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Edition 2.0 2018-09
REDLINE VERSION

INTERNATIONAL STANDARD

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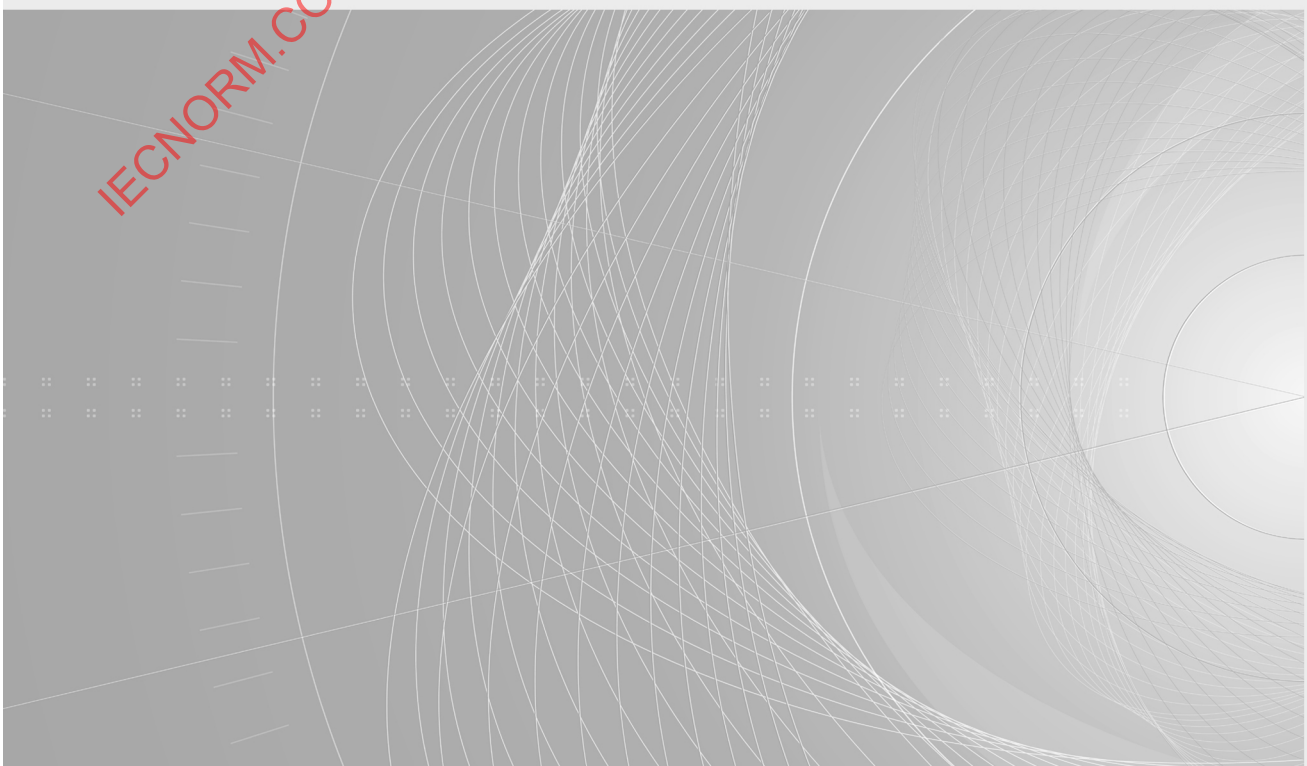
Low-voltage electrical installations –
Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles



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Low-voltage electrical installations – Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

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.
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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60364-7-722 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) introduction of requirements for electrical installations incorporating wireless power transfer systems;
b) clarification of the requirements regarding the protective measure placing out of reach in order to allow the use of pantographs in areas accessible to the public;
c) introduction of requirements covering the case where the EV may operate as a source in parallel with other sources.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
64/2285/FDIS	64/2318/RVD

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

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

A list of all parts in the IEC 60364 series, published under the general title *Low voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

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

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

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

For the purpose of this part of IEC 60364 (IEC 60364-7-722) the requirements of the general Parts 1 to 6 of IEC 60364 apply.

The IEC 60364-7-7XX parts of IEC 60364 contain particular requirements for special installations or locations which are based on the requirements of the general parts of IEC 60364 (IEC 60364-1 to IEC 60364-6). These IEC 60364-7-7XX parts are considered in conjunction with the requirements of the general parts.

The particular requirements of this part of IEC 60364 supplement, modify or replace certain of the requirements of the general parts of IEC 60364 being valid at the time of publication of this part. The absence of reference to the exclusion of a part or a clause of a general part means that the corresponding clauses of the general part are applicable (undated reference).

Requirements of other 7XX parts being relevant for installations covered by this part also apply. This part may therefore also supplement, modify or replace certain of these requirements valid at the time of publication of this part.

The clause numbering of this part follows the pattern and corresponding references of IEC 60364. The numbers following the particular number of this part are those of the corresponding parts, or clauses of the other parts of the IEC 60364 series, valid at the time of publication of this part, as indicated in the normative references of this document (dated reference).

If requirements or explanations additional to those of the other parts of the IEC 60364 series are needed, the numbering of such items appears as 722.101, 722.102, 722.103, etc.

~~NOTE~~ In the case where new or amended general parts with modified numbering were published after this part was issued, the clause numbers referring to a general part in this Part 722 may no longer align with the latest edition of the general part. Dated references should be observed.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

722 Supplies for electric vehicles

722.1 Scope

The particular requirements of this document apply to

- circuits intended to supply energy to electric vehicles, and
- circuits intended for feeding back electricity from electric vehicles ~~into the supply network~~.

~~NOTE The requirements for feeding back electricity from electric vehicles into the supply network are under consideration.~~

~~Inductive charging is not covered.~~

Circuits covered by this document are terminated at the connecting point.

NOTE 1 The requirements for EV supply equipment for conductive charging and the relevant charging modes are described in IEC 61851 (all parts). The requirements for EV supply equipment for wireless power transfer are described in IEC 61980 (all parts).

NOTE 2 This document does not cover the assessment of the risk of explosion due to the possible production of hydrogen/other flammable gases during the battery recharging phase.

722.2 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 60269 (all parts), *Low voltage fuses*

IEC 60309-1:1999, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

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

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-8-2, *Low-voltage electrical installations – Part 8-2: Prosumer's low-voltage electrical installations*[1]

[1] Under preparation. Stage at the time of publication IEC RFDIS 60364-8-2:2018.

IEC 60898 (all parts), *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-6-2, *Low-voltage switchgear and controlgear – Part 6-2: Multiple function equipment – Control and protective switching devices (or equipment) (CPS)*

IEC 61008-1, *Residual current circuit-breakers without integral ~~overvoltage~~ overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009-1, *Residual current operated circuit-breakers with integral ~~overvoltage~~ overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*

~~IEC 61140:2001, *Protection against electric shock – Common aspects for installation and equipment*~~

IEC 61557-8, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems*

~~IEC 61557-9, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment insulation fault location in IT systems*~~

IEC 61558-2-4, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*

IEC 61851 (all parts), *Electric vehicle conductive charging system*

IEC 61980 (all parts), *Electric vehicle wireless power transfer (WPT) systems*

IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*

IEC 62196-1, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

IEC 62196-2, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories*

IEC 62196-3, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers*

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*[2]

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

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2 Under preparation. Stage at the time of publication IEC TS BPUB 62196-4:2018.

IEC 62423, *Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses*

IEC 62955, *Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicle*

722.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

722.3.1
electric vehicle
electric road vehicle
EV
~~any 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 a residential or public electricity service), which is manufactured primarily for use on public streets, roads or highways~~

~~Note 1 to entry: In ISO publications, the term "electric road vehicle" is used for "electric vehicle."~~

~~[SOURCE: IEC 61851-1:2010, 3.8]~~

any vehicle propelled by an electric motor drawing current from a rechargeable energy storage system (RESS), intended primarily for use on public roads

[SOURCE: ISO 17409:2015, 3.19, modified — "rechargeable energy storage system" has been added.]

722.3.2
connecting point
~~point where one electric vehicle is connected to the fixed installation~~

~~Note 1 to entry: The connecting point is a socket-outlet or a vehicle connector.~~

~~Note 2 to entry: The connecting point may be part of the fixed installed electric vehicle supply equipment in accordance with the IEC 61851 series.~~

terminating point in the fixed installation where energy is transferred to/from one electric vehicle

EXAMPLE A socket-outlet, a vehicle connector or a wireless power transfer device.

Note 1 to entry: The connecting point may be part of the fixed installed EV supply equipment.

~~**722.3.3**~~
~~**mode 1 charging**~~
~~connection of the EV to the a.c. supply network (mains) utilizing standardized socket-outlets not exceeding 16 A and not exceeding 250 V a.c. single-phase or 480 V a.c. three-phase, at the supply side, and utilizing the live and protective earth conductors~~

~~[SOURCE: IEC 61851-1:2010, 6.2 "EV charging modes, mode 1 charging"]~~

~~722.3.4~~
~~mode 2 charging~~
~~connection of the EV to the a.c. supply network (mains) utilizing standardized single-phase or three-phase socket-outlets not exceeding 32 A and not exceeding 250 V a.c. single-phase or 480 V a.c. three-phase, and utilizing the live and protective earth conductors together with a control pilot function and system of personnel protection against electric shock (RCD) between the EV and the plug or as a part of the in-cable control box~~

~~[SOURCE: IEC 61851-1:2010, 6.2 "EV charging modes, mode 2 charging", modified]~~

~~722.3.5~~
~~mode 3 charging~~
~~connection of the EV to the a.c. supply network (mains) utilizing dedicated electric vehicle supply equipment where the control pilot function extends to control equipment in the electric vehicle supply equipment permanently connected to the a.c. supply network (mains)~~

~~[SOURCE: IEC 61851-1:2010, 6.2 "EV charging modes, mode 3 charging"]~~

~~722.3.6~~
~~mode 4 charging~~
~~connection of the EV to the a.c. supply network (mains) utilizing an off-board charger where the control pilot function extends to equipment permanently connected to the a.c. supply~~

~~[SOURCE: IEC 61851-1:2010, 6.2 "EV charging modes, mode 4 charging"]~~

722.3.~~7~~3
demand factor
ratio, expressed as a numerical value or as a percentage, of the maximum demand of a circuit or a group of circuits within a specified period, to the corresponding total installed load of the circuit(s)

Note 1 to entry: In using this term, it is necessary to specify to which level of the system it relates.

[SOURCE: IEC 60050-691:1973, 691-10-05, modified – ~~the word "circuit" has replaced the word "installation"~~ The term "installation" has been replaced with the term "circuit"].

722.3.4
EV charging station
stationary part of EV supply equipment connected to the supply network

[SOURCE: IEC 61851-1:2017, 3.1.5, modified — The note has been deleted.]

722.3.5
EV supply equipment
equipment or a combination of equipment, providing dedicated functions to supply electric energy from a fixed electrical installation or supply network to an EV for the purpose of charging

[SOURCE: IEC 61851-1:2017, 3.1.1, modified — The examples have been deleted.]

722.3.6
load control
electrical (energy) management system ensuring that the sum of load currents of dedicated circuits does not exceed a predetermined value

~~722.30 Assessment of general characteristics~~

722.31 Purposes, supplies and structure

722.311 Maximum demand and diversity

Add the following:

It shall be considered that in normal use each single connecting point is used at its rated current or at the configured maximum charging current of the charging station. The means for configuration of the maximum charging current shall only be made by the use of a key or a tool and only be accessible to skilled or instructed persons.

NOTE For this application the demand factor of the final circuit supplying the connecting point (e.g. the socket-outlet) is equal to 1.

Since all the connecting points of the installation can be used simultaneously, the diversity factor of the distribution circuit shall be taken as equal to 1 unless a load control is included in the EV supply equipment or installed upstream or a combination of both. ~~However, this factor may be reduced where load control is available.~~

722.312 Conductor arrangement and system earthing

722.312.2.1 TN systems

Add the following:

In a TN system, ~~the final circuit supplying a connecting point shall be a TN-S system~~ a circuit supplying a connecting point shall not include a PEN conductor.

722.314 Division of installation

Add the following:

722.314.101

A dedicated circuit shall be provided for the ~~connection~~ transfer of energy from/to the electric vehicle~~s~~.

722.4 Protection for safety

722.41 Protection against electric shock

722.410.3 General requirements

722.410.3.5

Replace the existing text by the following:

The protective measure obstacles as specified in IEC 60364-4-41:2005, Clause B.2 shall not be applied.

The protective measure placing out of reach, as specified in IEC 60364-4-41:2005, Clause B.3 may only be applied where an automatic connection system in accordance with IEC 61851-23-1[3] is used.

3 Under consideration.

722.410.3.6

The protective measures as specified in IEC 60364-4-41:2005 and IEC 60364-4-41:2005/AMD1:2017, Annex C shall not be applied.

722.411 Protective measure: automatic disconnection of supply

722.411.3 Requirements for fault protection

722.411.3.3 Additional protection

Replace the existing text by the following:

Each AC connecting point shall be individually protected by a residual current device (RCD) with a rated residual operating current not exceeding 30 mA.

NOTE This requirement implies that this RCD is not used for protecting other connecting points or current-using equipment.

722.413 Protective measure: electrical separation

722.413.3 Requirements for fault protection

~~*Add the following:*~~

~~**722.413.3.101** The circuit shall be supplied through a fixed isolating transformer complying with IEC 61558-2-4.~~

~~NOTE In mode 4 (d.c. charging), requirements for the isolating transformer are under consideration.~~

722.413.3.2

Replace the requirements as follows:

The separated circuit shall be supplied through an isolating transformer complying with IEC 61558-2-4, and the voltage of the separated circuit shall not exceed 500 V.

~~**722.41.B Obstacles and placing out of reach**~~

~~**722.41.B.2 Obstacles**~~

~~*Replace the existing text by the following:*~~

~~Protection by obstacles shall not be used.~~

~~**722.41.B.3 Placing out of reach**~~

~~*Replace the existing text by the following:*~~

~~Protection by placing out of reach shall not be used.~~

~~**722.41.C.1 Non-conducting location**~~

~~*Replace the existing text by the following:*~~

~~Protection by non-conducting location shall not be used.~~

~~**722.41.C.2 Protection by earth-free local equipotential bonding**~~

~~*Replace the existing text by the following:*~~

~~Protection by earth-free local equipotential bonding shall not be used.~~

~~**722.41.C.3 Electrical separation for the supply of more than one item of current-using equipment**~~

~~*Replace the existing text by the following:*~~

~~Electrical separation shall not be used for the supply of more than one electric vehicle.~~

722.44 Protection against voltage disturbances and electromagnetic disturbances

722.443 Protection against transient overvoltages of atmospheric origin or due to switching

722.443.4 Overvoltage control

Add the following after the first paragraph:

A connecting point accessible to the public is considered as part of a public service and therefore shall be protected against transient overvoltages.

722.444 Measures against electromagnetic influences

722.444.1 General

Add the following:

722.444.1.101

The equipment for wireless power transfer shall not impair the safety and the proper functioning of the electrical installation and shall be installed according to the manufacturer's instructions.

722.5 Selection and erection of electrical equipment

722.51 Common rules

722.511 Compliance with standards

Add the following:

722.511.101

For conductive power transfer, EV charging stations shall comply with the appropriate parts of the IEC 61851 series.

722.511.102

Wireless power transfer (WPT) systems for EVs shall comply with the appropriate parts of the IEC 61980 series.

722.512 Operational conditions and external influences

722.512.2 External influences

Add the following:

722.512.2.101 Presence of water (AD)

~~Where the connection point is~~ When installed outdoors, the equipment shall be selected with a degree of protection of at least IPX4 in order to protect against water splashes (AD4).

722.512.2.102 Presence of solid foreign bodies (AE)

~~Where the connecting point is~~ When installed outdoors, the equipment shall be selected or provided with a degree of protection of at least IP4X in order to protect against the ingress of small objects (AE3).

722.512.2.103 Impact (AG)

Equipment installed in public areas ~~and car park sites~~ shall be protected against mechanical damage ~~(impact of medium severity AG2)~~ considering an impact of high severity (AG3). This protection ~~of the equipment~~ shall be ~~afforded~~ provided by one or more of the following:

~~– the position or location shall be selected to avoid damage by any reasonably foreseeable impact;~~

~~– local or general mechanical protection shall be provided;~~

~~– equipment shall be installed that complies with a minimum degree of protection against external mechanical impact of IK07 in accordance with the requirements of IEC 62262.~~

- by locating the equipment to avoid damage by any reasonably foreseeable impact;
- by providing local or general mechanical protection of the equipment;
- by selecting and erecting equipment with a minimum degree of protection against external mechanical impact in accordance with the requirements of IEC 62262 of IK08.

722.53 Selection and erection of electrical equipment – Isolation, switching and control

722.530 Introduction

722.530.3 General and common requirements

Add the following:

722.530.3.101

The requirements of ~~this clause~~ 722.530.3.102 and from 722.531 to 722.535.3 shall be achieved either by the selection and erection of the appropriate equipment in the fixed installation or by the selection of an EV charging station which incorporates the appropriate equipment or a combination of both.

NOTE 1 The requirements for the selection and erection of devices for isolation, switching and control of the wireless power transfer system are covered by IEC 60364-5-53.

NOTE 2 The in-cable control and protection device (IC-CPD) according to IEC 62752 is not designed for use in fixed installations.

~~**722.530.3.102 Insulation monitoring devices (IMD)**~~

~~For circuits in IT systems that are intended to supply energy for electric vehicles, for example by an isolating transformer or a battery system, an insulation monitoring device (IMD) according to IEC 61557-8 shall be provided.~~

~~An IMD may not be necessary for a circuit that uses automatic disconnection of supply at the first fault.~~

~~It is recommended to install an IMD with the following two response values:~~

~~– Pre-warning~~

~~If the insulation resistance falls below 300 Ω/V an optical and/or acoustical signal should be issued to the user. An ongoing charging session may continue but a new charging session shall not take place.~~

~~– Alarm~~

~~If the resistance falls below 100 Ω/V an optical and/or acoustical signal should be issued to the user. The charging circuit may shut down within 10 s.~~

~~**722.530.3.103 Insulation fault location system (IFLS)**~~

722.530.3.102

For circuits described in ~~722.530.3.102~~ 722.531.3.101, and if more than one electric vehicle is supplied from the same unearthed supply, it is recommended to use an insulation fault location system (IFLS) according to IEC 61557-9 to detect the faulty circuitry within the shortest possible time.

722.531 Devices for protection against indirect contact by automatic disconnection of supply

722.531.2 Residual current protective devices

Add the following:

722.531.2.101 ~~Except for circuits using the protective measure of electrical separation, each connecting point shall be protected by its own RCD of at least type A, having a rated residual operating current not exceeding 30 mA.~~

RCDs protecting each connecting point in accordance with 722.411.3.3 shall comply at least with the requirements of an RCD type A and shall have a rated residual operating current not exceeding 30 mA.

Where the EV charging station is equipped with a socket-outlet or vehicle connector complying with IEC 62196 (all parts), protective measures against DC fault current shall be taken, except where provided by the EV charging station. The appropriate measures, for each connection point, shall be as follows:

- the use of an RCD type B; or
- the use of an RCD type A ~~and appropriate equipment that ensures disconnection of the supply in case of d.c. fault current above 6 mA~~ in conjunction with a residual direct current detecting device (RDC-DD) complying with IEC 62955; or
- the use of an RCD type F in conjunction with a residual direct current detecting device (RDC-DD) complying with IEC 62955.

RCDs shall comply with one of the following standards: IEC 61008-1, IEC 61009-1, IEC 60947-2 or IEC 62423.

~~NOTE Requirements for the selection and erection of RCDs in the case of supplies using d.c. vehicle connectors according to the IEC 62196 series are under consideration.~~

NOTE Subclause 722.531.2.101 is not applicable in case the connecting point is protected by other protective measures against electric shock such as SELV or electric separation.

722.531.2.1.1

Replace the existing subclause, including the NOTE, as follows:

RCDs shall disconnect all live conductors.

722.531.3 Insulation monitoring devices

Add the following:

722.531.3.101

Except where a protective device is installed to interrupt the circuit in the event of a first earth fault, an insulation monitoring device (IMD) in accordance with IEC 61557-8 shall be provided.

If the IMD is not part of the EV charging station then it is recommended that the IMD provides the following two response values:

- Pre-warning

  If the insulation resistance falls below 300 Ω/V an optical and/or acoustical signal should be issued to the user. An ongoing charging session may continue but a new charging session shall not take place.

- Alarm

  If the resistance falls below 100 Ω/V an optical and/or acoustical signal should be issued to the user. The charging circuit should shut down within 10 s.

722.533 Devices for protection against overcurrent

Add the following:

722.533.101

Except where EV supply equipment in accordance with IEC 61851-1 having more than one connecting point is installed and incorporates the necessary overcurrent protective device required by IEC 61851-1:2017, 13.1, each connecting point shall be supplied individually by a final circuit protected by an overcurrent protective device complying with IEC 60947-2, IEC 60947-6-2 or IEC 61009-1 or with the relevant parts of the IEC 60898 series or the IEC 60269 series.

~~NOTE 1 The overcurrent protective device may be part of the switchboard, the fixed installation or the electric vehicle supply equipment.~~

NOTE ~~2~~ The EV supply equipment ~~may~~ can have multiple connecting points.

722.535 Co-ordination of various protective devices

722.535.3 Discrimination between residual current protective devices

Replace the first paragraph as follows:

Where required for service reasons, selectivity shall be maintained between the RCD protecting a connecting point and an RCD installed upstream.

722.54 Earthing arrangements and protective conductors

722.543 Protective conductors

Add the following:

722.543.101

Control signals on the protective conductor (PE) shall not flow into the fixed electrical installation upstream of the EV charging station; equipment shall be selected accordingly.

NOTE 1 The requirement is to prevent such signals, and the related devices ~~shall not impair~~ impairing the correct functioning of the devices installed to provide the protective measure of automatic disconnection of supply (e.g. RCD).

NOTE 2 This requirement can be achieved by using a galvanic separation of the control electronics.

~~The requirements of 7.5.2 of IEC 61140:2001 shall apply.~~

NOTE 3 Temporary currents used to perform the test of the continuity of protective conductors for safety purposes are not considered as signal currents.

722.55 Other equipment

Add the following:

722.55.101 Socket-outlets and vehicle connectors

722.55.101.1

~~Each connecting point shall be provided with one socket-outlet or vehicle connector complying with an appropriate standard, e.g. IEC 60309-1 or IEC 62196-1, where interchangeability is not required, and IEC 60309-2, IEC 62196-2 or IEC 62196-3 where interchangeability is required. Socket-outlets with a rated current not exceeding 16 A according to the national standard may also be used.~~

Where the connecting point is a socket-outlet or a vehicle connector, it shall comply with:

- IEC 60309-1 or IEC 62196-1, where interchangeability is not required, or
- IEC 60309-2, IEC 62196-2, IEC 62196-3 or IEC TS 62196-4 where interchangeability is required, or
- the national standard for socket-outlets, provided the rated current does not exceed 16 A.

Except where electrical separation is used, each socket-outlet shall have an earthing contact connected to the protective conductor (PE).

722.55.101.2

Every socket-outlet or vehicle connector shall be located as close as practicable to the EV parking place to be supplied.

722.55.101.3

Portable socket-outlets ~~are not permitted~~ shall not be used.

722.55.101.4

One socket-outlet or vehicle connector shall supply only one electric vehicle at the same time.

722.55.102 EV charging stations

EV charging stations for public use shall be so designed as to facilitate easy access to the charging point regardless of where the vehicle inlet is located on the electric vehicle.

722.551 Low voltage generating sets

722.551.1 Scope

722.551.1.1

Add the following dashed list item:

– electric vehicle

722.551.2 General requirements

Add the following:

722.551.2.101

Where electric vehicles are intended to feedback energy to the electric installations, the requirements of IEC 60364-8-2[4] apply.

NOTE Additional requirements for circuits intended for feeding back electricity from electric vehicles are under consideration.

722.551.7 Additional requirements for installations where the generating set may operate in parallel with other sources including systems for distribution of electricity to the public

722.551.7.2

Item b) is replaced by:

b) the socket-outlet or vehicle connector shall comply with IEC 62196 (all parts); and

722.6 Verification

722.6.4 Initial verification

722.6.4.1 General

722.6.4.1.1

Add the following:

The existing installation which is influenced shall also be verified with respect to compliance with the requirements of IEC 60364 (all parts) (e.g. requirements for protection against overcurrent due to the increase of load current).

722.6.5.1.1

Add the following:

NOTE Requirement for periodic verifications is a matter for national consideration.

4 Under preparation. Stage at the time of publication IEC RFDIS 60364-8-2:2018.

Annex A
(informative)

List of notes concerning certain countries

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
ES	722		Special requirements apply in Spain.	In Spain, according to the Royal Decree 1053/2014, special requirements apply to the electrical installations for the supply of electric vehicles.
FR	722		To take in account the national regulation.	In France, special requirements apply (Décret n°2017-26 du 12 janvier 2017).
IT	722.1		This part of the standard shall be in line with the general rules existing in Italy for safety and operational purposes.	In Italy, limitations to the use of mode 1 and mode 2 are given in CEI EN 61851-1.
GB	722.1		For clarification.	In the UK, electrical installations for charging mobility scooters and similar vehicles of 10 A and less are excluded.
NO	722.1		As the definition of electric vehicle is very wide and also seems to cover electrical bicycles and electrical wheel-chairs, and that the document is not intended for circuits supplying such electrical items, we see it necessary to exempt circuits supplying such items from the scope.	In Norway, the requirements of this part of IEC 60364 do not apply to circuits intended to supply energy to electric vehicles where the rated charging current is less or equal to 5 A.
DE	~~722.3.7~~ 722.3.3		As the demand factor is not used anymore, delete definition 722.3.3	In Germany, definition ~~722.3.7~~ 722.3.3 is deleted.
CN	722.3.4		China has a different definition of EV charging station.	In China for EV charging station the following definition applies: 722.3.4 EV charging station infrastructure that supplies electric energy for the recharging of electric vehicles, including three or more chargers, of which at least one off-broad charger, and related power supplies, monitoring devices and other auxiliary facilities
DE	722.31		In Germany the DSO requires symmetric load.	In Germany the following note is added: NOTE In Germany see also the requirements of the DSO regarding unsymmetric load.
AT	722.311	permanent	To take in account the national regulation	In Austria the maximum asymmetric load connected to LV networks of a DSO shall not exceed 3,68 kVA.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
DE	722.311		Simplify wording to avoid misunderstanding for electrical installers. No need to introduce new additional term “demand factor".	In Germany the following note is deleted: NOTE For this application the demand factor of the final circuit supplying the connecting point (e.g. the socket-outlet) is equal to 1.
GB	722.312.2.1		For safety.	~~In the UK, the national standard permits TNCS to be used subject to certain conditions being satisfied (Electricity safety, quality and continuity regulations). (722.411.4.1)~~ As regulation 8(4) of the ESQCR 2002 prohibits the use of PEN conductors in a consumer’s installation this subclause cannot be applied in the UK.
NO	722.314.101		In Norway, the number of electrical vehicles has considerably increased in recent years, and a number of connecting points has been established in new and existing installations. However, we recognise that in existing installations, the installation of new connecting points may easily be skipped due to high costs in order to establish a separate dedicated circuit for the connection points, thus people charge their vehicles using an ordinary socket-outlet in an existing circuit. The national committee dislikes this situation and is stressing the need for using a charging mode 3 with a type 2 socket-outlet. However, we do not see any safety issue installing an EV charging station for private use, e.g. in dwellings or related locations, in an existing circuit, as long as the installation owner is informed of the possibility that charging may not take place due to a fault elsewhere in the circuit and agrees on this.	In Norway the following requirement is added: Where a connecting point for private use needs to be installed in an existing installation, e.g. for a dwelling or similar locations, an existing circuit may be used for such purpose, provided the risk is accepted by the installation owner.
AT	722.411.3.3	Permanent	In Austria this requirement is mentioned under Subclause 722.415.1.	For Austria, see the note to Subclause 722.415.1.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
AT	722.415.1 (addition)	Permanent	As in ~~722.531.2~~ 722.411.3.3 obviously additional protection with RCD having a rated residual operating current not exceeding 30 mA is meant, it should be mentioned here as a requirement. It seems important to mention here that “true additional” protection by RCD is needed for each connection point except for cases ~~of 722.413.3.101~~ in 722.413.3.2.	In Austria add a Subclause 722.415.1 with the following text: 722.415.1 Except for circuits protected by electrical separation (see 722.413.3.2), circuits supplying connection points shall be additionally protected by RCDs having a rated residual operating current not exceeding 30 mA. Devices selected shall disconnect all live conductors including the neutral (see 722.531.2). The function of fault protection for the circuit shall be fulfilled separately.
FR	722.415.2 (addition)		When the connecting point is installed outside the building, some external conductive parts and the mass of the electrical vehicles can be simultaneously accessible and may have different potential.	In France, a new subclause is added: 722.415.2 For outdoor installations, this additional protection shall also be installed taking into account the ~~location of the electric vehicles~~ risk of simultaneous access to extraneous exposed conductive parts.
ES	722.443.4		In Spain the protection against transient and temporary overvoltages in the circuits intended to supply energy to electric vehicles is mandatory.	In Spain, according to the Royal Decree 1053/2014, Clause 6.4 of the ITC-BT-52, all the circuits intended to supply energy to electric vehicles must be protected against transient and temporary overvoltages.
FI	722.443.4		Due to the low number of ground flash density, protection against transient voltages is not mandatory in Finland.	In Finland protection against transient voltages is not mandatory. General rules apply.
AT	722.512.2.101	Permanent	It seems important to mention here that IPX4 is mandatory in any case.	In Austria, add the following text to 722.512.2.101: Where the plug (according to national standards or IEC 60884-1) is inserted in and a degree of protection of IPX4 cannot be reached, additional measures shall be provided to protect the connecting point against splashing water from all directions.
~~SE~~	~~722.512.2.101~~		~~AD3 should be sufficient for most cases~~	~~In Sweden, a new subclause is added:~~ ~~722.512.2.101 Presence of water (AD)~~ ~~Where the connection point is installed outdoors, the equipment shall be selected with a degree of protection of at least IPX3 in order to protect against water sprays (AD3)~~

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
DE	722.512.2.101		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2, etc.) for the stated classes of external influences are not used in Germany.	In Germany, add the following text to 722.512.2.101: Where the connection point is installed outdoors, the equipment shall be selected with a degree of protection of at least IPX4 in order to protect against water splashes.
DE	722.512.2.102		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2, etc.) for the stated classes of external influences are not used in Germany.	In Germany add the following text to ~~722.512.2.101~~ 722.512.2.102: Where the connecting point is installed outdoors, the equipment shall be selected or provided with a degree of protection of at least IP4X in order to protect against the ingress of small objects.
DE	722.512.2.103		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2 etc.) for the stated classes of external influences are not used in Germany and IK-degrees are not applicable in all member countries of the IEC.	In Germany add the following text to 722.512.2.103: Equipment installed in public areas and car park sites shall be protected against mechanical damage (impact of medium severity). Protection of the equipment shall be ~~afforded~~ ensured by one or more of the following: – the position or location shall be selected to avoid damage by any reasonably foreseeable impact; – local or general mechanical protection shall be provided.
~~FI~~	~~722.512.2.103~~		~~Experience with boxes of socket-outlets for heating of cars during winter have shown that protection class IK07 is not sufficient~~	~~In Finland, the following text replaces the third bullet:~~ ~~– equipment shall be installed that complies with a minimum degree of protection against external mechanical impact of IK08 in accordance with the requirements of IEC 62262~~
NO	722.530.3.102		As the protective measure “electrical separation for the supply of more than one item of current-using equipment” is prohibited (see 722.410.3.6), this requirement is related to an IT system. This should be clearly stated.	In Norway, the following text applies: If more than one electric vehicle is supplied within an IT installation, it is recommended to use an insulation fault location system (IFLS) according to IEC 61557-9 to detect the faulty circuitry within the shortest possible time. NOTE In Norway, such an IFLS is not to be used in an installation galvanically connected to a public IT distribution network.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
GB	722.531.2.101		For safety reasons.	In the UK, mode 1 charging shall be used only in conjunction with suitable RCD protection.
JP	722.531.2.101		Type A RCD is not popular in Japan. Therefore it is accepted to use type AC RCDs ~~in~~ according to IEC 61851-1.	In Japan, the following notes are added: NOTE 1 Some countries may allow the use of an RCD of type AC (national standard) for mode 1 vehicles connected to existing domestic installations. NOTE 2 In some countries, in addition to the RCD of Type AC (national standard), a means for the protection of fault current with a performance at least equal to Type A (IEC) is provided for modes 2,3 and 4.
NO	722.531.2.101		In Norway, most installations are supplied by an IT-system without any presence of a neutral conductor, thus all single-phase loads are supplied by two line conductors. We therefore consider that RCD Type A is not sufficient.	In Norway, most installations are supplied by an IT-system without any presence of a neutral conductor, thus all single-phase loads are supplied by two line conductors. We therefore consider that RCD Type A is not sufficient.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
GB	722.55.101.1		This subclause refers to "where inter-changeability is not required" but interchangeability is always required to allow vehicles to be charged at different locations. To ensure the user understands the intended use of the dedicated final circuit for EV charging, a suitable label should be applied.	In the UK, the following text applies: ~~722.55.101.1~~ Each AC connecting point shall incorporate: (i) one socket-outlet complying with ~~the national standard where the manufacturer approves its suitability for use~~ BS1363-2 marked "EV" on its rear or (ii) one socket-outlet or connector complying with IEC 60309-2 which is interlocked and classified according to IEC 60309-1:1999, 6.1.5 to prevent the socket contacts being live when accessible; or (iii) one socket-outlet or connector complying with IEC 60309-2 which is part of an interlocked self-contained product complying with IEC 60309-4 and classified according to IEC 60309-4:2006, 6.1.101 and 6.1.102 which prevents the socket contacts being live when accessible; or (iv) one type 1 vehicle connector complying with IEC 62196-2 for use with mode 3 charging only; or (v) one type 2 socket-outlet or vehicle connector complying with IEC 62196-2 for use with mode 3 charging only; or (vi) one type 3 socket-outlet or vehicle connector complying with IEC 62196-2 for use with mode 3 charging only. NOTE Vehicle manufacturers' instructions should be followed when determining the type of socket-outlet to be installed. A label shall be provided on the front face or adjacent to the socket-outlet or its enclosure stating: 'suitable for electric vehicle charging'

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.55.101.1		In Norway providing more strict requirements for this subclause has been necessary.	In Norway, the following applies: ~~– For mode 3 charging each connection point shall be provided with one socket-outlet ore vehicle connector in accordance with IEC 62196-2, Type 2.~~ ~~– For mode 1 and mode 2 charging each connection point shall be provided with:~~ ~~– one socket-outlet or connector in accordance with IEC 60369-2, or~~ ~~– one socket-outlet in accordance with our national standard if the rating current of the overcurrent protective device is ≤ 10 A~~ Where the connecting point is a: – socket-outlet, it shall be in accordance with IEC 60309-2 or IEC 62196-2, and – vehicle connector, it shall be in accordance IEC 62196-1.
US	722.55.101.1		Given the particular considerations unique to electric vehicle charging, interchangeability of EV socket-outlets or connectors with similar devices used for non-EV purposes should not be permitted. Allowing compatible configurations could result in hazardous situations.	In the US, the following applies: In the US, inter- changeability of EV socket-outlets or connectors (couplers) with other wiring devices in the electrical system is not permitted.
IT	722.55.101.1		The requirements shall be in line with the general rules existing in Italy for safety and operational purposes.	In Italy socket-outlets and vehicle connectors shall comply with IEC 60309-2 or IEC 62196-2 or IEC 62196-3, taking into account requirements given in CEI EN 61851-1.
IT	722.55.101.1		In Italy the standard reference for socket outlets with a rated current not higher than 16 A is CEI 23-50 (for household installations).	In Italy, socket-outlets with a rated current not exceeding 16 A according to the national standard (e.g. CEI 23-50) may also be used.
FR	722.55.101.1		In France, socket outlets up to 32 A shall have shutters.	In France socket-outlet up to and including 32 A, accessible to ordinary persons (BA1) handicapped persons (BA2) and children (BA3) shall be provided with shutters.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
PT	722.55.101.1		In Portugal, socket outlets up to 16 A shall have shutters.	In Portugal, socket-outlets up to and including 16 A, accessible to ordinary persons (BA1) handicapped persons (BA2) and children (BA3) shall be provided with shutters.
JP	722.55.101.1		In Japan, ~~it is allowed to connect~~ using a socket-outlet up to 30 A for EVs is allowed.	In Japan, the following text ~~replaces~~ applies for the ~~second sentence of this~~ third list item in the first paragraph: Socket-outlets with a rated current not exceeding 30 A according to a national standard may also be used.
CH	722.55.101.1		Plugs and socket-outlets for households and similar purposes according to the national standard SEV 1011 are only suitable to charge light electric vehicles and only occasionally electric vehicles. Therefore, their installations in charging stations for electric vehicles must be forbidden.	In Switzerland, the following text applies for 722.55.101.1: Where the connecting point is a socket-outlet or a vehicle connector, it shall comply with: – IEC 60309-1 or IEC 62196-1, where interchangeability is not required or – IEC 60309-2, IEC 62196-2, IEC 62196-3 or IEC TS 62196-4 where interchangeability is required. Socket-outlets for households and similar purposes according to the national standard SEV 1011 shall not be installed in charging stations for electric vehicles. They are however suitable to charge light electric vehicles like electric bicycles and scooters and, only occasionally, electric vehicles. NOTE For charging currents of more than 8 A (2 kVA), the use of plugs and socket-outlets according to IEC 60309-2 is recommended for mode 1 and mode 2 connections
DE	722.55.101.3		Portable socket-outlets are not part of the fixed installation according to IEC 60364 (all parts).	In Germany 722.55.101.3 ~~"portable socket-outlets are not permitted" is deleted~~ does not apply.
NO	722.55.103		In Norway, further requirements for EV charging stations and connecting points are needed.	In Norway the following text applies: 722.55.103 EV charging stations shall be located in such a distance from any "Ex-zone" that charging cannot take place inside the Ex-zone.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.55.104		In Norway, further requirements for EV charging stations and connecting points are needed.	In Norway the following text applies: 722.55.104 Where the connecting point is intended to be connected by an in-cable control box, the connection point shall be provided with means to fasten the in-cable control box in order to offload the mechanical stresses on the contacts in the socket-outlet due to the weight of the in-cable control box.
NO	722.55.02 (addition)		In Norway, the number of electrical vehicles is rapidly increasing (more than 30 000 electrical vehicles June 2014). The number of charging stations installed has also increased tremendously ~~in the last year~~, and unfortunately experiences have shown that a number of detailed requirements are needed in order to keep the electrical safety at an appropriate level. The following subclauses, being part of the national regulations, are given both for information and consideration for inclusion in Part 722.	In Norway, the following additional subclauses apply: 722.55.02 EV charging stations ~~722.55.02.01 EV charging stations shall be located at least 10 m from any "Ex-sone". A further distance may be required.~~ ~~722.55.02.02 EV charging stations for mode 2 charging shall be provided with means to fasten the in-cable control box in order to offload the mechanical stresses on the contacts in the socket-outlet du the weight of the in-cable control box.~~ ~~722.55.02.03 EV charging stations for public use shall be so designed as to facilitate easy access to the charging point, regardless on where the charging inlet is located on the electrical vehicle.~~ ~~NOTE It is recommended to design the charging station as an island. In such an arrangement, any vehicle could be charged with minimal distance between the charging station and vehicle connection point and the risk of damage to the charging cable is reduced.~~ ~~722.55.02.04~~ 722.55.02.01 EV charging stations shall be so designed that heavy snowfall or snøpakking (snow drift) due to strong winds do not cause ~~of~~ ingress of snow in the charging station and the sealing of any cooling intake.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.55.02 (addition)		(Continued)	In Norway, the following additional subclauses apply. ~~722.55.02.05~~ 722.55.02.02 Charging stations shall be so designed that the charging cable can be run over or otherwise pinched. Where a charging cable may come in contact with the ground (such as soil, concrete, asphalt, stone~~, etc.~~) the ground surface should be of such a nature that the outer sheath of the charging cables is not damaged. NOTE Rough surfaces on concrete or rough asphalt are examples of surfaces where the outer sheath of a cable can be significantly scratched. This can lead to puncturing of the outer sheath, water penetration and puncture of the insulation. ~~722.55.02.06~~ 722.55.02.03 EV charging stations shall be designed in accordance with IEC TS 61439-7.
NO	722.55.02 (addition)		There is a need for providing additional requirements for the verification of publicly available charging stations.	In Norway, the following additional subclauses apply. 722.62.2 Interval for periodic verification Replace the requirements with the following: 722.62.2.01 Publicly available EV charging stations shall be visually inspected at least once per week in order to verify that: – the equipment is not visibly damaged in such a way that the safety might be impaired; and – the EV charging station is not showing any operational faults/errors. 722.62.2.02 Publicly available EV charging stations shall be verified in accordance with the requirements of IEC 60364-6:2016, ~~62.1~~ 6.5 at least once a year.

Bibliography

IEC 60050-691~~:1973~~, *International Electrotechnical Vocabulary – Chapter 691: Tariffs for electricity* (available at http://www.electropedia.org)

IEC 60309-4:2006, *Plugs, socket-outlets and couplers for industrial purposes – Part 4: Switched socket-outlets and connectors with or without interlock*

IEC 60364-5-51:2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-53, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC TS 61439-7, *Low-voltage switchgear and controlgear assemblies – Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicles charging stations*

IEC 61557-9, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment insulation fault location in IT systems*

~~IEC 61851 (all parts), *Electric vehicle conductive charging system*~~

~~IEC 61851-1, *Electric vehicle conductive charging system – Part 1: General requirements*~~

IEC 61851-1:~~2010~~ 2017, *Electric vehicle conductive charging system – Part 1: General requirements*

IEC 61851-23-1, *Electric vehicle conductive charging system – Part 23-1: DC electric vehicle charging station with an autoconnect charging device*[5]

~~IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*~~

IEC TR 62350, *Guidance for the correct use of residual current-operated protective devices (RCDs) for household and similar use*

IEC 62752, *In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)*

ISO 17409:2015, *Electrically propelled road vehicles – Connection to an external electric power supply – Safety requirements*

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5 Under consideration.

IEC 60364-7-722

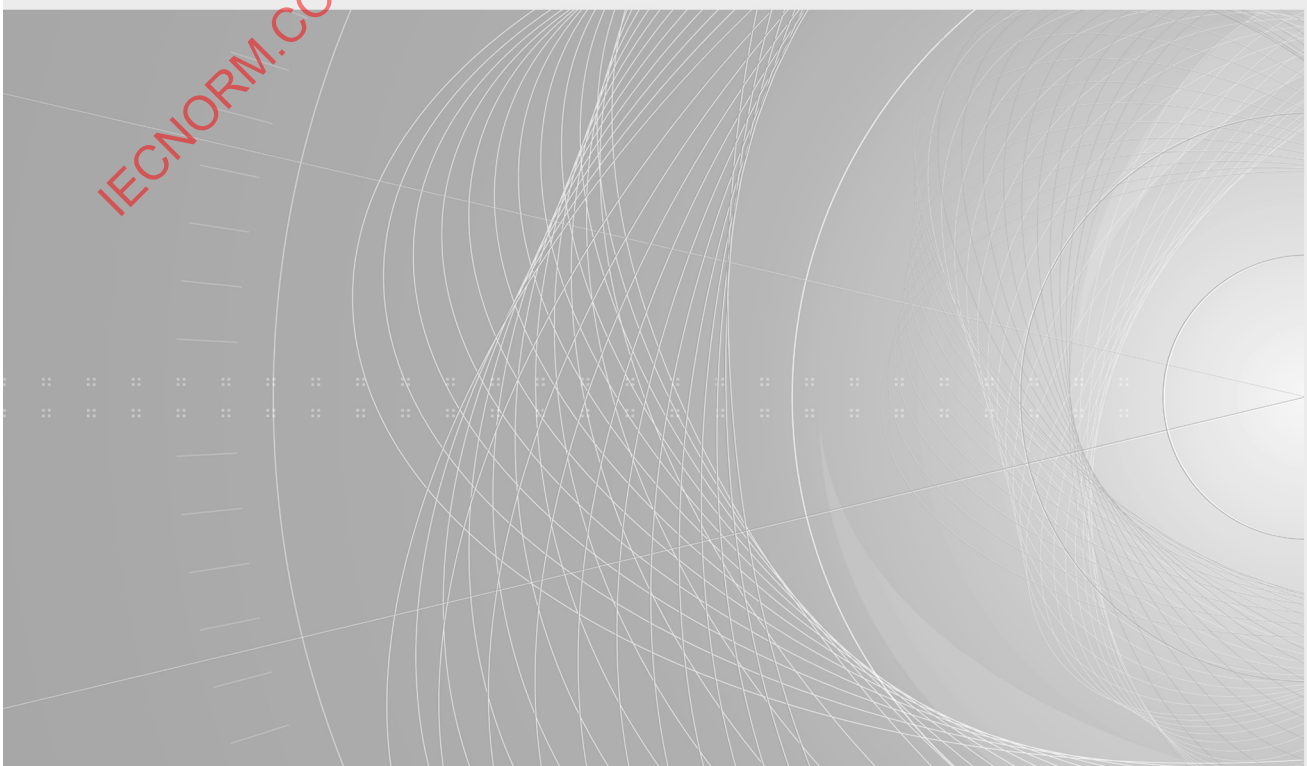
Edition 2.0 2018-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage electrical installations –
Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

Installations électriques à basse tension –
Partie 7-722: Exigences pour les installations et emplacements spéciaux – Alimentation des véhicules électriques



IEC 60364-7-722:2018-09(en-fr)

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

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.
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International Standard IEC 60364-7-722 has been prepared by IEC technical committee 64: Electrical installations and protection against electric shock.

This second edition cancels and replaces the first edition published in 2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) introduction of requirements for electrical installations incorporating wireless power transfer systems;
b) clarification of the requirements regarding the protective measure placing out of reach in order to allow the use of pantographs in areas accessible to the public;
c) introduction of requirements covering the case where the EV may operate as a source in parallel with other sources.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
64/2285/FDIS	64/2318/RVD

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

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

A list of all parts in the IEC 60364 series, published under the general title *Low voltage electrical installations*, can be found on the IEC website.

The reader's attention is drawn to the fact that Annex A lists all of the “in-some-country” clauses on differing practices of a less permanent nature relating to the subject of this standard.

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

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

INTRODUCTION

For the purpose of this part of IEC 60364 (IEC 60364-7-722) the requirements of the general Parts 1 to 6 of IEC 60364 apply.

The IEC 60364-7-7XX parts of IEC 60364 contain particular requirements for special installations or locations which are based on the requirements of the general parts of IEC 60364 (IEC 60364-1 to IEC 60364-6). These IEC 60364-7-7XX parts are considered in conjunction with the requirements of the general parts.

The particular requirements of this part of IEC 60364 supplement, modify or replace certain of the requirements of the general parts of IEC 60364 being valid at the time of publication of this part. The absence of reference to the exclusion of a part or a clause of a general part means that the corresponding clauses of the general part are applicable (undated reference).

Requirements of other 7XX parts being relevant for installations covered by this part also apply. This part may therefore also supplement, modify or replace certain of these requirements valid at the time of publication of this part.

The clause numbering of this part follows the pattern and corresponding references of IEC 60364. The numbers following the particular number of this part are those of the corresponding parts, or clauses of the other parts of the IEC 60364 series, valid at the time of publication of this part, as indicated in the normative references of this document (dated reference).

If requirements or explanations additional to those of the other parts of the IEC 60364 series are needed, the numbering of such items appears as 722.101, 722.102, 722.103, etc.

In the case where new or amended general parts with modified numbering were published after this part was issued, the clause numbers referring to a general part in this Part 722 may no longer align with the latest edition of the general part. Dated references should be observed.

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

Part 7-722: Requirements for special installations or locations – Supplies for electric vehicles

722 Supplies for electric vehicles

722.1 Scope

The particular requirements of this document apply to

- circuits intended to supply energy to electric vehicles, and
- circuits intended for feeding back electricity from electric vehicles.

Circuits covered by this document are terminated at the connecting point.

NOTE 1 The requirements for EV supply equipment for conductive charging and the relevant charging modes are described in IEC 61851 (all parts). The requirements for EV supply equipment for wireless power transfer are described in IEC 61980 (all parts).

NOTE 2 This document does not cover the assessment of the risk of explosion due to the possible production of hydrogen/other flammable gases during the battery recharging phase.

722.2 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 60269 (all parts), *Low voltage fuses*

IEC 60309-1:1999, *Plugs, socket-outlets and couplers for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, socket-outlets and couplers for industrial purposes – Part 2: Dimensional interchangeability requirements for pin and contact-tube accessories*

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

IEC 60364-4-41:2005, *Low-voltage electrical installations – Part 4-41: Protection for safety – Protection against electric shock*
IEC 60364-4-41:2005/AMD1:2017

IEC 60364-8-2, *Low-voltage electrical installations – Part 8-2: Prosumer's low-voltage electrical installations*[1]

IEC 60898 (all parts), *Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

[1] Under preparation. Stage at the time of publication IEC RFDIS 60364-8-2:2018.

IEC 60947-6-2, *Low-voltage switchgear and controlgear – Part 6-2: Multiple function equipment – Control and protective switching devices (or equipment) (CPS)*

IEC 61008-1, *Residual current circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*

IEC 61009-1, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*

IEC 61557-8, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 8: Insulation monitoring devices for IT systems*

IEC 61558-2-4, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-4: Particular requirements and tests for isolating transformers and power supply units incorporating isolating transformers*

IEC 61851 (all parts), Electric vehicle conductive charging system

IEC 61980 (all parts), *Electric vehicle wireless power transfer (WPT) systems*

IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*

IEC 62196-1, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

IEC 62196-2, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 2: Dimensional compatibility and interchangeability requirements for a.c. pin and contact-tube accessories*

IEC 62196-3, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 3: Dimensional compatibility and interchangeability requirements for d.c. and a.c./d.c. pin and contact-tube vehicle couplers*

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*[2]

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62423, *Type F and type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses*

IEC 62955, *Residual direct current detecting device (RDC-DD) to be used for mode 3 charging of electric vehicle*

722.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

2 Under preparation. Stage at the time of publication IEC TS BPUB 62196-4:2018.

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

722.3.1
electric vehicle
electric road vehicle
EV
any vehicle propelled by an electric motor drawing current from a rechargeable energy storage system (RESS), intended primarily for use on public roads

[SOURCE: ISO 17409:2015, 3.19, modified — "rechargeable energy storage system" has been added.]

722.3.2
connecting point
terminating point in the fixed installation where energy is transferred to/from one electric vehicle

EXAMPLE A socket-outlet, a vehicle connector or a wireless power transfer device.

Note 1 to entry: The connecting point may be part of the fixed installed EV supply equipment.

722.3.3
demand factor
ratio, expressed as a numerical value or as a percentage, of the maximum demand of a circuit or a group of circuits within a specified period, to the corresponding total installed load of the circuit(s)

Note 1 to entry: In using this term, it is necessary to specify to which level of the system it relates.

[SOURCE: IEC 60050-691:1973, 691-10-05, modified — The term "installation" has been replaced with the term "circuit".].

722.3.4
EV charging station
stationary part of EV supply equipment connected to the supply network

[SOURCE: IEC 61851-1:2017, 3.1.5, modified — The note has been deleted.]

722.3.5
EV supply equipment
equipment or a combination of equipment, providing dedicated functions to supply electric energy from a fixed electrical installation or supply network to an EV for the purpose of charging

[SOURCE: IEC 61851-1:2017, 3.1.1, modified — The examples have been deleted.]

722.3.6
load control
electrical (energy) management system ensuring that the sum of load currents of dedicated circuits does not exceed a predetermined value

722.31 Purposes, supplies and structure

722.311 Maximum demand and diversity

Add the following:

It shall be considered that in normal use each single connecting point is used at its rated current or at the configured maximum charging current of the charging station. The means for configuration of the maximum charging current shall only be made by the use of a key or a tool and only be accessible to skilled or instructed persons.

NOTE For this application the demand factor of the final circuit supplying the connecting point (e.g. the socket-outlet) is equal to 1.

Since all the connecting points of the installation can be used simultaneously, the diversity factor of the distribution circuit shall be taken as equal to 1 unless a load control is included in the EV supply equipment or installed upstream or a combination of both.

722.312 Conductor arrangement and system earthing

722.312.2.1 TN systems

Add the following:

In a TN system, a circuit supplying a connecting point shall not include a PEN conductor.

722.314 Division of installation

Add the following:

722.314.101

A dedicated circuit shall be provided for the transfer of energy from/to the electric vehicle.

722.4 Protection for safety

722.41 Protection against electric shock

722.410.3 General requirements

722.410.3.5

Replace the existing text by the following:

The protective measure obstacles as specified in IEC 60364-4-41:2005, Clause B.2 shall not be applied.

The protective measure placing out of reach, as specified in IEC 60364-4-41:2005, Clause B.3 may only be applied where an automatic connection system in accordance with IEC 61851-23-1[3] is used.

722.410.3.6

The protective measures as specified in IEC 60364-4-41:2005 and IEC 60364-4-41:2005/AMD1:2017, Annex C shall not be applied.

722.411 Protective measure: automatic disconnection of supply

722.411.3 Requirements for fault protection

722.411.3.3 Additional protection

Replace the existing text by the following:

3 Under consideration.

Each AC connecting point shall be individually protected by a residual current device (RCD) with a rated residual operating current not exceeding 30 mA.

NOTE This requirement implies that this RCD is not used for protecting other connecting points or current-using equipment.

722.413 Protective measure: electrical separation

722.413.3 Requirements for fault protection

722.413.3.2

Replace the requirements as follows:

The separated circuit shall be supplied through an isolating transformer complying with IEC 61558-2-4, and the voltage of the separated circuit shall not exceed 500 V.

722.44 Protection against voltage disturbances and electromagnetic disturbances

722.443 Protection against transient overvoltages of atmospheric origin or due to switching

722.443.4 Overvoltage control

Add the following after the first paragraph:

A connecting point accessible to the public is considered as part of a public service and therefore shall be protected against transient overvoltages.

722.444 Measures against electromagnetic influences

722.444.1 General

Add the following:

722.444.1.101

The equipment for wireless power transfer shall not impair the safety and the proper functioning of the electrical installation and shall be installed according to the manufacturer's instructions.

722.5 Selection and erection of electrical equipment

722.51 Common rules

722.511 Compliance with standards

Add the following:

722.511.101

For conductive power transfer, EV charging stations shall comply with the appropriate parts of the IEC 61851 series.

722.511.102

Wireless power transfer (WPT) systems for EVs shall comply with the appropriate parts of the IEC 61980 series.

722.512 Operational conditions and external influences

722.512.2 External influences

Add the following:

722.512.2.101 Presence of water (AD)

When installed outdoors, the equipment shall be selected with a degree of protection of at least IPX4 in order to protect against water splashes (AD4).

722.512.2.102 Presence of solid foreign bodies (AE)

When installed outdoors, the equipment shall be selected or provided with a degree of protection of at least IP4X in order to protect against the ingress of small objects (AE3).

722.512.2.103 Impact (AG)

Equipment installed in public areas shall be protected against mechanical damage considering an impact of high severity (AG3). This protection shall be provided by one or more of the following:

- by locating the equipment to avoid damage by any reasonably foreseeable impact;
- by providing local or general mechanical protection of the equipment;
- by selecting and erecting equipment with a minimum degree of protection against external mechanical impact in accordance with the requirements of IEC 62262 of IK08.

722.53 Selection and erection of electrical equipment – Isolation, switching and control

722.530 Introduction

722.530.3 General and common requirements

Add the following:

722.530.3.101

The requirements of 722.530.3.102 and from 722.531 to 722.535.3 shall be achieved either by the selection and erection of the appropriate equipment in the fixed installation or by the selection of an EV charging station which incorporates the appropriate equipment or a combination of both.

NOTE 1 The requirements for the selection and erection of devices for isolation, switching and control of the wireless power transfer system are covered by IEC 60364-5-53.

NOTE 2 The in-cable control and protection device (IC-CPD) according to IEC 62752 is not designed for use in fixed installations.

722.530.3.102

For circuits described in 722.531.3.101, and if more than one electric vehicle is supplied from the same unearthed supply, it is recommended to use an insulation fault location system (IFLS) according to IEC 61557-9 to detect the faulty circuitry within the shortest possible time.

722.531 Devices for protection against indirect contact by automatic disconnection of supply

722.531.2 Residual current protective devices

Add the following:

722.531.2.101

RCDs protecting each connecting point in accordance with 722.411.3.3 shall comply at least with the requirements of an RCD type A and shall have a rated residual operating current not exceeding 30 mA.

Where the EV charging station is equipped with a socket-outlet or vehicle connector complying with IEC 62196 (all parts), protective measures against DC fault current shall be taken, except where provided by the EV charging station. The appropriate measures, for each connection point, shall be as follows:

- the use of an RCD type B; or
- the use of an RCD type A in conjunction with a residual direct current detecting device (RDC-DD) complying with IEC 62955; or
- the use of an RCD type F in conjunction with a residual direct current detecting device (RDC-DD) complying with IEC 62955.

RCDs shall comply with one of the following standards: IEC 61008-1, IEC 61009-1, IEC 60947-2 or IEC 62423.

NOTE Subclause 722.531.2.101 is not applicable in case the connecting point is protected by other protective measures against electric shock such as SELV or electric separation.

722.531.2.1.1

Replace the existing subclause, including the NOTE, as follows:

RCDs shall disconnect all live conductors.

722.531.3 Insulation monitoring devices

Add the following:

722.531.3.101

Except where a protective device is installed to interrupt the circuit in the event of a first earth fault, an insulation monitoring device (IMD) in accordance with IEC 61557-8 shall be provided.

If the IMD is not part of the EV charging station then it is recommended that the IMD provides the following two response values:

- Pre-warning

  If the insulation resistance falls below 300 Ω/V an optical and/or acoustical signal should be issued to the user. An ongoing charging session may continue but a new charging session shall not take place.
- Alarm

  If the resistance falls below 100 Ω/V an optical and/or acoustical signal should be issued to the user. The charging circuit should shut down within 10 s.

722.533 Devices for protection against overcurrent

Add the following:

722.533.101

Except where EV supply equipment in accordance with IEC 61851-1 having more than one connecting point is installed and incorporates the necessary overcurrent protective device required by IEC 61851-1:2017, 13.1, each connecting point shall be supplied individually by a final circuit protected by an overcurrent protective device complying with IEC 60947-2,

IEC 60947-6-2 or IEC 61009-1 or with the relevant parts of the IEC 60898 series or the IEC 60269 series.

NOTE The EV supply equipment can have multiple connecting points.

722.535 Co-ordination of various protective devices

722.535.3 Discrimination between residual current protective devices

Replace the first paragraph as follows:

Where required for service reasons, selectivity shall be maintained between the RCD protecting a connecting point and an RCD installed upstream.

722.54 Earthing arrangements and protective conductors

722.543 Protective conductors

Add the following:

722.543.101

Control signals on the protective conductor (PE) shall not flow into the fixed electrical installation upstream of the EV charging station; equipment shall be selected accordingly.

NOTE 1 The requirement is to prevent such signals, and the related devices impairing the correct functioning of the devices installed to provide the protective measure of automatic disconnection of supply (e.g. RCD).

NOTE 2 This requirement can be achieved by using a galvanic separation of the control electronics.

NOTE 3 Temporary currents used to perform the test of the continuity of protective conductors for safety purposes are not considered as signal currents.

722.55 Other equipment

Add the following:

722.55.101 Socket-outlets and vehicle connectors

722.55.101.1

Where the connecting point is a socket-outlet or a vehicle connector, it shall comply with:

- IEC 60309-1 or IEC 62196-1, where interchangeability is not required, or
- IEC 60309-2, IEC 62196-2, IEC 62196-3 or IEC TS 62196-4 where interchangeability is required, or
- the national standard for socket-outlets, provided the rated current does not exceed 16 A.

Except where electrical separation is used, each socket-outlet shall have an earthing contact connected to the protective conductor (PE).

722.55.101.2

Every socket-outlet or vehicle connector shall be located as close as practicable to the EV parking place to be supplied.

722.55.101.3

Portable socket-outlets shall not be used.

722.55.101.4

One socket-outlet or vehicle connector shall supply only one electric vehicle at the same time.

722.55.102 EV charging stations

EV charging stations for public use shall be so designed as to facilitate easy access to the charging point regardless of where the vehicle inlet is located on the electric vehicle.

722.551 Low voltage generating sets

722.551.1 Scope

722.551.1.1

Add the following dashed list item:

– electric vehicle

722.551.2 General requirements

Add the following:

722.551.2.101

Where electric vehicles are intended to feedback energy to the electric installations, the requirements of IEC 60364-8-2[4] apply.

NOTE Additional requirements for circuits intended for feeding back electricity from electric vehicles are under consideration.

722.551.7 Additional requirements for installations where the generating set may operate in parallel with other sources including systems for distribution of electricity to the public

722.551.7.2

Item b) is replaced by:

b) the socket-outlet or vehicle connector shall comply with IEC 62196 (all parts); and

722.6 Verification

722.6.4 Initial verification

722.6.4.1 General

722.6.4.1.1

Add the following:

The existing installation which is influenced shall also be verified with respect to compliance with the requirements of IEC 60364 (all parts) (e.g. requirements for protection against overcurrent due to the increase of load current).

4 Under preparation. Stage at the time of publication IEC RFDIS 60364-8-2:2018.

722.6.5.1.1

Add the following:

NOTE Requirement for periodic verifications is a matter for national consideration.

Annex A
(informative)

List of notes concerning certain countries

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
ES	722		Special requirements apply in Spain.	In Spain, according to the Royal Decree 1053/2014, special requirements apply to the electrical installations for the supply of electric vehicles.
FR	722		To take in account the national regulation.	In France, special requirements apply (Décret n°2017-26 du 12 janvier 2017).
IT	722.1		This part of the standard shall be in line with the general rules existing in Italy for safety and operational purposes.	In Italy, limitations to the use of mode 1 and mode 2 are given in CEI EN 61851-1.
GB	722.1		For clarification.	In the UK, electrical installations for charging mobility scooters and similar vehicles of 10 A and less are excluded.
NO	722.1		As the definition of electric vehicle is very wide and also seems to cover electrical bicycles and electrical wheel-chairs, and that the document is not intended for circuits supplying such electrical items, we see it necessary to exempt circuits supplying such items from the scope.	In Norway, the requirements of this part of IEC 60364 do not apply to circuits intended to supply energy to electric vehicles where the rated charging current is less or equal to 5 A.
DE	722.3.3		As the demand factor is not used anymore, delete definition 722.3.3.	In Germany, definition 722.3.3 is deleted.
CN	722.3.4		China has a different definition of EV charging station.	In China for EV charging station the following definition applies: 722.3.4 EV charging station infrastructure that supplies electric energy for the recharging of electric vehicles, including three or more chargers, of which at least one off-broad charger, and related power supplies, monitoring devices and other auxiliary facilities
DE	722.31		In Germany the DSO requires symmetric load.	In Germany the following note is added: NOTE In Germany see also the requirements of the DSO regarding unsymmetric load.
AT	722.311	permanent	To take in account the national regulation	In Austria the maximum asymmetric load connected to LV networks of a DSO shall not exceed 3,68 kVA.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
DE	722.311		Simplify wording to avoid misunderstanding for electrical installers. No need to introduce new additional term “demand factor".	In Germany the following note is deleted: NOTE For this application the demand factor of the final circuit supplying the connecting point (e.g. the socket-outlet) is equal to 1.
GB	722.312.2.1		For safety.	As regulation 8(4) of the ESQCR 2002 prohibits the use of PEN conductors in a consumer’s installation this subclause cannot be applied in the UK.
NO	722.314.101		In Norway, the number of electrical vehicles has considerably increased in recent years, and a number of connecting points has been established in new and existing installations. However, we recognise that in existing installations, the installation of new connecting points may easily be skipped due to high costs in order to establish a separate dedicated circuit for the connection points, thus people charge their vehicles using an ordinary socket-outlet in an existing circuit. The national committee dislikes this situation and is stressing the need for using a charging mode 3 with a type 2 socket-outlet. However, we do not see any safety issue installing an EV charging station for private use, e.g. in dwellings or related locations, in an existing circuit, as long as the installation owner is informed of the possibility that charging may not take place due to a fault elsewhere in the circuit and agrees on this.	In Norway the following requirement is added: Where a connecting point for private use needs to be installed in an existing installation, e.g. for a dwelling or similar locations, an existing circuit may be used for such purpose, provided the risk is accepted by the installation owner.
AT	722.411.3.3	Permanent	In Austria this requirement is mentioned under Subclause 722.415.1.	For Austria, see the note to Subclause 722.415.1.
AT	722.415.1 (addition)	Permanent	As in 722.411.3.3 obviously additional protection with RCD having a rated residual operating current not exceeding 30 mA is meant, it should be mentioned here as a requirement. It seems important to mention here that “true additional” protection by RCD is needed for each connection point except for cases in 722.413.3.2.	In Austria add a Subclause 722.415.1 with the following text: 722.415.1 Except for circuits protected by electrical separation (see 722.413.3.2), circuits supplying connection points shall be additionally protected by RCDs having a rated residual operating current not exceeding 30 mA. Devices selected shall disconnect all live conductors including the neutral (see 722.531.2). The function of fault protection for the circuit shall be fulfilled separately.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
FR	722.415.2 (addition)		When the connecting point is installed outside the building, some external conductive parts and the mass of the electrical vehicles can be simultaneously accessible and may have different potential.	In France, a new subclause is added: 722.415.2 For outdoor installations, this additional protection shall also be installed taking into account the risk of simultaneous access to extraneous exposed conductive parts.
ES	722.443.4		In Spain the protection against transient and temporary overvoltages in the circuits intended to supply energy to electric vehicles is mandatory.	In Spain, according to the Royal Decree 1053/2014, Clause 6.4 of the ITC-BT-52, all the circuits intended to supply energy to electric vehicles must be protected against transient and temporary overvoltages.
FI	722.443.4		Due to the low number of ground flash density, protection against transient voltages is not mandatory in Finland.	In Finland protection against transient voltages is not mandatory. General rules apply.
AT	722.512.2.101	Permanent	It seems important to mention here that IPX4 is mandatory in any case.	In Austria, add the following text to 722.512.2.101: Where the plug (according to national standards or IEC 60884-1) is inserted in and a degree of protection of IPX4 cannot be reached, additional measures shall be provided to protect the connecting point against splashing water from all directions.
DE	722.512.2.101		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2, etc.) for the stated classes of external influences are not used in Germany.	In Germany, add the following text to 722.512.2.101: Where the connection point is installed outdoors, the equipment shall be selected with a degree of protection of at least IPX4 in order to protect against water splashes.
DE	722.512.2.102		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2, etc.) for the stated classes of external influences are not used in Germany.	In Germany add the following text to 722.512.2.102: Where the connecting point is installed outdoors, the equipment shall be selected or provided with a degree of protection of at least IP4X in order to protect against the ingress of small objects.
DE	722.512.2.103		IEC 60364-5-51:2005, Annex A is only informative and the abbreviations (e.g. AA2, AB2 etc.) for the stated classes of external influences are not used in Germany and IK-degrees are not applicable in all member countries of the IEC.	In Germany add the following text to 722.512.2.103: Equipment installed in public areas and car park sites shall be protected against mechanical damage (impact of medium severity). Protection of the equipment shall be ensured by one or more of the following: – the position or location shall be selected to avoid damage by any reasonably foreseeable impact; – local or general mechanical protection shall be provided.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.530.3.102		As the protective measure “electrical separation for the supply of more than one item of current-using equipment” is prohibited (see 722.410.3.6), this requirement is related to an IT system. This should be clearly stated.	In Norway, the following text applies: If more than one electric vehicle is supplied within an IT installation, it is recommended to use an insulation fault location system (IFLS) according to IEC 61557-9 to detect the faulty circuitry within the shortest possible time. NOTE In Norway, such an IFLS is not to be used in an installation galvanically connected to a public IT distribution network.
GB	722.531.2.101		For safety reasons.	In the UK, mode 1 charging shall be used only in conjunction with suitable RCD protection.
JP	722.531.2.101		Type A RCD is not popular in Japan. Therefore it is accepted to use type AC RCDs according to IEC 61851-1.	In Japan, the following notes are added: NOTE 1 Some countries may allow the use of an RCD of type AC (national standard) for mode 1 vehicles connected to existing domestic installations. NOTE 2 In some countries, in addition to the RCD of Type AC (national standard), a means for the protection of fault current with a performance at least equal to Type A (IEC) is provided for modes 2,3 and 4.
NO	722.531.2.101		In Norway, most installations are supplied by an IT-system without any presence of a neutral conductor, thus all single-phase loads are supplied by two line conductors. We therefore consider that RCD Type A is not sufficient.	In Norway, most installations are supplied by an IT-system without any presence of a neutral conductor, thus all single-phase loads are supplied by two line conductors. We therefore consider that RCD Type A is not sufficient.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
GB	722.55.101.1		This subclause refers to “where inter-changeability is not required” but interchangeability is always required to allow vehicles to be charged at different locations. To ensure the user understands the intended use of the dedicated final circuit for EV charging, a suitable label should be applied.	In the UK, the following text applies: Each AC connecting point shall incorporate: (i) one socket-outlet complying with BS 1363-2 marked “EV” on its rear or (ii) one socket-outlet or connector complying with IEC 60309-2 which is interlocked and classified according to IEC 60309-1:1999, 6.1.5 to prevent the socket contacts being live when accessible; or (iii) one socket-outlet or connector complying with IEC 60309-2 which is part of an interlocked self-contained product complying with IEC 60309-4 and classified according to IEC 60309-4:2006, 6.1.101 and 6.1.102 which prevents the socket contacts being live when accessible; or (iv) one type 1 vehicle connector complying with IEC 62196-2 for use with mode 3 charging only; or (v) one type 2 socket-outlet or vehicle connector complying with IEC 62196-2 for use with mode 3 charging only; or (vi) one type 3 socket-outlet or vehicle connector complying with IEC 62196-2 for use with mode 3 charging only. NOTE Vehicle manufacturers' instructions should be followed when determining the type of socket-outlet to be installed. A label shall be provided on the front face or adjacent to the socket-outlet or its enclosure stating: ‘suitable for electric vehicle charging’
NO	722.55.101.1		In Norway providing more strict requirements for this subclause has been necessary.	In Norway, the following applies: Where the connecting point is a: – socket-outlet, it shall be in accordance with IEC 60309-2 or IEC 62196-2, and – vehicle connector, it shall be in accordance IEC 62196-1.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
US	722.55.101.1		Given the particular considerations unique to electric vehicle charging, interchangeability of EV socket-outlets or connectors with similar devices used for non-EV purposes should not be permitted. Allowing compatible configurations could result in hazardous situations.	In the US, the following applies: In the US, inter- changeability of EV socket-outlets or connectors (couplers) with other wiring devices in the electrical system is not permitted.
IT	722.55.101.1		The requirements shall be in line with the general rules existing in Italy for safety and operational purposes.	In Italy socket-outlets and vehicle connectors shall comply with IEC 60309-2 or IEC 62196-2 or IEC 62196-3, taking into account requirements given in CEI EN 61851-1.
IT	722.55.101.1		In Italy the standard reference for socket outlets with a rated current not higher than 16 A is CEI 23-50 (for household installations).	In Italy, socket-outlets with a rated current not exceeding 16 A according to the national standard (e.g. CEI 23-50) may also be used.
FR	722.55.101.1		In France, socket outlets up to 32 A shall have shutters.	In France socket-outlet up to and including 32 A, accessible to ordinary persons (BA1) handicapped persons (BA2) and children (BA3) shall be provided with shutters.
PT	722.55.101.1		In Portugal, socket outlets up to 16 A shall have shutters.	In Portugal, socket-outlets up to and including 16 A, accessible to ordinary persons (BA1) handicapped persons (BA2) and children (BA3) shall be provided with shutters.
JP	722.55.101.1		In Japan, using a socket-outlet up to 30 A for EVs is allowed.	In Japan, the following text applies for the third list item in the first paragraph: Socket-outlets with a rated current not exceeding 30 A according to a national standard may also be used.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
CH	722.55.101.1		Plugs and socket-outlets for households and similar purposes according to the national standard SEV 1011 are only suitable to charge light electric vehicles and only occasionally electric vehicles. Therefore, their installations in charging stations for electric vehicles must be forbidden.	In Switzerland, the following text applies for 722.55.101.1: Where the connecting point is a socket-outlet or a vehicle connector, it shall comply with: – IEC 60309-1 or IEC 62196-1, where interchangeability is not required or – IEC 60309-2, IEC 62196-2, IEC 62196-3 or IEC TS 62196-4 where interchangeability is required. Socket-outlets for households and similar purposes according to the national standard SEV 1011 shall not be installed in charging stations for electric vehicles. They are however suitable to charge light electric vehicles like electric bicycles and scooters and, only occasionally, electric vehicles. NOTE For charging currents of more than 8 A (2 kVA), the use of plugs and socket-outlets according to IEC 60309-2 is recommended for mode 1 and mode 2 connections
DE	722.55.101.3		Portable socket-outlets are not part of the fixed installation according to IEC 60364 (all parts).	In Germany 722.55.101.3 does not apply.
NO	722.55.103		In Norway, further requirements for EV charging stations and connecting points are needed.	In Norway the following text applies: 722.55.103 EV charging stations shall be located in such a distance from any "Ex-zone" that charging cannot take place inside the Ex-zone.
NO	722.55.104		In Norway, further requirements for EV charging stations and connecting points are needed.	In Norway the following text applies: 722.55.104 Where the connecting point is intended to be connected by an in-cable control box, the connection point shall be provided with means to fasten the in-cable control box in order to offload the mechanical stresses on the contacts in the socket-outlet due to the weight of the in-cable control box.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.55.02 (addition)		In Norway, the number of electrical vehicles is rapidly increasing (more than 30 000 electrical vehicles June 2014). The number of charging stations installed has also increased tremendously, and unfortunately experiences have shown that a number of detailed requirements are needed in order to keep the electrical safety at an appropriate level. The following subclauses, being part of the national regulations, are given both for information and consideration for inclusion in Part 722.	In Norway, the following additional subclauses apply: 722.55.02 EV charging stations 722.55.02.01 EV charging stations shall be so designed that heavy snowfall or snøpakking (snow drift) due to strong winds do not cause ingress of snow in the charging station and the sealing of any cooling intake.
NO	722.55.02 (addition)		(Continued)	In Norway, the following additional subclauses apply. 722.55.02.02 Charging stations shall be so designed that the charging cable can be run over or otherwise pinched. Where a charging cable may come in contact with the ground (such as soil, concrete, asphalt, stone) the ground surface should be of such a nature that the outer sheath of the charging cables is not damaged. NOTE Rough surfaces on concrete or rough asphalt are examples of surfaces where the outer sheath of a cable can be significantly scratched. This can lead to puncturing of the outer sheath, water penetration and puncture of the insulation. 722.55.02.03 EV charging stations shall be designed in accordance with IEC TS 61439-7.

Country	Clause N°	Nature (permanent or less permanent according to IEC Directives)	Rationale (detailed justification for the requested country note)	Wording
NO	722.55.02 (addition)		There is a need for providing additional requirements for the verification of publicly available charging stations.	In Norway, the following additional subclauses apply. 722.62.2 Interval for periodic verification Replace the requirements with the following: 722.62.2.01 Publicly available EV charging stations shall be visually inspected at least once per week in order to verify that: – the equipment is not visibly damaged in such a way that the safety might be impaired; and – the EV charging station is not showing any operational faults/errors. 722.62.2.02 Publicly available EV charging stations shall be verified in accordance with the requirements of IEC 60364-6:2016, 6.5 at least once a year.

Bibliography

IEC 60050-691, *International Electrotechnical Vocabulary – Chapter 691: Tariffs for electricity* (available at http://www.electropedia.org)

IEC 60309-4:2006, *Plugs, socket-outlets and couplers for industrial purposes – Part 4: Switched socket-outlets and connectors with or without interlock*

IEC 60364-5-51:2005, *Electrical installations of buildings – Part 5-51: Selection and erection of electrical equipment – Common rules*

IEC 60364-5-53, *Electrical installations of buildings – Part 5-53: Selection and erection of electrical equipment – Isolation, switching and control*

IEC 60884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC TS 61439-7, *Low-voltage switchgear and controlgear assemblies – Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicles charging stations*

IEC 61557-9, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures – Part 9: Equipment insulation fault location in IT systems*

IEC 61851-1:2017, *Electric vehicle conductive charging system – Part 1: General requirements*

IEC 61851-23-1, *Electric vehicle conductive charging system – Part 23-1: DC electric vehicle charging station with an autoconnect charging device*[5]

IEC TR 62350, *Guidance for the correct use of residual current-operated protective devices (RCDs) for household and similar use*

IEC 62752, *In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)*

ISO 17409:2015, *Electrically propelled road vehicles – Connection to an external electric power supply – Safety requirements*

5 Under consideration.

SOMMAIRE

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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INSTALLATIONS ÉLECTRIQUES À BASSE TENSION –

Partie 7-722: Exigences pour les installations et emplacements spéciaux – Alimentation des véhicules électriques

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60364-7-722 a été établie par le comité d'études 64 de l'IEC: Installations électriques et protection contre les chocs électriques.

Cette deuxième édition annule et remplace la première édition parue en 2015. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) introduction des exigences relatives aux installations électriques comprenant des systèmes de transfert d'énergie sans fil;

b) clarification des exigences relatives aux mesures de protection de mise hors de portée par éloignement, afin de permettre l'utilisation de pantographes dans les zones accessibles au public;

c) introduction des exigences couvrant le cas dans lequel le VE peut fonctionner en tant que source en parallèle avec d'autres sources.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
64/2285/FDIS	64/2318/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 60364, publiées sous le titre général *Installations électriques à basse tension*, peut être consultée sur le site web de l'IEC.

L'attention du lecteur est attirée sur le fait que l'Annexe A énumère tous les articles traitant des différences à caractère moins permanent inhérentes à certains pays, concernant le sujet de la présente norme.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous «http://webstore.iec.ch» dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Pour les besoins de la présente partie de l'IEC 60364 (IEC 60364-7-722), les exigences des parties générales 1 à 6 de l'IEC 60364 s'appliquent.

Les parties IEC 60364-7-7XX de l'IEC 60364 contiennent des exigences particulières pour les installations et emplacements spéciaux, qui sont fondées sur les exigences des parties générales de l'IEC 60364 (IEC 60364-1 à IEC 60364-6). Ces parties IEC 60364-7-7XX sont prises en compte conjointement avec les exigences des parties générales.

Les exigences particulières de la présente partie de l'IEC 60364 complètent, modifient ou remplacent certaines des exigences des parties générales de l'IEC 60364 en vigueur au moment de la publication de la présente partie. L'absence de référence à l'exclusion d'une partie ou d'un article d'une partie générale signifie que les articles correspondants de la partie générale sont applicables (références non datées).

Les exigences des autres parties 7XX pertinentes pour les installations couvertes par la présente partie s'appliquent également. Par conséquent, la présente partie peut également compléter, modifier ou remplacer certaines de ces exigences en vigueur au moment de sa publication.

La numérotation des articles de la présente partie suit la structure et les références correspondantes de l'IEC 60364. Les numéros placés derrière le numéro spécifique de la présente partie sont ceux des parties ou des articles correspondants des autres parties de la série IEC 60364, en vigueur au moment de la publication de la présente partie, comme indiqué dans les références normatives du présent document (références datées).

Si des exigences ou des explications en plus de celles des autres parties de la série IEC 60364 sont nécessaires, la numérotation de tels éléments se fait de la manière suivante: 722.101, 722.102, 722.103, etc.

Si des parties générales nouvelles ou modifiées sont publiées avec une numérotation modifiée après la parution de la présente partie, les numéros d'articles se référant à une partie générale dans cette Partie 722 peuvent ne plus correspondre avec la dernière édition des parties générales. Il convient alors de prendre en compte les références datées.

INSTALLATIONS ÉLECTRIQUES À BASSE TENSION –

Partie 7-722: Exigences pour les installations et emplacements spéciaux – Alimentation des véhicules électriques

722 Alimentation des véhicules électriques

722.1 Domaine d'application

Les exigences particulières du présent document sont applicables

- aux circuits destinés à fournir de l'énergie aux véhicules électriques, et
- aux circuits destinés à réinjecter de l'électricité provenant de véhicules électriques.

Les circuits couverts par le présent document se terminent au point de connexion.

NOTE 1 Les exigences relatives au système d'alimentation pour VE pour la charge conductive et les modes de charge appropriés sont décrites dans l'IEC 61851 (toutes les parties). Les exigences relatives au système d'alimentation pour VE pour le transfert d'énergie sans fil sont décrites dans l'IEC 61980 (toutes les parties).

NOTE 2 Le présent document ne couvre pas l'appréciation du risque d'explosion dû à la possible production d'hydrogène ou d'autres gaz inflammables lors du rechargement de la batterie.

722.2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60269 (toutes les parties), *Fusibles basse tension*

IEC 60309-1:1999, *Prises de courant pour usages industriels – Partie 1: Règles générales*

IEC 60309-2, *Prises de courant pour usages industriels – Partie 2: Règles d'interchangeabilité dimensionnelle pour les appareils à broches et alvéoles*

IEC 60364 (toutes les parties), *Installations électriques à basse tension*

IEC 60364-4-41:2005, *Installations électriques à basse tension – Partie 4-41: Protection pour assurer la sécurité – Protection contre les chocs électriques*
IEC 60364-4-41 :2005/AMD1 :2017

IEC 60364-8-2, *Installations électriques à basse tension – Partie 8-2 : Installations électriques à basse tension du prosommateur*[1]

IEC 60898 (toutes les parties), *Petit appareillage électrique – Disjoncteurs pour la protection contre les surintensités pour installations domestiques et analogues*

IEC 60947-2, *Appareillage à basse tension – Partie 2 : Disjoncteurs*

1 En cours d'élaboration. Stade au moment de la publication IEC RFDIS 60364-8-2:2018.

IEC 60947-6-2, *Appareillage à basse tension – Partie 6-2 : Matériels à fonctions multiples – Appareils (ou matériel) de connexion de commande de protection (ACP)*

IEC 61008-1, *Interrupteurs automatiques à courant différentiel résiduel sans dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (ID) – Partie 1 : Règles générales*

IEC 61009-1, *Interrupteurs automatiques à courant différentiel résiduel avec dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (DD) – Partie 1 : Règles générales*

IEC 61557-8, *Sécurité électrique dans les réseaux de distribution basse tension de 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection – Partie 8 : Contrôleur permanent d'isolement pour réseaux IT*

IEC 61558-2-4, *Sécurité des transformateurs, bobines d'inductance, blocs d'alimentation et produits analogues pour des tensions d'alimentation jusqu'à 1 100 V – Partie 2-4 : Règles particulières et essais pour les transformateurs de séparation des circuits et les blocs d'alimentation incorporant des transformateurs de séparation des circuits*

IEC 61851 (toutes les parties), *Système de charge conductive pour véhicules électriques*

IEC 61980 (toutes les parties), *Systèmes de transfert de puissance sans fil (WPT) pour véhicules électriques*

IEC 62196 (toutes les parties), *Fiches, socles de prise de courant, prises mobiles de véhicule et socles de connecteur de véhicule – Charge conductive des véhicules électriques*

IEC 62196-1, *Fiches, socles de prise de courant, prises mobiles de véhicule et socles de connecteur de véhicule – Charge conductive des véhicules électriques – Partie 1 : Règles générales*

IEC 62196-2, *Fiches, socles de prise de courant, prises mobiles de véhicule et socles de connecteur de véhicule – Charge conductive des véhicules électriques – Partie 2 : Exigences dimensionnelles de compatibilité et d'interchangeabilité pour les appareils à broches et alvéoles pour courant alternatif*

IEC 62196-3, *Fiches, socles de prise de courant, prises mobiles de véhicule et socles de connecteur de véhicule – Charge conductive des véhicules électriques – Partie 3 : Exigences dimensionnelles de compatibilité et d'interchangeabilité pour les connecteurs de véhicule à broches et alvéoles pour courant continu et pour courants alternatif et continu*

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* (disponible en anglais seulement)[2]

IEC 62262, *Degrés de protection procurés par les enveloppes de matériels électriques contre les impacts mécaniques externes (code IK)*

IEC 62423, *Interrupteurs automatiques à courant différentiel résiduel de type B et de type F avec et sans protection contre les surintensités incorporée pour usages domestiques et analogues*

2 En cours d'élaboration. Stade au moment de la publication IEC TS BPUB 62196-4:2018.

IEC 62955, *Dispositif de détection à courant différentiel résiduel continu (DD-CDC) à utiliser pour la charge en mode 3 des véhicules électriques*

722.3 Termes et définitions

Pour les besoins du présent document, les termes et définitions suivants s'appliquent.

L'ISO et l'IEC tiennent à jour des bases de données terminologiques destinées à être utilisées en normalisation, consultables aux adresses suivantes :

- IEC Electropedia : disponible à l'adresse http://www.electropedia.org/
- ISO Online browsing platform : disponible à l'adresse http://www.iso.org/obp

722.3.1
véhicule électrique
véhicule électrique routier
VE
tout véhicule propulsé par un moteur électrique dont le courant électrique provient d'un système de stockage d'énergie rechargeable (RESS – *rechargeable energy storage system*), destiné principalement à l'utilisation sur la voie publique

[SOURCE : ISO 17409 :2015, 3.19, modifiée — Le libellé complet de «RESS» a été ajouté.]

722.3.2
point de connexion
point de terminaison dans l'installation fixe où l'énergie est transmise à/depuis un véhicule électrique

EXEMPLE Un socle de prise de courant, une prise mobile de véhicule ou un dispositif de transfert d'énergie sans fil.

Note 1 à l'article : Le point de connexion peut faire partie du système d'alimentation fixe pour VE.

722.3.3
facteur d'utilisation
rapport, exprimé en valeur numérique ou en pourcentage, de la puissance maximale appelée par un circuit ou un ensemble de circuits, au cours d'une période déterminée, à la puissance installée de ce circuit ou de ces circuits

Note 1 à l'article : Il convient d'utiliser ce terme en précisant à quel niveau du réseau il se rapporte.

[SOURCE : IEC 60050-691 :1973, 691-10-05, modifiée — Le terme «installation» a été remplacé par le terme «circuit».]

722.3.4
borne de charge pour VE
partie fixe du système d'alimentation pour VE raccordé au réseau d'alimentation

[SOURCE : IEC 61851-1 :2017, 3.1.5, modifiée — La note a été supprimée.]

722.3.5
système d'alimentation pour VE
équipement ou ensemble d'équipements assurant des fonctions dédiées à l'alimentation en énergie électrique à partir d'une installation électrique fixe ou d'un réseau d'alimentation jusqu'au VE pour les besoins de la charge

[SOURCE : IEC 61851-1 :2017, 3.1.1, modifiée — Les exemples ont été supprimés.]

722.3.6
contrôle de la charge
système de gestion (de l'énergie) électrique garantissant que la somme des courants de charge des circuits dédiés ne dépasse pas une valeur prédéterminée

722.31 Buts, alimentations et structures

722.311 Demande maximale et diversité

Ajouter ce qui suit:

Le fait qu'en utilisation normale chaque point de connexion est utilisé à sa valeur de courant assigné ou à la valeur de courant de charge maximum configurée pour la borne de charge doit être pris en considération. La configuration du courant de charge maximum doit s'effectuer uniquement avec une clé ou un outil, et doit être réalisée uniquement par des personnes averties ou qualifiées.

NOTE Pour cette application, le facteur d'utilisation du circuit terminal qui alimente le point de connexion (par exemple le socle de prise de courant) est égal à 1.

Tous les points de connexion pouvant être utilisés simultanément, le facteur de diversité du circuit de distribution doit être considéré comme égal à 1, sauf si un contrôle de la charge est compris dans le système d'alimentation pour VE, ou installé en amont, ou les deux.

722.312 Disposition des conducteurs et mise à la terre

722.312.2.1 Schémas TN

Ajouter ce qui suit:

Dans le cas d'un schéma TN, un circuit alimentant un point de connexion ne doit pas inclure un conducteur PEN.

722.314 Division des installations

Ajouter ce qui suit:

722.314.101

Un circuit dédié doit être prévu pour le transfert d'énergie depuis/vers le véhicule électrique.

722.4 Protection pour assurer la sécurité

722.41 Protection contre les chocs électriques

722.410.3 Exigences générales

722.410.3.5

Remplacer le texte existant par ce qui suit :

Les obstacles des mesures de protection tels que spécifiés dans l'IEC 60364-4-41 :2005, Article B.2 ne doivent pas s'appliquer.

La mesure de protection de mise hors de portée par éloignement telle que spécifiée dans l'IEC 60364-4-41 :2005, Article B.3 ne peut s'appliquer que lorsqu'un système de connexion automatique conformément à l'IEC 61851-23-1[3] est utilisé.

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3 A l'étude.

722.410.3.6

Les mesures de protection telles que spécifiées dans l'IEC 60364-4-41 :2005 et l'IEC 60364-4-41 :2005/AMD1 :2017, Annexe C ne doivent pas s'appliquer.

722.411 Mesure de protection : coupure automatique de l'alimentation

722.411.3 Exigences pour la protection en cas de défaut

722.411.3.3 Protection complémentaire

Remplacer le texte existant par ce qui suit :

Chaque point de connexion en courant alternatif doit être protégé individuellement par un dispositif à courant différentiel résiduel (DDR) avec un courant résiduel de fonctionnement assigné ne dépassant pas 30 mA.

NOTE Cette exigence implique que ce DDR n'est pas utilisé pour la protection d'autres points de connexion ou d'autres matériels d'utilisation.

722.413 Mesure de protection : séparation électrique

722.413.3 Exigences pour la protection en cas de défaut

722.413.3.2

Remplacer les exigences comme suit :

Le circuit séparé doit être alimenté par un transformateur de séparation des circuits conforme à l'IEC 61558-2-4, et la tension du circuit séparé ne doit pas dépasser 500 V.

722.44 Protection contre les perturbations de tension et les perturbations électromagnétiques

722.443 Protection contre les surtensions transitoires d'origine atmosphérique ou dues à des manœuvres

722.443.4 Maîtrise des surtensions

Ajouter ce qui suit après le premier alinéa :

Un point de connexion accessible au public est considéré comme un service public et par conséquent doit être protégé contre les surtensions transitoires.

722.444 Dispositions contre les influences électromagnétiques

722.444.1 Généralités

Ajouter ce qui suit:

722.444.1.101

Le matériel de transfert d'énergie sans fil ne doit pas altérer la sécurité et le bon fonctionnement de l'installation électrique, et doit être installé selon les instructions du fabricant.

722.5 Choix et mise en œuvre des matériels électriques

722.51 Règles communes

722.511 Conformité aux 35lare

Ajouter ce qui suit:

722.511.101

En ce qui concerne l'échange d'énergie conductrice, les bornes de charge pour VE doivent être conformes aux parties correspondantes de la série IEC 61851.

722.511.102

Les systèmes de transfert d'énergie sans fil pour les VE doivent être conformes aux parties correspondantes de la série IEC 61980.

722.512 Conditions de service et influences externes

722.512.2 Influences 35laret35

Ajouter ce qui suit:

722.512.2.101 Présence d'eau (AD)

Lorsqu'il est installé à l'extérieur, le matériel doit être choisi avec un degré de protection d'au moins IPX4, afin d'assurer une protection contre les projections d'eau (AD4).

722.512.2.102 Présence de corps solides étrangers (AE)

Lorsqu'il est installé à l'extérieur, le matériel doit être choisi avec un degré de protection d'au moins IP4X ou présenter ledit degré de protection afin d'assurer une protection contre la pénétration de petits objets (AE3).

722.512.2.103 Chocs (AG)

Le matériel installé dans un lieu public doit être protégé contre les dommages mécaniques par suite d'un choc élevé (AG3). Cette protection doit être assurée par au moins une des méthodes suivantes :

- en plaçant le matériel de façon à éviter des dommages liés à tout choc raisonnablement prévisible ;
- en prévoyant une protection mécanique locale ou générale du matériel ;
- en choisissant et mettant en œuvre le matériel en se conformant à un degré minimal de protection contre les impacts mécaniques externes de niveau IK08, conformément aux exigences de l'IEC 62262.

722.53 Choix et mise en œuvre des matériels électriques – Coupure, sectionnement et commande

722.530 Introduction

722.530.3 Généralités et exigences communes

Ajouter ce qui suit: