

INTERNATIONAL STANDARD



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



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INTERNATIONAL STANDARD



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE ELECTRICAL INSTALLATIONS –

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

FOREWORD

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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.

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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 applications²*

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

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**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 vehicles.

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 61851-23-13 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 60364-8-2⁴ 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-board 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		<p>This subclause refers to “where inter-changeability is not required” but interchangeability is always required to allow vehicles to be charged at different locations.</p> <p>To ensure the user understands the intended use of the dedicated final circuit for EV charging, a suitable label should be applied.</p>	<p>In the UK, the following text applies:</p> <p>722.55.101.1 Each AC connecting point shall incorporate:</p> <ul style="list-style-type: none"> (i) one socket-outlet complying with the national standard where the manufacturer approves its suitability for use 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. <p>NOTE Vehicle manufacturers' instructions should be followed when determining the type of socket-outlet to be installed.</p> <p>A label shall be provided on the front face or adjacent to the socket-outlet or its enclosure stating:</p> <p>‘suitable for electric vehicle charging’</p>