

PAIGALDUS-PISTIKÜHENDUSED PÜSIVAKS
ÜHENDAMISEKS KOHTKINDLATES PAIGALDISTES

Installation couplers intended for permanent
connection in fixed installations

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 61535:2019 sisaldab Euroopa standardi EN IEC 61535:2019 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 61535:2019 consists of the English text of the European standard EN IEC 61535:2019.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 20.12.2019.	Date of Availability of the European standard is 20.12.2019.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.100.99

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:
Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Installation couplers intended for permanent connection in fixed
installations
(IEC 61535:2019)**

Coupleurs d'installation pour connexions permanentes dans
les installations fixes
(IEC 61535:2019)

Installationssteckverbinder für dauernde Verbindung in
festen Installationen
(IEC 61535:2019)

This European Standard was approved by CENELEC on 2019-11-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 23/792/CDV, future edition of IEC 61535:2019, prepared by IEC/TC 23 "Electrical accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61535:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2020-08-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-11-20

This document supersedes EN 61535:2009 and all of its amendments and corrigenda (if any).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 61535:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60309 (series)	NOTE	Harmonized as EN 60309-4:2007/A1 (series)
IEC 60320 (series)	NOTE	Harmonized as EN 60320 (series)
IEC 60364 (series)	NOTE	Harmonized as HD 60364 (series)
IEC 60364-4-41:2005	NOTE	Harmonized as HD 60364-4-41:2017
IEC 60364-5-52:2009	NOTE	Harmonized as HD 60364-5-52:2011
IEC 61995 (series)	NOTE	Harmonized as EN 61995-2:2009/A1 (series)

Annex ZA

(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-31	2008	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	2008
IEC 60112	-	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
			+ A1	2009
IEC 60529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
+ A1	1999		+ A1	2000
+ A2	2013		+ A2	2013
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007
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)	EN 60695-2-11	-
IEC 60998-2-3	-	Connecting devices for low-voltage circuits for household and similar purposes - Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units	EN 60998-2-3	-
IEC 60999-1	1999	Connecting devices - Electrical copper conductors - Safety requirements for screw-type and screwless-type clamping units - Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm ² up to 35 mm ² (included)	EN 60999-1	2000
IEC 61032	1997	Protection of persons and equipment by enclosures - Probes for verification	EN 61032	1998

Annex ZZ (informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request relating to harmonised standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding safety objectives of that Directive, and associated EFTA regulations.

**Table ZZ.1 — Correspondence between this European standard and Annex I of
Directive 2014/35/EU [2014 OJ L96]**

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
(1)(a)	Clauses 1, 7, 8, Annex D, Annex E	
(1)(b)	Clauses 6.2, 6.3, 8.3, 8.4, 9, 11, 12, 19, 22, Annex A, Annex E	
(1)(c)	Clause 4	
(2)(a)	Clauses 9, 10, 12, 14, 16, 19.5, 20, 21, 23, Annex A	
(2)(b)	Clauses 11.2, 12.9, 15, 16, 17, 21.5	
(2)(c)	Clauses 10.1, 12, 24	
(2)(d)	Clauses 6, 10, 14, 21, 23, 24	
(3)(a)	Clauses 9.1, 12, 13, 18, 19.2, 19.3, 19.4, 20, 21.3, 21.4, 22	
(3)(b)	Clauses 13, 21, 24, 25	
(3)(c)	Clauses 11.2, 12.2, 12.3	

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

CONTENTS

FOREWORD	6
INTRODUCTION	8
1 Scope	9
2 Normative references	9
3 Terms and definitions	10
4 General requirements	12
5 Conditions for tests	12
5.1 General	12
5.2 Test conditions	13
5.3 Tests on non-rewirable installation couplers	13
5.4 Order of tests	13
5.5 Specification of tests	13
5.6 Compliance requirements	13
5.7 Routine tests for non-rewirable installation couplers	13
6 Ratings	13
6.1 Rated voltage	13
6.2 Rated current	14
6.3 Rated connecting capacity	14
6.4 Tests	15
7 Classification	15
8 Marking and documentation	15
8.1 General	15
8.2 Use of symbols or letters	16
8.3 Markings	16
8.4 Documentation	17
9 Dangerous compatibility	17
9.1 Unintended or improper connection	17
9.2 Engagement	18
9.3 Compatibility of different installation coupler systems	18
9.4 Compatibility with standard systems	18
10 Protection against electric shock	18
10.1 Degree of protection against ingress of solid foreign objects	18
10.2 Access to live parts	19
10.3 External parts	19
11 Terminals, terminations and connectable conductors	19
11.1 Terminals and terminations	19
11.1.1 General	19
11.1.2 Terminals of rewirable installation couplers	19
11.1.3 Terminations of non-rewirable installation couplers	20
11.2 Connectable conductors	20
12 Construction	20
12.1 Earth connection	20
12.2 Locking against rotation	21
12.3 Mechanical strength of contacts	21
12.4 Housing of rewirable installation couplers	21

12.5	Housing of non-rewirable installation couplers	21
12.6	Dismantling and opening of rewirable installation couplers.....	21
12.7	Earthing contact and earthing terminal	22
12.8	Loose conductor strands	22
12.8.1	General	22
12.8.2	Strand test for rewirable installation couplers.....	22
12.8.3	Strand test for non-rewirable installation couplers.....	23
12.8.4	Strand test for non-rewirable moulded-on installation couplers	23
12.9	Incorporation of electrical devices	23
12.10	Retaining means	23
12.11	Distribution blocks	24
12.12	Shrouds	24
12.13	Factory wiring	24
12.14	Stress test	24
12.14.1	General	24
12.14.2	Stress test of rewirable installation couplers	24
12.14.3	Stress test of non-rewirable installation couplers	24
12.15	Separation of non-rewirable installation couplers	25
13	Protection against harmful ingress of solid foreign objects and against harmful ingress of water	25
13.1	General.....	25
13.2	Protection against harmful ingress of solid foreign objects	25
13.3	Protection against harmful ingress of water.....	25
14	Insulation resistance and electric strength	25
14.1	General.....	25
14.2	Insulation resistance	26
14.3	Electric strength.....	26
15	Construction of contacts	27
15.1	Resiliency	27
15.2	Resistance of connections	27
15.3	Contact pressure	27
16	Temperature rise	27
17	Breaking capacity	28
18	Forces necessary to disengage the parts of the installation coupler.....	29
19	Cables and their connection	29
19.1	Capability of being fitted	29
19.2	Relief from pull, thrust and torsion	30
19.3	Relief	30
19.4	Capability to connect cables with different cross-sectional area	30
19.5	Sharp edges	33
20	Mechanical strength	33
21	Resistance to heat and ageing.....	34
21.1	Resistance to heat	34
21.2	Dry heat storage	34
21.3	Ball pressure test.....	34
21.4	Ageing of elastomeric and thermoplastic material	35
21.5	Current cycling test.....	35
22	Screws, current-carrying parts and connections.....	36

22.1	Screws and nuts	36
22.2	Screws and insulating material.....	37
22.3	Screws and rivets for electrical and mechanical connections.....	38
22.4	Metals of current-carrying parts	38
23	Clearances, creepage distances and distances through solid insulation.....	38
24	Resistance to abnormal heat and to tracking	41
24.1	Resistance to abnormal heat.....	41
24.2	Resistance to tracking.....	43
25	Resistance to rusting	43
Annex A (normative)	Routine earth (PE) continuity tests	45
Annex B (normative)	Test circuits for temperature rise test	46
Annex C (normative)	Number of sets of test samples used for the tests and sequence of tests for each set	49
Annex D (informative)	Guide to use	50
D.1	General.....	50
D.2	Applications	50
D.3	Use of installation couplers	50
Annex E (normative)	Warning symbol used in DC applications.....	52
Bibliography	53
Figure 1	– Apparatus for testing the cable anchorage	32
Figure 2	– Apparatus for measuring the distortion (example)	33
Figure 3	– Ball-pressure apparatus	35
Figure 4	– Explanation of "small part"	43
Figure B.1	– 1P + N + PE installation couplers, including N (left figure), including PE (right figure).....	46
Figure B.2	– 3P + N + PE installation couplers, 3 phases loaded (left figure), N and PE loaded (right figure)	46
Figure B.3	– 1P + N + PE distribution block, phase and N loaded	47
Figure B.4	– 1P + N + PE distribution block, phase and PE loaded	47
Figure B.5	– 3P + N + PE to 1P + N + PE distribution block, 3 phases loaded.....	48
Figure B.6	– 3P + N + PE to 1P + N + PE distribution block, N and PE loaded	48
Figure D.1	– Examples of use of installation couplers	51
Figure E.1	– Symbol "DO NOT CONNECT OR DISCONNECT UNDER LOAD".....	52
Table 1	– Voltage rating for installation couplers in AC application	14
Table 2	– Voltage rating for installation couplers in DC application	14
Table 3	– Classes of installation couplers	15
Table 4	– Test currents for installation couplers	28
Table 5	– Forces to be applied to cable anchorages	31
Table 6	– Torque applied for the tightening and loosening test.....	37
Table 7	– Installation couplers intended for use in supply systems with a maximum voltage to earth of 150 V AC, rated impulse voltage 2,5 kV	38
Table 8	– Installation couplers intended for use in supply systems with a maximum voltage to earth of 300 V AC, rated impulse voltage 4,0 kV	39

Table 9 – Installation couplers intended for use in single-phase two-wire systems 50 V DC and single-phase three-wire systems 60 V DC, rated impulse voltage 0,8 kV	39
Table 10 – Installation couplers intended for use in single-phase two-wire systems 120 V DC and single-phase three-wire systems 240 V DC, rated impulse voltage 2,5 kV	40
Table 11 – Installation couplers intended for use in single-phase two-wire systems 220 V DC and single-phase three-wire systems 440 V DC, rated impulse voltage 4,0 kV	41
Table C.1 – Sets of samples	49

INTERNATIONAL ELECTROTECHNICAL COMMISSION

INSTALLATION COUPLERS INTENDED FOR PERMANENT CONNECTION IN FIXED INSTALLATIONS

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 61535 has been prepared by IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 2009 and Amendment 1:2012. This edition constitutes a technical revision.

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

- a) enlargement of the scope to DC application;
- b) addition of further requirements as regards DC application (marking, etc.), no additional test procedures were deemed necessary; however some modifications were necessary in the normative text;
- c) changes and enhancement of the field of application of installation couplers into outdoor applications;
- d) addition of a suitable temperature range;

- e) updating of the list of normative references, modified to undated references, where possible.

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

CDV	Report on voting
23/792/CDV	23/848/RVC

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

This document 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*;
- explanatory matter: 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

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

INTRODUCTION

AC and DC installation couplers according to this document may be used, for example, in prefabricated buildings, commercial showrooms, installation cavities, such as suspended floors and ceilings, in partition walls and in any similar applications, or cable tray systems, cable ladder systems, cable ducting systems and cable trunking systems or in furniture complying with IEC 60364-7-713.

This document may be used as a guide for installation couplers with additional contacts for voltages other than mains voltages.

Particular requirements for installation couplers, for example, for use at higher ambient temperatures, with higher mechanical durability (e.g. metal housings), with higher fire resistance and for use in control circuits (e.g. SELV), are under consideration.

National rules can have requirements concerning the accessibility of installation couplers.

National rules can specify who is allowed to carry out the connection and disconnection of installation couplers.

National rules can have requirements concerning installation couplers with metal conduits.