

CERTIFICATE

Issued to:
Applicant:
WAGO GmbH & Co. KG
Hansastrasse 27
32423 Minden/westfalen, Germany

Licensee:
WAGO GmbH & Co. KG
Hansastrasse 27
32423 Minden/westfalen, Germany

Product : Splicing wire connector
Trade name(s) : WAGO
Type(s)/model(s) : 221

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

DEKRA hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard(s) EN 60998-2-2:2004
- an inspection of the factory location according to CENELEC Operational Document CIG 021
- a DEKRA certification agreement with the number 2074495

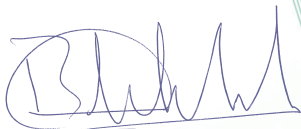
DEKRA hereby grants the right to use the ENEC certification mark.

The ENEC certification mark may be applied to the product as specified in this certificate for the duration and under the conditions of the ENEC certification agreement.

This certificate is issued on 12 November 2021 and expires upon withdrawal of one of the above mentioned standards.

Certificate number: 71-113253 REV.1

DEKRA Certification B.V.



B.T.M. Holtus
Managing Director



H.R.M. Barends
Certification Manager

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ACCREDITED BY THE
DUTCH ACCREDITATION
COUNCIL



SPECIFICATION OF THE CERTIFIED PRODUCT**Product data**

Product	: Splicing wire connector
Trade name(s)	: WAGO
Type(s)/model(s)	: 221-2401, 221-2411 and 221-4xx
Material	: thermoplastic material
Rated connecting capacity	: 4 mm ²
Rated current	: 32 A
Rated voltage	: 450 V
T-rating	: 85 °C

Product data – type 221-2401

Connectable conductors	: 0,2 - 4 mm ² solid 0,34 - 4 mm ² flexible 0.2 - 2,5 mm ² stranded
Description	: screwless type clamping units, both sides of the connector one clamping unit, 1-pole, orange lever

Product data – type 221-2411

Connectable conductors	: 0,2 - 4 mm ² flexible and solid 0,2 - 2,5 mm ² stranded
Type	: 221 with suffixes -2401, -2411
Description	: screwless type clamping units, both sides of the connector one clamping unit, 1-pole, orange lever

Product data – type 221-4xx

Connectable conductors	: 0,14 mm ² flexible 0,2 - 4 mm ² flexible and solid 1,5 - 4 mm ² stranded
Type	: 221 with suffixes -412, -413 and -415
Description	: screwless type clamping units, 1-pole, last number of the suffix indicates the number of clamping units, orange lever
Type	: 221 with suffixes -482, -483 and -485
Description	: screwless type clamping units, 1-pole, last number of the suffix indicates the number of clamping units, gray lever

TESTS**Test requirements**

EN 60998-2-2:2004

Test result

The test results are laid down in DEKRA test file 224556300.

Additional information

ENEC scope: For components intended to be used only in appliances.

The test results are laid down in DEKRA test report 2245563.50.

This certificate replaces certificate No. 71-113253 which we hereby declare invalid.

Conclusion

The examination proved that all requirements were met.

Factory locations

WAGO GmbH & Co. KG
Hansastraße 27
32423 Minden/westfalen, Germany

WAGO Contact S.A.
Route de l'Industrie 19 CP 168
1564 Domdidier, Switzerland

WAGO Kontakttechnik GmbH & Co. KG Werk Sondershausen
Waldstraße 1
99706 Sondershausen, Germany

Wago Pvt. Ltd.
C-27, Sector-58, Phase III
201301 Noida Uttar Pradesh, India

Wago Electronic (Tianjin) Co. Ltd.
No. 5 Quanhui Road Wu Qing Development Area
301700 Tianjin, China

Wago Elwag sp.z.o.o.
Ul. Piekna 58 a
50-506 Wrocław, Poland

Wago Elwag
Innowacyjna 2
55-330 Wroblowice, Poland



WAGO Kontakttechnik GmbH & Co. KG
Cammer Str. 17
32423 Minden, Germany



Test Report issued under the responsibility of:



TEST REPORT IEC 60998-2-2:2004 Connecting devices for low voltage circuits for household and similar purposes Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units	
Report Reference No.....	2245563.50
Date of issue.....	2021-02-24
Total number of page.....	41
Applicant's name.....	WAGO Kontakttechnik GmbH & Co. KG
Address.....	Hansastraße 27, 32423 Minden/Westfalen, Germany
Test specification:	
Standard.....	IEC 60998-2-2 (see also IEC 60 998-1:2002)
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
Test Report Form No.	IEC60998_2_2B
Test Report Form(s) Originator.....	DEKRA certification B.V.
Master TRF.....	Dated 2012-02
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If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.	
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
Test item description.....	Splicing wire connector
Trade Mark.....	WAGO
Manufacturer.....	WAGO Kontakttechnik GmbH & Co. KG
Model/Type reference	Series 221
Ratings	450 V, 32 A, 4 mm ²

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	DEKRA Certification B.V.	DEKRA Certification B.V.
Testing location/ address.....:		Meander 1051, 6825 MJ Arnhem, The Netherlands
<input type="checkbox"/>	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		A. A. P. Vught (Technician Industrial Safety) 
Approved by (name, function, signature)....:		F.S Strikwerda (Project Manager Industrial Safety) 
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature)		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)....:		
<input checked="" type="checkbox"/>	Testing procedure: CTF Stage 3:	WAGO Kontakttechnik GmbH & Co. KG
<input type="checkbox"/>	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		Hansastraße 27, 32423 Minden/Westfalen, Germany
Tested by (name, function, signature).....:		J. Olbrich (Engineer) 
Witnessed by (name, function, signature)..:		H.L. Schendstok (Project Manager Industrial Safety) 
Approved by (name, function, signature)....:		R. Gioia (Team Leader) 
Supervised by (name, function, signature) :		F.S Strikwerda (Project Manager Industrial Safety) 

<p>List of Attachments (including a total number of pages in each attachment):</p> <p>Attachment A: EN 60998-1 CENELEC COMMON MODIFICATIONS and EN 60998-2-2 CENELEC COMMON MODIFICATIONS (2 pages) Attachment B: EN 60998-1 SPECIAL NATIONAL CONDITIONS, United Kingdom (1 page)</p>	
<p>Summary of testing:</p>	
<p>Tests performed (name of test and test clause):</p> <p>First Edition, 2168803.50: Complete type-testing Tests are carried out on type 221-415 unless otherwise stated.</p> <p>Second Edition, 2221141.50: This report replaces report 2168803.50 issued on 2014-02-12 Due to the fact of re-verification a temperature-rise test (clause 15) on 221-415 is carried out.</p> <p>Third Edition, 2224732.50: This report replaces report 2221141.50 issued on 2017-10-19 Due to the fact that types 221-482, 221-483 and 221-485 are added. The following tests are carried out: clause 12.1, 12.2, 13.3, 13.4, 14.101, 14.2, 16.2, 16.3, 18, 19</p> <p>Fourth Edition, 2245563.50: This report replaces report 2224732.50 issued on 2018-08-21, due to the fact that types 221-2401 and 221-2411 are added. The following tests are carried out under CTF3: clause 8, 9, 10, 10.104, 10.105, 10.106, 11, 12.1, 12.2, 13.3, 13.4, 14.101, 14.2, 15, 15.101, 16.2, 16.3, 17, 19</p> <p>The following test is carried out at DEKRA clause 18</p>	<p>Testing location:</p> <p>WAGO Kontakttechnik GmbH & Co. KG Hansastraße 27, 32423 Minden/Westfalen, Germany</p> <p>WAGO Kontakttechnik GmbH & Co. KG Hansastraße 27, 32423 Minden/Westfalen, Germany</p> <p>WAGO Kontakttechnik GmbH & Co. KG Hansastraße 27, 32423 Minden/Westfalen, Germany</p> <p>WAGO Kontakttechnik GmbH & Co. KG Hansastraße 27, 32423 Minden/Westfalen, Germany</p> <p>DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem The Netherlands</p>

Summary of compliance with National Differences

List of countries addressed:

European Group Differences

Special National Conditions United Kingdom

The product fulfils the requirements of EN 60998-2-2: 2004 in conjunction with EN 60998-1:2004.

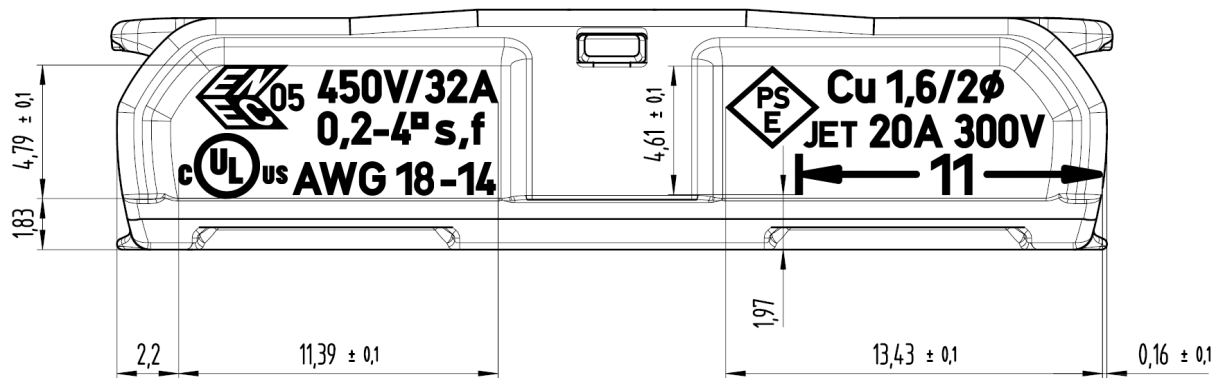
Copy of marking plate

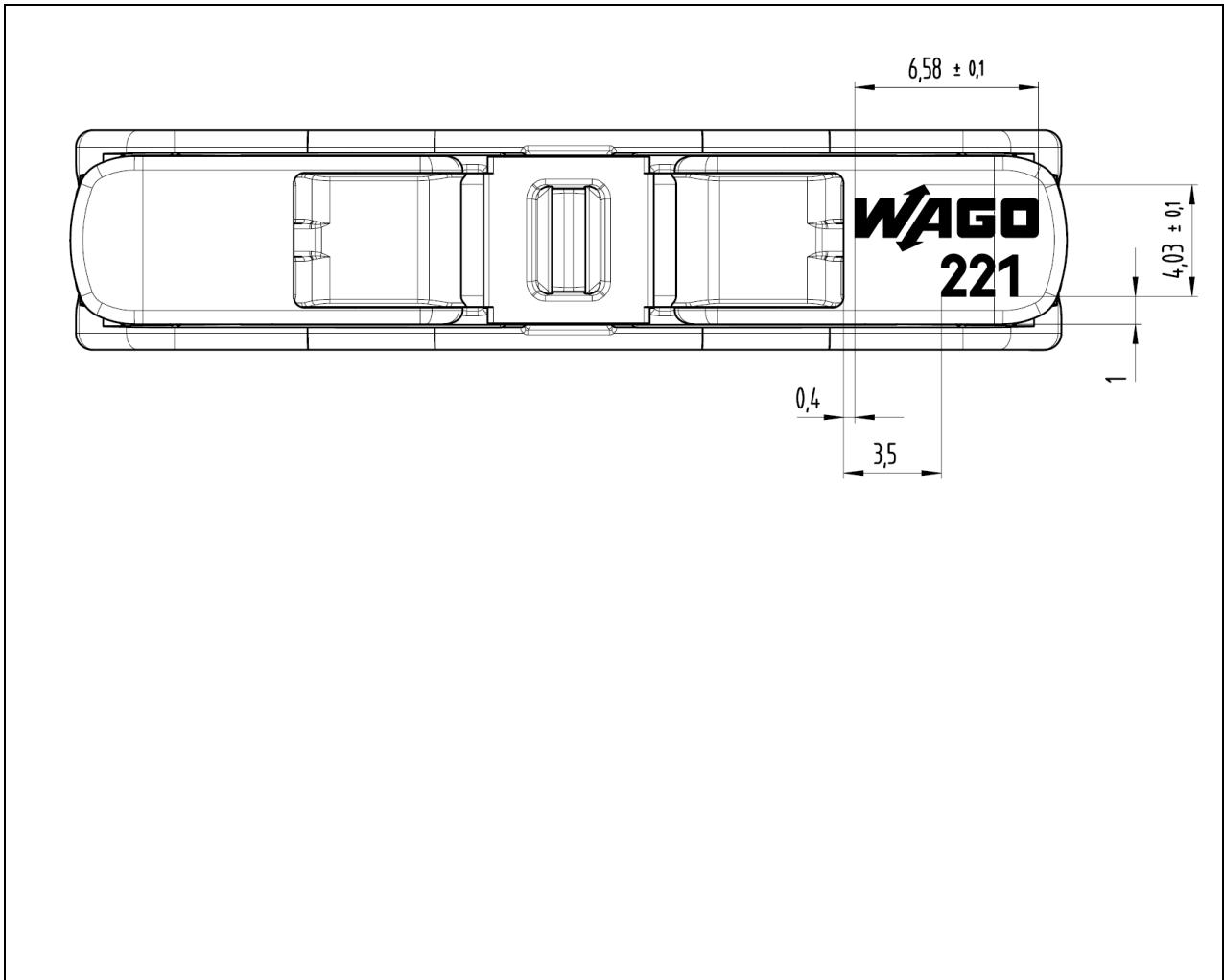
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBS that own these marks.

Example for all types, except 221-2401 and 221-2411



Example for type 221-2411





Test item particulars:

- Number of terminals.....: single multiway
- Protection against electric shock.....: with without
- Means of fixing.....: with without
- Rated temperature.....: without T marking with T marking (85°C)
- IP number.....: IP-
- Type of terminals, screwless-type.....: universal non-universal push wire
- Conductor type.....: rigid flexible
- Rated connecting capacity.....: 0,14mm² "F" 0,2mm² 4mm² 1,5mm²
 2,5mm² 4mm² 6mm² 10mm²
- Conductor insulation.....: 16mm² 25mm² 35 mm²
- Rated voltage (V ac / V dc).....: AC DC

Classification of installation and use

Supply Connection

..... :
Possible test case verdicts: - test case does not apply to the test object: N/A - test object does meet the requirement.....: P (Pass) - test object does not meet the requirement: F (Fail)
Testing Date of receipt of test item: 2019-11 Date (s) of performance of tests.....: 2021-01
General remarks: 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 Issuing testing laboratory. "(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 <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator. N.B.: Projects performed under the IECEE CB-Scheme CTF procedure, are fully in line with the procedures and requirements of the IECEE CB-Scheme, but do not fall under DEKRA Netherland's laboratory accreditation, according to ISO/IEC 17025, by the Dutch Accreditation Council.

Manufacturer's Declaration per sub-clause 6.2.5 of IEC 60947-2:

The application for obtaining a CB Test Certificate Yes
 includes more than one factory location and a Not applicable
 declaration from the Manufacturer stating that the
 sample(s) submitted for evaluation is (are)
 representative of the products from each factory
 has been provided

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies)..... :

General product information:**Factory locations:**

Wago Elwag sp.z.o.o.
 ul. Piekna 58 a
 50-506, Wroclaw, Poland

Wago Elwag
 Innowacyjna 2
 55-330 Wroblowice, Poland

Wago Pvt. Ltd.
 C-27, Sector-58, Phase III
 201301 Noida Uttar Pradesh, India

Wago Electronic (Tianjin) Co. Ltd.
 No. 5 Quanhui Road
 Wu Qing Development Area
 301700 Tianjin, China

WAGO Kontakttechnik GmbH & Co. KG
 Hansastrasse 27, 32423 Minden/Westfalen
 Germany

WAGO Kontakttechnik GmbH & Co. KG, Werk Sondershausen
 Waldstrasse 1, 99706, Sondershausen
 Germany

WAGO Contact S.A.
 Route de l'Industrie 19, CP 168, 1564, Domdidier, Switzerland

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
8	MARKING		
8.1	On main part: All types, except 221-2401 and 221-2411		
	a) rated connecting capacity (mm ²)	0,14 mm² "f" 0,2 mm² - 4 mm²	P
	b) rated insulation voltage (V).....	450 V	P
	c) T marking (°C) (if > 40 °C or < -5 °C)	85 °C catalogue	P
	d) type reference	221-415 example	P
	e) manufacturer's or responsible vendor's name, trademark or identification mark	WAGO	P
	f) IP if > IP20		N
	Small devices: only d) and e) indicated on device		N
	All marks visible on smallest package unit		P
8.1	On main part: Types 221-2401 and 221-2411		
	a) rated connecting capacity (mm ²)	0,2 mm² - 4 mm²	P
	b) rated insulation voltage (V).....	450 V	P
	c) T marking (°C) (if > 40 °C or < -5 °C)	85 °C catalogue	P
	d) type reference	221	P
	e) manufacturer's or responsible vendor's name, trademark or identification mark	WAGO	P
	f) IP if > IP20		N
	Small devices: only d) and e) indicated on device		N
	All marks visible on smallest package unit		P
8.101	Type of acceptable conductor "s" "r" or "f"		P
8.102	Marking indicating the length of insulation to be removed before insertion of the conductor		P
8.2	Multiway terminal devices: at least two adjacent		N
8.3	When symbols are used they shall be as follow: V for volts mm ² or □ for square millimetres T for T-rating		P
8.4	Marking: durable and easily legible; 15 s water; 15 s hexane		P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
9	PROTECTION AGAINST ELECTRIC SHOCK		
	Live parts not accessible		P
10	CONNECTION OF CONDUCTORS		
10.1	Connecting devices allow correct connection of conductors		P
10.101	Connection or disconnection: use a general tool or simple insertion	lever operated	P
	Disconnection operation other than a pull	lever operated	P
10.102	Terminals accept two or more conductors of same or different nominal cross-sectional areas; see table 101 (as specified by manufacturer):		P
	Universal terminals shall accept rigid(solid or stranded) and flexible unprepared conductors		P
	Non-universal terminals shall accept the types of conductors declared by the manufacturer		P
	Rated connecting capacity (mm ²)	all types, except 221-2401 and 221-2411 0,14 mm² "f" 0,2 mm² - 4 mm² type 221-2401 0,34 mm² - 4 mm² type 221-2411 0,2 mm² - 4 mm²	P
	Suitable for connecting cross-sectional areas (mm ²)	all types, except 221-2401 and 221-2411 0,14 mm² "f" 0,2 mm² - 4 mm² "f" "sol" 1,5 mm² - 4 mm² "str" type 221-2401 0,2 mm² - 4 mm² "sol" 0,34 mm² - 4 mm² "f" 0,2 mm² - 2,5 mm² "str" type 221-2411 0,2 mm² - 4 mm² "f" "sol" 0,2 mm² - 2,5 mm² "str"	P
10.103	Terminals accept rigid and flexible conductors (table 101), unless otherwise specified (see 8.1)		P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Smallest diameter (mm); largest diameter (mm).....:	0,42 mm, 2,7 mm	P
	During the test: terminals show no damage		P
10.104	Terminals clamp the conductor without undue damage: All types, except 221-2401 and 221-2411		
10.104.1	Connection/disconnection 5 times: smallest diameter (mm).....:	0,14 mm² "f"	P
	Connection/disconnection 5 times: largest diameter (mm).....:	4 mm²	P
	After the test, terminal not damaged		P
10.104	Terminals clamp the conductor without undue damage: Types 221-2411		
10.104.1	Connection/disconnection 5 times: smallest diameter (mm).....:	0,2 mm² solid and flexible	P
	Connection/disconnection 5 times: largest diameter (mm).....:	4 mm² solid, stranded and flexible	P
	After the test, terminal not damaged		P
10.104.2	Rated cross-sectional area (mm ²)	4 mm²	P
	Type	rigid and flexible	P
	After the test, no wire of conductor escaped outside the terminal		P
10.105	Secureness test:		
	during the test: the conductor does not slip out, no break near clamping unit and no damage	See appended table 10.105	P
10.106	Pull test:		
	- during the test the conductor does not come out	See appended table 10.106	P

11	CONSTRUCTION		
11.101	Contact pressure not transmitted via insulating material, unless there is sufficient resiliency		P
11.102	Insertion and disconnection, in accordance with manufacturer's instructions		P
	Openings clearly distinguishable		P
11.103	Terminals so constructed that:		
	- each conductor is clamped individually		P
	- conductors can be connected or disconnected at same time or separately	separately	P
	Possible to clamp maximum number of conductors	1	P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
11.104	Inadequate insertion of conductor avoided		P
11.2	Clamping units clamp conductors reliably and between metal surfaces		P
11.3	Connecting devices: insulation of conductors not in contact with live parts of different polarity		P
11.4	Insulating lining: adequate mechanical strength and secured in a reliable manner		P
11.5	Current-carrying parts: adequate mechanical strength, electrical conductivity and resistance to corrosion; type of metal.....:	tin plated copper	P
	Current-carrying parts not made with electroplated coating if subjected to mechanical wear		N
11.6	Terminals: possible to connect number of conductors as specified by the manufacturer:		
	- number of conductors.....:	1	P
	- rigid, cross-sectional area (mm ²).....:	0,2 mm² - 4 mm²	P
	- flexible, cross-sectional area (mm ²).....:	all types, except 221-2401 and 221-2411 0,14 mm² - 4 mm² all types, except 221-2401 and 221-2411 0,2 mm² - 4 mm²	P
11.7	Fixing means of bases do not serve any other purpose		P
12	RESISTANCE TO AGEING, TO HUMIDITY CONDITIONS, TO INGRESS OF SOLID OBJECTS AND TO HARMFUL INGRESS OF WATER Type 221-413, 221-482, 221-483, 221-485, 221-2411		
12.1	Connecting devices resistant to ageing; after the test (168 h): no cracks visible, not sticky or greasy, no damage; test temperature (°C).....:	<input type="checkbox"/> 85 °C <input checked="" type="checkbox"/> T + 30 °C=115 °C	P
12.2	After humidity test (91-95%): no damage; test duration (168 h for connecting devices > IPx2, 48 h for all other).....:	48 h	P
12.3	IP test (IEC 60529).....:	IP__	N
	After the test, electric strength test as 13.4, and by inspection	IP__	N
	no appreciable entry of water		N
13	INSULATION RESISTANCE AND ELECTRIC STRENGTH Type 221-415, 221-485, 221-2411		

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
13.1	Insulated connecting devices provided with adequate insulation resistance and electric strength		P
13.2	Insulation between the connected conductors and the external surface is adequate for all the combinations of conductors		P
13.3	Insulation resistance measured 1 min after application of 500 V d.c.	See appended table 13.3	P
13.4	Electric strength test	See appended table 13.4	P
14	MECHANICAL STRENGTH Type 221-415, 221-485, 221-2411		
14.101	the test conductor, properly inserted into a clamping unit of the connection devices shall be allowed to be bent (deflected) in all 12 directions each of them differing from the adjacent directions by $30^\circ \pm 5^\circ$		
	Deflection test (principle of test apparatus shown in figure 103a):		
	- requirement: $\leq 2,5$ mV	See appended table 14.101	P
	max measured voltage drop (mV)	0,99 mV	P
14.2	Tumbling barrel (for < 50 g): 50 falls; after the test no damage	4,15 g	P
14.3	Impact test (for > 50 g): 10 blows:		
	- height of fall: 7,5 cm		N
	- height of fall: 10 cm		N
	- height of fall: 20 cm		N
	- height of fall: 25 cm		N
	After the test, no damage and live parts shall not become accessible		N
15	TEMPERATURE RISE		
	requirement: ≤ 45 K		P
	max measured temperature rise (K)	See appended table 15	P
15.101	192 temperature cycles test, each cycle with a duration of 1 h, with the test current as defined in Table 2 of Part I		P
	Cabinet temperature (°C).....: <input type="checkbox"/> 40 <input checked="" type="checkbox"/> T-marking: 85 °C		P
	Maximum voltage drop did not exceed 22,5 mV or 1,5 times 24 th cycle value	See appended table 15.101	P
16	RESISTANCE TO HEAT		
16.1	Connecting devices are sufficiently resistant to heat		P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
16.2	Heating cabinet test	See appended table 16.2	P
	After the test: no changes impairing further use and markings still legible		P
16.3	Ball-pressure test (IEC 60695-10-2) for parts necessary to retain current-carrying parts and parts of the earthing circuit in position	See appended table 16.3A	P
	Impression diameter not exceed 2 mm		P
	Ball-pressure test (IEC 60695-10-2) for parts not necessary to retain current-carrying parts and parts of the earthing circuit in position	See appended table 16.3B	N
	Impression diameter not exceed 2 mm		N
17	CLEARANCES AND CREEPAGE DISTANCES		P
	Creepage distances, clearances and distances through sealing compound	See appended table 17	P
18	RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT AND FIRE		
	Glow-wire test (clauses 4 to 10 of IEC 60695-2-10)	See appended table 18	P
	No visible flames and no sustained glowing or flame and glowing extinguished within 30 s		P
	No ignition of the tissue paper or scorching of the board		P
19	RESISTANCE OF INSULATING MATERIAL TO TRACKING		
	Tracking test (IEC 60112): PTI 175 V, 50 drops, solution A	See appended table 19	P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

10.105	TABLE: Clamping securement and damage to the conductor test					
	Model/type reference.....:		221-415			
No of sample	Conductor cross-sectional area (mm ²)	Conductor type	Mass for conductor (kg)	Height H (mm)	Diameter of bushing hole (mm)	
1-3	0,14	Flexible	0,1	260	6,4	P
4-6	0,2	Solid / flexible	0,1	260	6,4	P
7-9	4	Solid/ flexible	0,9	280	9,5	P
10-12	4	stranded	0,9	280	9,5	P
Supplementary information:						
10.106	TABLE: Pull-out test					
	Model/type reference.....:		221-415			
No of sample	Conductor cross-sectional area (mm ²)	Conductor type	Pull force (N)			
1-3	0,14	flexible	10		P	
4-6	0,2	solid / flexible	10		P	
7-9	4	solid / flexible	60		P	
10-12	4	stranded	60		P	
Supplementary information:						

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

10.105						
TABLE: Clamping securement and damage to the conductor test						
Model/type reference.....:					221-2411	
No of sample	Conductor cross-sectional area (mm ²)	Conductor type	Mass for conductor (kg)	Height H (mm)	Diameter of bushing hole (mm)	
1-3	0,2	solid / flexible	0,2	260	6,4	P
4-6	4	solid / flexible	0,9	280	9,5	P
7-9	1,5	stranded	0,4	260	6,5	P
10-12	2,5	stranded	0,7	280	9,5	P
13-15	0,2	stranded	0,2	260	6,4	P
Supplementary information:						
10.106						
TABLE: Pull-out test						
Model/type reference.....:					221-2411	
No of sample	Conductor cross-sectional area (mm ²)	Conductor type	Pull force (N)			
1-3	0,2	solid / flexible	10			P
4-6	4	solid / flexible	60			P
7-9	1,5	stranded	40			P
10-12	2,5	stranded	50			P
13-15	0,2	stranded	10			P
Supplementary information:						

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

10.105						
TABLE: Clamping securement and damage to the conductor test						
Model/type reference.....:					221-2401	
No of sample	Conductor cross-sectional area (mm ²)	Conductor type	Mass for conductor (kg)	Height H (mm)	Diameter of bushing hole (mm)	
1-3	0,2	solid	0,2	260	6,4	P
4-6	0,34	flexible	0,2	260	6,4	P
7-9	4	solid / flexible	0,9	280	9,5	P
13-15	2,5	stranded	0,7	280	9,5	P
16-18	0,2	stranded	0,2	260	6,4	P
Supplementary information:						
10.106						
TABLE: Pull-out test						
Model/type reference.....:					221-2401	
No of sample	Conductor cross-sectional area (mm ²)	Conductor type		Pull force (N)		
1-3	0,2	solid		10		P
4-6	0,34	flexible		15		P
7-9	4	solid / flexible		60		P
13-15	2,5	stranded		50		P
16-18	0,2	stranded		10		P
Supplementary information:						

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-415	
	Smallest cross-sectional area (mm²) :	0,14 mm² "f" / 0,2 mm² "r"	
	Largest cross-sectional area (mm²) :	4 mm² "r"	
	Test voltage applied between	Measured (MΩ)	Required (MΩ)
	All clamping units together and the body	>20 MΩ	5 MΩ
	Each clamping unit and all others together		
	Supplementary information:		

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-485	
	Smallest cross-sectional area (mm²) :	0,14 mm² "f" / 0,2 mm² "r" / 0,2 mm² "f"	
	Largest cross-sectional area (mm²) :	4 mm² "r" / 4 mm² "f"	
	Test voltage applied between	Measured (MΩ)	Required (MΩ)
	All clamping units together and the body	>20 MΩ	5 MΩ
	Each clamping unit and all others together		
	Supplementary information:		

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-2411	
	Smallest cross-sectional area (mm ²) :	0,2 mm ² solid and flexible	
	Largest cross-sectional area (mm ²) :	4 mm ² solid, stranded and flexible	
	Test voltage applied between	Measured (MΩ)	Required (MΩ)
	All clamping units together and the body	>5 MΩ	5 MΩ
	Each clamping unit and all others together		
Supplementary information:			

13.4	TABLE: Electric strength test		
	Model/type reference.....:	221-415	
	Rated insulation voltage (V).....:	450 V	
	Test voltage applied between	Test voltage (V)	Flashover / breakdown (Yes/No)
	All clamping units together and the body	2500 V	No
	Each clamping unit and all others together		
Supplementary information:			

13.4	TABLE: Electric strength test		
	Model/type reference.....:	221-485	
	Rated insulation voltage (V).....:	450 V	
	Test voltage applied between	Test voltage (V)	Flashover / breakdown (Yes/No)
	All clamping units together and the body	2500 V	No
	Each clamping unit and all others together		
Supplementary information:			

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

13.4	TABLE: Electric strength test			
	Model/type reference.....:	221-2411		
	Rated insulation voltage (V).....:	450 V		
	Test voltage applied between	Test voltage (V)	Flashover / breakdown (Yes/No)	
	All clamping units together and the body	2500 V	No	
	Each clamping unit and all others together			
Supplementary information:				

14.101	TABLE: Mechanical strength Type 221-413				
	0,1 times the test current (A)	0,2 A		P	
	smallest cross-sectional area (mm ²) 10.103	0,14 mm²		P	
	force (N) (table 104)	0,09 N		P	
	Distance (mm) (table 104)	100 mm		P	
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,39	0,38	0,39	P
	- voltage drop measured (mV) (2 nd deflection)	0,39	0,38	0,38	P
	- voltage drop measured (mV) (3 rd deflection)	0,39	0,38	0,38	P
	- voltage drop measured (mV) (4 th deflection)	0,38	0,39	0,38	P
	- voltage drop measured (mV) (5 th deflection)	0,38	0,39	0,38	P
	- voltage drop measured (mV) (6 th deflection)	0,39	0,39	0,38	P
	- voltage drop measured (mV) (7 th deflection)	0,38	0,39	0,39	P
	- voltage drop measured (mV) (8 th deflection)	0,39	0,39	0,39	P
	- voltage drop measured (mV) (9 th deflection)	0,39	0,39	0,39	P
	- voltage drop measured (mV) (10 th deflection)	0,38	0,39	0,39	P
	- voltage drop measured (mV) (11 th deflection)	0,38	0,39	0,39	P
	- voltage drop measured (mV) (12 th deflection)	0,39	0,39	0,39	P
	- requirement: ≤ 2,5 mV			P	

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

14.101	TABLE: Mechanical strength Type 221-413				
	0,1 times the test current (A)	0,4 A			P
	smallest cross-sectional area (mm ²) 10.103	0,2 mm²			P
	force (N) (table 104)	0,09 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,42	0,43	0,43	P
	- voltage drop measured (mV) (2 nd deflection)	0,45	0,44	0,44	P
	- voltage drop measured (mV) (3 rd deflection)	0,46	0,45	0,45	P
	- voltage drop measured (mV) (4 th deflection)	0,45	0,45	0,45	P
	- voltage drop measured (mV) (5 th deflection)	0,46	0,44	0,45	P
	- voltage drop measured (mV) (6 th deflection)	0,46	0,45	0,45	P
	- voltage drop measured (mV) (7 th deflection)	0,45	0,45	0,44	P
	- voltage drop measured (mV) (8 th deflection)	0,46	0,46	0,45	P
	- voltage drop measured (mV) (9 th deflection)	0,45	0,45	0,45	P
	- voltage drop measured (mV) (10 th deflection)	0,46	0,46	0,45	P
	- voltage drop measured (mV) (11 th deflection)	0,45	0,45	0,45	P
	- voltage drop measured (mV) (12 th deflection)	0,46	0,45	0,45	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-413				
	0,1 times the test current (A)	3,2 A			P
	smallest cross-sectional area (mm ²) 10.103	4 mm²			P
	force (N) (table 104)	2 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,62	0,57	0,60	P
	- voltage drop measured (mV) (2 nd deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (3 rd deflection)	0,57	0,54	0,54	P
	- voltage drop measured (mV) (4 th deflection)	0,54	0,54	0,55	P
	- voltage drop measured (mV) (5 th deflection)	0,61	0,58	0,56	P
	- voltage drop measured (mV) (6 th deflection)	0,60	0,57	0,55	P
	- voltage drop measured (mV) (7 th deflection)	0,60	0,58	0,59	P
	- voltage drop measured (mV) (8 th deflection)	0,61	0,60	0,59	P
	- voltage drop measured (mV) (9 th deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (10 th deflection)	0,59	0,58	0,58	P
	- voltage drop measured (mV) (11 th deflection)	0,59	0,58	0,59	P
	- voltage drop measured (mV) (12 th deflection)	0,58	0,58	0,58	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-485				
	0,1 times the test current (A)	0,2 A			P
	smallest cross-sectional area (mm ²) 10.103	0,14 mm² flexible			P
	force (N) (table 104)	0,09 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,38	0,38	0,39	P
	- voltage drop measured (mV) (2 nd deflection)	0,38	0,38	0,38	P
	- voltage drop measured (mV) (3 rd deflection)	0,38	0,38	0,38	P
	- voltage drop measured (mV) (4 th deflection)	0,37	0,39	0,38	P
	- voltage drop measured (mV) (5 th deflection)	0,37	0,39	0,37	P
	- voltage drop measured (mV) (6 th deflection)	0,37	0,39	0,37	P
	- voltage drop measured (mV) (7 th deflection)	0,37	0,39	0,39	P
	- voltage drop measured (mV) (8 th deflection)	0,37	0,39	0,37	P
	- voltage drop measured (mV) (9 th deflection)	0,39	0,39	0,37	P
	- voltage drop measured (mV) (10 th deflection)	0,37	0,39	0,39	P
	- voltage drop measured (mV) (11 th deflection)	0,38	0,39	0,37	P
	- voltage drop measured (mV) (12 th deflection)	0,37	0,39	0,39	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

14.101	TABLE: Mechanical strength Type 221-485				
	0,1 times the test current (A)	0,4 A	P		
	smallest cross-sectional area (mm ²) 10.103	0,2 mm² solid	P		
	force (N) (table 104)	0,09 N	P		
	Distance (mm) (table 104)	100 mm	P		
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,41	0,43	0,43	P
	- voltage drop measured (mV) (2 nd deflection)	0,44	0,44	0,45	P
	- voltage drop measured (mV) (3 rd deflection)	0,45	0,44	0,45	P
	- voltage drop measured (mV) (4 th deflection)	0,45	0,45	0,41	P
	- voltage drop measured (mV) (5 th deflection)	0,46	0,44	0,41	P
	- voltage drop measured (mV) (6 th deflection)	0,45	0,46	0,42	P
	- voltage drop measured (mV) (7 th deflection)	0,45	0,45	0,42	P
	- voltage drop measured (mV) (8 th deflection)	0,46	0,46	0,43	P
	- voltage drop measured (mV) (9 th deflection)	0,45	0,45	0,41	P
	- voltage drop measured (mV) (10 th deflection)	0,44	0,46	0,45	P
	- voltage drop measured (mV) (11 th deflection)	0,45	0,47	0,43	P
	- voltage drop measured (mV) (12 th deflection)	0,44	0,45	0,45	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-485				
	0,1 times the test current (A)	3,2 A			P
	smallest cross-sectional area (mm ²) 10.103	4 mm² solid			P
	force (N) (table 104)	2 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,62	0,57	0,60	P
	- voltage drop measured (mV) (2 nd deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (3 rd deflection)	0,59	0,54	0,54	P
	- voltage drop measured (mV) (4 th deflection)	0,56	0,54	0,55	P
	- voltage drop measured (mV) (5 th deflection)	0,62	0,58	0,56	P
	- voltage drop measured (mV) (6 th deflection)	0,61	0,57	0,55	P
	- voltage drop measured (mV) (7 th deflection)	0,63	0,58	0,59	P
	- voltage drop measured (mV) (8 th deflection)	0,61	0,60	0,59	P
	- voltage drop measured (mV) (9 th deflection)	0,61	0,60	0,60	P
	- voltage drop measured (mV) (10 th deflection)	0,55	0,58	0,58	P
	- voltage drop measured (mV) (11 th deflection)	0,56	0,58	0,59	P
	- voltage drop measured (mV) (12 th deflection)	0,57	0,58	0,58	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-485				
	0,1 times the test current (A)	3,2 A			P
	smallest cross-sectional area (mm ²) 10.103	4 mm² stranded			P
	force (N) (table 104)	2 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,68	0,66	0,65	P
	- voltage drop measured (mV) (2 nd deflection)	0,68	0,72	0,71	P
	- voltage drop measured (mV) (3 rd deflection)	0,69	0,65	0,65	P
	- voltage drop measured (mV) (4 th deflection)	0,64	0,74	0,73	P
	- voltage drop measured (mV) (5 th deflection)	0,66	0,73	0,73	P
	- voltage drop measured (mV) (6 th deflection)	0,68	0,64	0,67	P
	- voltage drop measured (mV) (7 th deflection)	0,69	0,66	0,69	P
	- voltage drop measured (mV) (8 th deflection)	0,64	0,62	0,68	P
	- voltage drop measured (mV) (9 th deflection)	0,71	0,75	0,73	P
	- voltage drop measured (mV) (10 th deflection)	0,72	0,74	0,71	P
	- voltage drop measured (mV) (11 th deflection)	0,72	0,73	0,72	P
	- voltage drop measured (mV) (12 th deflection)	0,73	0,75	0,74	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-42411				
	0,1 times the test current (A)	0,4 A			P
	smallest cross-sectional area (mm ²) 10.103	0,2 mm² solid			P
	force (N) (table 104)	0,09 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,56	0,55	0,55	P
	- voltage drop measured (mV) (2 nd deflection)	0,56	0,55	0,55	P
	- voltage drop measured (mV) (3 rd deflection)	0,56	0,56	0,56	P
	- voltage drop measured (mV) (4 th deflection)	0,55	0,56	0,55	P
	- voltage drop measured (mV) (5 th deflection)	0,56	0,56	0,56	P
	- voltage drop measured (mV) (6 th deflection)	0,58	0,58	0,56	P
	- voltage drop measured (mV) (7 th deflection)	0,57	0,56	0,56	P
	- voltage drop measured (mV) (8 th deflection)	0,57	0,56	0,56	P
	- voltage drop measured (mV) (9 th deflection)	0,58	0,57	0,56	P
	- voltage drop measured (mV) (10 th deflection)	0,57	0,56	0,56	P
	- voltage drop measured (mV) (11 th deflection)	0,57	0,56	0,56	P
	- voltage drop measured (mV) (12 th deflection)	0,56	0,56	0,56	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-42411				
	0,1 times the test current (A)	3,2 A			P
	smallest cross-sectional area (mm ²) 10.103	4 mm² solid			P
	force (N) (table 104)	2 N			P
	Distance (mm) (table 104)	100 mm			P
	-screwless terminal number	1	2	3	-
	- voltage drop measured (mV) (1 st deflection)	0,99	0,84	0,89	P
	- voltage drop measured (mV) (2 nd deflection)	0,96	0,91	0,93	P
	- voltage drop measured (mV) (3 rd deflection)	0,78	0,94	0,74	P
	- voltage drop measured (mV) (4 th deflection)	0,65	0,71	0,63	P
	- voltage drop measured (mV) (5 th deflection)	0,50	0,51	0,52	P
	- voltage drop measured (mV) (6 th deflection)	0,47	0,53	0,58	P
	- voltage drop measured (mV) (7 th deflection)	0,51	0,51	0,51	P
	- voltage drop measured (mV) (8 th deflection)	0,47	0,44	0,48	P
	- voltage drop measured (mV) (9 th deflection)	0,48	0,51	0,63	P
	- voltage drop measured (mV) (10 th deflection)	0,55	0,55	0,60	P
	- voltage drop measured (mV) (11 th deflection)	0,51	0,58	0,67	P
	- voltage drop measured (mV) (12 th deflection)	0,81	0,82	0,92	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

15	TABLE: Temperature rise		
	Model/type reference.....	221-415	
	Terminal	<input checked="" type="checkbox"/> single <input type="checkbox"/> multiway	—
	T marking (°C)	<input checked="" type="checkbox"/> Yes (85°C):	—
	Largest cross-sectional area (mm ²).....	4 mm²	
	Conductors	rigid and flexible	
	Rated connecting capacity (mm ²).....	4 mm²	
	Test current (A).....	32 A	
Thermocouple Locations		max. temperature measured, (K)	max. temperature limit, (K)
On conductor in the terminal T1		21	45
On conductor in the terminal T2		22	45
On conductor in the terminal T3		21	45
On conductor in the terminal T4		22	45
On conductor in the terminal T5		22	45
	Model/type reference.....	221-415	
	Terminal	<input checked="" type="checkbox"/> single <input type="checkbox"/> multiway	—
	T marking (°C)	<input checked="" type="checkbox"/> Yes (85°C):	—
	Used cross-sectional area (mm ²)	4 mm²	
	Conductors	rigid	
	Test current (A).....	32 A	
Thermocouple Locations		max. temperature measured, (K)	max. temperature limit, (K)
On conductor in the terminal T1		24	45
On conductor in the terminal T2		23	45
On conductor in the terminal T3		22	45
On conductor in the terminal T4		23	45
On conductor in the terminal T5		24	45
Supplementary information:			

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

15	TABLE: Temperature rise		
	Model/type reference.....	221-2411	
	Terminal	<input checked="" type="checkbox"/> single <input type="checkbox"/> multiway	—
	T marking (°C)	<input checked="" type="checkbox"/> Yes (85°C):	—
	Largest cross-sectional area (mm ²).....	4 mm²	
	Conductors	solid, stranded and flexible	
	Rated connecting capacity (mm ²).....	4 mm²	
	Test current (A).....	32 A	
	Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)
	On conductor in the terminal and wire (sample with solid wire)	27 26 26	45
	On conductor in the terminal and wire (sample with flexible wire)	24 28 25	45
	On conductor in the terminal and wire (sample with stranded wire)	19 20 19	45
Supplementary information:			

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

15.101	TABLE: Temperature-cycling test			
	Model/type reference	221-415		
	Smallest cross-sectional area (mm ²)	0,14 mm² flexible		
	Test current (Table 2) (A).....	2 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors	(after 24 cycles)			
Stranded conductors	(after 24 cycles)			
Flexible conductors	(after 24 cycles)	1,31	1,40	1,36
Solid conductors	(1,5 times 24 th cycle value)			
Stranded conductors	(1,5 times 24 th cycle value)			
Flexible conductors	(1,5 times 24 th cycle value)	1,96	2,10	2,04
Solid conductors	(after 192 cycles)			
Stranded conductors	(after 192 cycles)			
Flexible conductors	(after 192 cycles)	0,89	1,01	0,99
	Largest cross-sectional area (mm ²)	4 mm² rigid flexible		
	Test current (Table 2) (A).....	32 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors	(after 24 cycles)	2,31	2,10	2,00
Stranded conductors	(after 24 cycles)	2,12	2,23	2,10
Flexible conductors	(after 24 cycles)	2,00	2,50	2,64
Solid conductors	(1,5 times 24 th cycle value)	3,46	3,15	3,00
Stranded conductors	(1,5 times 24 th cycle value)	3,18	3,34	3,15
Flexible conductors	(1,5 times 24 th cycle value)	3,00	3,75	3,96
Solid conductors	(after 192 cycles)	1,85	1,83	1,87
Stranded conductors	(after 192 cycles)	1,79	1,81	1,80
Flexible conductors	(after 192 cycles)	2,00	2,50	2,64
Supplementary information:				

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

15.101	TABLE: Temperature-cycling test				
	Model/type reference	221-415			
	Smallest cross-sectional area (mm ²)	0,2 mm² rigid flexible			
	Test current (Table 2) (A).....	4 A			
	Measured voltage drop of:	Measured voltage drop (mV)			
		Sample 1	Sample 2	Sample 3	
	Solid conductors (after 24 cycles)	1,72	1,54	1,71	P
	Stranded conductors (after 24 cycles)				
	Flexible conductors (after 24 cycles)	1,79	1,79	2,10	P
	Solid conductors (1,5 times 24 th cycle value)	2,58	2,31	2,56	P
	Stranded conductors (1,5 times 24 th cycle value)				
	Flexible conductors (1,5 times 24 th cycle value)	2,68	2,68	3,15	P
	Solid conductors (after 192 cycles)	1,48	1,27	1,26	P
	Stranded conductors (after 192 cycles)				
	Flexible conductors (after 192 cycles)	1,28	1,14	1,89	P

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Clause	Requirement + Test	Result - Remark	Verdict

15.101	TABLE: Temperature-cycling test			
	Model/type reference	221-2411		
	Smallest cross-sectional area (mm ²)	0,2 mm² solid and flexible		
	Test current (Table 2) (A).....	4 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors	(after 24 cycles)	10,18	11,90	12,14
Stranded conductors	(after 24 cycles)			
Flexible conductors	(after 24 cycles)	11,10	15,04	13,51
Solid conductors	(1,5 times 24 th cycle value)	15,27	17,85	18,21
Stranded conductors	(1,5 times 24 th cycle value)			
Flexible conductors	(1,5 times 24 th cycle value)	16,65	22,56	20,27
Solid conductors	(after 192 cycles)	10,03	11,46	11,80
Stranded conductors	(after 192 cycles)			
Flexible conductors	(after 192 cycles)	11,35	15,24	13,47
	Largest cross-sectional area (mm ²)	4 mm² solid, stranded and flexible		
	Test current (Table 2) (A).....	32 A		
Measured voltage drop of:		Measured voltage drop (mV)		
		Sample 1	Sample 2	Sample 3
Solid conductors	(after 24 cycles)	15,33	12,71	13,91
Stranded conductors	(after 24 cycles)	13,36	14,49	10,92
Flexible conductors	(after 24 cycles)	13,41	16,01	16,31
Solid conductors	(1,5 times 24 th cycle value)	23,00	19,07	20,87
Stranded conductors	(1,5 times 24 th cycle value)	20,04	21,74	16,38
Flexible conductors	(1,5 times 24 th cycle value)	20,12	24,02	24,47
Solid conductors	(after 192 cycles)	15,28	12,44	13,83
Stranded conductors	(after 192 cycles)	13,26	14,71	13,00
Flexible conductors	(after 192 cycles)	13,68	16,55	16,33
Supplementary information:				

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

16.2	TABLE: Heating cabinet test			
	Test temperature (°C).....:	<input type="checkbox"/> 85°C <input checked="" type="checkbox"/> T + 45 = 130 °C		
	Model/type reference	Sample 1	Sample 2	Sample 3
	221-413	P	P	P
	221-485	P	P	P
	221-2411	P	P	P
Supplementary information:				

16.3A	TABLE: Ball pressure test of insulating materials all types, except 221-2401 and 221-2411			
	Test temperature (°C).....:	<input type="checkbox"/> 125 <input checked="" type="checkbox"/> T + 45 =130 °C		
	Part under test	Material designation / manufacturer	Impression diameter (mm)	
	Housing	Xantar	1 mm	P
	Lever orange	Celanex	1 mm	P
	Lever orange	Ultradur	1 mm	P
	Lever grey	Polyamide for Zytel	0,8 mm	P
Supplementary information:				

16.3A	TABLE: Ball pressure test of insulating materials types 221-2401 and 221-2411			
	Test temperature (°C).....:	<input type="checkbox"/> 125 <input checked="" type="checkbox"/> T + 45 =130 °C		
	Part under test	Material designation / manufacturer	Impression diameter (mm)	
	Housing	Xantar	0,99 mm	P
	Lever orange	Celanex	0,85 mm	P
	Cover	Makrolon	1,01 mm	P
Supplementary information:				

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

16.3B	TABLE: Ball pressure test of insulating materials			
	Test temperature (°C).....:	<input type="checkbox"/> 70	<input type="checkbox"/> T + 40 =	
	Part under test	Material designation / manufacturer	Impression diameter (mm)	N
Supplementary information:				

17	TABLE: Clearances and creepage distances all types, except 221-2401 and 221-2411				
	Rated insulation voltage (V).....:	450 V			P
	Clearance cl, creepage distance cr and distance through sealing compound tsc at/of:	Required cl, cr, tsc (mm)	Measured cl (mm)	Measured cr (mm)	Measured tsc (mm)
	Between clamping units				
	Clamping units - surface	4	4,05	4,07	-
Supplementary information:					

17	TABLE: Clearances and creepage distances types 221-2401 and 221-2411				
	Rated insulation voltage (V).....:	450 V			P
	Clearance cl, creepage distance cr and distance through sealing compound tsc at/of:	Required cl, cr, tsc (mm)	Measured cl (mm)	Measured cr (mm)	Measured tsc (mm)
	Between clamping units				
	Clamping units - surface	4	4,11	4,11	-
Supplementary information:					

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

18	TABLE: Glow-wire test		
Part under test	Material designation / manufacturer	Test temperature (°C)	Time of extinguish of flames and glowing, if any
housing and lever (type 221-415)	Xantar / Celanex / Ultradur	850°C	flame extinguished immediately after removal.
housing and lever (type 221-485)	Xantar / Polyamide for Zytel	850°C	flame extinguished immediately after removal.
Supplementary information:			

18	TABLE: Glow-wire test		
Part under test	Material designation / manufacturer	Test temperature (°C)	Time of extinguish of flames and glowing, if any
housing and lever (type 221-2401)	Xantar (transparent) / Celanex (orange)	850°C	flame extinguished immediately after removal.
Supplementary information:			

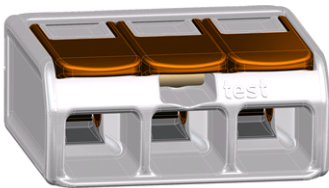
19	TABLE: Tracking		
Part under test	Material designation / manufacturer	Test voltage (V)	Remarks
housing	Xantar	175 V	P
Lever orange	Celanex	175 V	P
Lever orange	Ultradur	175 V	P
Lever grey	Polyamide for Zytel	175 V	P
Cover	Makrolon	175 v	P
Supplementary information:			

Remarks

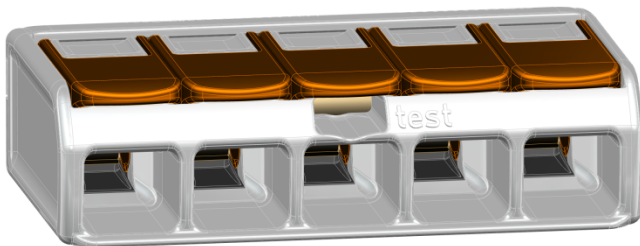
Illustrations:



Type: 221-412



Type: 221-413



Type: 221-415



Type: 221-482

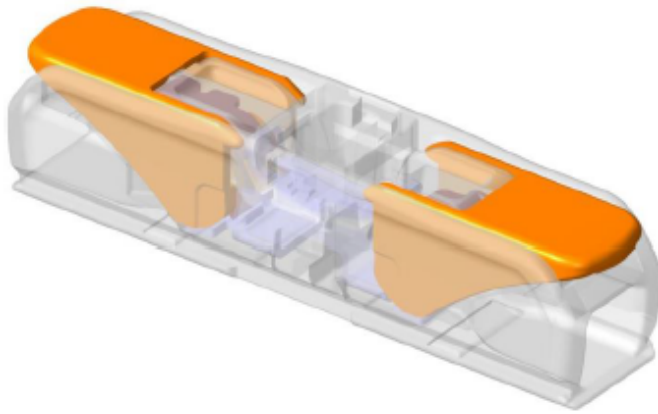


Type: 221-483

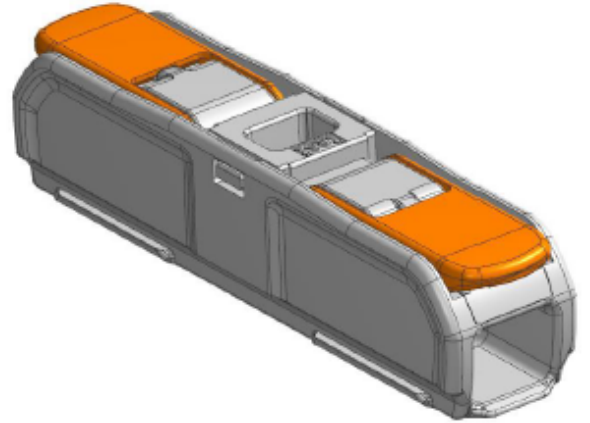


Type: 221-485

Remarks



Type 221-2401



Type 221-2411

Annex A IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

**ATTACHMENT TO TEST REPORT IEC 60998-2-2
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**

**Connecting devices for low voltage circuits for household and similar purposes
Part 2-2: Particular requirements for connecting devices as separate entities with
screwless-type clamping units**

Differences according to: EN 60998-1 : 2004 and EN 60998-2-2 : 2004 in conjunction with
IEC 60998-1 : 2002 and IEC 60998-2-2 : 2002

Attachment Form No.: [EU_GD_IEC60998_2_2B](#)

Attachment Originator.....: DEKRA certification B.V.

Master Attachment: [Date \(2013-02\)](#)

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EN 60998-1 CENELEC COMMON MODIFICATIONS			
1	Scope		
delete	In the first paragraph ", and equivalent AWG conductors".		P
6.2	Main characteristics		
delete	NOTE 1		P
8.3	Marking		
delete	the NOTE		P
11.6	Construction		
delete	", or equivalent AWG conductors".		P
15.4	Temperature rise		
delete	the NOTE		P
Annex	B		
delete	The whole annex		P

Annex A IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

EN 60998-2-2			
CENELEC COMMON MODIFICATIONS			
10.103	Connection of conductors		
delete	NOTE 1		P
delete	In Table 101, NOTE 2, "and for AWG conductors, on ASTM B172-71, ICEA publication S-19-81, ICEA Publication S-66-524 and ICEA Publication S-65-516."		
10.105			
delete	NOTE 1 and NOTE 2		P
10.106			
delete	NOTE 1 and NOTE 2		P
14.101	Mechanical strength		
delete	the NOTE		P
Annex	BB		
delete	The whole annex		P

Annex B IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX ZB (normative) SPECIAL NATIONAL CONDITIONS (EN 60998-1)			
Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.			
NOTE If it affects harmonization, it forms part of the European Standard.			
For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.			
Clause			
6.2	United Kingdom		
Replace	The entire subclause by: 6.2 The standard rated connecting capacities are 0,2 mm ² , 0,34 mm ² , 0,5 mm ² , 0,75 mm ² , 1 mm ² , 1,25mm ² , 1,5 mm ² , 2,5 mm ² , 4 mm ² , 6 mm ² , 10 mm ² , 16 mm ² , 25 mm ² , and 35 mm ²		P



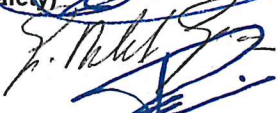



OD ECS 040-1
January 2019

Responsible CB



TEST REPORT SUMMARY

Report Number.....	2245563.50
Date of issue.....	2021-02-24
Tested by (name, function, signature):	J. Olbrich (Engineer) 
Witnessed by (name, function, signature):	H.L. Schendstok (Project Manager Industrial Safety) 
Approved by (name, function, signature):	R. Gioia (Team leader) 
Supervised by (name, function, signature):	F.S. Strikwerda (Project Manager Industrial Safety) 

Testing Laboratory.....	DEKRA Certification B.V.
Address	Meander 1051, 6825 MJ Arnhem, The Netherlands
Testing procedure.....	<input type="checkbox"/> ENEC <input checked="" type="checkbox"/> CCA NTR <input type="checkbox"/> ENEC based on IECEE CBTC with number:
Customer Testing Procedure.....	<input type="checkbox"/> TMP/CTF Stage 1 <input type="checkbox"/> WMT/CTF Stage 2 <input checked="" type="checkbox"/> SMT/CTF Stage 3

Applicant.....	WAGO Kontakttechnik GmbH & Co. KG
Address	Hansastraße 27, 32423 Minden/Westfalen, Germany
Manufacturer.....	WAGO Kontakttechnik GmbH & Co. KG
Address	Hansastraße 27, 32423 Minden/Westfalen, Germany

Product.....	Splicing wire connector
Model/Type reference	Series 221
Trademark.....	
Ratings	450 V, 32 A, 4 mm ²

Certification Scheme	<input type="checkbox"/> ENEC <input checked="" type="checkbox"/> CCA <input type="checkbox"/> Other: _____
Standard(s).....	EN 60998-2-2: 2004 in conjunction with EN 60998-1:2004
<input checked="" type="checkbox"/> The text of the a.m. European Standard was approved by CENELEC is equivalent with the corresponding IEC Publication.	
<input checked="" type="checkbox"/> The text of the a.m. European Standard was approved by CENELEC with agreed common modifications and is <u>not</u> equivalent with the corresponding IEC Publication. An EU Deviation Addendum has to be issued.	

This EN test report consists of the following parts:

<input checked="" type="checkbox"/> IEC Test Report Number.....	2245563.50
<input checked="" type="checkbox"/> EU Deviation Addendum.....	2245563.50 Attachment A

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