

KAABLIGA ÜHITATUD JUHTIMIS- JA KAITSESEADIS  
ELEKTRILISTE MAANTEESÕIDUKITE LAADIMISEKS  
LAADIMISVIISIL 2

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

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN IEC 62752:2024 sisaldab Euroopa standardi EN IEC 62752:2024 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 18.10.2024.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN IEC 62752:2024 consists of the English text of the European standard EN IEC 62752:2024.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 18.10.2024.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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EUROPEAN STANDARD

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**In-cable control and protection device (IC-CPD) for mode 2  
charging of electric road vehicles  
(IEC 62752:2024)**

Dispositif de contrôle et de protection intégré au câble (IC-CPD) pour la charge en mode 2 des véhicules électriques  
(IEC 62752:2024)

Ladeleitungsintegrierte Steuer- und Schutzeinrichtung für die Ladebetriebsart 2 von Elektro-Straßenfahrzeugen (IC-CPD)  
(IEC 62752:2024)

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## European foreword

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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



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

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



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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



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

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

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## 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 .....	16
3.2 Terms and definitions relating to terminals.....	18
3.3 Terms and definitions relating to residual current functions .....	18
3.3.1 Terms and definitions relating to currents flowing from live parts to earth.....	18
3.3.2 Terms and definitions relating to the energization of the residual current function .....	19
3.3.3 Terms and definitions relating to the operation and to the functions of the IC-CPD .....	19
3.3.4 Terms and definitions relating to values and ranges of energizing quantities.....	21
3.3.5 Terms and definitions relating to values and ranges of influencing quantities.....	23
3.3.6 Terms and definitions relating to conditions of operation.....	23
3.3.7 Terms and definitions relating to control functions between electric vehicle and IC-CPD .....	23
3.4 Terms and definitions relating to tests.....	24
3.5 Terms and definitions relating to construction .....	24
4 Classification.....	24
4.1 According to the supply.....	24
4.1.1 General .....	24
4.1.2 IC-CPD supplied from one phase and neutral and from two phases (LNSE/LLSE or LNE/LLE).....	24
4.1.3 IC-CPD supplied from three phases and neutral (LLLNSE or LLLNE).....	25
4.2 According to the construction.....	25
4.2.1 General .....	25
4.2.2 IC-CPD including the function box separated from the plug and vehicle connector .....	25
4.2.3 Modular IC-CPD .....	25
4.3 According to the method of connecting the cable(s) .....	25
4.3.1 General .....	25
4.3.2 Non-rewirable IC-CPDs .....	25
4.3.3 IC-CPDs wired by the manufacturer.....	25
4.3.4 Pluggable IC-CPD .....	25
4.4 Classification according to the protective conductor path .....	26
4.4.1 General .....	26
4.4.2 IC-CPDs with switched protective conductor.....	26
4.4.3 IC-CPDs with non-switched protective conductor .....	26
4.5 Classification according to the verification of availability of the upstream protective conductor .....	26
4.5.1 General .....	26
4.5.2 IC-CPD with verification of the availability of the upstream protective conductor .....	26

4.5.3	IC-CPD without verification of the availability of the upstream protective conductor .....	26
4.6	Classification according to the usage .....	26
4.6.1	IC-CPD for portable use .....	26
4.6.2	IC-CPD for wall mounting .....	26
4.6.3	IC-CPD for portable use and for wall mounting .....	26
5	Characteristics of IC-CPDs .....	27
5.1	Summary of characteristics .....	27
5.2	Rated quantities and other characteristics .....	27
5.2.1	Rated voltages .....	27
5.2.2	Rated current ( $I_n$ ) .....	27
5.2.3	Rated residual operating current ( $I_{\Delta n}$ ) .....	28
5.2.4	Rated residual non-operating current ( $I_{\Delta no}$ ) .....	28
5.2.5	Rated frequency .....	28
5.2.6	Rated making and breaking capacity ( $I_m$ ) .....	28
5.2.7	Rated residual making and breaking capacity ( $I_{\Delta m}$ ) .....	28
5.2.8	Operating characteristics in case of residual currents comprising a DC component .....	28
5.2.9	Insulation coordination including creepage distances and clearances .....	28
5.2.10	Coordination with short-circuit protection devices (SCPDs) .....	28
5.3	Standard and preferred values .....	29
5.3.1	Preferred values of rated operational voltage ( $U_e$ ) .....	29
5.3.2	Preferred values of rated current ( $I_n$ ) .....	29
5.3.3	Standard values of rated residual operating current ( $I_{\Delta n}$ ) .....	29
5.3.4	Standard value of rated residual non-operating current ( $I_{\Delta no}$ ) .....	30
5.3.5	Standard minimum value of the non-operating overcurrent through the IC-CPD .....	30
5.3.6	Preferred values of rated frequency .....	30
5.3.7	Minimum value of the rated making and breaking capacity ( $I_m$ ) .....	30
5.3.8	Minimum value of the rated residual making and breaking capacity ( $I_{\Delta m}$ ) .....	30
5.3.9	Standard value of the rated conditional short-circuit current ( $I_{nc}$ ) .....	30
5.3.10	Standard value of the rated conditional residual short-circuit current ( $I_{\Delta c}$ ) .....	30
5.3.11	Limit values of break time .....	30
6	Marking and other product information .....	31
6.1	Data to be marked on the IC-CPD .....	31
6.2	Information to be provided to the end-user .....	33
7	Standard conditions for operation in service and for installation .....	33
7.1	Standard conditions .....	33
7.2	Conditions for installations .....	34
8	Requirements for construction and operation .....	34
8.1	Mechanical design .....	34
8.2	Pluggable electrical connections of pluggable IC-CPDs according to 4.3.4 .....	35
8.2.1	General .....	35
8.2.2	Degree of protection of pluggable electrical connection against solid foreign objects and against water for pluggable IC-CPD .....	36

8.2.3	Breaking capacity of pluggable electrical connection for pluggable IC-CPD .....	36
8.3	Construction .....	37
8.3.1	General .....	37
8.3.2	Terminations of IC-CPDs .....	38
8.3.3	Enclosure of IC-CPDs according to 4.3.3 .....	38
8.3.4	Terminal screws or nuts of IC-CPDs according to 4.3.3 .....	38
8.3.5	Strain on the conductors of IC-CPDs according to 4.3.3 .....	38
8.3.6	Additional requirements for IC-CPDs according to 4.3.3.....	39
8.3.7	Insulating parts which retain live parts in position .....	39
8.3.8	Screws for IC-CPD according to 4.3.3.....	39
8.3.9	Means for suspension from a wall or other mounting surfaces .....	39
8.3.10	Plug as an integral part of direct plug-in equipment .....	39
8.3.11	Flexible cables and cords and their connection .....	40
8.4	Electrical performance .....	40
8.4.1	Protective conductor path .....	40
8.4.2	Contact mechanism .....	41
8.4.3	Clearances and creepage distances (see Annex C) .....	41
8.5	Protection against electric shock.....	44
8.5.1	General .....	44
8.5.2	Requirements relating to plugs, whether incorporated or not in integral items .....	44
8.5.3	Degree of protection of the function box .....	44
8.5.4	Requirements relating to vehicle connectors.....	45
8.6	Dielectric properties .....	45
8.7	Temperature rise .....	45
8.8	Operating characteristics .....	45
8.8.1	General .....	45
8.8.2	Safe connection operating characteristics.....	46
8.8.3	Operating characteristics with AC residual currents and residual currents having a DC component.....	46
8.8.4	Operating characteristics with smooth DC residual current .....	46
8.8.5	Behaviour of the IC-CPD after a residual current operation.....	46
8.8.6	Residual pulsating direct currents which may result from rectifying circuits supplied from two phases .....	46
8.8.7	Residual pulsating direct currents which may result from rectifying circuits supplied from three phases.....	47
8.9	Mechanical and electrical endurance .....	47
8.10	Performance at short-circuit currents .....	47
8.11	Resistance to mechanical shock and impact .....	47
8.12	Resistance to heat .....	47
8.13	Resistance to abnormal heat and to fire .....	47
8.14	Performance of the test function .....	48
8.15	Behaviour in the event of loss of the supply voltage .....	48
8.16	Resistance of IC-CPDs against unwanted tripping due to surge currents to earth resulting from impulse voltages .....	48
8.17	Control pilot function controller .....	48
8.18	Reliability.....	49
8.19	Resistance to tracking.....	49
8.20	Electromagnetic compatibility (EMC).....	49

8.21	Behaviour of the IC-CPD at low ambient air temperature.....	49
8.22	Operation with supply failure and hazardous live protective conductor conditions .....	49
8.23	Verification of a standing current in the protective conductor in normal service .....	49
8.24	Behaviour at specific environmental conditions .....	50
8.25	Resistance to vibration and shock.....	50
9	Tests .....	50
9.1	General.....	50
9.1.1	Opening and closing of contacts .....	50
9.1.2	Type tests.....	50
9.1.3	Test sequences .....	51
9.1.4	Routine tests .....	52
9.2	Test conditions .....	52
9.3	Test of indelibility of marking .....	52
9.4	Verification of protection against electric shock.....	53
9.5	Test of dielectric properties.....	53
9.5.1	Resistance to humidity.....	53
9.5.2	Insulation resistance of the main circuit .....	54
9.5.3	Dielectric strength of the main circuit .....	55
9.5.4	Secondary circuit of detection transformers .....	55
9.5.5	Verification of impulse withstand voltages (across clearances and across solid insulation) and of leakage current across open contacts.....	55
9.6	Temperature-rise test.....	58
9.6.1	Test conditions .....	58
9.6.2	Test procedure .....	59
9.6.3	Measurement of the temperature rise of different parts .....	59
9.6.4	Temperature rise of a part .....	59
9.7	Verification of the operating characteristics.....	59
9.7.1	Test circuit.....	59
9.7.2	Residual sinusoidal alternating currents tests .....	60
9.7.3	Verification of the correct operation with residual currents having a DC component.....	62
9.7.4	Verification of behaviour in the event of composite residual current .....	63
9.7.5	Verification of the correct operation in the event of smooth DC residual current.....	65
9.7.6	Miswiring and supply failure tests .....	65
9.7.7	Verification of protective conductor contact behaviour .....	69
9.7.8	Verification that the protective conductor is connected to the electric vehicle.....	69
9.7.9	Verification of standing current in the protective conductor connection in normal service .....	70
9.7.10	Verification of the correct operation in the event of residual direct currents which may result from rectifying circuits supplied from two phases.....	70
9.7.11	Verification of the correct operation in case of residual direct currents which may result from rectifying circuits supplied from three phases.....	70
9.8	Verification of mechanical and electrical endurance .....	71
9.8.1	Endurance of plug and vehicle connector part .....	71
9.8.2	Endurance of the residual current function of the IC-CPD .....	71
9.9	Verification of the behaviour of the IC-CPD under overcurrent conditions.....	73

9.9.1	List of the overcurrent tests .....	73
9.9.2	Short-circuit tests .....	73
9.9.3	Verification of the making and breaking capacity of the plug of the IC-CPD .....	78
9.10	Verification of resistance to mechanical shock and impact .....	78
9.10.1	General .....	78
9.10.2	Drop test .....	79
9.10.3	Test for screwed glands of IC-CPDs .....	79
9.10.4	Mechanical strength test on IC-CPDs provided with cords .....	80
9.10.5	Mechanical impact test and shock test.....	80
9.11	Test of resistance to heat.....	80
9.11.1	General .....	80
9.11.2	Temperature test in heating cabinet.....	80
9.11.3	Ball pressure test for insulating material necessary to retain in position current-carrying parts .....	81
9.11.4	Ball pressure test for insulating material not necessary to retain in position current-carrying parts .....	81
9.12	Resistance of insulating material to abnormal heat and to fire.....	82
9.13	Verification of the self-test .....	83
9.13.1	Test conditions .....	83
9.13.2	Verification of the self-test with IC-CPD in normal operation .....	83
9.13.3	Verification of the self-test with simulated welded contacts of IC-CPD .....	83
9.14	Verification of the behaviour of IC-CPDs in the event of loss of the supply voltage.....	84
9.14.1	Verification of correct operation at the minimum operating voltage ( $U_X$ ).....	84
9.14.2	Verification of the automatic opening in the event of loss of the supply voltage .....	84
9.14.3	Verification of the reclosing function .....	84
9.15	Verification of the limiting values of the non-operating current under overcurrent conditions.....	85
9.16	Verification of resistance against unwanted tripping due to surge currents to earth resulting from impulse voltages .....	85
9.17	Verification of reliability.....	85
9.17.1	Climatic test.....	85
9.17.2	Test at a temperature of 45 °C.....	87
9.18	Resistance to ageing .....	87
9.19	Resistance to tracking.....	88
9.20	Test on pins provided with insulating sleeves.....	88
9.21	Verification of the effects of strain on the conductors .....	89
9.22	Checking of the torque exerted by IC-CPDs on fixed socket-outlets .....	89
9.23	Tests of the cord anchorage.....	89
9.24	Flexing test of non-rewirable IC-CPDs .....	90
9.25	Verification of the electromagnetic compatibility (EMC).....	91
9.25.1	Emission.....	91
9.25.2	Immunity.....	91
9.26	Tests replacing verifications of creepage distances and clearances .....	93
9.26.1	General .....	93
9.26.2	Abnormal conditions .....	93
9.26.3	Temperature rise resulting from fault conditions .....	93
9.27	Verifications for single electronic components used in IC-CPDs.....	96

9.27.1	General .....	96
9.27.2	Capacitors .....	96
9.27.3	Resistors and inductors .....	96
9.28	Chemical loads .....	96
9.29	Heat test under solar radiation .....	96
9.30	Resistance to ultra-violet (UV) radiation .....	97
9.31	Damp and salt mist test for marine and coastal environments .....	97
9.31.1	Test for external metallic parts only .....	97
9.31.2	Test criteria .....	98
9.32	Vehicle drive-over .....	98
9.32.1	General .....	98
9.32.2	Test at crushing force 5 000 N .....	98
9.32.3	Test at crushing force 11 000 N .....	98
9.32.4	Performance after the tests .....	98
9.33	Low storage temperature test .....	99
9.34	Vibration and shock test .....	99
9.35	Verification of insulating parts which keep live parts in position .....	100
9.36	Verification of the thermal control device .....	100
Annex A (normative) Test sequences and number of samples to be submitted for verification of conformity to this document .....		137
A.1	Verification of conformity .....	137
A.2	Test sequences .....	137
A.3	Number of samples to be submitted for full test procedure .....	139
A.4	Number of samples to be submitted for simplified test procedures in the case of submitting simultaneously a range of IC-CPDs of the same fundamental design .....	141
Annex B (normative) Routine tests .....		143
Annex C (normative) Determination of clearances and creepage distances .....		144
C.1	Overview .....	144
C.2	Orientation and location of a creepage distance .....	144
C.3	Creepage distances where more than one material is used .....	144
C.4	Creepage distances split by a floating conductive part .....	144
C.5	Measurement of creepage distances and clearances .....	144
Annex D (informative) Switched-protective conductor application .....		149
D.1	Explanation of switched-protective conductor (SPE) function and application .....	149
D.2	Examples of incorrect supply wiring .....	150
Annex E (informative) Example of IC-CPD for mode 2 charging .....		153
Annex F (informative) Types of IC-CPD according to construction and assembly .....		154
Annex G (informative) Methods for determination of short-circuit power factor .....		155
G.1	Overview .....	155
G.2	Method I – Determination from DC components .....	155
G.3	Method II – Determination with pilot generator .....	156
Bibliography .....		157
Figure 1 – Test circuit for the verification of operating characteristic (9.7.2) .....		102
Figure 2 – Verification of correct operation for hazardous live PE (see Table 14 and Table 15) .....		105
Figure 3 – Verification of temperature rise of the protective conductor .....		106

Figure 4 – Verification of open neutral for LNSE types, and open line for LLSE types .....	107
Figure 5 – Verification of a standing current in the protective conductor in normal service .....	108
Figure 6 – Test circuit for the verification of the making and breaking capacity and the short-circuit coordination with an SCPD (see 9.9.2) .....	111
Figure 7 – Standard test wire 1,0 mm .....	111
Figure 8 – Test circuit for the verification of the correct operation in the event of residual pulsating direct currents (see 9.7.3).....	113
Figure 9 – Test circuit for the verification of the correct operation in the event of residual pulsating direct currents superimposed by a smooth direct current (see 9.7.3.3).....	115
Figure 10 – Verification of open protective conductor (see 9.7.6.4) .....	116
Figure 11 – Arrangement for compression test for verification of protection against electric shock.....	117
Figure 12 – Ball-pressure test apparatus.....	117
Figure 13 – Test circuit for IC-CPD according to 4.1.2 to verify the correct operation in the event of residual pulsating direct currents which may result from rectifying circuits supplied from two phases .....	118
Figure 14 – Tests circuit for IC-CPD according to 4.1.3 to verify the correct operation in the event of residual pulsating direct currents which may result from rectifying circuits supplied from three phases .....	119
Figure 15 – Apparatus for testing the cord retention.....	120
Figure 16 – Apparatus for flexing test .....	121
Figure 17 – Arrangement for mechanical strength test on IC-CPDs provided with cords (9.10.4).....	121
Figure 18 – Stabilizing period for reliability test (9.17.1.3).....	122
Figure 19 – Reliability test cycle (9.17.1.3) .....	123
Figure 20 – Example for test circuit for verification of ageing of electronic components (9.18).....	124
Figure 21 – Current ring wave 0,5 $\mu$ s/100 kHz .....	124
Figure 22 – Example of test circuit for the verification of resistance to unwanted tripping .....	125
Figure 23 – Minimum creepage distances and clearances as a function of peak value of voltage (see 9.26.3 a)).....	126
Figure 24 – Minimum creepage distances and clearances as a function of peak value of operating voltage (see 9.26.3 a)) .....	127
Figure 25 – Test cycle for low temperature test.....	127
Figure 26 – Test circuit for verification of connection of protective conductor to the EV, according to 9.7.8 .....	128
Figure 27 – Verification of correct operation in the event of smooth DC leakage current, according to 9.7.5 .....	129
Figure 28 – Example of a test circuit for the verification of correct operation in the event of residual sinusoidal alternating currents composed of multi-frequency components .....	130
Figure 29 – Test circuit for endurance test according to 9.8 .....	131
Figure 30 – The use of the IC-CPD .....	132
Figure 31 – Informative wave shape of inrush current for tests according to 9.8.2.....	132
Figure 32 – Standard test finger.....	133
Figure 33 – Small parts.....	134

Figure 34 – Test circuit for the verification of the self-test (9.13) .....	135
Figure 35 – Arrangement for verification of the thermal control device .....	136
Figure D.1 – Examples of incorrect supply wirings for LLSE types .....	151
Figure D.2 – Examples of incorrect supply wirings for LNSE types .....	152
Figure E.1 – Example for IC-CPD showing the different parts and functions .....	153
Figure F.1 – Example of IC-CPD including function box, cables, plug and connector in accordance with 4.2.2 .....	154
Figure F.2 – Example of modular IC-CPD in accordance with 4.2.3 a) .....	154
Figure F.3 – Example of modular IC-CPD in accordance with 4.2.3 b) .....	154
Table 1 – Preferred values of rated current and corresponding preferred values of rated voltages .....	29
Table 2 – Limit values of break time for AC residual currents at rated frequency .....	30
Table 3 – Limit values of break time for smooth DC residual currents .....	31
Table 4 – Limit values of break time for residual pulsating direct currents which may result from rectifying circuits supplied from two or three phases .....	31
Table 5 – Standard conditions for operation in service .....	34
Table 6 – Minimum cross-sectional area of flexible cable or cord .....	40
Table 7 – Minimum clearances and creepage distances .....	42
Table 8 – Temperature-rise values .....	45
Table 9 – List of type tests .....	51
Table 10 – Test voltage for verification of impulse withstand voltage .....	57
Table 11 – Tripping current ranges for IC-CPDs in the event of pulsating DC current .....	62
Table 12 – Different frequency component values of test currents and starting current values ( $I\Delta$ ) for verifying operation in the event of steady increased residual current .....	64
Table 13 – Operating current ranges for composite residual current .....	64
Table 14 – Supply failure and hazardous live protective conductor (PE) connections for test with reference to correct supply connections for LNSE/LLSE and LNE/LE types .....	66
Table 15 – Supply failure and hazardous live protective conductor (PE) connections for test with reference to correct supply connections for LLLNSE and LLLNE types .....	67
Table 16 – Tests to verify the behaviour of IC-CPDs under overcurrent conditions .....	73
Table 17 – Minimum values of $I^2t$ and $I_p$ .....	74
Table 18 – List of tests of resistance to mechanical shock and impact .....	79
Table 19 – Torque applied to the spanner for the test .....	80
Table 20 – EMC immunity tests .....	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 .....	138
Table A.2 – Number of samples to be submitted for full test procedure .....	140
Table A.3 – Reduction of number of samples .....	142

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

## FOREWORD

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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 an International Standard.

This second edition cancels and replaces the first edition published in 2016, and Amendment 1:2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- Subclause 8.3.1 revised to add requirements for a mandatory control device that detects the temperature of the current carrying parts in the household plug;
- Test requirements added in a new Subclause 9.36 for the temperature control device;
- Harmonization of EMC requirements with new edition of IEC 61543 and IEC 61851-21-2;
- General improvement of test and requirements.

The text of this International Standard is based on the following documents:

Draft	Report on voting
23E/1342/FDIS	23E/1346/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

In this document, 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 document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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## INTRODUCTION

The essential purpose of this document is the 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 residual current device (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 document is to describe the relevant requirements for an in-cable control and protection device (IC-CPD) to be used for mode 2 charging.

This version of IEC 62752 covers also the content of the former IEC 62335.

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

### 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 document 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 document

- provides a control pilot function in accordance with IEC 61851-1:2017, Annex A;
- checks supply conditions and prevents charging in the event of supply faults under specified conditions;
- can have a switched protective conductor.

Residual currents with frequencies different from the rated frequency, DC residual currents and specific environmental situations are considered.

This document 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 document 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.

This document is applicable to IC-CPDs to be used in AC circuits only, with preferred values of rated frequency 50 Hz, 60 Hz or 50/60 Hz. IC-CPDs according to this document are not intended to be used for bidirectional or reverse power transfer, feeding back energy to the system for distribution of electricity.

This document is applicable to IC-CPDs having a rated residual operating current not exceeding 30 mA and which are intended to provide additional protection for the circuit downstream of the IC-CPD as it cannot be guaranteed that the upstream installation is equipped with an RCD rated  $I_{\Delta n} \leq 30$  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);
- a cable between the subassemblies and the vehicle connector (optional);
- a vehicle connector for connection to the electric vehicle.

For plugs for household and similar use the respective requirements of the national standard and specific requirements defined by the national committee of the country where the product is placed on the market apply. If no national requirements exist, IEC 60884-1 applies. For industrial plugs IEC 60309-2 applies. For specific applications and areas non-interchangeable industrial plugs can be used. In this case IEC 60309-1 applies.

Plugs, connectors and cables which are part of the IC-CPD are tested according to relevant product standards.

The switching contacts of the IC-CPD are not intended to provide an isolation function, as isolation can be ensured by disconnecting the plug.

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

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-5:2018, *Environmental testing – Part 2-5: Tests – Test S: Simulated solar radiation at ground level and guidance for solar radiation testing and weathering*

IEC 60068-2-11, *Environmental testing – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-64, *Environmental testing – Part 2-64: Tests – Test Fh: Vibration, broadband random and guidance*

IEC 60068-3-4, *Environmental testing – Part 3-4: Supporting documentation and guidance – Damp heat tests*

IEC 60112, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60309-1:2021, *Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes – Part 1: General requirements*

IEC 60309-2, *Plugs, fixed or portable socket-outlets and appliance inlets for industrial purposes – Part 2: Dimensional compatibility requirements for pin and contact-tube accessories*

IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances*

IEC 60384-14:2023, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*

IEC 60417, *Graphical symbols for use on equipment* (available at: <https://www.graphical-symbols.info/equipment>)

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-2-10, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60884-1:2022, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-5:2014/AMD1:2017

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61439-7:2022, *Low-voltage switchgear and controlgear assemblies – Part 7: Assemblies for specific applications such as marinas, camping sites, market squares, electric vehicle charging stations*

IEC 61540, *Portable residual current devices (PRCDs) without integral overcurrent protection for household and similar use*

IEC 61543:2022, *Residual current-operated protective devices (RCDs) for household and similar use – Electromagnetic compatibility*

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

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

IEC 62196-1:2022, *Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – Part 1: General requirements*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62368-1:2023, *Audio/video, information and communication technology equipment – Part 1: Safety requirements*

IEC 62893-3, *Charging cables for electric vehicles for rated voltages up to and including 0,6/1 kV – Part 3: Cables for AC charging according to modes 1, 2 and 3 of IEC 61851-1 of rated voltages up to and including 450/750 V*

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

ISO 178, *Plastics – Determination of flexural properties*

ISO 179 (all parts), *Plastics – Determination of Charpy impact properties*

ISO 2409, *Paints and varnishes – Cross-cut test*

ISO 4628-3, *Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3: Assessment of degree of rusting*

ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*

ISO 16750-5:2010, *Road vehicles – Environmental conditions and testing for electrical and electronic equipment – Part 5: Chemical loads*

ISO 17409:2020, *Electrically propelled road vehicles – Conductive power transfer – Safety requirements*

### **3 Terms and definitions**

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

NOTE 1 Where the terms "voltage" and "current" are used, they imply RMS values, unless otherwise specified.

NOTE 2 Throughout this document, the word "earthing" is used for "protective earthing".

NOTE 3 The term "accessory" is used as a general term covering plugs, socket-outlets, vehicle connectors and vehicle inlets.

#### **3.1 Terms and definitions relating to plugs and socket-outlets**

##### **3.1.1**

##### **plug**

accessory having pins designed to engage with the contacts of a socket-outlet