DEKRA

Test Report

2270390.01

Applicant	:	Zaptec Charger AS Professor Olav Hanssens Vei 7a 4021 STAVANGER, NORWAY
Order number	:	227039000
Product	:	Electrical vehicle charging station
Trademark	:	Zaptec Go O-PEN
Type(s)	:	Laadpunt

Arnhem, 24 November 2022

Manufacturer/ Production site: Zaptec Charger AS.
Professor Olav Hanssens Vei 7a 4021 STAVANGER, NORWAY

Subject	:	PEN loss detection and disconnection
Test requirements	:	BS 7671:2018+A1:2020 (clause iv of section 722.411.4.1)
Conclusion	:	The product complies with the specified requirements
Tested by	:	S. Sahin
Checked by	:	L.S.M. Mooi

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1 Subject

TN-C-S (PME) earthing systems are widely used on low voltage distribution systems in the UK and around the world. Although this arrangement has proved generally very reliable there are circumstances where a fault on the combined Protective Earth and Neutral (PEN) conductor could lead to a potentially dangerous voltage arising on the installation earth conductor and any conductive surfaces that are connected to the (protective) earth.

This report investigates the conditions under which a potentially dangerous voltage could arise when the PEN conductor is damaged or broken. In case of PEN interruption EVSE shall detect it to preventing electric shocks which eliminates the requirement for additional earth electrodes whilst improving the overall safety of the charge point installation.

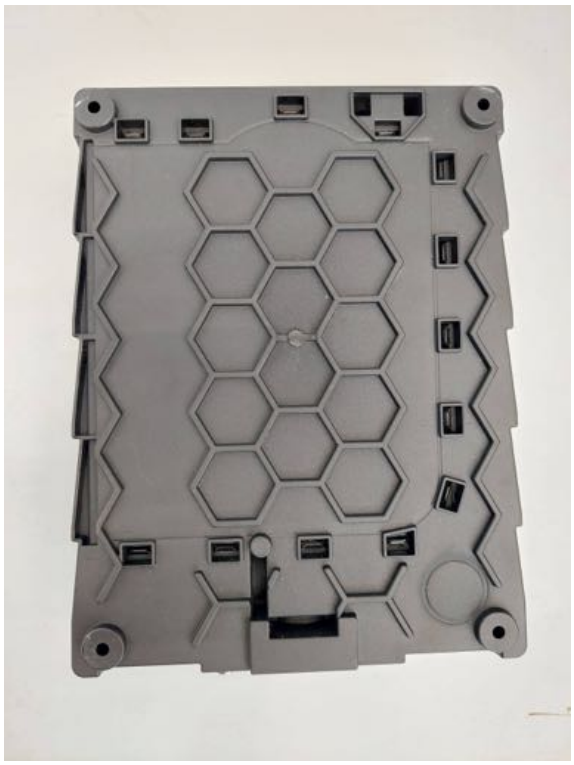
Section 722.411.4.1 of BS 7671 (The IET Wiring Regulations) offers several methods . Accordingly, iv of section 722.411.4.1 was assessed in this report based on request of Zaptec Charger AS

Product information

Trademark	:	Zaptec Go O-PEN
Type(s)	:	Laadpunt
Dimensions	:	180 x 242 x 75 mm
Equipment	:	Electrical Vehicle Charging Station
Number of samples tested	:	1
Type of mounting means	:	Wall-mounted
Assembly for use in locations with	:	Restricted access

2 Object identification

Picture 1: Front view



Picture 2: Rear view

Picture 3: Side view

Picture 4: Side view

Picture 5: Bottom view

Picture 6: Top view

Picture 7: Internal view

3 General Items

Location of the tests

All tests were carried out at the DEKRA Certification laboratory in Arnhem, The Netherlands.

Tests were carried out by

S. Sahin	DEKRA Certification B.V., Arnhem, The Netherlands.

The tests were supervised by

L.S.M. Mooi	DEKRA Certification B.V., Arnhem, The Netherlands

General note on tests

The conclusion and results stated in this report are based on a non-recurrent examination of the sample provided by the applicant.

4 Description of the tests

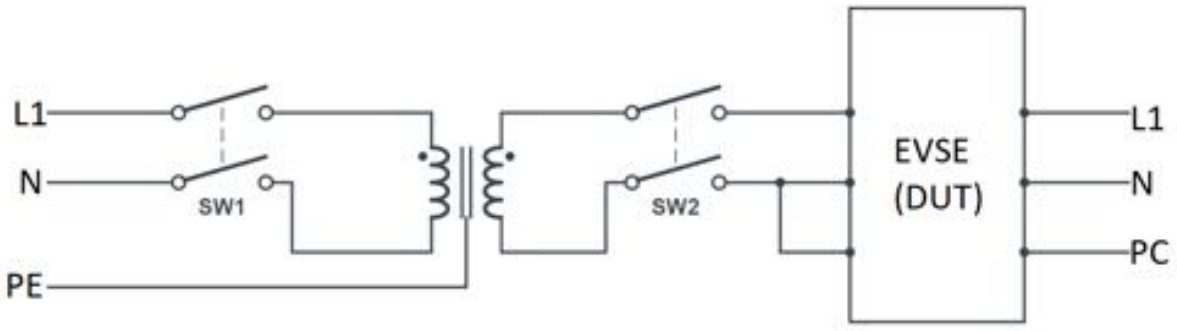
4.1 TN system

(iv)
Protection against electric shock in a single-phase installation 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 utilization voltage at the charging point, between the line and neutral conductors, being greater than 253 V rms or less than 207 V rms. The device shall provide isolation and be selected in accordance with Table 537.4. Equivalent means of functionality could be included within the charging equipment. Closing or resetting of the device shall be possible only if the voltage between line and neutral conductors is in the range 207 to 253 V rms.

Relay used in EVSE comply with the table 537.4. See the details of relay below table.

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark of conformity
Relay	Song Chuan Precision Co., Ltd.	118-2AH-F-C E05	50 A, 277 VAC, double pole normally open (DPNO) Contact gap: 1.80mm Ambient temperature: -40 to + 85°C Switching cycles:50K	UL 60947-1 UL 60947-4-1 IEC 61810-1:2015 EN 61810-1:2015	E88991 (UL) R50436737 (TUV R)

The test circuit is set-up as following figure;



L1: Line conductor
N: Neutral conductor
PE: Protective earthing conductor
PC: Protective conductor

Variable isolation transformer is used to determine if the working voltage range corresponds to the requirement of clause 722.411.4.1(iv).

EVSE is supplied at 230V, the input voltage is then decreased down to 207 V gradually to determine the lowest working voltage and similarly, it is increased up to 253V gradually to determine highest working voltage.

Results:

EV supply equipment terminate the output and provide the insulation by relay in 4 s when the input voltage is lower than 207V and higher than 253V. It was verified that EV supply equipment complies with the specified voltage range in clause 722.411.4.1(iv).