PD IEC/TS 62840-1:2016

BSI Standards Publication

Electric vehicle battery swap system

Part 1: General and guidance

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National foreword

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A list of organizations represented on this committee can be obtained on request to its secretary.

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Electric vehicle battery swap system – Part 1: General and guidance

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ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 1: General and guidance

FOREWORD

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Technical Specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC TS 62840-1, which is a Technical Specification, has been prepared by IEC technical committee 69: Electric road vehicles and electric industrial trucks.

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The text of this Technical Specification is based on the following documents:

Enquiry draft	Report on voting
69/368/DTS	69/399/RVC

Full information on the voting for the approval of this technical specification 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.

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 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

- transformed into an International standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

The purpose of the battery swap system is to provide energy partly or in total to electric road vehicles (EVs) through fast replacement of their swappable battery system (SBS). While charging, the EV typically takes a relatively long time, the battery swap process takes only a few minutes to complete. Thus it will reduce 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 is 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 document serves as generic requirements for battery swap systems for EVs.

The IEC 62840 series includes two parts:

– IEC 62840-1: General and guidance;
– IEC 62840-2: Safety requirements.

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ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 1: General and guidance

1 Scope

This part of IEC 62840, which is a Technical Specification, gives the general overview for battery swap systems, for the purposes of swapping batteries of electric road vehicles (EVs) when the vehicle powertrain is turned off and when the battery swap system is connected to the supply network at standard supply voltages according to IEC 60038 with a rated voltage up to 1 000 V AC and up to 1 500 V DC.

This document is applicable for battery swap systems for EV equipped with one or more swappable battery system (SBS).

NOTE Battery swap systems for light electric vehicles (LEVs) according to the IEC 61851-3[1] series are under consideration.

This document 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*

3 Terms and definitions

3.1
electric vehicle
EV
electric road vehicle
vehicle propelled by an electric motor drawing current from a rechargeable storage battery or from other portable energy storage devices (rechargeable, using energy from a source off the vehicle, such as residential or public electric service), which is manufactured primarily for use on public streets, roads or highways

[SOURCE: ISO 17409:2015, 3.19, modified — Some precisions have been added.]

3.2
battery swap system
battery swap station and supporting systems

[1] Under consideration.

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3.3
supporting system
system which serve the battery swap station

3.4
battery swap station
BSS
facility that provides EVs with a swappable battery system (SBS)

3.5
battery pack
energy storage device that includes cells or cell assemblies normally connected with cell electronics, voltage class B circuit and overcurrent shut-off device, including electrical interconnections, and interfaces for external systems

Note 1 to entry: For further explanation, see ISO 12405-1:2011, 5.4 and Clause A.2.

Note 2 to entry: Examples of external systems are cooling, voltage class B, auxiliary voltage class A and communication.

[SOURCE: ISO 12405-1:2011, 3.2]

3.6
swappable battery system
SBS
battery pack with a coupler for connecting charger/electric vehicle (EV), lock/unlock devices, battery control unit (BCU), thermal management unit, electrical protection circuit, enclosure and supporting devices

3.7
battery system
energy storage device that includes cells or cell assemblies or battery pack(s) as well as electrical circuits and electronics

Note 1 to entry: For further explanation, see ISO 12405-1:2011, 5.5.2, 5.5.3, A.3.1 and A.3.2. Battery system components can also be distributed in different devices within the vehicle.

Note 2 to entry: Examples of electronics are the BCU and contactors.

[SOURCE: ISO 12405-1:2011, 3.3]

3.8
swappable battery system coupler
SBS coupler
dedicated coupler for connecting a swappable battery system to an electric vehicle (EV) or to a charging rack

3.9
SBS charger
swappable battery system charger
device installed outside the EV to supply DC power to a swappable battery system (SBS) or a series of SBS

3.10
charging rack
equipment used for carrying a swappable battery system (SBS) and connecting a SBS to a charger to accomplish the charge process

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