UL 2748A

STANDARD FOR SAFETY

Arcing Fault Interrupting Devices

UL Standard for Safety for Arcing Fault Interrupting Devices, UL 2748A

First Edition, Dated August 29, 2017

Summary of Topics

This revision of ANSI/UL 2748A dated October 28, 2021 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated September 10, 2021.

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UL 2748A

Standard for Arcing Fault Interrupting Devices

Prior to the first edition, the requirements for the products covered by this standard were included in the Outline of Investigation for Arcing Fault Interrupting Devices, UL 2748A.

First Edition

August 29, 2017

This ANSI/UL Standard for Safety consists of the First Edition including revisions through October 28, 2021.

The most recent designation of ANSI/UL 2748A as a Reaffirmed American National Standard (ANS) occurred on October 28, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements cover fast operating devices intended to interrupt currents associated with arcing faults, having interrupting times faster than conventional overcurrent devices.

1.2 These requirements cover open type devices that are intended to be installed within power distribution equipment.

1.3 These requirements cover devices rated up to 52 kV ac maximum.

1.4 This standard does not include the requirements for sensors intended to detect arcing faults, devices intended to trigger the functioning of the arc interrupting device, or devices intended to quench arcing faults by transferring the arcing fault to a lower impedance path.

1.5 This standard does not include requirements for integration and testing of arcing fault interrupting devices within equipment it is intended to protect.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

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

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

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

4 Undated References

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

5 Glossary

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

5.2 ARCING FAULT – A non-intentional discharge of electrical energy in air or other gas, including discharges across the surface of an insulating material.

5.3 INTERRUPTING DEVICE – A device that is used to interrupt an arcing fault.

5.4 LOW-VOLTAGE – A voltage of 1000 V ac or less.

5.5 MEDIUM-VOLTAGE – A voltage of greater than 1000 V ac, up to 52 kV ac.

5.6 OPEN TYPE DEVICE – A device not provided with an overall enclosure. An open type device is intended to be field installed within an end-product equipment enclosure.

5.7 POLLUTION DEGREE 2 MICROENVIRONMENT – An area where normally only nonconductive pollution occurs, but where occasional, temporary conductivity may be expected. Typical constructions that reduce the possibilities of conductive pollution and condensation or high humidity are:

a) Non-ventilated enclosures that are provided with continuous application of heat through the use of heaters or through continuous energization of the device, with interruptions such that cooling to the point of condensation does not occur; or

b) The use of ventilated enclosures where all openings are provided with filters.

5.8 RESETTABLE – Capable of being returned to a closed position by pushing a button, moving a handle, or similar means. Devices that cannot possibly be returned to a closed position without replacing parts using special tools are not considered resettable.

5.9 STANDARD PROTECTIVE DEVICE – A fuse, circuit breaker, or other device that provides protection against overcurrents and that complies with standards that define the operating characteristics for the overcurrent device.

CONSTRUCTION

6 General

6.1 Other than as noted in 6.2, interrupting devices that are intended to directly replace standard protective devices shall comply with the dimensional requirements for the standard protective device that will be replaced.

6.2 Interrupting devices that are intended to directly replace standard protective devices may have overall dimensions that differ from standard device that will be replaced, providing the dimensional changes do not affect the electrical connections or mounting of the device when the replacement is made.

6.3 Interrupting devices that are not direct replacements for standard protective devices shall not have dimensions that would allow the device to be inserted in place of a standard protective device.

7 Creepage and Clearance Distance

7.1 A device intended to replace a standard protective device shall comply with the creepage and clearance distance requirements of the standard used to investigate the standard protective device.

7.2 Creepage and clearance distances within low-voltage control circuits of interrupting devices shall comply with the creepage and clearance distance requirements of the Standard for Industrial Control Equipment, UL 508. Creepage and clearance distances between low-voltage control circuits and medium voltage control circuits shall be no less than the creepage and clearance distances required from the low-

voltage circuit to grounded metal, and shall also be sufficient to meet the dielectric requirements specified in this standard for the maximum voltage rating of the device, with the control circuits grounded during testing.

7.3 For printed wiring boards, the creepage and clearance distances shall comply with requirements of the Standard for Insulation Coordination Including Clearances and Creepage Distances for Electrical Equipment, UL 840. For the purpose of this investigation, interrupting devices shall be considered to be located within circuits of overvoltage category 3. All interrupting devices are considered to be installed in pollution degree 3 environments, except for portions of the device located in a pollution degree 2 microenvironment.

7.4 Pollution Degree 2 shall be considered to exist on a printed-wiring board where a coating provides an uninterrupted covering of the conductive material for at least one of two conductive materials and covers the entire space between the two conductive materials for which the spacing is being evaluated.

8 Wiring

8.1 Insulated conductors provided as part of an interrupting device shall be rated for the particular application and shall have an ampacity no less than the maximum current rating of the circuit to which they are connected.

8.2 Wiring shall be located or protected to prevent contact with any sharp edge or moving part that could damage the insulation.

8.3 Insulated conductors shall be separated from wiring and uninsulated live parts connected to other circuits, unless both circuits are provided with insulation rated for the highest voltage.

9 Operation

9.1 Interrupting devices with adjustable sensitivity shall comply with the requirements of this standard over the entire range of possible settings.

9.2 Interrupting devices that have provisions for disabling the arcing fault interrupting function shall have provisions for local and remote indication that the device has been disabled. Devices with provisions for intentionally delaying the time between detection of an arcing fault and operation of the arcing fault interrupting function shall have provisions for local and remote indication that operation of the interrupting function will be intentionally delayed.

9.3 Interrupting devices that can be reset after an arcing fault has been interrupted shall be provided with visual indication that the device has operated under an arcing fault condition and shall also have provisions for remote indication of arcing fault interruption function operation.

9.4 Devices that cannot be reset after an arcing fault interruption, and must be replaced after interruption (such as a fusible element) are not required to have such indication that the device has interrupted an arcing fault.

9.5 Interrupting devices that are resettable, shall be marked in accordance with 16.5. Devices that cannot be reset after an arcing fault interruption, and must be replaced after interruption (such as a fusible element) are not required to have such indication that the device has interrupted an arcing fault.

PERFORMANCE

10 General

10.1 Interrupting devices that are intended to directly replace standard protective devices shall comply with performance requirements for that standard protective device, including the required time-current characteristics for overloads other than arcing faults.

10.2 Interrupting devices shall comply with the requirements of Sections 11 – 14 with the interrupting device installed and connected in accordance with the manufacturer's installation instructions.

10.3 Interrupting devices with adjustable settings shall be tested to demonstrate compliance with the performance requirements over the range of possible settings, including minimum and maximum settings.

11 Continuous Current Test

11.1 Devices intended to replace standard protective devices shall comply with the continuous current (temperature) test as required by the standard for the standard protective device.

11.2 Low-voltage interrupting devices that are not intended to replace standard protective devices shall be subjected to a continuous current test in accordance with For Switchgear – Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies – Conformance Test Procedures, ANSI/IEEE C37.51. During the continuous current test, the device shall operate without exceeding the allowable temperature limits specified in Tables 3 and 4 of Metal-Enclosed Low-Voltage (1000 Vac and below, 3200 Vdc and below) Power Circuit Breaker Switchgear, ANSI/IEEE C37.20.1, and in the Table for Maximum temperature rise and the Table for Maximum enclosure surface temperature rises of the Standard for Industrial Control Equipment, UL 508.

11.3 Medium-voltage interrupting devices that are not intended to replace standard protective devices shall be subjected to a continuous current test in accordance with For Switchgear – Metal-Enclosed Interrupter Switchgear Assemblies – Conformance Testing, ANSI/IEEE C37.57. During the continuous current test, the device shall operate without exceeding the allowable temperature limits specified in Tables 2 and 3 of Metal-Enclosed Interrupter Switchgear (1 kV–38 kV), ANSI/IEEE C37.20.3, and in the Table for Maximum temperature rise and the Table for Maximum enclosure surface temperature rises of the Standard for Industrial Control Equipment, UL 508.

12 Power-Frequency Withstand Voltage Tests

12.1 Devices intended to replace standard protective devices shall comply with the power frequency (dielectric) withstand test as required by the standard that covers the device.

12.2 Low-voltage interrupting devices that are not intended to replace standard protective devices shall comply with the power-frequency withstand voltage tests of For Switchgear – Metal-Enclosed Low-Voltage AC Power Circuit Breaker Switchgear Assemblies – Conformance Test Procedures, ANSI/IEEE C37.51.

12.3 Medium-voltage interrupting devices that are not intended to replace standard protective devices shall comply with the power-frequency withstand voltage tests of For Switchgear – Metal-Enclosed Interrupter Switchgear Assemblies – Conformance Testing, ANSI/IEEE C37.57.

13 Internal Arcing Fault Test

13.1 To demonstrate the interrupting device does not create an arc fault hazard during the interruption of an arcing fault at the minimum and maximum arcing fault current rating, the interrupting device shall be