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PRE-STANDARD

Electric vehicle battery swap system –
Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems

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ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems

FOREWORD

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A PAS is an intermediate specification made available to the public and needing a lower level of consensus than an International Standard to be approved by vote (simple majority).

IEC PAS 62840-3 has been processed by IEC technical committee 69: Electrical power/energy transfer systems for electrically propelled road vehicles industrial trucks.

The text of this PAS is based on the following document:	This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document
Draft PAS	**Report on voting**
69/749/DPAS	69/772/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

This PAS shall remain valid for an initial maximum period of 2 years starting from the publication date. The validity may be extended for a single period up to a maximum of 2 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

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.

INTRODUCTION

The IEC 62840 series is published in separate parts according to the following structure:

IEC TS 62840-1: Electric vehicle battery swap system – Part 1: General and guidance

IEC 62840-2: Electric vehicle battery swap system – Part 2: Safety requirements

IEC PAS 62840-3: Electric vehicle battery swap system – Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems

This document derives from IEC 61851-3 (all parts) and was established by IEC TC 69 WG10 as a referencing document to IEC TS 61851-3-1.

NOTE In this document, EV supply equipment configuration type F according to IEC TS 61851-3-1 for removable battery systems is named "battery swap station".

After moving of the document to IEC TC 69 WG13, IEC TC 69 decided to publish the document as PAS based on IEC TS 61851-3-3 as an intermediate specification, which responds to particular market needs according to 2.4.8 of ISO/IEC Directives, Part 1:2020, published prior to the development of a full International Standard.

For this reason, this document is to be used in conjunction with IEC 61851-3 (all parts).

By the upcoming revision of IEC 62840 (all parts), this document will be fully integrated into the IEC 62840 series.

ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 3: Particular safety and interoperability requirements for battery swap systems operating with removable RESS/battery systems

1 Scope

This document applies to battery swap systems for removable RESS of electric road vehicle when connected to the supply network, with a rated supply voltage up to 480 V AC or up to 400 V DC, for battery systems with a rated voltage up to 120 V DC.

NOTE 1 In the following countries, the acceptable nominal supply voltage is up to 600 V AC: CA, US.

This document applies to battery swap systems for removable RESS/EV where the removable RESS/EV is stored for the purpose of transfer power between the battery swap station and removable RESS/EV.

Requirements for bidirectional energy transfer DC to AC are under consideration and are not part of this document.

This document applies to:

– battery swap systems supplied from on-site storage systems (for example buffer batteries etc);
– manual, mechanically assisted and automatic systems;
– battery swap systems intended to supply removable battery systems having communication allowing to identify the battery system characteristics;
– battery swap systems intended to be installed at an altitude of up to 2 000 m.

The aspects covered in this document include:

– requirements for power transfer between the battery systems;
– additional requirements for communication;
– the connection to supply network.

Additional requirements may apply to special locations.

This document does not apply to:

– safety requirements for mechanical equipment covered by ISO 10218 (all parts);
– locking compartments systems providing AC socket-outlets for the use of manufacturer specific voltage converter units and manufacturer specific battery systems;
– safety aspects related to maintenance;
– electrical devices and components which are covered by their specific product standards;
– trolley buses, rail vehicles;
– any on-board equipment which is covered by ISO;
– EMC requirements for on-board equipment while connected to the supply, which are covered by IEC 61851-21-1.

Requirements for battery swap systems using protective measures as covered by 410 of IEC 60364-4-41:2005 other than double or reinforced insulation are under consideration.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
IEC 60529:1989/AMD1:1999
IEC 60529:1989/AMD2:2013

IEC TS 61851-3-1:—, *Electric vehicles conductive power supply system – Part 3-1: Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – AC and DC conductive power supply systems*[1]

IEC TS 61851-3-2: —, *Electric vehicles conductive power supply system – Part 3-2 Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – Portable and mobile DRI EV supply equipment*[2]

IEC TS 61851-3-4: —, *Electric vehicles conductive power supply system – Part 3-4 Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – General definitions and requirements for CANopen communication*[3]

IEC TS 61851-3-5: —, *Electric vehicles conductive power supply system – Part 3-5 Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – Pre-defined communication parameters and general application objects*[4]

IEC TS 61851-3-6: —, *Electric vehicles conductive power supply system – Part 3-6: Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – Voltage converter unit communication*[5]

IEC TS 61851-3-7: —, *Electric vehicles conductive power supply system – Part 3-7: Particular requirements for EV supply equipment where protection relies on double or reinforced insulation – Battery system communication*[6]

IEC TS 62196-4:—, *Plugs, socket-outlets, vehicle connectors and vehicles inlet – Conductive charging of electric vehicles – Part 4: Dimensional compatibility and interchangeability requirements for DC pin and contact-tube accessories for class II or class III applications*[7]

IEC TS 62840-1:2016, *Electric vehicle battery swap system – Part 1: General and guidance*

IEC 62840-2:2016, *Electric vehicle battery swap system – Part 2: Safety requirements*

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[1] Under preparation. Stage at the time of publication: IEC ADTS 61851-3-1:2021.

[2] Under preparation. Stage at the time of publication: IEC ADTS 61851-3-2:2021.

[3] Under preparation. Stage at the time of publication: IEC RPUB 61851-3-4:2021.

[4] Under preparation. Stage at the time of publication: IEC RPUB 61851-3-5:2021.

[5] Under preparation. Stage at the time of publication: IEC RPUB 61851-3-6:2021.

[6] Under preparation. Stage at the time of publication: IEC RPUB 61851-3-7:2021.

[7] Under preparation. Stage at the time of publication: IEC BPUB TS 62196-4:2021.

IEC TS 63066:2017*, Low-voltage docking connectors for removable energy storage units*

ISO 10218-1:2011, *Robots and robotic devices – Safety requirements for industrial robots – Part 1: Robots*

ISO 10218-2:2011, *Robots and robotic devices – Safety requirements for industrial robots – Part 2: Robot systems and integration*

ISO 19353:2019, *Safety of machinery – Fire prevention and fire protection*

EN 14470 (all parts), *Fire safety storage cabinets*

EN 50604-1:2016, *Secondary lithium batteries for light EV (electric vehicle) applications – Part 1: General safety requirements and test methods*
EN 50604-1:2016/AMD1:2021