

Test Report issued under the responsibility of:



TEST REPORT IEC 61535 Installation Couplers intended for permanent connection in fixed installation	
Report Reference No.	47462 / rev.1
Date of issue	7 th June 2015 (re-issued 7 th August 2015)
Total number of pages	14
CB Testing Laboratory	Nemko Ltd
Address	15 Chelsea Fields Estate, Western Road, London, SW19 2QA
Applicant's name	ELET PLAST LTD
Address	Unit 05, 23/F New Treasure Centre 10 Ng Fong Street, San Po Kong, Kowloon, Hong Kong
Test specification:	
Standard	IEC 61535:2009 (First Edition) + A1: 2012
Test procedure	type test
Non-standard test method	N/A
Test Report Form No.	IEC61535B
Test Report Form(s) Originator	DEKRA certification B.V.
Master TRF	Dated 2013-01
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Test item description	Installation Couplers (EPx family, AC family & GST family)
Trade Mark	
Manufacturer	ELET PLAST Ltd, / ADELS / wieland
Model/Type reference	EPN, EPS, EPC, EPE, EPT, AC 166 G & GST 18
Ratings	20A, 250V/400V ~

Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB Testing Laboratory:	Nemko Ltd
Testing location/ address	15 Chelsea Fields Estate, Western Road, London, SW19 2QA, UK
<input type="checkbox"/> Associated CB Test Laboratory:	
Testing location/ address	
Tested by (name + signature)	Bunmi Phillips
Approved by (+ signature).....	Giuseppe Capanna



Summary of testing:	
<p>Tests performed (name of test and test clause): The tested connectors belonging to the EPx family, AC family & GST family, with breaking capacity (CBC) of the manufacturers: ELET PLAST Ltd (type EPN, EPC, EPE, EPT) Adels-Contact (Type AC 166 G ... / ...and Wieland (Type GESIS GST 18 ...) are meeting the requirements of compatibility, according to the enclosed program, regarding mechanical and electric functions.</p> <p>The following tests have been carried out :</p> <p>9 Dangerous compatibility 12 Construction 14 Insulation Resistance and Electric Strength 15 Construction of contacts 16 Temperature rise 18 Forces necessary to disengage the parts of the installation coupler 21 Resistance to heat and ageing</p>	<p>Testing location:</p> <p>Nemko Ltd 15 Chelsea Fields Estate Western Road London SW19 2QA</p>
<p>Summary of compliance with National Differences United Kingdom & Germany</p>	
<p>List of Attachments: Attachment 1: UK and Germany Special national conditions</p>	

Copy of marking plate:

EPx



Adels



Wieland



Screwless Couplers

EPS



Wieland



Test item particulars:	Installation coupler family of connectors: EPx (ELETPLAST), AC (ADELS) & GST (Wieland)
Rated impulse voltage	<input type="checkbox"/> 2,5 kV <input checked="" type="checkbox"/> 4kV
Method of connecting	<input checked="" type="checkbox"/> rewirable <input type="checkbox"/> non rewirable
Degree of protection	<input type="checkbox"/> IP ..
Location of installation.....	<input type="checkbox"/> readily <input checked="" type="checkbox"/> non-readily
Earthing contact	<input checked="" type="checkbox"/> with <input type="checkbox"/> without
Type of conductors.....	<input type="checkbox"/> solid <input type="checkbox"/> rigid (solid and stranded) <input type="checkbox"/> flexible <input checked="" type="checkbox"/> both (solid and stranded) and flexible
Type of terminal for rewirable installation couplers	<input checked="" type="checkbox"/> screw <input checked="" type="checkbox"/> screwless <input type="checkbox"/> piercing
Voltage (V).....	250/400
Current (A).....	20
Possible test case verdicts:	
- test case does not apply to the test object.....	N
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing	
Date of receipt of test item	26 th March 2015
Date (s) of performance of tests	7 th May 2015 to 21 st July 2015

General remarks:

The test results presented in this report relate only to the object tested.

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"(See Enclosure #)" refers to additional information appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a comma / point is used as the decimal separator.

This report replaces report 47462 due to addition of EPS models

General product information: Models covered by report**Main Model = EPC..O (Tall)**

First dot (3,4 or 5) = Number of ways

Second dot (M or F) = Male or Female

Variant 1 = EPN..O (Flat)

First dot (3,4 or 5) = Number of ways

Second dot (M or F) Male or Female

Variant 2 = EP.. SERIE (Distributors)

First dot(J,T, D or E) = Number of outlets

J = 1, T = 2, D = 3 & E = 5

Second dot (3 or 5) = Number of ways

Variant 3 = EPS..O (Snap in screwless)

First dot (3,4 or 5) = Number of ways

Second dot (M or F) = Male or Female

Adels

AC 166 G ...

Wieland

GESIS GST 18 ...

9	DANGEROUS COMPATIBILITY		P
9.1	An installation coupler system shall be designed and construction so that unintended or improper connection is prevented		P
	Engagement of the installation male and female connector is attempted in any unintended configuration		P
	- 80 N (rated current 10 A, 16 A and 20 A)		P
	- 120 N (rated current 25 A and 32 A)		N
	Accessories with electrometric or thermoplastic material: test carried out at (35 ± 2) °C		N
9.2	It shall not be possible, within a given installation coupler system, to engage an installation male connector with an installation female connector		P
	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		P
	without earthing contact if the installation male connector is an installation male connector with earthing contact		P
	with different phase to neutral voltage ratings or different rated current		P
	Compliance is checked by the test according to 9.1		P
9.3	Installation couplers of different systems from the same manufacturer shall not be dangerously compatible		P
	Compliance is checked by the test according to 9.1		P
9.4	Not compatible with IEC 60309, IEC 60320, IEC 60906		P

12	CONSTRUCTION		P
12.1	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		P
	When withdrawing the installation male connector, the current-carrying male contacts shall separate before the earth connection is broken		P
12.2	Contacts of installation male connectors shall be locked against rotation if male contacts can be touched without the aid of tool		N

	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. The contact parts shall not rotate more than an angle of 30° in total		N
12.3	Contacts shall be securely fixed and shall have sufficient mechanical strength. They shall not be removable without the aid of a tool		P
	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.		P
12.4	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		P
12.5	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
12.6	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		P
	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		P
12.7	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
12.8	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.		P
	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

12.8.1	Rewirable accessories: test with 6 mm free wire		
	free wire of a conductor connected to a live terminal not touch any accessible metal part or able to emerge from the enclosure		P
	free wire of a conductor connected to an earthing terminal not touch a live part		P
12.8.2	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
	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		P
12.8.3	Non-rewirable, moulded-on accessories:		N
	Verification of means to prevent stray wires reducing the minimum distance through insulation to external accessible surface below 1,5 mm		N
12.9	Installation couplers themselves shall not incorporate any other electrical devices for example switches, fuses, relays, thermostats, surge protective devices and thermal current limiting devices		P
	The use of installation couplers as connection for the electrical devices listed above is permitted		P
12.10	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
	It shall only be possible to render the means of retention ineffective by a deliberate or intentional act		N
	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
	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. The installation coupler shall not loosen or become disconnected		N
12.11	The distribution block shall include one installation male connector only for each circuit		N
	The distribution block intended for fixed mounting shall have means for fixing to the support e.g. screw holes		N
12.12	Installation male connectors shall have a shroud, which shall be at least as long as the longest pin		N

12.13	Non-rewirable installation couplers shall be factory-wired		N
12.14	Installation couplers with earthing contact shall be so adjusted that the current-carrying conductors will be stressed before the protective earthing conductor		P
12.14.1	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		P
	in case of excessive stresses, the protective earthing conductor will break after the current-carrying conductors		P
	It should be possible to mount the installation coupler properly		P
12.14.2	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
12.15	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

14	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
	Specimens kept in a humidity cabinet containing air with relative humidity maintained between 91 % and 95 % for:		P
	– 48 h (2 days) for installation couplers with IP-rating IP X0		P
	– 168 h (7 days) for installation couplers with IP-rating higher than IP X0		N
	After this treatment the specimens show no damage		P
14.1	The insulation resistance measured 60 s ± 5 s after application of 500 V d.c. is not less than 5 MΩ	See appended table 14.1	P
14.2	Electric strength: a.c. test voltage applied for 1 min	See appended table 14.2	P

15	CONSTRUCTION OF CONTACTS		P
15.1	Installation female connector contact assemblies shall have sufficient resilience to ensure adequate contact pressure on installation male connector pins		P
	Compliance is checked by the tests according to Clauses 16 to 18		P
15.2	The resistance of connections including the earthing connection shall be sufficiently low		P

	The contact resistance across the installation coupler is measured and it shall not exceed 1 mΩ per clamping unit	(F) EPN to (M) Adels = 0.56mΩ (F) EPN to(M)Wieland=0.58mΩ (M) EPN to (F) Adels = 0.58mΩ (M)EPN to(F)Wieland=0.58mΩ Screwless couplers (F) EPS to (M) Adels = 0.64mΩ (F)EPS to(M) Wieland=0.56mΩ	P
	The contact resistance across the distribution block shall not exceed 10 mΩ for the combination		N
15.3	Electrical connections shall be designed in such a way that contact pressure is not transmitted through insulating material		P

16	TEMPERATURE RISE		P
	Contacts and other current-carrying parts shall be so designed as to prevent excessive temperature rise due to current flow under normal operation	See appended table 16	P

18	FORCES NECESSARY TO INSERT AND TO WITHDRAW THE CONNECTOR		P
	Installation couplers shall be such that the installation coupler can be easily disengaged		P
	The retaining means shall be rendered ineffective before the test. Installation couplers shall be engaged and disengaged 10 times		P
	The pull-force measured during the 10 th disengagement shall not exceed 80 N	(M) EPN pull from (F) Wieland = 22.2N (5 way) (M) EPN pull from (F) Adels = 25.4N (5 way) (F) EPN pull from (M) Wieland = 50.7N (5 way) (F) EPN pull from (M) Adels = 32.2N (5 way) Screwless couplers 5 way (M) EPS pull from (F) Wieland = 18.3N (F) EPS pull from (M) Wieland = 31.7N (M) EPS pull from (F) Adels = 32.8N (F) EPS pull from (M) Adels = 41.9N	P

21	RESISTANCE TO HEAT AND AGEING		P
21.1	Installation couplers shall be sufficiently resistant to heat		P
21.2	Specimens of installation couplers and caps are kept for 1 h in a heating cabinet at a temperature of 100 °C \pm 2 °C		P
	During the test: no change impairing their further use and sealing compound, if any, not flow		P
21.3	Parts of insulation material, with the exception of electrometric or similar materials for installation couplers shall be subjected to a ball-pressure for 1 hour		N
	After the test: diameter of impression \leq 2 mm	See appended table 21.3	N
21.4	Installation couplers of electrometric and thermoplastic materials shall be adequately resistant to ageing		P
	Installation couplers are kept in the cabinet, which is maintained at a temperature of 70 °C \pm 2 °C, for 240 h (10 days).		P
	After the test: specimen show no damage		P

14.1	TABLE: Insulation resistance		P	
	Test voltage applied between:	Measured (M Ω)	Required (M Ω)	P
	a) current-carrying parts of different polarity	> 100	\geq 5 M Ω	P
	b) all current-carrying parts connected together and the body	>100	\geq 5 M Ω	P
	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	> 100	\geq 5 M Ω	P
	d) each current-carrying part and parts of the earthing circuit	> 100	\geq 5 M Ω	P
	Supplementary information:			

14.2	TABLE: Electric strength			P
Points of application of the test voltage (Table 101):	Test voltage (V)	Flashover / breakdown (Yes/No)	P	
a) current-carrying parts of different polarity	1500	N	P	
b) all current-carrying parts connected together and the body	3000	N	P	
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	N	P	
d) each current-carrying part and parts of the earthing circuit	1500	N	P	
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	N	P	
Supplementary information:				

16	TABLE: Temperature rise test			P
	Type and cross-sectional area of cord fitted to installation couplers	2.5mm ²		—
	Torque applied to screws of clamping units (Table 4) (Nm)	0.5Nm		—
Specimen N°	Test circuit (Annex B)	Test current (Table 2) (A)	Measured temperature rise Δt of terminals and contacts (K):	Allowed ΔT (K)
(F) EPN / (M) Adels	B1 (3 way)	25	30.6	45
(M) EPN / (F) Adels	B1 (3 way)	25	29.3	45
(F) EPN / (M) Adels Plus Adels distribution block	B3 (3 way)	25	26.9	45
(M) EPN / (F) Adels Plus Adels distribution block	B3 (3 way)	25	27.3	45
(F) EPN / (M) Adels Plus Wieland distribution block	B3 (3 way)	25	27.7	45
(M) EPN / (F) Adels Plus Wieland distribution block	B3 (3 way)	25	26.7	45
(F) EPN / (M) Wieland	B1 (3 way)	25	29.0	45
(M) EPN / (F) Wieland	B1 (3 way)	25	28.1	45
(F) EPN / (M) Wieland Plus Adels distribution block	B3 (3 way)	25	25.9	45
(M) EPN / (F) Wieland Plus Adels distribution block	B3 (3 way)	25	27.0	45
(F) EPN / (M) Wieland Plus Wieland distribution block	B3 (3 way)	25	27.7	45
(M) EPN / (F) Wieland Plus Wieland distribution block	B3 (3 way)	25	26.7	45
(F) EPN / (M) Adels	B2 (5 way)	25	39.0	45
(F) EPN / (M) Adels Plus Wieland distribution block	B2 (5 way)	25	34.8	45
(F) EPN / (M) Wieland	B2 (5 way)	25	32.5	45
(F) EPN / (M) Wieland Plus Wieland distribution block	B2 (5 way)	25	28.5	45
Supplementary information:				

16	TABLE: Temperature rise test			P
	Type and cross-sectional area of cord fitted to installation couplers		2.5mm ²	—
	Torque applied to screws of clamping units (Table 4) (Nm)		Screwless couplers	—
Specimen N°	Test circuit (Annex B)	Test current (Table 2) (A)	Measured temperature rise Δt of terminals and contacts (K):	Allowed ΔT (K)
(F) EPS / (M) Wieland	B1 (3 way)	25	32.3	45
(F) EPS / (M) Adels	B1 (3 way)	25	31.7	45
(F) EPS/ (M) Wieland	B2 (5 way)	25	34.8	45
(F) EPS / (M) Adels	B2 (3 way)	25	31.3	45
Supplementary information:				