

CEP – Central earthing point

Monitoring for EMC-compliant operation



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In electrical installations using a TN-S system, the central earthing point (CEP) is the only connection between the earthing system and the equipotential bonding system.

Due to modern electronic loads (electrical equipment) such as switched-mode power supplies with filter assemblies or frequency converters, the requirements for electromagnetic compatibility (EMC) are becoming increasingly stringent.

A crucial prerequisite for this is that each electrical system has only one central earthing point in order to prevent stray currents in the protective conductor system or equipotential bonding system. This applies in particular to electrical systems with multiple feeds.

Multiple earthing points, known as PEN bridges, can lead to stray currents, some of which can flow through the equipotential bonding (EB). This may lead to corrosion on metal pipes (water or gas).

Regardless of whether alternating or direct currents are involved, the resistance of the protective conductor RPE to the CEP should always be lower than the equipotential bonding RPA of the building, which is a prerequisite for fault protection and optimum electromagnetic compatibility.

Normative reference

IEC 60634-4-44 Low-voltage electrical installations – Part 4-444:

Protection against voltage disturbances and electromagnetic disturbances.

As part of initial inspections in accordance with VDE 0100-600 and, in particular, during periodic verification in accordance with DGUV V3* or SK3602**, measurements taken at the CEP can be used to assess the EMC status of the electrical system with regard to existing multiple PEN bridges. High currents with a frequency of 50 Hz could be an indication of this.

To continuously monitor the condition of the electrical system, online monitoring consisting of a current transformer, an evaluator and, if necessary, condition-monitoring is recommended.

This type of CEP monitoring system enables the operator to detect unfavourable conditions at an early stage by providing 24/7 monitoring, and serves as the starting point for comprehensive monitoring of stray currents, leakage currents and fault currents.

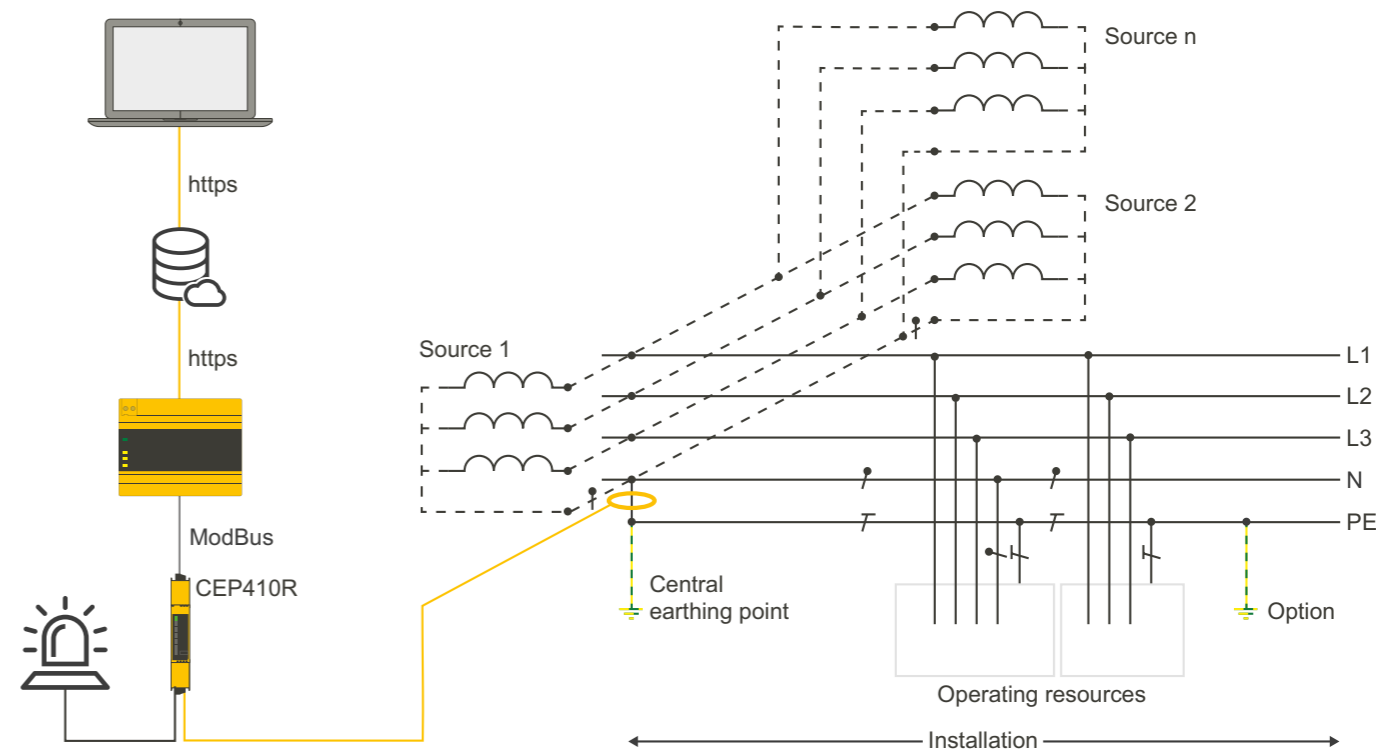
*) DGUV V3 – German Social Accident Insurance Regulation 3 'Electrical Installations and Equipment'

**) SK3602 – Fire protection clause in property insurance policies for companies, which stipulates an annual inspection of electrical systems by a recognised expert in accordance with VdS guidelines

CEP 24/7 monitoring

New installation and retrofit

Existing installations in particular often require EMC optimisation. Whether it is a conversion or an extension – continuous CEP monitoring could form the basis for safe and optimised operation of the electrical system. Split-core current transformers (CT) with high measuring accuracy can be easily integrated into an existing installation at the CEP.



Schematic representation in accordance with DIN VDE 100-444 or IEC 60364-4-44

Sensor test in independent testing lab

Bender current transformers (CTs) have been tested in an independent testing lab under short-circuit-like conditions up to **50 kA**.

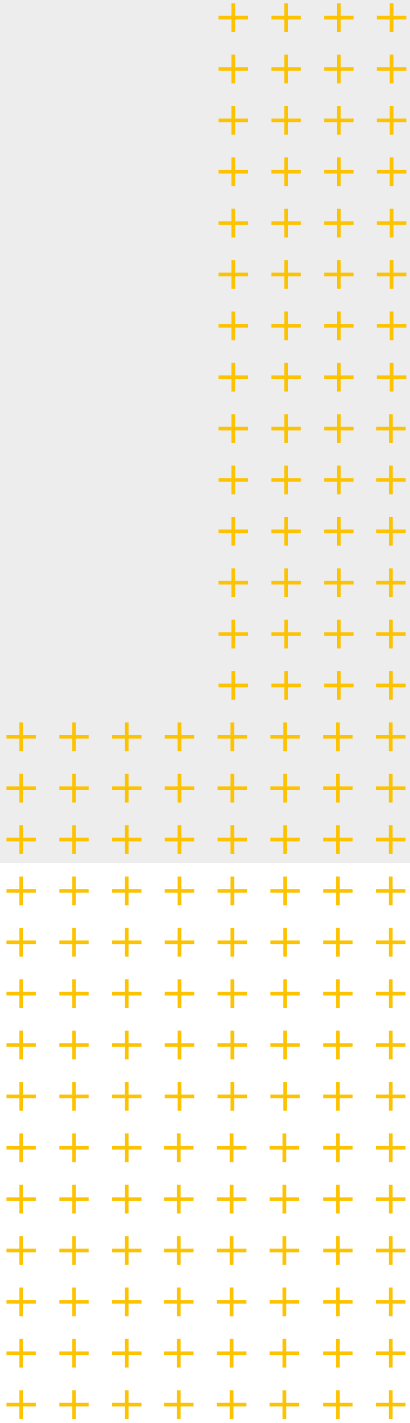
The functionality of CEP monitoring is only guaranteed when the CEP410R-2 is used in combination with the corresponding current transformer (CT) from Bender.

The testing lab is accredited by DAkkS – Deutsche Akkreditierungsstelle GmbH in accordance with DIN EN ISO/IEC 17025 and qualified as a third-party test facility for testing products as part of UL's Third-Party Test Data Programme.

Further certifications of the testing lab:

- DEKRA Certificate of approval for Customer's Test Facility
- VDE Certificate of acceptance for the Test Data Acceptance Program (TDAP)





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