SECTION 722
ELECTRIC VEHICLE CHARGING INSTALLATIONS

NOTE: Definitions relating to Section 722 can be found in Part 2 under electric vehicle (EV), {722}

722.1 Scope

The particular requirements of this section apply to circuits intended to supply electric vehicles for charging purposes.

The requirements of this section do not apply to electric vehicle charging points that:

(i) employ inductive charging

(ii) charge mobility scooters and similar vehicles of 10 A and less.

NOTE: Requirements for protection for safety when feeding back electricity from an electric vehicle into a private or public supply network are under consideration.

722.3 Assessment of general characteristics

722.31 Purposes, supplies and structure

722.311 Maximum demand and diversity

A dedicated final circuit shall be provided for the connection to electric vehicles. It shall be considered that in normal use each single charging point is used at its rated current. Where the final circuit supplies more than one charging point no diversity shall be allowed.

Diversity may be allowed for a dedicated distribution circuit supplying multiple electric vehicle charging points if load control is available.

722.312 Conductor arrangement and system earthing

722.312.2.1 TN systems

For a TN system, the final circuit supplying a charging point for electric vehicles shall not include a PEN conductor.

722.4 Protection for safety

722.41 Protection against electric shock

722.410.3 General requirements

722.410.3.5 The protective measures of obstacles and placing out of reach (Section 417) shall not be used.

722.410.3.6 The protective measures of non-conducting location (Regulation 418.1) and earth-free local equipotential bonding (Regulation 418.2) shall not be used.

722.411.4 TN system

722.411.4.1 A PME earthing facility shall not be used as the means of earthing for the protective conductor contact of a charging point located outdoors or that might reasonably be expected to be used to charge a vehicle located outdoors unless one of the following methods is used :

(i) The charging point forms part of a three-phase installation that also supplies loads other than for electric vehicle charging and, because of the characteristics of the load of the installation, the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.

NOTE 1: Annex 722, item A722.2 gives some information relating to (i).

NOTE 2 : See also Regulation 64 1.5 when undertaking alterations and additions.

(ii) The main earthing terminal of the installation is connected to an installation earth electrode by a protective conductor complying with Regulation 544.1.1. The resistance of the earth electrode to Earth shall be such that the maximum voltage between the main earthing terminal of the installation and Earth in the event of an open-circuit fault in the PEN conductor of the low voltage network supplying the installation does not exceed 70 V rms.

NOTE: Annex 722, item A 722.3 gives guidance on determining the maximum resistance required for the earth electrode in (ii)

(iii) Protection against electric shock is provided by a device which disconnects the charging point from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.10 l(ii) within 5s in the event of the voltage between the circuit protective conductor and Earth exceeding 70 V rms. The device shall not operate if the voltage exceeds 70 V rms for less than 4s. The device shall provide isolation. Closing or resetting of the device shall be by manual means only. Equivalent functionality could be included within the charging equipment

Where buried in the ground, a protective conductor connecting to an earth electrode for the purposes of (ii) or (iii) shall have a cross-sectional area not less than that stated in Table 54.1.

722.413 Protective measure: Electrical separation

722.413.1.2 This protective measure shall be limited to the supply of one electric vehicle supplied from one unearthed source. The circuit shall be supplied through a fixed isolating transformer complying with BS EN 61558-2-4.

722.5 Selection and erection of equipment

722.51 Common rules

722.511 Compliance with standards

722.511 .1 Where an EV charging point is built into a low voltage switchgear or control gear assembly the requirements of the relevant part of BS EN 61439 series shall apply.

722.511.101 EV charging equipment shall comply with the appropriate parts of the BS EN 61851 series.

722.512 Operational conditions and external influences

722.512.2 External influences

722.512.2.201 Presence of water (AD)

Where installed outdoors, the equipment shall be selected with a degree of protection of at least IPX4 in accordance with BS EN 60529 in order to protect against water splashes (AD4).

722.512.2.202 Presence of solid foreign bodies (AE)

Where installed outdoors, the equipment shall be selected with a degree of protection of at least IP4X in accordance with BS EN 60529 to protect against the ingress of very small objects (AE3).

722.512.2.203 Impact (AG)

Equipment installed in public areas and car park sites shall be protected against mechanical damage (impact of medium severity AG2). Protection of the equipment shall be afforded 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 BS EN 62262.

722.531 Devices for fault protection by automatic disconnection of supply

722.531.2 RCDs

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

Each charging point incorporating a socket-outlet or vehicle connector complying with the BS EN 62196 series, protective measures against DC fault current shall be taken, except where provided by the EV charging equipment.

The appropriate measures, for each connection point, shall be as follows:

- RCD Type B; or

- RCD Type A and appropriate equipment that provides disconnection of the supply in case of DC fault current above 6 rnA.

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

NOTE: Requirements for the selection and erection of RCDs in the case of supplies using DC vehicle connectors according to the BS EN 62196 series are under consideration.

722.531.2.1.1 RCDs shall disconnect all live conductors.

722.533 Devices for protection against overcurrent

722.533.101 Each charging point shall be supplied individually by a final circuit protected by an overcurrent protective device complying with BS EN 60947-2, BS EN 60947-6-2 or BS EN 61009- 1 or with the relevant parts of the BS EN 60898 series or the BS EN 60269 series.

NOTE: The electric vehicle charging equipment may have multiple charging points.

722.537 Isolation and switching

722.537.4 Emergency switching off

722.537.4.101 Where emergency switching off is required, such devices shall be capable of breaking the full load current of the relevant parts of the installation and disconnect all live conductors, including the neutral conductor.

722.55 Other equipment

722.55.101 Socket-outlets and connectors

722.55.101.0.201.1 Each AC charging point shall incorporate

(i) one socket-outlet complying with BS 1363-2 marked ' EV' on its rear and, except where there is no possibility of confusion, a label shall be provided on the front face or adjacent to the socket-outlet or its enclosure stating: 'suitable for electric vehicle charging', or

(ii) one socket-outlet or connector complying with BS EN 60309-2 which is interlocked and classified to clause 6.1.5 of BS EN 60309-1 to prevent the socket contacts being live when accessible, or

(iii) one socket-outlet or connector complying with BS EN 60309-2 which is part of an interlocked self-contained product complying with BS EN 60309-4 and classified to clauses 6.1.101 and 6.I.102 to prevent the socket contacts being live when accessible, or

(iv) one Type 1 vehicle connector complying with BS EN 62196-2 for use with mode 3 charging only, or

(v) one Type 2 socket-outlet or vehicle connector complying with BS EN 62196-2 for use with mode 3 charging only, or

(vi) one Type 3 socket-outlet or vehicle connector complying with BS EN 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.

722.55.101.0.201.2 Each socket-outlet shall be installed in a distribution board in accordance with Regulation 722.51 or in its appropriate enclosure (e.g. flush or surface mounted socket-outlet box) and mounted in a fixed position.

Portable socket-outlets shall not be used but tethered vehicle connectors are allowed.

722.55.101.3 One socket-outlet or vehicle connector shall supply only one electric vehicle.

722.55.101.4 In EV charging modes 3 and 4, an electrical or mechanical system shall be provided to prevent the plugging/unplugging of the plug unless the socket-outlet or the vehicle connector has been switched off from the supply.

722.55.101.5 The lowest part of any socket-outlet shall be placed at a height of 0.5 to 1.5m from the ground

NOTE: The requirements of the relevant National Building Regulations should be adhered to in respect of socket-outlet heights.

722.55.101.6 Precautions on supply of the fixed Installation by the EV

NOTE: Requirements for precautions on supply of the fixed installation by the EV are under consideration.