

IET 01 FAQ's

What is IET 01?

IET 01 is intended to specify the protection measures and methods of operation for electric vehicle (EV) charging equipment when an open PEN fault occurs. Such faults may present a risk of injury to installers, operators, and the public.

Who is IET 01 for?

IET 01 is primarily for manufacturers to enable them to apply a standard approach for how open PEN detection devices are to operate in electric vehicle charging applications. It is also useful to designers and installers as it is intended to simplify their understanding of how a given EV chargepoint will operate when an open PEN fault occurs.

Essentially, BS 7671 currently has requirements for how EV charge equipment needs to operate when a fault occurs in the public low voltage supply network – which is not the correct place for product standard requirements. IET 01, therefore, is a specification for EV charging equipment which means that product standard requirements would no longer need to be in BS 7671. The intention is that BS 7671 refers out to IET 01, i.e. install a chargepoint which meets the requirements of IET 01.

What is an 'open PEN' or 'open PEN conductor' fault?

Open PEN occurs when the combined Protective Earth Neutral (PEN) conductor in a low voltage TN-C distribution network goes 'open circuit'. During an open PEN fault, a dangerous potential can develop between any metalwork connected to the protective conductor of the electrical system, in this case it's the metallic body of the car, and 'true earth'.

What causes an open PEN fault?

Open PEN faults may be caused by numerous factors. Most commonly through damage to cabling from heavy equipment or machinery, or environmental factors and conditions leading to corrosion.

What are the risks of an open PEN fault?

Any metalwork connected to the protective conductor of the electrical system may present a risk of electric shock leading to serious injury. While EV chargepoints are the focus of IET 01, this risk is not limited to EV charging equipment.

Who is responsible when an open PEN fault occurs?

Where an open PEN fault is detected the relevant Distribution Network Operator (DNO) / Distribution System Operator (DSO) is to be contacted immediately. This will ensure the fault is reported, assessed and addressed.

EV equipment which has been specified in accordance with IET 01 provides methods of protection and operation where an open PEN fault occurs, however, the risk of a dangerous potential developing continues to exist between any metalwork connected to the protective conductor of the electrical system and 'true earth'.

What do current Regulations say?

BS 7671 IET Wiring Regulations (BS 7671:2018+A2:2022+A3:2024) states within clause 722.411.4.1 (iv) that protection against electric shock is provided by a device which electrically disconnects the vehicle from the live conductors of the supply and from protective earth in accordance with Regulation 543.3.3.101(ii) within 5 s in the event of the utilisation voltage at the charging point, between the line and neutral conductors, being greater than 253 V rms or less than 207 V rms.

Different manufacturers of existing EV charging equipment use different methods to achieve this. It is not always clear to the installer what method is used or if the chargepoint is suitable for a particular location.

How common are open PEN faults?

Further research is needed to assess both the frequency and implications of broken PEN conductor faults. Research by the IET, ECA, Electrical Safety First, NAPIT, NICEIC and SELECT into the nature and extent of Neutral Current Diversion (NCD) across the UK network is being undertaken and reports of incidences are encouraged to help build better understanding.

NCD reports can be made using the following QR code:



Why has the IET developed IET 01 for EV in particular?

An open PEN fault presents a danger to all connected metalwork, but a particular risk arises where an electric vehicle (EV) chargepoint is present. IET 01 has been developed, working alongside stakeholders across industry, in response to incidences involving open PEN faults and EVs, and calls from our members and colleagues that something needed to be done to address the issue with a standard approach.

Is IET 01 a designated standard?

IET 01 is not a designated standard. The IET make no claim that IET 01 is a designated standard or that IET 01 can be used as a 'presumption of conformity'.

Designated standards can help manufacturers demonstrate their products, services or processes comply with GB law. By following designated standards, manufacturers can claim, 'presumption of conformity' (which can be countered by evidence) with the corresponding essential requirements. For more information on designated standards visit

<https://www.gov.uk/guidance/designated-standards>

Why should IET 01 be used if it is not a designated standard?

No consolidated standard approach or specification for how EV equipment should operate in case of an open PEN fault has existed until now. IET 01 has been developed by consensus of a technical committee of industry stakeholders facilitated by the IET with the requirements of the relevant designated standards in mind, and for the improvement, advancement and promotion of electrical safety.

It is the IET's ambition that IET 01 be adopted by manufacturers, designers and installers, and considered for recognition by the relevant standardisation bodies.

IET 01 is not intended as a static document and will be revised, expanded and updated as needed with input and consensus from technical committees, external stakeholders and public consultation as appropriate. The IET welcome feedback and comment.

How can I provide feedback or otherwise contribute to the development of IET documents?

Contact the IET Technical Regulations and Codes and Guidance teams by email: ietstandardssales@theiet.org.