Product Service

TEST REPORT PPP 59015A:2013 Rev. 1:2018-01 TUV SUD Test Report for Installation Couplers for use on AC side of Photovoltaic Systems	
Report No.: Date of issue: Project handler:	70.407.15.071.02-01 2021-2-4 Xingxing Liu
Testing laboratory: Address: Testing location:	TÜV SÜD Certification and Testing (China) Co., Ltd. ShanghaiBranch No.151 Hengtong Road, 200070 Shanghai, P. R. China as above
Client: Client number: Address: Contact person:	Wuxi Betteri Electronic Technology Co., LTD 85127 5-1, #11, Jinshan Rd. Branch#IV Wuxi Optoelectronic Material Science&Technology Park 214037 Wuxi PEOPLE'S REPUBLIC OF CHINA Jingning Deng
Standard:	This TUV SUD test report form is based on the following requirements: PPP 59015A:2013 Rev.1:2018-01
TRF number and revision*:*	PPP 59015A:2013 Rev. 1:2018-01
TRF originated by:	TUV SUD Product Service, Mr./Mrs. Yaqun LIU *(product specialist)*
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General disclaimer:	This test report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.
Scheme: Non-standard test method:	☒ TUV Mark ☐ without certification ☐ GS Mark ☐ NRTL Mark ☐ EU-Directive ☐ No ☒ Yes, see details under Summary of testing
National deviations: Number of pages *(Report)*: Number of pages *(Attachments)*:	N/A 41 0
Compiled by:	Xingxing Liu *(Printed Name and Signature)* 2021-02-04
Approved by:	Hongxue Wang *(Printed Name and Signature)* 2021-02-04

TÜV®

Test sample:	for Installation Couplers for use on AC side of Photovoltaic Systems
Type of test object:	N/A
Trademark:	Betteri
Model and/or type reference:	BC01-3M22-15(Male); BC01-3F22-15(Female) BC01-3M22-05(Male), BC01-3F22-15(Female)
Rating(s):	25A(4,0mm^2); 20A(2,5mm^2)
Manufacturer:	Wuxi Betteri Electronic Technology Co., LTD
Manufacturer number:	85127
Address:	5-1, #11, Jinshan Rd. Branch#IV Wuxi Optoelectronic Material Science&Technology Park 214037 Wuxi PEOPLE'S REPUBLIC OF CHINA
Sub-contractors/ tests (clause):	N/A
Name:	N/A
Order description:	☒ Complete test according to TRF
	☐ Partial test according to manufacturer's specifications
	☐ Preliminary test
	☐ Spot check
	☐ Others:
Date of order:	2020-11-5
Date of receipt of test item:	2021-1-11
Date(s) of performance of test:	2021-1-12~2021-1-15

Test item particulars:	
Installation couplers	
Rated impulse voltage ..... :	☐ 2,5 kV ☒ 4kV
Rated current..... :	25A(4,0mm^2); 20A(2,5mm^2)
Rated voltage ..... :	250VAC
Rated connecting capacities (cross section area) ..... :	4,0mm^2 / 2,5mm^2
Method of connecting ..... :	☒ rewirable ☐ non rewirable
Degree of protection ..... :	IP68(1m, 1h)
Location of installation ..... :	☐ readily ☒ non-readily
Earthing contact ..... :	☒ with ☐ without
Type of conductors ..... :	☐ solid ☐ rigid (solid and stranded) ☒ flexible ☐ both (solid and stranded) and flexible
Type of terminal for rewirable installation couplers..... :	☒ screw ☐ screwless ☐ piercing

Number of poles and which poles..... :	P+N+PE
Connection thread metric ..... :	M25*3,0
Insulation material..... :	Enclosure:540Z(f1) Support current part:644Z(f1) Cable gland:EXL9330(f1)
Contact material and surface treatment ..... :	C3604 copper with silver plating

Purpose of the product (Description of intended use):

Installation couplers for use on AC side of photovoltaic systems with a rated voltage up to and including 690VAC and a rated connecting capacity up to and including 10mm^2 for permanent connection in indoor electrical installation.

Characteristic data *(not shown on the marking plate)*:

See clause A1

Attachments:

General remarks:

"(see remark #)" refers to a remark appended to the report.
"(see appended table)" refers to a table appended to the report.
*Throughout this report **a comma** is used as the decimal separator.*
The test results presented in this report relate only to the object tested.
This report shall not be reproduced except in full without the written approval of the testing laboratory.

Summary of testing:

Based on report 70.407.15.071.02-01, the certifica needs to updated as PPP 59015A:2013 Rev. 00 was updated to Rev.01, accordingly A4, E1, E2, F6 and G1 shall be retested with positive results in this report.

☐ deviation(s) found
☐ no deviations found

Additional information on Non-standard test method(s)

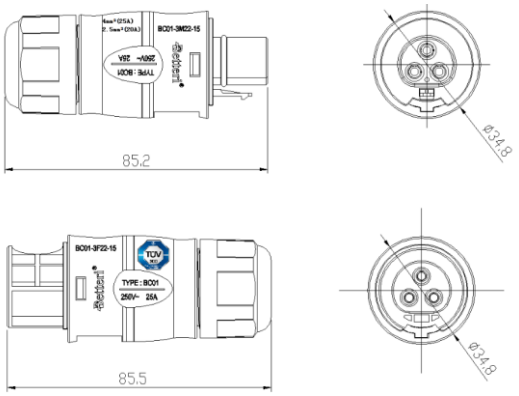
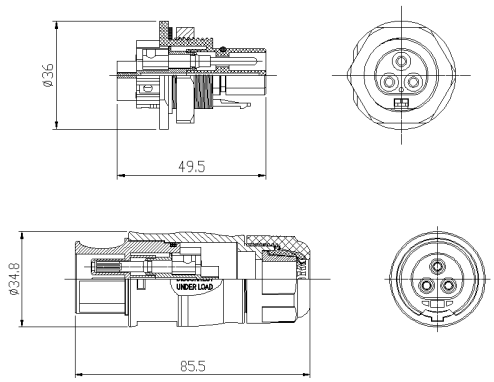
Sub clause:

Page:

Rational:

If additional information is necessary, please provide

Copy of marking plate:

Picture of the product:
BC01-3M22-15(Male); BC01-3F22-15(Female)  BC01-3M22-05(Male), BC01-3F22-15(Female) 
Name and address of factory (ies) *(only if certification is provided)*:

Possible test case verdicts:	
test case does not apply to the test object:	N/A (not applicable / not included in the order)
test object does meet the requirement:	P (Pass)
test object does not meet the requirement:	F (Fail)
Possible suffixes to the verdicts:	
suffix for detailed information for the client:	C (Comment)
suffix for important information for factory inspection:	M (Manufacturing)

Clause	Requirement + Test	result – Remark	Verdict
A Mechanical test GROUP (separate tests)			
A1	**MARKING**		P
A1.1	Connectors are marked with:		P
	- rated current (A) ..... :	25A(4,0mm^2); 20A(2,5mm^2)	P
	- rated voltage (V)..... :	250VAC	P
	- name, trademark or identification mark of the maker or responsible vendor ..... :	Betteri	P
	- IP-code if higher than IP43 ..... :	IP68(1m, 1h)	P
	- type reference ..... :	BC01-3M22-15(Male); BC01-3F22-15(Female) BC01-3M22-05(Male), BC01-3F22-15(Female)	P
	- rated connecting capacity for rewirable installation couplers in mm²	4,0mm^2 / 2,5mm^2	P
	- connected conductor size in mm² for non-rewirable installation couplers ..... :		N/A
A1.2	Correct symbols are used		P
A1.3	Marking is easily discernible before installation		P
A1.4	Terminal markings		P
A1.5	Marking is easily legible and durable		P
	Test: 15 s with water, 15 s with petroleum spirit	Marking made by moulding	N/A
A1.6	The manufacturer's catalogue or installation instruction shall contain the following information		P
	Connection and disconnection without load only		P
	Types of cable		P
	Not suitable for readily accessible areas		N/A
	Suitable for readily accessible areas		P
	Marking for the length of insulating to be removed		P
	Length of slack of a PE-conductor		P
	Warning advising		P
	Statement of replacements		P
	Wiring instruction		P
	The installation instructions shall be available in catalogue, documentation or smallest packaging		P

A2	**DANGEROUS COMPATIBILITY**	N/A

Clause	Requirement + Test	result – Remark	Verdict
A2.1	An installation coupler system shall be designed and construction so that unintended or improper connection is prevented		N/A
	Engagement of the installation male and female connector is attempted in any unintended configuration		N/A
	- 80 N (rated current 10 A, 16 A and 20 A)		N/A
	- 120 N (rated current 25 A and 32 A)		N/A
	Accessories with electrometric or thermoplastic material: test carried out at (35 ± 2) °C		N/A
	The force shall be applied on the same axis of the connection for 1 min, during the test no contact shall occur.		N/A
A2.2	It shall not be possible, within a given installation coupler system, to engage an installation male connector with an installation female connector		N/A
	with a different number of live poles; exceptions may be admitted for installation female connectors which are specially constructed for the purpose of allowing engagement with installation male connectors of a lower number of poles, provided that no dangerous situation can arise		N/A
	without earthing contact if the installation male connector is an installation male connector with earthing contact		N/A
	with different phase to neutral voltage ratings		N/A
	Compliance is checked by the test according to 2.1		N/A
A2.3	Installation couplers of different systems from the same manufacturer shall not be dangerously compatible		N/A
	Compliance is checked by the test according to 2.1		N/A
A2.4	Not compatible with IEC 60309, IEC 60320, IEC 60906		N/A
	Compliance is checked by manual test and in case of doubt by examination of drawings.		N/A

A3	**TERMINALS, TERMINATIONS AND CONNECTABLE CONDUCTORS**		N/A
A3.1	General		N/A
	For installation couplers with clamping units, IEC 60999-1 applies as applicable with the exception of the test of 9.10		N/A

Clause	Requirement + Test	result – Remark	Verdict
A3.1.1	Rewirable installation couplers shall be provided with screw-type terminals, with screwless terminals or reusable piercing terminals		N/A
	Insulation piercing terminals shall comply with IEC 60998-2-3		N/A
A3.1.2	Non-rewirable installation couplers shall be provided with soldered, welded, crimped or means for insulation piercing or screwless clamping units or equally effective permanent means		N/A
	Screwless terminals and insulation piercing terminals are not allowed for non-rewirable moulded-on installation couplers with the exception that means are included which prevent the moulding material from penetrating into the clamping unit.		N/A
	Solder type terminations shall be provided with means for mechanically fixing the conductor in position which are independent of the solder		N/A
	Compliance is checked by inspection, measurement and the test of 15.1.		N/A
A3.2	Terminals for the rewirable installation female connector and installation male connector shall not have smaller rated connecting capacities than as follow:		N/A
	1,5 mm^2 for installation couplers marked 10 A according to the maximum current rating		N/A
	1,5 mm^2 for installation couplers marked 16 A according to the maximum current rating		N/A
	2,5 mm^2 for installation couplers marked 20 A according to the maximum current rating		N/A
	4 mm^2 for installation couplers marked 25 A according to the maximum current rating		N/A
	4 mm^2 for installation couplers marked 32 A according to the maximum current rating		N/A
	Compliance is checked by the following test: Conductors with the indicated cross-sectional areas and types shall be connected and screws shall be tightened with the torque values. For installation couplers, the test is carried out in conjunction with the test of 5.8.		N/A

A4	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH INSULATION**	P

Clause	Requirement + Test	result – Remark	Verdict
	The clearances shall at least meet the requirements for overvoltage category III. For creepage distances pollution degree 2 as specified in IEC 60664-1 shall be applied. Creepage distances, clearances and distances through solid insulation are not less than the values shown in table 1		P
A5	**CONSTRUCTION**		N/A
A5.1	Installation couplers shall be so constructed that when inserting the installation male connector the earth connection, if any, is made at least 1 mm before the current-carrying contacts of the installation male connector become live		N/A
	When withdrawing the installation male connector, the current-carrying male contacts shall separate before the earth connection is broken		N/A
A5.2	Contacts of installation male connectors shall be locked against rotation if male contacts can be touched without the aid of tool		N/A
	Compliance is checked by the following tests: A torque with a value of 0,4 Nm is applied to the contacts for 60 s in one direction and for 60 s in the opposite direction.		N/A
	The contact parts shall not rotate more than an angle of 30º in total		N/A
A5.3	Contacts shall be securely fixed and shall have sufficient mechanical strength. They shall not be removable without the aid of a tool		N/A
	Compliance is checked by inspection and by the following tests: The installation coupler shall be placed in a heating cabinet for 1 h at a temperature of (70±2) °C Immediately after the heating period an axial force of 40 N shall be applied to each contact of the installation female connector and installation male connector in both directions consecutively. This force shall be reached by gradual increase at a rate not exceeding 20 N/s until the specified value is reached. The maximum value shall be maintained for 60 s.		N/A
	After the test the installation coupler is allowed to cool to room temperature and then no contact shall have been displaced in the body of the installation coupler by more than 1 mm.		N/A

Clause	Requirement + Test	result – Remark	Verdict
A5.4	The housing of rewirable installation couplers shall completely enclose the terminals and the ends of cable sheaths. It shall be possible to arrange each conductor such that its insulation cannot come into contact with live parts having another polarity		N/A
A5.5	The housing of non-rewirable installation couplers shall completely enclose the terminations and the ends of cable sheaths. The conductors shall be so arranged that their insulation cannot come into contact with live parts having another polarity		N/A
A5.6	Rewirable installation coupler housings shall be reliably fixed and it shall not be possible to dismantle the installation coupler without the aid of a tool		N/A
	For rewirable installation couplers there shall be independent means for fixing and locating the parts of the installation coupler with respect to each other, at least one of which shall be operated with the aid of a tool for opening		N/A
A5.7	If the earthing contact and the earthing terminal are not in one piece, the various parts shall be connected together by a reliable manner		N/A
A5.8	Rewirable installation couplers classified according to 7.6.3 or 7.6.4 shall be so designed that loose conductor strands in the installation coupler will not present a risk of electric shock.		N/A
	For non-rewirable installation couplers means shall be provided to prevent loose conductor strands from reducing the minimum clearance and creepage distance requirements and the distance through solid insulation between conductors and all accessible external surfaces of the installation coupler with the exception of the engagement face of the installation male connector of the installation coupler.		N/A
A5.8.1	Rewirable accessories: test with 6 mm free wire		N/A
	free wire of a conductor connected to a live terminal not touch any accessible metal part or able to emerge from the enclosure		N/A
	free wire of a conductor connected to an earthing terminal not touch a live part		N/A
A5.8.2	Non-rewirable, non-moulded-on accessories: test with a free wire of length equivalent to the maximum designed stripping length declared by the manufacturer plus 2 mm		N/A

Clause	Requirement + Test	result – Remark	Verdict
	free wire of a conductor connected to a live termination not touch any accessible metal part or reduce creepage distance and clearance below 1,5 mm to the external surface		N/A
A5.8.3	Non-rewirable, moulded-on accessories:		N/A
	Verification of means to prevent stray wires reducing the minimum distance through insulation to external accessible surface below 1,5 mm		N/A
A5.9	Installation couplers themselves shall not incorporate any other electrical devices for example switches, fuses, relays, thermostats, surge protective devices and thermal current limiting devices		N/A
	The use of installation couplers as connection for the electrical devices listed above is permitted		N/A
A5.10	Installation couplers shall be provided with retaining means which engages automatically when the installation coupler or cap is connected and which is capable of disengagement for disconnecting		N/A
	It shall only be possible to render the means of retention ineffective by a deliberate or intentional act		N/A
	For installation couplers classified in accordance with 7.4.1 intended for installation in a readily accessible location the means of disengagement shall only be made by the use of a key or tool		N/A
	Compliance is checked by the following test. The fully engaged installation coupler shall be subjected to a smooth axial traction force of 80 N for a period of 1 min, during which the retaining device shall be fully engaged.		N/A
	The installation coupler shall not loosen or become disconnected.		N/A
A5.11	The distribution block shall include one installation male connector only for each circuit		N/A
	The distribution block intended for fixed mounting shall have means for fixing to the support e.g. screw holes		N/A
A5.12	Installation male connectors shall have a shroud, which shall be at least as long as the longest pin		N/A
A5.13	Non-rewirable installation couplers shall be factory-wired		N/A

Clause	Requirement + Test	result – Remark	Verdict
A5.14	Installation couplers with earthing contact shall be so adjusted that the current-carrying conductors will be stressed before the protective earthing conductor		N/A
A5.14.1	Rewirable installation couplers shall have adequate space for the slack of protective earthing conductor so that, if the cable anchorage becomes inoperative, the protective earthing conductor connection is subjected to strain after the connections of the current carrying conductors		N/A
	Compliance is checked by the following test. The cable is connected to the installation coupler so that the current-carrying conductors are led from the cable anchorage to the corresponding terminals by the shortest route.		N/A
	After they are correctly connected, the core of the protective earthing conductor is led to its terminal and cut off at a distance 8 mm longer than necessary when using the shortest possible path for its correct connection.		N/A
	After the protective earthing conductor is connected to the terminal, it must be possible to accommodate the loop formed by the surplus length of the protective earthing conductor when the installation coupler is assembled correctly.		N/A
A5.14.2	In non-rewirable installation couplers with earthing contact the length of the conductors between the terminations and the cable anchorage shall be so adjusted that the current-carrying conductors will be stressed before the protective earthing conductor if the cable slips in its cable anchorage		N/A
A5.15	In non-rewirable installation couplers it shall not be possible for the cable to be separated from the installation coupler without making it permanently useless		N/A
	Compliance is checked by inspection and by manual test.		N/A

A6	**CONSTRUCTION OF CONTACTS**		N/A
A6.1	Installation female connector contact assemblies shall have sufficient resilience to ensure adequate contact pressure on installation male connector pins		N/A
	Compliance is checked by the tests according to Clauses temperature rise, Breaking capacity, and Forces necessary to disengage the parts of the installation coupler		N/A

Clause	Requirement + Test	result – Remark	Verdict
A6.2	The resistance of connections including the earthing connection shall be sufficiently low. Compliance is checked by the following test: Conductors having the rated cross-sectional areas specified by the manufacturer shall be connected to installation couplers. The clamping screws, if any, are tightened with the torque values specified in Table 4. Non-rewirable installation couplers shall be tested with conductors of the rated connecting capacity. The installation coupler is fully engaged and loaded with the rated current for 1 h. The voltage drop across the clamping unit is measured and the contact resistance is calculated.		N/A
	The contact resistance across the installation coupler is measured and it shall not exceed 1 mΩ per clamping unit.		N/A
	The contact resistance across the distribution block shall not exceed 10 mΩ for the combination		N/A
A6.3	Electrical connections shall be designed in such a way that contact pressure is not transmitted through insulating material		N/A

A7	**CABLES AND THEIR CONNECTION**		N/A
7.1	Installation couplers shall be capable of being fitted with types of cables and cross-sectional areas specified by the manufacturer of the installation coupler		N/A
	Pre-wired installation couplers shall only be supplied with the appropriate conductors connected to the correct terminals or terminations (see Clause 8)		N/A
7.2	Installation couplers shall be so constructed that the clamping units of the cables shall be relieved from pull, thrust and torsion and the cable sheath at the entrance shall be protected against abrasion, e.g. by a cable anchorage for rewirable installation couplers		N/A
7.3	For rewirable installation couplers		N/A
	it shall be clear how the relief from strain and the prevention of twisting is intended to be effected		N/A
	the cable anchorage, or at least part of it, shall be integral with or fixed to one of the other components of the installation coupler		N/A

Clause	Requirement + Test	result – Remark	Verdict
	makeshift methods, such as tying the cable into a knot or tying the ends with string, shall not be used		N/A
	the cable anchorage shall be suitable for the types of cables specified by the manufacturer		N/A
	the cable anchorage shall be of insulating material or be provided with an insulating lining fixed to the metal parts		N/A
	it shall not be possible for the cable to touch the clamping screws of the cable anchorage if these screws are accessible with the test probe B according to Figure 2 of IEC 61032		N/A
	metal parts of the cable anchorage, including its screws, if any, shall be insulated from the earthing circuit		N/A
7.4	Pull force, torque test and distortion		N/A
	Rewirable installation couplers shall be tested with the types of cables specified by the manufacturer, first with the smallest and then with the largest cross-sectional area. Non-rewirable installation couplers shall be tested with the cables as delivered.		N/A
	The cable shall be subjected 50 times to a pull force according to Table 3 for 1 s in one smooth and continuous motion. The cable shall not be damaged during testing. After the test, the cable shall not have been longitudinally displaced by more than 2 mm. Immediately after this, a torque of 0,25 Nm is to be applied to the cable for 1 min. After this test, the cable shall not be distorted by more than 45º.		N/A
7.5	Installation couplers shall be so designed that the cable cannot be damaged by sharp edges where it enters the installation coupler		N/A
	If guards are provided for this purpose, they shall be of insulating material and shall be reliably fixed		N/A
	Compliance is checked by inspection and by the relevant tests of “Installation couplers of elastomeric and thermoplastic materials shall be adequately resistant to ageing”		N/A
A8	Contact retention in insert(EN 61984:2009)		N/A
	Test load shall be three times the specified insertion force (mating) of one contact or the specified insertion force of one contact plus 50N, whichever is less. The minimum test load shall not be less than 20 N.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Contacts safety retained and no axial displacement likely to impair normal operation		N/A
A9	**Provisions for earthing(IEC 61984:2009)**		N/A
	The specimens shall be engaged and disengaged by hand in every possible position. To indicate contact, an electrical device (for example a lamp) shall be used.		N/A
	It shall be checked that the protective earthing contact will first make and last break relative to any other contact. For this test, all other contacts shall be wired in parallel.		N/A
	Resistance between accessible metal parts and the earthing contact		N/A
	A current of 1,5 times the rated current with a maximum of 25 A derived from a source having an open voltage not exceeding 12 V is passed through the protective earthing contact and each of the accessible metal parts in sequence. The voltage drop between the protective earthing contact and the accessible metal part is measured after steady conditions have been established and the resistance is calculated from the current and this voltage drop. This test shall be carried out on the engaged specimen only.		N/A
	In no case shall the resistance exceed the maximum value given in 0,1Ω.		N/A
A10	**Interlock (IEC 61984:2009)**		N/A
10.1	The specimens are engaged by hand over their full engagement distance. The requirement that interlock contacts will make last and break first before any other contact shall be checked. For this test, all other contacts shall be wired in series.		N/A
	A connector with an interlock shall be so designed that it cannot be engaged or disengaged as long as the contacts are live.		N/A
10.2	Connectors with locking device or with snap-in device shall withstand a load of at least 80 N for 1 min. The specified force shall be applied in the direction of the separation of the mated pair with the rate of 10 N/sec.		N/A

Clause	Requirement + Test	result – Remark	Verdict
A11	**BREAKING CAPACITY**		N/A
	Installation couplers shall be mounted according to the manufacturer's instructions. Before the test the retention device shall be made ineffective, the installation couplers shall then be operated 100 strokes without load and 50 strokes with load		N/A
	- test voltage rated voltage (V)		N/A
	- test current rated current (A) .....:		N/A
	- power factor .....:		N/A
	During the test: no flashover and any sustained arcing		N/A
	After the test, the specimens shall withstand an electrical strength test as specified in Sub clause 14.2, the test voltage being reduced to 1500 V		N/A
	The specimens shall show no		N/A
	wear impairing their further use		N/A
	deterioration of enclosures or barriers		N/A
	damage on the entry holes for the male contacts that might impair proper working		N/A
	loosening of electrical or mechanical connections		N/A
	seepage of sealing compound		N/A

A12	**FORCES NECESSARY TO INSERT AND TO WITHDRAW THE CONNECTOR**		N/A
12.1	Installation couplers shall be such that the installation coupler can be easily disengaged		N/A
	Compliance is checked by the following test: The retaining means shall be rendered ineffective before the test. Installation couplers shall be engaged and disengaged 10 times		N/A
	The pull-force measured during the 10th disengagement shall not exceed 80 N		N/A
12.2	Resistance to ageing(two specimen from 12.1)		N/A
	Installation couplers of electrometric and thermoplastic materials shall be adequately resistant to ageing		N/A
	Installation couplers are kept in the cabinet, which is maintained at a temperature of 70 °C ±2 °C, for 240 h (10 days).		N/A
	After the test, specimen show no damage.		N/A

Clause	Requirement + Test	result – Remark	Verdict
A13	**MECHANICAL STRENGTH**		N/A
	Installation couplers shall have adequate mechanical strength		N/A
	Installation couplers subjected to the free fall test: procedure 2 of IEC 60068-2-31:		N/A
	Number of falls ..... :		N/A
	After the test: specimens show no damage and no part become detached or loosened		N/A
A14	**LOW TEMPERATURE IMPACT(EN50521:2008)**		N/A
	Mated specimen		N/A
	Stored at a temperature (ºC)..... :		N/A
	Storing duration (h) ..... :		N/A
	Impact energy (J) ..... :		N/A
	Number of impacted positions ..... :		N/A
	Visual examination: A connector shall show no damage likely to impair safety after exposure to mechanical stress according to the test programme; Contacts safety retained; Internal insulation shall not show damage likely to impair safety		N/A
A15	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		N/A
15.1	Electrical or mechanical connections using screws and nuts shall withstand the mechanical stresses occurring in normal use		N/A
	Screws and nuts which transmit contact pressure shall be of metal and in engagement with a metal thread		N/A
	Other screws and nuts which are operated when mounting an installation coupler during installation may be in engagement with a thread of insulation material		N/A
	Compliance is checked by inspection and, for screws and nuts which are likely to be operated during the life of the installation coupler, by the following test. The screws and nuts are tightened and loosened – 10 times for metal screws in engagement with a thread of insulating material and for screws of insulating material; – 5 times in all other cases.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	During the test, there shall be no damage that will impair the further use of the installation coupler.		N/A
15.2	Screws in engagement with a thread of insulating material and screws of insulating material: correct introduction into the screw hole or nut is ensured		N/A
	Compliance is checked by inspection and by manual test.		N/A
15.3	Screws and rivets are locked against loosening or turning		N/A
	Compliance is checked by inspection and by manual test.		N/A
15.4	Current-carrying parts and earthing contacts shall comply with 8.1.1 of IEC 60999-1		N/A
A16	**MECANICAL STRENGTH IMPACT: EN 60512 / Test [7b] (Only free Connectors)**		N/A
	Mass of specimen (g) ……..:		N/A
	Dropping height (mm) ..... :		N/A
	Dropping cycles……..:		N/A
	positions in 45° steps, one cycle per position		N/A
	Visual examination: No damage likely to impair safety; Internal insulations not damaged;Parts against electric shock not amaged;Clearances and creepage distances not reduced		N/A
B	**SERVICE LIFE TEST GROUP B (sequence tests, except for B4)**		N/A
B1	**INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]**		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)……..:		N/A
	Test current		N/A
B2	**MECANICAL OPERATIONS: EN 60512 / Test [9a]**		N/A
6.3.5	Operating cycles .....:		N/A
	Insertion speed .....:		N/A
	Rest .....:		N/A
	VISUAL EXAMINATION: EN 60512 / Test [1a]		N/A
5.11	No damage shall occur which could impair normal use		N/A

Clause	Requirement + Test	result – Remark	Verdict
B3	**FINAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]**		N/A
	Contact resistance R_2 (mΩ) .....:		N/A
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5$ mΩ + R_1 Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A
B4	**BENDING TEST: EN 60309-1, 24.4 modified(this test is performed on new specimen)**		N/A
6.3.6	Only non-rewireable connectors		N/A
	Rated current .....:		N/A
	Rated voltage .....:		N/A
	Wire cross section .....:		N/A
	Mass (N)……..…….:		N/A
	Numbers of Bendings .....:		N/A
	DURING THE TEST		N/A
	No interruption of the test current		N/A
	AFTER THE TEST		N/A
	The cable support sleeve shall not be loosened from the body		N/A
	The insulation shall show no signs of abrasion or of wear and tear		N/A
	Broken strands shall not pierce the insulation		N/A
	VISUAL EXAMINATION: EN 60512 / Test [1a]		N/A
5.11.2	No damage shall occur which could impair normal use		N/A

C	**Thermal TEST GROUP C(sequence tests)**		N/A
C1	**INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]**		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)…….:		N/A
	Test current		N/A

Clause	Requirement + Test	result – Remark	Verdict
C2	**TEMPERATURE RISE TEST: EN 60512 / Test [5a]**		P
	Contacts and other current-carrying parts shall be so designed as to prevent excessive temperature rise due to current flow under normal operation.		P
	Compliance is checked by the following test: Installation couplers are fitted with cables having the cross-sectional area, the terminal screws, if any, being tightened with a torque of the values Distribution blocks are tested as delivered. Test circuits are shown in schematic diagrams of Annex B. Installation couplers shall be fully engaged. The test current is passed through the current-carrying contacts for 1 h. After this, one current-carrying contact and the earthing contact shall be loaded with the test current 1 h.		P
	During the above tests, the temperature rise shall not exceed 45 K in single-phase test-circuits and 50 K in poly-phase test-circuits.		P
C3	**DRY HEAT: EN 60512 / Test [11i]**		N/A
	Mated specimen		N/A
	Test duration .....:		N/A
	Upper temperature limit .....:		N/A
	Visual examination Any existing cover shall be removed if required, No damage likely to impair function.		N/A
C4	**FINAL MEASUREMENTS**		N/A
	Contact resistance R_2 (mΩ)……:		N/A
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5\ m\Omega + R_1$ Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A

D	**Climate TEST GROUP D**		N/A

Clause	Requirement + Test	result – Remark	Verdict
D1	**Thermal Cycle (TC200)**		N/A
D1.1	INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)……..…….:		N/A
	Test current		N/A
D1.2	Thermal Cycle in accordance with EN 60068-2-14:2009 Test Nb(test sequence 1)		N/A
5.3.9	The specimens shall be prepared according to 5.2.5 with attached and short-circuited cell connections.		N/A
5.3.9.1	Lower temperature limit (°C)..... :		N/A
	Upper temperature limit (°C) ..... :		N/A
	Number of cycles ..... :		N/A
	Visual Examination after thermal cycle		N/A
	Function guaranteed		N/A
	No damage shall occur which could impair normal use		N/A
D1.3	FINAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Contact resistance R_2 (mΩ) .....:		N/A
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5\ m\Omega + R_1$ Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A
D1.4	INSULATION RESISTANCE		N/A

Clause	Requirement + Test	result – Remark	Verdict
	The insulation resistance measured 60 s ± 5 s after application of 500 V d.c. is not less than 5 MΩ The insulation resistance is measured with a d.c. voltage of approximately 500 V applied as listed below, each measurement being made 1 min after application of the voltage a) between current-carrying parts of different polarity; b) between all current-carrying parts connected together and the body; c) on the installation female connector not engaged to its counterpart, between all currentcarrying parts and a metal foil in contact with the exposed front surface; d) between each current-carrying part and parts of the earthing circuit.		N/A
D1.5	ELECTRIC STRENGTH		N/A
	A voltage of substantially sine-wave form, having a frequency of 50 Hz to 60 Hz is applied for 1 min between the parts indicated in D1.4		N/A

D2	**Damp Heat**		N/A
D2.1	INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)……..:		N/A
	Test current		N/A
D2.2	Damp Heat in accordance with IEC 61215 clause 10.13(test sequence 2)		N/A
5.3.10	Test duration (h).....:		N/A
	Temperature (°C) .....:		N/A
	Relative humidity(%) .....:		N/A
	Visual Examination after Damp Heat test;		N/A
	Function guaranteed		N/A
	No damage shall occur which could impair normal use		N/A
D2.3	FINAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Contact resistance R_2 (mΩ) .....:		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5\ m\Omega + R_1$ Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A
D2.4	INSULATION RESISTANCE		N/A
	The insulation resistance measured 60 s ± 5 s after application of 500 V d.c. is not less than 5 MΩ The insulation resistance is measured with a d.c. voltage of approximately 500 V applied as listed below, each measurement being made 1 min after application of the voltage a) between current-carrying parts of different polarity; b) between all current-carrying parts connected together and the body; c) on the installation female connector not engaged to its counterpart, between all currentcarrying parts and a metal foil in contact with the exposed front surface; d) between each current-carrying part and parts of the earthing circuit.		N/A
D2.5	ELECTRIC STRENGTH		N/A
	A voltage of substantially sine-wave form, having a frequency of 50 Hz to 60 Hz is applied for 1 min between the parts indicated in D2.4		N/A

D3	**Thermal cycle and humidity-freeze test (test sequence 3) acc. to EN 50521:2008**		N/A
D3.1	INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / TEST [2B]		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)…….:		N/A
	Test current		N/A
D3.2	THERMAL CYCLE IN ACCORDANCE WITH (IEC 60068-2-14 TEST NB)		N/A
5.3.9	Specimen with cell sided connected interconnect ribbons acc. to clause 5.2.5		N/A
5.3.9.2	Lower temperature limit (°C) ..... :		N/A
	Upper temperature limit (°C) ..... :		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Number of cycles ..... :	50	N/A
	Visual Examination after thermal cycle		N/A
	Function guaranteed		N/A
	No damage shall occur which could impair normal use		N/A
D3.3	HUMIDITY FREEZE TEST		N/A
5.3.17	The specimens shall be prepared according to 5.2.5 with attached and short-circuited cell connections.		N/A
5.3.17.2	Attach a suitable temperature sensor to the front or back surface of the specimens near the middle. ..... : Install the specimen(s) in the climatic chamber at room temperature.		N/A
	10 complete cycles according to Figure 2, about 24h per cycle, throughout the test, record the sample temperature.		N/A
	Then stored 2h-4h for recovery at room temperature, (h); (℃) ..... :		N/A
D3.4	FINAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / TEST [2B]		N/A
	Contact resistance R_2 (mΩ) .....:		N/A
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5\ m\Omega + R_1$ Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A
D3.5	INSULATION RESISTANCE		N/A

Clause	Requirement + Test	result – Remark	Verdict
	The insulation resistance measured 60 s ± 5 s after application of 500 V d.c. is not less than 5 MΩ The insulation resistance is measured with a d.c. voltage of approximately 500 V applied as listed below, each measurement being made 1 min after application of the voltage a) between current-carrying parts of different polarity; b) between all current-carrying parts connected together and the body; c) on the installation female connector not engaged to its counterpart, between all currentcarrying parts and a metal foil in contact with the exposed front surface; d) between each current-carrying part and parts of the earthing circuit.		N/A
D3.6	ELECTRIC STRENGTH		N/A
	A voltage of substantially sine-wave form, having a frequency of 50 Hz to 60 Hz is applied for 1 min between the parts indicated in D3.5		N/A

E	**Degree of protection**		P
E1	**PROTECTION AGAINST ELECTRIC SHOCK**		P
E1.1	An engaged installation coupler shall comply with the requirements for IP 2XC. The installation coupler shall be so designed that live parts are not accessible if the installation male and installation female connector are partially or completely engaged. The installation female connector shall be so designed that live parts are not accessible when disengaged and shall comply with the requirements for IP 2X. The earthing contact and any metal parts connected to the earthing contact shall not be accessible when the installation coupler is completely engaged.		P
	Installation couplers for use in readily accessible areas shall comply with IP 2XD both engaged and unengaged.		N/A
	If the engagement face of the installation female connector for readily accessible areas does not comply with IP 2XD the manufacturer shall make caps available. These caps shall only be removable with the aid of a tool.		N/A

Clause	Requirement + Test	result – Remark	Verdict
	Compliance is checked after the removal of parts which can be removed without the use of a tool by using the test probe C according to Figure 3 of IEC 61032, the test probe D according to Figure 4 of IEC 61032 and the test probe 11 according to Figure 7 of IEC 61032 respectively.		P
E1.2	It is not possible to access live parts without the aid of a tool		P
	Bushes are adequately fixed and it is not possible to remove them without dismantling the connector		P
	Compliance is checked by inspection and by manual test.		P
E1.3	External parts of connectors are of insulating material		P
	Compliance is checked by inspection.		P
E2	**PROTECTION AGAINST HARMFUL INGRESS OF SOLID FOREIGN OBJECTS AND AGAINST HARMFUL INGRESS OF WATER**		P
E3.1	Protection against harmful ingress of foreign solid objects		P
	The minimum IP rating shall be IP 2X		P
	The housing of the installation coupler shall provide a degree of protection against ingress of foreign solid objects as declared by the manufacturer	IP6X	P
	Compliance is checked according to IEC 60529. For numeral 5, category 2 applies. IP classification is measured when the mating parts are engaged completely and caps are used for open installation female connectors.		N/A
E3.2	Protection against harmful ingress of water		P
	The minimum IP rating shall be IP 55		P
	The housing of the installation coupler shall provide a degree of protection against harmful ingress of water as declared by the manufacturer	IPX8(1m, 1h)	P
	Compliance is checked according to IEC 60529. For numeral 3 and 4, the oscillating tube in Figure 4 of IEC 60529 is used. IP classification is measured when the mating parts are engaged completely and caps are used for open installation female connector.		N/A
F	**INSULATION MATERIAL GROUP F**		P

Clause	Requirement + Test	result – Remark	Verdict
F1	INITIAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Reference value for subsequent measurement Contact resistance R_1 (mΩ)…….:		N/A
	Test current		N/A
F2	WEATHER RESISTANCE: ISO 4892-2 Method A		N/A
	Radiation .....:	550W/m²	N/A
	Waveband .....:	290 ~ 800nm	N/A
	Black standard temperature .....:	+65°C	N/A
	Relative humidity .....:	65%RH	N/A
	Cycle .....:	18min spraying 102min drying	N/A
	Test duration .....:	500h	N/A
	VISUAL EXAMINATION: EN 60512 / Test [1a]		N/A
	No cracks		N/A
F3	FINAL MEASUREMENTS (CONTACT RESISTANCE): EN 60512 / Test [2b]		N/A
	Contact resistance R_2 (mΩ) .....:		N/A
	Test current .....:		N/A
	$R_2 \leq 1{,}5\ R_1$ or $R_2 \leq 5\ m\Omega + R_1$ Deviation of the contact resistance shall be no more than 50 % of the reference value or ≤ 5 mΩ.The higher value.		N/A
F4	INSULATION RESISTANCE		N/A

Clause	Requirement + Test	result – Remark	Verdict
	The insulation resistance measured 60 s ± 5 s after application of 500 V d.c. is not less than 5 MΩ The insulation resistance is measured with a d.c. voltage of approximately 500 V applied as listed below, each measurement being made 1 min after application of the voltage a) between current-carrying parts of different polarity; b) between all current-carrying parts connected together and the body; c) on the installation female connector not engaged to its counterpart, between all currentcarrying parts and a metal foil in contact with the exposed front surface; d) between each current-carrying part and parts of the earthing circuit.		N/A
F5	ELECTRIC STRENGTH		N/A
	A voltage of substantially sine-wave form, having a frequency of 50 Hz to 60 Hz is applied for 1 min between the parts indicated in 14.1		N/A
F6	**FLAMMABILITY RATING FOR POLYMERIC MATERIALS AND GLOW WIRE TEST**		P
F6.1	FLAMMABILITY RATING FOR POLYMERIC MATERIALS SERVING AS AN ENCLOSURE FOR LIVE PARTS		P
5.20.1a	Insulation materials serving as an enclosure have flammability class HB, V-2, V-1, V-0 acc. to EN 60695-11-10 .....:		P
5.20.1c	650°C for parts made of insulating material not intended to retain current-carrying parts and parts of the earthing circuit in position even though they may be in contact with them; Glow wire temperature during test acc. to EN 60695-2-10		P
	The specimen is regarded as having passed the glow-wire test if – there is no visible flame and no sustained glowing, or if – flames and glowing on the specimen extinguish within 30 s after removal of the glowwire. There shall be no ignition of the tissue paper or scorching of the board.		P
	No ignition of the material .....:		P

Clause	Requirement + Test	result – Remark	Verdict
F6.2	FLAMMABILITY RATING FOR PLOYMERIC MATERIALS SERVING TO SUPPORT LIVE PARTS		P
5.20.2a	Insulation materials serving as support live parts have flammability class HB, V-2, V-1, V-0 acc. to EN 60695-11-10.....:		P
5.20.2c	850°C for parts made of insulating material intended to retain current-carrying parts and parts of the earthing circuit in position. Glow wire temperature during test acc. to EN 60695-2-10(RESISTANCE TO ABNORMAL HEAT):		P
	The specimen is regarded as having passed the glow-wire test if – there is no visible flame and no sustained glowing, or if – flames and glowing on the specimen extinguish within 30 s after removal of the glowwire. There shall be no ignition of the tissue paper or scorching of the board.		P
	No ignition of the material .....:		P

G GROUP (separate tests)			
G1	**Resistance to tracking (PTI)**		P
	For installation couplers, parts of insulating material retaining live parts in position shall be of material resistant to tracking. *Ceramic parts are not tested.*		P
	The material under test shall pass a proof-tracking-index (PTI) of minimum 175 V using test solution A with the interval between drops 30 s ± 5 s. If the manufacturer specifies the used material as to be of PTI ≥ 400 V (material group II) or PTI ≥ 600 V (material group I), the reduced creepage distances apply.		P
	No flashover or breakdown between electrodes shall occur before a total of 50 drops has fallen.		P
G2	**BALL PERSURE**		N/A
	Parts of insulation material, with the exception of elastomeric or similar materials for installation couplers shall be subjected to a ball-pressure test.		N/A

Clause	Requirement + Test	result – Remark	Verdict
G2.1	125°C ± 2 °C for those parts of installation couplers which retain current-carrying parts and parts of the earthing circuit in position, 1h. The diameter of the impression caused by the ball is measured and shall not exceed 2 mm.		N/A
G2.2	70 °C ± 2 °C for other parts of installation couplers, 1h. The diameter of the impression caused by the ball is measured and shall not exceed 2 mm.		N/A
G3	**RESISTANCE TO RUSTING**		N/A
	Ferrous parts shall be adequately protected against rusting.		N/A
	Compliance is checked by the following test: All grease is removed from the parts to be tested by immersion in a cold chemical degreaser such as petroleum ether for 10 min. The parts are then immersed for 10 min in a 10 % solution of ammonium chloride in water at a temperature of 20°C ± 5 °C. Without drying, but after shaking off any drops, the parts are placed for 10 min in a box containing air saturated with moisture at a temperature of 20 °C ± 5°C.		N/A
	After the parts have been dried for 10 min in a heating cabinet at a temperature of 100°C ±5 °C and have been left at room temperature for 24 h, their surface shall show no signs of rust. Traces of rust on sharp edges and any yellowish film removable by rubbing are ignored.		N/A
G4	**Specimens of installation couplers and caps are kept for 1 h in a heating cabinet at a temperature of 100 ºC±2 ºC**		N/A
	During the test, the specimens shall not undergo any change impairing their further use, and sealing compound shall not flow to such an extent that live parts are exposed. A slight displacement of the sealing compound shall be neglected provided that safety is not impaired.		N/A

Clause	Requirement + Test	result – Remark	Verdict
H1	**Installation couplers shall be sufficiently resistant to ageing**		N/A
	Resistance to ageing for the installation coupler engaged as for normal use is checked by the current cycling ageing test at ambient temperature		N/A
	The test is made at ambient temperature on all poles of three installation couplers. Rewirable installation couplers are wired with conductors of cross-section according to Table 2 prepared as for the voltage drop test according to test 9.8 of IEC 60999-1. Non-rewirable installation couplers shall be tested as delivered		N/A
	During the test a test current is passed through all poles except during the cooling period. The whole test arrangement, including the conductors, shall not be moved until all the following voltage drop tests have been completed. The assembled installation couplers are then subjected to 384 cycles, each cycle having a duration of approximately 1 h, divided into 30 min with current and 30 min without current. The voltage drop is measured after the 24th, 192nd and 384th temperature cycles are completed using the maximum current rating and test arrangement previously specified.	The allowable voltage drop per clamping unit shall not exceed the smaller of the two following values: – either 22,5 mV; – or 1,5 times the value measured after the 24th cycle. In addition, after this test an inspection with normal or corrected vision, without additional magnification, shall show no changes impairing further use, such as cracks, deformations or the like. See appended TABLE 9	N/A

Clause	Requirement + Test	result – Remark	Verdict

TABLE 1 **Table 5a – Installation couplers intended for use in supply systems with a maximum voltage to earth of 690 V, rated impulse voltage 4,0 kV**

	Clearance Mm		Creepage distance [c] mm					
			Rated insulating voltage					
			Material group					
			I		II		III	
			≤ 690 V					
Between	**Req.**	**Meas.**	**Req.**	**Meas.**	**Req.**	**Meas.**	**Req.**	**Meas.**
Live parts of different polarity	1,5	12	3,2	--	4,5	15	6,3	--
Live parts and -accessible external surface [a]	5,5	22,2	6,4	--	9	24,5	12,6	--
- inaccessible external screws or the like [b]	--	--	--	--	--	--	--	--
Parts of the earthing circuit and - live parts	1,5	12	4	--	5,6	15	8	--
- accessible screws or the like	--	--	--	--	--	--	--	--
- inaccessible external screws or the like [b]	--	--	--	--	--	--	--	--

a The accessible external surface includes a metal foil in contact with the external surfaces of insulating material.
b Inaccessible external screws are those which cannot be touched with the test probe B of IEC 61032.
c Values for creepage distances are adapted to clearances because creepage distances cannot be smaller than the corresponding clearances.

Clause	Requirement + Test	result – Remark	Verdict

TABLE 2	**TABLE: Pull and torque test for connectors**						
	Torque applied on clamping screws of cord anchorage (Nm) .....:						—
Specimen	Type of cord	Nominal cross-sectional area (mm^2)	Pull (50 times) (N)	Torque (1 min) (0,25 Nm)	Displacement of cord (mm)	Distortion °	
-	-	-	-	-	-	-	N/A
-	-	-	-	-	-	-	N/A
Supplementary information:							

TABLE 3	**TABLE: threaded part torque test**				
threaded part identification	diameter of thread (mm)	column number (I or II)	applied torque (Nm)	times (5/10)	no damage
L	-	-	-	-	-
N	-	-	-	-	-
PE	-	-	-	-	-
supplementary information:					

TABLE 4	**TABLE: Temperature rise test**		—
	Type and cross-sectional area of cord fitted to installation couplers .....:	$4mm^2$	—
	Torque applied to screws of clamping units (Table 4) (Nm), if any .....:	N/A	—
	Test current .....:	31,25A	

Specimen	Temperature measuring point	Measured temperature rise Δt of terminals and contacts (K):	Allowed ΔT (K)
	L pole on female connector	43,6	45
	PE pole on male connector	42,5	45
Supplementary information: **line side male connector mated with line side female connector**			

Clause	Requirement + Test	result – Remark	Verdict

TABLE 5 Insulation resistance

Test voltage applied between:	Measured (MΩ)				Required (MΩ)
	D1.4	D2.4	D3.5	F4	
a) current-carrying parts of different polarity	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ
b) all current-carrying parts connected together and the body	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ
c) on the installation female connector not engaged to its counterpart, between all current carrying parts and a metal foil in contact with the exposed front surface	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ
d) each current-carrying part and parts of the earthing circuit	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ	≥ 5 MΩ
Supplementary information:					

TABLE 6 Electric strength

Points of application of the test voltage (Table 101):	Test voltage (V)	Flashover /breakdown (Yes/No)			
		D1.5	D2.5	D3.5	F5
a) current-carrying parts of different polarity	1500	1890	No	No	No
b) all current-carrying parts connected together and the body	3000	3780	No	No	No
c) on the installation female connector not engaged to its counterpart, between all current carrying parts and a metal foil in contact with the exposed front surface	3000	3780	No	No	No
d) each current-carrying part and parts of the earthing circuit	1500	1890	No	No	No

Clause	Requirement + Test	result – Remark	Verdict

e) for rewirable installation couplers between accessible metal parts of the cable anchorage including clamping screws and a metal rod of the maximum diameter of the cable inserted in its place	1500	1890	No	No	No	
Supplementary information:						

TABLE 7	**TABLE: Glow-wire test**				
Part under test	Material designation	Test temperature (°C)	no visible flame and no sustained glowing (P/F) or flame and glowing extinguish within 30 s (s)	no ignition of the tissue paper (P/F)	
Enclosure	540Z(f1)	650	No	No	P
Support live part	644Z(f1)	750	No	No	P
Supplementary information:					

TABLE 8	**TABLE: Resistance to tracking**		
Part under test	Material designation	Test voltage (V)	Flashover / breakdown (Yes/No)
Support live part	644Z(f1)	175	No
Supplementary information:			

TABLE 9	**TABLE: Ball pressure test**			
Part under test	Material designation	Test temperature (°C)	Impression diameter (mm)	
-	-	-	-	N/A
Supplementary information:				

TABLE 10	**TABLE: current cycling test for the installation coupler**		N/A
	Temperature cycles test		N/A
	test current per table 2 (A) ..... :		N/A
	nominal cross-sectional area (mm^2) ..... :		N/A
	allowed voltage drop (mV) ..... :	≤ 22,5 mV or 1,5 times 24th cycle value (mV)	N/A

Clause	Requirement + Test	result – Remark	Verdict

Sample number	1	2	3	4	5	6	Remarks
voltage drop after 24th cycle	-	-	-	-	-	-	N/A
voltage drop after 192nd cycle	-	-	-	-	-	-	N/A
voltage drop after 384th cycle	-	-	-	-	-	-	N/A
Supplementary information: One additional set of 3 samples mentioned as sample no. 4, 5 and 6 may be necessary for testing with conductors of the smallest and largest cross section. See Sub clause 9.8 of IEC 60999-1.							

Annex A

List of test equipment used at the Manufacturer's Testing Laboratory:

Equipment	Inventory No	Last date	Due date	Test items
IP67 anti-flush device	TXC-2	2020.09.15	2021.09.14	Degree of protection IP Code
Dust test chamber	AIV-500	2020.09.15	2021.09.14	Degree of protection IP Code
Withstanding voltage tester	CHT9951A	2020.09.15	2021.09.14	Dielectric strength
Glowing filament tester	ZRS-2	2020.09.15	2021.09.14	Flammability
TPARKING tester	LDQ-2-C	2020.09.15	2021.09.14	PTI

Annex B

Test circuits for temperature rise test (See Clause C2)

Clause	Requirement + Test	result – Remark	Verdict

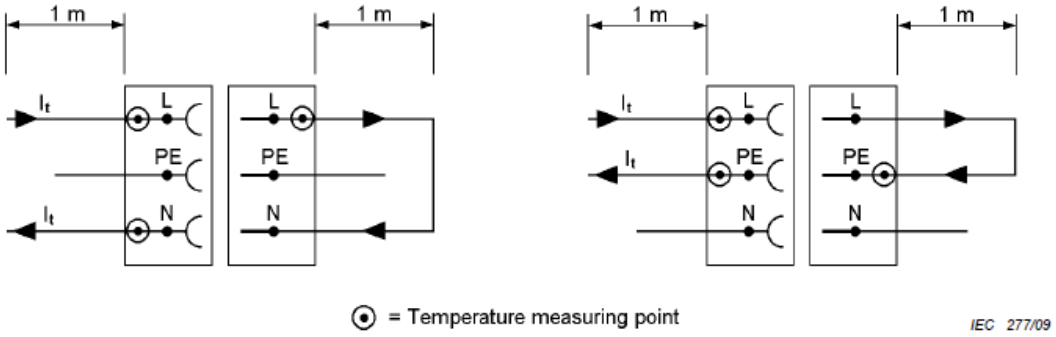


Figure B.1 – 1P + N + PE installation couplers, including N (left figure), including PE (right figure)

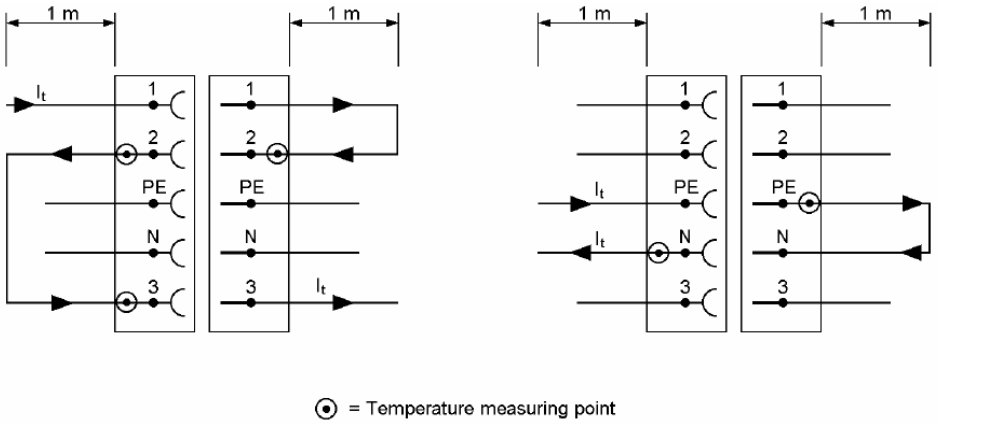


Figure B.2 – 3P + N + PE installation couplers, 3 phases loaded (left figure), N and PE loaded (right figure)

Clause	Requirement + Test	result – Remark	Verdict

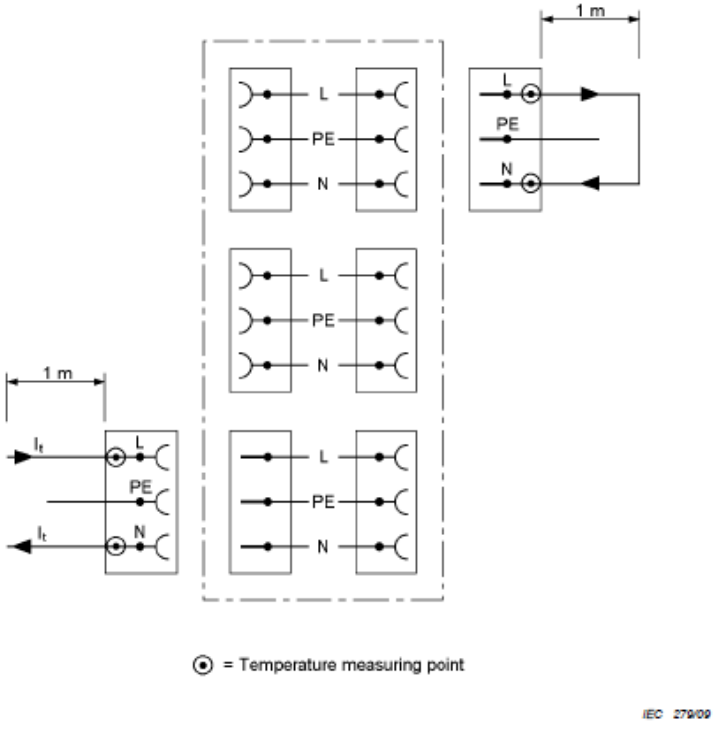


Figure B.3 – 1P + N + PE distribution block, phase and N loaded

Clause	Requirement + Test	result – Remark	Verdict

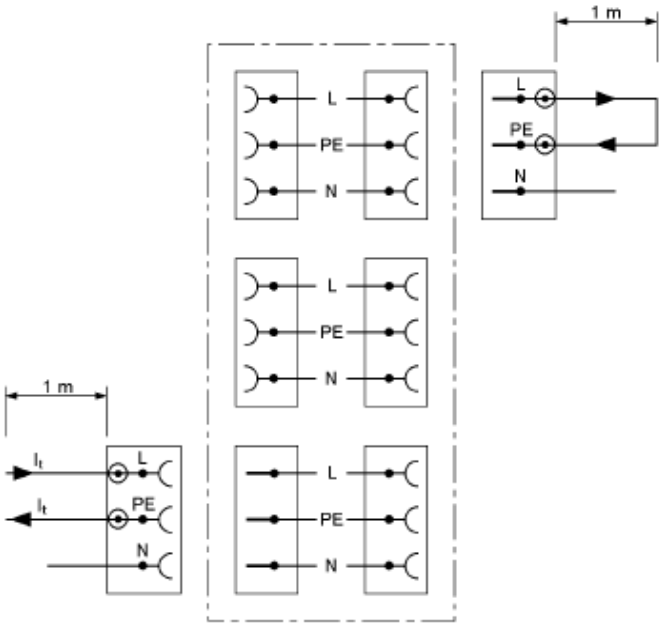


Figure B.4 – 1P + N + PE distribution block, phase and PE loaded

Clause	Requirement + Test	result – Remark	Verdict

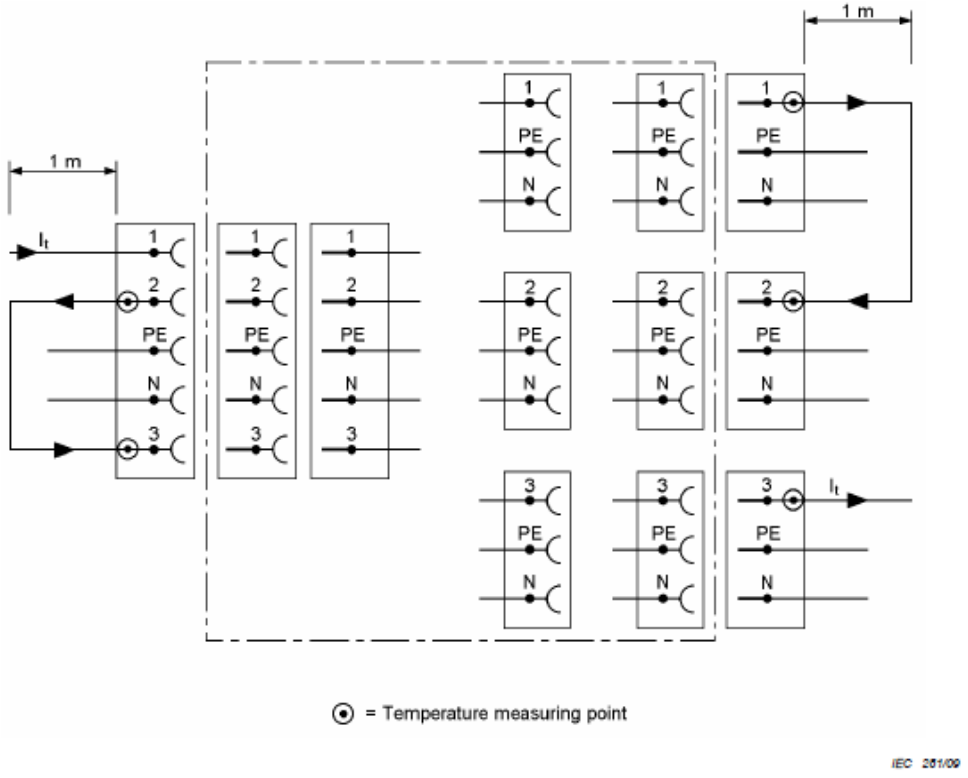


Figure B.5 – 3P + N + PE - to 1P + N + PE distribution block, 3 phases loaded

Clause	Requirement + Test	result – Remark	Verdict

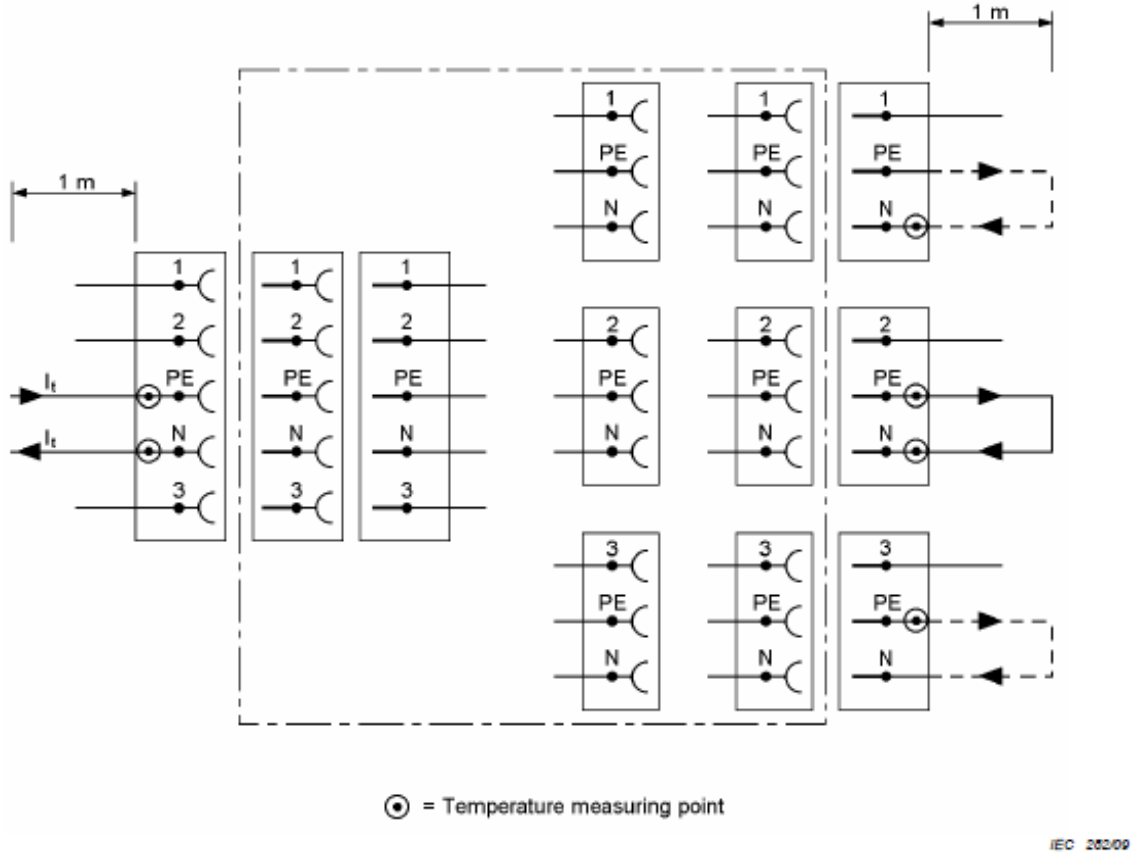


Figure B.6 – 3P + N + PE - to 1P + N + PE distribution block, N and PE loaded