



ANSI/CAN/UL 2743:2023

JOINT CANADA-UNITED STATES
NATIONAL STANDARD

STANDARD FOR SAFETY

Portable Power Packs

ULNORM.COM : Click to view the full PDF of UL 2743 2023



SCC FOREWORD

National Standard of Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

ULNORM.COM : Click to view the full PDF of UL 2743 2023

UL Standard for Safety for Portable Power Packs, ANSI/CAN/UL 2743

Second Edition, Dated July 3, 2018

Summary of Topics

This revision of ANSI/CAN/UL 2743 dated April 14, 2023 includes the following changes:

- Clarification to definition of hazardous voltage level; [5.21](#)
- Addition of definition of "portable or moveable"; [1.7](#), [Table 1.1](#), [4.3](#), [5.29A](#)
- Alignment of requirements for sub-enclosures with UL 746C; [7.3.2](#)
- Receptacle output not supplied by AC mains; [12.3.1](#), [12.3.1A](#), [17.5](#), [70.24](#), [72.3](#), [4.3](#)
- Increase the vehicle adapter voltage rating; [11.1.2](#)
- Replacement of UL 60950-1 with UL 62368-1 for external charger standard; [11.3.2](#), [4.3](#)
- Double insulated products with functional earthing; [5.18A](#), [14.2](#) – [14.6](#)
- Alternative cell standard for Lithium and Lead Acid batteries; [28.2.1](#), [28.3.1](#), [4.3](#)
- Addition of alternative standard for inverters in the power pack; [30.1](#), [4.3](#)
- Addition of mass limitation for stability test; [37.1](#)
- Addition of the induction output and energy hazard measurement test; [12.1.2](#), [12.1.3](#), [12.4.3](#), [12.5.3](#), Section [12.6](#), Section [47A](#)
- Addition of LVLE circuit requirements and test; [5.27](#), [12.1.4](#), Section [12A](#), Section [47B](#)
- Clarification of Leakage Current Test with hazardous voltage circuits; [46.1](#), [49.1](#)
- Option of single fault condition in control circuit besides functional safety evaluation; [40.1](#), [50.1.7](#)
- Clarification of the short circuit resistance for output short circuit test; [50.2.2](#), [50.2.3](#)
- Charging current for Overcharging Test; [50.9.2](#)
- Additional requirements for large energy storage systems (ESS); [28.3.7](#), [32.4](#), Section [50.11](#), [70.23](#)
- Strain relief test for interconnecting cable; [11.2.2.1](#), [11.2.2.3](#), Section [54.1](#)
- Updates to the Impact Test and Drop Test; [55.1.2](#), [55.2.1](#), [55.3.1](#), [55.3.2](#)
- Clarification of the compliance criteria for the Rain Test; [5.15](#), [5.31A](#), [5.31B](#), [60.2](#), [60.2A](#), [60.3](#), [60.3A](#), [60.4](#), [69.1](#)

- **Power Pack Ampacity Test and booster ampacity rating marking; [65.1](#), [69.1](#)**
- **Addition of UL 969A requirements for flag labels; [69.3](#), [4.3](#)**
- **Revisions to Markings and Instructions; [70.11](#), [70.12](#), [72.3](#)**
- **Addition of instruction for booster cable connection and disconnection to battery; [72.3](#)**
- **Clarification to Annex [A](#) as Normative or Informative**

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 new and revised requirements are substantially in accordance with Proposal(s) on this subject dated July 8, 2022 and December 2, 2022.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of ULSE Inc. (ULSE).

ULSE provides this Standard "as is" without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will ULSE be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if ULSE or an authorized ULSE representative has been advised of the possibility of such damage. In no event shall ULSE's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold ULSE harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.



ANSI/UL 2743-2023

JULY 3, 2018

(Title Page Reprinted: April 14, 2023)



1

ANSI/CAN/UL 2743:2023

Standard for Portable Power Packs

First Edition – October, 2016

Second Edition

July 3, 2018

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through April 14, 2023.

The most recent designation of ANSI/UL 2743 as an American National Standard (ANSI) occurred on April 14, 2023. 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 April 14, 2023.

COPYRIGHT © 2023 ULSE INC.

ULNORM.COM: Click to view the full PDF of UL 2743 2023

No Text on This Page

ULNORM.COM : Click to view the full PDF of UL 2743 2023

CONTENTS

Preface	7
---------------	---

INTRODUCTION

1 Scope	9
2 Units of Measurement	9
3 Components	10
4 Referenced Publications	10
5 Glossary	13

CONSTRUCTION

6 General	16
7 Frame and Enclosure	16
7.1 General	16
7.2 Metallic enclosures	17
7.3 Nonmetallic enclosures	19
7.4 Openings in enclosures	19
7.5 Environmental considerations	21
8 Flammability of Materials	21
9 Assembly	22
10 Corrosion Protection	23
11 Supply Connections	24
11.1 General	24
11.2 Flexible cord connection	25
11.3 External power supplies	26
11.4 Vehicle adapters	27
11.5 Photovoltaic panels	27
12 Output Connections	27
12.1 General	27
12.2 Booster cable assemblies	28
12.3 Receptacles	29
12.4 DC output connectors and USB connectors	30
12.5 Vehicle adapter sockets	30
12.6 Induction power transmitter	30
12A LVLE Circuits	30
13 Grounding	31
13.1 General	31
13.2 Grounding identification	32
14 Double Insulated Products	32
15 Current Carrying Parts	33
16 Internal Wiring	33
16.1 Mechanical protection	33
16.2 Wiring insulation	34
16.3 Splices and connections	34
17 Separation of Circuits	35
18 Insulating Materials	35
19 Compressors	35
19.1 General	35
19.2 Motors and thermal protection	36
19.3 Parts subject to pressure	36
20 Capacitors and Electrochemical Capacitor Modules	36
20.1 Capacitors	36

	20.2 Electrochemical capacitor modules	37
21	Resistors	37
22	Lampholders	37
23	Transformers	37
24	Switches and Controls	38
25	Printed-Wiring Boards.....	38
26	Interlocks	39
27	Overload Protection Devices	39
28	Internal Battery.....	40
	28.1 General.....	40
	28.2 Lead acid batteries	40
	28.3 Lithium-ion batteries.....	40
29	Spacings	41
30	Inverters	43
31	Charging Functions	43

PROTECTION AGAINST INJURY TO PERSONS

32	General	43
33	Back Feed Protection	44
34	Sharp Edges	44
35	Strength of Enclosure	44
36	Attachments.....	44
37	Stability	44
38	Strength of Handles.....	44
39	Surface Temperatures	44
40	Safety Circuits and Control Circuits.....	45

PERFORMANCE

41	General	45
42	Power Input Test	46
43	Normal Charging Operation Test	46
44	Lithium Charging System Test	47
45	Capacitor Discharge Test	48
46	Leakage Current Test	48
47	Normal Temperature Test.....	51
	47.1 General.....	51
	47.2 Maximum normal load	53
	47.3 Power pack ampacity temperature test	54
47A	Energy Hazard Measurement Test	54
47B	LVLE Circuit Test.....	55
48	Dielectric Voltage Withstand Test.....	56
49	Leakage Current Following Humidity Conditioning	57
50	Abnormal Operation Tests.....	57
	50.1 General.....	57
	50.2 Output connections short circuit test.....	58
	50.3 Reverse polarity of booster cables	58
	50.4 Component faults	58
	50.5 Relay and solenoid burnout	59
	50.6 Printed-wiring board abnormal test.....	59
	50.7 Disconnected fan test.....	59
	50.8 Blocked ventilation test.....	59
	50.9 Overcharging test	59
	50.10 Internal battery reverse polarity test.....	60

50.11	Thermal propagation test	60
51	Vibration Test	60
52	Ground Continuity	60
53	Overload Tests	61
53.1	General.....	61
53.2	Overload of switches and controls test.....	61
53.3	Overload of protection devices.....	61
53.4	Overload of interlocks	61
54	Strain Relief Test	61
54.1	Direct-pull strain relief test	61
54.2	Push-back strain relief test	62
55	Strength of Enclosure Tests.....	62
55.1	General.....	62
55.2	Impact test	62
55.3	Drop test.....	63
56	Mold Stress Test.....	63
57	Strength of Handles Test.....	63
58	Stability Test	64
59	Hydrostatic Strength Test.....	64
60	Rain Test	64
61	Tests on Insulating Materials	68
62	Accelerated Aging of Gaskets, Sealing Compounds, and Adhesives Test	69
63	Metallic Coating Thickness Test.....	70
64	Permanency of Wrapped Hang Tag Marking.....	72
65	Power Pack Ampacity Test.....	73
66	Back Feed Test	73
67	Cold Bend Test.....	73
68	Clamp Tests.....	74
68.1	General.....	74
68.2	Cold drop test.....	74
68.3	Dielectric voltage-withstand test.....	74
68.4	Secureness test.....	75

MARKINGS

69	General	75
70	Cautionary Markings.....	76

INSTRUCTIONS

71	General	78
72	Instructions Pertaining to Risk of Fire, Electric Shock, or Injury to Persons	79
73	Installation Instructions	81
74	Operating Instructions.....	82
75	User Maintenance Instructions	82
76	Moving and Storage Instructions.....	82

Annex A – Safety Marking Translations (Normative for Canada and Informative for the US)

No Text on This Page

ULNORM.COM : Click to view the full PDF of UL 2743 2023

Preface

This is the Second Edition of ANSI/CAN/UL 2743, the Standard for Safety for Portable Power Packs.

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.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

Annex [A](#) is identified as Normative for Canada and Informative for the US. Informative text is for informational purposes only, and Normative text is considered to be mandatory.

This ANSI/CAN/UL 2743 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 Collaborative Standards Development System (CSDS) at <https://csds.ul.com>.

Our Standards for Safety are copyrighted by ULSE Inc. Neither a printed nor electronic copy of a Standard should be altered in any way. All of our Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of ULSE Inc.

This Edition of the Standard has been formally approved by the Technical Committee (TC) for Portable Power Packs, TC 2743.

This list represents the TC 2743 membership when the final text in this standard was balloted. Since that time, changes in the membership may have occurred.

TC 2743 Membership

Name	Representing	Interest Category	Region
Simon Aman	Stanley Black & Decker	Producer	USA
Rich Byczek	Intertek	Testing and Standards	USA
Among Chen	DEKRA	Testing and Standards	China
Mike Chou	Great Consultant Service Co.	General	Chinese Taipei
Clarence Cormier	Alberta Municipal Affairs	AHJ	Alberta, Canada

TC 2743 Membership Continued on Next Page

TC 2743 Membership Continued

Name	Representing	Interest Category	Region
Drew Feng	Dongguan Poweramp Technology Limited	Supply Chain	China
Yang Gao	Nanjing Chervon Industry Co.	Producer	China
Jonette Herman	UL Standards & Engagement	TC Project Manager – Non-voting	USA
Asep Hidayat	PT International Chemical Industry (Representing BSN)	International Delegate	Indonesia
Viky Huang	Shenzen Hello Tech Energy Co.	Producer	China
Diana Pappas Jordan	UL Standards & Engagement	TC Chair – Non-voting	USA
Rebecca Le	UL Solutions	Testing and Standards	China
Jody Leber	CSA Group	Testing and Standards	USA
Matt Nygren	Milwaukee Electric Tool Corp	Supply Chain	USA
Barry O'Dell	Schumacher Electric Corp	Producer	USA
Francois Renaud-Byrne	Hybrid Power Solutions	Producer	Ontario, Canada
Michael Savage	Marion County, FL	AHJ	USA
Samuel Sudler III	SEA Ltd	General	USA
Jerry Xiao	SGS-CSTC Standards Technical Services Co LTD	Testing and Standards	China

International Classification for Standards (ICS): 97.180

For information on ULSE Standards, visit <https://www.shopulstandards.com>, call toll free 1-888-853-3503 or email us at ClientService@shopULStandards.com.

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.

CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE.

INTRODUCTION

1 Scope

1.1 These requirements cover portable and movable power packs provided with one or more batteries, electrochemical capacitors, or electrochemical capacitor modules. If provided with a battery, the battery shall be either a lead acid or lithium ion battery. The power packs are provided with one or more inputs and one or more outputs. For power packs provided with a booster function, the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 24 V dc maximum, to provide emergency starting power.

1.2 These requirements cover power packs suitable for outdoor use, temporary outdoor use, or indoor use only. Outdoor use packs are intended to be used outdoors with no restrictions. Temporary outdoor use packs are intended to be used outdoors in limited wet conditions and always stored indoors. Indoor use only packs are intended to be stored indoors and used indoors and are not intended to be used outdoors at any time. A power pack with a booster function is not considered indoor use only under any conditions.

1.3 These requirements cover power packs provided with additional systems such as an air compressor (tankless type) for inflating tires or other inflatable items, or with a light to act as warning lights to oncoming traffic, as a flashlight, or the like. These functions are also powered by the internal battery.

1.4 These requirements cover the power pack options such as lights, voltmeters, internal air compressor assemblies, associated gauges, inverters, vehicle adapters, and internal batteries, as well as the charging of the internal batteries, when these options are integral to the power pack.

1.5 These requirements do not cover wiring or cabling used in the recharging function of electric vehicle recharging equipment.

1.6 These requirements do not cover power banks which are covered in the Outline of Investigation for Power Banks, UL 2056.

1.7 These requirements do not cover power packs having a capacity exceeding the limits specified in [Table 1.1](#) which are covered by the Standard for Energy Storage Systems and Equipment, UL 9540.

Table 1.1
Portable Power Pack Threshold Quantities

Portable power pack technology	Aggregate capacity	
	kWh	MJ
Lead-acid, all types	70	252
Lithium-ion, all types	20	72
Electrochemical Capacitors	3	10.8

2 Units of Measurement

2.1 The values given in SI (metric) units shall be normative. Any other values are for information only.

2.2 Values stated without parentheses are the requirement. Values within parentheses are considered explanatory or approximate information.

3 Components

3.1 Except as indicated in 3.2, a component of a product covered by this Standard shall comply with the requirements for that component.

3.2 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.

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

3.4 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.

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 Products covered by this Standard shall comply with the referenced installation codes and standards noted in this Section as appropriate for the country where the product is to be used. When the product is intended for use in more than one country, the product shall comply with the installation codes and standards for all countries where it is intended to be used.

4.3 The following publications are referenced in this Standard:

ASTM A90, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings

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

ASTM E376, Standard Practice for Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Testing Methods

ASTM D412, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

ASTM B568, Standard Test Method for Measurement of Coating Thickness by X-Ray Spectrometry

ASTM A653, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

CSA C22.2 No. 0.15, Adhesive Labels

CAN/CSA C22.2 No. 0.17, Evaluation of Properties of Polymeric Mate

CAN/CSA C22.2 No. 0.2, Insulation Coordination

- CSA C22.2 No. 42, General Use Receptacles, Attachment Plugs, and Similar Wiring Devices
- CAN/CSA C22.2 No. 66.1, Low Voltage Transformers – Part 1: General Requirements
- CAN/CSA C22.2 No. 66.2, Low Voltage Transformers – Part 2: General Purpose Transformers
- CAN/CSA C22.2 No. 66.3, Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers
- CAN/CSA C22.2 No. 68, Motor Operated Appliances (Household and Commercial)
- CAN/CSA C22.2 No. 77, Motors With Inherent Overheating Protection
- CSA C22.2 No. 107.1, Power Conversion Equipment
- CSA C22.2 No. 107.2, Battery Chargers
- CAN/CSA C22.2 No. 182.3, Special Use Attachment Plugs, Receptacles, and Connectors
- CAN/CSA C22.2 No. 197, PVC Insulating Tape
- CAN/CSA C22.2 No. 127, Equipment and Lead Wires
- CAN/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. 60335-2-29, Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers
- CSA C22.2 E60730-1, Automatic Electrical Controls – Part 1: General Requirements
- CSA C22.2 No. 60950-1, Information Technology Equipment – Safety – Part 1: General Requirements
- CSA C22.2 No. 62133-2, Secondary Cells and Batteries Containing Alkaline and 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
- UL 94, Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
- UL 101, Leakage Current for Appliances
- UL 498, Attachment Plugs and Receptacles
- UL 506, Specialty Transformers
- UL 510, Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
- UL 635, Insulating Bushings

UL 746C, Polymeric Materials – Use in Electrical Equipment Evaluations

UL 758, Appliance Wiring Material

UL 796, Printed-Wiring Boards

UL 810A, Electrochemical Capacitors

UL 840, Insulation Coordination Including Clearance and Creepage Distances for Electrical Equipment

UL 943, Ground-Fault Circuit Interrupters

UL 969, Marking and Labeling Systems

UL 969A, Marking and Labeling Systems – Flag Labels, Flag Tags, Wrap-Around Labels and Related Products

UL 1004-3, Thermally Protected Motors

UL 1012, Power Units Other Than Class 2

UL 1097, Double Insulation Systems for Use in Electrical Equipment

UL 1236, Battery Chargers for Charging Engine-Starter Batteries

UL 1310, Class 2 Power Units

UL 1437, Electrical Analog Instruments – Panel Board Types

UL 1450, Motor-Operated Air Compressors, Vacuum Pumps, and Painting Equipment

UL 1561, Dry-Type General Purpose and Power Transformers

UL 1581, Reference Standard for Electrical Wires, Cables, and Flexible Cords

UL 1642, Lithium Batteries

UL 1741, Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources

UL 1839, Automotive Battery Booster Cables

UL 1973, Batteries for Use in Stationary and Motive Auxiliary Power Applications

UL 1977, Component Connectors for Use in Data, Signal, Control and Power Applications

UL 1989, Standby Batteries

UL 2089, Vehicle Battery Adapters

UL/ULC 2580, Batteries for Use In Electric Vehicles

UL 5085-1, Low Voltage Transformers – Part 1: General Requirements

UL 5085-2, Low Voltage Transformers – Part 2: General Purpose Transformers

UL 5085-3, Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers

UL 9540, Energy Storage Systems and Equipment

UL 60335-2-29, Household and Similar Electrical Appliances – Safety – Part 2-29: Particular Requirements for Battery Chargers

UL 60730-1, Automatic Electrical Controls – Part 1: General Requirements

UL 60950-1, Information Technology Equipment – Safety – Part 1: General Requirements

UL 62109-1, Power Converters for Use in Photovoltaic Power Systems – Part 1: General Requirements

UL 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

UL 62368-1, Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements

5 Glossary

5.1 For the purpose of this Standard, the following definitions apply:

5.2 ACCESSIBLE – Able to be contacted by an accessibility probe.

5.3 BATTERY – An electrical storage unit consisting of two or more cells.

5.4 BOOSTER CABLE – The conductors that originate at the power pack's internal battery and terminate at the clamps that are intended to be temporarily connected to the land vehicle's battery. If the cable is connected through a switch and therefore does not have a continuous path to the exterior of the power pack's enclosure, then the definition shall apply to the portion of cable that exits the power pack's enclosure.

5.5 BOOSTER FUNCTION – When the power packs are used for providing a temporary power source to a depleted land vehicle battery, rated 24 V maximum, to provide emergency starting power.

5.6 CAPACITOR MODULE – A single or multiple series and/or parallel-connected, electrochemical capacitors with associated circuitry.

5.7 CHARGING SYSTEM – Combination of circuitry intended to charge, balance, and/or maintain the state of charge of the battery.

5.8 CLAMP – Devices located at the ends of the power pack's booster cables, and which contain the jaw ends, connectors, and handle ends, which are used to make the temporary connections to the land vehicles battery.

5.9 CLAMP CONNECTORS – Portion of the clamp that contacts the battery terminals.