

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

(standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/3d346016-cf16-41ca-9adb-7ba3b2b06b39/iec-62752-2016>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2016 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms, containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 62752

Edition 1.0 2016-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

(standards.iteh.ai)

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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.50

ISBN 978-2-8322-3182-1

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

CONTENTS

FOREWORD.....	10
INTRODUCTION.....	12
1 Scope.....	13
2 Normative references.....	14
3 Terms and definitions	16
3.1 Terms and definitions relating to plugs and socket-outlets.....	17
3.2 Terms and definitions relating to terminals.....	18
3.3 Terms and definitions relating to residual current functions	19
3.3.1 Terms and definitions relating to currents flowing from live parts to earth.....	19
3.3.2 Terms and definitions relating to the energization of the residual current function	20
3.3.3 Terms and definitions relating to the operation and to the functions of the IC-CPD	20
3.3.4 Terms and definitions relating to values and ranges of energizing quantities.....	22
3.3.5 Terms and definitions relating to values and ranges of influencing quantities.....	24
3.3.6 Conditions of operation.....	24
3.3.7 Terms and definitions relating to control functions between electric vehicle and IC-CPD.....	25
3.4 Terms and definitions relating to tests	25
3.5 Terms and definitions relating to construction	26
4 Classification.....	26
4.1 According to the supply	26
4.1.1 General	26
4.1.2 IC-CPD supplied from one phase and neutral (LNSE or LNE).....	26
4.1.3 IC-CPD supplied from two phases (LLSE or LLE).....	26
4.1.4 IC-CPD supplied from three phases and neutral (LLLNSE or LLLNE)	26
4.2 According to the construction	26
4.2.1 General	26
4.2.2 IC-CPD including the function box separated from the plug and connector.....	26
4.2.3 IC-CPD with the function box integrated together with the plug.....	26
4.2.4 Modular IC-CPD.....	27
4.3 According to the method of connecting the cable(s)	27
4.3.1 General	27
4.3.2 Non-rewirable IC-CPDs	27
4.3.3 IC-CPDs wired by the manufacturer.....	27
4.3.4 Pluggable IC-CPD.....	27
4.4 Classification according to the protective conductor path	27
4.4.1 General	27
4.4.2 IC-CPDs with switched protective conductor	27
4.4.3 IC-CPDs with non-switched protective conductor	28
4.5 Classification according to behaviour in case of open protective conductor.....	28
4.5.1 General	28

4.5.2	IC-CPD with verification of the availability of the upstream protective conductor.....	28
4.5.3	IC-CPD without verification of the availability of the upstream protective conductor.....	28
5	Characteristics of IC-CPDs	28
5.1	Summary of characteristics	28
5.2	Rated quantities and other characteristics	29
5.2.1	Rated voltages.....	29
5.2.2	Rated current (I_n).....	29
5.2.3	Rated residual operating current ($I_{\Delta n}$)	29
5.2.4	Rated residual non-operating current ($I_{\Delta no}$).....	29
5.2.5	Rated frequency.....	29
5.2.6	Rated making and breaking capacity (I_m)	29
5.2.7	Rated residual making and breaking capacity ($I_{\Delta m}$)	30
5.2.8	Operating characteristics in case of residual currents comprising a d.c. component.....	30
5.2.9	Insulation coordination including creepage distances and clearances	30
5.2.10	Coordination with short-circuit protection devices (SCPDs)	30
5.3	Standard and preferred values	30
5.3.1	Preferred values of rated operational voltage (U_e)	30
5.3.2	Preferred values of rated current (I_n)	30
5.3.3	Standard values of rated residual operating current ($I_{\Delta n}$)	31
5.3.4	Standard value of rated residual non-operating current ($I_{\Delta no}$)	31
5.3.5	Standard minimum value of the non-operating overcurrent through the IC-CPD	31
5.3.6	Preferred values of rated frequency.....	31
5.3.7	Minimum value of the rated making and breaking capacity (I_m)	31
5.3.8	Minimum value of the rated residual making and breaking capacity ($I_{\Delta m}$)	31
5.3.9	Standard value of the rated conditional short-circuit current (I_{nc})	32
5.3.10	Standard value of the rated conditional residual short-circuit current ($I_{\Delta c}$)	32
5.3.11	Limit values of break time.....	32
6	Marking and other product information	32
6.1	Data to be marked on the IC-CPD.....	32
6.2	Information to be provided to the end-user.....	34
7	Standard conditions for operation in service and for installation	35
7.1	Standard conditions	35
7.2	Conditions for installations	36
8	Requirements for construction and operation.....	36
8.1	Mechanical design	36
8.2	Pluggable electrical connections of pluggable IC-CPDs according to 4.3.4	37
8.2.1	General	37
8.2.2	Degree of protection of pluggable electrical connection against solid foreign objects and water for pluggable IC-CPD	37
8.2.3	Breaking capacity of pluggable electrical connection for pluggable IC-CPD	38
8.2.4	Additional requirements.....	38
8.3	Construction	38
8.3.1	General	38

8.3.2	Terminations of IC-CPDs.....	39
8.3.3	Enclosure of IC-CPDs according to 4.3.3.....	39
8.3.4	Terminal screws or nuts of IC-CPDs according to 4.3.3.....	39
8.3.5	Strain on the conductors of IC-CPDs according to 4.3.3.....	40
8.3.6	Additional requirements for IC-CPDs according to 4.3.3.....	40
8.3.7	Insulating parts which keep the live parts in position.....	40
8.3.8	Screws for IC-CPD according to 4.3.3.....	40
8.3.9	Means for suspension from a wall or other mounting surfaces.....	40
8.3.10	Plug as an integral part of plug-in equipment.....	40
8.3.11	Flexible cables and cords and their connection.....	41
8.4	Electrical performance.....	42
8.4.1	Protective conductor path.....	42
8.4.2	Contact mechanism.....	42
8.4.3	Clearances and creepage distances (see Annex C).....	43
8.5	Protection against electric shock.....	45
8.5.1	General.....	45
8.5.2	Requirements relating to plugs, whether incorporated or not in integral items.....	46
8.5.3	Degree of protection of the function box.....	46
8.5.4	Requirements relating to vehicle connectors.....	46
8.6	Dielectric properties.....	46
8.7	Temperature rise.....	47
8.8	Operating characteristics.....	47
8.8.1	General.....	47
8.8.2	Safe connection operating characteristics.....	47
8.8.3	Operating characteristics with a.c. residual currents and residual currents having a d.c. component.....	47
8.8.4	Operating characteristics with smooth d.c. residual current.....	48
8.8.5	Behaviour of the IC-CPD after a residual current operation.....	48
8.8.6	Residual pulsating direct currents which may result from rectifying circuits supplied from two phases.....	48
8.8.7	Residual pulsating direct currents which may result from rectifying circuits supplied from three phases.....	48
8.9	Mechanical and electrical endurance.....	48
8.10	Performance at short-circuit currents.....	49
8.11	Resistance to mechanical shock and impact.....	49
8.12	Resistance to heat.....	49
8.13	Resistance to abnormal heat and to fire.....	49
8.14	Performance of the test function.....	49
8.15	Behaviour in case of loss of the supply voltage.....	50
8.16	Resistance of IC-CPDs against unwanted tripping due to surge currents to earth resulting from impulse voltages.....	50
8.17	Control pilot function controller.....	50
8.18	Reliability.....	50
8.19	Resistance to tracking.....	50
8.20	Electromagnetic compatibility (EMC).....	51
8.21	Behaviour of the IC-CPD at low ambient air temperature.....	51
8.22	Operation with supply failure and hazardous live protective conductor conditions.....	51

8.23	Verification of a standing current in the protective conductor in normal service	51
8.24	Behaviour at specific environmental conditions	51
8.25	Resistance to vibration and shock	51
9	Tests	52
9.1	General	52
9.1.1	Opening and closing of contacts	52
9.1.2	Type tests	52
9.1.3	Test sequences	53
9.1.4	Routine tests	54
9.2	Test conditions	54
9.3	Test of indelibility of marking	54
9.4	Verification of protection against electric shock	55
9.5	Test of dielectric properties	55
9.5.1	Resistance to humidity	55
9.5.2	Insulation resistance of the main circuit	56
9.5.3	Dielectric strength of the main circuit	57
9.5.4	Secondary circuit of detection transformers	57
9.5.5	Verification of impulse withstand voltages (across clearances and across solid insulation) and of leakage current across open contacts	57
9.6	Temperature-rise test	60
9.6.1	Test conditions	60
9.6.2	Test procedure	60
9.6.3	Measurement of the temperature rise of different parts	61
9.6.4	Temperature rise of a part	61
9.7	Verification of the operating characteristic	61
9.7.1	General	61
9.7.2	Test circuit	61
9.7.3	Residual sinusoidal alternating currents tests	62
9.7.4	Verification of the correct operation with residual currents having a d.c. component	64
9.7.5	Verification of behaviour in case of composite residual current	65
9.7.6	Verification of the correct operation in case of smooth d.c. residual current	66
9.7.7	Miswiring and supply failure tests	67
9.7.8	Verification of protective conductor contact behaviour	71
9.7.9	Verification that the protective conductor is connected to the electric vehicle	72
9.7.10	Verification of standing current in the protective conductor connection in normal service	72
9.7.11	Verification of the correct operation in case of residual direct currents which may result from rectifying circuits supplied from two phases	72
9.7.12	Verification of the correct operation in case of residual direct currents which may result from rectifying circuits supplied from three phases	73
9.8	Verification of mechanical and electrical endurance	73
9.8.1	Endurance of plug and vehicle connector part	73
9.8.2	Endurance of the residual current function of the IC-CPD	73
9.9	Verification of the behaviour of the IC-CPD under overcurrent conditions	75
9.9.1	List of the overcurrent tests	75
9.9.2	Short-circuit tests	75

9.9.3	Verification of the making and breaking capacity of the plug of the IC-CPD	81
9.10	Verification of resistance to mechanical shock and impact.....	81
9.10.1	General	81
9.10.2	Drop test.....	81
9.10.3	Test for screwed glands of IC-CPDs	82
9.10.4	Mechanical strength test on IC-CPDs provided with cords	82
9.11	Test of resistance to heat	82
9.11.1	General	82
9.11.2	Temperature test in heating cabinet.....	82
9.11.3	Ball pressure test for insulating material necessary to retain in position current-carrying parts.....	83
9.11.4	Ball pressure test for insulating material not necessary to retain in position current-carrying parts	83
9.12	Resistance of insulating material to abnormal heat and to fire	84
9.13	Verification of the self test	84
9.14	Verification of the behaviour of IC-CPDs in case of loss of the supply voltage.....	85
9.14.1	Verification of correct operation at the minimum operating voltage (U_x)	85
9.14.2	Verification of the automatic opening in case of loss of the supply voltage	85
9.14.3	Verification of the reclosing function	86
9.15	Verification of the limiting values of the non-operating current under overcurrent conditions.....	86
9.16	Verification of resistance against unwanted tripping due to surge currents to earth resulting from impulse voltages.....	86
9.17	Verification of reliability	86
9.17.1	Climatic test.....	86
9.17.2	Test at a temperature of 45 °C	88
9.18	Resistance to ageing.....	89
9.19	Resistance to tracking	89
9.20	Test on pins provided with insulating sleeves.....	90
9.21	Test of mechanical strength of non-solid pins of plugs.....	90
9.22	Verification of the effects of strain on the conductors	90
9.23	Checking of the torque exerted by IC-CPDs on fixed socket-outlets	90
9.24	Tests of the cord anchorage	90
9.25	Flexing test of non-rewirable IC-CPDs	91
9.26	Verification of the electromagnetic compatibility (EMC)	92
9.27	Tests replacing verifications of creepage distances and clearances.....	93
9.27.1	General	93
9.27.2	Abnormal conditions.....	93
9.27.3	Temperature rise resulting from fault conditions.....	93
9.28	Verifications for single electronic components used in IC-CPDs	94
9.28.1	General	94
9.28.2	Capacitors	94
9.28.3	Resistors and inductors.....	94
9.29	Chemical loads	96
9.30	Heat test under solar radiation.....	96
9.31	Resistance to ultra-violet (UV) radiation.....	96
9.32	Damp and salt mist test for marine and coastal environments.....	97
9.32.1	Test for internal metallic parts	97

9.32.2	Test for external metallic parts only	97
9.32.3	Test criteria	97
9.33	Hot damp test for tropical environments	97
9.34	Vehicle drive-over	97
9.34.1	General	97
9.34.2	Test at crushing force 5 000 N.....	98
9.34.3	Test at crushing force 11 000 N.....	98
9.34.4	Performance after the tests	98
9.35	Low storage temperature test	98
9.36	Vibration and shock test	99
Annex A (normative) Test sequences and number of samples to be submitted for verification of conformity to this standard.....		140
A.1	Verification of conformity	140
A.2	Test sequences.....	140
A.3	Number of samples to be submitted for full test procedure	142
A.4	Number of samples to be submitted for simplified test procedures in case of submitting simultaneously a range of IC-CPDs of the same fundamental design.....	144
Annex B (normative) Routine tests		146
Annex C (normative) Determination of clearances and creepage distances		147
C.1	Overview.....	147
C.2	Orientation and location of a creepage distance	147
C.3	Creepage distances where more than one material is used	147
C.4	Creepage distances split by a floating conductive part	147
C.5	Measurement of creepage distances and clearances.....	147
Annex D (informative) Switched-protective conductor application		152
D.1	Explanation of switched-protective conductor (SPE) function and application.....	152
D.2	Examples of incorrect supply wiring	153
Annex E (informative) Example of IC-CPD for mode 2 charging		156
Annex F (informative) Types of IC-CPD according to construction and assembly		157
Annex G (informative) Methods for determination of short-circuit power factor		158
G.1	Overview.....	158
G.2	Method I – Determination from d.c. components.....	158
G.3	Method II – Determination with pilot generator	158
Bibliography		160
Figure 1 – Desired characteristics for maintaining the same level of protection over the frequency range.....		61
Figure 2 – Test circuit for the verification of operating characteristic (9.7.3), endurance test (9.8.2) and reduced supply voltage (9.14.1)		101
Figure 3 – Test circuit for the verification when plugged in incompatible supply systems (9.7.7.4)		104
Figure 4 – Verification of correct operation for hazardous live PE (see Table 14 and Table 15).....		107
Figure 5 – Verification of temperature rise of the protective conductor.....		108
Figure 6 – Verification of open neutral for LNSE types, and open line for LLSE types		109
Figure 7 – Verification of a standing current in the protective conductor in normal service		110

Figure 8 – Test circuit for the verification of the making and breaking capacity and the short-circuit coordination with an SCPD (see 9.9.2)	114
Figure 9 – Standard test wire 1,0 mm	114
Figure 10 – Test circuit for the verification of the correct operation in the case of residual pulsating direct currents (see 9.7.4)	116
Figure 11 – Test circuit for the verification of the correct operation in the case of residual pulsating direct currents superimposed by a smooth direct current (see 9.7.4.3).....	118
Figure 12 – Verification of open protective conductor (see 9.7.7.5)	120
Figure 13 – Arrangement for compression test for verification of protection against electric shock	121
Figure 14 – Ball-pressure test apparatus	121
Figure 15 – Test circuit for IC-CPD according to 4.1.3 to verify the correct operation in case of residual pulsating direct currents which may result from rectifying circuits supplied from two phases.....	122
Figure 16 – Tests circuit for IC-CPD according to 4.1.4 to verify the correct operation in case of residual pulsating direct currents which may result from rectifying circuits supplied from three phases	123
Figure 17 – Apparatus for testing the cord retention.....	124
Figure 18 – Apparatus for flexing test.....	125
Figure 19 – Arrangement for mechanical strength test on IC-CPDs provided with cords (9.10.4)	126
Figure 20 – Stabilizing period for reliability test (9.17.1.4).....	126
Figure 21 – Reliability test cycle (9.17.1.4)	127
Figure 22 – Example for test circuit for verification of ageing of electronic components (9.18)	128
Figure 23 – Current ring wave 0,5 µs/100 kHz	129
Figure 24 – Example of test circuit for the verification of resistance to unwanted tripping	129
Figure 25 – Minimum creepage distances and clearances as a function of peak value of voltage (see 9.27.3 a))	130
Figure 26 – Minimum creepage distances and clearances as a function of peak value of operating voltage (see 9.27.3 a)).....	131
Figure 27 – Test cycle for low temperature test	132
Figure 28 – Test circuit for verification of connection of protective conductor to the EV, according to 9.7.9	133
Figure 29 – Verification of correct operation in case of smooth d.c. leakage current, according to 9.7.6	134
Figure 30 – Example of a test circuit for the verification of correct operation in case of residual sinusoidal alternating currents composed of multi-frequency components	135
Figure 31 – Test circuit for endurance test according to 9.8	136
Figure 32 – The use of the IC-CPD	137
Figure 33 – Informative wave shape of inrush current for tests according to 9.8.2.....	138
Figure 34 – Test finger.....	139
Figure D.1 – Examples of incorrect supply wirings for LLSE types.....	154
Figure D.2 – Examples of incorrect supply wirings for LNSE types	155
Figure E.1 – Example for IC-CPD showing the different parts and functions	156
Figure F.1 – Example of IC-CPD including function box, cables, plug and connector according to 4.2.2	157

Figure F.2 – Example of plug integrated function box according to 4.2.3	157
Figure F.3 – Example of modular IC-CPD according to 4.2.4a).....	157
Figure F.4 – Example of modular IC-CPD according to 4.2.4b).....	157
Table 1 – Preferred values of rated current and corresponding preferred values of rated voltages.....	31
Table 2 – Limit values of break time for a.c. residual currents at rated frequency	32
Table 3 – Limit values of break time for smooth d.c. residual currents	32
Table 4 – Limit values of break time for residual pulsating direct currents which may result from rectifying circuits supplied from two or three phases	32
Table 5 – Standard conditions for operation in service	35
Table 6 – Minimum cross-sectional area of flexible cable or cord	41
Table 7 – Minimum clearances and creepage distances (rated voltage 230 V, 230/400 V).....	44
Table 8 – Temperature-rise values	47
Table 9 – List of type tests	53
Table 10 – Test voltage for verification of impulse withstand voltage.....	59
Table 11 – Tripping current ranges for IC-CPDs in case of pulsating d.c. current.....	64
Table 12 – Different frequency component values of test currents and starting current values (I_{Δ}) for verifying the operating in case of steady increased residual current	66
Table 13 – Operating current ranges for composite residual current	66
Table 14 – Supply failure and hazardous live protective conductor (PE) connections for test with reference to correct supply connections for LNSE / LNE and LLSE / LLE types.....	68
Table 15 – Supply failure and hazardous live protective conductor (PE) connections for test with reference to correct supply connections for LLLNSE / LLLNE types	69
Table 16 – Tests to verify the behaviour of IC-CPDs under overcurrent conditions	75
Table 17 – Minimum values of I^2t and I_p	76
Table 18 – List of tests of resistance to mechanical shock and impact.....	81
Table 19 – Torque applied to the spanner for the test	82
Table 20 – Tests already covered for EMC by this standard	92
Table 21 – Maximum permissible temperatures under abnormal conditions	95
Table 22 – PSD value depending on frequency for vibration testing	99
Table A.1 – Test sequences.....	141
Table A.2 – Number of samples to be submitted for full test procedure.....	143
Table A.3 – Reduction of number of samples.....	145

INTERNATIONAL ELECTROTECHNICAL COMMISSION

IN-CABLE CONTROL AND PROTECTION DEVICE FOR MODE 2 CHARGING OF ELECTRIC ROAD VEHICLES (IC-CPD)

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62752 has been prepared by subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories, in co-operation with ISO TC 22/SC 37 Electrically propelled vehicles.

It is published as a double logo standard.

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

FDIS	Report on voting
23E/919/FDIS	23E/938/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table. In ISO, the standard has been approved by 11 P members out of 12 having cast a vote.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this standard, the following print types are used:

- Requirements proper, in roman type;
- *Test specifications, in italic type;*
- NOTES, in smaller roman type.

The committee has decided that the contents of this 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.

NOTE The attention of National Committees is drawn to the fact that equipment manufacturers and testing organizations may need a transitional period following publication of a new, amended or revised IEC publication in which to make products in accordance with the new requirements and to equip themselves for conducting new or revised tests.

New specific requirements for IC-CPD are provided in comparison to IEC 61851-1:2010, Clause 11, which was applied to IC-CPD before the availability of this standard.

It is the recommendation of the committee that the content of 5.1, 6.1 and 8.8.4, as indicated, of this publication be adopted for implementation nationally at the end of the transitional period, which is 2017-12-31.

The contents of the corrigendum of February 2019 have been included in this copy.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 62752:2016
<https://standards.iteh.ai/catalog/standards/sist/3d346016-cf16-41ca-9adb-7ba3b2b06b39/iec-62752-2016>

INTRODUCTION

The essential purpose of this standard is safe and reliable access of electric vehicles to a supply system. The definition for mode 2 charging of electric vehicle is described in IEC 61851-1.

For all charging modes, protection against electric shock in case of failure of basic protection and/or fault protection is provided, at least by a type A RCD (see IEC 60364-7-722 and IEC 61851-1).

For mode 2 charging including the situation where it cannot be guaranteed that the installation is equipped with RCDs, for example charging the electric vehicle at an unknown installation, a dedicated protection is used for the connected electric vehicle. The intention of this standard is to describe the relevant requirements for an in-cable control and protection device (IC-CPD) to be used for mode 2 charging.

The IC-CPD is not a protection device for use in fixed installations.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[IEC 62752:2016](https://standards.iteh.ai/catalog/standards/sist/3d346016-cf16-41ca-9adb-7ba3b2b06b39/iec-62752-2016)

<https://standards.iteh.ai/catalog/standards/sist/3d346016-cf16-41ca-9adb-7ba3b2b06b39/iec-62752-2016>

IN-CABLE CONTROL AND PROTECTION DEVICE FOR MODE 2 CHARGING OF ELECTRIC ROAD VEHICLES (IC-CPD)

1 Scope

This International Standard applies to in-cable control and protection devices (IC-CPDs) for mode 2 charging of electric road vehicles, hereafter referred to as IC-CPD including control and safety functions.

This standard applies to portable devices performing simultaneously the functions of detection of the residual current, of comparison of the value of this current with the residual operating value and of opening of the protected circuit when the residual current exceeds this value.

The IC-CPD according to this standard

- has a control pilot function controller in accordance with IEC TS 62763;
- checks supply conditions and prevents charging in case of supply faults under specified conditions;
- may have a switched protective conductor.

These IC-CPDs are intended for use in TN-, and TT-systems.

The use of IC-CPDs in IT systems may be limited.

Residual currents with frequencies different from the rated frequency, d.c. residual currents and specific environmental situation are considered.

This standard is applicable to IC-CPDs performing the safety and control functions as required in IEC 61851-1 for mode 2 charging of electric vehicles.

This standard is applicable to IC-CPDs for single-phase circuits not exceeding 250 V or multi-phase circuits not exceeding 480 V, their maximum rated current being 32 A.

NOTE 1 In Denmark, the following additional requirement applies: for IC-CPDs supplied with a plug for household and similar use the maximum charging current is 8 A, if the charging cycle can exceed 2 h.

NOTE 2 In Finland, the following additional requirement applies: for IC-CPDs supplied with a plug for household and similar use the maximum charging current is 8 A for long lasting charging.

This standard is applicable to IC-CPDs to be used in a.c. circuits only, with preferred values of rated frequency 50 Hz, 60 Hz or 50/60 Hz. IC-CPDs according to this standard are not intended to be used to supply electric energy towards the connected grid.

This standard is applicable to IC-CPDs having a rated residual operating current not exceeding 30 mA and are intended to provide additional protection for the circuit downstream of the IC-CPD in situations where it cannot be guaranteed that the installation is equipped with an RCD with $I_{\Delta n} \leq 30$ mA.

The IC-CPD consists of:

- a plug for connection to a socket-outlet in the fixed installation;
- one or more subassemblies containing the control and protection features;
- a cable between the plug and the subassemblies (optional);