

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

**Installation couplers intended for permanent connection in fixed installations**

**Coupleurs d'installation pour connexions permanentes dans les installations fixes**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 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 Secretariat  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

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 It also gives information on projects, replaced and withdrawn publications.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](http://webstore.iec.ch/justpublished)

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

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://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: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

### 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.

#### Recherche de publications IEC -

##### [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

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](http://webstore.iec.ch/justpublished)

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

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 61535

Edition 3.0 2023-03

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

---

**Installation couplers intended for permanent connection in fixed installations**

**Coupleurs d'installation pour connexions permanentes dans les installations fixes**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.120.99

ISBN 978-2-8322-6700-4

**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.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references .....	9
3 Terms and definitions .....	10
4 General requirements .....	12
5 Conditions for tests.....	13
5.1 General.....	13
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 .....	14
6 Ratings.....	14
6.1 Rated voltage .....	14
6.2 Rated current.....	14
6.3 Rated connecting capacity .....	15
6.4 Tests .....	15
7 Classification.....	15
8 Marking and documentation.....	16
8.1 General.....	16
8.2 Use of symbols or letters .....	16
8.3 Markings .....	16
8.4 Documentation.....	17
9 Dangerous compatibility .....	18
9.1 Unintended or improper connection.....	18
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 .....	19
10.1 Degree of protection against ingress of solid foreign objects.....	19
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 .....	20
11.1.3 Terminations of non-rewirable installation couplers.....	20
11.2 Connectable conductors.....	20
12 Construction.....	21
12.1 Connection between earthing contacts.....	21
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 .....	22
12.6	Dismantling and opening of rewirable installation couplers.....	22
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.....	23
12.8.3	Strand test for non-rewirable non-moulded-on 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 .....	24
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 .....	25
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 .....	26
14.1	General.....	26
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 .....	28
16	Temperature rise .....	28
17	Breaking capacity .....	29
18	Forces necessary to disengage the parts of the installation coupler.....	30
19	Cables and their connection .....	30
19.1	Capability of being fitted .....	30
19.2	Relief from pull, thrust and torsion .....	30
19.3	Cable anchorage.....	30
19.4	Capability to connect cables with different cross-sectional area .....	31
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 .....	42
24.1	Resistance to abnormal heat.....	42
24.2	Resistance to tracking.....	44
25	Resistance to rusting .....	44
Annex A	(normative) Routine protective earth continuity tests .....	46
Annex B	(normative) Test circuits for temperature rise test .....	47
Annex C	(normative) Number of sets of test samples used for the tests and sequence of tests for each set .....	50
Annex D	(informative) Guide to use .....	51
D.1	General.....	51
D.2	Applications .....	51
D.3	Examples of use of installation couplers .....	51
Annex E	(normative) Warning symbol used in DC applications.....	54
Annex F	(informative) Additional tests and requirements for installation couplers intended to be used in ambient air temperature below –5 °C down to and including –45 °C .....	55
F.1	General.....	55
F.2	General requirements on tests .....	55
F.3	Additional marking and documentation .....	55
F.3.1	Additional marking .....	55
F.3.2	Additional documentation.....	55
F.4	Mechanical strength at lower ambient air temperatures.....	55
Bibliography	.....	57
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" .....	44
Figure B.1	– 1P + N + PE installation couplers, including N .....	47
Figure B.2	– 1P + N + PE installation couplers, including PE .....	47
Figure B.3	– 3P + N + PE installation couplers, 3 phases loaded .....	47
Figure B.4	– 3P + N + PE installation couplers, N and PE loaded.....	47
Figure B.5	– 1P + N + PE distribution block, phase and N loaded .....	48
Figure B.6	– 1P + N + PE distribution block, phase and PE loaded .....	48
Figure B.7	– 3P + N + PE to 1P + N + PE distribution block, 3 phases loaded.....	49
Figure B.8	– 3P + N + PE to 1P + N + PE distribution block, N and PE loaded .....	49
Figure D.1	– Examples of use of installation couplers .....	52
Figure D.2	– Magnified area of Figure D.1 to show installation couplers.....	53
Figure E.1	– Symbol "DO NOT CONNECT OR DISCONNECT UNDER LOAD" .....	54
Table 1	– Voltage rating for installation couplers in AC application .....	14

Table 2 – Voltage rating for installation couplers in DC application .....	14
Table 3 – Classification of installation couplers .....	15
Table 4 – Test currents for installation couplers .....	29
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 .....	40
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 .....	41
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 .....	42
Table C.1 – Sets of samples .....	50

## 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.

IEC 61535 has been prepared by IEC technical committee 23: Electrical accessories. It is an International Standard.

This third edition cancels and replaces the second edition published in 2019. This edition constitutes a technical revision.

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

- a) inclusion of a definition for "live part" based on IEC 61140;
- b) additional optional cross medial documentation, e.g. marking with QR-Code;
- c) corrections on the consistent use of the expressions "earth", "earthing contact", "earthing circuit" and "protective earth(ing)" throughout the document;
- d) addition of missing compliance provisions to 13.3;
- e) update of Figure D.1 of Annex D;
- f) inclusion of new Annex F for cold climate requirements.

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

Draft	Report on voting
23/1062/FDIS	23/1066/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.

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.

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).

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,
- 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 or lower 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.