UL 3100

Outline of Investigation for Automated Mobile Platforms (AMPs)

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Summary of Topics

This second issue of the Outline of Investigation for Automated Mobile Platforms (AMPs), UL 3100, covers battery-operated mobile platforms with or without a payload.

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INTRODUCTION

1 Scope

1.1 These requirements cover battery-operated mobile platforms with or without a payload, as specified in 1.2. These devices are intended to be used indoors in a commercial or industrial environment. The device is battery powered using either lead acid batteries or lithium based batteries that, if rechargeable, are charged through a conductive system while either on board or off board the device.

1.2 Mobile platforms that are covered by this Outline are intended to be for lifting, carrying, product picking, towing, and the like. The actuator may be provided with a gripping attachment, suction attachment, scope attachment, and the like, to lift or carry the load.

1.3 Portions of a system, such as the charger, that are located off board the AMP, are intended to be installed in accordance with the National Electrical Code (NEC), NFPA 70.

1.4 This outline does not include requirements for industrial robots, which are covered under the Standard for Robots and Robotic Equipment, UL 1740. A robotic manipulator that is in compliance with these standards may be used as the payload for the integrated system.

1.5 This outline does not include requirements for Automatic Guided Vehicle or Automated Vehicles that function as commercial and industrial floor cleaning equipment. This equipment is covered under ANSI C22.2 No. 336, Particular Requirements for Rechargeable Battery-Operated Commercial Robotic Floor Treatment Machines with Traction Drives.

1.6 This outline does not cover battery powered industrial trucks that are rated Type E, EE, ES, or EX, and marked as such, as defined in NFPA 505. These truck types are covered under the Standard for Electric-Battery-Powered Industrial Trucks, UL 583.

2 Components

2.1 A component of a product covered by this outline shall:

a) Comply with the requirements for that component as specified in this outline;

b) Be used in accordance with its rating(s) established for the intended conditions of use; and

c) Be used within its established use limitations or conditions of acceptability.

2.2 A component of a product covered by this outline is not required to comply with a specific component requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product;

b) Is superseded by a requirement in this outline; or

c) Is separately investigated when forming part of another component, provided the component is used within its established ratings and limitations.

2.3 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.

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2.4 A component that is also intended to perform other functions such as overcurrent protection, ground-fault circuit-interruption, surge suppression, any other similar functions, or any combination thereof, shall comply additionally with the requirements of the applicable UL standard(s) that cover devices that provide those functions.

3 Units of Measurement

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

4 Referenced Publications

4.1 The following standards are referenced in this outline, and portions of these referenced standards may be essential for compliance.

American Society for Testing and Materials (ASTM) Standards

ANSI/ASTM E230/E230M, *Standard Specification and Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples*

IEC Standards

IEC 60068-2-64, *Standard for Environmental Testing – Part 2-64: Tests – Test Fh: Vibration, Broadband Random and Guidance*
IEC 60812, *Standard for Analysis Techniques for System Reliability – Procedure for Failure Mode and Effects Analysis (FMEA)*
IEC 61025, *Standard for Fault Tree Analysis (FTA)*
IEC 61508-1, *Electrical/Electronic/Programmable Electronic Safety-Related Systems – Part 1: General Requirements*

ISO Standards

ISO 12405-1, *Standard for Electrically Propelled Road Vehicles – Test Specification for Lithium-Ion Traction Battery Packs and Systems – Part 1: High-Power Applications*
ISO 13849-1, *Standard for Safety of Machinery – Safety Related Parts of Control Systems – Part 1: General Principles for Design*
ISO 13849-2, *Standard for Safety of Machinery – Safety Related Parts of Control Systems – Part 2: Validation*

MIL Standards

MIL-STD-1629A, *Procedures for Performing a Failure Mode, Effects, and Criticality Analysis*

NFPA Standards

NFPA 70, *National Electrical Code*

SAE Standards

SAE J1127, *Standard for Low Voltage Battery Cable*
SAE J1128, *Standard for Low Voltage Primary Cable*
SAE J1739, *Potential Failure Mode and Effects Analysis in Design (Design FMEA), Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes (Process FMEA)*

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