UL 98B

Outline of Investigation for Enclosed and Dead-front Switches for use in Photovoltaic Systems

Issue Number 4

December 17, 2024

Summary of Topics

This is the fourth issue of the Outline of Investigation for Enclosed and Dead-Front Switches for Use in Photovoltaic Systems, UL 98B dated December 17, 2024. These requirements cover enclosed and dead-front switches rated up to 2000 V dc, intended for use in dc photovoltaic (PV) systems and installed in accordance with Article 690 of the National Electrical Code, NFPA 70. These switches are intended for ambient conditions between minus 20 to +50 °C.

Portions of this document include excerpts from UL Standards. UL Standards are owned and copyrighted © by ULSE Inc. ULSE Inc. authorizes the use of these portions solely for use in this document.

UL's Outlines of Investigation are copyrighted by UL LLC. Neither a printed nor electronic copy of an Outline of Investigation should be altered in any way. All of UL's Outlines of Investigation and all copyrights, ownerships, and rights regarding those Outlines of Investigation shall remain the sole and exclusive property of UL LLC.

© 2024 UL LLC

UL COPYRIGHTED MATERIAL – NOT AUTHORIZED FOR FURTHER REPRODUCTION OR DISTRIBUTION WITHOUT PERMISSION FROM UL INC.

No Text on This Page

UL COPYRIGHTED MATERIAL – NOT AUTHORIZED FOR FURTHER REPRODUCTION OR DISTRIBUTION WITHOUT PERMISSION FROM UL INC.

CONTENTS

INTRODUCTION

1 Scope 5
2 Components 5
3 Units of Measurement 5
4 Undated References 5
5 Glossary 6

CONSTRUCTION

6 General 6
7 Spacings 7
8 Wire Terminals 7
9 Bus Bars 9
10 Enclosure Doors 9
11 Fusing 9
12 Wiring and Bending Space 10

PERFORMANCE

13 General 10
14 Heating Test 13
15 Endurance Test 13
16 Close-Open Test 14
17 Short Circuit Tests 14
18 Electrically Tripped Switches 14
18.1 General 14
18.2 Heating test for electrically tripped switches 14
18.3 Endurance test for electrically tripped switches 15
18.4 Contact opening test for electrically tripped switches 15
19 Mold Stress Relief Test 15
20 Strength of Insulating Base and Support Test 15
21 Wire Terminals for Other Class and Strand Configurations 15

RATINGS

22 General 15

MARKINGS

23 General 16

ACCESSORIES

24 Construction 18
24.1 General 18
24.2 Mounting 18
24.3 Field wiring 18
24.4 Strain relief 19
24.5 Spacings 19
24.6 Electrical tripping mechanism 20
24.7 Overvoltage-trip release devices 20

UL COPYRIGHTED MATERIAL – NOT AUTHORIZED FOR FURTHER REPRODUCTION OR DISTRIBUTION WITHOUT PERMISSION FROM UL INC.

24.8 Electrical operators 20
25 Performance 20
25.1 General 20
25.2 Electrical tripping mechanism 21
25.3 Overvoltage-trip release devices 21
25.4 Electrical operators 22
25.5 Alarm and auxiliary switches 22
26 Ratings 24
27 Markings 24

UL COPYRIGHTED MATERIAL – NOT AUTHORIZED FOR FURTHER REPRODUCTION OR DISTRIBUTION WITHOUT PERMISSION FROM UL INC.

INTRODUCTION

1 Scope

1.1 These requirements cover open, enclosed and dead-front switches rated up to 2000 V dc, intended for use in dc photovoltaic (PV) systems and installed in accordance with Article 690 of the National Electrical Code, NFPA 70. These switches are intended for ambient conditions between minus 20 to +50 °C.

1.2 These requirements are intended to be used in conjunction with requirements in the Standard for Enclosed and Dead-Front Switches, UL 98, except as modified or supplemented by the following requirements.

1.3 Unless otherwise specified, when the term switch is used in this outline, it refers to a photovoltaic, enclosed, open, or dead-front switch.

1.4 Fusible switches are intended for use with photovoltaic (PV) fuses which comply with the requirements of the Standard for Low-Voltage Fuses - Part 19: Photovoltaic Fuses, UL 2579.

1.5 These requirements also apply to open type switches, used in conjunction with the Outline of Investigation for Open Type Switches, UL 98A.

1.6 These requirements also cover fused and unfused electrically tripped PV switches.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this outline 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 outline; or

b) Is superseded by a requirement in this outline.

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 outline shall be interpreted as referring to the latest edition of that code or standard.

UL COPYRIGHTED MATERIAL – NOT AUTHORIZED FOR FURTHER REPRODUCTION OR DISTRIBUTION WITHOUT PERMISSION FROM UL INC.