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Edition 1.0 2018-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
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In-cable control and protection device for mode 2 charging of electric road vehicles (IC-CPD)

Appareil de contrôle et de protection intégré au câble pour la charge en mode 2 des véhicules électriques (IC-CPD)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

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FOREWORD

This amendment has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories.

The text of this amendment is based on the following documents:

FDIS	Report on voting
23E/1055/FDIS	23E/1072/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

CONTENTS

Add the following new headings:

4.6 Classification according to the usage

4.6.1 IC-CPD for portable use

4.6.2 IC-CPD for wall mounting

4.6.3 IC-CPD for portable use and for wall mounting

9.10.5 Verification requirements for IC-CPD according to 4.6.2 and 4.6.3

FOREWORD

Delete the existing Note.

INTRODUCTION

Delete the last paragraph.

1 Scope

Replace the first bullet point of the third paragraph by the following:

- has a control pilot function controller in accordance with IEC 61851-1:2017, Annex A;

Add, after the last paragraph, the following new paragraph:

The IC-CPD is not considered to be a protective device for use in fixed installations.

2 Normative references

Replace the reference to IEC 61851-1:2010 by the following:

IEC 61851-1:2017, *Electric vehicle conductive charging system – Part 1: General requirements*

Add the following new references:

IEC TS 61439-7:2014, *Low-voltage switchgear and controlgear assemblies – Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicles charging stations*

IEC 62196 (all parts), *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles*

CISPR 14-1, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

Delete reference to IEC TS 62763:2013.

3 Terms and definitions

3.3.3.9
control circuit

Replace definition by the following:

circuit (other than a path of the main circuit) intended for the closing operation or the opening operation, or both, of an IC-CPD

3.3.7.2
system state

Replace definition by the following:

state that indicates different states during the charging process according to IEC 61851-1:2017, Annex A

EXAMPLE Connected, ready to charge, charging.

4 Classification

4.2.4 Modular IC-CDP

Replace Note 2 with the following new note:

NOTE 2 In the following countries, the control pilot circuit function controller is not permitted within the body of the vehicle connector: US.

4.5.2 IC-CPD with verification of the availability of the upstream protective conductor

Replace the second paragraph by the following:

An IC-CPD classified according to 4.5.2 can have a function to deactivate the verification check of the availability of the upstream protective conductor. After plugging into a socket outlet, it shall be indicated for at least 30 s by a visual or audible signal that the detection function is deactivated.

Add the following new subclause 4.6:

4.6 Classification according to the usage

4.6.1 IC-CPD for portable use

IC-CPD that can be used as mobile device.

4.6.2 IC-CPD for wall mounting

IC-CPD designed to be used only when hung in the intended operating position. Such devices can be easily removed from their hanging location.

NOTE 1 This classification includes all positions in a height giving the same degree of protection as wall mounting, for example mounted on ceiling, pillars, etc.

NOTE 2 In the following countries, the use of IC-CPDs according to 4.6.2 is not allowed: CH.

4.6.3 IC-CPD for portable use and for wall mounting

IC-CPD that can be used both as a mobile device and when hung in the intended operating position. Such devices can be easily removed from their hanging location.

5 Characteristics of IC-CPDs

5.1 Summary of characteristics

Replace, at the end of the subclause, the last bullet point by the following:

- switches on or off in response to the system states according to IEC 61851-1:2017, Annex A.

5.3.2 Preferred values of rated current (I_n)

Add the following new note at the end of the subclause:

NOTE 3 In the following countries, the use of IEC 60309-2 accessories is recommended for mode 2 connections for more than 10 A: IT.

6 Marking and other product information

6.1 Data to be marked on the IC-CPD

Replace item j) by the following:

j) IC-CPD shall be marked with the symbol 

, indicating the lowest ambient temperature, −25 °C or lower, within the symbol. If a lower value than –25 °C is declared by the manufacturer, the declared value shall be a multiple of 5 °C; the symbol shall indicate this value.

Delete item p).

6.2 Information to be provided to the end-user

Replace item h) by the following:

h) a list of instructions about how to connect the IC-CPD to the socket-outlet and to the car, and how to store it properly. This includes the information to the user that it is recommended for the electrical installation intended for EV charging to be checked by an electrical installer;

Add new item i):

i) information about which components of a pluggable IC-CPD are allowed to be used in combination.

7 Standard conditions for operation in service and for installation

7.1 Standard conditions

Replace, in Table 5, footnote b by the following:

b Values outside this range are admissible where more severe climatic conditions prevail, subject to agreement between manufacturer and user. The declared values shall be a multiple of 5 °C.

8 Requirements for construction and operation

8.2.1 General

Replace first paragraph by the following:

Connections of an IC-CPD shall be designed in a way that only accessories fulfilling the requirements of 8.2 can be connected. Components of a pluggable IC-CPD shall not be intermateable in any way other than declared by the manufacturer. Notably, pluggable connections at the function box shall not comply with standard products, for example IEC 62196 (all parts) or IEC 60309 (all parts).

Add new paragraph after the fourth paragraph:

Vehicle connectors and the connection to their cables shall be non-rewirable or rewirable by the manufacturer. They shall not be pluggable.

8.3.1 General

Add the following two new paragraphs before NOTE 1:

The IC-CPD may be equipped with a control device that detects the temperatures in the plug and/or in the device and limits the charging current when the temperature exceeds the limited values. If equipped with a control device, the manufacturer shall declare the functionality and shall provide respective charging curves.

Compliance is checked by the appropriate tests of Clause 9.

8.3.9 Means for suspension from a wall or other mounting surfaces

Replace the text of the subclause by the following:

An IC-CPD with means for suspension shall fulfil the requirements for protection against electric shock according to 8.5 in the mounted and in the unmounted position.

Compliance is checked by inspection.

8.3.10 Plug as an integral part of plug-in equipment

Replace the first paragraph by the following:

If a plug is an integral part of plug-in equipment, the plug-in equipment shall not cause overheating of the pins.

Replace the second paragraph by the following:

Compliance is checked by the tests of 9.6.

8.3.11.2 Minimum cross section

Replace the NOTE by the following:

NOTE In the following countries, specific cable types for cable assemblies are required by national regulations: JP.

8.4.3 Clearances and creepage distances (see Annex C)

Delete, in Table 7, footnote g for Minimum creepage distances.

8.5.3 Degree of protection of the function box

Replace the fifth paragraph by the following:

In addition to the IP requirement, the function box for IC-CPD according to 4.6.1, 4.6.2 and 4.6.3 shall be submitted to the test procedure according to 14.2.7 of IEC 60529:1989 with the upper part of the function box placed 5 cm under water.

8.15 Behaviour in case of loss of the supply voltage

Replace the fifth and sixth paragraphs by the following:

However, after an operation due to a residual fault followed by a drop of line voltage the charging cycle shall not be reinitiated automatically.

According to IEC 61851-1:2017, Annex A, the IC-CPD shall open automatically in case of a voltage drop and reinitiate the charging cycle in accordance with IEC 61851-1:2017, Annex A, when the line voltage is restored.

8.17 Control pilot function controller

Replace the first paragraph by the following:

The control pilot circuit shall be according to IEC 61851-1:2017, Annex A.

Replace the last paragraph by the following:

Compliance is checked by testing according to IEC 61851-1:2017, Annex A.

9 Tests

9.1.1 Opening and closing of contacts

Replace the first paragraph by the following:

If specific operating cycles are not described for tests requiring the opening or closing of contacts, the control pilot function controller with an appropriate PWM signal shall be used to operate the IC-CPD by simulation of the different vehicle states as described by IEC 61851-1:2017, Annex A. For that purpose a specially assembled dummy may be used.

Replace the last paragraph by the following:

The control pilot function controller including the PWM signal is defined in IEC 61851-1:2017, Annex A.

9.1.3 Test sequences

Add the following new paragraph at the end:

If the manufacturer declares that its IC-CPD is equipped with a function to limit the charging current, it is allowed to do the test with the control pilot function. The charging curve is to be included in the test report.

9.7.3.8 Verification of the correct operation at low ambient air temperatures of –25 °C

Replace the heading by the following:

9.7.3.8 Verification of the correct operation at low ambient air temperatures of –25 °C or lower

Replace the fifth paragraph by the following:

Within 6 h the ambient air temperature is reduced to −25 °C ± 2 °C or to the temperature limit as declared by the manufacturer ± 2 °C without any supply of humidity and is kept at this value for 6 h. Within the next 6 h the temperature is increased to +23 °C ± 2 °C and the relative humidity is increased to 93 % ± 3 %.

Replace the eighth paragraph by the following:

Prior to the end of the last 6-h period at −25 °C or at the temperature limit as declared by the manufacturer a residual current is passed through one pole of the IC-CPD.

9.10.1 General

Replace Table 18 by the following new table:

Table 18 – List of tests of resistance to mechanical shock and impact

Item to be tested	Test subclause
For devices classified under 4.3.2, 4.3.3, 4.3.4	9.10.2 and 9.10.4
For screwed glands of IC-CPDs	9.10.3
For devices classified under 4.6.1	9.10.2, 9.10.3 and 9.10.4
For devices classified under 4.6.2	9.10.5
For devices classified under 4.6.3	9.10.2, 9.10.3, 9.10.4 and 9.10.5

9.10.2 Drop test

Replace the third paragraph by the following:

After completion of the above test the IC-CPD enclosure shall show no visible damage that would mitigate touch protection. The IC-CPD shall be powered up. The self test shall be performed successfully. After the self test the IC-CPD shall satisfy the characteristics of 5.1.

Add new subclause 9.10.5:

9.10.5 Verification requirements for IC-CPD according to 4.6.2 and 4.6.3

The relevant tests from IEC TS 61439-7:2014, 10.2.102.6 and 10.2.102.7 shall be made.

9.14.3 Verification of the reclosing function

Replace the last paragraph by the following:

At that voltage or 85 V, whichever is the highest, it shall be verified that the IC-CPD operates in accordance with Table 2 at $I_{\Delta n}$. The supply voltage is removed and then re-applied after 30 s and the IC-CPD shall not reclose automatically as long as the dedicated means for a manual reset have been used. If the manual reset is done by disconnecting the IC-CPD from the socket outlet, the IC-CPD may reclose again.

9.23 Checking of the torque exerted by IC-CPDs on fixed socket-outlets

Replace the Note by the following two new notes:

NOTE 1 This torque test is relevant for plugs according to IEC 60884-1 or a relevant national standard.

NOTE 2 In the following countries, this test is not required: JP.

9.26 Verification of the electromagnetic compatibility (EMC)

Replace the last paragraph by the following:

For devices containing a continuously operating oscillator, the test of CISPR 14-1 shall be carried out on the samples prior to the tests of IEC 61543.

9.34.1 General

Add the following before the first paragraph:

For IC-CPD classified according to 4.6.2, this test is not applicable if the function box has in all axes a dimension larger than 0,25 m.

9.36 Vibration and shock test

Replace the last item in the list in the fourth paragraph by the following:

- duration: 16 ms.