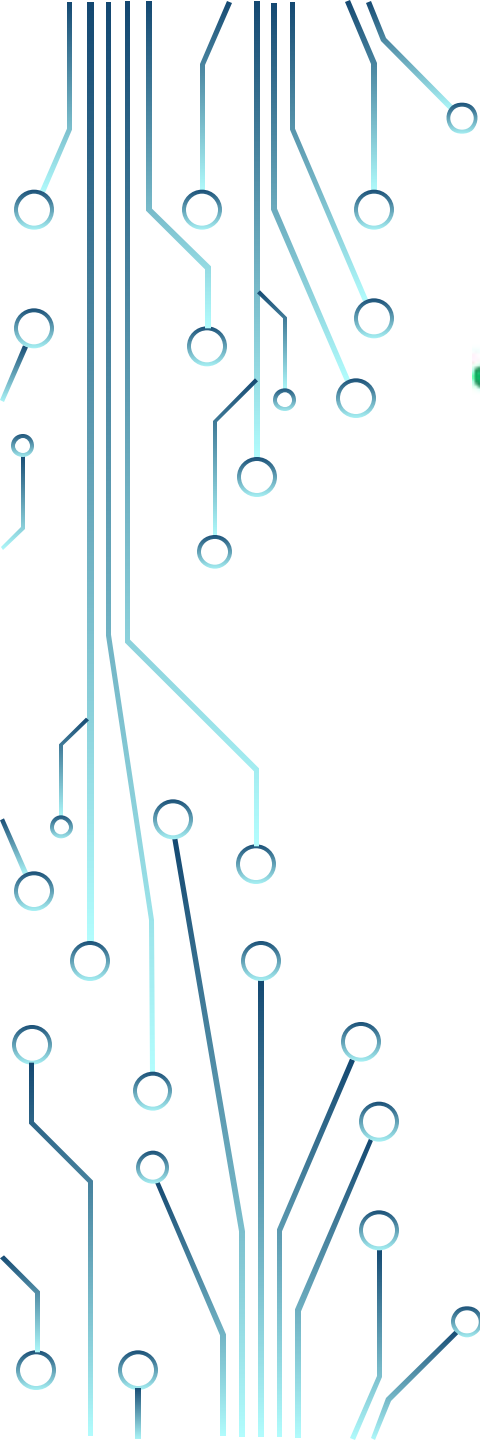
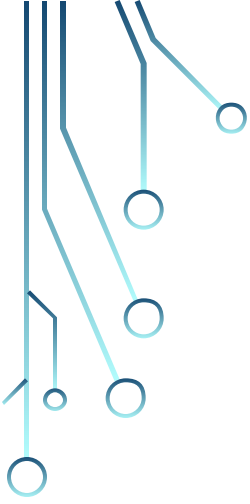




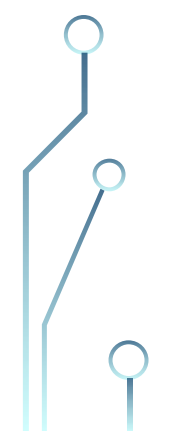
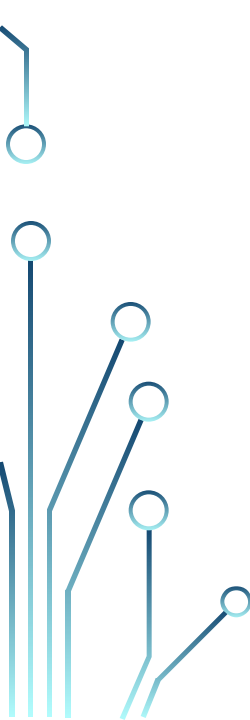
O-PEN®





Why do I need PEN fault protection from matt:e ?

TN-C-S is the most common form of earthing provided at new installations which utilises a single conductor for the neutral and earthing functions (PEN) with an earth terminal derived from the neutral cable.

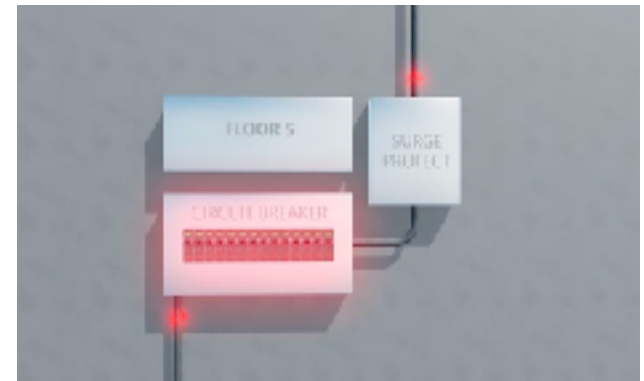
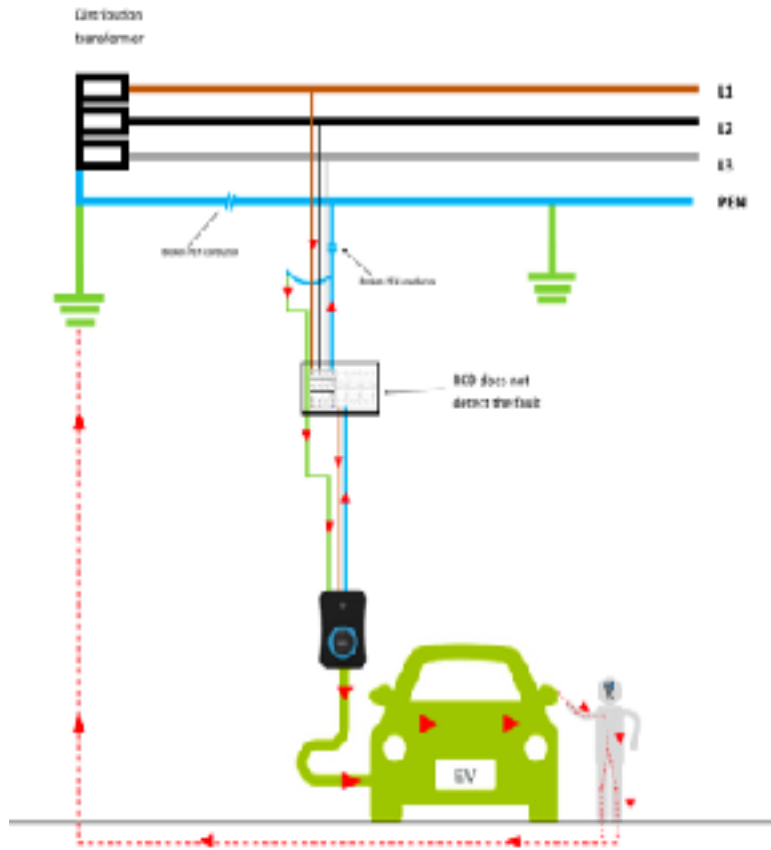


PEN conductors are susceptible to damage, corrosion and general wear and tear across our ageing PME network.

Given the huge projected load growth on the network, for heat pumps, solar PV, battery storage and EV charge point installations, incidents are expected to continue to rise.



MCBS AND RCDS DO NOT DETECT THE FAULT



BS 7671 states that a PME earthing facility shall not be used as means of earthing for an EV charging point located outdoors unless an additional protective measure is used. The current options are earth electrodes, isolation transformers or compliant PEN fault protection devices.



ISOLATION TRANSFORMER

$$\text{£} + \text{BIG} + \text{[Person Struggling with Box]} = \text{X}$$



4kW
30kG
Over £400.00

EARTH ELECTRODES



- Risk of striking buried services.
- Difficult to achieve the correct separation distances needed between different earthing systems above and below ground.
- Additional cost for ground works and removal of the waste.
- Uncertainty of how many rods would need to be installed to get a suitably low resistance.

ENA EREC G12 Issue 5 (2023) including Amendment A1 (2025).

Clause 6.2.16.2 (Additional form of protection to PME) states:

“For these reasons, the value of impedance to earth of a supplementary electrode used as the sole means of additional protection for an EVCP is required to be less than as described in Clause 6.2.15 to the extent that obtaining the required value is considered impractical. Therefore, the use of a supplementary electrode is not recommended for EVCPs.”

PEN fault protection (Unicorn devices)

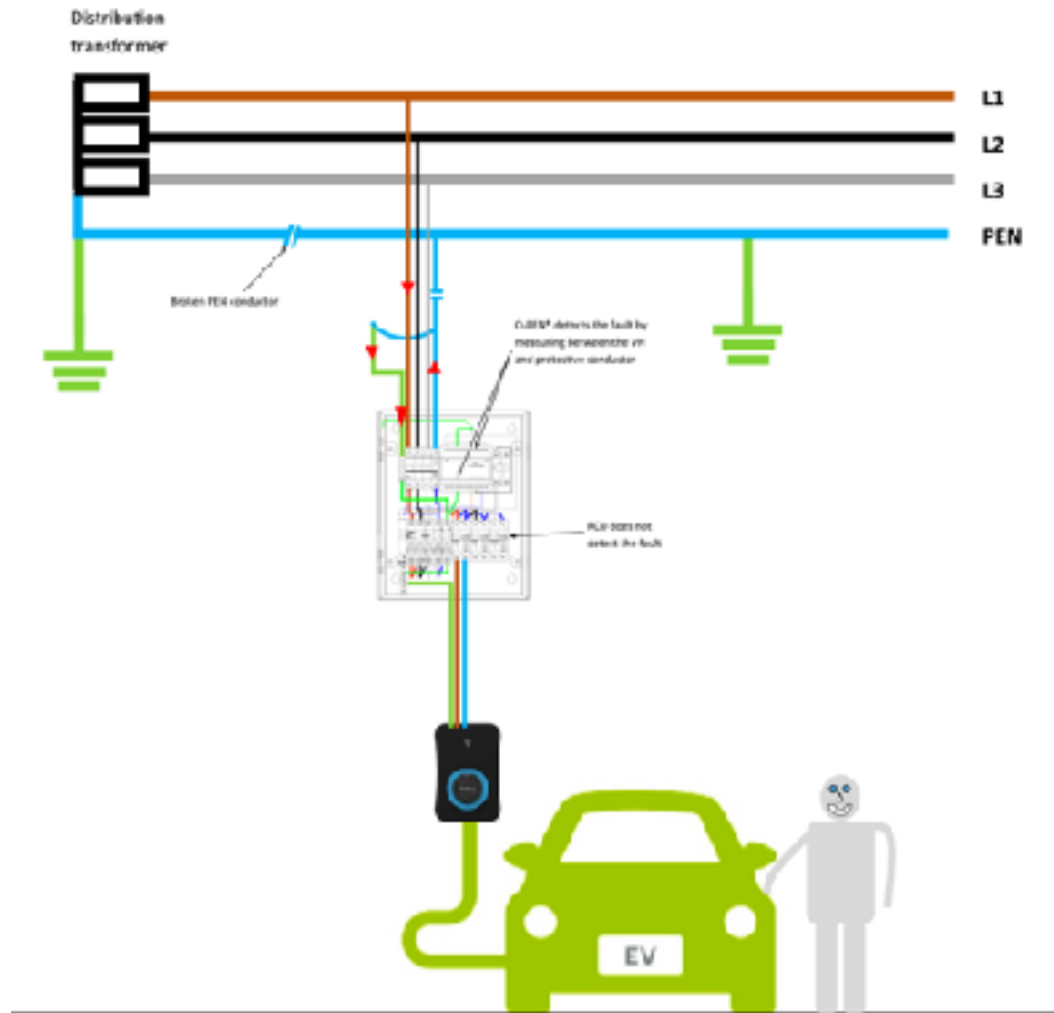


The IET Standard Code of Practice for Electrical Vehicle Charging Equipment Installation (3rd Edition), published August 2018 states:

5.3.5 Installing equipment that detects open-circuit faults

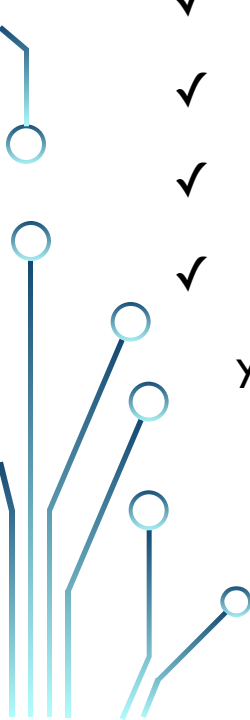
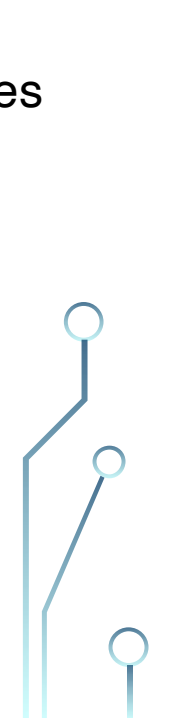
Installing equipment that detects open-circuit faults in the neutral (PEN conductor) and disconnects the supply, including the protective conductor, in the event of such faults, would address the problems associated with an open-circuit fault in the neutral (PEN conductor). However, although such devices are currently under development, at the time of writing of this Code of Practice, none are commercially available.

PEN fault protection helps facilitate compliance with Regulation 722.411.4.1 (iii) (iv)





KEY BENEFITS OF USING PEN FAULT PROTECTION FOR EV CHARGE POINT INSTALLATION

- ✓ Standardises installation
 - ✓ No more scanning for buried services
 - ✓ Minimises civil works
 - ✓ Prevents danger posed by driving Earth electrodes into the ground
 - ✓ Allows charge points to be mounted directly onto metal clad structures
 - ✓ Safer earth connection as connected directly onto PME supply
 - ✓ Guarantees that the earth resistance values are met and maintained all year round
- 
- 

Whats needed for on street charging?

In accordance with ENA Engineering Recommendation G12 Issue 5 Amendment 1 (Draft for Public Consultation, 2025), Clause 6.2.16.2, for connection applications received on or after 1 January 2027, DNOs shall only provide a PME earth terminal where the installation includes an Open PEN Detection Device (OPDD) compliant with EREC G12.

As a minimum requirement:

- The OPDD shall be designed to comply with IET Code of Practice (IET01).
- Method of operation M1a shall not be used.
- The design shall be verified by type testing and certification at an independent test centre.
- Where the OPDD is installed within a street electrical fixture, it shall protect both the street electrical fixture and the EV charge point installation (EVCP).

Approved manufacturer accepted for use on UKPN Network

Manufacturer	Model	Type	Intended Use
matt-e Ltd	O-PEN Monitor with MTE/A 5P contactor	3 [M2b]	Three-phase broken neutral detection unit - provides compliance with BS 7671:2018 + AMD2: 2022, Regulation 722.411.4.1 (iii)
matt-e Ltd	O-PEN Monitor with MTE/A 3P contactor	1 [M1a]	Single-phase broken neutral detection unit - provides compliance with BS 7671: 2018 + AMD2: 2022, regulation 722.411.4.1 (iv)

Approved Manufacturer



Why choose matt:e ?



matt:e

Caring about your World



- We specialise in PEN fault protection technology.
- UK Designed and Manufactured and use UK based suppliers where possible
- Our products are designed and built to meet the specific needs for EV charge point installations and help simplify compliance with BS 7671: 2018 Amendment 2: 2022, BS EN 61851-1, IET 01:2024 and ENA Engineering Recommendation G12.
- Our technology is designed to help electricians, designers, and consultants design and install safe and compliant EV charge point installations.



Single-Phase Protection Units

These units monitor the L-N voltage at the supply and help facilitate compliance with Regulation 722.411.4.1.(iv) and IET:01 M1a.

These devices have set points of 207V ~ 262.2V

Available in mild steel IP41 or ABS IP65 enclosures for loads up to 63A.

Additional protection includes:

- Isolation only

- MCB

- Type A RCBO

- Type B RCCB

- Type 1 or Type 1+2 SPD



SP-M1b3t-B-SPD

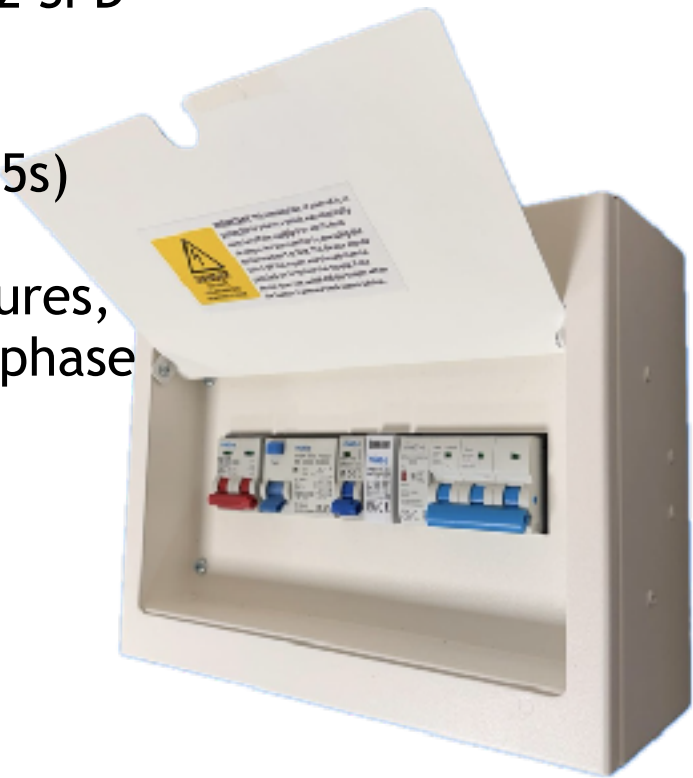
Single-Phase Protection Units for V2X installations.

These units are essential for compliant V2X installations and come complete with a bi-directional Type B RCCB and Type 2 SPD

IET 01 M1b3t

Set points 184V ~ 262.2V (273.7 0.5s)

Available in mild steel IP41 enclosures, these units are suitable for single-phase Loads up to 7.40kW.





MTE/A M1b3t

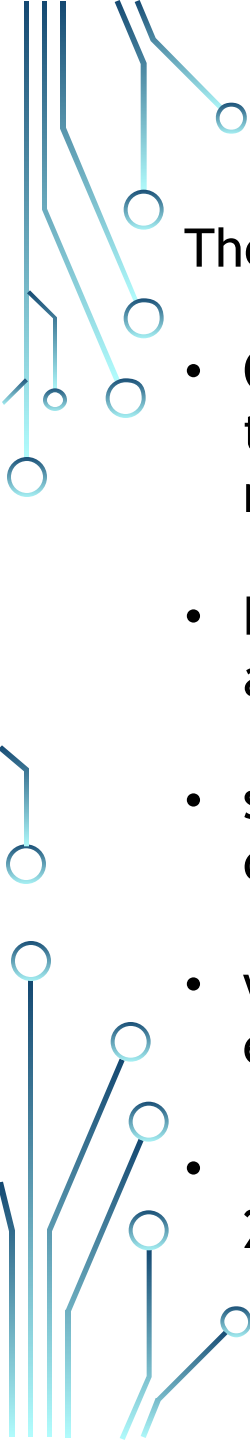
PEN fault protection built in to MCBs.

Available in 3 and 5-pole options, provide a space-saving, cost effective solution

Typically used in lamp posts or to protect single EV charge points. IET:01 standard M1b3t

Set points 184V ~ 262.2V (273.7V, 0.5s)

21mA on the protective conductor



O-PEN®

The safest solution for installing when 3 phases are available.

- O-PEN® technology creates a zero-point reference from the three-phase supply which is used to detect broken neutral conductors within PME systems.
 - Enhanced safety through measured voltages instead of assuming faults based solely on L-N voltage measurements.
 - significantly reducing the likelihood of nuisance tripping during normal operation.
 - with O-PEN®, there's no need for reference ground electrodes.
 - Facilitates compliance with BS 7671: 2018 Amendment 2, 2022 Regulation 722.411.4.1.(iii) and IET:01 M2b
- 

ARD Three-Phase Protection Units

Complete with built in O-PEN® technology these units are available in various configurations designed to protect multiple single or three-phase loads.

Additional protection options include:

- MCBs
- Type A RCBOs
- Type B RCCBs
- Type 1 or Type 1+2 SPDs

Helping to facilitate compliance with

- 722.411.4.1 (iii)
- IET 01 M2b





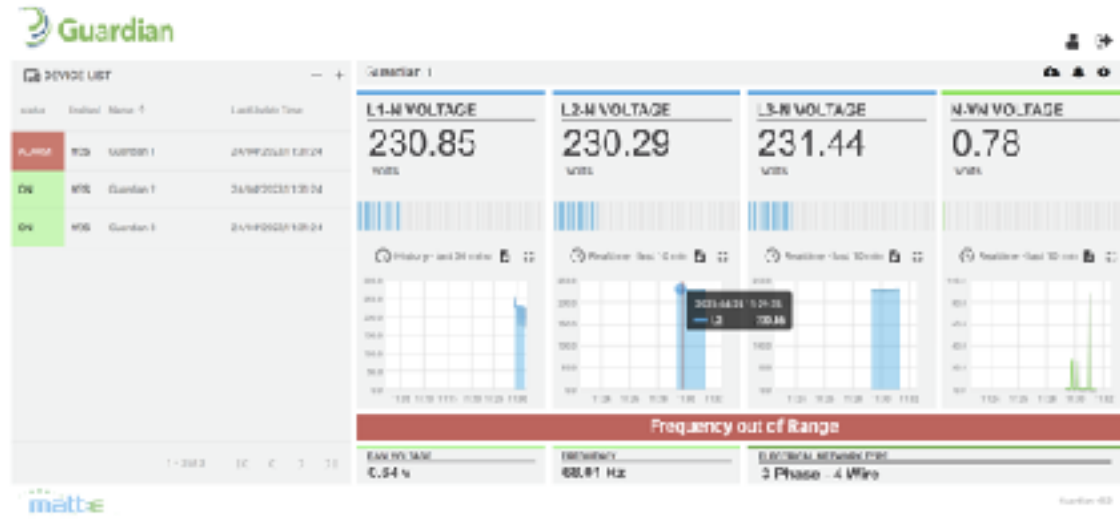
The Guardian is the latest development of the O-PEN® device and incorporates two star points, one used to detect the loss of the supply neutral and the other to detect stray voltages on services that shouldn't normally be live.

Detected faults include;

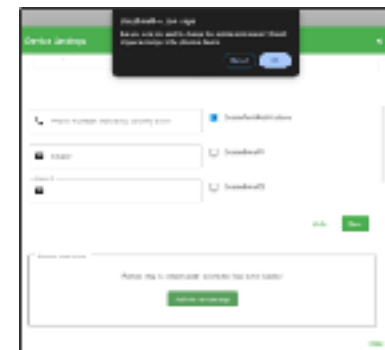
- Loss of neutral
- Stray voltage
- High and low line voltage
- High and low frequency
- Phase imbalance



Cloud Connectivity



- Early Warning Alerts
- Automatic Isolation
- Remote Isolation of connected loads



Guardian Protection





Proven in the Field: Guardian Delivers Results for Zest



"Set it up in minutes... within half an hour started to get alerts. Easily downloaded the data... provided evidence to the DNO. Great bit of kit, we will certainly be using more in the future."

Andy Butler, Technical Director | Zest

Why Professionals Choose Guardian:

- Quick and simple installation
- Remote monitoring via secure portal
- Accurate PEN fault detection with data logging
- Evidence-ready for DNO reporting
- Trusted by leading EV specialists



Guardian: Protecting EV Installations, Delivering Evidence, Building Trust.
www.matt-e.co.uk | info@matt-e.co.uk



Simplifying EV connection