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March 27, 1996

Revision pages for

Standard for

Protectors for Paired Conductor Communications Circuits

UL 497, Sixth Edition

Attached to this transmittal notice is a reprinted title page for the sixth edition of UL 497.

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 497-1996.

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	July 25, 1995 (Reprinted March 27, 1996)
2 – 35	July 25, 1995

JULY 25, 1995

(Title Page Reprinted: March 27, 1996)



American National Standard

ANSI/UL 497-1996

1

UL 497

Standard for

Protectors for Paired Conductor Communications Circuits

The first – fourth editions were titled Protectors for Communication Circuits. The fifth edition was titled Protectors for Paired Conductor Communication Circuits.

First Edition – March, 1953

Second Edition – November, 1965

Third Edition – February, 1971

Fourth Edition – December, 1978

Fifth Edition – February, 1991

Sixth Edition**July 25, 1995**

Approval as an American National Standard (ANSI) covers the numbered paragraphs on pages dated July 25, 1995. 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 C33.22-1970 – UL 497, November, 1965

Approved as ANSI/UL 497-1979, October 10, 1979

Approved as ANSI/UL 497-1996, January 12, 1996

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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UL 497

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Protectors for Paired Conductor Communications Circuits





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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.

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July 25, 1995

Standard for

Protectors for Paired Conductor Communications Circuits

UL 497, Sixth Edition

Accompanying this transmittal notice is a copy of the sixth edition of UL 497.

A CHANGE IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT EXCEPT FOR SECTIONS 17, 20, 22, AND 45 WHICH BECOME EFFECTIVE FEBRUARY 1, 1997 AS INDICATED IN THE SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEMS.

THE CURRENT REQUIREMENTS IN EFFECT FOR THE REQUIREMENTS HAVING FUTURE EFFECTIVE DATES ARE LOCATED IN THE BACK OF THE STANDARD.

New product submittals 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 requirements in this standard are substantially in accordance with UL's bulletin on this subject dated March 27, 1995. This bulletin is now obsolete and may be discarded.

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JULY 25, 1995

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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 protectors for paired conductor communications circuits to be used in accordance with Article 800 of the National Electrical Code, ANSI/NFPA 70.

1.2 As covered by these requirements, a communications circuit protector consists of single- and multiple-pair air gap arresters, gas tube arresters, or solid state arresters, with or without fuses or other voltage-limiting devices. A circuit protector is intended to protect equipment, wiring, and personnel against the effects of excessive potentials and currents in telephone lines caused by lightning, contacts with power conductors, power induction, and rises in ground potential.

1.3 This standard does not cover the following:

- a) Lightning protective devices for the protection of secondary distribution wiring systems and equipment.
- b) Antenna discharge units for radio and television receiving appliances.
- c) Lightning conductor and air terminals for connection of lightning rods for building protection.
- d) Protectors for fire alarm signaling circuits that are covered by the Standard for Protectors for Data Communications and Fire Alarm Circuits, UL 497B.
- e) Secondary Protectors for Communications Circuits, UL 497A.
- f) Transient Voltage Surge Suppressors, UL 1449.

1.4 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.

1.4 revised July 25, 1995

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 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.

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

2.1.4 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.

2.2 Units of measurement

2.2.1 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.

2.2.2 Unless otherwise indicated, all voltage and current values mentioned in this standard are root-mean-square (rms).

2.3 Undated references

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

3 Glossary

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

3.2 **APPLIQUÉ ARRESTER ASSEMBLY** – An assembly containing two 2-electrode or one 3-electrode gas tube arresters intended for factory or field connection on a protector block across a pair of carbon arresters. It is intended to reduce maintenance of carbon arresters by discharging lightning-induced voltages that can cause deterioration of carbon arresters. An appliqué arrester may be constructed to shunt the telephone circuit to earth ground or remove itself from the telephone circuit by fusing open, thus permitting operation of parallel arresters during sustained abnormal line voltage.

3.3 **ARRESTER** – An overvoltage component or assembly of components which permits current flow through it when a designed voltage limit is reached. The arrester may consist of a spark gap, gas tube, solid-state component, or the like, coupled with other hardware which serves to support, position, and align the current-carrying components that make up the arrester.

3.4 **ARRESTER RATING** – The breakdown voltage rating specified by the manufacturer.

3.5 **DIRECT CURRENT (DC) BREAKDOWN VOLTAGE** – The voltage at which an arrester changes from non-conduction to conduction when the DC potential is increased at a rate not greater than 2000 volts per second.

3.6 **FUSE, INSTRUMENT (FUSE, SNEAK CURRENT)** – A fuse connected in series between the equipment side of an arrester and the telephone equipment that is intended to limit "sneak currents."

3.7 **FUSE, LINE** – A fuse connected in series between a telephone entrance conductor and an arrester and the telephone equipment that is intended to open during a sustained power fault and prevent the protector and ground wire from overheating. The equipment side of the fuse is connected to an arrester.

3.8 **FUSE WIRE** – A conductor inserted in the telephone outside plant (OSP) if fuseless protectors are installed. The fuse wire is inserted into the connections of the telephone distribution plant between the telephone wire on the pole and the aerial drop wire leading to the building protector.

- 3.9 FUSIBLE ELEMENT** – A portion of an arrester assembly composed of a eutectic alloy that melts on occurrence of a sustained fault, such as a power line contact fault, and permanently shorts the arrester to ground. Other mechanisms that operate and provide a short-circuit mode are also considered fusible elements.
- 3.10 GAS TUBE SURGE ARRESTER** – A gap or series of gaps in an enclosed discharge medium, other than air at atmospheric pressure, designed to protect apparatus or personnel or both from high transient voltages.
- 3.11 GLOW MODE** – The conductive mode of a gas arrester that exists after breakdown when the circuit impedance limits the current to a value less than the glow-to-arc transition current. In the glow mode the gas in the arrester is not completely ionized and the voltage across the arrester is greater than the arc voltage but less than the breakdown voltage.
- 3.12 HEAT COIL** – A protection device that is used to detect low current fault conditions that flow through the protector to the equipment side when the abnormal voltage is insufficient to cause the overvoltage device to shunt the abnormal current to ground. It is comprised of a small gauge wire wound on a metallic bobbin with a shorting pin. When the coil is heated above a predetermined temperature and melts the eutectic alloy holding the pin in position, it grounds or opens the circuit.
- 3.13 LINE CONDUCTOR** – A conductor that terminates on the outside plant or field side of the protector.
- 3.14 PROTECTOR, FUSED** – A protector containing arresters and line fuses.
- 3.15 PROTECTOR, FUSELESS** – A protector containing arresters, but no line fuses.
- 3.16 PROTECTOR, MULTIPLE PAIR** – A protector intended for connection of more than one telephone circuit.
- 3.17 PROTECTOR, SINGLE PAIR** – A protector intended for connection of only one telephone circuit.
- 3.18 SHORT CIRCUIT MODE** – A resulting mode whereby the voltage across the line contact and ground contact point of a protector assembly will not exceed 50 volts when subjected to the DC breakdown and surge voltage measurement procedure described in this standard.
- 3.19 SNEAK CURRENT** – An abnormal current on a telephone conductor that is not sufficient to open a fuse wire or line fuse and that is not driven by a voltage that is high enough to cause an arrester to operate.
- 3.20 STATION CONDUCTOR** – A conductor that terminates on the inside plant or house side of the protector.

CONSTRUCTION

4 General

- 4.1** A communications circuit protector shall be constructed to withstand, without damage, its intended installation and use and shall comply with the performance requirements specified in Sections 11 – 43.
- 4.2** A fuseless protector shall consist of an assembly comprising:
- An insulating base containing two or more arresters or the equivalent;