



SLOVENSKI STANDARD
oSIST prEN IEC 62840-2:2024
01-julij-2024

Sistem menjave baterij v električnih vozilih - 2. del: Varnostne zahteve

Electric vehicle battery swap system - Part 2: Safety requirements

Batteriewechselsysteme für Elektrofahrzeuge - Teil 2: Sicherheitsanforderungen

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

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IEC TC 69 : ELECTRICAL POWER/ENERGY TRANSFER SYSTEMS FOR ELECTRICALLY PROPELLED ROAD VEHICLES AND INDUSTRIAL TRUCKS	
SECRETARIAT: Belgium	SECRETARY: Mr Peter Van den Bossche
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input checked="" type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input checked="" type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Electric vehicle battery swap system - Part 2: Safety requirements

PROPOSED STABILITY DATE: 2026

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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;*

162 – notes: in small roman type.

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

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

167 – 7.6.1: RCDs of type AC may be used (Japan).

168 – 7.6.1: a device which measures leakage current over a range of frequencies and trips at
169 pre-defined levels of leakage current, based upon the frequency, is required (United States).

170 – 10.4: three-part cautionary statements are required (United States).

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

- 174 • reconfirmed,
- 175 • withdrawn,
- 176 • replaced by a revised edition, or
- 177 • amended.

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179

INTRODUCTION

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

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

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

- 189 • swap of EV swappable battery system (SBS) or removable battery systems(RBS);
- 190 • storage of EV SBS/RBS;
- 191 • charging and cooling of EV SBS/RBS;
- 192 • testing, maintenance and safety management of EV SBS/RBS.

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

195 This part of IEC 62840 contains the general safety requirements for battery swap system of
196 SBS/RBS. The specific safety requirements for dedicated system will be described in other
197 standards of IEC 62840 series.

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ELECTRIC VEHICLE BATTERY SWAP SYSTEM –

Part 2: Safety requirements

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202 1 Scope

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

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

209 Aspects covered in this standard:

- 210 • safety requirements of the battery swap system and/or its systems;
- 211 • security requirements for communication;
- 212 • electromagnetic compatibility (EMC);
- 213 • Marking and instructions;
- 214 • protection against electric shock and other hazards.

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

216 This standard is not applicable to:

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

220 2 Normative references

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

225 IEC 60038, *IEC standard voltages*

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

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

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

230 IEC 60479 (all parts), *Effects of current on human beings and livestock*

231 IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

232 IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1:*
233 *Principles, requirements and tests*

234 IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-*
235 *wire flammability test method for end-products (GWEPT)*

236 IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test method*

237 IEC TR 60755, *General requirements for residual current operated protective devices*

238 IEC 60898-1, *Electrical accessories – Circuit-breakers for overcurrent protection for household*
239 *and similar installations – Part 1: Circuit-breakers for a.c. operation*

- 240 IEC 60947-2, *Low-voltage switchgear and control gear – Part 2: Circuit-breakers*
- 241 IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors,*
242 *switch-disconnectors and fuse-combination units*
- 243 IEC 60947-4-1, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-*
244 *starters – Electromechanical contactors and motor-starters*
- 245 IEC 60950-1:2005, *Information technology equipment – Safety – Part 1: General requirements*
- 246 IEC 60950-1:2005/AMD1:2009
- 247 IEC 60950-1:2005/AMD2:2013
- 248 IEC 61000-6-7, *Electromagnetic compatibility (EMC) – Part 6-7: Generic standards – Immunity*
249 *requirements equipment intended to perform functions in a safety-related system (functional*
250 *safety) in industrial environments*
- 251 IEC 61008 (all parts), *Residual current operated circuit-breakers without integral overcurrent*
252 *protection for household and similar uses (RCCBs)*
- 253 IEC 61009 (all parts), *Residual current operated circuit-breakers with integral overcurrent*
254 *protection for household and similar uses (RCBOs)*
- 255 IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*
- 256 IEC 61439-1:2011, *Low-voltage switchgear and controlgear assemblies – Part 1: General rules*
- 257 IEC 61508-1, *Functional safety of electrical/electronic/programmable electronic safety-related*
258 *systems – Part 1: General requirements*
- 259 IEC 61511-1, *Functional safety – Safety instrumented systems for the process industry sector*
260 *– Part 1: Framework, definitions, system, hardware and application programming requirements*
- 261 IEC 61784-3, *Industrial communication networks – Profiles – Part 3: Functional safety*
262 *fieldbuses – General rules and profile definitions*
- 263 IEC 61810-1, *Electromechanical elementary relays – Part 1: General and safety requirements*
- 264 IEC 61851-23:2023, *Electric vehicle conductive charging system – Part 23: DC electric vehicle*
265 *supply equipment*
- 266 IEC 62052-11, *Electricity metering equipment (AC) – General requirements, tests and test*
267 *conditions – Part 11: Metering equipment*
- 268 IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against*
269 *external mechanical impacts (IK code)*
- 270 IEC 62423, *Type F and type B residual current operated circuit-breakers with and without*
271 *integral overcurrent protection for household and similar uses*
- 272 IEC 62840-1:2016, *Electric vehicle battery swap system – Part 1: General and guidance*
- 273 ISO 2972, *Numerical control of machines – Symbols*
- 274 ISO 7000, *Graphical symbols for use on equipment – Registered symbols*
- 275 ISO 10218-1, *Robots and robotic devices – Safety requirements for industrial robots – Part 1:*
276 *Robots*
- 277 ISO 10218-2, *Robots and robotic devices – Safety requirements for industrial robots – Part 2:*
278 *Robot systems and integration*
- 279 ISO 12405-1, *Electrically propelled road vehicles – Test specification for lithium-ion traction*
280 *battery packs and systems – Part 1: High-power applications*