

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

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**Electric vehicle battery swap system –  
Part 2: Safety requirements**

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



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ELECTROTECHNICAL  
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTRIC VEHICLE BATTERY SWAP SYSTEM –**

**Part 2: Safety requirements**

**FOREWORD**

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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- withdrawn,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 system;
- 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<sup>1</sup> 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*

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<sup>1</sup> Under consideration.