IEC 62840-2

Edition 1.0 2016-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric vehicle battery swap system – Part 2: Safety requirements

Système d'échange de batterie de véhicule électrique – Partie 2: Exigences de sécurité

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub
La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished
Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org
Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc
Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

IEC 62840-2

Edition 1.0 2016-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Electric vehicle battery swap system – Part 2: Safety requirements

Système d'échange de batterie de véhicule électrique – Partie 2: Exigences de sécurité

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 43.120

ISBN 978-2-8322-3632-1

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 2: Safety requirements

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62840-2 has been prepared by IEC technical committee 69: Electric road vehicles and electric industrial trucks.

The text of this standard is based on the following documents:

FDIS	Report on voting
69/420/FDIS	69/433/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This standard is to be read in conjunction with IEC 62840-1:2016.

in this document, the following print types are used:

– requirements: in roman type;

– *test specifications: in italic type;*

– notes: in small roman type.

A list of all parts in the IEC 62840 series, published under the general title *Electric vehicle battery swap system*, can be found on the IEC website.

The following differing practices of a less permanent nature exist in the countries indicated below

– 7.6.1: RCDs of type AC may be used (Japan).

– 7.6.1: a device which measures leakage current over a range of frequencies and trips at pre-defined levels of leakage current, based upon the frequency, is required (United States).

– 10.4: three-part cautionary statements are required (United States).

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

The purpose of the battery swap system is to provide energy partly or in total to electric vehicles (EV) through fast replacement of their swappable battery systems (SBS). While charging, the EV typically takes a relatively long time, whereas the battery swap process takes only a few minutes to complete. Thus it will reduce the range anxiety and will facilitate travel for longer distances.

As there is a possibility to charge the batteries after their removal from the vehicle in various ways, the impact of this process on the critical infrastructure of the electrical grid can be minimized.

Battery swap stations mainly include one or more of the following functions:

- swap of EV swappable battery system (SBS);
- storage of EV SBS;
- charging and cooling of EV SBS;
- testing, maintenance and safety management of EV SBS.

This part of IEC 62840 serves as a generic approach for safety during the lifecycle of battery swap systems and stations for electric vehicles.

ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 2: Safety requirements

1 Scope

This part of IEC 62840 provides the safety requirements for a battery swap system, for the purposes of swapping swappable battery system (SBS) of electric vehicles. The battery swap system is intended to be connected to the supply network. The power supply is up to 1 000 V AC or up to 1 500 V d.c, in accordance with IEC 60038.

This standard also applies to battery swap systems supplied from on-site storage systems (e.g. buffer batteries).

Aspects covered in this standard:

- safety requirements of the battery swap system and/or its systems;
- security requirements for communication;
- electromagnetic compatibility (EMC);
- signs and instructions;
- protection against electric shock and other hazards.

This standard is applicable to battery swap systems for EV equipped with one or more SBS.

NOTE Battery swap systems for light EVs according to the IEC 61851-3 series[1] are under consideration.

This standard is not applicable to:

- aspects related to maintenance and service of the battery swap station (BSS);
- trolley buses, rail vehicles and vehicles designed primarily for use off-road;
- maintenance and service of EVs.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038, *IEC standard voltages*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60204-1, *Safety of machinery – Electrical equipment of machines – General requirements*

IEC 60364 (all parts), *Low-voltage electrical installations*

1 Under consideration.