UL 2140

Outline of Investigation for Prefabricated Power Distribution Assemblies

Issue Number: 1

August 31, 2026

Summary of Topics

This is the first issue of the Outline of Investigation for Prefabricated Power Distribution Assemblies, UL 2140, dated August 31, 2026. Previously, it was made available internally on May 1, 2026.

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.

© 2026 UL LLC

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

No Text on This Page

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

CONTENTS

1 Scope 5
2 Equipment, Sub-Assemblies and Components 5
3 Units of Measurement 6
4 Undated References 6
5 Glossary 6
6 Construction 6
6.1 General 6
6.2 Wiring and protection 7
6.3 Wiring methods and materials 8
6.4 Field wiring compartments 8
6.5 Field wiring terminals 8
6.6 Wire bending space 8
6.7 Separation of circuits 8
6.8 Disconnecting means 8
6.9 Overcurrent protection 9
6.10 Service equipment 9
7 Grounding and Bonding 9
8 Spaces Around Electrical Equipment 10
9 Product Assembly and Field Installable Accessories 10
9.1 General 10
9.2 Split shipment of assemblies and shipment of sub-assemblies 10
9.3 Field installed accessories 11
9.4 Prefabricated power distribution assemblies not fully configured 11
10 Ratings 12
11 Markings 12
11.1 General 12
11.2 Field wiring terminal markings 15
11.3 NEC required markings 15
12 Instructions, Drawings, and Other Documentation 15
12.1 General 15
12.2 Electronic access to instructions, drawings, and other documentation 16

ANNEX A (Normative) Standards for Components

Standards for Components 19

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

No Text on This Page

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

1 Scope

1.1 This Outline of Investigation covers prefabricated power distribution assemblies. These assemblies incorporate pre-installed electrical power distribution systems comprised of electrical distribution equipment and interconnecting raceways and conductors.

1.2 These prefabricated power distribution assemblies incorporate pre-installed materials and equipment which, after installation, may be concealed and may not be accessible for inspection at the final installation site.

1.3 The prefabricated power distribution assemblies covered by these requirements are intended for fixed installation and may be intended for use either indoors or outdoors when installed in an overall enclosure.

1.4 These requirements do not cover:

a) Any overall enclosure into which the assembly is installed;

b) Fire protection or suppression systems which may be installed above or around the skid;

c) Structural requirements of any base, frame or other structure to which the individual components are mounted;

d) Mechanical structures such as skids, ramps, ladders, stairs, platforms;

e) Access and working space around electrical equipment that is accessible from the outside of the assembly (such as an outward-facing panelboard or field-wiring compartment);

f) Spacings to walls and ESS groups that are not an integral part of the prefabricated power distribution assemblies.

1.5 These requirements are to be applied in conjunction with product standards and NFPA 70®, *National Electrical Code*® (NEC®) to validate the prefabricated power distribution assembly complies with the applicable code and standards requirements.

1.6 Where stationary batteries are installed in the prefabricated power distribution assembly, and the quantities of batteries exceed the threshold amounts specified in Table 6.1, the requirements in this Outline of Investigation are to be applied in conjunction with product standards and the Standard for the Installation of Stationary Energy Storage Systems, NFPA 855.

1.7 This Outline of Investigation assumes that the final installation of the prefabricated power distribution assemblies will be performed by qualified service personnel in accordance with the applicable installation instructions and national installation codes.

1.8 These prefabricated power distribution assemblies are intended for installation subject to approval by the Authority Having Jurisdiction. Information regarding equipment and wiring provided by the manufacturer as part of the assembly is included with the assembly and any equipment or wiring not identified by the manufacturer is subject to the inspection and approval by the Authority Having Jurisdiction.

2 Equipment, Sub-Assemblies and Components

2.1 Except as indicated in 2.2, equipment, sub-assemblies and components used as a part of a prefabricated power distribution assembly covered by this Outline of Investigation shall comply with the

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

requirements for that equipment, sub-assembly or component. See Annex A for a list of common standards covering equipment, sub-assemblies and components.

2.2 Equipment, sub-assemblies and components are 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 of Investigation; or

b) Is superseded by a requirement in this Outline of Investigation.

2.3 Equipment, sub-assemblies and components shall be used in accordance with their ratings and any installation requirements established for the intended conditions of use.

2.4 Equipment, sub-assemblies and components that are incomplete in construction features or restricted in performance capabilities shall be used only under the specific conditions for which they have been evaluated.

3 Units of Measurement

3.1 Where a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this Outline of Investigation shall be interpreted as referring to the latest edition of that code or standard. When specifically requested, a prefabricated power distribution assembly shall be permitted to be evaluated to older editions of the National Electrical Code (NEC), NFPA 70.

5 Glossary

5.1 For the purposes of this Outline of Investigation, refer to the National Electrical Code (NEC), NFPA 70 for definitions. Definitions unique to this Outline of Investigation are included in this Section.

5.2 Accessory – A device or equipment that performs a secondary function and is not a required for the essential function of the overall assembly

5.3 Sub-Assembly – A component of an overall assembly that is designed as a separate unit to facilitate shipment.

5.4 Split Shipment – Assemblies and sub-assemblies that are shipped in multiple shipments rather than one single shipment.

6 Construction

6.1 General

6.1.1 Electrical circuits that are an integral part of the prefabricated power distribution assembly shall comply with the appropriate end-product standard requirements for its use and installation, according to the applicable standards in Annex A. The interconnection of electrical equipment shall comply with the National Electrical Code (NEC), NFPA 70. Requirements in this Outline of Investigation are provided to facilitate the evaluation for the prefabricated power distribution assembly for compliance with the NEC and supplement the NEC.

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

6.1.2 Stationary batteries and energy storage systems shall comply with the NEC. Where stationary batteries are installed in quantities that exceed Table 6.1, they shall additionally meet the applicable requirements of NFPA 855.

Table 6.1
Threshold Amounts for Application of NFPA 855

Battery Technology	kWh
Lead-acid (all types)	70
Ni-Cad, Ni-MH, Ni-Fe,and Ni-Zn	70
Lithium-ion (all types)	20
Sodium Nickel Chloride	20
Sodium Nickel Chloride evaluated to UL 1973 and meeting the cell-level performance requirements in UL 9540A	70
Flow Batteries (Including Vanadium, Zinc-Bromine, Polysulfide-Bromide, and other flowing electrolyte-type technologies)	20
Lithium metal	20
Zinc-air, aqueous	70
Zinc bromide	20
Zinc manganese dioxide (Zn-MnO2)	20
Sodium sulfur	70
Iron-air, aqueous	70
Nickel-hydrogen	20
Other Battery Technologies	10

6.1.3 Live parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by enclosures. Enclosures shall be evaluated to applicable standards for the overall equipment or evaluated to an applicable standard for enclosures.

6.1.4 Equipment shall be mounted in accordance with instructions provided by the equipment manufacturer and in accordance with the NEC.

6.1.5 All equipment shall be secured and prevented from shifting or movement in place by means other than friction.

6.1.6 All installed equipment shall be secured, supported, braced or the like to prevent damage, loosening, dislodging or breaking during shipping and handling that could increase the risk of electric shock, fire or injury to persons. It is acceptable to use braces, packing material and the like that is removed upon installation for this purpose.

6.1.7 Equipment with ventilating openings shall be mounted so that ventilation openings are not obstructed by other equipment. Equipment shall be secured to the surface on which it is mounted.

6.1.8 All installed equipment shall be of the enclosed type.

6.2 Wiring and protection

6.2.1 Wiring shall be suitable for its use and installation. This requirement does not apply to wiring that is part of equipment evaluated to the appropriate equipment requirements.

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