ANSI/CAN/UL 3100:2024

JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

Automated Mobile Platforms (AMPs)

ANSI/UL 3100-2024

SCC FOREWORD

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UL Standard for Safety for Automated Mobile Platforms (AMPs), ANSI/CAN/UL 3100

First Edition, Dated May 26, 2021

Summary of Topics

This revision of ANSI/CAN/UL 3100 dated May 23, 2024 includes the following changes in requirements:

– Revision of on board charger and charging station requirements: 5.3A, 6.2, 11.1, 11.2, and 11.3;

– Revision of requirements regarding motors and motor overload: 13.3 and 56.1;

– Revision of battery requirements: 7.4, 8.1, 32.1, and 37.6;

– Removal of Section 43;

– Clarification of requirements in Section 45.4: 7.4, 8.1, 32.1, and 37.6

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

The revised requirements are substantially in accordance with Proposal(s) on this subject dated October 6, 2023 and March 1, 2024.

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ANSI/UL 3100-2024

MAY 26, 2021
(Title Page Reprinted: May 23, 2024)

ANSI/CAN/UL 3100:2024

Standard for Automated Mobile Platforms (AMPs)

First Edition

May 26, 2021

This ANSI/CAN/UL Safety Standard consists of the First Edition including revisions through May 23, 2024.

The most recent designation of ANSI/UL 3100 as an American National Standard (ANSI) occurred on May 23, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, Preface or SCC Foreword.

This standard has been designated as a National Standard of Canada (NSC) on May 23, 2024.

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PREFACE

This is the First Edition of the ANSI/CAN/UL 3100 Standard for Automated Mobile Platforms (AMPs).

ULSE is accredited by the American National Standards Institute (ANSI) and the Standards Council of Canada (SCC) as a Standards Development Organization (SDO).

This Standard has been developed in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization.

This ANSI/CAN/UL 3100 Standard is under continuous maintenance, whereby each revision is approved in compliance with the requirements of ANSI and SCC for accreditation of a Standards Development Organization. In the event that no revisions are issued for a period of four years from the date of publication, action to revise, reaffirm, or withdraw the standard shall be initiated.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

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

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This Edition of the Standard has been formally approved by the Technical Committee (TC) on Automated Mobile Platforms (AMPs), TC 3100.

This list represents the TC 3100 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

TC 3100 Membership

Name	Representing	Interest Category	Region
Arab, Aliasghar	Agile Safe Autonomy by Narranj LLC	Testing & Standards Organization	USA
Callahan, Haley	UL Standards & Engagement	TC Project Manager – Non-voting	USA
Fields, Jennifer	UL Standards & Engagement	TC Chair – Non-voting	USA
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Kamble, Sudesh	Intertek Testing Services	Testing & Standards Organization	USA
Kim, Ji Han	Hyundai	Producer	South Korea
Kim, Seongmin	LG Electronics, Korea	Producer	South Korea
Klave, Michael	Toyota Industrial Equipment Manufacturing	Producer	USA

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TC 3100 Membership Continued

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Marvel, Jeremy	National Institute of Standards & Technology	Government	USA
McGoldrick, Kevin	Hyster-Yale Group Inc	Producer	USA
McLachlan, Robert	Raymond Corp	General Interest	USA
Murray, Lisa	Nidec Motor Corporation	Supply Chain	USA
Ortiz, Harold	PILZ Automation Safety L P	General Interest	USA
Ortlieb, Mark	Brain Corporation	Producer	USA
Ould, Lee	Safety Engineering Laboratory (SEL)	General Interest	USA
Prather, Aaron	FedEx	Commercial / Industrial User	USA
Rood, Ian	UBSafe Inc	General Interest	Canada
Shea, Roberta Nelson	Universal Robots	Supply Chain	USA
Sines, Jeread	Amazon	Producer	USA
Sorrano, Chris	SICK, Inc.	General Interest	USA
Sudler III, Samuel	SEA LTD	General Interest	USA
Tao, Luke	SGS	Testing & Standards Organization	China
Tiwary, Sumit	GreyOrange India Pvt Ltd	Producer	India
Webber, Luke	MCFA	Producer	USA
Winrich, Marvin	Rockwell Automation	Supply Chain	USA
Woods, Benjamin	Rivian Automotive	Commercial/Industrial Users	USA
Yang, Shuping	Beijing Research Institute of Automation for Machinery Industry	International Delegate	China

International Classification for Standards (ICS): 25.040.30

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This Standard is intended to be used for conformity assessment.

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for this particular application.

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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 only or as outdoor use devices 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 Standard are intended for lifting, carrying, product picking, towing, and the like. These actions may be provided by 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 and the Canadian Electrical Code (CE Code), CSA C22.1.

1.4 This Standard does not include requirements for industrial robots, which are covered under the Standard for Robots and Robotic Equipment, UL 1740 and Industrial Robots and Robot Systems, CSA Z434. A robotic manipulator that is in compliance with these standards may be used as the payload for the integrated system.

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

1.6 This Standard does not cover battery powered industrial trucks that are rated Type E, EE, ES, or EX, and marked as such, as defined in the Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations, NFPA 505. These truck types are covered under the Standard for Electric-Battery-Powered Industrial Trucks, UL 583 and the Guide for the Investigation of Electric-Battery-Powered Industrial Trucks, ULC/ORD-C583.

1.7 Automated mobile platforms are not provided with “forks” and are not intended to operate as “forklifts.” Any device with that capability is considered an industrial truck and is evaluated as indicated in 1.6.

1.8 This standard does not cover products intended to transport persons.

2 Components

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

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

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 Standard 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 Standard; 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.

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 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 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.

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

ANSI Z97.1, *Safety Glazing Materials Used In Buildings – Safety Performance Specifications And Methods Of Test*

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

ASTM D1525, *Standard Test Method For Vicat Softening Temperature Of Plastics*

21 CFR Part 1040 series, *Performance Standards for Light-Emitting Products*

CSA C22.1, *Canadian Electrical Code (CE Code)*

CSA C22.2 No. 0.15, *Adhesive Labels*

CSA C22.2 No. 0.2, *Insulation Coordination*

CSA C22.2 No. 0.8, *Safety Functions Incorporating Electronic Technology*

CSA C22.2 No. 14, *Industrial Control Equipment*

CSA C22.2 No. 0.17, *Evaluation of Properties of Polymeric Materials*

CSA C22.2 No. 49, *Flexible Cords and Cables*

CSA C22.2 No. 66.1, *Low Voltage Transformers – Part 1: General Requirements*

CSA C22.2 No. 66.2, *Low Voltage Transformers – Part 2: General Purpose Transformers*

CSA C22.2 No. 66.3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

CSA C22.2 No. 75, *Thermoplastic - Insulated Wires and Cables*

CSA C22.2 No. 94.2, *Enclosures for Electrical Equipment, Environmental Considerations*

CSA C22.2 No. 96, *Portable Power Cables*

CSA C22.2 No. 100, *Motors and Generators*

CSA C22.2 No. 107.1, *Power Conversion Equipment*

CSA C22.2 No. 107.2, *Battery Chargers*

CSA C22.2 No. 182.3, *Special Use Attachment Plugs, Receptacles, and Connectors*

CSA C22.2 No. 210, *Appliance Wiring Material Products*

CSA C22.2 No. 223, *Power Supplies with Extra Low Voltage Class 2 Outputs*

CSA C22.2 No. 248 series, *Low Voltage Fuses*

CSA C22.2 No. 336, *Particular Requirements for Rechargeable Battery-Operated Commercial Robotic Floor Treatment Machines with Traction Drives*

CSA C22.2 No. 60950-1, *Information Technology Equipment – Safety – Part 1: General Requirements*

CSA C22.2 No. 60335-2-29, *Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers*

CSA C22.2 No. 62133-2, *Secondary Cells and Batteries Containing Alkaline or other Non-Acid Electrolytes – Safety Requirements for Portable Sealed Secondary Cells, and for Batteries made from them, for use in Portable Applications – Part 2: Lithium Systems*

CSA C22.2 No. 62368-1, *Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements*

CSA Z434, *Industrial Robots and Robot Systems*

IEC 60068-2-64, *Environmental Testing – Part 2-64: Tests – Test Fh: Vibration, Broadband Random and Guidance*

IEC 60417 (No. 5041), *Graphical Symbols for Use on Equipment*

IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*