

NOTIFICATION OF TEST RESULTS

Issued to: WAGO GmbH & Co. KG
Hansastraße 27, 32423 Minden, Germany

For the product: Splicing wire connectors

Trade name: WAGO

Type/Model: 221

Manufactured by: WAGO GmbH & Co. KG
Hansastraße 27, 32423 Minden, Germany

Ratings: 450 V, 32 A, 4 mm²

Additional information: This NTR replaces NTR NL-8024 issued on 21 November 2024, due to the fact that new types are added.
See Annex for factory locations
Customer's Testing facility: E-CTF 3

A sample of the product has been tested and found to be in conformity with the current HD/EN and equivalent national standard
EN 60998-1:2004, EN 60998-2-2:2004

As shown in the Test Report
2292199.50

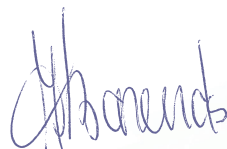
This Notification of Test Results is the result of testing a sample of the product submitted, in accordance with the provisions of the relevant specific standard.

This Notification of Test Results has been established by a body, which participates in the CENELEC Certification Agreement (CCA) of 11th September 1973 as amended on 29th March 1983. Any other body participating in the CCA will take this Notification as a basis for granting a national mark of conformity or a national approval as specified in the CCA, as long as the standard referred to above is still in force in the country of that body.

Arnhem, 18 February 2025

Number: NTR NL-8062

DEKRA Certification B.V.



H.R.M Barends
Certification Manager

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CCA
CENELEC CERTIFICATION AGREEMENT
ACCORD DE CERTIFICATION DU CENELEC

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Annex

**CCA
CENELEC CERTIFICATION AGREEMENT
ACCORD DE CERTIFICATION DU CELENEC**

Ref. no. NTR NL 8062
Page 1 of 1

Factory locations:

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

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

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

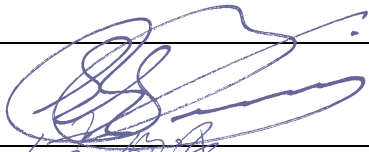


Test Report issued under the responsibility of:



TEST REPORT IEC 60998-2-2 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 Number.....	2292199.50
Date of issue	2025-01-31
Total number of pages.....	52
Name of Testing Laboratory preparing the Report.....	DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem, The Netherlands
Applicant's name	WAGO GmbH & Co. KG
Address	Hansastraße 27, 32423 Minden, Germany
Test specification:	
Standard	IEC 60998-2-2:2002 for use in conjunction with IEC 60998-1:2002
Test procedure.....	CB Scheme
Non-standard test method	N/A
TRF template used	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No.	IEC60998_2_2C
Test Report Form(s) Originator	DEKRA Certification B.V.
Master TRF	Dated 2020-08-28
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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 NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description.....:	Splicing wire connector
Trade Mark.....:	
Manufacturer.....:	WAGO GmbH & Co. KG
Model/Type reference.....:	221
Ratings.....:	450 V, 32 A, 4 mm ²

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory	DEKRA Certification B.V.
Testing location/ address.....:		Meander 1051, 6825 MJ Arnhem, The Netherlands
☐	Associated CB Testing Laboratory:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		H.L. Schendstok (Project Manager Industrial Safety) 
Approved by (name, function, signature)....:		F. Fu (Project Manager Industrial Safety) 
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....:		
Tested by (name, function, signature).....:		
Approved by (name, function, signature)....:		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....:		
Tested by (name + signature)		
Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)....:		
☒	Testing procedure: CTF Stage 3:	WAGO GmbH & Co. KG
☐	Testing procedure: CTF Stage 4:	
Testing location/ address.....:		Hansastraße 27, 32423 Minden, Germany
Tested by (name, function, signature).....:		N. Gudenko (Engineer, WAGO) In the past
Witnessed by (name, function, signature)..:		B. Veenvliet (Technician Industrial Safety, DEKRA) In the past
Approved by (name, function, signature)....:		R. Gioia (Head of Electrotechnical Laboratory, WAGO) In the past
Supervised by (name, function, signature) :		W.C. van Ginkel (Technician Industrial Safety, DEKRA) In the past

List of Attachments (including a total number of pages in each attachment): Annex A: EN 60998-1 CENELEC COMMON MODIFICATIONS and EN 60998-2-2 CENELEC COMMON MODIFICATIONS (2 pages) Annex B: EN 60998-1 SPECIAL NATIONAL CONDITIONS, United Kingdom (1 page)	
Summary of testing:	
Tests performed (name of test and test clause): First Edition, 2168803.50: Complete type-testing Tests are carried out on type 221-415 unless otherwise stated. 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. 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 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 The following test is carried out at DEKRA clause 18	Testing location: WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem The Netherlands

Fifth Edition, 2270581.50: This report replaces report 225563.50 issued on 2021-02-24, due to the fact that new recycled certified plastic (green) is added. The following tests are carried out under CTF3: clause 9, 12.1, 12.2, 13.3, 13.4, 14.2, 16.1, 16.2, 18, 19 Except for the results of above mentioned tests, all other test results in this test report are taken over from previous test report 2245563.50.	WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany
Sixth Edition, 2279386.50: This report replaces report 2270581.50 issued on 2023-04-11, due to the fact that new type 221-420 is added. All tests of the standard are also carried out at type 221-420 under CTF3 Except for the results of above mentioned tests, all other test results in this test report are taken over from previous test report 2270581.50.	WAGO GmbH & Co. KG Hansastraße 27, 32423 Minden, Germany
Seventh Edition, 2292199.50: This report replaces report 2279386.50 issued on 2024-10-24, due to the fact that new types 221-2431, 221-2421, 221-430 and 221-490 are added. No tests are necessary, because these new types has a green lever, which was already tested in report 2270581.50. The connectable conductors of type 221-4xx are modified, the screwless-type clamping units of type 221-4xx are the same as the screwless-type clamping units of type 221-4x0, therefore the tests of 221-4x0 can be used for type 221-4xx All test results in this test report are taken over from previous test report 2279386.50.	DEKRA Certification B.V. Meander 1051, 6825 MJ Arnhem The Netherlands

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.**

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

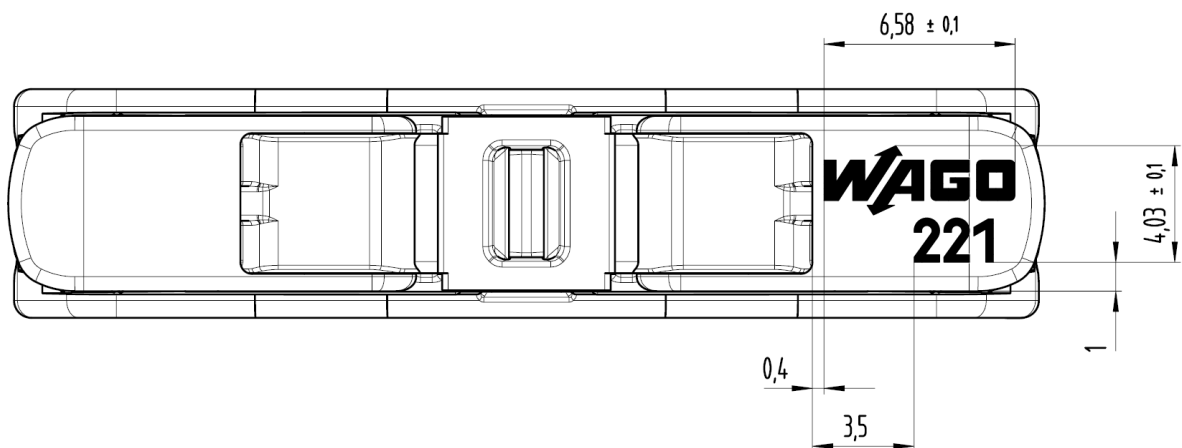
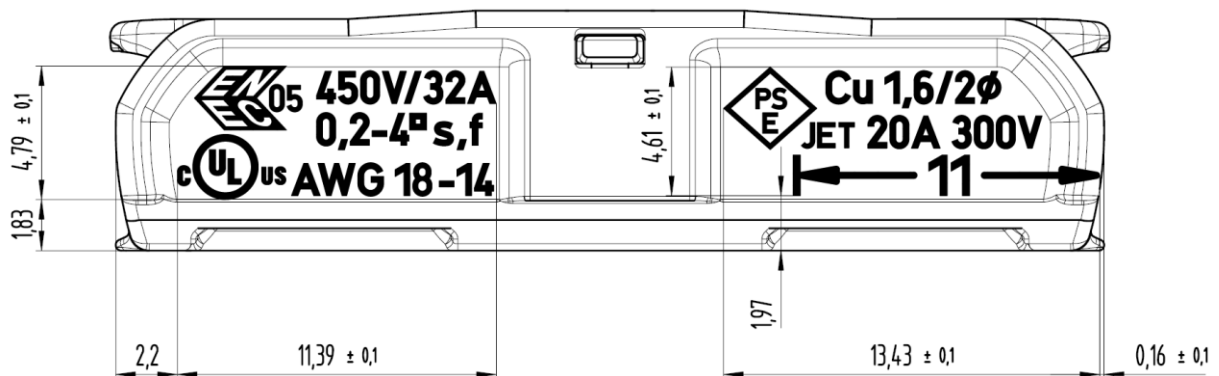
Copy of marking plate

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.

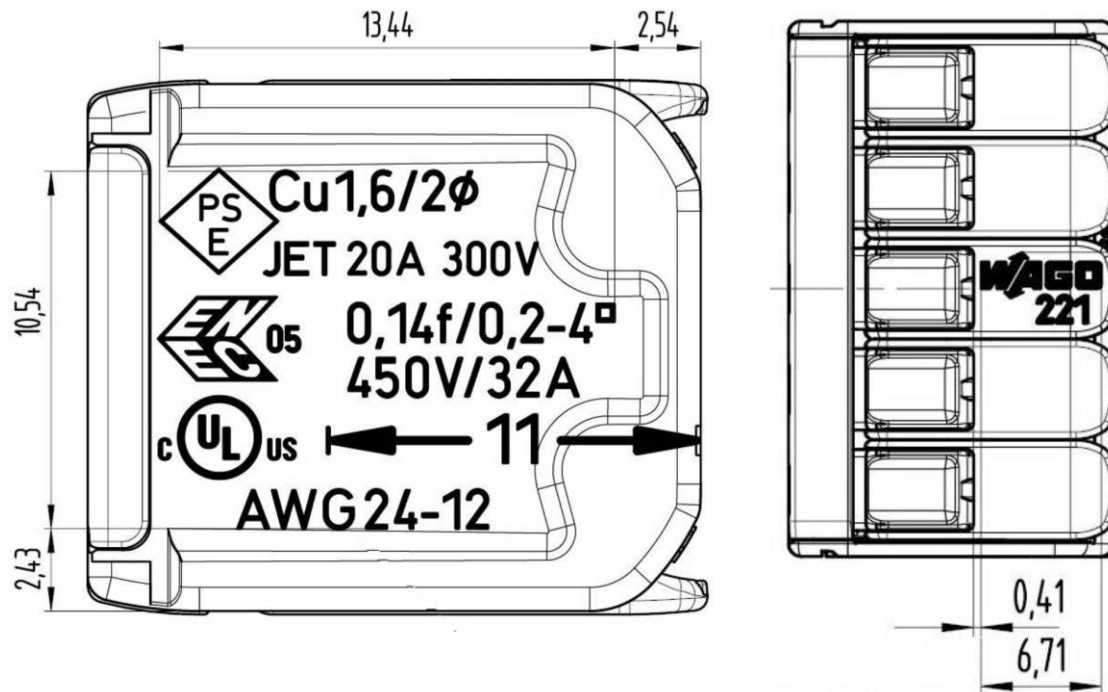
Example for all types, except 221-2401 and 221-2411



Example for type 221-2411



Example for type 221-420



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:	☒ 0,14mm ² "f" ☒ 0,2mm ² ☒ 4mm ² ☐ 1,5mm ² ☐ 2,5mm ² ☐ 4mm ² ☐ 6mm ² ☐ 10mm ²
Conductor insulation:	☐ 16mm ² ☐ 25mm ² ☐ 35 mm ²
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 : 03-2023	
Date (s) of performance of tests : 06-2023 – 08-2023	
General remarks:	
"(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. 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 Nederland's laboratory accreditation, according to ISO/IEC 17025, by the Dutch Accreditation Council.	

Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60998-2-20:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☒ Yes ☐ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....:	Factory locations: WAGO GmbH & Co. KG, Werk Sondershausen Waldstrasse 1, 99706, Sondershausen Germany WAGO Contact S.A. Route de l'Industrie 19, CP 168, 1564, Domdidier, Switzerland WAGO GmbH & Co. KG Cammer Str. 17, 32423 Minden Germany
General product information:	
See page 46 and 49.	

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	As example: 221-415 221-420	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, 221-2411, 221-420		
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	Terminals clamp the conductor without undue damage: Types 221-420		
10.104.1	Connection/disconnection 5 times: smallest diameter (mm).....:	0,14 mm² flexible 0,2 mm² solid	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

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
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
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 mm ² - 4 mm ²	P
	- flexible, cross-sectional area (mm ²)	all types, except 221-2401 and 221-2411 0,14 mm ² - 4 mm ² all types, except 221-2401 and 221-2411 0,2 mm ² - 4 mm ²	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, 221-422, 221-420		
12.1	Connecting devices resistant to ageing; after the test (168 h): no cracks visible, not sticky or greasy, no damage; test temperature (°C)	☐ 85 °C ☒ 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

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
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, 221-425, 221-420		
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, (221-425 Tumbling barrel only), 221-420		
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

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Cabinet temperature (°C).....:	☐ 40 ☒ 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
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 (mm²)	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 (mm²)	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 (mm²)	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 (mm²)		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 (mm²)	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 (mm²)		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
10.105	TABLE: Clamping securement and damage to the conductor test					
	Model/type reference.....:			221-420		
No of sample	Conductor cross-sectional area (mm²)	Conductor type	Mass for conductor (kg)	Height H (mm)	Diameter of bushing hole (mm)	
137 1-10	0,14	flexible	0,2	260	6,4	P
138 1-10	0,2	solid	0,2	260	6,4	P
139 1 -10	0,2	stranded	0,2	260	6,4	P
140 1 - 10	4	flexible	0,9	280	9,5	P
141 1 - 10	4	stranded	0,9	280	9,5	P
142 1 - 10	4	solid	0,9	280	9,5	P
Supplementary information:						
10.106	TABLE: Pull-out test					
	Model/type reference.....:			221-420		
No of sample	Conductor cross-sectional area (mm²)		Conductor type		Pull force (N)	
137 1-10	0,14		flexible		10	P
138 1-10	0,2		solid		10	P
139 1 -10	0,2		stranded		10	P
140 1 - 10	4		flexible		60	P
141 1 - 10	4		stranded		60	P
142 1 - 10	4		solid		60	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:			

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-2411	
	Smallest cross-sectional area (mm²) :	0,2 mm² solid and flexible	
	Largest cross-sectional area (mm²) :	4 mm² 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:			

IEC 60998-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-425	
	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		>5 MΩ	5 MΩ
Each clamping unit and all others together			
Supplementary information:			

13.3	TABLE: Insulation resistance		
	Model/type reference.....:	221-420	
	Smallest cross-sectional area (mm²) :	0,14 mm² "f" / 0,2 mm² "s" / 0,2 mm² "str"	
	Largest cross-sectional area (mm²) :	4 mm² "s" / 4 mm² "f" / 4 mm² "str"	
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:			

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

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:			

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:			

13.4	TABLE: Electric strength test		
	Model/type reference.....:	221-425	
	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.....:	221-420	
	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 mm ²			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 (mm²) 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
14.101	TABLE: Mechanical strength Type 221-420				
	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)	0,48	0,53	0,52	P
	- voltage drop measured (mV) (2 nd deflection)	0,47	0,53	0,53	P
	- voltage drop measured (mV) (3 rd deflection)	0,47	0,54	0,53	P
	- voltage drop measured (mV) (4 th deflection)	0,47	0,54	0,52	P
	- voltage drop measured (mV) (5 th deflection)	0,47	0,54	0,51	P
	- voltage drop measured (mV) (6 th deflection)	0,47	0,53	0,51	P
	- voltage drop measured (mV) (7 th deflection)	0,47	0,53	0,51	P
	- voltage drop measured (mV) (8 th deflection)	0,48	0,53	0,52	P
	- voltage drop measured (mV) (9 th deflection)	0,48	0,53	0,52	P
	- voltage drop measured (mV) (10 th deflection)	0,48	0,54	0,52	P
	- voltage drop measured (mV) (11 th deflection)	0,48	0,54	0,52	P
	- voltage drop measured (mV) (12 th deflection)	0,47	0,53	0,52	P
	- requirement: ≤ 2,5 mV				P

IEC 60998-2-2					
Clause	Requirement + Test	Result - Remark			Verdict
14.101	TABLE: Mechanical strength Type 221-420				
	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)	0,65	0,60	0,58	P
	- voltage drop measured (mV) (2 nd deflection)	0,61	0,60	0,57	P
	- voltage drop measured (mV) (3 rd deflection)	0,59	0,61	0,57	P
	- voltage drop measured (mV) (4 th deflection)	0,59	0,57	0,60	P
	- voltage drop measured (mV) (5 th deflection)	0,61	0,57	0,62	P
	- voltage drop measured (mV) (6 th deflection)	0,65	0,60	0,64	P
	- voltage drop measured (mV) (7 th deflection)	0,65	0,57	0,61	P
	- voltage drop measured (mV) (8 th deflection)	0,59	0,55	0,58	P
	- voltage drop measured (mV) (9 th deflection)	0,55	0,60	0,56	P
	- voltage drop measured (mV) (10 th deflection)	0,54	0,76	0,58	P
	- voltage drop measured (mV) (11 th deflection)	0,56	0,77	0,61	P
	- voltage drop measured (mV) (12 th deflection)	0,56	0,68	0,62	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	☒ single ☐ multiway	—
	T marking (°C)	☒ 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	☒ single ☐ multiway	—
	T marking (°C)	☒ 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	☒ single ☐ multiway	—
	T marking (°C)	☒ 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	TABLE: Temperature rise		
	Model/type reference.....:	221-420	
	Terminal	☒ single ☐ multiway	—
	T marking (°C)	☒ 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)		22 23 23	45
On conductor in the terminal and wire (sample with flexible wire)		27 30 25	45
On conductor in the terminal and wire (sample with stranded wire)		21 20 24	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 (mm²)	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

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

15.101	TABLE: Temperature-cycling test				
	Model/type reference	221-2411			
	Smallest cross-sectional area (mm²)	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	P
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	P
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	P
	Largest cross-sectional area (mm²)	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	P
Stranded conductors	(after 24 cycles)	13,36	14,49	10,92	P
Flexible conductors	(after 24 cycles)	13,41	16,01	16,31	P
Solid conductors	(1,5 times 24 th cycle value)	23,00	19,07	20,87	P
Stranded conductors	(1,5 times 24 th cycle value)	20,04	21,74	16,38	P
Flexible conductors	(1,5 times 24 th cycle value)	20,12	24,02	24,47	P
Solid conductors	(after 192 cycles)	15,28	12,44	13,83	P
Stranded conductors	(after 192 cycles)	13,26	14,71	13,00	P
Flexible conductors	(after 192 cycles)	13,68	16,55	16,33	P
Supplementary information:					

IEC 60998-2-2					
Clause	Requirement + Test		Result - Remark	Verdict	
15.101	TABLE: Temperature-cycling test				
	Model/type reference	221-420			
	Smallest cross-sectional area (mm²)	0,14 mm² flexible 0,2 mm² solid			
	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)		13,7	11,6	13,2	
Stranded conductors (after 24 cycles)					
Flexible conductors (after 24 cycles)		17,2	23,9	19,9	P
Solid conductors (1,5 times 24 th cycle value)		20,55	17,4	19,8	
Stranded conductors (1,5 times 24 th cycle value)					
Flexible conductors (1,5 times 24 th cycle value)		25,8 / 2 x 22,5	35,85/ 2 x 22,5	29,85/ 2 x 22,5	P
Solid conductors (after 192 cycles)		13,6	12,2	11,9	
Stranded conductors (after 192 cycles)					
Flexible conductors (after 192 cycles)		16,7	22,5	19,4	P
	Largest cross-sectional area (mm²)	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)		23,3	22,6	20,4	P
Stranded conductors (after 24 cycles)					P
Flexible conductors (after 24 cycles)		26,0	25,9	23,2	P
Solid conductors (1,5 times 24 th cycle value)		34,95 / 2 x 22,5	33,9 / 2 x 22,5	30,6 / 2 x 22,5	P
Stranded conductors (1,5 times 24 th cycle value)					P
Flexible conductors (1,5 times 24 th cycle value)		39,0 / 2 x 22,5	24,02 / 2 x 22,5	24,47 / 2 x 22,5	P
Solid conductors (after 192 cycles)		21,1	22,0	20,5	P
Stranded conductors (after 192 cycles)					P
Flexible conductors (after 192 cycles)		25,7	25,4	22,6	P
Supplementary information:					
Two clamping units are tested in series, therefore the voltage drop limit should be 2 x 22,5 mV					

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

16.2	TABLE: Heating cabinet test			
	Test temperature (°C).....:	☐ 85°C ☒ 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
	221-425	P	P	P
	221-420	P	P	P
Supplementary information:				

16.3A	TABLE: Ball pressure test of insulating materials all types, except 221-2401, 221-2411 and 221-425			
	Test temperature (°C).....:	☐ 125 ☒ 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
	Lever green	Elcrin	1,03 mm	P
Supplementary information:				

16.3A	TABLE: Ball pressure test of insulating materials types 221-2401 and 221-2411			
	Test temperature (°C).....:	☐ 125 ☒ 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
16.3A	TABLE: Ball pressure test of insulating materials types 221-420			
	Test temperature (°C).....:		☐ 125 ☒ 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:				

16.3B	TABLE: Ball pressure test of insulating materials			
	Test temperature (°C).....:		☐ 70 ☐ 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:					

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

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:					

17	TABLE: Clearances and creepage distances types 221-420				
	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)
Clamping units - surface		4	4,05	4,05	-
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 221-415)		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.
lever (type 221-422)		Elcrin	850°C	flame extinguished immediately after removal.
Supplementary information:				

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

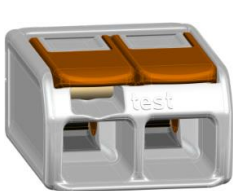
18	TABLE: Glow-wire test		
Part under test	Material designation / manufacturer	Test temperature (°C)	Time of extinguish of flames and glowing, if any
housing and lever (type 221-2401)	Xantar (transparent) / Celanex (orange)	850°C	flame extinguished immediately after removal.
Supplementary information:			

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 221-0420)	Xantar (transparent) / Celanex (orange)	850°C	flame extinguished immediately after removal.
Supplementary information:			

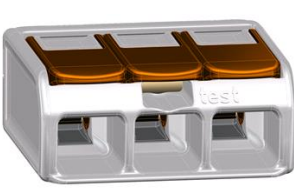
19	TABLE: Tracking		
Part under test	Material designation / manufacturer	Test voltage (V)	Remarks
housing	Xantar	175 V	P
Lever orange	Celanex	175 V	P
Lever orange	Ultradur	175 V	P
Lever grey	Polyamide for Zytel	175 V	P
Cover	Makrolon	175 V	P
Lever green	Elcrin	175 V	P
Supplementary information:			

Remarks

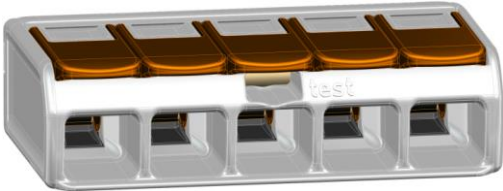
Illustrations:



Type: 221-412



Type: 221-413



Type: 221-415



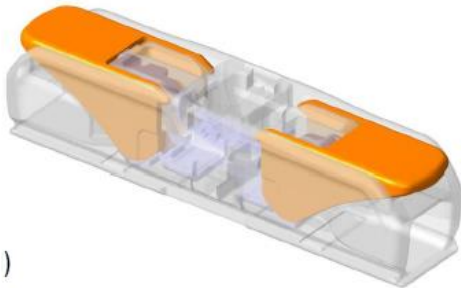
Type: 221-482



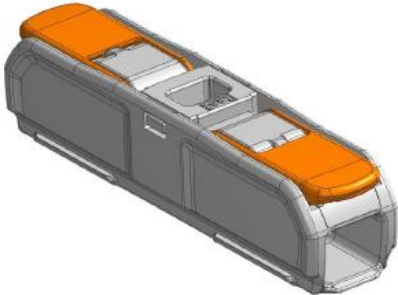
Type: 221-483



Type: 221-485



Type 221-2401



Type 221-2411



Type 221-422



Type 221-423



Type 221-425

Remarks



Type 221-420



Type 221-2431



Type 221-2421

Remarks

Product data

Product	:	Splicing wire connector
Trade name(s)	:	WAGO
Type(s)/model(s)	:	221-24x1, 221-4x0 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 221-24x1

Connectable conductors	:	0,2 - 4 mm ² solid 0,34 - 4 mm ² flexible 0,2 - 2,5 mm ² stranded
------------------------	---	--

Type	:	221-2401
Description	:	screwless type clamping units, both sides of the connector one clamping unit, 1-pole, orange lever, top white

Type	:	221-2421
Description	:	screwless type clamping units, both sides of the connector one clamping unit, 1-pole, green lever, top white

Product data – type 221-24x1

Connectable conductors	:	0,2 - 4 mm ² flexible and solid 0,2 - 2,5 mm ² stranded
------------------------	---	--

Type	:	221 with suffixes -2411
Description	:	screwless type clamping units, both sides of the connector one clamping unit, 1-pole, orange lever, top transparent

Type	:	221 with suffixes -2431
Description	:	screwless type clamping units, both sides of the connector one clamping unit, 1-pole, green lever, top transparent

Product data – type 221-4x0

Connectable conductors	:	0,14 mm ² flexible 0,2 - 4 mm ² flexible, stranded and solid
------------------------	---	---

Type	:	221-420
Description	:	screwless type clamping units, 10-poles, orange lever

Type	:	221-430
Description	:	screwless type clamping units, 10-poles, green lever

Type	:	221-490
Description	:	screwless type clamping units, 10-poles, grey lever

Remarks

Product data – type 221-4xx

Connectable conductors	:	0,14 mm ² flexible 0,2 - 4 mm ² flexible, stranded and solid
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
Type	:	221 with suffixes -422, -423, and -425
Description	:	screwless type clamping units, 1-pole, last number of the suffix indicates the number of clamping units, green lever

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_2C			
Attachment Originator: DEKRA certification B.V.			
Master Attachment: Date 2020-08-28			
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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 mm², 0,34 mm², 0,5 mm², 0,75 mm², 1 mm², 1,25mm², 1,5 mm², 2,5 mm², 4 mm², 6 mm², 10 mm², 16 mm², 25 mm², and 35 mm²		P