NFPA 70.

12.2 Field wiring compartment

12.2.1 The field wiring compartment in which connections are to be made shall be of such size as to accommodate all wiring connections as specified by the installation wiring diagram.

12.2.2 Internal components in the wiring area and wire insulation shall be protected from sharp edges by insulating or metal barriers having smooth, rounded edges or by the following or equivalent instructions located in the wiring area: "CAUTION — When Making Installation, Route Field Wiring Away From Sharp Projections, Corners, and Internal Components."

12.2.3 The wiring terminals of a product designed for mounting in an outlet box shall be located or protected so that, upon installation, the wiring in the outlet box is not forced against the terminals, which may cause damage to the conductor insulation.

12.3 Terminals (general application)

12.3.1 A wiring terminal shall be prevented from turning.

12.3.1.1 A field wiring terminal shall comply with the requirements in:

- a) 12.3.2;
- b) The field wiring requirements in the requirements for electrical quick-connect terminals, UL 310; or
- c) The Standard for Wire Connectors and Soldering Lugs for Use With Copper Conductors, UL 486A; or
- 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.

12.3.1.1 added January 18, 1995

12.3.2 Any of the following terminal configurations may be employed on all circuits to which field wiring connections are made.

- a) **Connectors and Lugs** – 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 shall not be less than 0.050 inch (1.3 mm) thick. Securing screws and clamping plates may be plated steel.
- b) **Terminal Plates With Wire Binding Screws** [For No. 10 AWG (5.3 mm²) and Smaller Wires] – A terminal plate tapped for a wire binding screw shall be of a nonferrous metal not less than 0.050 inch (1.3 mm) in thickness for a No. 8 (4.2 mm diameter) or larger screw, and not less than 0.030 inch (0.76 mm) in thickness for a No. 6 (3.5 mm diameter) or smaller screw. The plate shall 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. If a wire binding screw is employed at a wiring terminal, the screw shall not be smaller than No. 8 (4.2 mm diameter), except that a No. 6 (3.5 mm diameter) screw may be employed for the connection of a No. 14 AWG (2.1 mm²) or smaller conductor and a No. 4 (2.8 mm diameter) screw may be used for a No. 19 AWG (0.65 mm²) or smaller conductor. Screws and clamping plates may be plated steel. Other constructions may be employed if they provide equivalent thread security of the wire binding screw. 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.

12.4 Terminals (qualified application)

12.4.1 Any of the following terminal configurations may be used for connection of field wiring if the construction complies with all of the requirements in 12.4.2.

- a) **Push-In Terminals** – Nonferrous (screwless) push-in terminals of the type employed on some switches and receptacles. Solid conductors are pushed into slots containing spring type 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 considered suitable for use with aluminum conductors. The marking adjacent to the terminal shall indicate that copper conductors only are to be used.
- b) **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. Mating terminals shall be shipped with the product with instructions for their installation. Requires special tool for crimping of field wires.
- c) **Solder Terminals** – Conventional nonferrous solder terminals.
- d) **Solderless Wrapped Terminals** – Solderless wrapped nonferrous terminals which require a special tool and terminal post design.
- e) **Telephone Type Terminals** – Nonferrous terminal plates employing a narrow V-shaped slot for securing of a conductor in a special post design. Requires special tool for wire connection.

- f) **Other Terminals** – Other terminal connections may be employed if determined to be equivalent to (a) – (e) and limited to the same restrictions.

12.4.1 revised January 18, 1995

12.4.2 Any of the terminal configurations listed in 12.4.1 may be employed for connection of field wiring if complying with all of the following conditions:

- a) If a special tool is required for connection, its use is indicated on the installation wiring diagram by name of manufacturer and model number or equivalent, 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 to be employed shall not be less than No. 22 AWG (0.32 mm²).
- c) The wire size to be used shall have the current-carrying capacity of the circuit application.
- d) The terminal configuration shall comply with requirements in the Special Terminal Assemblies Test, Section 45.

Exception: Terminals complying with the requirements in any of the standards specified in 12.3.1.1 are not required to be subjected to the Special Terminal Assemblies Tests, Section 45.

12.4.1 revised January 18, 1995

12.5 Leads

12.5.1 If leads are provided in lieu of wiring terminals, they shall not be less than 6 inches (152 mm) long, and shall not be smaller than No. 22 AWG (0.32 mm²).

Exception No. 1: A lead may be less than 6 inches in length if it is evident that the use of a longer lead may result in damage to the lead insulation.

Exception No. 2: Solid copper leads as small as No. 26 AWG (0.13 mm²) may be used if:

- a) The current does not exceed 1 ampere for lengths up to 2 feet (61 cm) and the current does not exceed 0.4 ampere for lengths up to 10 feet (3.05 m),
- b) There are two or more conductors and they are covered by a common jacket or the equivalent,
- c) The assembled conductors comply with the requirement of 42.2.1 for strain relief, and
- d) The installation instructions indicate that the lead shall not be spliced to a conductor larger than No. 18 AWG (0.82 mm²).

12.5.2 For connection of a line-voltage source, the leads shall not be smaller than No. 18 AWG (0.82 mm²).

12.6 Cords and plugs

12.6.1 A portable or movable product that is intended to be connected to high-voltage or line-voltage shall be provided with not less than 6 feet (1.8 m) of flexible cord and a two or three prong attachment plug of proper type and rating for connection to the supply circuit.

Exception: The cord may be less than 6 feet in length if it is evident that the use of the longer cord may result in damage to the cord or product, or result in a risk of fire or electric shock, or is not required for the proper operation of the product.

12.6.2 A stationary product may be provided with a flexible cord.

12.6.3 The flexible cord shall be of Type SV, SVT, SJ, SJT, or equivalent, minimum No. 18 AWG (0.82 mm²). It shall be rated for use at the voltage and ampacity rating of the product.

12.6.4 The investigation of such a product is to include consideration of the need and the desirability of its being movable.

12.6.5 The power supply cord shall be provided with a strain relief means so that a stress on the cord will not be transmitted to terminals, splices, or internal wiring. See the Strain Relief Test, Section 42.

12.6.6 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.

12.6.7 Clamps of any material (metal or otherwise) may be used on cords and supply leads without varnished-cloth insulating tubing or the equivalent under the clamp unless it is judged that the tubing or the equivalent is necessary to prevent the clamp from damaging the cord or supply leads.

12.6.8 Means shall be provided to prevent the supply cord or supply leads from being pushed into the unit through the cord-entry hole if such displacement could 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 suitable or could reduce spacings (such as to a metal strain-relief clamp) below the minimum acceptable values or is likely to damage internal connections or components.

45 Special Terminal Assemblies Tests

45.1 General

45.1.1 To determine if a terminal assembly employed as a connection for field wiring complies with the requirements in 12.4.1 and 12.4.2, representative samples of the terminal assembly shall comply with the tests in 45.2.1 – 45.6.2.

Exception: Terminals complying with the requirements in any of the standards specified in 12.3.1.1 are not required to be subjected to these tests.

45.1.1 revised January 18, 1995

45.2 Disconnection and reconnection

45.2.1 If a wire is to be disconnected for testing or routine servicing and then reconnected, each terminal shall be subjected to 20 disconnections and 20 reconnections prior to the tests described in 45.3.1 – 45.6.2.

45.3 Mechanical secureness

45.3.1 A terminal connection shall withstand the application of a straight pull of 5 pounds-force (22.2 N), applied for 1 minute to the wire in the direction that would most likely result in pullout, without separating from the wire.

45.3.2 Six terminal assemblies using the maximum wire size and six assemblies using the minimum wire size are to be subjected to this test. If a special tool is required to assemble the connection it is to be used, in accordance, with the manufacturer's instructions. Each sample is to be subjected to a gradually increasing pull on the wire until the test pull of 5 pounds-force (22.2 N) is reached.

45.3.2 revised January 18, 1995

45.4 Flexing test

45.4.1 The wire attached to a terminal shall withstand an average of 5 right angle bends without breaking.

45.4.2 Six terminal assemblies employing the maximum wire size and six assemblies with the minimum wire size are to be subjected to this test. The terminal is to be rigidly secured so as to prevent any movement. With the wire in 3 pounds-force (13.3 N) tension and held at a point 3 inches (76.2 mm) from the terminal-to-wire juncture the wire shall be bent at a right angle from the nominal wire position. The wires shall be assembled to the terminals using any special tool required as per the manufacturer's instructions. The tension on the wire shall hold the wire in a rigid position during the flexing trials.

45.5 Millivolt drop test

45.5.1 The voltage drop across a terminal connection using the maximum and minimum wire sizes intended to be employed with the terminals connected in series, shall not be greater than 300 millivolts with the maximum current of the circuit flowing through the terminal connection at the rated voltage of the circuit.

45.5.2 Six terminal assemblies employing the maximum wire sizes and six assemblies employing the minimum sizes are to be subjected to this test. The wires shall be assembled to the terminals, using any special tool, if required, according to the manufacturer's instructions. The voltage drop shall then be measured using a high impedance millivoltmeter with the maximum current, as specified by the manufacturer, flowing through the connection.

45.6 Temperature test

45.6.1 The maximum temperature rise on a terminal junction with the maximum and minimum wire sizes with which the terminal is employed, connected in turn, shall not be greater than 30°C (54°F) based on an ambient temperature of 25°C (77°F).

45.6.2 Six terminal assemblies employing the maximum wire size and six employing the minimum size are to be subjected to this test. The wire shall be assembled to the terminals using any special tools, if required, according to the manufacturer's instructions. The maximum current to which the wire will be subjected in service shall then be passed through the terminal connection. The maximum temperature rise shall then be measured by the thermocouple method in accordance with the Temperature Test, Section 39, after temperatures have stabilized.

46 Marking Permanency Tests

46.1 Directly applied markings, or a marking plate secured by cement or adhesive, located on the outside of the product shall comply with the applicable portion of the Standard for Marking and Labeling Systems, UL 969.

47 Noise of Operation Test

47.1 Surveillance camera units that are to be used in an area where they can be seen, heard, or both, by a holdup person shall be relatively quiet in operation when tested "as-received" and following the Endurance Test, Section 35. Sound output measurements are to be made in a chamber having nonreverberant characteristics and an ambient not exceeding 35 decibels and the measured noise levels at a point 3 feet (0.9 m) from the unit shall not exceed 45 decibels when the unit is operating.

47.2 Sound levels shall be measured by a sound meter designed, constructed, and calibrated in accordance with Specifications for General Purpose Sound Level Meters, ANSI S1.4-1992. The meter shall be in the "A-weighting" scale.

OUTDOOR USE EQUIPMENT

48 General

48.1 In addition to the preceding sections of this standard, products intended for outdoor use shall comply with the Rain Test, Section 49, and the Dust Test, Section 50, and the requirements in 30.2.

49 Rain Test

49.1 If the equipment is exposed to outside weather conditions, its exposed sections shall withstand a rain exposure for 1 hour without creating a risk of electric shock or affecting its operation. The assembly shall also comply with 49.8 after the test.

49.2 All electrical components are to be energized and the product tested in its intended position and under the conditions that could cause the entrance of water into or on electrical components. It may be necessary to operate the product under various modes of operation or to de-energize the product if additional water entry could result. Each exposure is to be for 1 hour, and if more than one exposure is required, the product is to be prepared for test as indicated in 49.4 before repeating the test.

49.3 Field wiring connections are to be made in accordance with the wiring method specified for the product. Openings intended to terminate conduit are to be sealed. Openings intended for the entry of a conductor(s) for a low-voltage circuit are not to be sealed unless seals are provided as a part of the product.

49.4 The product is to be examined to determine that all electrical parts, including motor windings, are not wetted and that there is no accumulation of water within the enclosures of electrical parts prior to rain exposure. See also 49.5.

● Surveillance Camera Units

Northbrook, Illinois • (708) 272-8800
 Melville, New York • (516) 271-6200
 Santa Clara, California • (408) 985-2400
 Research Triangle Park,
 North Carolina • (919) 549-1400



Underwriters Laboratories Inc., founded in 1894, is chartered as a not-for-profit organization without capital stock, under the laws of the State of Delaware, to establish, maintain, and operate laboratories for the examination and testing of devices, systems and materials to determine their relation to hazards to life and property, and to ascertain, define and publish standards, classifications and specifications for materials, devices, products, equipment, constructions, methods, and systems affecting such hazards.

UL Standards for Safety are developed under a procedure which provides for participation and comment from the affected public as well as industry. The procedure takes into consideration a survey of known existing standards and the needs and opinions of a wide variety of interests concerned with the subject matter of the standard. Thus manufacturers, consumers, individuals associated with consumer-oriented organizations, academicians, government officials, industrial and commercial users, inspection authorities, insurance interests and others provide input to UL in the formulating of UL Standards for Safety, to keep them consonant with social and technological advances.

A not-for-profit organization
 dedicated to public safety and
 committed to quality service



Underwriters Laboratories Inc.®

An independent, not-for-profit organization testing for public safety

June 22, 1993

Standard for

Surveillance Camera Units

UL 983, Fifth Edition

Accompanying this transmittal notice is a copy of the fifth edition of UL 983.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT.

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

Subscribers to UL's services in the area covered by this standard will receive these revised and/or additional pages automatically. Others may receive such pages by subscribing to UL's subscription service for revisions. See UL's CATALOG OF STANDARDS FOR SAFETY for a description of the revision subscription service, the cost of the service for this standard, and ordering information.



JUNE 22, 1993

1

UL 983

**Standard for
Surveillance Camera Units**

First Edition – June, 1972
Second Edition – May, 1973
Third Edition – August, 1978
Fourth Edition – July, 1979

The First, Second, and Third editions were titled Standard for Surveillance Cameras.

Fifth Edition

June 22, 1993

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

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 1-55989-413-X

COPYRIGHT © 1978, 1993 UNDERWRITERS LABORATORIES INC.

UL's Standards for Safety are copyrighted to protect UL's publication rights, not to restrict their use in product design or evaluation. See paragraph E of the Foreword.

(1 — 06/22/93 — 06/22/93)

CONTENTS

FOREWORD

INTRODUCTION

1 Scope	7
2 General	7
3 Glossary	8
4 Instructions and Drawings	9

CONSTRUCTION

ASSEMBLY

5 General	9
6 Protection of Service Personnel	9
7 Test Feature	10
8 Enclosure	10
9 Electric Shock	19
10 Corrosion Protection	20
11 Lens, Mounting, and Film	20

FIELD WIRING

12 Field Wiring Connections	22
13 Polarity Identification	25

INTERNAL WIRING

14 General	25
15 Separation of Circuits	26
16 Bonding for Grounding	26

ELECTRICAL COMPONENTS

17 General	27
18 Bushings	28
19 Overcurrent Protection	28
20 Semiconductors	29
21 Switches	29
22 Transformers, Coils, and Relays	29

SPACINGS

23 General	29
------------------	----

PERFORMANCE**ALL UNITS**

24	General	31
25	Operation Test	32
26	Current Protection Test	32
27	Input Test	32
28	Electrical Supervision Test	33
29	Voltage Variation Test	33
30	Variable Ambient Test	33
31	Humidity Test	33
32	Leakage Current Tests for High-Voltage Cord-Connected Products	33
33	Electric Shock Current Test	36
34	Overload Test	40
35	Endurance Test	40
36	Jarring Test	41
37	Power Supply Test	41
38	Dielectric Voltage-Withstand Test	42
39	Temperature Test	43
40	Abnormal Operation Test	48
41	Polymeric Materials Test	48
42	Strain Relief Test	49
43	Ignition Through Bottom-Panel Openings Test	49
44	Mechanical Strength Tests for Enclosures	50
45	Tests on Special Terminal Assemblies	51
46	Marking Permanency Tests	52
47	Noise of Operation Test	52

OUTDOOR USE EQUIPMENT

48	General	52
49	Rain Test	52
50	Dust Test	55

RADIO FREQUENCY OPERATED INITIATING DEVICES

51	General	55
52	Test Feature	55
53	Range	55
54	Drop Test	55

MANUFACTURING AND PRODUCTION TESTS

55	General	56
56	Production Line Dielectric Voltage-Withstand Tests for High-Voltage Products	56
57	Production Line Grounding Continuity Tests for High-Voltage Cord Connected Products	57

MARKING

58	General	57
----	---------	----

ACCESSORY EQUIPMENT

59	General	59
60	Construction	59
61	Performance (Installation) Test	60
62	Markings	60

APPENDIX A

Standards for Components	A1
--------------------------	----

FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover surveillance cameras and accessories intended for use at mercantile and banking premises to provide a means of recording images of holdup attempts or other activities in the area.

1.2 A surveillance camera may be designed to operate automatically, by manual actuation, or have dual capability. It is intended to record images of the area covered by its field and may take single frame, rapid sequence, or motion pictures.

1.3 Video and television products used as surveillance camera units shall also comply with the Standard for Low-Voltage Video Products Without Cathode-Ray-Tube Displays, UL 1409, or the Standard for Television Receivers and High-Voltage Video Products, UL 1410.

1.4 These requirements cover equipment intended for installation in accordance with the requirements of the National Electrical Code, NFPA 70.

1.5 A product that contains features, characteristics, components, materials, or systems new or different from those in use when the standard was developed, 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 level of safety for the user of the product as originally anticipated by the intent of this standard.

2 General

2.1 Terminology

2.1.1 The term "product" as used in this standard refers to all types of surveillance cameras and their control units and accessories.

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.