ELECTRIC VEHICLE CHARGING

INTRODUCTION

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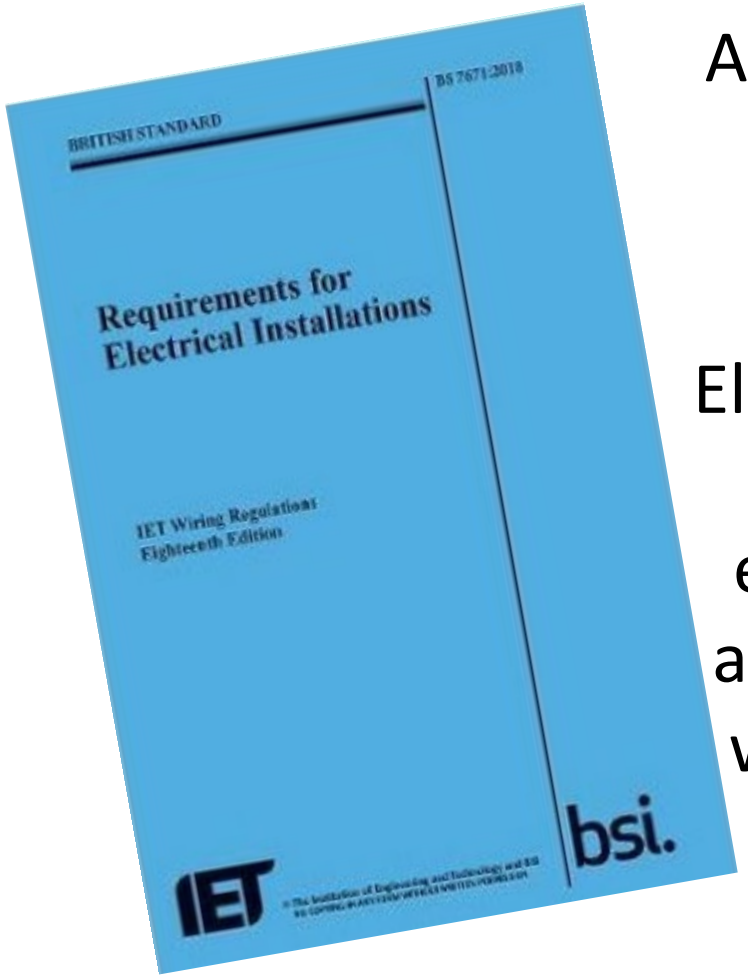
Introduction to the Requirements of Amendment 1:2020 of BS 7671

Examples of some of the EV FAQs from the Technical Helpline

CURRENT REGULATIONS

BS 7671:2018 AND AMENDMENT 1:2020



Amendment 1:2020 was issued on 1st February 2020

Electrical Installations falling within the scope of Section 722, the erection of which is commenced after 31st July 2020, are to comply with BS 7671:2018 incorporating Amendment 1:2020

Maximum Demand and Diversity

722.311.201

Load curtailment, including load reduction or disconnection, either automatically or manually, may be taken into account when determining maximum demand of the installation or part thereof.

Previously – (BS 7671:2018)

- 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.

PROTECTION AGAINST ELECTRIC SHOCK – 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:

Previously – (BS 7671:2018) *in summary*

(i) charging point forms part of a three-phase installation – because of the characteristics of the load of the installation – max of 70 V between MET and Earth in the event of an open-circuit fault in the PEN conductor.

(ii) supplementary earth electrode – max voltage of 70 V between MET and Earth in the event of an open-circuit fault in the PEN conductor.

(iii) protection by a device which disconnects the charging point from the live conductors of the supply and from protective earth in the event of a voltage exceeding 70 V between the c.p.c. and Earth.

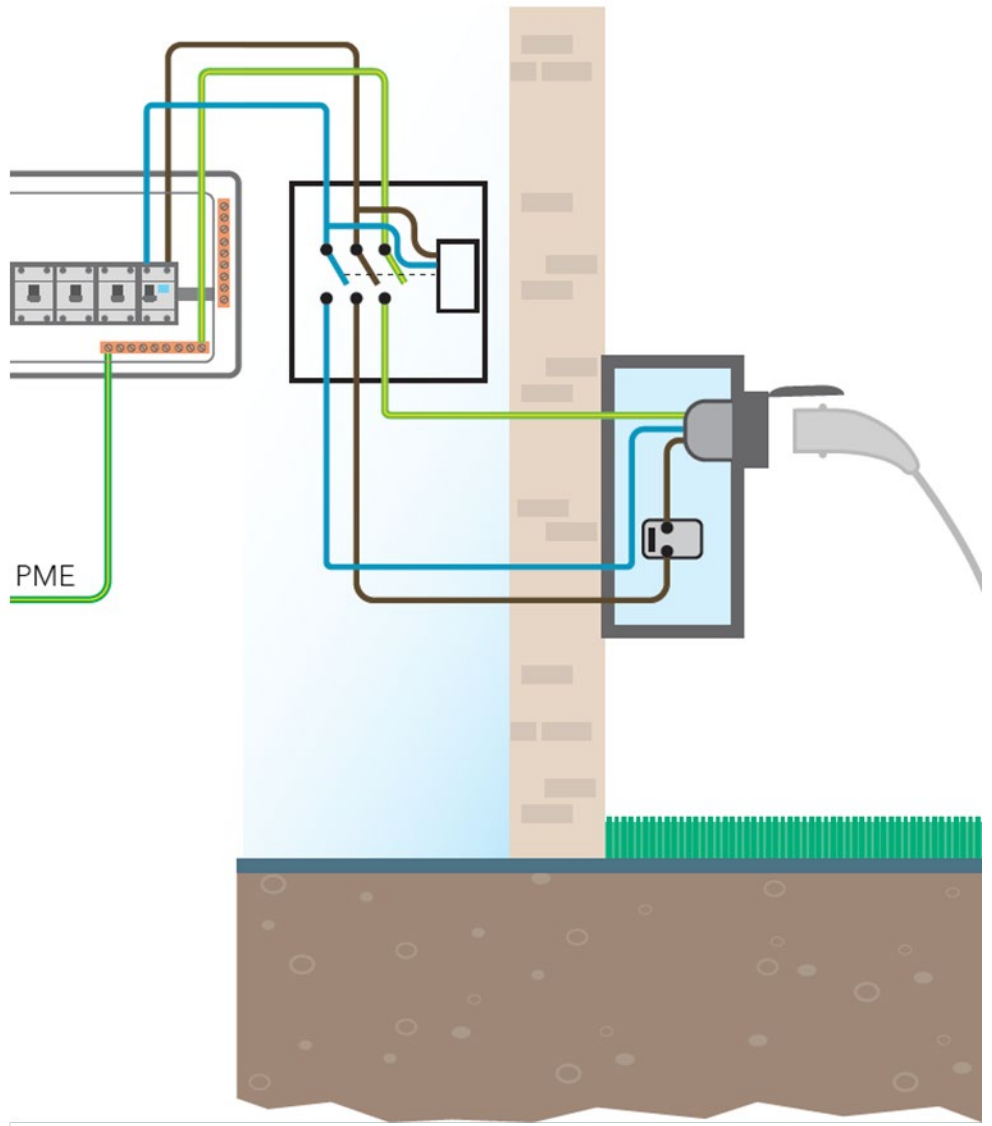
PROTECTION AGAINST ELECTRIC SHOCK – TN SYSTEM

722.411.4.1 (IV)

…A DEVICE WHICH ELECTRICALLY DISCONNECTS THE VEHICLE FROM LIVE CONDUCTORS OF THE SUPPLY AND PROTECTIVE EARTH… WITHIN 5 S…

…VOLTAGE BETWEEN THE LINE AND NEUTRAL CONDUCTORS BEING…< 207 V OR > 253 V

…EQUIVALENT MEANS OF FUNCTIONALITY COULD BE INCLUDED WITHIN THE CHARGING EQUIPMENT……



Protection Against Electric Shock – TN System

722.411.4.1 (v) – (Future Developments)

Protection against electric shock is provided by the use of an alternative device to those in (iii) or (iv) which does not result in a lesser degree of safety than using (iii) or (iv). Equivalent means of functionality could be included within the charging equipment. The device (or means of functionality) shall operate by electrically disconnecting the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii). It shall provide isolation and be selected in accordance with Table 537.4.

Protection Against Electric Shock – TN System

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Protection Against Electric Shock – TT System

722.411.4.1 – Note 6 (Informative)

Creating a TT earthing system for charging equipment or the whole installation as an alternative to using a PME earthing facility with one of methods (i) to (v) above may not be an appropriate solution due to the inability to provide sufficient separation from buried metalwork connected to the supply PEN conductor.

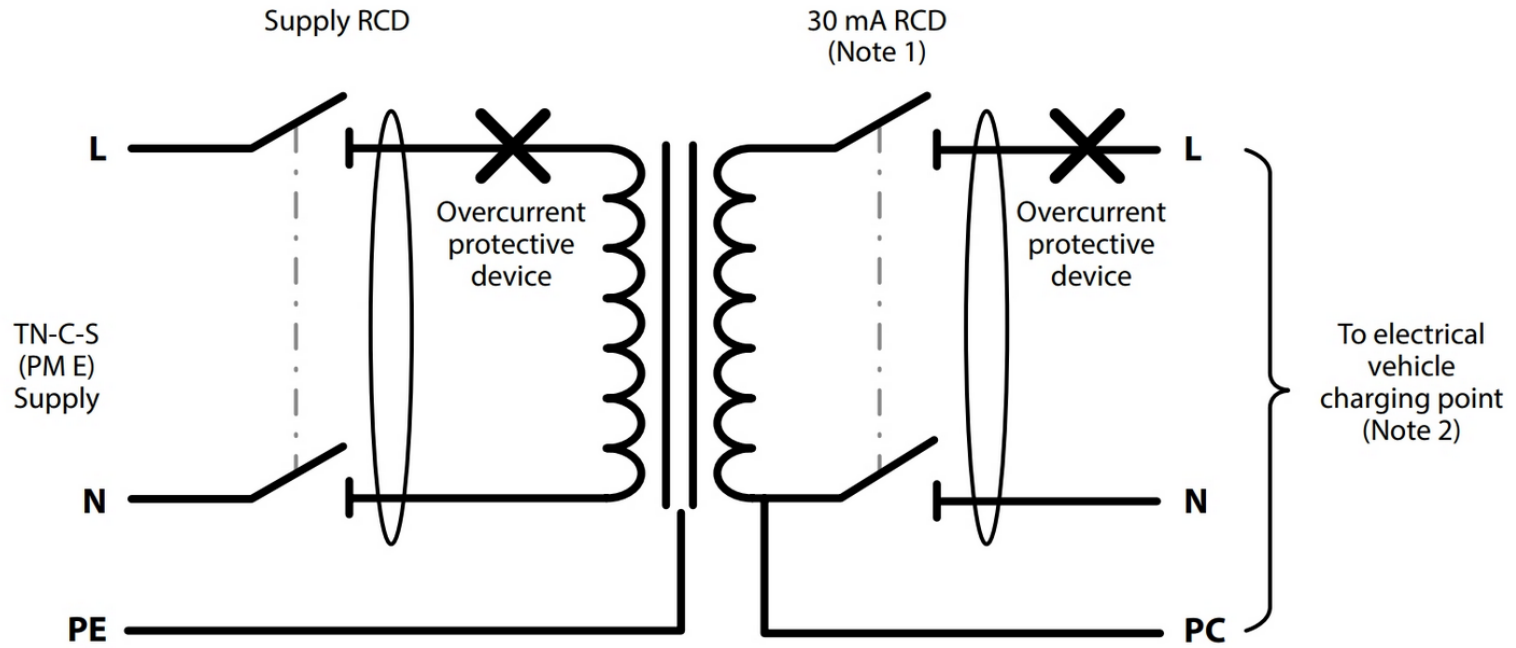
PROTECTION AGAINST ELECTRIC SHOCK – ELECTRICAL SEPARATION

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.

NOTE: An example of an arrangement for the supply of a Class I electric vehicle charging point from a separated source is shown in Annex A722, Item A722.5.

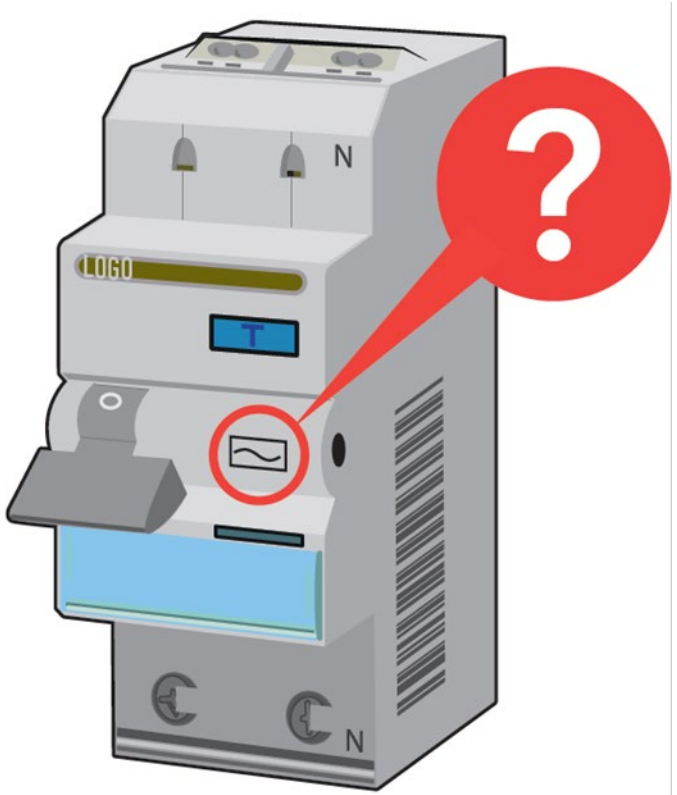
Fig A722 – Example of a separated system where protective conductor monitoring is required



RESIDUAL CURRENT DEVICES (RCDS)

722.513.3.1

RCDS SHALL DISCONNECT ALL LIVE CONDUCTORS.



Residual Current Devices (RCDs)

722.513.3.101

Unless supplied by a circuit using the protective measure of electrical separation, each charging point incorporating a socket-outlet or vehicle connector complying with the BS EN 62196 series shall be protected by an RCD having a rated residual operating current not exceeding 30 mA.

Except where provided by the EV charging equipment, protection against DC fault currents shall be provided by: (i) an RCD Type B, or (ii) an RCD Type A or Type F in conjunction with a residual direct current detecting device (RDC-DD) complying with BS IEC 62955 as appropriate to the nature of the residual and superimposed currents and recommendation of the manufacturer of the charging equipment. 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.

Frequently Asked Questions to the Technical Helpline

Q) On an EICR, what classification code would be attributed to an EV charging installation capable of charging a vehicle outside and connected to PME earth?

An existing Electric Vehicle charging installation capable of charging a vehicle outside and connected to PME earth is recommended as a Classification Code C3 – Improvement Recommended

FREQUENTLY ASKED QUESTIONS TO THE TECHNICAL HELPLINE

Q) REGULATION 722.533.101 STATES THAT EACH EV CHARGING POINT MUST BE SUPPLIED INDIVIDUALLY BY A FINAL CIRCUIT. HOW IS THIS REQUIREMENT MET WHEN EV CHARGING EQUIPMENT HAS MORE THAN ONE SOCKET-OUTLET?

With reference to the definitions in Part 2 it can be seen that:

- the circuit supplying the EV charging equipment is a distribution circuit or 'sub-main' as it supplies distribution equipment or switchgear forming part of a separate installation;

and

- the wiring within the EV charging equipment downstream of the overcurrent protective device required by Regulation 722.533.101 is a final circuit. This is because it connects directly to socket-outlet(s) or other outlet point(s) for the connection of current-using equipment – in this case the electric vehicle.

Frequently Asked Questions to the Technical Helpline

Q) Do the requirements of Regulation 722.411.4.1 regarding TN systems apply to the following:

a) Installations forming part of a TN-S system

b) Installations forming part of a TT system

c) Installations employing protective neutral bonding (PNB)?

a) No. It should be noted, however, that there may be occasions when what at first appears to be a TN-S supply arrangement has been converted to TN-C-S as a result of line repairs carried out on the supply network. However, unless this has been indicated at the intake position or has been confirmed by the supplier, it should be assumed that the supply remains TN-S

b) No

c) Yes.

FREQUENTLY ASKED QUESTIONS TO THE TECHNICAL HELPLINE

Q) WHAT IS THE RECOMMENDED INITIAL FREQUENCY OF INSPECTION FOR AN ELECTRIC VEHICLE CHARGING INSTALLATION?

- seek guidance from the Electric Vehicle Charging equipment manufacturer.
- give consideration to the recommended initial frequency for the installation which supplying the Electric Vehicle Charging equipment, including environment, usage, maintenance regime, etc.

THANK YOU FOR TIME TODAY

ANY QUESTIONS?