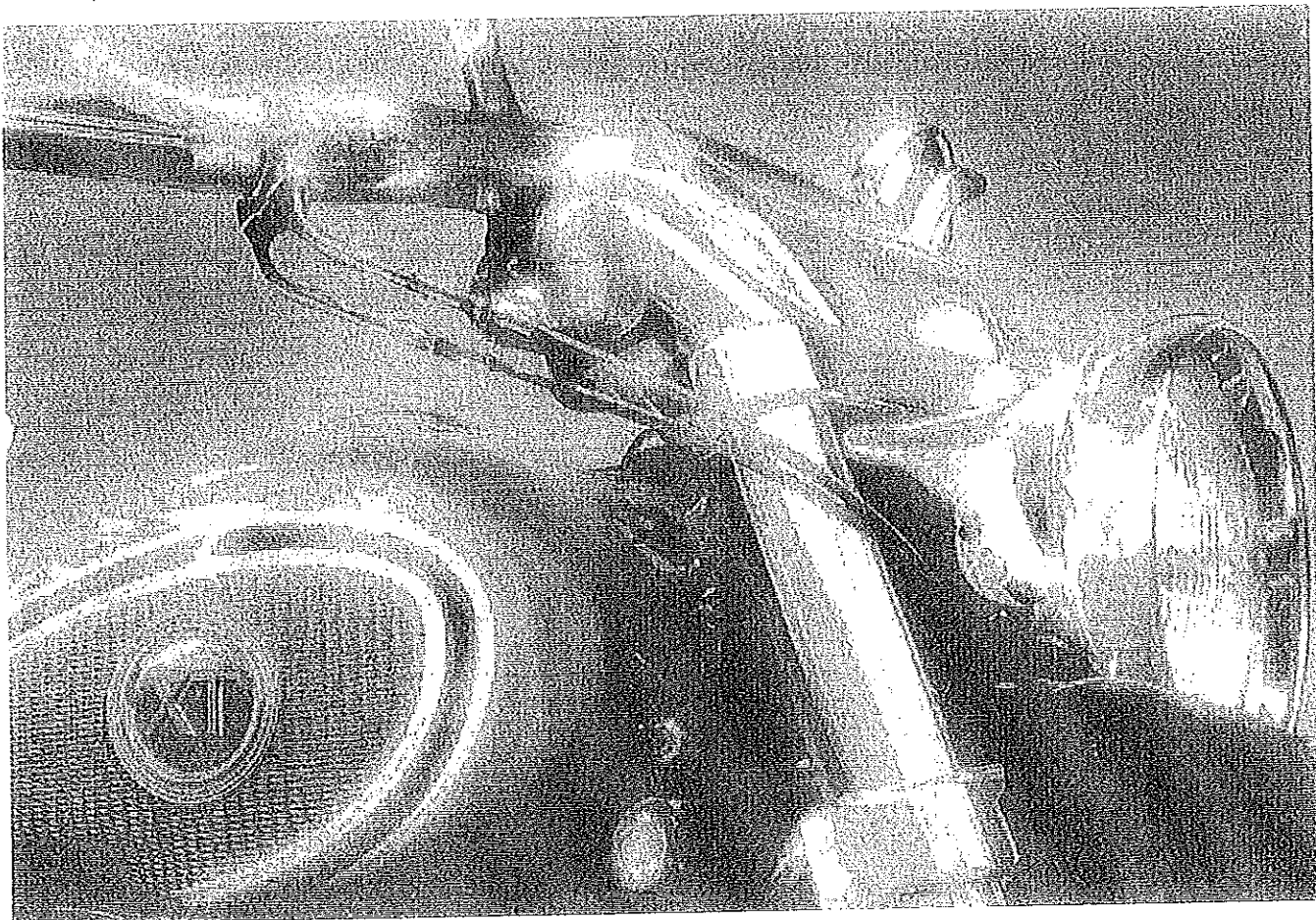


New SACE Tmax XT, XTraordinary completeness of range.



Here are the 4 new SACE Tmax XT frames for you:

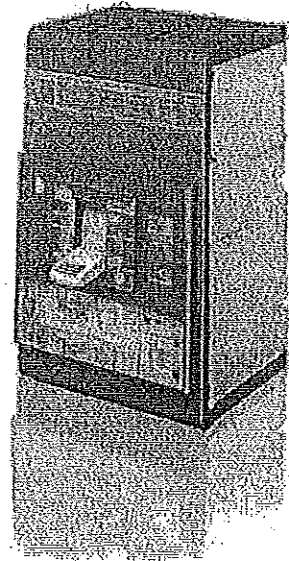
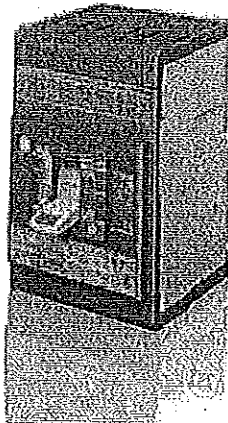
- the small XT1 up to 160A;
- the high-performing XT2 up to 160A;
- the reliable XT3 up to 250A;
- the powerful XT4 up to 250A.

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The new SACE Tmax XT go everywhere and fear no tests as they are made to respond successfully to all plant engineering requirements, from the standard ones to the most technologically advanced ones, thanks to the extraordinary fullness of their range. A complete offer up to 250A for distribution, for energy metering, for motor protection, for generator protection, for oversized neutral, as switch-disconnectors and for any other needs. A new range of both thermomagnetic and electronic protection trip units,

interchangeable right from the smallest frames. To say nothing of the new and large number of dedicated accessories available, even for special applications.

All that remains is for you to choose: XT1 and XT3 for building standard installations with ABB SACE's unquestioned reliability and safety, whereas XT2 and XT4 for building technologically advanced installations with top of market performance. New SACE Tmax XT, for any choice, always and in any case simply extraordinary.

New SACE Tmax XT. XTreme protection.



Construction Characteristics

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Construction characteristics

		XT1				
Size ^(2.1)	(A)	160				
Poles	(No.)	3, 4				
Rated service voltage, Ue ^(2.4)	(AC) 50-60Hz	690				
	(DC)	500				
Rated insulation voltage, Ui ^(2.4)	(V)	800				
Rated impulse withstand voltage, Uimp ^(2.4)	(kV)	8				
Versions		Fixed, Plug-in ⁽²⁾				
Breaking capacities according to IEC 60947-2		B	C	N	S	H
Rated ultimate short-circuit breaking capacity, Icu ^(2.7)						
Icu @ 220-230-240V 50-60Hz (AC)	[kA]	25	40	65	85	100
Icu @ 380V 50-60Hz (AC)	[kA]	18	25	36	50	70
Icu @ 415V 50-60Hz (AC)	[kA]	18	25	36	50	70
Icu @ 440V 50-60Hz (AC)	[kA]	15	25	36	50	65
Icu @ 500V 50-60Hz (AC)	[kA]	8	18	30	36	50
Icu @ 525V 50-60Hz (AC)	[kA]	6	8	22	35	35
Icu @ 690V 50-60Hz (AC)	[kA]	3	4	6	8	10
Icu @ 250V (DC) 2 poles in series	[kA]	18	25	36	50	70
Icu @ 500V (DC) 2 poles in series	[kA]	-	-	-	-	-
Icu @ 500V (DC) 3 poles in series ⁽³⁾	[kA]	18	25	36	50	70
Rated service short-circuit breaking capacity, Ics ^(2.8)						
Ics @ 220-230-240V 50-60Hz (AC)	[kA]	100%	100%	75% (50)	75%	75%
Ics @ 380V 50-60Hz (AC)	[kA]	100%	100%	100%	100%	75%
Ics @ 415V 50-60Hz (AC)	[kA]	100%	100%	100%	75%	50% (37.5)
Ics @ 440V 50-60Hz (AC)	[kA]	75%	50%	50%	50%	50%
Ics @ 500V 50-60Hz (AC)	[kA]	100%	50%	50%	50%	50%
Ics @ 525V 50-60Hz (AC)	[kA]	100%	100%	50%	50%	50%
Ics @ 690V 50-60Hz (AC)	[kA]	100%	100%	75%	50%	50%
Ics @ 250V (DC) 2 poles in series	[kA]	100%	100%	100%	100%	75%
Ics @ 500V (DC) 2 poles in series	[kA]	-	-	-	-	-
Ics @ 500V (DC) 3 poles in series ⁽³⁾	[kA]	100%	100%	100%	100%	75%
Rated short-circuit making capacity, Icm ^(2.19)						
Icm @ 220-230-240V 50-60Hz (AC)	[kA]	52.5	84	143	187	220
Icm @ 380V 50-60Hz (AC)	[kA]	36	52.5	75.6	105	154
Icm @ 415V 50-60Hz (AC)	[kA]	36	52.5	75.6	105	154
Icm @ 440V 50-60Hz (AC)	[kA]	30	52.5	75.6	105	143
Icm @ 500V 50-60Hz (AC)	[kA]	13.6	36	63	75.6	105
Icm @ 525V 50-60Hz (AC)	[kA]	9.18	13.6	46.2	73.5	73.5
Icm @ 690V 50-60Hz (AC)	[kA]	4.26	6.88	9.18	13.6	17
Breaking capacities according to NEMA-AB1						
@ 240V 50-60Hz (AC)	[kA]	25	40	65	85	100
@ 480V 50-60Hz (AC)	[kA]	8	18	30	36	65
Utilisation Category (IEC 60947-2)		A				
Reference Standard		IEC 60947-2				
Isolation behaviour		✓				
Mounted on DIN rail		DIN EN 50022				
Mechanical life ^(2.14)	[No. Operations]	25000				
Electrical life @ 415 V (AC) ^(2.13)	[No. Hourly operations]	240				
	[No. Operations]	8000				
	[No. Hourly operations]	120				
Dimensions - Fixed						
Width x Depth x Height)	3 poles	[mm]	76.2 x 70 x 130			
	4 poles	[mm]	101.6 x 70 x 130			
Total opening time						
Circuit-breaker with shunt opening release	[ms]	15				
Circuit-breaker with undervoltage release	[ms]	15				
Trip units for power distribution						
TMD/TMA		☑				
TMD		☑				
Ekip LS/I		☑				
Ekip I		☑				
Ekip LSI		☑				
Ekip LSIG		☑				
Ekip E		☑				
Trip units for motor protection						
MF/MA		☑				
Ekip M-I		☑				
Ekip M-LIU		☑				
Ekip M-LRIU		☑				
Trip units for generator protection						
TMG		☑				
Ekip G-LS/I		☑				
Trip units for oversized Neutral Protection						
Ekip N-LS/I		☑				
Interchangeable protection trip units						
Weight - Fixed	3/4 poles	[kg]	1.1 / 1.4			
Plug-in (EF terminals)	3/4 poles	[kg]	2.21 / 2.82			
Withdrawable (EF terminals)	3/4 poles	[kg]				



⁽¹⁾ 90kA@690V only for XT1 160. Available for short-circuit, please ask ABB SACE
⁽²⁾ XT1 plug-in in max=125A

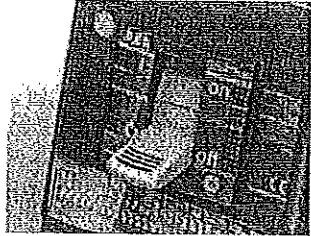
⁽³⁾ XT1 500V DC 4 poles in series
⁽⁴⁾ XT1 750V DC please ask ABB SACE for availability

⁽⁵⁾ Complete circuit-breaker
⁽⁶⁾ Loose trip unit

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Construction characteristics

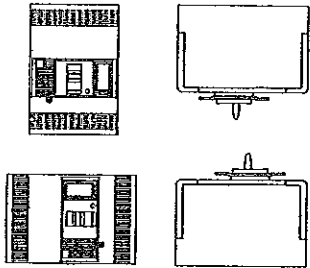
The references in round brackets ^(G1.2) in the technical catalogue refer to the Glossary in the final chapter of the technical catalogue.



Positive operation

All the moulded-case circuit-breakers in the SACE Tmax XT family are realized in accordance with the following construction characteristics:

- double insulation^(G1.5);
- positive operation^(G1.6);
- isolation behaviour^(G1.7);
- electromagnetic compatibility^(G1.8);
- tropicalization^(G1.9);
- impact and vibration resistance^(G1.10);
- power supply from the top towards the bottom or vice versa;
- versatility of the installation. It is possible to mount the circuit-breaker in horizontal, vertical, or lying down position without any derating of the rated characteristics;
- no nominal performance derating for use up to an altitude of 2000m. Above 2000m, the properties of the atmosphere (composition of the air, dielectric strength, cooling power and pressure) change, having an impact on the main parameters which define the circuit-breaker. The table below gives the changes to the main performance parameters;

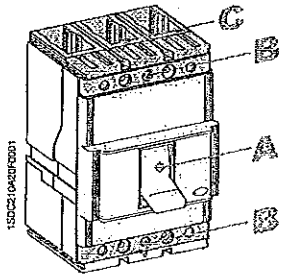


Installation positions

Altitude		2000m	3000m	4000m	5000m
Rated employ voltage, U _e	[V]	690	600	540	470
Rated uninterrupted current	%	100	98	93	90

- the SACE Tmax XT circuit-breakers can be used in environments where the temperature is between -25°C and +70°C and stored in environments where the temperature is between -40°C and +70°C. To use temperatures other than 40°C, see the "Temperature Performances" paragraph of the Characteristic Curves and the technical information chapter;

- different degrees of protection IP (International Protection)^(G1.11);



Protection degrees

Circuit-breaker	Circuit-breaker						
	With front	Without front ⁽¹⁾	With front for lever -FLD-	With rotary Handles	With transmitted rotary handle and accessory IP54	With high terminal covers HTC	With low terminal covers LTC
A	IP40	IP20	IP40	IP40	IP54	IP40	IP40
B	IP20	IP20	IP20	IP20	IP20	IP40	IP40
C	NC	NC	NC	NC	NC	IP40	IP30

⁽¹⁾ During the installation of electrical accessories
NC Not classifiable

Accessories

	Motor operator MOD, MOE or MOE-E	Residual current devices	Residual current from switchboard RCQ020	Automatic Transfer Switch ATS021 and ATS022
On front	IP30	IP40	IP41	IP40

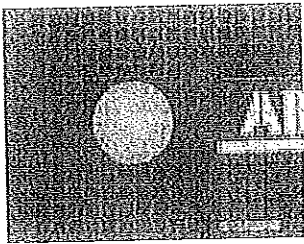
- all the circuit-breakers in the XT family are fitted with a test pushbutton which allows the release test to be done. This test must be carried out with the circuit-breaker closed and with no current.



Test pushbutton

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Regulations and Reference Standards



Hologram

Conformity with Standards

The SACE Tmax XT circuit-breakers and their accessories are constructed in conformity with:

- Standard^(69.1);
 - IEC 60947-2;
- Directives^(66.2);
 - EC "Low Voltage Directive" (LVD) N° 2006/95/EC (in replacement of 73/23/EEC and subsequent amendments);
 - EC "Electromagnetic Compatibility Directive" (EMC) 2004/108/CE;
- Naval Registers^(69.3) (ask ABB SACE for the versions available):
 - Lloyd's Register of Shipping, Germanischer Lloyd, Bureau Veritas, Rina, Det Norske Veritas, Russian Maritime Register of Shipping, ABS.

Certification of conformity with the product Standards is carried out in the ABB SACE tests laboratory (accredited by SINAL) in respect of the EN 45011 European Standard, by the Italian certification body ACAE (Association for Certification of Electrical Apparatus), member of the European LOVAG organisation (Low Voltage Agreement Group) and by the Swedish certification body SEMKO belonging to the international IECEE organisation.

The SACE Tmax XT series has a hologram on the front, obtained using special anti-forgery techniques, a guarantee of the quality and genuineness of the circuit-breaker as an ABB SACE product.



Naval Registers

Company Quality System

The ABB SACE Quality System conforms with the following Standards:

- ISO 9001 international Standard;
- EN ISO 9001 (equivalent) European Standards;
- UNI EN ISO 9001 (equivalent) Italian Standards;
- IRIS International Railway Industry Standard.

The ABB SACE Quality System attained its first certification with the RINA certification body in 1990.

Environmental Management System, Social Responsibility and Ethics

Attention to protection of the environment is a priority commitment for ABB SACE. Confirmation of this is the realisation of an Environmental Management System certified by RINA (ABB SACE was the first industry in the electromechanical sector in Italy to obtain this recognition) in conformity with the International ISO14001 Standard. In 1999 the Environmental Management System was integrated with the Occupational Health and Safety Management System according to the OHSAS 18001 Standard and later, in 2005, with the SA 8000 (Social Accountability 8000) Standard, committing itself to respect of business ethics and working conditions.

The commitment to environmental protection becomes concrete through:

- selection of materials, processes and packaging which optimise the true environmental impact of the product;
- use of recyclable materials;
- voluntary respect of the RoHS directive^(68.4).

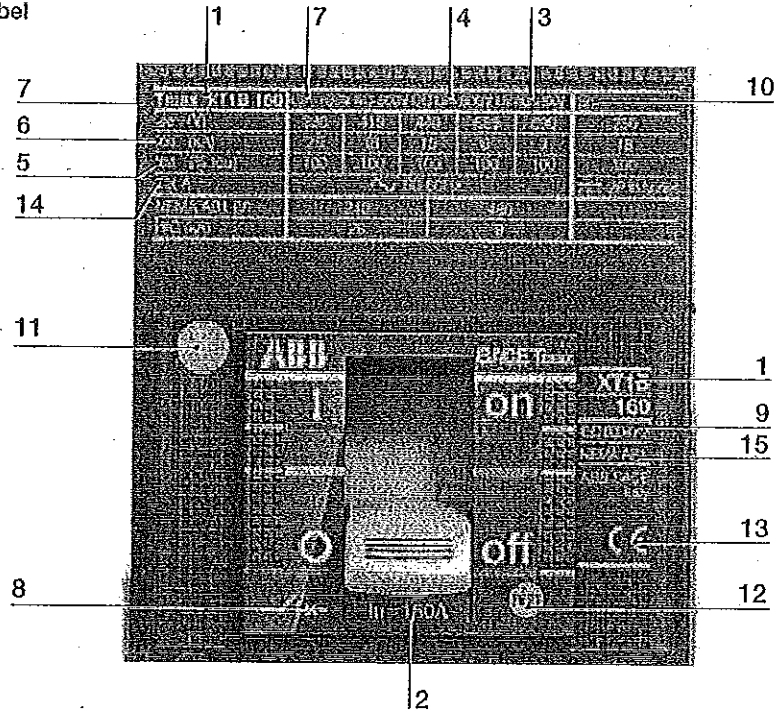
ISO 14001, 18001 and SA8000 recognitions together with ISO 9001 made it possible to obtain RINA BEST FOUR CERTIFICATION.

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Identification of the SACE Tmax XT circuit-breakers

The characteristics of the circuit-breaker are given on the rating nameplate on the front of the circuit-breaker, and on the side rating plate.

Front label



Side label

The side rating plate contains the following information:

Tmax XT TB.160		IEC 60947-2	
Max 690V AC/500V DC		Ui=800V	Uimp=8&V
Ics (kA)	25 31.5 40 50 63	250	
Icu (kA)	25 31.5 40 50 63	10	
Ics (% Ics)	100 115 100 100 100	100	
Ue (kV)	250	360	
Icu (kA)	25	10	
ABB SACE		S/N	
ABB SACE		CE	
ACCESSORIES			

- 1 Name of the circuit-breaker and performance level⁽¹⁾
- 2 In: rated current of the circuit-breaker⁽¹⁾
- 3 Uimp: rated impulse withstand voltage⁽¹⁾
- 4 Ui: insulation voltage⁽¹⁾
- 5 Ics: rated short-circuit duty breaking capacity⁽¹⁾
- 6 Icu: rated ultimate short-circuit breaking capacity⁽¹⁾
- 7 Ue: rated service voltage⁽¹⁾
- 8 Symbol of isolation behaviour⁽¹⁾
- 9 Reference Standard IEC 60947-2⁽¹⁾
- 10 Serial number
- 11 Anti-forgery logo
- 12 Test pushbutton
- 13 CE marking
- 14 Utilisation Category
- 15 Reference Standard NEMA-AB1

⁽¹⁾ In compliance with the IEC 60947-2 Standard

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Nomenclature of the trip units and residual current protection devices

The tables below give details of the logic with which each thermomagnetic trip units, electronic trip units and residual current devices has been named.

Magnetic trip units		
Family Name		Protection
M: magnetic	+	F: with fixed threshold A: with adjustable threshold

Thermomagnetic trip units		
Family Name		Protection
TM: thermomagnetic	+	A: with adjustable thermal and magnetic threshold D: with adjustable thermal and fixed magnetic threshold G: with adjustable thermal and fixed magnetic threshold (for generator protection)

Example:

- ☒ MA: magnetic only trip unit, with adjustable protection threshold;
- ☒ TMD: thermomagnetic trip unit, with adjustable thermal and fixed magnetic protection threshold;
- ☒ TMG: thermomagnetic trip unit, with adjustable thermal and fixed magnetic protection threshold, specifically for protection of generators.

Electronic trip units					
Family Name		Application		Protection	Circuit-breaker ⁽¹⁾
Ekip	+: Distribution M: Motor protection G: Generator protection N: Neutral E: Energy measurements	+	I LS/I LSI LSIG LIU LRIU	XT2 XT4

⁽¹⁾ Circuit-breaker has to be defined only with loose release.

Example:

- ☒ Ekip LS/I: electronic trip unit for distribution networks protection, with "L" against overload and as an alternative "S" protection function against delay short circuit or "I" protection function against instantaneous short circuit;
- ☒ Ekip M-LRIU: electronic trip unit for motors protection, with LRIU protection functions;
- ☒ Ekip N-LS/I XT2: loose electronic trip unit for the neutral protection, with "L" against overload and as an alternative "S" protection function against delay short circuit or "I" protection function against instantaneous short circuit.

Residual Current Protection Devices

Family Name		Typology
RC	+	Inst: instantaneous type "A" Sel: selective type "A" Sel 200: selective type "A" reduced to 200mm. B Type: selective type "B"

Example:

- ☒ RC Inst: residual current protection device with instantaneous timing;
- ☒ RC Sel 200: residual current protection device with adjustable time trip, reduced to 200mm;
- ☒ RC B type: residual current protection device "B" type.

The SACE Tmax XT family ranges

The SACE Tmax XT moulded-case circuit-breaker family complies with different installation requirements. Circuit-breakers are available with trip units dedicated to different applications, such as power distribution, generator protection, motor protection and oversized neutral protection. Some of these circuit-breakers can also be used in communication systems and plants that function at 400Hz. Switch-disconnectors are also available.

In = Rated uninterrupted current ^(1,2)	XT1 160	XT2 160	XT3 250	XT4 250
Power distribution				
Thermomagnetic trip units				
TMD	16...160		63...250	
TMD/TMA		1.6...160		16...250
Electronic trip units				
Ekip LSI/		10...160		40...250
Ekip I		10...160		40...250
Ekip LSI		10...160		40...250
Ekip LSI G		10...160		40...250
Ekip E-LSIG				40...250
Motor protection				
Magnetic trip units				
MF/MA		1...100 ⁽¹⁾	100...200 ⁽¹⁾	10...200 ⁽¹⁾
Electronic trip units				
Ekip M-I		20...100 ⁽¹⁾		
Ekip M-LIU		25...100 ⁽¹⁾		40...160 ⁽¹⁾
Ekip M-LRIU		25...100 ⁽¹⁾		40...200 ⁽¹⁾
Generator Protection				
Thermomagnetic trip units				
TMG		16...160	63...250	
Electronic trip units				
Ekip G-LSI		10...160		40...250
Oversized Neutral Protection 160%				
Electronic trip units				
Ekip N-LSI/		10...100 ⁽²⁾		40...160 ⁽²⁾
Switch-disconnectors				
	☒		☒	☒
Special applications				
100Hz				
	☒	☒	☒	☒
Communication				
		☒		☒

⁽¹⁾ Only 3 poles version

⁽²⁾ Only 4 poles version

Circuit-breakers for power distribution

Main characteristics

SACE Tmax XT moulded-case circuit-breakers are the ideal solution for all distribution levels, from the main low voltage switchboard to the subswitchboards in the installation. They feature high specific let-through current peak and energy limiting characteristics that allow the circuits and equipment on the load side to be sized in an optimum way. SACE Tmax XT circuit-breakers with thermomagnetic and electronic trip units protect against overloads, short-circuits, earth faults and indirect contacts in low voltage distribution networks.

The SACE Tmax XT family of moulded-case circuit-breakers can be equipped with:

- ③ thermomagnetic trip units^(3,2), for direct and alternating current network protection, using the physical properties of a bimetal and an electromagnet to detect the overloads and short-circuits;
- ④ electronic trip units^(3,4), for alternating current network protection. Releases with microprocessor technology obtain protection functions that make the operations extremely reliable and accurate. The power required for operating them correctly is supplied straight from the current sensors of the releases. This ensures that they trip even in single-phase conditions and on a level with the minimum setting.

The electronic protection trip unit consists of:

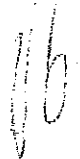
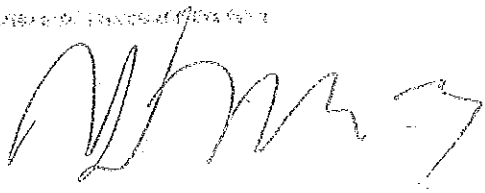
- 3 or 4 current sensors (current transformers);
- a protection unit;
- an opening solenoid (built into the electronic trip unit).

Characteristics of Electronic trip units SACE Tmax XT

Operating temperature	-25°C...+70°C
Relative humidity	98%
Self-supplied	0.2xIn (single phase) ⁽¹⁾ ②
Auxiliary supply (where applicable)	24V DC ± 20%
Operating frequency	45...66Hz or 360...440Hz
Electromagnetic compatibility	IEC 60947-2 Annex F

⁽¹⁾ 0.32 x In for Ekip N-LS/A

⁽²⁾ For 10A: 0.4In



Circuit-breakers for power distribution

Main characteristics

Characteristics of circuit-breakers for power distribution

		XT1	XT2	XT3	XT4
Size ^(62.1)	[A]	160	160	250	160/250
Poles	[Nr.]	3, 4	3, 4	3, 4	3, 4
Rated service voltage, U_e ^(62.4)	(AC) 50-60Hz [V]	690	690	690	690
	(DC) [V]	500	500	500	500
Rated insulation voltage, U_i ^(62.5)	[V]	800	1000	800	1000
Rated impulse withstand voltage, U_{imp} ^(62.6)	[kV]	8	8	8	8
Versions		Fixed, Plug-in	Fixed, Withdrawable, Plug-in	Fixed, Plug-in	Fixed, Withdrawable, Plug-in
Breaking capacities		B C N S H	N S H L V	N S	N S H L V
Trip units		Thermomagnetic	Thermomagnetic, Electronic	Thermomagnetic	Thermomagnetic, Electronic
TMD/TMA			☒		☒
TMD		☒		☒	
Ekip LSI			☒		☒
Ekip I			In = 10A, 25A, 63A, 100A, 160A		In = 40A, 63A, 100A, 160A, 250A
Ekip LSI			In = 10A, 25A, 63A, 100A, 160A		In = 40A, 63A, 100A, 160A, 250A
Ekip LSI			In = 10A, 25A, 63A, 100A, 160A		In = 40A, 63A, 100A, 160A, 250A
Ekip LSIG			In = 10A, 25A, 63A, 100A, 160A		In = 40A, 63A, 100A, 160A, 250A
Ekip E-LSIG					In = 40A, 63A, 100A, 160A, 250A
Interchangeability			☒		☒

☒ Complete circuit-breaker

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Circuit-breakers for power distribution

Electronic trip units

Ekip LS/I

Main characteristics:

- 1 available for XT2 and XT4 in the three-pole and four-pole versions;
- 2 protections:
 - against overload (L): 0.4...1xIn adjustable protection threshold, with adjustable time trip curve;
 - against short-circuit with delay (S): 1...10xIn adjustable protection threshold, with adjustable time trip curve (as an alternative to I protection);
 - against instantaneous short-circuit (I): 1...10xIn adjustable protection threshold, with instantaneous trip curve (as an alternative to S protection);
 - of the neutral in four-pole circuit-breakers:
 - for In ≥100A can be selected in the OFF or ON positions, 50%, 100% of the phases;
 - for In <100A, neutral protection is fixed at 100% of the phases and disabled by user;
- 3 manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- 4 LED:
 - LED with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xIn;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xI_n;
 - S: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LS/I: LED with steady red light, shows that the protection has tripped. After the circuit-breaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - Ekip LS/I is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the red LEDs flashing simultaneously;
- 5 test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the protection functions test to be carried out;
- 6 thermal memory which can be activated by Ekip T&P;
- 7 self-supply from 0.2xIn minimum current up.

L, S, I protection LED

Dip switch for the selection between S protection function or I protection function

Dip switch for the trip curve selection

Power-on LED

Test Connector

Slot for lead seal

Dip switch for LS/I protection function setting

Ekip LS/I

Protection function	Trip threshold	Trip curve ¹⁾	Excludability	Relation	Thermal memory
Against overloads with long inverse time delay trip according to IEC 60947-2 Standard	Manual setting: I ₁ = 0.4...1xIn step 0.04 Tolerance: trip between 1.05...1.3 I ₁ (IEC 60947-2)	Manual setting: t ₁ = 12-36s at I=3xI ₁ Tolerance: ±10% up to 4xIn ±20% from 4xIn	-	t = k/I ²	Yes
Against short-circuits with independent time delay (t=k)	Manual setting: I ₂ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	I ₂ = 0.1-0.2s Tolerance: ±15%	Yes	t = k	
Against short-circuits with adjustable threshold and instantaneous trip time	Manual setting: I ₃ = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	≤20ms	Yes	t = k	-

¹⁾ Tolerances in case of:
- self-powered trip unit at full power;
- 2 or 3 phase power supply.
In conditions other than those considered, the following tolerance held:

Protection	Trip threshold	Trip time
L	reference between 1.05 and 1.3 x I ₁	±20%
S	±10%	±20%
I	±15%	±60ms

Ekip LSI and Ekip LSI G

Main characteristics:

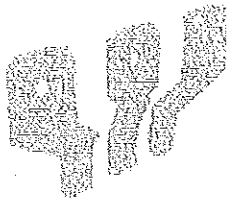
- available for XT2 and XT4 in three-pole and four-pole versions;
- protections:
 - against overloads (L): 0.4...1xIn adjustable protection threshold, with adjustable time trip curve;
 - against short-circuits with delay (S): 1...10xIn adjustable protection threshold, with adjustable time trip curve (short inverse time ($t=k^2$) or independent time ($t=k$));
 - against instantaneous short-circuits (I): 1...10xIn adjustable protection threshold, with instantaneous trip curve;
 - against earth faults (G): 0.2...1xIn adjustable protection threshold, with independent time trip curve;
 - of the neutral in four-pole circuit-breakers:
 - for $I_n \geq 100A$ can be selected in OFF or ON, 50%, 100% of phases;
 - for $I_n < 100A$ neutral protection is fixed on 100% of phases and disabled by user;
- setting:
 - manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
 - electronic setting, made both locally using the Ekip T&P or Ekip Display accessory and via remote control, by means of the Ekip Com unit;
- LED:
 - LED on with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xIn;
 - red LED for each protection:
 - L: LED with steady red light, indicates pre-alarm for current exceeding 0.9xI;
 - I: LED with flashing red light, indicates alarm for current exceeding setted threshold;
 - LSI G: LED with steady red light, shows that the protection has tripped. After the circuit-breaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
 - the trip unit is equipped with a device that detects the eventual opening solenoid disconnection thanks to the simultaneous blinking of all the LED;
- test connector on the front of the release:
 - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about the latest trip happened;
 - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted, the protection functions test to be carried out, electronic setting of the protection functions of the trip unit and of the communication parameters;
- thermal memory which can be activated by Ekip T&P or Ekip Display;
- self-supply from a minimum current of 0.2xIn up;
- the three-pole version can be accessorized with external neutral;
- with the addition of the Ekip Com in the circuit-breaker, you can:
 - acquire and transmit a wide range of information via remote control;
 - accomplish the circuit-breaker opening and closing commands by means of the motor operator in the electronic version (MOE-E);
 - know the state of the circuit-breaker (open/closed/trip) via remote control;
 - setting the configuration and programming the unit, such as the current thresholds and the protection function curves.

Accessories

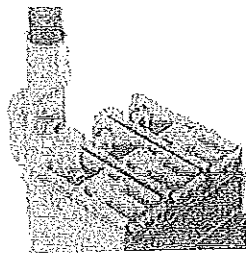
Mechanical Accessories

Front extended spread terminals - ES

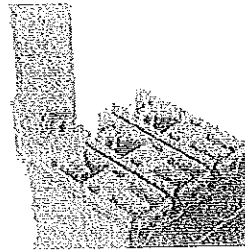
CB	Vers.	Busbar dimensions MAX [mm]			Cable terminals [mm]		Tightening				H Terminal covers [mm]			H Separators [mm]		
		W	D	Ø	W	Ø	Terminal /CB		Cable or busbar /Terminal		2	50	60	25	100	200
XT1	F-P	25	4	8.5	25	3.5	M6	6Nm	M8	9Nm	-	-	-	-	-	S
XT2	F-P-W	30	4	10.5	30	10.5	M6	6Nm	M10	18Nm	-	-	-	-	-	S
XT3	F-P	30	4	10.5	30	10.5	M8	8Nm	M10	18Nm	-	-	-	-	-	S
XT4	F-P-W	30	6	10.5	30	10.5	M8	8Nm	M10	18Nm	-	-	-	-	-	S



Front extended spread terminal - ES



ES terminal with cable lug



ES terminal with busbar

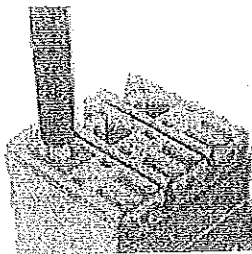
Terminals for copper cables - FCCu

CB	Type of terminal	Vers.	Cable [mm²]		Tightening		L cable stripping [mm]	H Terminal covers [mm]			H Separators [mm]		
			Rigid	Flexible	Cable or busbar /Terminal			2	50	60	25	100	200
XT1	Internal	F-P	1x2.5...70	1x2.5...50	12x12mm	7Nm	12	-	R	-	S ⁰	R	R
	Internal	F-P	-	2x2.5...35				-	R	-	S ⁰	R	R
XT2	Internal	F-P-W	1x2.5...95	1x2.5...70	14x14mm	7Nm	14	-	R	-	S ⁰	R	R
	Internal	F-P-W	-	2x2.5...50				-	R	-	S ⁰	R	R
XT3	Internal	F-P	1x6...185	1x6...150	18x18mm	14Nm	12	-	-	R	S ⁰	R	R
	Internal	F-P	-	2x6...70				-	-	R	S ⁰	R	R
XT4	Internal	F-P-W	1x6...185	1x6...150	18x18 mm	14Nm	12	-	-	R	S ⁰	R	R
	Internal	F-P-W	-	2x6...70				-	-	R	S ⁰	R	R

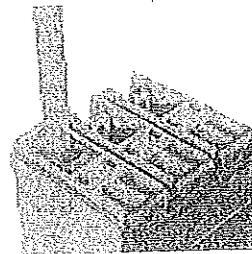
⁰ Phase separators supplied as standard with basic version circuit-breaker



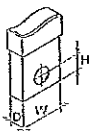
FCCu terminal



FCCu terminal with cable



FCCu terminal with busbar



W Width
H Hole Height
D Depth

F Fixed
P Plug-in
W Withdrawable
Ø Diameter
S Standard
R On Request

[Handwritten signatures and scribbles]

Terminals for copper/aluminum cables - FC CuAl

CB	Type of terminal	Vers.	Cable [mm ²]		Tightening				L cable stripping [mm]	H Terminal covers [mm]			H Separators [mm]		
			Rigid	Flexible	Terminal /CB	Cable or busbar /Terminal		2		50	60	25	100	200	
XT1	internal	F-P	1x1.5...50	1x 1.5...50	M5	5Nm	Ø 9.5mm	7Nm	16	-	R	-	S	R	R
	external	F-P	1x35...95	NO	M6	6Nm	Ø 14mm	13.5Nm	16	-	S	-	-	-	-
	external ¹⁰	F-P	1x120...240	NO	M6	6Nm	Ø 24mm	31Nm	24	ADAPTER					
XT2	internal	F-P-W	1x2.5...95	1x2.5...70	-	-	Ø 14mm	7Nm	14	-	R	-	S	R	R
	external ¹⁰	F-P-W	1x120...240	NO	M6	6Nm	Ø 24mm	31Nm	24	ADAPTER					
	external ¹⁰	F-P-W	1x70...185	NO	M6	6Nm	Ø 18mm	25Nm	20	-	S	-	-	-	-
	external ¹⁰	F-P-W	2x35...95	NO	M6	6Nm	Ø 16mm	12Nm	18/33	-	-	S	-	-	-
XT3	internal ¹⁰	F-P-W	1x35...150	NO	M9	9Nm	Ø 17mm	31Nm	20	-	-	R	S	R	R
	internal	F-P	1x90...185	NO	-	-	Ø 18mm	16Nm	20	-	-	R	S	R	R
	external ¹⁰	F-P	1x120...240	NO	M8	8Nm	Ø 24mm	31Nm	24	ADAPTER					
	external ¹⁰	F-P	2x35...150	NO	M8	8Nm	Ø 18mm	16Nm	22/42	-	-	S	-	-	-
XT4	internal	F-P-W	1x2.5...185	1x2.5...150	-	-	Ø 17mm	10Nm	21	-	-	R	S	R	R
	external ¹⁰	F-P-W	1x120...240	NO	M8	8Nm	Ø 24mm	31Nm	24	ADAPTER					
	external ¹⁰	F-P-W	2x35...150	NO	M8	8Nm	Ø 18mm	16Nm	22/42	-	-	S	-	-	-

¹⁰ Take-up auxiliary voltage device included



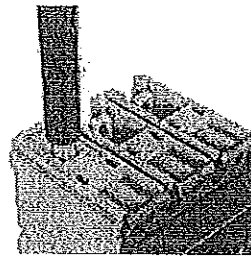
Internal FCCuAl terminal for copper/aluminum cables



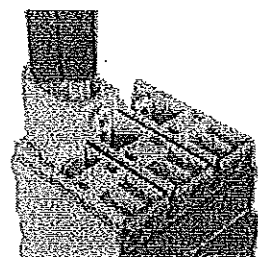
Internal FCCuAl terminal for copper and aluminum cable with take-up of auxiliary voltage



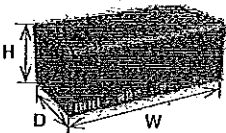
External FCCuAl terminal for copper/aluminum cables



FCCuAl internal terminal with cable



FCCuAl external terminal with cables

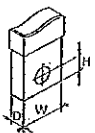


Pitch adapter

Adaptor for FCCuAl terminals up to 240mm²

Circuit-breaker	Poles	Dimensions [mm] [WxHxD]
XT1	3	105x50x68
	4	140x50x68
XT2	3	105x50x68
	4	140x50x68
XT3	3	105x50x68
	4	140x50x68
XT4	3	105x50x68
	4	140x50x68

Note: With XT1 and XT2 the adaptor increases the width of the circuit-breaker



W Width
H Hole Height
D Depth

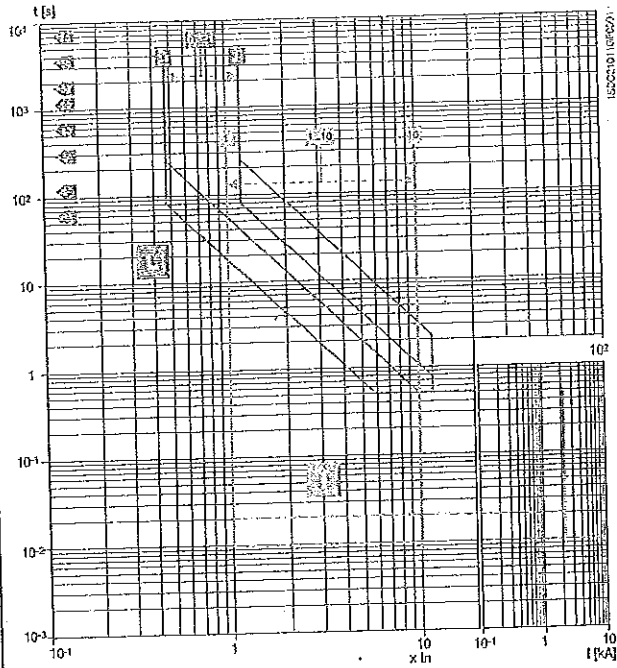
F Fixed
P Plug-in
W Withdrawable
Ø Diameter
S Standard
R On Request

[Handwritten signatures and marks]

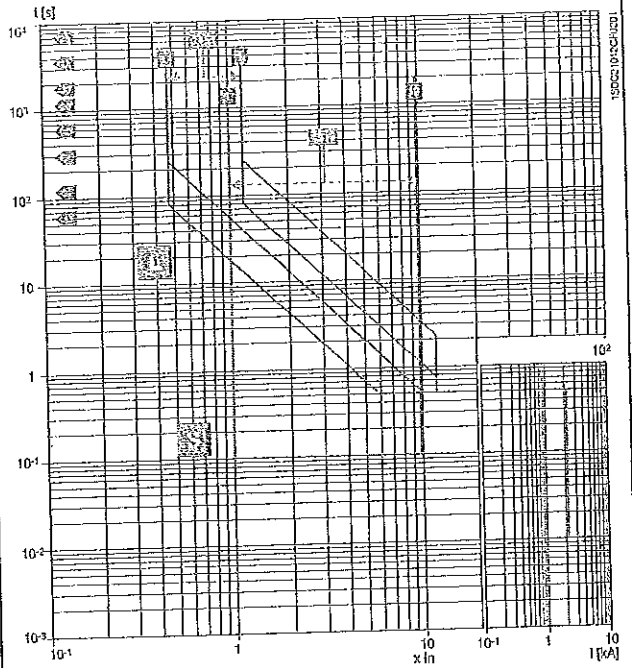
Trip curves with electronic trip unit

Trip curves for distribution

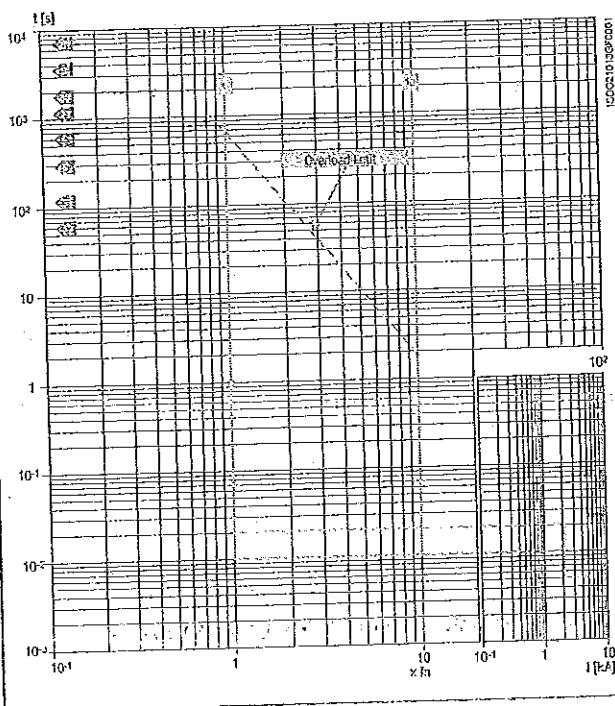
XT2 Ekip LS/I
L-I functions



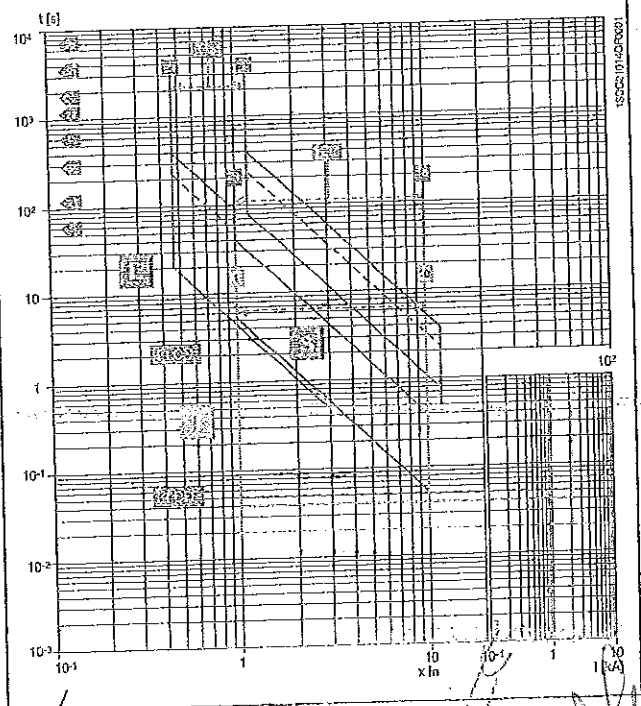
XT2 Ekip LS/I
L-S functions



XT2 Ekip I
I function



XT2 Ekip LSI
L-S-I functions



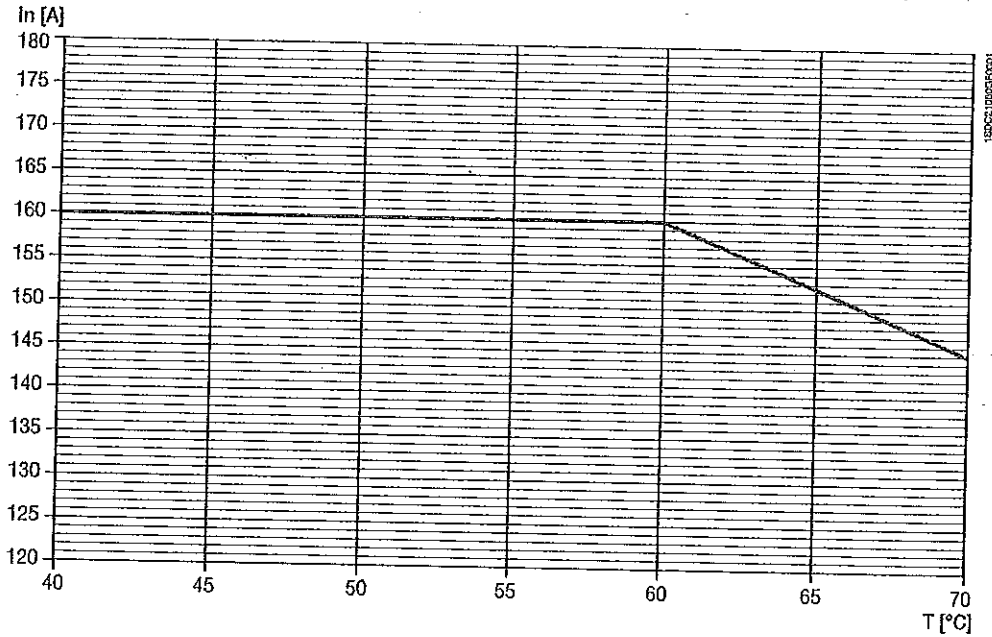
Temperature performances

XT2 - Fixed circuit-breakers with only magnetic and electronic trip unit

	40°C	50°C	60°C	70°C
	I_{max} [A]	I_{max} [A]	I_{max} [A]	I_{max} [A]
F-FCCu	160	160	160	145

F = Front flat terminals

FCCu = Front for copper cables

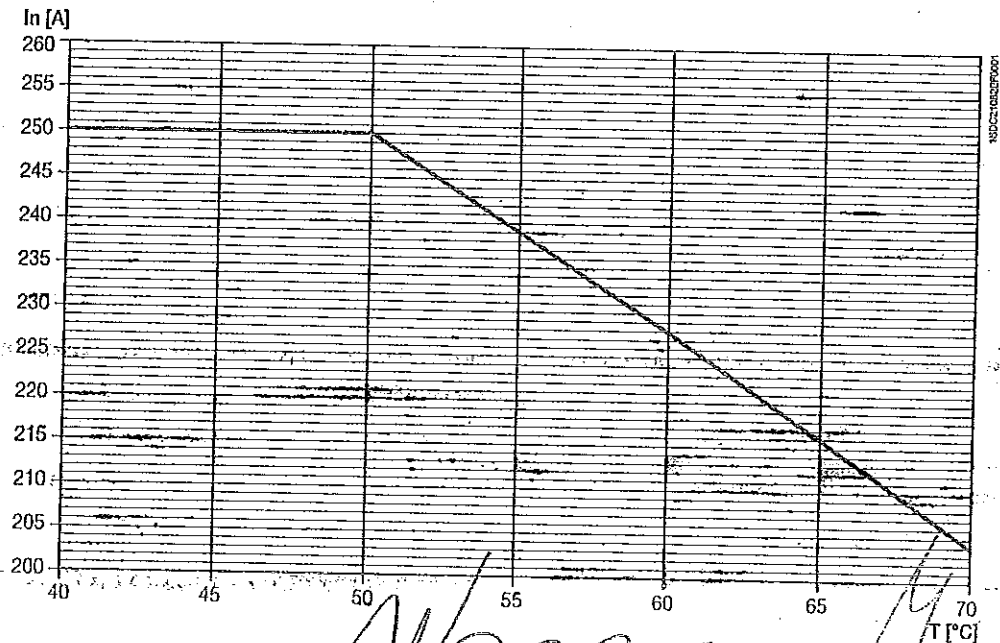


XT3 - Fixed circuit-breakers with only magnetic trip unit or switch-disconnectors

	40°C	50°C	60°C	70°C
	I_{max} [A]	I_{max} [A]	I_{max} [A]	I_{max} [A]
F-FCCu	250	250	228	204

F = Front flat terminals

FCCu = Front for copper cables



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Handwritten initials

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Information

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ПРИЛОЖЕНИЕ 9.3.2

Техническо описание и чертежи с нанесени на тях размери

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**

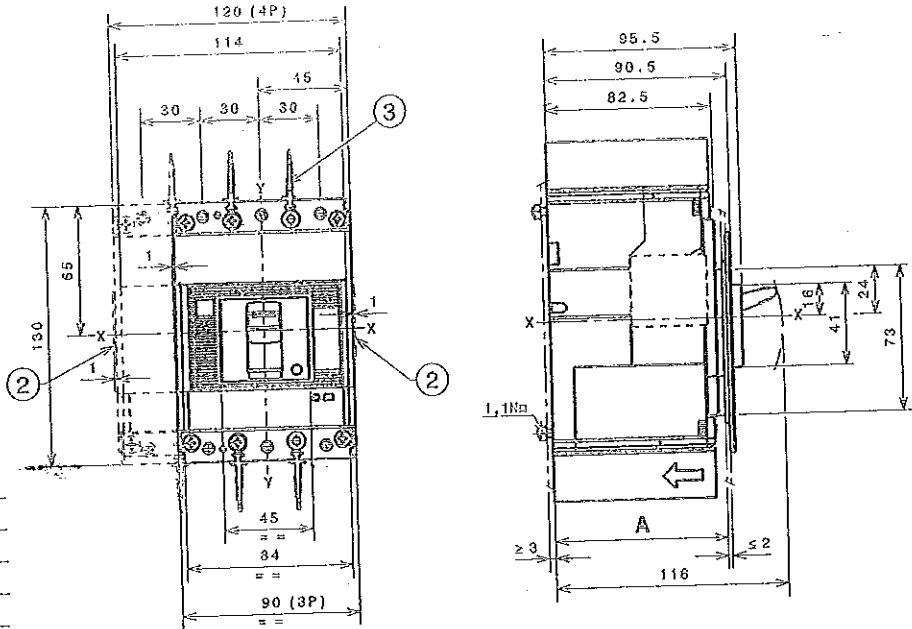
Overall dimensions

Tmax XT2 - Installation for fixed circuit-breaker

Fixed circuit-breaker fixing on sheet

Caption

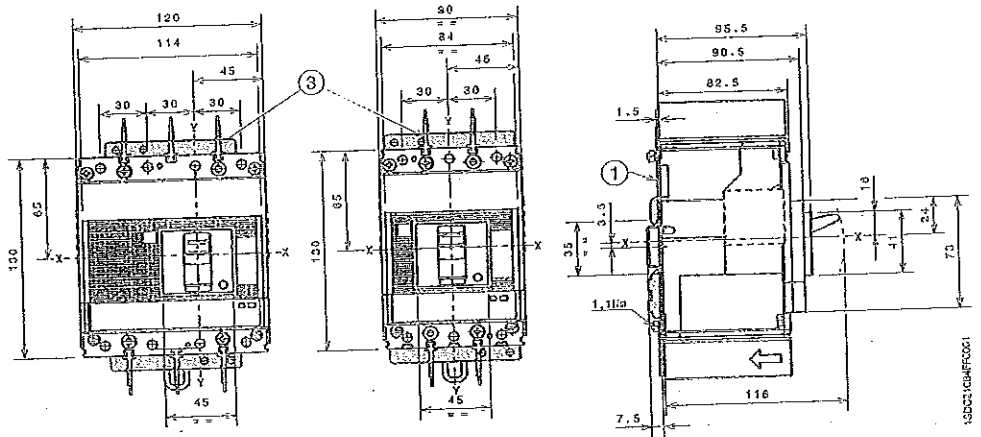
- ② Optional wiring ducts
- ③ 25mm insulating barriers between phases (compulsory) provided



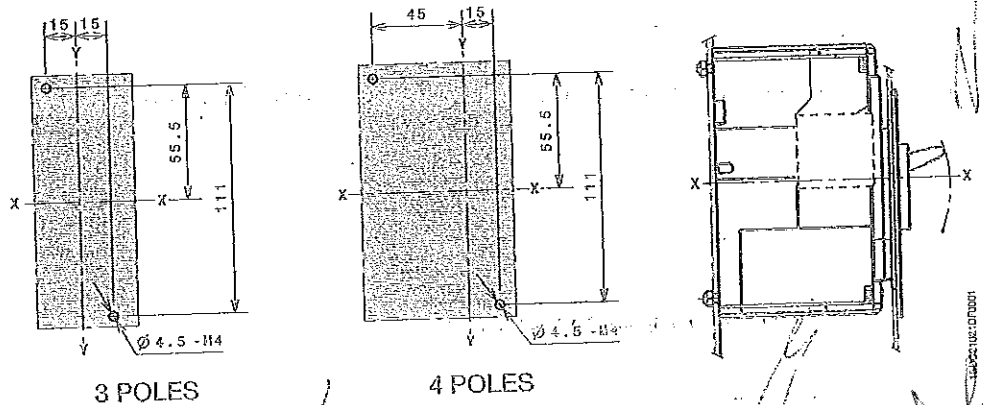
Fixed circuit-breaker fixing on DIN EN 50022 rail

Caption

- ① Bracket for fixing
- ③ 25mm insulating barriers between phases (compulsory) provided



Drilling templates and support sheet



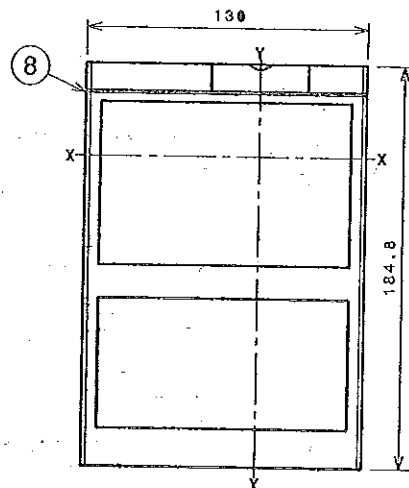
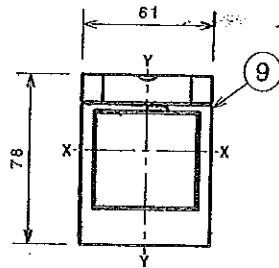
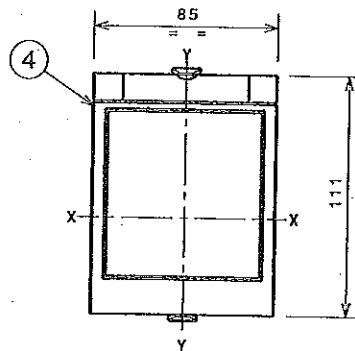
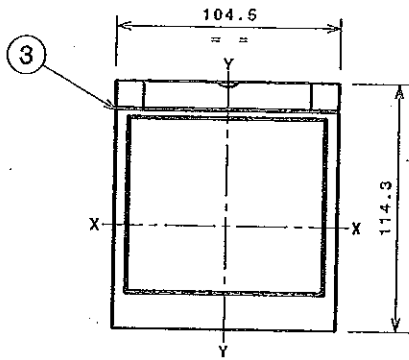
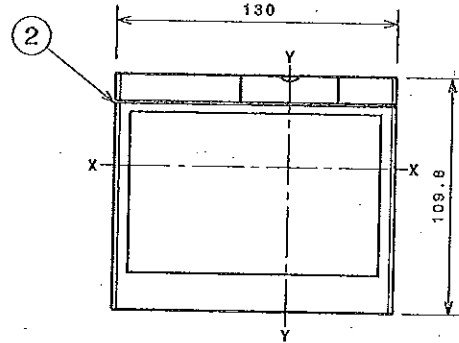
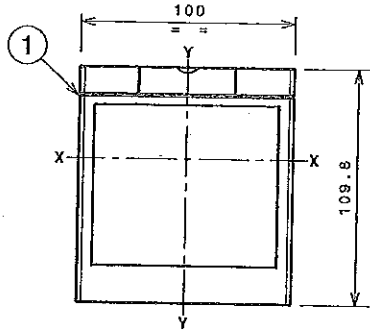
Overall dimensions

Tmax XT2 - Installation for fixed circuit-breaker

Flanges

Caption

- ① Flange for fixed circuit-breaker III
- ② Flange for fixed circuit-breaker IV
- ③ Flange for fixed circuit-breaker III-IV with MOE and FLD
- ④ Flange for circuit-breaker III-IV with direct rotary handle RHD
- ⑧ Flange for circuit-breaker IV with fixed residual current and front terminals
- ⑨ Optional flange



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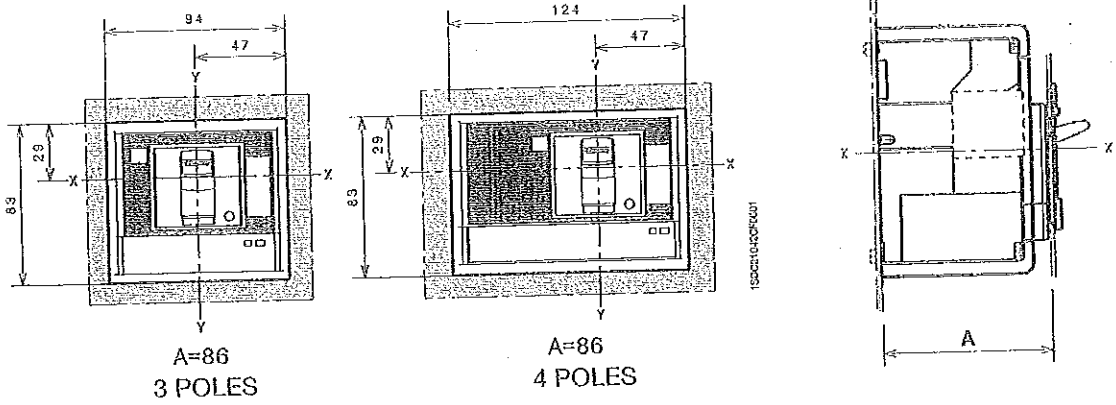
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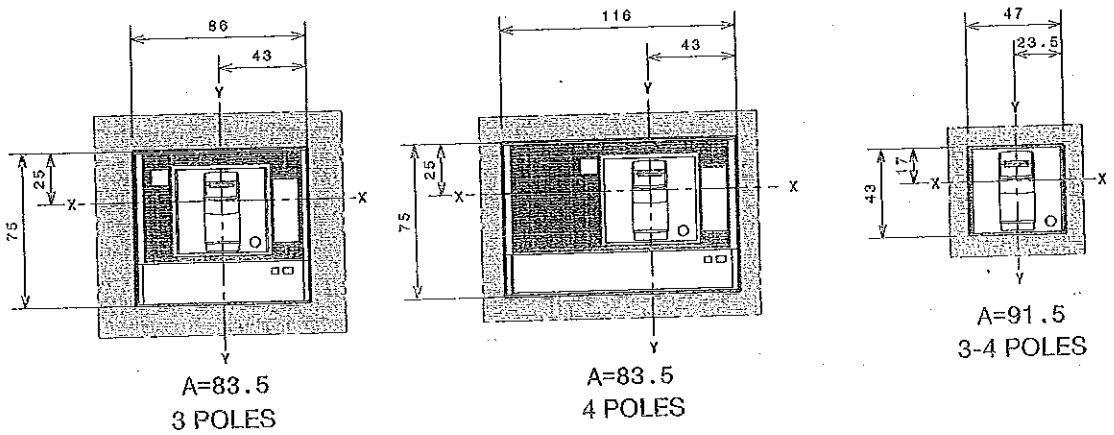
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Drilling templates compartment door

With standard flange



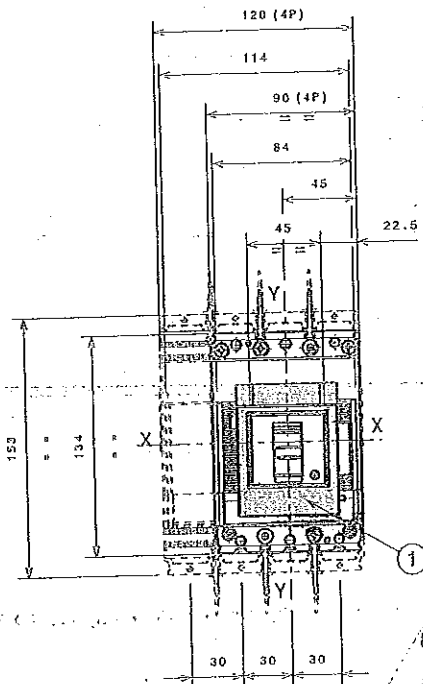
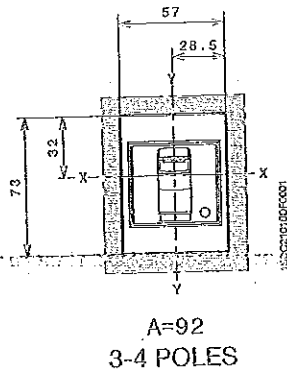
Without flange



With optional flange

Caption

① Optional flange



Execution		A	B	C
With optional flange	fixed	92		3-4 poles
	plug-in, fixing at 50mm		142	3-4 poles
	plug-in, fixing at 70mm		162	3-4 poles

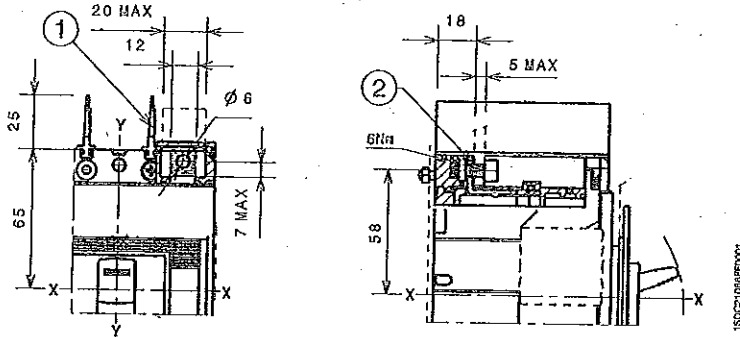
Overall dimensions

Tmax XT2 - Terminals for fixed circuit-breaker

Terminals F

Caption

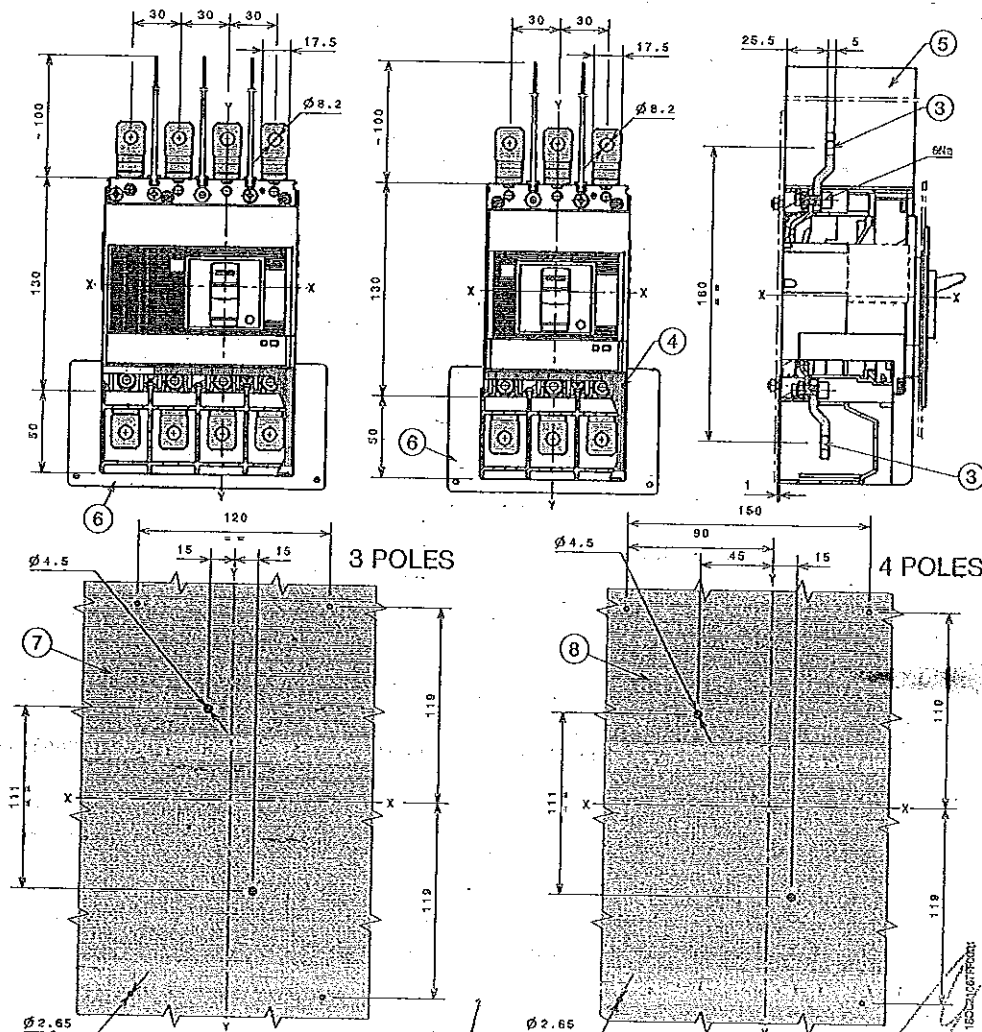
- ① 25mm insulating barriers between phases (compulsory) not provided
- ② Front terminals for busbars connection



Terminals EF

Caption

- ③ Front extended terminals
- ④ Terminal covers with degree of protection IP40 (optional) not provided
- ⑤ 100mm insulating barriers between phases (compulsory) provided
- ⑥ Insulated plate (compulsory) provided for XT2 U_e>440V
- ⑦ Drilling template for 3p circuit-breaker U_e>440V (compulsory)
- ⑧ Drilling template for 4p circuit-breaker U_e>440V (compulsory)

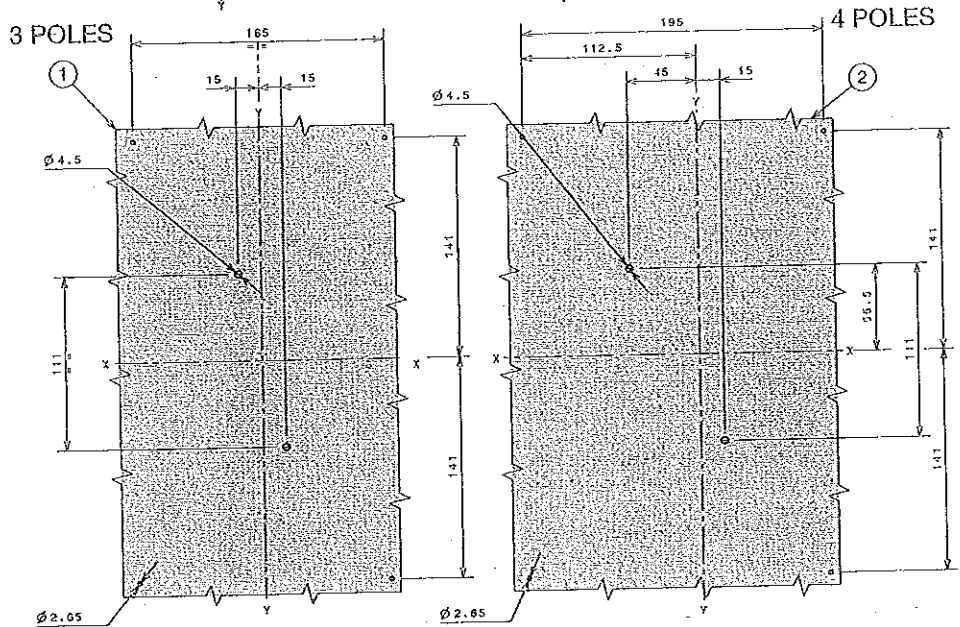
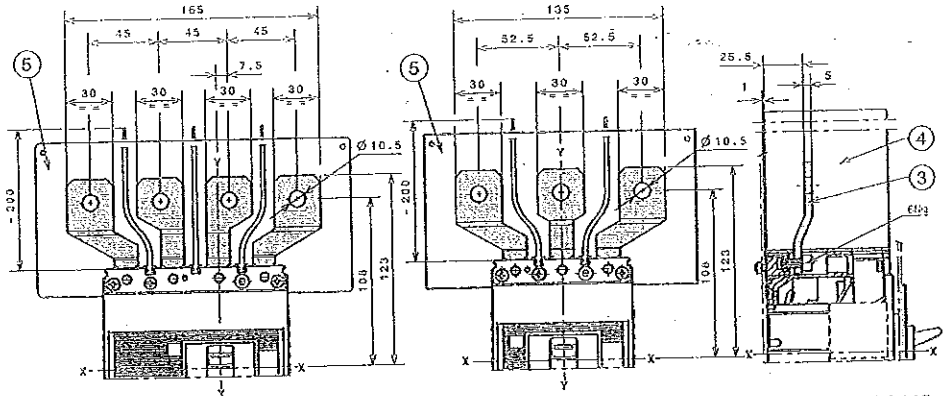


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Terminals ES

Caption

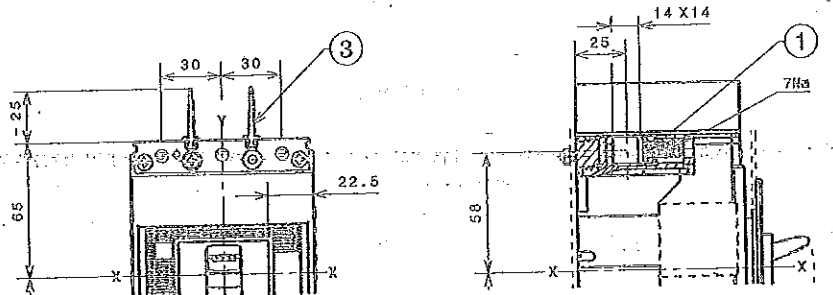
- ① Drilling template for 3p circuit-breaker $U_e > 440V$ (compulsory)
- ② Drilling template for 4p circuit-breaker $U_e > 440V$ (compulsory)
- ③ Front extended spread terminals
- ④ 200mm insulating barriers between phases (compulsory) provided for $U_e > 440V$
- ⑤ Insulated plate (compulsory) provided for XT2 $U_e > 440V$



1x1...95mm² terminals FCCuAl

Caption

- ① 1x1...95mm² terminals FCCuAl
- ③ 25mm insulating barriers between phases (compulsory) provided



1SDC2100300001

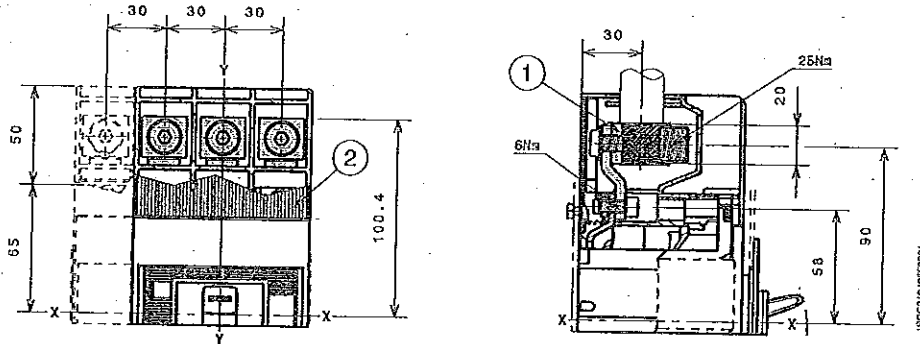
Overall dimensions

Tmax XT2 - Terminals for fixed circuit-breaker

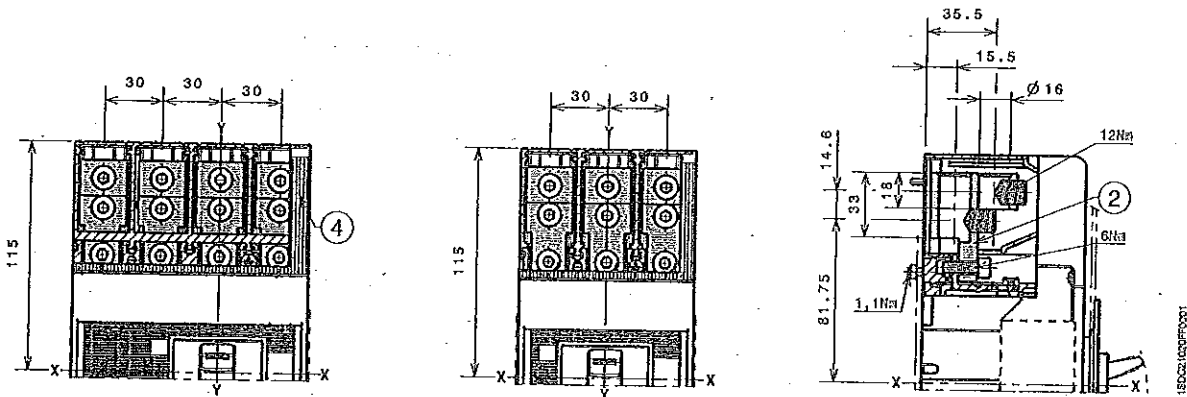
1x70...185mm² terminals FCCuAl

Caption

- ① External terminal FCCuAl
- ② High terminal covers with degree of protection IP40 (optional) provided



2x35...95mm² terminals FCCuAl



Caption

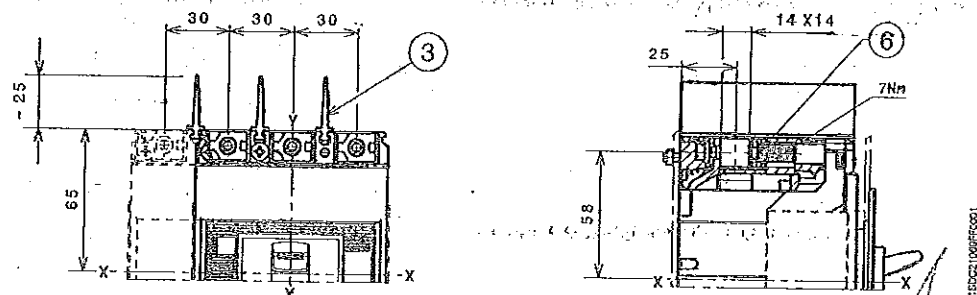
- ② 2x35...95mm² terminals FCCuAl
- ④ Terminal covers with degree of protection IP40 (optional) provided

Handwritten signature

Terminals FCCu

Caption

- ③ 25mm Insulating barriers between phases (compulsory) provided as standard with the circuit-breaker
- ⑥ Terminals FCCu



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ПРИЛОЖЕНИЕ 9.3.3

ЕО декларация за съответствие

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



EC Declaration of Conformity
EG Konformitätserklärung
CE Déclaration de conformité
CE Dichiarazione di conformità

This declaration of conformity is issued under the sole responsibility of the manufacturer
Die alleinige Verantwortung für die Ausstellung dieser Konformitätserklärung trägt der Hersteller /
La présente déclaration de conformité est établie sous la seule responsabilité du fabricant /
La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante

ABB SPA -- ABB SACE DIVISION
via Baioni 35
I 24123 Bergamo

Object of declaration
Gegenstand der Erklärung / Objet de la déclaration / Oggetto della dichiarazione

Circuit Breaker / Leistungsschalter / Disjoncteur / Interruttore

Type / Typ / Type / Tipo
Tmax XT2
(and relative accessories)

The object of the declaration described above is in conformity with the relevant Community harmonisation legislation

Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen / Harmonisierungsrechtsvorschriften der Gemeinschaft /

L'objet de la déclaration décrit ci-dessus est conforme à la législation communautaire d'harmonisation applicable /
L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa comunitaria di armonizzazione

**No. 2006/95/EC Low voltage equipment / Niederspannungsrichtlinie / Directive basse tension /
Direttiva Bassa Tensione**

**No. 2004/108/EC Electromagnetic compatibility / EMV-Richtlinie / Directive CEM / Direttiva
EMC**

and are in conformity with the following harmonized standards or other normative documents
nachgewiesen durch die Einhaltung der nachstehend aufgeführten Normen oder anderen normativen Dokumenten /
et justifié par le respect des Normes mentionnées ci-dessous ou autres documents normatifs /
e sono stati applicati le norme o altri documenti normativi indicati di seguito

EN 60947-1: 2007/A1:2011
EN 60947-2: 2006/A2:2013

Year of CE-marking
Jahr der CE-Kennzeichnung / Année d'apposition du marquage CE / Anno in cui è stata affissa la marcatura
2009

Signed for and on behalf of
Unterzeichnet für und im Namen von / Signé par et au nom de / Firmato in vece e per conto di

ABB SpA -- ABB Sace Division
Bergamo, October 04th, 2013

Lucio Azzola
R&D Manager

Document No.: **1SD1.000165R0010 Rev: 1**

ABB SpA -- ABB Sace Division

ТОВАРЕН ПОСРЕДИК

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ТОВАРЕН ПОСРЕДИК



Management System
ISO 9001:2008
OHSAS 18001:2007
www.tuv.com
ID 519502655



Management System
ISO 14001:2004
www.tuv.com
ID 519502655

ПРИЛОЖЕНИЕ 9.3.4

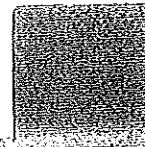
Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



TYPE APPROVAL CERTIFICATE
N. ELE389411CS

This is to certify that the product below is found to be in compliance with the applicable requirements of the RINA type approval system.

<i>Description</i>	Circuit breaker
<i>Type</i>	Tmax XT Series: XT1, XT2, XT3, XT4
<i>Applicant</i>	ABB SpA - ABB Sace Division Via Baloni, 35 24123 Bergamo Italy
<i>Manufacturer</i>	ABB SpA - ABB Sace Division Via Enrico Fermi, 14 03100 Frosinone Italy
<i>Testing Standards</i>	IEC 60947-2 RINA Rules for Classification of Ships Part C_ Machinery System and Fire protection Ch.3, Sect.6. Table1

Issued in Genova on May 24, 2012.

This certificate is valid until May 23, 2017

Valerio Bonanni

RINA

Valerio Bonanni

1/6

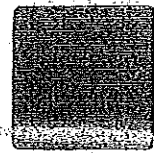
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Genova, May 24, 2012

RINA
Via Corsica, 12 - 16128 Genova



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TYPE APPROVAL CERTIFICATE N. ELE389411CS

Tmax XT

Product Description

• **Circuit Breaker type Tmax XT1**

Version	XT1B			XT1C			XT1N			XT1S			XT1H		
Rated current In [A]	160			160			160			160			160		
Release type	TMD R50+R160														
Voltage [V]	240	440	690	240	440	690	240	440	690	240	440	690	240	440	690
Icu [kA]	25	15	3	40	25	4	65	36	6	85	50	8	100	65	10
Ics [kA]	25	12	3	40	13	4	50	18	4	64	25	4	75	33	5
Icm [kA]	52.5	30	4.5	84	52.5	6	143	75.6	9	187	105	13.6	220	143	17
Frequency [Hz]	50-60			50-60			50-60			50-60			50-60		
T amb [°C]	40			40			40			40			40		

• **Circuit Breaker type Tmax XT2**

Version	XT2N			XT2S			XT2H			XT2L			XT2V		
Rated current In [A]	160			160			160			160			160		
Release type	TMA, TMD, MF, MA Ekip LSI/, Ekip I, Ekip LSI/, Ekip LSI G, Ekip G LSI/, Ekip N LSI/, Ekip M-LIU R20+R160														
Voltage [V]	240	440	690	240	440	690	240	440	690	240	440	690	240	440	690
Icu [kA]	65	36	10	85	50	12	100	65	15	150	100	18	200	150	20
Ics [kA]	65	36	10	85	50	12	100	65	15	150	100	18	200	150	15
Icm [kA]	143	75.6	17	187	105	24	220	143	30	330	220	36	440	330	40
Frequency [Hz]	50-60			50-60			50-60			50-60			50-60		
T amb [°C]	40			40			40			40			40		

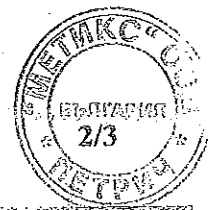
• **Circuit Breaker type Tmax XT3**

Version	XT3N			XT3S		
Rated current In [A]	250			250		
Release type	TMD, MA R83-R250					
Voltage [V]	240	440	690	240	440	690
Icu [kA]	50	25	5	85	40	8
Ics [kA]	38	19	4	43	20	4
Icm [kA]	105	52.5	8.5	187	84	13.5
Frequency [Hz]	50-60			50-60		
T amb [°C]	40			40		

Genova, May 24, 2012

RINA
Via Corsica, 12 - 16128 Genova

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TYPE APPROVAL CERTIFICATE N. ELE389411CS

Tmax XT

Circuit Breaker type Tmax XT4

Version	XT4N			XT4S			XT4H			XT4L			XT4V		
Rated current In [A]	160/250			160/250			160/250			160/250			160/250		
Release type	TMA, TMD, MA Ekip LS/I, Ekip I, Ekip LSI, Ekip LSIG, Ekip G LS/I, Ekip N LS/I, Ekip M-LIU R25+R250														
Voltage [V]	240	440	690	240	440	690	240	440	690	240	440	690	240	440	690
Icu [kA]	65	36	10	85	50	12	100	65	15	150	100	20	200	150	25
Ics [kA]	65	36	10	85	50	12	100	65	15	150	100	20	200	150	20
Icm [kA]	143	75.6	17	187	105	24	220	143	30	330	220	40	440	330	52.5
Frequency [Hz]	50-60			50-60			50-60			50-60			50-60		
T amb [°C]	40			40			40			40			40		

For T ambient = 45°C, thermal – magnetic release must be derated in accordance with following table:

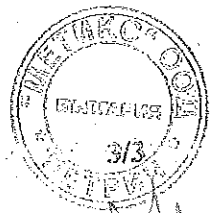
XT1			XT2			XT3			XT4		
In [A]	MIN [A]	MAX [A]	In [A]	MIN [A]	MAX [A]	In [A]	MIN [A]	MAX [A]	In [A]	MIN [A]	MAX [A]
50	33,9	48,4	20	13,5	19,3	63	43	61	25	17	24
63	42,7	61	25	16,8	24,0	80	54	77	32	22	31
80	54,2	77	32	21,6	30,8	100	68	97	40	27	39
100	67,8	97	40	27,0	38,5	125	85	121	50	34	48
125	84,7	121	50	33,7	48,2	160	108	155	63	43	61
160	108,4	155	63	42,5	60,7	200	136	194	80	54	77
			80	54,0	77,1	250	169	242	100	68	97
			100	67,5	96,4				125	85	121
			125	84,3	120,5				160	108	155
			160	107,9	154,2				200	136	194
									225	152	218
									250	169	242

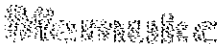
Reference document:
SACE Tmax XT Technical catalogue: doc. n. 1SDC210033D0202

Notes:
Rated service short circuit breaking capacity (Ics)
Rated ultimate short circuit breaking capacity (Icu)
Rated short circuit making capacity (Icm)

Genova, May 24, 2012

RINA
Via Corsica, 12 - 16128 Genova





ТОВ "ТЕХНИКА БУЛГАРИЯ"
ул. "Солун" 1080 гр. "Трън" булевард "1" 5
тел. 07133 2 380 0500; факс: 07133 2 380 3214
www.technika.bg



Management
System
ISO 9001:2008
OHSAS 18001:2007

www.tuv.com
ID: 4105026555



Management
System
ISO 14001:2004

www.tuv.com
ID: 4105026555

ПРИЛОЖЕНИЕ 9.3.5

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

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РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



ENTE ITALIANO DI ACCREDITAMENTO
 Ministero degli Interni - Dipartimento di IA, UE e RAC
 Agency of IA, UE and RAC - Italian Accreditation Agency



CERTIFICATO DI ACCREDITAMENTO

Accreditation Certificate

Registrazione n° 011E Rev. 09
 Registration n°

Si dichiara che **RINA CHECK S.R.L.**
 We declare that

VIA CORSICA 12 16128 - GENOVA (GE) - Italia

è conforme ai requisiti della norma UNI CEI EN ISO/IEC 17020 Ed. 2012

meets the requirements of the standard ISO/IEC 17020 Ed. 2012

quale Organismo di Ispezione di Tipo A
 (così come dettagliato nell'Allegato al presente Certificato)

as Body for the Inspection of Type A
 (as stated in the Enclosure to this Certificate)

Il presente Certificato non è da ritenersi valido se non accompagnato dal relativo Allegato e può essere sospeso o revocato in qualsiasi momento nel caso di inadempienza accertata da parte di ACCREDIA. La vigenza dell'accREDITAMENTO può essere verificata sul sito WEB (www.accredia.it) o richiesta direttamente al Dipartimento di competenza.
 This Certificate is not valid without the relative Enclosure and can be suspended or withdrawn at any time in the event of non fulfilment as ascertained by ACCREDIA. Confirmation of the validity of accreditation can be verify on website (www.accredia.it) or by contacting the relevant Department.

Data di 1° emissione
 1st issue date
 2002-03-21

Data di modifica
 Modification date
 2014-09-29

Data di Scadenza
 Expiring date
 2018-03-20

Il Direttore di Dipartimento
 The Department Director
 (Dott. Emersio Riva)

Il Presidente
 The President
 (Cav. del Lav. Federico Grazzini)

Il Direttore Generale
 The General Director
 (Dott. Filippo Filippi)



Allegato al Certificato di accreditamento n° 011E Rev. 09
Enclosure to the accreditation Certificate n° 011E Rev. 09

rilasciato a / Issued to: **RINA CHECK S.R.L.**

Ispezione di tipo A nei seguenti settori:

Costruzioni edili e delle opere di ingegneria civile in generale e relative opere impiantistiche, opere di presidio e di difesa ambientale e di ingegneria naturalistica.

Per la tipologia ispettiva:

- Ispezioni sulla progettazione delle opere (ivi comprese, quando richieste, quelle effettuate ai fini delle verifiche di cui all'art. 112 del Decr. Leg.vo n° 163 del 12.04.06, G.U. del 02.05.06 o al sensi di altre legislazioni applicabili e successive modifiche).
- Ispezione sulla esecuzione delle opere (a fronte della Norma UNI 10721:1998 "Servizi di controllo tecnico per le nuove costruzioni", delle leggi applicabili e dei capitoli della committenza).

Opere impiantistiche industriali.

Per la tipologia ispettiva:

- Ispezioni sulla progettazione delle opere (ivi comprese, quando richieste, quelle effettuate ai fini delle verifiche di cui all'art. 112 del Decr. Leg.vo n° 163 del 12.04.06, G.U. del 02.05.06 o al sensi di altre legislazioni applicabili e successive modifiche).

Inspection of type A in the following sectors:

Building constructions, civil engineering works in general and related plants, works of protection, of environmental defence and naturalistic engineering.

Regarding the Inspection Type:

- Inspection on design of buildings (including, when requested, those finalised to the evaluation, according to the art. 112 of the legislative decree n° 163 dated 06.04.12, G.U. dated 06.05.02 or in compliance with other applicable regulations and following modification).
- Inspection on the construction process (according to the standard UNI 10721:1998 "Technical control services for new constructions" or pursuant to the applicable law or customer specification).

Industrial plants:

Regarding the Inspection Type:

- Inspection on design of buildings (including, when requested, those finalised to the evaluation, according to the art. 112 of the legislative decree n° 163 dated 06.04.12, G.U. dated 06.05.02 or in compliance with other applicable regulations and following modification).

L'accreditamento per i settori elencati nel presente Allegato è valido fino a tutto il 2018 -03 -20
The accreditation for the sectors listed in this Enclosure is valid until 2018 -03 -20

Il Direttore di Dipartimento
The Department Director
(Dott. Emanuele Riva)

Il Presidente
The President
(Cav. del Lav. Federico Grazioli)

Il Direttore Generale
The General Director
(Dott. Filippo Trifanti)

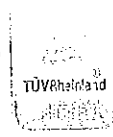
Milano, 2014 -09 -29





Management System
ISO 5201:2003
OHSAS 18001:2007

Member since
1994



Management System
ISO 14001:2004

Member since
1994

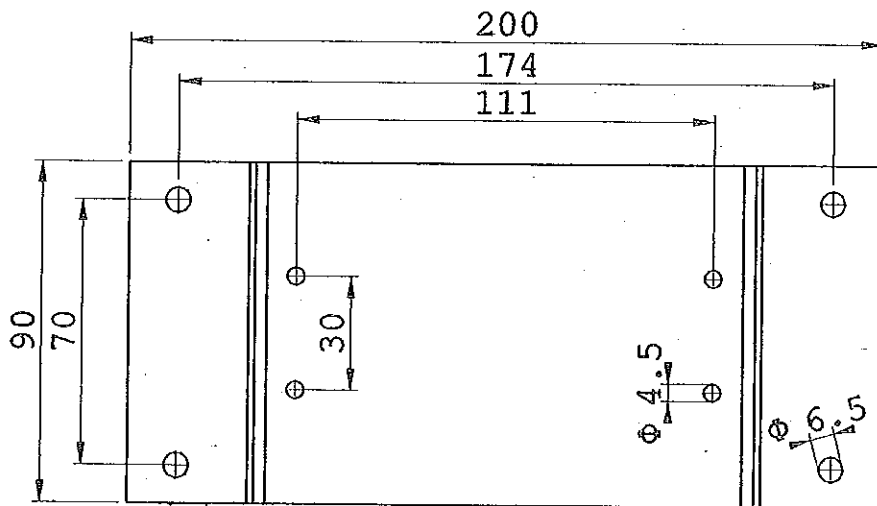
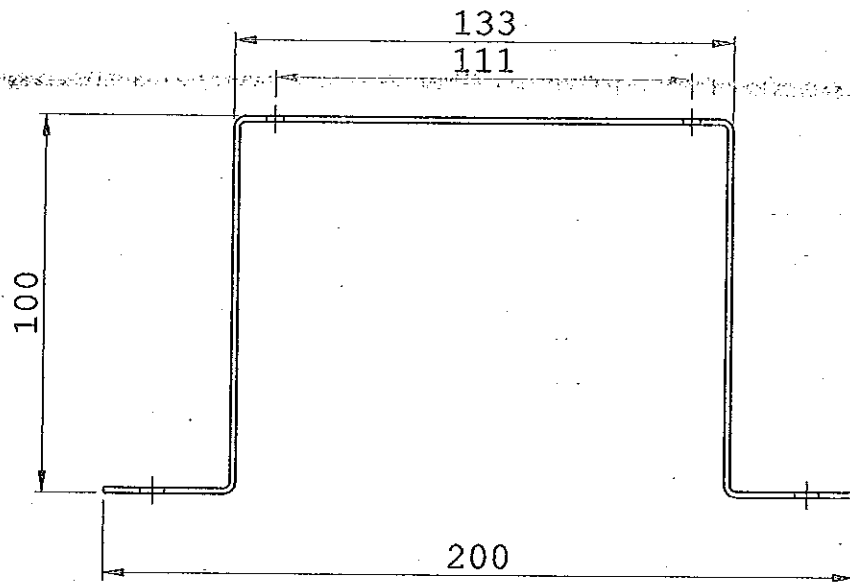
ПРИЛОЖЕНИЕ 9.3.6

Техническо описание и чертежи с нанесени размери на монтажни планки, единичната цена на които не се включва в цената на прекъсвачите

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“
РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**



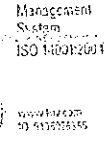
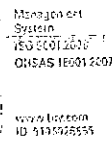
Арт. 3

№

				Мащаб	Маса	Бр.	
						1	
				Лист	ПЛОЧА МОНТАЖНА ЗА ЕЛЕКТРОМЕР Tmax XT2		
Изм.	Опис	Подпис	Дата	Ламарина DX51+Zn275			
Разр.	Руйков	<i>[Signature]</i>					
УТВ.	инж. Джамбазов	<i>[Signature]</i>					



Метикс в.о.д
гр. ПЕТРИЧ



ПРИЛОЖЕНИЕ 9.3.7

Инструкции за транспортиране, складиране, монтиране, вкл. въртящия момент на затягане на клемовите съединения, обслужване и поддържане

Автоматичните прекъсвачи НН с лят корпус трябва да се транспортират опаковани в оригинална опаковка.

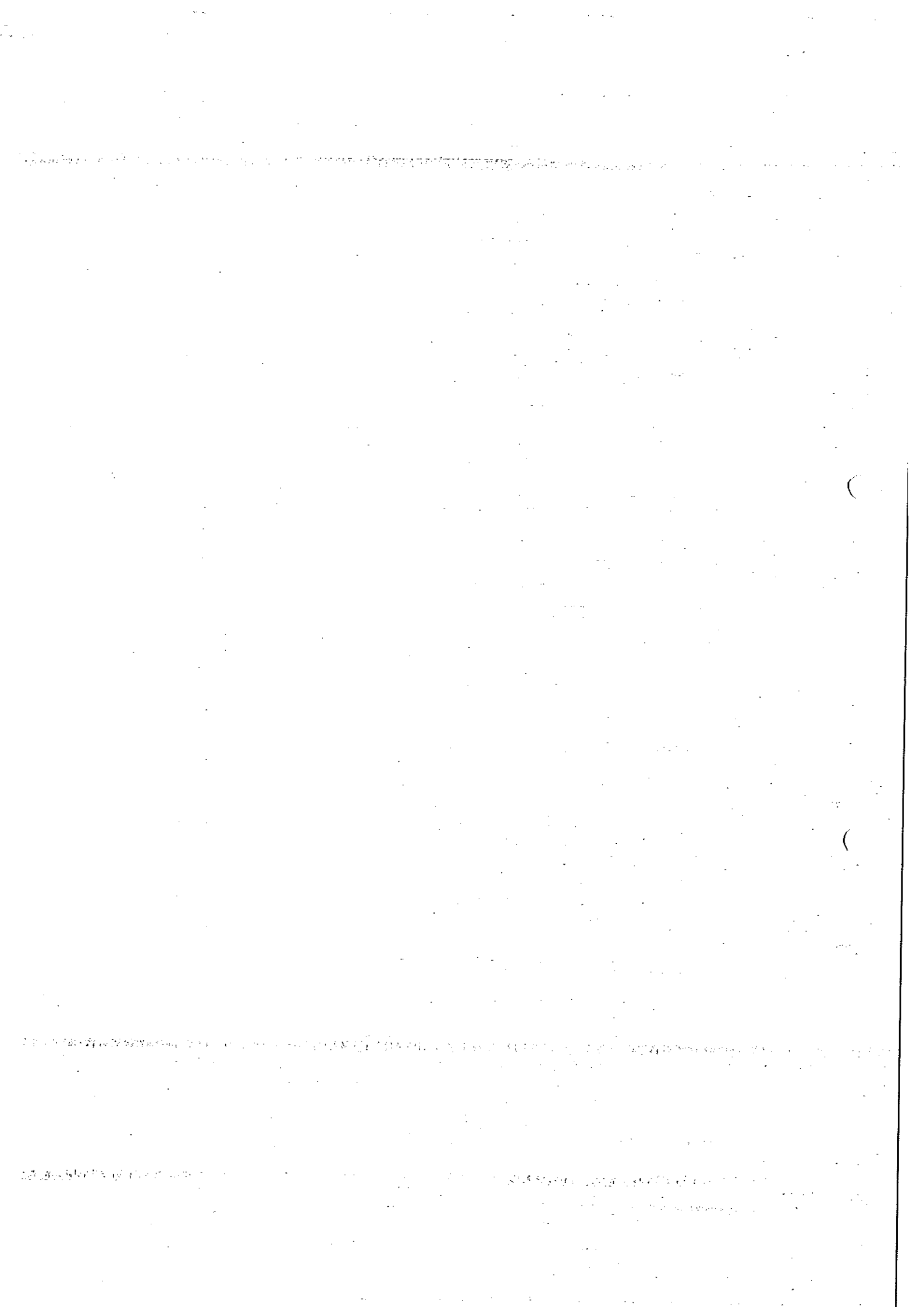
Автоматичните прекъсвачи НН с лят корпус трябва да се съхраняват в сухи, закрити помещения опаковани в оригинална опаковка

Автоматичните прекъсвачи НН с лят корпус да бъдат монтирани на монтажна проща, сила на затягане 2,5 Nm.

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“
РЕФ. № PPD 15-065

организиран от “ЧЕЗ Разпределение България” АД



Наименование на материала: Триполюсни автоматични прекъсвачи НН с лят корпус, от 160 А до 1250 А, с електронна защита, категория А

Съкратено наименование на материала: Трип. авт. прек. НН, с ел. защита, 160-1250 А, кат. А

Област: Н – Електрически уредби СрН/НН

Категория: 17–Комутационни апарати

НН за защита

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

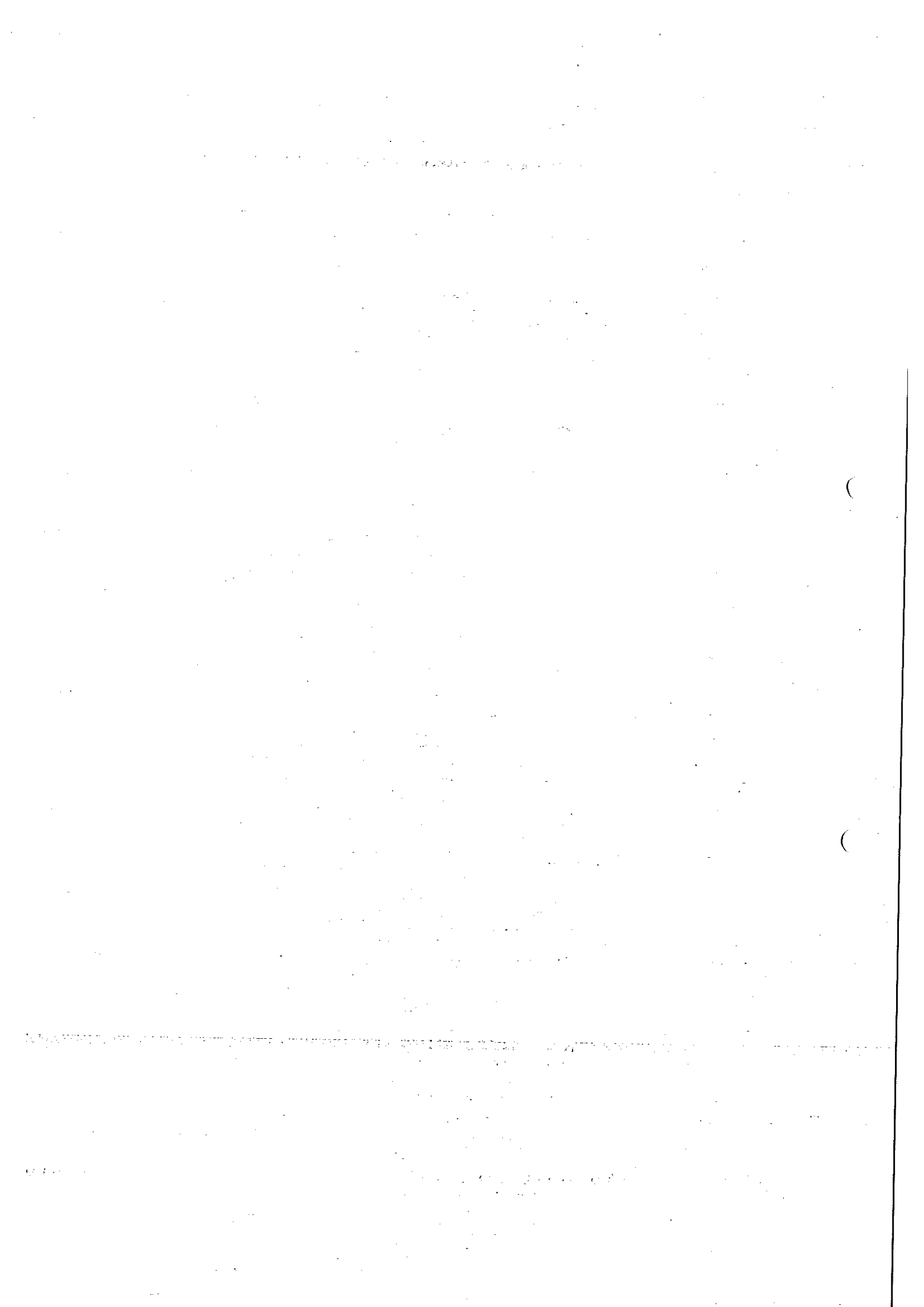
Триполюсните автоматични прекъсвачи НН с лят корпус представляват механични комутационни апарати от фиксиран тип с предно свързване на шинната система. Автоматичните прекъсвачи са способни да провеждат и да включват/изключват ръчно електрически токове във вериги при нормални условия и да включват, да провеждат за определено време и да изключват автоматично посредством защита от електронен тип токове във вериги при условията на претоварване и късо съединение.

Тялото (корпусът) на автоматичните прекъсвачи НН е изработено чрез формоване на устойчив на нагряване, на огън и на механични удари изолационен материал. Използваните в конструкцията изолационни материали съответстват на изискванията на т. 7.1. от БДС EN 60947-2:2006.

Управлението се осъществява ръчно посредством лост. Включването/изключването на контактите на трите полюса се осъществява едновременно с висока скорост, която не зависи от действията на оператора. Автоматичният прекъсвач изпълнява разединяваща функция, която е обозначена с предвидения от стандарта символ. На челния панел на прекъсвача е разположен тест-бутон за проверка на изключвателния механизъм. Лостът за управление при вертикално монтиране на автоматичните прекъсвачи се движи в направление „нагоре – надолу”, при което контактите се затварят при движение „нагоре”. Лостът има три ясно индицирани положения, съответстващи на позицията на контактната система: „Включено”, „Изключено” и „Автоматично изключено от свръхтокове /Тест”. Конструкцията осигурява защита срещу проникване на твърди тела и вода до степен най-малко IP20 за клемните съединения и IP40 за челната повърхност на прекъсвача, съгласно БДС EN 60529+A1:2004.

Стойностите на преграждането на частите на триполюсните автоматични прекъсвачи НН с лят корпус при нормален работен режим при температура до 40°C не трябва да надвишават посочените в таблица 7 от БДС EN 60947-2:2006 стойности. Прекъсвачите са маркирани с информацията съгласно т. 5.2 от БДС EN 60947-2:2006 и CE маркировка за съответствие.

Прекъсвачите се доставят с предпазни клемови капаци, изолиращи фазови сепаратори и разширители и удължители на входа и на изхода, които са подходящи за свързване към шинна система, която е изработена с алуминиеви шини с правоъгълно сечение.



По искане на възложителя прекъсвачите трябва да бъдат доставени с адапторни планки, които са съобразени с присъединителните и габаритните размери на автоматичните прекъсвачи от сериите: A100, A1, A250, A2, A2-400, A3, A4 и A5 съгласно табл. 1 и фиг. 1 по-долу, произведени от бившия ЕАЗ гр. Пловдив.

Триполюсните автоматични прекъсвачи са пакетирани в картонени кутии, на които е залепен етикет с наименование на материала „Автоматичен прекъсвач“, техническите данни, годината на производство, партидните номера и стандарта, в съответствие с който са произведени и изпитани - БДС EN 60947-2:2006.

Използване:

Триполюсните автоматични прекъсвачи НН с лят корпус се монтират в главните разпределителни табла в трансформаторните постове и се използват за защита на силови трансформатори СрН/0,4 kV с мощност до 800 kVA.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Триполюсните автоматични прекъсвачи НН с лят корпус трябва да отговарят на посочените по-долу стандарти или еквиваленти, включително на техните валидни изменения и допълнения:

• БДС EN 60947-1:2007 "Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)"; и

• БДС EN 60947-2:2006 „Комутационни апарати за ниско напрежение. Част 2: Автоматични прекъсвачи (IEC 60947-2:2006)“ и техните валидни изменения и допълнения

• БДС EN 60529+A1:2004 Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989+A1:1999) и

да бъдат оценени положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	ABB SACE Tmax T7, ITALY, Приложение 9.4.1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.4.2
3.	ЕО декларация за съответствие	Приложение 9.4.3
4.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.4.4

№ по ред	Документ	Приложение № или номер
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение 9.4.5
6.	Техническо описание и чертежи с нанесени размери на монтажни планки, единичната цена на които не се включва в цената на прекъсвачите	Приложение 9.4.6

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от проверките и изпитванията могат да бъдат и само на английски.)

Технически данни:

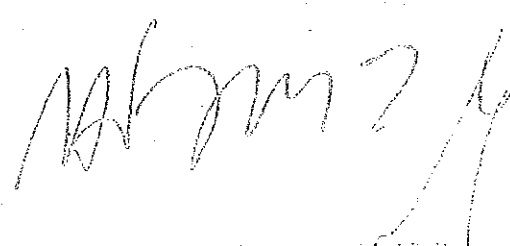

1. Характеристики на работната среда

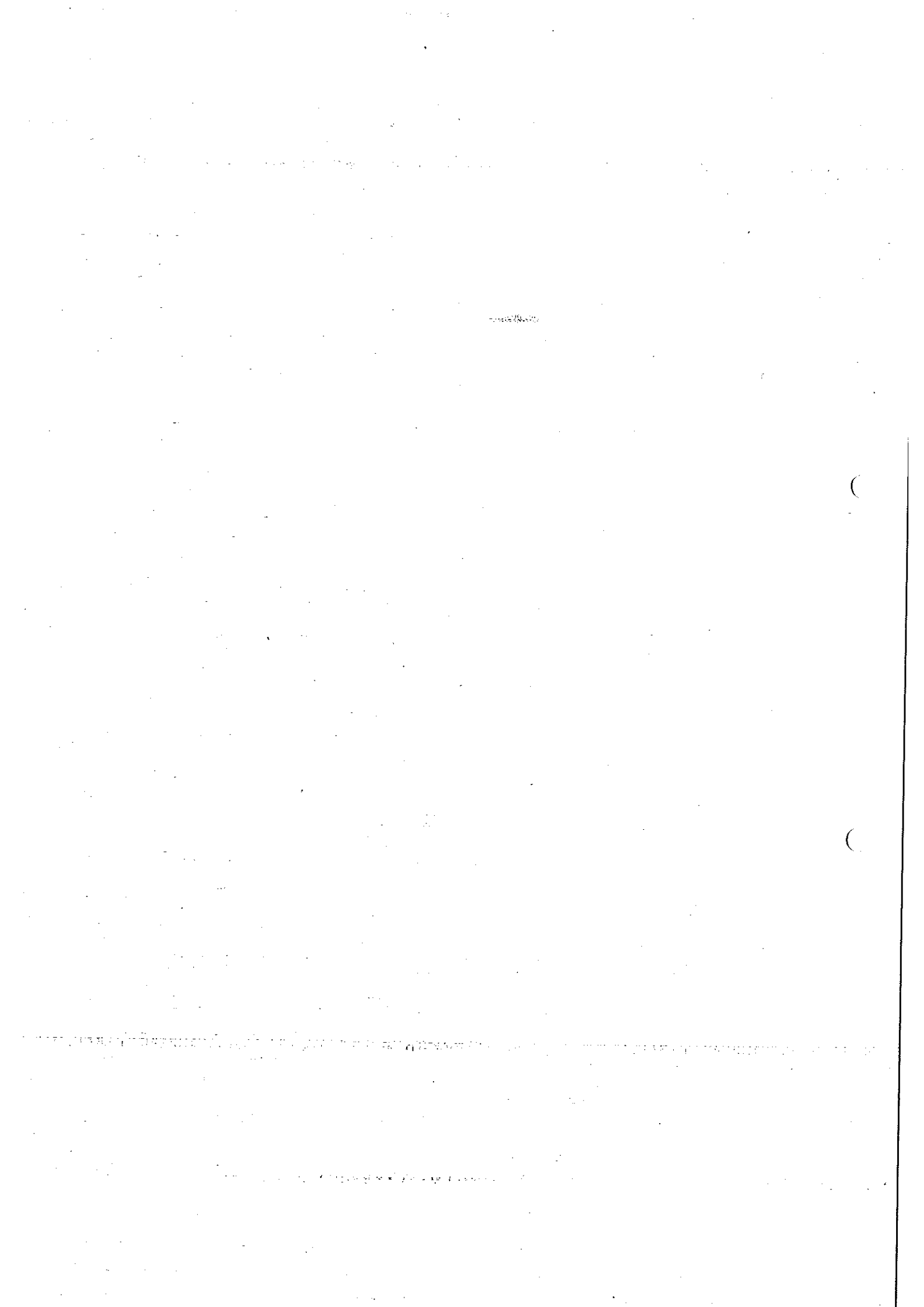
№ по ред	Характеристика	Стойност
1.1	Място на монтиране	На закрито
1.2	Максимална околна температура	+ 40°C
1.3	Минимална околна температура	Минус 5°C
1.4	Максимална средна околна температура за период от 24 ч.	+ 35°C
1.5	Относителна влажност (при 20°C)	До 90 %
1.6	Степен на замърсяване	3
1.7	Надморска височина	До 2000 m

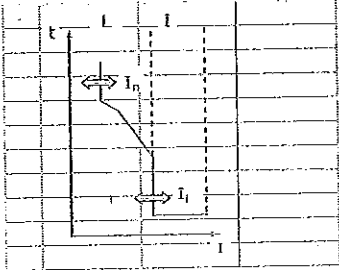
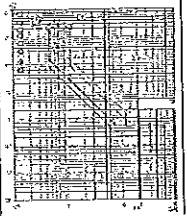
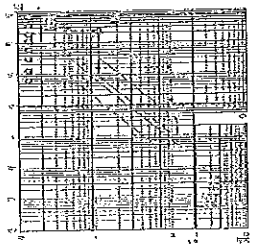
2. Параметри на електроразпределителната мрежа

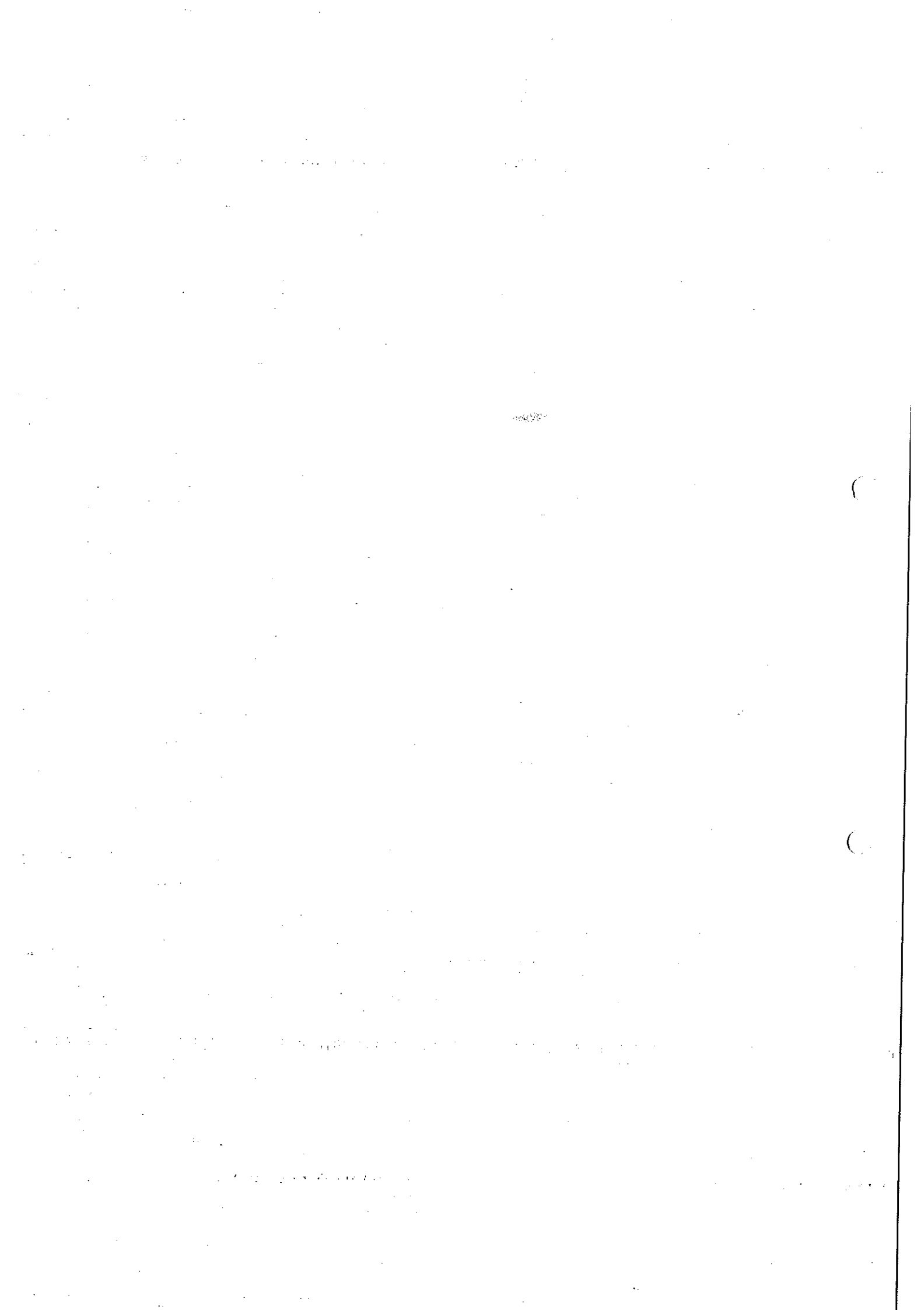
№ по ред	Параметър	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Брой проводници в разпределителната мрежа	4 проводна мрежа (L1, L2, L3, PEN)
2.5	Схема на разпределителната мрежа	TN-C

3. Общи технически параметри и други данни

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№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.1	Брой на полюсите	3	3
3.2	Обявено работно напрежение (U_n)	min 690 V AC	690 V AC
3.3	Обявена честота	50 Hz	50 Hz
3.4	Обявено импулсно напрежение (U_{imp})	min 6 kV	8 kV
3.5	Обявено изолационно напрежение (U_i)	min 690 V	800 V до 200A 1000 V до 1600A
3.6	Категория на приложение	A	A
3.7	Работна изключвателна възможност при късо съединение (I_{cs})	min 50% от I_{cu}	100% от I_{cu}
3.8	Защита от свръхтокове	-	-
3.8.1	Тип и времетокова характеристика	<p>Защитата от свръхтокове трябва да бъде от електронен тип с времетокова характеристика от показания по-долу вид:</p> 	 <p>Електронна L-I</p> <p>L-I Function</p> 
3.8.2	Защита от претоварване	<p>а) Диапазон на настройване $I_R = (\min 0,5 \div 1) \times I_n$</p> <p>б) Условен ток на неизключване $I_{nd} = 1,05 \times I_R$ във времеви интервал от 120 минути</p> <p>в) Условен ток на изключване $I_d = 1,30 \times I_R$ във времеви интервал до 120 минути</p>	<p>$0,40 - 1 \times I_n$</p> <p>$I_{nd} = 1,05 \times I_R$ във времеви интервал от 120 минути</p> <p>$I_d = 1,30 \times I_R$ във времеви интервал до 120 минути</p>
3.8.3	Защита от къси съединения	Токът на изключване I_i трябва да бъде фиксиран на една от стойностите или регулируем в диапазона препоръчително от min $4 \times I_n$ до $10 \times I_n$	$1 \times I_n$ до $10 \times I_n$

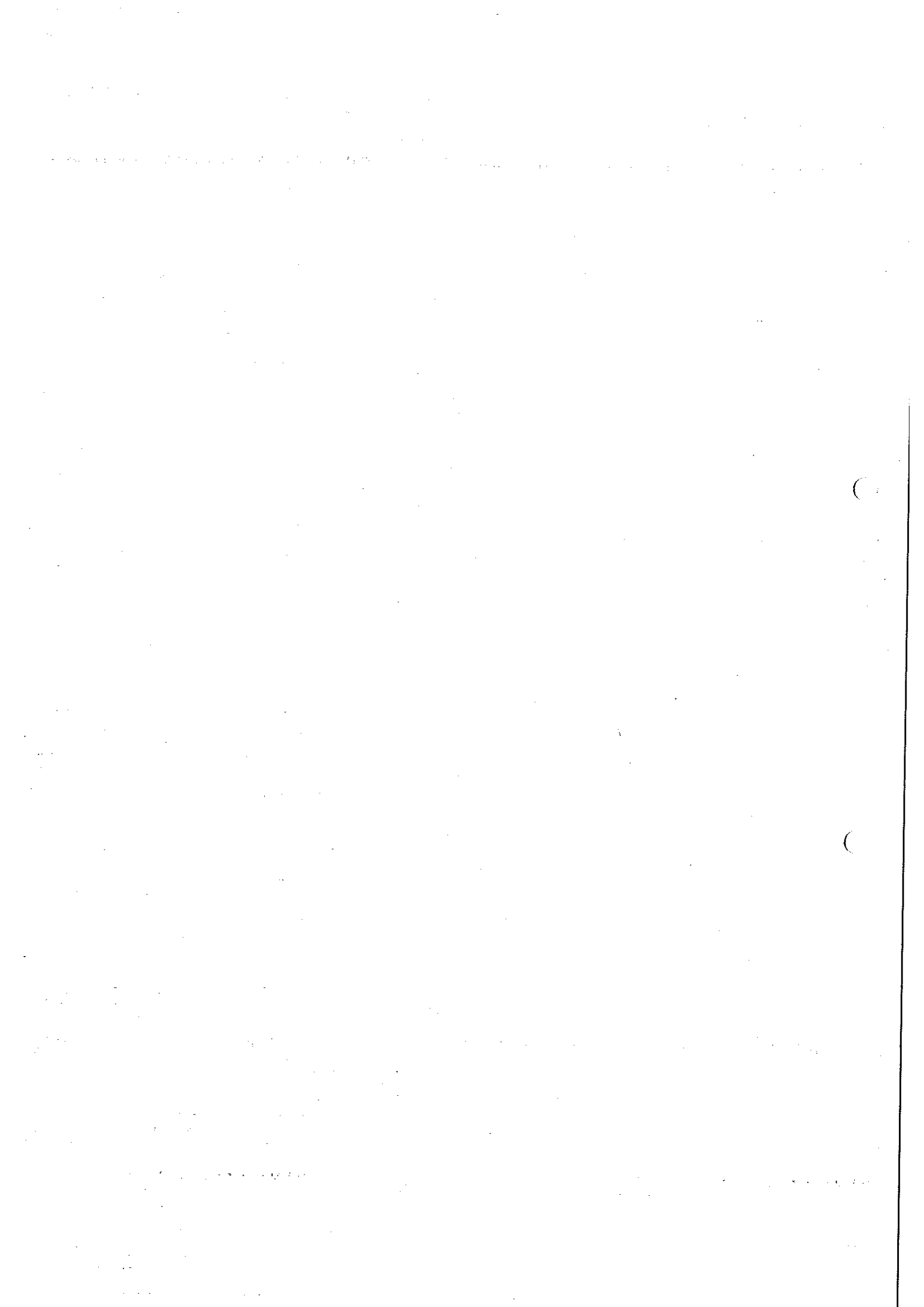


№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.9	Степен на защита от проникване на твърди тела и вода съгласно БДС EN 60529+A1:2004		
3.9.1	Клемни съединения	IP 20	IP20
3.9.2	Челна повърхност	IP 40	IP 40
3.10	Акcesoари	а) Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение	Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение
		б) Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори.	Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори.

4. Триполюсни автоматични прекъсвачи НН с лят корпус, от 160 А + 1250 А, с електронна защита, категория А

4.1 Триполюсен автоматичен прекъсвач НН с лят корпус, 1250 А, с електронна защита, кат. А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 6004		Tmax T7	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 1250 А, с електронна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ел. защита, 1250 А, кат. А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.1.1	Обявен ток (I_n)	1250 А	1250 А
4.1.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 45 kA / 500 V	50 kA / 500 V
4.1.3	Работна изключвателна възможност при късо съединение (I_{cs})	Съгласно т. 3.7 и т. 4.5.2 Да се посочи	100% от I_{cu} 50 kA / 500 V
4.1.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	1 x I_n до 10x I_n
4.1.5	Време за изключване при I_{cu}	max 0,030 s	0.01 s
4.1.6	Износоустойчивост		

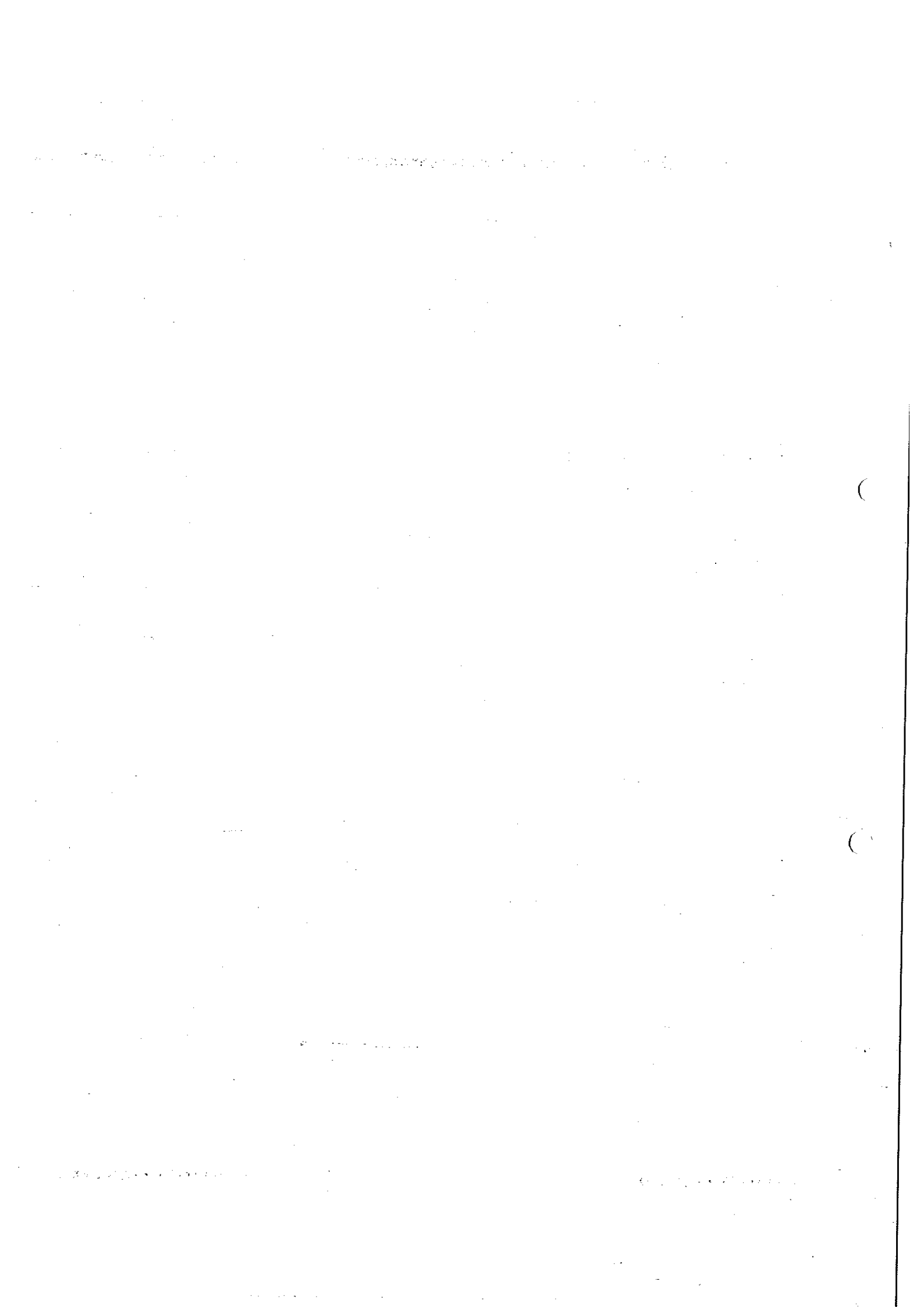


Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 6004		Tmax T7	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 1250 А, с електронна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ел. защита, 1250 А, кат. А	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.1.6a	Електрическа (брой к.ц.)	min 500 бр.	2 000
4.1.6b	Механична (брой к.ц.)	min 2500 бр.	10 000
4.1.7	Максимални размери ВxШxД (Дълбочината „Д“ не включва лоста за управление)	375x210x160 mm	268x210x154
4.1.8	Тегло, kg	Да се посочи	9,7 kg

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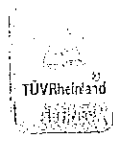
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ТОВАРНАТА ИЛИ СЛУЖБЕНА МАРКА
ИЛИ ИДЕНТИФИКАЦИОННОТО
ИМЕННО СЪОБЩЕНИЕ НЕ МОЖЕ
ДА СЕ ПОСТАВИ НАДЪВЪНУМ
НАДЪВЪНУМ НАДЪВЪНУМ
ИЛИ ИДЕНТИФИКАЦИОННОТО
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НАДЪВЪНУМ НАДЪВЪНУМ



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ПРИЛОЖЕНИЕ 9.4.1

Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Product Selector

Tmax Molded Case Circuit Breakers

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Power and productivity
for a better world™

ABB

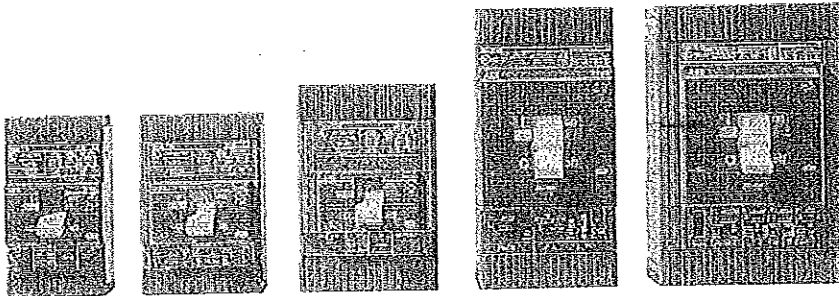
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Molded Case Circuit Breakers Index

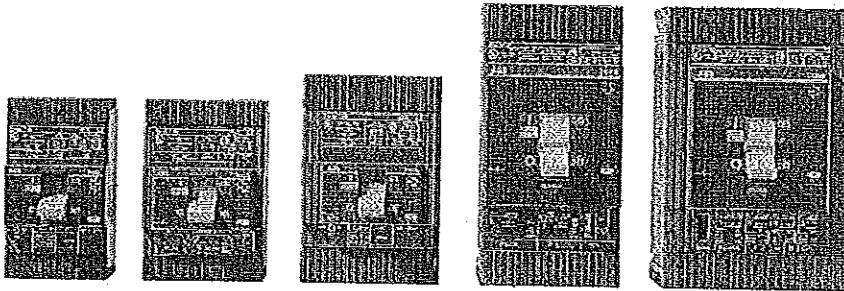


Tmax Molded Case Circuit Breakers

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Molded Case Circuit Breakers Index



Tmax Molded Case Circuit Breakers

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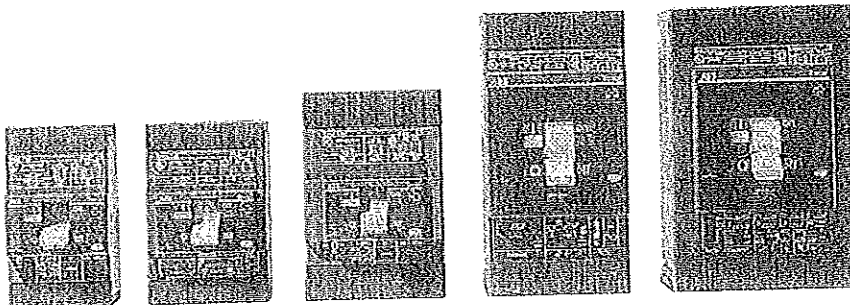
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Tmax Molded case circuit breakers



Tmax

Molded Case Circuit Breakers



Introduction

ABB is once again demonstrating its commitment to new product development and its superiority in product technology. Never before has the industry seen such high performance, versatility and standardization in a range of molded case circuit breakers.

The ABB Tmax line of circuit breakers, with a range up to 3000A, has several key features that go along with its very small size:

- Double insulation – this construction characteristic allows for the CSA/UL listed field installation of internal accessories without exposure to energized parts
- Complete range of electrical and mechanical accessories
- Positive operation – breakers from ABB ensure that the toggle indicates the precise position of the moving contacts. This guarantees safe and reliable signaling by the device
- Installation – Tmax molded case circuit breakers can be installed in panels and switchboards in either the horizontal or vertical planes while being fed from either end without any derating of their performance characteristics
- Interrupting ratings at 600VAC up to 100kAIC
- Compact size
- All Tmax molded case circuit breakers are CSA-UL listed and IEC rated for global application and acceptance

- All versions of the Tmax family are suitable for reverse feed applications

The ABB Tmax series includes eight basic frame sizes as well as the T1 single pole with the range rated from 15A to 3000A at 600VAC.

Frame Sizes – Eight Basic Sizes

The ABB Tmax series includes eight basic frame sizes as well as the T1 single pole with the range rated from 15A to 3000A at 600VAC. The various versions carry the following interrupting capacities:

- B Basic breaking capacity
- N Normal breaking capacity
- S Standard breaking capacity
- H High breaking capacity
- L Extra high breaking capacity
- V Very high breaking capacity

Derived Versions

- Thermal magnetic
- Electronic
- Molded case switches
- Motor circuit protectors (MCPs)
- Direct current (DC) rated

ABB Tmax Versions

- Fixed: all models
- Drawout or plug-in: T2, T3, Ts3, T4, T5, T6 and T7
- UL File #E93565 (breakers and MCPs)
- #E116596 (Accessories)
- #E116595 (Molded case switches)
- CSA file #LR54280

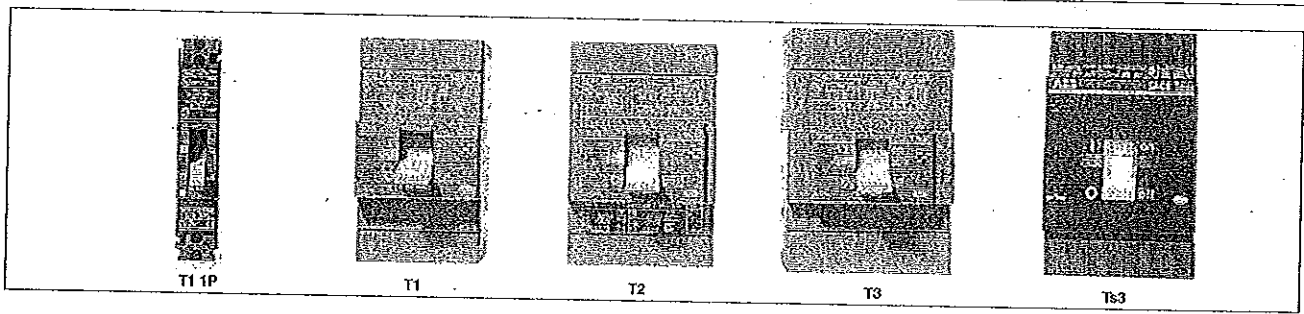
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Selection Guide

Circuit Breakers for Power Distribution

T1 - Ts3

Tmax



Type		Tmax T1 1p	Tmax T1	Tmax T2		Tmax T3		Tmax Ts3			Tmax Ts3		
Frame size	[A]	100	100	100		225		150			225		
Number of poles	[N]	1	3-4	3-4		3-4		2-3-4			2-3-4		
Rated voltage	AC (50-60Hz)	[V]	347	480		600Y/347		600			480		
	DC	[V]		500		600		600			500		
Interrupting ratings		B	N	S	H	N	S	N	H	L	N	H	L
	240V AC	[kA rms]	50 ⁽¹⁾	65	100	50	65	65	100	150	65	100	150
277V AC	[kA rms]	18 (1)											
347V AC	[kA rms]	14 (1)											
480V AC	[kA rms]		22 ⁽²⁾	35	65	25	35	25	50	85 ⁽³⁾	25	50	65
600Y/347V AC	[kA rms]		10			10	10						
600V AC	[kA rms]							14	14	25			
250V DC (2 poles in series)	[kA rms]		25			25	35						
500V DC (3 poles in series)	[kA rms]		25			25	35						
500V DC (2 poles in series)	[kA rms]							35	50	65	20	35	50
600V DC (3 poles in series)	[kA rms]							20	35	50			
Trip units	TMF												
	TMD/TMA												
	MA												
	Electronic												
Dimensions	H	[in/mm]	5.12/130	5.12/130	5.12/130	5.9/150	6.7/170	6.7/170			6.7/170		
	W 3p	[in/mm]	1/25.4	3/76	3.54/90	4.13/105	4.13/105	4.13/105			4.13/105		
	D	[in/mm]	2.76/70	2.76/70	2.76/70	2.76/70	4.07/103.5	4.07/103.5			4.07/103.5		
Mechanical life	[No. operations]	25000	25000	25000	25000	25000	25000	25000			25000		

(1) In15A = 10kA@277VAC 10kA@347VAC
 (2) In15A = 35kA@240VAC 14kA@480V/277 VAC
 (3) In from 10A up to 30A-65kA@480V AC

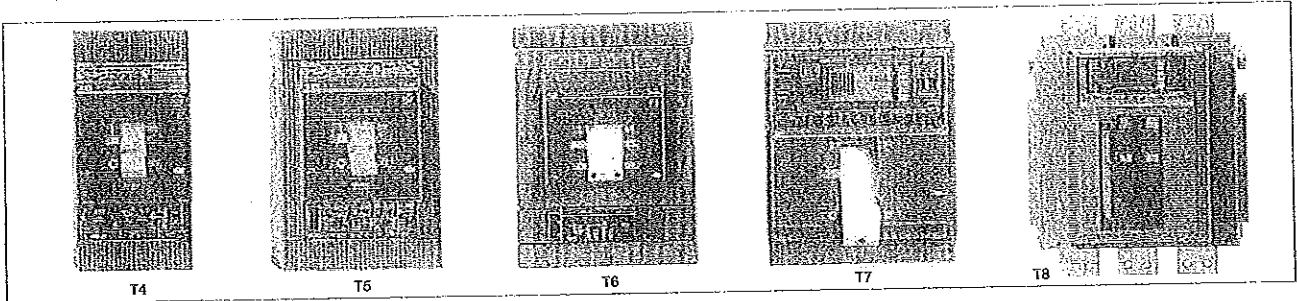
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Circuit Breakers for Power Distribution

T4 - T8

Tmax



Type		Tmax T4	Tmax T5	Tmax T6	Tmax T7	Insulated Case T8
Frame size	[A]	250	400-600 ⁽³⁾	800	1000-1200	1600, 2000, 2500 & 3000
Number of poles	[Np]	2-3-4 ⁽⁴⁾	2-3-4 ⁽⁴⁾	3-4	3-4	3
Rated voltage	AC (50-60Hz)	[V] 600	600	600	600	600
	DC	[V] 600	600	600	600	T8
Interrupting ratings		N S H L V	N S H L V	N S H L	S H L	T8V
	240V AC	[kA rms] 65 100 150 200 200	65 100 150 200 200	65 100 200 200	65 100 150	125
	277V AC	[kA rms]				
	347V AC	[kA rms]				
	480V AC	[kA rms] 25 35 65 100 150	25 35 65 100 150	35 50 65 100	50 65 100	125
	600Y/347V AC	[kA rms]				
	600V AC	[kA rms] 18 25 35 65 100	18 25 35 65 100	20 25 35 42	25 50 65	100
	250V DC (2 poles in series)	[kA rms]				
	500V DC (3 poles in series)	[kA rms]				
	500V DC (2 poles in series)	[kA rms] 25 35 50 65 100	25 35 50 65 100	35 35 50 65		
	600V DC (3 poles in series)	[kA rms] 16 25 35 50 65	16 25 35 50 65	20 20 35 50		
	Trip units	TMF	°		°	
TMD/TMA		°				
MA						
Electronic		°				
Dimensions	H	[in/mm] 8.07/205	8.07/205	10.55/268	10.55/268	15/382
	W 3p	[in/mm] 4.13/105	5.51/140	8.26/210	8.26/210	16.8/427
	D	[in/mm] 4.07/103.5	4.07/103.5	4.07/103.5	6.06/154 (toggle) 7/178 (motor)	11.2/282
Mechanical life	[No. operations]	20,000	20,000	20,000	10,000	15,000

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(3) T5 600 with electronic trip units only and in three pole version-
 (4) 2 pole T4N250 and T5N400 available only in N interrupting capacity.

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Tmax

General Information Catalog Number Explanation

T3 S 080 T W - 4 XXX

Accessories (Added In Alpha-Numeric Order) ⁽¹⁾

- A = Auxiliary Switch
- S_ = Shunt trip with voltage code
- U_ = Undervoltage release with voltage code

Number Of Poles

- 1 = 1 pole (T1 only)
- 2 = 2 pole
- 4 = 4 pole
- None = 3 pole

Type Connectors

- W = None
- L = Lugs on top/bottom terminals
- T = Lugs on top terminal
- B = Lugs on bottom terminal

Trip Unit Function

- B = LS/I (AC only)
- D = Molded Case Switch (MCS)
- T = Thermal-magnetic
- M = Magnetic only (MCP)
- E5 = Electronic MCP (AC only)
- C = LSI (AC only)
- E = LSI (AC only)
- P = PR332/P LI
- R = PR332/P LSI
- S = PR332/P LSI

Current Rating

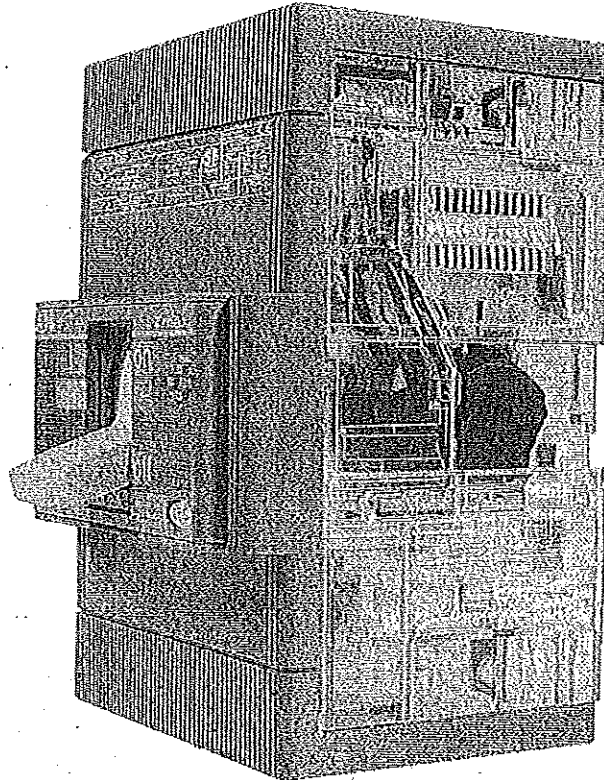
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|--------------|------------|
| 015 = 15A | 16 = 1600A |
| 080 = 80A | 20 = 2000A |
| 100 = 100A | 25 = 2500A |
| 225 = 225A | 30 = 3000A |
| 250 = 250A | |
| 400 = 400A | |
| 600 = 600A | |
| 800 = 800A | |
| 1000 = 1000A | |
| 1200 = 1200A | |

Interrupting Rating Class

- B = Basic
- N = Normal
- S = Standard
- H = High
- L = Extra High
- V = Very high

Frame Size

- | | |
|----------------------------------|---------------------------|
| T1 = 100A | T8 ⁽³⁾ = 1600A |
| T2 = 100A | = 2000A |
| T3 = 225A | = 2500A |
| Ts3 = 225A | = 3000A |
| T4 = 250A | |
| T6 = 400A, 600A | |
| T6 = 600A, 800A | |
| T7 ⁽²⁾ = 1000A, 1200A | |



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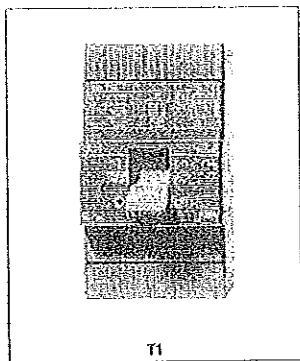
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(1) Consult ABB for factory installed accessories.
 (2) For T7, refer to page 40
 (3) For T8, refer to page 46

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100A, 600Y/347VAC, 480VAC Δ
Thermal-Magnetic

T1



Dimensions 3P Fixed Version 5.12H x 3.00W x 2.76D
Weight 2.34 (lbs)

General

The T1 breaker family ranges from 15 through 100 amperes. The T1 trip units are non-interchangeable and use the very latest technology in electromagnetic relays for overcurrent trip protection. Thermal overload protection is provided by heat sensitive bimetals. Short-circuit protection for the breaker is accomplished using a precise magnetic coil. State of the art construction in contacts and arcing chambers aid in limiting damaging fault currents through the protected circuits.

Standards

The UL489/CSA C22.2 No. 5 version of T1 also carries an IEC-60947-2 rating.

Versions

The T1 frame is available in two versions:

- T = Thermal-magnetic, fixed
- D = Molded case switch

Performance Levels

The T1 breaker has two performance levels available:

- B = Basic (Single Pole)
- N = Normal (3 or 4 pole)

Number of Poles

The UL/CSA version of the T1 is available in single, three and four pole versions. IEC versions of the T1 are also available with the same dimensions up to 160 amperes. Please contact ABB for details.

Reverse Feeding

All versions of the T1 family are suitable for reverse feed applications.

Molded Case Switches

UL/CSA switches include no overcurrent protection except for a high instantaneous trip mechanism for self protection.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	B (1-Pole)	N
240VAC	15	—	35
	20 - 100	—	50
277VAC	15	10	—
	20 - 100	18	—
347VAC	15	10	—
	20 - 100	14	—
480Y/277VAC	15	—	14
480VAC	20 - 100	—	22
600Y/347VAC	15 - 100	—	10
250VDC 2 pole series	15 - 100A	—	25
500VDC 3 pole series	15 - 100A	—	25

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	B (1-Pole)	N
230VAC	16 - 160A	25	50
415VAC	16 - 160A	—	36
440VAC	16 - 160A	—	22
500VAC	16 - 160A	—	15
690VAC	16 - 160A	—	6
250VDC 2 pole series	16 - 160A	—	36
500VDC 2 pole series	16 - 160A	—	36

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T1

T1
600Y/347VAC, 480VAC Δ
Thermal-Magnetic/Molded Case Switch

T1-100A Frame, Thermal-Magnetic Trip Unit Fixed, 1 pole

Breaker	IC at 347VAC	Rating	Magnetic Trip	1-Pole, 347VAC Part Number	List Price
T1B	10kA	15A	1000A	T1B015TL-1	
		20A	1000A	T1B020TL-1	
	14kA	25A	1000A	T1B025TL-1	
		30A	1000A	T1B030TL-1	
		40A	1000A	T1B040TL-1	
		50A	1500A	T1B050TL-1	
		60A	1500A	T1B060TL-1	
		70A	1500A	T1B070TL-1	
		80A	1500A	T1B080TL-1	
		90A	1500A	T1B090TL-1	
		100A	1500A	T1B100TL-1	

T1-100A Frame, Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC/500VDC Part Number	List Price	4-Pole, 600Y/347VAC/500VDC Part Number	List Price
T1N	14kA	15A	1000A	T1N015TL		T1N015TL-4	
		20A	1000A	T1N020TL		T1N020TL-4	
	22kA	25A	1000A	T1N025TL		T1N025TL-4	
		30A	1000A	T1N030TL		T1N030TL-4	
		40A	1000A	T1N040TL		T1N040TL-4	
		50A	1500A	T1N050TL		T1N050TL-4	
		60A	1500A	T1N060TL		T1N060TL-4	
		70A	1500A	T1N070TL		T1N070TL-4	
		80A	1500A	T1N080TL		T1N080TL-4	
		90A	1500A	T1N090TL		T1N090TL-4	
		100A	1500A	T1N100TL		T1N100TL-4	

T-100A Frame, 100% Rated Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC/500VDC Part Number	List Price
T1NQ	14kA	15 ¹⁾	1000A	T1NQ015TL	
		20	1000A	T1NQ020TL	
	22kA	25	1000A	T1NQ025TL	
		30	1000A	T1NQ030TL	
		40	1000A	T1NQ040TL	
		50	1500A	T1NQ050TL	
		60	1500A	T1NQ060TL	
		70	1500A	T1NQ070TL	
		80	1500A	T1NQ080TL	
		90	1500A	T1NQ090TL	
		100	1500A	T1NQ100TL	

T1-100A Frame, Molded Case Switch

Breaker	Interrupting Capacity ²⁾	Rating	Magnetic Trip	3-Pole, 600Y/347V/500VDC Part Number	List Price	4-Pole, 600Y/347V/500VDC Part Number	List Price
T1-D	240V, 50kA	100A	1000A	T1N100DL		T1N100DL-4	

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1 Rated 480Y/277VAC for 15A.
 2 When protected by a OCPD with appropriate ratings.

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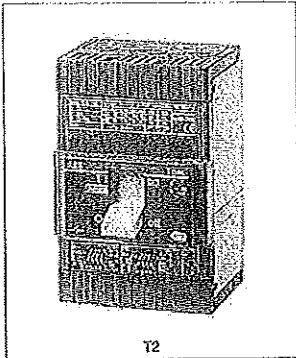
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T2

100A, 480VAC Δ

T2

Thermal-Magnetic/Electronic/Current Limiting



T2

Dimensions 3P Fixed Version 5.12H x 3.54W x 2.76D
 Weight 2.84 (lbs)

General

The T2 breaker family ranges from 10 through 100 amperes. The T2 trip units are non-interchangeable and use the very latest technology in electromagnetic relays for overcurrent trip protection as well as a version with microprocessor-based electronic trip unit. Thermal overload protection is provided by heat sensitive bimetals. State of the art construction in contacts and arcing chambers aid in limiting damaging fault currents through the protected circuits.

Standards

The UL489/CSA C22.2 No. 5 version of T2 also carries an IEC-60947-2 rating.

Versions

The T2 frame is available in four versions:

- T = Thermal-magnetic, fixed
- B = Adjustable LS/I electronic
- M = Magnetic only (MCP)
- E5 = Electronic instantaneous only (MCP)

Trip Functions

These tripping functions are available:

- L = Long time
- S = Short time
- I = Instantaneous

Performance Levels

The T2 breaker has two performance levels available:

- S = Standard
- H = High - UL Current Limiting

Number of Poles

The UL/CSA version of the T2 is available in three and four pole versions. IEC versions of the T2 are also available with the same dimensions up to 160 amperes. Please contact ABB for details.

Reverse Feeding

All versions of the T2 family are suitable for reverse feed applications.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	S	H
240VAC	10 - 100A	65	150
480VAC Δ	10 - 100A	35	65

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	S	H
230VAC	1.6 - 160A	85	100
415VAC	1.6 - 160A	50	70
440V	1.6 - 160A	45	55
500V	1.6 - 160A	30	36
690VAC	1.6 - 160A	7	8
250VDC 2 pole series	1.6 - 160A	50	70
500VDC 3 pole series	1.6 - 160A	50	70

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T2

T2
100A, 480VAC Δ
Thermal-Magnetic/Current Limiting

T2-100A Frame, Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 480VAC Part Number	List Price	4-Pole, 480VAC Part Number	List Price
T2S	35kA	15A	500A	T2S015TW		T2S015TW-4	
		20A	500A	T2S020TW		T2S020TW-4	
		25A	500A	T2S025TW		T2S025TW-4	
		30A	500A	T2S030TW		T2S030TW-4	
		40A	500A	T2S040TW		T2S040TW-4	
		50A	500A	T2S050TW		T2S050TW-4	
		60A	600A	T2S060TW		T2S060TW-4	
		70A	700A	T2S070TW		T2S070TW-4	
		80A	800A	T2S080TW		T2S080TW-4	
		90A	900A	T2S090TW		T2S090TW-4	
		100A	1000A	T2S100TW		T2S100TW-4	

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 480VAC Part Number	List Price	4-Pole, 480VAC Part Number	List Price
T2H UL Current Limiting	65kA	15A	500A	T2H015TW		T2H015TW-4	
		20A	500A	T2H020TW		T2H020TW-4	
		25A	500A	T2H025TW		T2H025TW-4	
		30A	500A	T2H030TW		T2H030TW-4	
		40A	500A	T2H040TW		T2H040TW-4	
		50A	500A	T2H050TW		T2H050TW-4	
		60A	600A	T2H060TW		T2H060TW-4	
		70A	700A	T2H070TW		T2H070TW-4	
		80A	800A	T2H080TW		T2H080TW-4	
		90A	900A	T2H090TW		T2H090TW-4	
		100A	1000A	T2H100TW		T2H100TW-4	

T2-100A Frame, 100% Rated Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 480VAC Part Number	List Price
T2SQ	35kA	15A	500A	T2SQ015TW	
		20A	500A	T2SQ020TW	
		25A	500A	T2SQ025TW	
		30A	500A	T2SQ030TW	
		40A	500A	T2SQ040TW	
		50A	500A	T2SQ050TW	
		60A	600A	T2SQ060TW	
		70A	700A	T2SQ070TW	
		80A	800A	T2SQ080TW	
		90A	900A	T2SQ090TW	
		100A	1000A	T2SQ100TW	

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 480VAC Part Number	List Price
T2HQ UL Current Limiting	65kA	15A	500A	T2HQ015TW	
		20A	500A	T2HQ020TW	
		25A	500A	T2HQ025TW	
		30A	500A	T2HQ030TW	
		40A	500A	T2HQ040TW	
		50A	500A	T2HQ050TW	
		60A	600A	T2HQ060TW	
		70A	700A	T2HQ070TW	
		80A	800A	T2HQ080TW	
		90A	900A	T2HQ090TW	
		100A	1000A	T2HQ100TW	

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T2
100A, 480VAC A
Electronic/Current Limiting, 100% Rated, MCP

T2

T2-100A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 480VAC	Trip Unit Type	CT Rating	3-Pole, 480VAC Part Number	List Price	4-Pole, 480VAC Part Number	List Price
T2S	35kA	PR221DS-LS/I	25A 60A 100A	T2S025BW T2S060BW T2S100BW		T2S025BW-4 T2S060BW-4 T2S100BW-4	
T2H UL Current Limiting	65kA	PR221DS-LS/I	25A 60A 100A	T2H025BW T2H060BW T2H100BW		T2H025BW-4 T2H060BW-4 T2H100BW-4	

T2-100A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 480VAC	Trip Unit Type	CT Rating	3-Pole, 480VAC Part Number	List Price
T2SQ	35kA	PR221DS-LS/I	25A 60A 100A	T2SQ025BW T2SQ060BW T2SQ100BW	
T2HQ UL Current Limiting	65kA	PR221DS-LS/I	25A 60A 100A	T2HQ025BW T2HQ060BW T2HQ100BW	

T2 -100A Frame, Motor Control Protection (MCP) Magnetic Only Trip Unit

Breaker	IC at 480VAC	Trip Unit Type	Rating	Adjustment Range	3-Pole, 480VAC Part Number	List Price
T2S	35kA	Mag only	20A 50A 100A	120 - 240 300 - 600 600 - 1200	T2S020MW T2S050MW T2S100MW	
T2H	65kA	Mag only	20A 50A 100A	120 - 240 300 - 600 600 - 1200	T2H020MW T2H050MW T2H100MW	

T2 -100A Frame, Motor Control Protection (MCP) Magnetic Only Electronic Trip Unit (AC Only)

Breaker	IC at 480VAC	Trip Unit Type	Rating	Adjustment Range	3-Pole, 480VAC Part Number	List Price
T2S	35kA	Instantaneous only	25A 60A 100A	25 - 250 60 - 600 100 - 1000	T2S025E5W T2S060E5W T2S100E5W	
T2H	65kA	Instantaneous only	25A 60A 100A	25 - 250 60 - 600 100 - 1000	T2H025E5W T2H060E5W T2H100E5W	

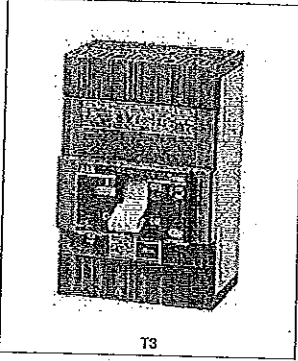
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T3

T3 225A, 600Y/347VAC, 480VAC Δ Thermal-Magnetic

Dimensions 3P Fixed Version 5.9H x 4.13W x 2.76D
Weight 5.45 (lbs)



T3

General

The T3 breaker family ranges from 60 through 225 amperes. The T3 trip units are non-interchangeable and use the very latest technology in electromagnetic relays for overcurrent trip protection. Thermal overload protection is provided by heat sensitive bimetals. Short-circuit protection begins at 10 times the thermal rating of the breaker using a precise magnetic coil. State of the art construction in contacts and arcing chambers aid in limiting damaging fault currents through the protected circuits.

Standards

The UL489/CSA C22.2 No. 5 version of T3 also carries an IEC-60947-2 rating.

Versions

The T3 frame is available in three versions:

- T = Thermal-magnetic, fixed
- M = Magnetic only (MCP)
- D = Molded case switch

Performance Levels

The T3 breaker has two performance levels available:

- N = Normal
- S = Standard

Number of Poles

The UL/CSA version of the T3 is available in three and four pole versions. IEC versions of the T3 are also available with the same dimensions up to 250 amperes. Please contact ABB for details.

Molded Case Switches

UL/CSA switches include no overcurrent protection except for a high instantaneous trip mechanism for self protection.

Reverse Feeding

All versions of the T3 family are suitable for reverse feed application.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	N	S
240VAC	60 - 225A	50	65
480VAC Δ	60 - 225A	25	35
600Y/347VAC	60 - 225A	10	10
250VDC (1)	60 - 225A	25	35
500VDC (2)	60 - 225A	25	35

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	B (1-Pole)	N
230VAC	63 - 250A	50	85
415VAC	63 - 250A	36	50
440V	63 - 250A	25	40
500V	63 - 250A	20	30
690VAC	63 - 250A	5	8
250VDC (1)	63 - 250A	36	50
500VDC (2)	63 - 250A	36	50

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(1) 2 poles in series.
(2) 3 poles in series.

T3
 225A, 600Y/347VAC, 480VAC Δ
 Thermal-Magnetic

T3

T3-225A Frame, Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC-500DC Part Number	List Price	4-Pole, 600Y/347VAC-500DC Part Number	List Price
T3N	25kA	60A	600A	T3N060TW		T3N060TW-4	
		70A	700A	T3N070TW		T3N070TW-4	
		80A	800A	T3N080TW		T3N080TW-4	
		90A	900A	T3N090TW		T3N090TW-4	
		100A	1000A	T3N100TW		T3N100TW-4	
		125A	1250A	T3N125TW		T3N125TW-4	
		150A	1500A	T3N150TW		T3N150TW-4	
		175A	1750A	T3N175TW		T3N175TW-4	
		200A	2000A	T3N200TW		T3N200TW-4	
		225A	2250A	T3N225TW		T3N225TW-4	

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC-500DC Part Number	List Price	4-Pole, 600Y/347VAC-500DC Part Number	List Price
T3S	35kA	60A	600A	T3S060TW		T3S060TW-4	
		70A	700A	T3S070TW		T3S070TW-4	
		80A	800A	T3S080TW		T3S080TW-4	
		90A	900A	T3S090TW		T3S090TW-4	
		100A	1000A	T3S100TW		T3S100TW-4	
		125A	1250A	T3S125TW		T3S125TW-4	
		150A	1500A	T3S150TW		T3S200TW-4	
		175A	1750A	T3S175TW		T3S175TW-4	
		200A	2000A	T3S200TW		T3S200TW-4	
		225A	2250A	T3S225TW		T3S225TW-4	

T3-225A Frame, 100% Rated Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC-500VDC Part Number	List Price
T3NQ	25kA	60A	600A	T3NQ060TW	
		70A	700A	T3NQ070TW	
		80A	800A	T3NQ080TW	
		90A	900A	T3NQ090TW	
		100A	1000A	T3NQ100TW	
		125A	1250A	T3NQ125TW	
		150A	1500A	T3NQ150TW	
		175A	1750A	T3NQ175TW	
		200A	2000A	T3NQ200TW	
		225A	2250A	T3NQ225TW	

Breaker	IC at 480VAC	Rating	Magnetic Trip	3-Pole, 600Y/347VAC-500VDC Part Number	List Price
T3SQ	35kA	60A	600A	T3SQ060TW	
		70A	700A	T3SQ070TW	
		80A	800A	T3SQ080TW	
		90A	900A	T3SQ090TW	
		100A	1000A	T3SQ100TW	
		125A	1250A	T3SQ125TW	
		150A	1500A	T3SQ150TW	
		175A	1750A	T3SQ175TW	
		200A	2000A	T3SQ200TW	
		225A	2250A	T3SQ225TW	

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T3

T3
225A, 600Y/347VAC, 480VAC Δ
MCP/Molded Case Switch

T3-225A Frame, Motor Control Protection (MCP) Magnetic Only Trip Unit

Breaker	IC at 480VAC	IC at 600Y/347VAC	IC at 500VDC	Trip Unit Type	Rating	Adjustment Range	3-Pole, 600Y/347VAC-500VDC Part Number	List Price
T3S	35kA	10kA	35kA	Mag only	100A	600 - 1200	T3S100MW	
					125A	750 - 1500	T3S125MW	
					150A	900 - 1800	T3S150MW	
					200A	1200 - 2400	T3S200MW	

T3S-225A Frame, Molded Case Switch

Breaker	Rating	Magnetic Trip	3-Pole, 600Y/347VAC-500VDC Part Number	List Price	4-Pole, 600Y/3 500VDC Part Number	List Price
T3S-D	150A 225A	1500A 2250A	T3S150DW		T3S150DW-4	
			T3S225DW		T3S225DW-4	

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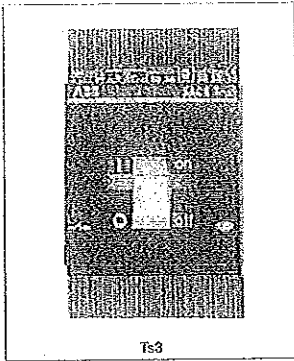
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Ts3
150A 600VAC Δ / 225A, 480VAC
Thermal-Magnetic

Ts3



Dimensions 3P Fixed Version 6.7H x 4.13W x 4.07D
 Weight 6.75 (lbs)

General

The Ts3 breaker family ranges from 15 through 225 amperes. The Ts3 trip mechanisms are non-interchangeable and use sensitive electromagnetic relays for overcurrent trip protection. Heat sensitive bimetals are used for thermal overcurrent protection. Short-circuit current protection begins at 10 times the thermal rating of the breaker and uses a magnetic coil principle.

Standards

The UL489/CSA C22.2 No. 5 version of Ts3 also carries an IEC-60947-2 rating.

Versions

To meet all application needs, the Ts3 is available in various versions:

- T = Thermal-magnetic
- D = Molded case switch
- M = Magnetic only (MCP)

Performance Level

Each version is also available in different maximum fault interrupting levels

- N = Normal
- H = High
- L = Extra high

Number of Poles

In UL/CSA form, the Ts3 is available in two pole or three pole versions, both with the same dimensions. A four-pole version is also available in the N version. For price estimation, add 35% to list price of selected version three pole breaker, contact ABB for details.

Molded Case Switches

UL/CSA switches include no overcurrent protection except for a high instantaneous trip mechanism for self protection. IEC type molded case switches with no trip protection are also available.

Reverse Feeding

All versions of the Ts3 family are suitable for reverse feed application.

UL/CSA Interrupting Capacity (kA RMS)
UL489 / CSA C22.2

Voltage	N	H	L
240 VAC	65	100	150
480 VAC	25	50	85 ⁽¹⁾
600 VAC ⁽²⁾	14	14	25
500 VDC ⁽³⁾	35	50	65
600 VDC ⁽³⁾	20	35	50
Ts3/225A 500VDC ⁽⁴⁾	20	35	50

IEC-60947-2 Interrupting Capacity (kA RMS)

Voltage	N	H	L
230 VAC	65	100	170
380/400/415VAC	35	65	85
440 VAC	30	50	65
500 VAC	25	40	50
690 VAC	14	18	20
500 VDC	35	50	65
750 VDC	20	35	50

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(1) 15-30A and 175-200-225A are 65kA at 480VAC
 (2) Ts3 175A, 200A, 225A are rated 480VAC / 500DVC maximum
 (3) Ts3 175A, 200A, 225A
 (4) 2 poles in series
 (5) 3 poles in series

Ts3

Ts3

150A, 600VAC Δ / 225A, 480VAC Δ

Thermal-Magnetic

Ts3-150A Frame, Thermal-Magnetic Trip Unit Fixed

Breaker	IC at 600VAC	Rating	Magnetic Trip	2-Pole, 480VAC/500VDC Part Number	List Price	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
Ts3N	14kA	15A	500A	Ts3N015TW-2		Ts3N015TW		Ts3N015TW-4	
		20A	500A	Ts3N020TW-2		Ts3N020TW		Ts3N020TW-4	
		25A	500A	Ts3N025TW-2		Ts3N025TW		Ts3N025TW-4	
		30A	500A	Ts3N030TW-2		Ts3N030TW		Ts3N030TW-4	
		35A	500A	Ts3N035TW-2		Ts3N035TW		Ts3N035TW-4	
		40A	500A	Ts3N040TW-2		Ts3N040TW		Ts3N040TW-4	
		50A	500A	Ts3N050TW-2		Ts3N050TW		Ts3N050TW-4	
		60A	600A	Ts3N060TW-2		Ts3N060TW		Ts3N060TW-4	
		70A	700A	Ts3N070TW-2		Ts3N070TW		Ts3N070TW-4	
		80A	800A	Ts3N080TW-2		Ts3N080TW		Ts3N080TW-4	
	90A	900A	Ts3N090TW-2		Ts3N090TW		Ts3N090TW-4		
	100A	1000A	Ts3N100TW-2		Ts3N100TW		Ts3N100TW-4		
	125A	1250A	Ts3N125TW-2		Ts3N125TW		Ts3N125TW-4		
	150A	1500A	Ts3N150TW-2		Ts3N150TW		Ts3N150TW-4		
	IC at 480VAC 25kA	175A (1)	1750A	Ts3N175TW-2		Ts3N175TW		Ts3N175TW-4	
	200A (1)	2000A	Ts3N200TW-2		Ts3N200TW		Ts3N200TW-4		
	225A (1)	2250A	Ts3N225TW-2		Ts3N225TW		Ts3N225TW-4		

Breaker	IC at 600VAC	Rating	Magnetic Trip	2-Pole, 480VAC/500VDC Part Number	List Price	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3H	14kA	15A	500A	Ts3H015TW-2		Ts3H015TW	
		20A	500A	Ts3H020TW-2		Ts3H020TW	
		25A	500A	Ts3H025TW-2		Ts3H025TW	
		30A	500A	Ts3H030TW-2		Ts3H030TW	
		35A	500A	Ts3H035TW-2		Ts3H035TW	
		40A	500A	Ts3H040TW-2		Ts3H040TW	
		50A	500A	Ts3H050TW-2		Ts3H050TW	
		60A	600A	Ts3H060TW-2		Ts3H060TW	
		70A	700A	Ts3H070TW-2		Ts3H070TW	
		80A	800A	Ts3H080TW-2		Ts3H080TW	
	90A	900A	Ts3H090TW-2		Ts3H090TW		
	100A	1000A	Ts3H100TW-2		Ts3H100TW		
	125A	1250A	Ts3H125TW-2		Ts3H125TW		
	150A	1500A	Ts3H150TW-2		Ts3H150TW		
	IC at 480VAC 50kA	175A (1)	1750A	Ts3H175TW-2		Ts3H175TW	
	200A (1)	2000A	Ts3H200TW-2		Ts3H200TW		
	225A (1)	2250A	Ts3H225TW-2		Ts3H225TW		

Breaker	IC at 600VAC	Rating	Magnetic Trip	2-Pole, 480VAC/500VDC Part Number	List Price	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3L	25kA	15A	500A	Ts3L015TW-2		Ts3L015TW	
		20A	500A	Ts3L020TW-2		Ts3L020TW	
		25A	500A	Ts3L025TW-2		Ts3L025TW	
		30A	500A	Ts3L030TW-2		Ts3L030TW	
		35A	500A	Ts3L035TW-2		Ts3L035TW	
		40A	500A	Ts3L040TW-2		Ts3L040TW	
		50A	500A	Ts3L050TW-2		Ts3L050TW	
		60A	600A	Ts3L060TW-2		Ts3L060TW	
		70A	700A	Ts3L070TW-2		Ts3L070TW	
		80A	800A	Ts3L080TW-2		Ts3L080TW	
	90A	900A	Ts3L090TW-2		Ts3L090TW		
	100A	1000A	Ts3L100TW-2		Ts3L100TW		
	125A	1250A	Ts3L125TW-2		Ts3L125TW		
	150A	1500A	Ts3L150TW-2		Ts3L150TW		
	IC at 480VAC 65kA	175A (1)	1750A	Ts3L175TW-2		Ts3L175TW	
	200A (1)	2000A	Ts3L200TW-2		Ts3L200TW		
	225A (1)	2250A	Ts3L225TW-2		Ts3L225TW		

(1) 480VAC/500VDC maximum

Ts3
150A, 600VAC Δ / 225A, 480VAC Δ, 100% Rated
Thermal-Magnetic

Ts3

Ts3-225A Frame, 100% Rated Thermal-Magnetic Trip Units

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3NQ	14kA	15A	500A	Ts3NQ015TW	
		20A	500A	Ts3NQ020TW	
		25A	500A	Ts3NQ025TW	
		30A	500A	Ts3NQ030TW	
		35A	500A	Ts3NQ035TW	
		40A	500A	Ts3NQ040TW	
		50A	500A	Ts3NQ050TW	
		60A	600A	Ts3NQ060TW	
		70A	700A	Ts3NQ070TW	
		80A	800A	Ts3NQ080TW	
	90A	900A	Ts3NQ090TW		
	100A	1000A	Ts3NQ100TW		
	125A	1250A	Ts3NQ125TW		
	150A	1500A	Ts3NQ150TW		
	IC at 480VAC 25kA	175A ⁽¹⁾	1750A	Ts3NQ175TW	
	200A ⁽¹⁾	2000A	Ts3NQ200TW		
	225A ⁽¹⁾	2250A	Ts3NQ225TW		

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3HQ	14kA	15A	500A	Ts3HQ015TW	
		20A	500A	Ts3HQ020TW	
		25A	500A	Ts3HQ025TW	
		30A	500A	Ts3HQ030TW	
		35A	500A	Ts3HQ035TW	
		40A	500A	Ts3HQ040TW	
		50A	500A	Ts3HQ050TW	
		60A	600A	Ts3HQ060TW	
		70A	700A	Ts3HQ070TW	
		80A	800A	Ts3HQ080TW	
	90A	900A	Ts3HQ090TW		
	100A	1000A	Ts3HQ100TW		
	125A	1250A	Ts3HQ125TW		
	150A	1500A	Ts3HQ150TW		
	IC at 480VAC 50kA	175A ⁽¹⁾	1750A	Ts3HQ175TW	
	200A ⁽¹⁾	2000A	Ts3HQ200TW		
	225A ⁽¹⁾	2250A	Ts3HQ225TW		

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3LQ	25kA	15A	500A	Ts3LQ015TW	
		20A	500A	Ts3LQ020TW	
		25A	500A	Ts3LQ025TW	
		30A	500A	Ts3LQ030TW	
		35A	500A	Ts3LQ035TW	
		40A	500A	Ts3LQ040TW	
		50A	500A	Ts3LQ050TW	
		60A	600A	Ts3LQ060TW	
		70A	700A	Ts3LQ070TW	
		80A	800A	Ts3LQ080TW	
	90A	900A	Ts3LQ090TW		
	100A	1000A	Ts3LQ100TW		
	125A	1250A	Ts3LQ125TW		
	150A	1500A	Ts3LQ150TW		
	IC at 480VAC 65kA	175A ⁽¹⁾	1750A	Ts3LQ175TW	
	200A ⁽¹⁾	2000A	Ts3LQ200TW		
	225A ⁽¹⁾	2250A	Ts3LQ225TW		

(1) 480VAC/500VDC maximum

ABB

Discount Schedule DS-ST

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Ts3

Ts3
150A, 600VAC Δ / 225A, 450VAC, 480VAC
MCP/Molded Case Switch

Ts3-225A Frame, Motor Control Protection (MCP) Magnetic Only Trip Unit

Breaker	IC at 480VAC	IC at 600VAC	IC at 500VDC	IC at 600VDC	Trip Unit Type	Rating	Adjustment Range	3-Pole, 600VAC/600VDC Part Number	List Price
Ts3L	25kA	10kA	--	50kA	Mag only	3	12-36	Ts3L003MW	
	25kA	10kA	--	50kA	Mag only	5	20-60	Ts3L005MW	
	25kA	10kA	--	50kA	Mag only	10	40-120	Ts3L010MW	
	25kA	10kA	65kA	50kA	Mag only	25	100-300	Ts3L025MW	
	85kA	25kA	65kA	50kA	Mag only	50	200-600	Ts3L050MW	
	85kA	25kA	65kA	50kA	Mag only	100	400-1200	Ts3L100MW	
	85kA	25kA	65kA	50kA	Mag only	125	500-1500	Ts3L125MW	
	85kA	25kA	50kA	50kA	Mag only	150	600-1600	Ts3L150MW	
	65kA	--	50kA	--	Mag only	175 (1)	700-2100	Ts3L175MW	
	65kA	--	50kA	--	Mag only	200 (1)	800-2400	Ts3L200MW	

Ts3-225A Frame, Molded Case Switch

Type	Voltage (max.)	Magnetic Trip	Amps	3-Pole 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
Ts3H	600VAC/600VDC	1500	150	Ts3H150DW		Ts3H150DW-4	
	480VAC/500VDC	2250	225 (1)	Ts3H225DW		Ts3H225DW-4	

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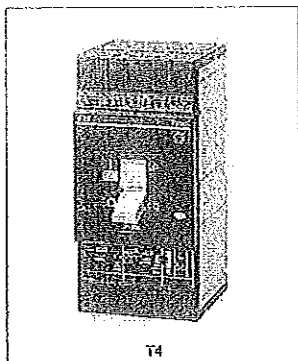
(1) 480VAC/500VDC Maximum

T4

250A, 600VAC Δ

T4

Electronic and Thermal-Magnetic



Dimensions 3P Fixed Version 8.07H x 4.13W x 4.07D

Weight 6.18 (lbs)

General

The T4 breaker is a 250 amp frame with either a microprocessor based over current protective trip system or a thermal magnetic trip unit.

Standards

The UL489/CSA C22.2 No. 5 version of T4 also carries an IEC-60947-2 rating.

Versions

To meet all application requirements, the T4 is available in the following versions:

- T = Thermal-magnetic
- B = Selectable & adjustable LI or LS
- C = Adjustable LSI
- E = Adjustable LSI Δ
- D = Molded Case Switch
- E5 = Electronic instantaneous only (MCP)

Trip Functions

These trip functions are available:

- L = Long time
- S = Short time
- I = Instantaneous
- G = Ground fault

Performance Levels

Each version is also available in different maximum fault interrupting levels:

- N = Normal
- S = Standard
- H = High - UL Current Limiting
- L = Extra high
- V = Very high - UL Current Limiting

Number of Poles ⁽³⁾

The T4 is available as a 2, 3 and 4 pole breaker. The 2 and 3 pole versions have the same dimensions.

Reverse Feeding

All versions of the T4 family are suitable for reverse feed application.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	N	S	H	L	V
240VAC	20 - 250A	65	100	150	200	200
480VAC	20 - 250A	25	35	65	100	150
600VAC	20 - 250A	18	25	35	65	100
500VDC ⁽¹⁾	20 - 250A	25	35	50	65	100
600VDC ⁽²⁾	20 - 250A	16	25	35	50	65

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	Continuous Rating	N	S	H	L	V
230VAC	20 - 320A	70	85	100	200	200
415VAC	20 - 320A	36	50	70	120	200
440VAC	20 - 320A	30	40	65	100	180
500VAC	20 - 320A	25	30	50	85	150
690VAC	20 - 320A	20	25	40	70	80
750VDC	20 - 320A	18	25	36	50	70

(1) 2 poles in series.

(2) 3 poles in series.

(3) 2 pole breakers available in S version only. 4 pole breakers available in H and V version only.

T4

T4
250A, 600VAC Δ
Electronic (AC Only)

T4-100A Frame, Electronic Trip Unit (AC Only) 40-100A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	2-Pole, 600VAC Part Number	List Price	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T4N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4N100BW-2 T4N100CW-2 T4N100EW-2		T4N100BW T4N100CW T4N100EW		T4N100BW-4 T4N100CW-4 T4N100EW-4	
T4S	25kA	PR221 LS/I PR222 LSI PR222 LSIG			T4S100BW T4S100CW T4S100EW			
T4H UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG			T4H100BW T4H100CW T4H100EW		T4H100BW-4 T4H100CW-4 T4H100EW-4	
T4L	65kA	PR221 LS/I PR222 LSI PR222 LSIG			T4L100BW T4L100CW T4L100EW			
T4V UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG			T4V100BW T4V100CW T4V100EW			

T4-150A Frame, Electronic Trip Unit (AC Only) 60-150A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	2-Pole, 600VAC Part Number	List Price	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T4N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4N150BW-2 T4N150CW-2 T4N150EW-2		T4N150BW T4N150CW T4N150EW		T4N150BW-4 T4N150CW-4 T4N150EW-4	
T4S	25kA	PR221 LS/I PR222 LSI PR222 LSIG			T4S150BW T4S150CW T4S150EW			
T4H UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG			T4H150BW T4H150CW T4H150EW		T4H150BW-4 T4H150CW-4 T4H150EW-4	
T4L	65kA	PR221 LS/I PR222 LSI PR222 LSIG			T4L150BW T4L150CW T4L150EW			
T4V UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG			T4V150BW T4V150CW T4V150EW			
T4V UL current limiting	100	PR221 LS/I PR222 LSI PR222 LSIG			T4V150BW T4V150CW T4V150EW			

T4-250A Frame, Electronic Trip Unit (AC Only) 100-250A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	2-Pole, 600VAC Part Number	List Price	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T4N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4N250BW-2 T4N250CW-2 T4N250EW-2		T4N250BW T4N250CW T4N250EW		T4N250BW-4 T4N250CW-4 T4N250EW-4	
T4S	25kA	PR221 LS/I PR222 LSI PR222 LSIG			T4S250BW T4S250CW T4S250EW			
T4H UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG			T4H250BW T4H250CW T4H250EW		T4H250BW-4 T4H250CW-4 T4H250EW-4	
T4L	65kA	PR221 LS/I PR222 LSI PR222 LSIG			T4L250BW T4L250CW T4L250EW			
T4V UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG			T4V250BW T4V250CW T4V250EW			

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T4
 250A, 600VAC Δ
 Electronic 100% Rated (AC Only)

T4

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T4NQ	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4NQ100BW T4NQ100CW T4NQ100EW	
T4SQ	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T4SQ100BW T4SQ100CW T4SQ100EW	
T4HQ UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T4HQ100BW T4HQ100CW T4HQ100EW	
T4LQ	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T4LQ100BW T4LQ100CW T4LQ100EW	
T4VQ UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T4VQ100BW T4VQ100CW T4VQ100EW	

T4-150A Frame, 100% Rated Electronic Trip Unit (AC Only) 60-150A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600V Part Number	List Price
T4NQ	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4NQ150BW T4NQ150CW T4NQ150EW	
T4SQ	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T4SQ150BW T4SQ150CW T4SQ150EW	
T4HQ UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T4HQ150BW T4HQ150CW T4HQ150EW	
T4LQ	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T4LQ150BW T4LQ150CW T4LQ150EW	
T4VQ UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T4VQ150BW T4VQ150CW T4VQ150EW	

T4-250A Frame, 100% Rated Electronic Trip Unit (AC Only) 100-250A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600V Part Number	List Price
T4NQ	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T4NQ250BW T4NQ250CW T4NQ250EW	
T4SQ	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T4SQ250BW T4SQ250CW T4SQ250EW	
T4HQ UL Current Limiting	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T4HQ250BW T4HQ250CW T4HQ250EW	
T4LQ	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T4LQ250BW T4LQ250CW T4LQ250EW	
T4VQ UL Current Limiting	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T4VQ250BW T4VQ250CW T4VQ250EW	

T4

T4 250A, 600VAC Δ Thermal-Magnetic Trip Units

T4-250A Frame, Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T4N	18kA	20A	500	T4N020TW		T4N020TW-4	
		30A (21-30A)	500	T4N030TW		T4N030TW-4	
		40A (28-40A)	500	T4N040TW		T4N040TW-4	
		50A (35-50A)	500	T4N050TW		T4N050TW-4	
		80A (56-80A)	400-800	T4N080TW		T4N080TW-4	
		100A (70-100A)	500-1000	T4N100TW		T4N100TW-4	
		125A (88-125A)	625-1250	T4N125TW		T4N125TW-4	
		150A (105-150A)	750-1500	T4N150TW		T4N150TW-4	
		200A (140-200A)	1000-2000	T4N200TW		T4N200TW-4	
		250A (175-250A)	1250-2500	T4N250TW		T4N250TW-4	
T4S	25kA	20A	500	T4S020TW			
		30A (21-30A)	500	T4S030TW			
		40A (28-40A)	500	T4S040TW			
		50A (35-50A)	500	T4S050TW			
		80A (56-80A)	400-800	T4S080TW			
		100A (70-100A)	500-1000	T4S100TW			
		125A (88-125A)	625-1250	T4S125TW			
		150A (105-150A)	750-1500	T4S150TW			
		200A (140-200A)	1000-2000	T4S200TW			
		250A (175-250A)	1250-2500	T4S250TW			
T4H UL Current Limiting	35kA	20A	500	T4H020TW		T4H020TW-4	
		30A (21-30A)	500	T4H030TW		T4H030TW-4	
		40A (28-40A)	500	T4H040TW		T4H040TW-4	
		50A (35-50A)	500	T4H050TW		T4H050TW-4	
		80A (56-80A)	400-800	T4H080TW		T4H080TW-4	
		100A (70-100A)	500-1000	T4H100TW		T4H100TW-4	
		125A (88-125A)	625-1250	T4H125TW		T4H125TW-4	
		150A (105-150A)	750-1500	T4H150TW		T4H150TW-4	
		200A (140-200A)	1000-2000	T4H200TW		T4H200TW-4	
		250A (175-250A)	1250-2500	T4H250TW		T4H250TW-4	
T4L	65kA	20A	500	T4L020TW			
		30A (21-30A)	500	T4L030TW			
		40A (28-40A)	500	T4L040TW			
		50A (35-50A)	500	T4L050TW			
		80A (56-80A)	400-800	T4L080TW			
		100A (70-100A)	500-1000	T4L100TW			
		125A (88-125A)	625-1250	T4L125TW			
		150A (105-150A)	750-1500	T4L150TW			
		200A (140-200A)	1000-2000	T4L200TW			
		250A (175-250A)	1250-2500	T4L250TW			
T4V UL Current Limiting	100kA	20A	500	T4V020TW			
		30A (21-30A)	500	T4V030TW			
		40A (28-40A)	500	T4V040TW			
		50A (35-50A)	500	T4V050TW			
		80A (56-80A)	400-800	T4V080TW			
		100A (70-100A)	500-1000	T4V100TW			
		125A (88-125A)	625-1250	T4V125TW			
		150A (105-150A)	750-1500	T4V150TW			
		200A (140-200A)	1000-2000	T4V200TW			
		250A (175-250A)	1250-2500	T4V250TW			

Breaker	IC at 600VAC	Rating	Magnetic Trip	2-Pole, 600VAC/500VDC Part Number	List Price
T4N	18kA	30A (21-30A)	500	T4N030TW-2	
		40A (28-40A)	500	T4N040TW-2	
		50A (35-50A)	500	T4N050TW-2	
		80A (56-80A)	400-800	T4N080TW-2	
		100A (70-100A)	500-1000	T4N100TW-2	
		125A (88-125A)	625-1250	T4N125TW-2	
		150A (100-150A)	750-1500	T4N150TW-2	
		200A (140-200A)	1000-2000	T4N200TW-2	
250A (175-250A)	1250-2500	T4N250TW-2			

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T4
 250A, 600VAC
 100% Rated Thermal-Magnetic Trip Units

T4

T4-250A Frame, 100% Rated Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
T4NQ	18kA	20A	500	T4NQ020TW	
		30A (21-30A)	500	T4NQ030TW	
		40A (28-40A)	500	T4NQ040TW	
		50A (35-50A)	500	T4NQ050TW	
		80A (56-80A)	400-800	T4NQ080TW	
		100A (70-100A)	500-1000	T4NQ100TW	
		125A (88-125A)	625-1250	T4NQ125TW	
		150A (105-150A)	750-1500	T4NQ150TW	
		200A (140-200A)	1000-2000	T4NQ200TW	
		250A (175-250A)	1250-2500	T4NQ250TW	
T4SQ	25kA	20A	500	T4SQ020TW	
		30A (21-30A)	500	T4SQ030TW	
		40A (28-40A)	500	T4SQ040TW	
		50A (35-50A)	500	T4SQ050TW	
		80A (56-80A)	400-800	T4SQ080TW	
		100A (70-100A)	500-1000	T4SQ100TW	
		125A (88-125A)	625-1250	T4SQ125TW	
		150A (105-150A)	750-1500	T4SQ150TW	
		200A (140-200A)	1000-2000	T4SQ200TW	
		250A (175-250A)	1250-2500	T4SQ250TW	
T4HQ	35kA	20A	500	T4HQ020TW	
		30A (21-30A)	500	T4HQ030TW	
		40A (28-40A)	500	T4HQ040TW	
		50A (35-50A)	500	T4HQ050TW	
		80A (56-80A)	400-800	T4HQ080TW	
		100A (70-100A)	500-1000	T4HQ100TW	
		125A (88-125A)	625-1250	T4HQ125TW	
		150A (105-150A)	750-1500	T4HQ150TW	
		200A (140-200A)	1000-2000	T4HQ200TW	
		250A (175-250A)	1250-2500	T4HQ250TW	
T4LQ	65kA	20A	500	T4LQ020TW	
		30A (21-30A)	500	T4LQ030TW	
		40A (28-40A)	500	T4LQ040TW	
		50A (35-50A)	500	T4LQ050TW	
		80A (56-80A)	400-800	T4LQ080TW	
		100A (70-100A)	500-1000	T4LQ100TW	
		125A (88-125A)	625-1250	T4LQ125TW	
		150A (105-150A)	750-1500	T4LQ150TW	
		200A (140-200A)	1000-2000	T4LQ200TW	
		250A (175-250A)	1250-2500	T4LQ250TW	
T4VQ	100kA	20A	500	T4VQ020TW	
		30A (21-30A)	500	T4VQ030TW	
		40A (28-40A)	500	T4VQ040TW	
		50A (35-50A)	500	T4VQ050TW	
		80A (56-80A)	400-800	T4VQ080TW	
		100A (70-100A)	500-1000	T4VQ100TW	
		125A (88-125A)	625-1250	T4VQ125TW	
		150A (105-150A)	750-1500	T4VQ150TW	
		200A (140-200A)	1000-2000	T4VQ200TW	
		250A (175-250A)	1250-2500	T4VQ250TW	

T4

T4
250A, 600VAC Δ
MCP (Instantaneous Only), Molded Case Switch

T4-250A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit Type	Rating	Adjustment Range	3-Pole, 600VAC Part Number	List Price
T4N	18kA	PR221 DS-I	100A	100-1000	T4N100E5W	
			150A	150-1500	T4N150E5W	
			250A	250-2500	T4N250E5W	
T4S	25kA	PR221 DS-I	100A	100-1000	T4S100E5W	
			150A	150-1500	T4S150E5W	
			250A	250-2500	T4S250E5W	
T4H	35kA	PR221 DS-I	100A	100-1000	T4H100E5W	
			150A	150-1500	T4H150E5W	
			250A	250-2500	T4H250E5W	
T4L	65kA	PR221 DS-I	100A	100-1000	T4L100E5W	
			150A	150-1500	T4L150E5W	
			250A	250-2500	T4L250E5W	

T4-250A Frame, Molded Case Switch

Type	Amps	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T4N-D	250	3000	T4N250DW		T4H250DW-4	
T4S-D	250	3000	T4S250DW			
T4H-D	250	3000	T4H250DW			
T4L-D	250	3000	T4L250DW			
T4V-D	250	3000	T4V250DW			

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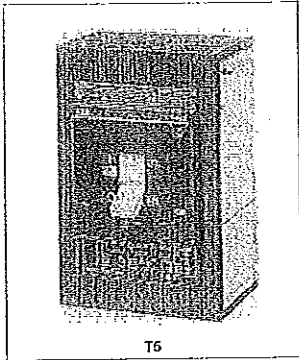
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T5
400A / 600A, 600VAC Δ
Electronic and Thermal-Magnetic

T5



T5

Dimensions 3P Fixed Version 8.07H x 5.51W x 4.07D
Weight 8.55 (lbs)

General

The T5 breaker is a 400/600 amp frame with either a microprocessor based over current protective trip system or a thermal magnetic trip unit. (1)

Standards

The UL489/CSA C22.2 No. 5 version of T5 also carries an IEC-60947-2 rating.

Versions

To meet all application requirements, the T5 is available in the following versions:

- T = Thermal-magnetic
- B = Selectable & adjustable LI or LS
- C = Adjustable LSI
- E = Adjustable LSI G
- D = Molded Case Switch
- E5 = Electronic instantaneous only (MCP)

Trip Functions

These trip functions are available:

- L = Long time
- S = Short time
- I = Instantaneous
- G = Ground fault

Performance Levels

Each version is also available in different maximum fault interrupting levels:

- N = Normal
- S = Standard
- H = High
- L = Extra high
- V = Very high

Number of Poles (2)

The T5 is available as a 2, 3 and 4 pole breaker. The 2 and 3 pole versions have the same dimensions.

Reverse Feeding

All versions of the T5 family are suitable for reverse feed application.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	N	S	H	L	V
240VAC	65	100	150	200	200
480VAC	25	35	65	100	150
600VAC	18	25	35	65	100
500VDC (3)	25	35	50	65	100
600VDC (3)	16	25	35	50	65

IEC 60947-2, Interrupting Capacity (kA RMS)

Voltage	N	S	H	L	V
230VAC	70	85	100	200	200
415VAC	35	50	70	120	200
440VAC	30	40	65	100	180
500VAC	25	30	50	85	150
690VAC	20	25	40	70	80
750VDC (3)	16	25	36	50	70

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(1) 2 poles in series.
 (2) 3 poles in series.
 (3) T5 600A not available with thermal magnetic trip unit.
 (4) 2 pole available in H version only. 4 pole available in N and H version only.

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T5

T5 400A / 600A Electronic (AC Only)

T5-300A Frame, Electronic Trip Unit (AC Only) 120-300A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	2-Pole, 600VAC Part Number	List Price	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T5N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T5N300BW-2 T5N300CW-2 T5N300EW-2		T5N300BW T5N300CW T5N300EW		T5N300BW-4 T5N300CW-4 T5N300EW-4	
T5S	25kA	PR221 LS/I PR222 LSI PR222 LSIG			T5S300BW T5S300CW T5S300EW			
T5H	35kA	PR221 LS/I PR222 LSI PR222 LSIG			T5H300BW T5H300CW T5H300EW		T5H300BW-4 T5H300CW-4 T5H300EW-4	
T5L	65kA	PR221 LS/I PR222 LSI PR222 LSIG			T5L300BW T5L300CW T5L300EW			
T5V	100kA	PR221 LS/I PR222 LSI PR222 LSIG			T5V300BW T5V300CW T5V300EW			

T5-400A Frame, Electronic Trip Unit (AC Only) 160-400A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	2-Pole, 600VAC Part Number	List Price	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T5N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T5N400BW-2 T5N400CW-2 T5N400EW-2		T5N400BW T5N400CW T5N400EW		T5N400BW-4 T5N400CW-4 T5N400EW-4	
T5S	25kA	PR221 LS/I PR222 LSI PR222 LSIG			T5S400BW T5S400CW T5S400EW			
T5H	35kA	PR221 LS/I PR222 LSI PR222 LSIG			T5H400BW T5H400CW T5H400EW		T5H400BW-4 T5H400CW-4 T5H400EW-4	
T5L	65kA	PR221 LS/I PR222 LSI PR222 LSIG			T5L400BW T5L400CW T5L400EW			
T5V	100kA	PR221 LS/I PR222 LSI PR222 LSIG			T5V400BW T5V400CW T5V400EW			

T5-600A Frame, Electronic Trip Unit (AC Only) 240-600A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T5N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T5N600BW T5N600CW T5N600EW	
T5S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T5S600BW T5S600CW T5S600EW	
T5H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T5H600BW T5H600CW T5H600EW	
T5L	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T5L600BW T5L600CW T5L600EW	
T5V	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T5V600BW T5V600CW T5V600EW	

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T5
 400A
 100% Rated Electronic (AC only) (1)

T5

T5-300A Frame, 100% Rated Electronic Trip Units (AC Only) 120-300A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T5N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T5NQ300BW T5NQ300CW T5NQ300EW	
T5S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T5SQ300BW T5SQ300CW T5SQ300EW	
T5H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T5HQ300BW T5HQ300CW T5HQ300EW	
T5L	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T5LQ300BW T5LQ300CW T5LQ300EW	
T5V	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T5VQ300BW T5VQ300CW T5VQ300EW	

T5-400A Frame, 100% Rated Electronic Trip Units (AC Only) 160-400A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T5N	18kA	PR221 LS/I PR222 LSI PR222 LSIG	T5NQ400BW T5NQ400CW T5NQ400EW	
T5S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T5SQ400BW T5SQ400CW T5SQ400EW	
T5H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T5HQ400BW T5HQ400CW T5HQ400EW	
T5L	65kA	PR221 LS/I PR222 LSI PR222 LSIG	T5LQ400BW T5LQ400CW T5LQ400EW	
T5V	100kA	PR221 LS/I PR222 LSI PR222 LSIG	T5VQ400BW T5VQ400CW T5VQ400EW	

(1) T5 600A not available as 100% rated

T5

T5
400A, 600VAC Δ
Thermal-Magnetic (1)

T5-300/400A Frame, Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	2-Pole, 600VAC/600VDC Part Number	List Price	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T5N	18kA	300A 400A	1500-3000 2000-4000	T5N300TW-2 T5N400TW-2		T5N300TW T5N400TW		T5N300TW-4 T5N400TW-4	
T5S	25kA	300A 400A	1500-3000 2000-4000			T5S300TW T5S400TW		T5S300TW-4 T5S400TW-4	
T5H	35kA	300A 400A	1500-3000 2000-4000			T5H300TW T5H400TW		T5H300TW-4 T5H400TW-4	
T5L	65kA	300A 400A	1500-3000 2000-4000			T5L300TW T5L400TW		T5L300TW-4 T5L400TW-4	
T5V	100kA	300A 400A	1500-3000 2000-4000			T5V300TW T5V400TW		T5V300TW-4 T5V400TW-4	

T5-300/400A Frames, 100% Rated, Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
T5N	18kA	300A 400A	1500-3000 2000-4000	T5NQ300TW T5NQ400TW	
T5S	25kA	300A 400A	1500-3000 2000-4000	T5SQ300TW T5SQ400TW	
T5H	35kA	300A 400A	1500-3000 2000-4000	T5HQ300TW T5HQ400TW	
T5L	65kA	300A 400A	1500-3000 2000-4000	T5LQ300TW T5LQ400TW	
T5V	100kA	300A 400A	1500-3000 2000-4000	T5VQ300TW T5VQ400TW	

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(1) T5 600A not available with thermal-magnetic trip unit.

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T5
400A / 600A

T5

MCP (Instantaneous Only), Molded Case Switch

T5-300/400A Frame, Motor Control Protection (MCP) Electronic Trip Unit (Ac Only)

Breaker	IC at 600VAC	Trip Unit	Rating	Adjustment Range	3-Pole, 600VAC/600VDC Part Number	List Price
T5N	18kA	PR221DS-I	300A 400A	300-3000 400-4000	T5N300E5W T5N400E5W	
T5S	25kA	PR221DS-I	300A 400A	300-3000 400-4000	T5S300E5W T5S400E5W	
T5H	55kA	PR221DS-I	300A 400A	300-3000 400-4000	T5H300E5W T5H400E5W	
T5L	65kA	PR221DS-I	300A 400A	300-3000 400-4000	T5L300E5W T5L400E5W	

T5-600A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Rating	Adjustment Range	3-Pole, 600VAC/600VDC Part Number	List Price
T5N	18kA	PR221DS-I	600A	600-6000	T5N600E5W	
T5S	25kA	PR221DS-I	600A	600-6000	T5S600E5W	
T5H	55kA	PR221DS-I	600A	600-6000	T5H600E5W	
T5L	65kA	PR221DS-I	600A	600-6000	T5L600E5W	

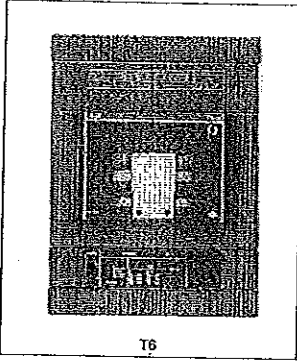
T5-400/600A Frame, Molded Case Switch

Type	IC at 600VAC	Amps	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T5N-D	18kA	400	5000	T5N400DW		T5H400DW-1	
T5S-D	25kA	400	5000	T5S400DW			
T5H-D	35kA	400	5000	T5H400DW			
T5L-D	65kA	400	5000	T5L400DW			
T5V-D	100kA	400	5000	T5V400DW			
T5N-D	18kA	600	6000	T5N600DW			
T5S-D	25kA	600	6000	T5S600DW			
T5H-D	35kA	600	6000	T5H600DW			
T5L-D	65kA	600	6000	T5L600DW			
T5V-D	100kA	600	6000	T5V600DW			

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T6

T6 600A / 800A, 600VAC Δ Electronic & Thermal-Magnetic



Dimensions 3P Fixed Version 10.55H x 8.26W x 4.07D
Weight 20.9 (lbs)

General

The T6 breaker is an 800 amp frame with either a microprocessor based over current protective trip system or a thermal magnetic trip unit. The T6 is available as a 600 or 800A frame.

Standards

The UL489/CSA C22.2 No. 5 version of T6 also carries an IEC-60947-2 rating.

Versions

To meet all application requirements, the T6 is available in the following versions:

- T = Thermal-magnetic, fixed
- B = Selectable & adjustable LI or LS
- C = Adjustable LSI
- E = Adjustable LSI⁽¹⁾
- D = Molded Case Switch
- E5 = Electronic Instantaneous only (MCP)

Trip Functions

These trip functions are available:

- L = Long time
- S = Short time
- I = Instantaneous
- G = Ground fault

Performance Levels

Each version is also available in different maximum fault interrupting levels:

- N = Normal
- S = Standard
- H = High
- L = Extra high

Number of Poles ⁽²⁾

The T6 is available as a 3 and 4 pole breaker.
4 poles only available in N or H version.

Reverse Feeding

All versions of the T6 family are suitable for reverse feed application.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	N	S	H	L
240VAC	65	100	200	200
480VAC	35	50	65	100
600VAC	20	25	35	42
600VDC ⁽¹⁾	35	35	50	65
600VDC ⁽²⁾	20	20	35	50

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	N	S	H	L
230VAC	70	85	100	200
415VAC	36	50	70	100
600VAC	20	22	25	30
750VDC ⁽³⁾	16	20	36	50

(1) 2 poles in series.
 (2) 3 poles in series.
 (3) 4 pole available N and H version only.

T6
600A / 800A, 600VAC A
Electronic (AC Only)

T6

T6-600A Frame, Electronic Trip Unit (AC Only) 240-800A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 LS/I PR222 LSI PR222 LSIG	T6N600BW T6N600CW T6N600EW		T6N600BW-4 T6N600CW-4 T6N600EW-4	
T6S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T6S600BW T6S600CW T6S600EW			
T6H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T6H600BW T6H600CW T6H600EW		T6H600BW-4 T6H600CW-4 T6H600EW-4	
T6L	42kA	PR221 LS/I PR222 LSI PR222 LSIG	T6L600BW T6L600CW T6L600EW			

T6-800A Frame, Electronic Trip Unit (AC Only) 320-800A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 LS/I PR222 LSI PR222 LSIG	T6N800BW T6N800CW T6N800EW		T6N800BW-4 T6N800CW-4 T6N800EW-4	
T6S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T6S800BW T6S800CW T6S800EW			
T6H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T6H800BW T6H800CW T6H800EW		T6H800BW-4 T6H800CW-4 T6H800EW-4	
T6L	42kA	PR221 LS/I PR222 LSI PR222 LSIG	T6L800BW T6L800CW T6L800EW			

T6-600A Frame, 100% Rated Electronic Trip Unit (AC Only) 240-600A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 LS/I PR222 LSI PR222 LSIG	T6NQ600BW T6NQ600CW T6NQ600EW	
T6S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T6SQ600BW T6SQ600CW T6SQ600EW	
T6H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T6HQ600BW T6HQ600CW T6HQ600EW	
T6L	42kA	PR221 LS/I PR222 LSI PR222 LSIG	T6LQ600BW T6LQ600CW T6LQ600EW	

T6-800A Frame, 100% Rated Electronic Trip Unit (AC Only) 320-800A Adjustable Range

Breaker	IC at 600VAC	Trip Unit	3-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 LS/I PR222 LSI PR222 LSIG	T6NQ800BW T6NQ800CW T6NQ800EW	
T6S	25kA	PR221 LS/I PR222 LSI PR222 LSIG	T6SQ800BW T6SQ800CW T6SQ800EW	
T6H	35kA	PR221 LS/I PR222 LSI PR222 LSIG	T6HQ800BW T6HQ800CW T6HQ800EW	
T6L	42kA	PR221 LS/I PR222 LSI PR222 LSIG	T6LQ800BW T6LQ800CW T6LQ800EW	

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T6

T6
600A / 800A, 600VAC Δ
Electronic & Thermal-Magnetic

T6-600/800A Frame, Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T6N	20kA	600A 800A	3000 - 6000A 4000 - 8000A	T6N600TW T6N800TW		T6N600TW-4 T6N800TW-4	
T6S	25kA	600A 800A	3000 - 6000A 4000 - 8000A	T6S600TW T6S800TW			
T6H	35kA	600A 800A	3000 - 6000A 4000 - 8000A	T6H600TW T6H800TW		T6H600TW-4 T6H800TW-4	
T6L	42kA	600A 800A	3000 - 6000A 4000 - 8000A	T6L600TW T6L800TW			

T6-600/800A Frame, 100% Rated Thermal-Magnetic Trip Unit

Breaker	IC at 600VAC	Rating	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price
T6N	20kA	600A 800A	3000 - 6000A 4000 - 8000A	T6NQ600TW T6NQ800TW	
T6S	25kA	600A 800A	3000 - 6000A 4000 - 8000A	T6SQ600TW T6SQ800TW	
T6H	35kA	600A 800A	3000 - 6000A 4000 - 8000A	T6HQ600TW T6HQ800TW	
T6L	42kA	600A 800A	3000 - 6000A 4000 - 8000A	T6LQ600TW T6LQ800TW	

T6-600A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment Range	3-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 DS-I	600-6000	T6N600E5W	
T6S	25kA	PR221 DS-I	600-6000	T6S600E5W	
T6H	35kA	PR221 DS-I	600-6000	T6H600E5W	
T6L	42kA	PR221 DS-I	600-6000	T6L600E5W	

T6-800A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment Range	3-Pole, 600VAC Part Number	List Price
T6N	20kA	PR221 DS-I	800-8000	T6N800E5W	
T6S	25kA	PR221 DS-I	800-8000	T6S800E5W	
T6H	35kA	PR221 DS-I	800-8000	T6H800E5W	
T6L	42kA	PR221 DS-I	800-8000	T6L800E5W	

T6-800A Frame, Molded Case Switch

Breaker	IC at 600VAC	Amp	Magnetic Trip	3-Pole, 600VAC/600VDC Part Number	List Price	4-Pole, 600VAC/600VDC Part Number	List Price
T6H	35kA	800	10,000	T6H800DW		T6H800DW-4	

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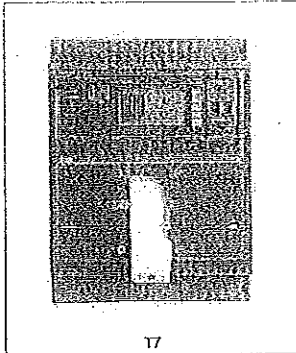
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T7-T7M
1000A / 1200A, 600VAC Δ
Electronic (AC Only)

T7



Dimensions 3P Fixed Version 10.55H x 8.26W x 6.07D ⁽¹⁾
 Weight 21.4 (lbs)

General

The T7 breaker is a 1200 amp frame with a microprocessor based over current protective trip system.
 Available in 2 versions: T7 for toggle operated, T7M for motor operated

Standards

The UL489/CSA C22.2 No. 5 version of T7 also carries an IEC-60947-2 rating.

Versions

To meet all application requirements, the T7 is available in the following versions:

- B = PR231-LS/I adjustable (dip switch)
- C = PR232-LSI adjustable (dip switch)
- E = PR331-LSIG adjustable (dip switch)
- D = Moulded Case Switch
- P = PR332-LI adjustable (keypad + LCD display)
- R = PR332-LSI adjustable (keypad + LCD display)
- S = PR332-LSIG adjustable (keypad + LCD display)

Trip Functions

These trip functions are available:

- L = Long time
- S = Short time
- I = Instantaneous
- G = Ground fault

Performance Levels

Each version is also available in different maximum fault interrupting levels:

- S = Standard
- H = High
- L = Extra high

Number of Poles

The T7 is available as a 3 and 4 pole breaker.

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	S	H	L
240VAC	65	100	150
480VAC	50	65	100
600VAC	25	50	65

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	S	H	L
230VAC	85	100	200
415VAC	50	70	120
690VAC	30	42	50

(1) Toggle type (dimensions of toggle not included)

T7

T7
1000A / 1200A, 600VAC Δ
Electronic (AC Only)

T7S-1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7S	25kA	PR231/P	LS/I	T7S1000BW		T7S1000BW-4	
		PR232/P	LSI	T7S1000CW		T7S1000CW-4	
		PR331/P	LSIG	T7S1000EW		T7S1000EW-4	
		PR332/P	LI	T7S1000PW		T7S1000PW-4	
		PR332/P	LSI	T7S1000RW		T7S1000RW-4	
		PR332/P	LSIG	T7S1000SW		T7S1000SW-4	

T7S-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7S	25kA	PR231/P	LS/I	T7S1200BW		T7S1200BW-4	
		PR232/P	LSI	T7S1200CW		T7S1200CW-4	
		PR331/P	LSIG	T7S1200EW		T7S1200EW-4	
		PR332/P	LI	T7S1200PW		T7S1200PW-4	
		PR332/P	LSI	T7S1200RW		T7S1200RW-4	
		PR332/P	LSIG	T7S1200SW		T7S1200SW-4	

T7H-1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7H	50kA	PR231/P	LS/I	T7H1000BW		T7H1000BW-4	
		PR232/P	LSI	T7H1000CW		T7H1000CW-4	
		PR331/P	LSIG	T7H1000EW		T7H1000EW-4	
		PR332/P	LI	T7H1000PW		T7H1000PW-4	
		PR332/P	LSI	T7H1000RW		T7H1000RW-4	
		PR332/P	LSIG	T7H1000SW		T7H1000SW-4	

T7H-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7H	50kA	PR231/P	LS/I	T7H1200BW		T7H1200BW-4	
		PR232/P	LSI	T7H1200CW		T7H1200CW-4	
		PR331/P	LSIG	T7H1200EW		T7H1200EW-4	
		PR332/P	LI	T7H1200PW		T7H1200PW-4	
		PR332/P	LSI	T7H1200RW		T7H1200RW-4	
		PR332/P	LSIG	T7H1200SW		T7H1200SW-4	

T7L-1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7L	65kA	PR231/P	LS/I	T7L1000BW		T7L1000BW-4	
		PR232/P	LSI	T7L1000CW		T7L1000CW-4	
		PR331/P	LSIG	T7L1000EW		T7L1000EW-4	
		PR332/P	LI	T7L1000PW		T7L1000PW-4	
		PR332/P	LSI	T7L1000RW		T7L1000RW-4	
		PR332/P	LSIG	T7L1000SW		T7L1000SW-4	

T7L-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7L	65kA	PR231/P	LS/I	T7L1200BW		T7L1200BW-4	
		PR232/P	LSI	T7L1200CW		T7L1200CW-4	
		PR331/P	LSIG	T7L1200EW		T7L1200EW-4	
		PR332/P	LI	T7L1200PW		T7L1200PW-4	
		PR332/P	LSI	T7L1200RW		T7L1200RW-4	
		PR332/P	LSIG	T7L1200SW		T7L1200SW-4	

T7M
1000A / 1200A, 600VAC Δ
Electronic (AC Only)

T7

T7MS-1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7MS	25kA	PR231/P	LS/I	T7MS1000BW		T7MS1000BW-4	
		PR232/P	LSI	T7MS1000CW		T7MS1000CW-4	
		PR331/P	LSIG	T7MS1000EW		T7MS1000EW-4	
		PR332/P	LI	T7MS1000PW		T7MS1000PW-4	
		PR332/P	LSI	T7MS1000RW		T7MS1000RW-4	
		PR332/P	LSIG	T7MS1000SW		T7MS1000SW-4	

T7MS-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7MS	25kA	PR231/P	LS/I	T7MS1200BW		T7MS1200BW-4	
		PR232/P	LSI	T7MS1200CW		T7MS1200CW-4	
		PR331/P	LSIG	T7MS1200EW		T7MS1200EW-4	
		PR332/P	LI	T7MS1200PW		T7MS1200PW-4	
		PR332/P	LSI	T7MS1200RW		T7MS1200RW-4	
		PR332/P	LSIG	T7MS1200SW		T7MS1200SW-4	

T7MH, 1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7MH	50kA	PR231/P	LS/I	T7MH1000BW		T7MH1000BW-4	
		PR232/P	LSI	T7MH1000CW		T7MH1000CW-4	
		PR331/P	LSIG	T7MH1000EW		T7MH1000EW-4	
		PR332/P	LI	T7MH1000PW		T7MH1000PW-4	
		PR232/P	LSI	T7MH1000RW		T7MH1000RW-4	
		PR332/P	LSIG	T7MH1000SW		T7MH1000SW-4	

T7MH-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7MH	50kA	PR231/P	LS/I	T7MH1200BW		T7MH1200BW-4	
		PR232/P	LSI	T7MH1200CW		T7MH1200CW-4	
		PR331/P	LSIG	T7MH1200EW		T7MH1200EW-4	
		PR332/P	LI	T7MH1200PW		T7MH1200PW-4	
		PR332/P	LSI	T7MH1200RW		T7MH1200RW-4	
		PR332/P	LSIG	T7MH1200SW		T7MH1200SW-4	

T7ML-1000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7ML	65kA	PR231/P	LS/I	T7ML1000BW		T7ML1000BW-4	
		PR232/P	LSI	T7ML1000CW		T7ML1000CW-4	
		PR331/P	LSIG	T7ML1000EW		T7ML1000EW-4	
		PR332/P	LI	T7ML1000PW		T7ML1000PW-4	
		PR332/P	LSI	T7ML1000RW		T7ML1000RW-4	
		PR332/P	LSIG	T7ML1000SW		T7ML1000SW-4	

T7ML-1200A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7ML	65kA	PR231/P	LS/I	T7ML1200BW		T7ML1200BW-4	
		PR232/P	LSI	T7ML1200CW		T7ML1200CW-4	
		PR331/P	LSIG	T7ML1200EW		T7ML1200EW-4	
		PR332/P	LI	T7ML1200PW		T7ML1200PW-4	
		PR332/P	LSI	T7ML1200RW		T7ML1200RW-4	
		PR332/P	LSIG	T7ML1200SW		T7ML1200SW-4	

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T7

T7
1000A / 1200A, 600VAC Δ
100% Rated Electronic (AC Only)

T7S-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7SQ	25kA	PR231/P	LS/I	T7SQ1000BW	
		PR232/P	LSI	T7SQ1000CW	
		PR331/P	LSIG	T7SQ1000EW	
		PR332/P	LI	T7SQ1000PW	
		PR332/P	LSI	T7SQ1000RW	
		PR332/P	LSIG	T7SQ1000SW	

T7S-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7SQ	25kA	PR231/P	LS/I	T7SQ1200BW	
		PR232/P	LSI	T7SQ1200CW	
		PR331/P	LSIG	T7SQ1200EW	
		PR332/P	LI	T7SQ1200PW	
		PR332/P	LSI	T7SQ1200RW	
		PR332/P	LSIG	T7SQ1200SW	

T7H-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7HQ	50kA	PR231/P	LS/I	T7HQ1000BW	
		PR232/P	LSI	T7HQ1000CW	
		PR331/P	LSIG	T7HQ1000EW	
		PR332/P	LI	T7HQ1000PW	
		PR332/P	LSI	T7HQ1000RW	
		PR332/P	LSIG	T7HQ1000SW	

T7H-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7HQ	50kA	PR231/P	LS/I	T7HQ1200BW	
		PR232/P	LSI	T7HQ1200CW	
		PR331/P	LSIG	T7HQ1200EW	
		PR332/P	LI	T7HQ1200PW	
		PR332/P	LSI	T7HQ1200RW	
		PR332/P	LSIG	T7HQ1200SW	

T7L-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7LQ	65kA	PR231/P	LS/I	T7LQ1000BW	
		PR232/P	LSI	T7LQ1000CW	
		PR331/P	LSIG	T7LQ1000EW	
		PR332/P	LI	T7LQ1000PW	
		PR332/P	LSI	T7LQ1000RW	
		PR332/P	LSIG	T7LQ1000SW	

T7L-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7LQ	65kA	PR231/P	LS/I	T7LQ1200BW	
		PR232/P	LSI	T7LQ1200CW	
		PR331/P	LSIG	T7LQ1200EW	
		PR332/P	LI	T7LQ1200PW	
		PR332/P	LSI	T7LQ1200RW	
		PR332/P	LSIG	T7LQ1200SW	

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T7M
 1000A / 1200A, 600VAC Δ
 100% Rated Electronic (AC Only)

T7

T7MS-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MSQ	25kA	PR231/P	LS/I	T7MSQ1000BW	
		PR232/P	LSI	T7MSQ1000CW	
		PR331/P	LSIG	T7MSQ1000EW	
		PR332/P	LI	T7MSQ1000PW	
		PR332/P	LSI	T7MSQ1000RW	
		PR332/P	LSIG	T7MSQ1000SW	

T7MS-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MSQ	25kA	PR231/P	LS/I	T7MSQ1200BW	
		PR232/P	LSI	T7MSQ1200CW	
		PR331/P	LSIG	T7MSQ1200EW	
		PR332/P	LI	T7MSQ1200PW	
		PR332/P	LSI	T7MSQ1200RW	
		PR332/P	LSIG	T7MSQ1200SW	

T7MH-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MHQ	50kA	PR231/P	LS/I	T7MHQ1000BW	
		PR232/P	LSI	T7MHQ1000CW	
		PR331/P	LSIG	T7MHQ1000EW	
		PR332/P	LI	T7MHQ1000PW	
		PR332/P	LSI	T7MHQ1000RW	
		PR332/P	LSIG	T7MHQ1000SW	

T7MH-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MHQ	50kA	PR231/P	LS/I	T7MHQ1200BW	
		PR232/P	LSI	T7MHQ1200CW	
		PR331/P	LSIG	T7MHQ1200EW	
		PR332/P	LI	T7MHQ1200PW	
		PR332/P	LSI	T7MHQ1200RW	
		PR332/P	LSIG	T7MHQ1200SW	

T7ML-1000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MLQ	65kA	PR231/P	LS/I	T7MLQ1000BW	
		PR232/P	LSI	T7MLQ1000CW	
		PR331/P	LSIG	T7MLQ1000EW	
		PR332/P	LI	T7MLQ1000PW	
		PR332/P	LSI	T7MLQ1000RW	
		PR332/P	LSIG	T7MLQ1000SW	

T7ML-1200A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T7MLQ	65kA	PR231/P	LS/I	T7MLQ1200BW	
		PR232/P	LSI	T7MLQ1200CW	
		PR331/P	LSIG	T7MLQ1200EW	
		PR332/P	LI	T7MLQ1200PW	
		PR332/P	LSI	T7MLQ1200RW	
		PR332/P	LSIG	T7MLQ1200SW	

T7

T7-T7M
 1000A / 1200A, 600VAC Δ
 MCP (Instantaneous Only), Molded Case Switch

T7-1000/1200A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Amps	Trip Unit	3-Pole, 600VAC Part Number	List Price
T7	25kA	1000	PR231/P-I	T7S1000MW	
	50kA	1000	PR231/P-I	T7H1000MW	
	65kA	1000	PR231/P-I	T7L1000MW	
	25kA	1200	PR231/P-I	T7S1200MW	
	50kA	1200	PR231/P-I	T7H1200MW	
	65kA	1200	PR231/P-I	T7L1200MW	

T7M-1000/1200A Frame, Motor Control Protection (MCP) Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Amps	Trip Unit	3-Pole, 600VAC Part Number	List Price
T7M	25kA	1000	PR231/P-I	T7MS1000MW	
	50kA	1000	PR231/P-I	T7MH1000MW	
	65kA	1000	PR231/P-I	T7ML1000MW	
	25kA	1200	PR231/P-I	T7MS1200MW	
	50kA	1200	PR231/P-I	T7MH1200MW	
	65kA	1200	PR231/P-I	T7ML1200MW	

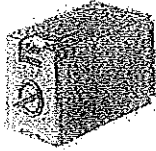
T7/T7M-1200A Frame, Molded Case Switch (AC Only)

Breaker	IC at 600VAC	Amps	Magnetic Trip	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T7	50kA	1200	12000	T7H1200DW		T7H1200DW-4	
T7M	50kA	1200	12000	T7MH1200DW		T7MH1200DW-4	

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T7-T7M
1000A / 1200A, 600VAC Δ
Accessories

T7



T7 X1 Shunt trip - UVR

Shunt Trips (YC)

Frame Size	Voltage	Part Number	List Price
T7 - T7M	415-440VAC	KT7XS1	
	380-400VAC	KT7XS2	
	240-250VAC/DC	KT7XS3	
	220-240VAC/DC	KT7XS4	
	120-127VAC/DC	KT7XS5	
	110-120VAC/DC	KT7XS6	
	60VAC/DC	KT7XS7	
	48VAC/DC	KT7XS8	
	30VAC/DC	KT7XS9	
	24VAC/DC	KT7XS0	

Undervoltage Release - (UVR)

Frame Size	Voltage	Part Number	List Price
T7 - T7M	415-440VAC	KT7XU1	
	380-400VAC	KT7XU2	
	240-250VAC/DC	KT7XU3	
	220-240VAC/DC	KT7XU4	
	120-127VAC/DC	KT7XU5	
	110-120VAC/DC	KT7XU6	
	60VAC/DC	KT7XU7	
	48VAC/DC	KT7XU8	
	30VAC/DC	KT7XU9	
		24VAC/DC	KT7XU0

Shunt Closing Release (YC)

Frame Size	Voltage	Part Number	List Price
T7M	415-440VAC	KT7MXC1	
	380-400VAC	KT7MXC2	
	240-250VAC/DC	KT7MXC3	
	220-240VAC/DC	KT7MXC4	
	120-127VAC/DC	KT7MXC5	
	110-120VAC/DC	KT7MXC6	
	60VAC/DC	KT7MXC7	
	48VAC/DC	KT7MXC8	
	30VAC/DC	KT7MXC9	
		24VAC/DC	KT7MXC0

Auxiliary Contacts - (AUX)

Frame Size	Type / Voltage	Part Number	List Price
T7-T7M	1 AUX "C" + 1 BA "C" 400VAC	KT7AS (1)	
	2 AUX "C" 400VAC	KT7XAS2	
	1 AUX "C" + 1 BA "C" 24VDC	KT7ASL (1)	
	2 AUX "C" 24VDC	KT7XAS2L	
	1 S51 "C" 250VAC	KT7XS51 (2)	
	1 S51 "C" 250VAC	KT7S51 (2)	

Possible combinations are:
 T7: a) 1 Aux + 1 BA b) 2 Aux,
 c) 3 Aux + 1 BA
 T7M: a) 2 Aux; b) 4 Aux

Spring Charging Motor (M)

Frame Size	Type / Voltage	Part Number	List Price
T7M	380...415VAC	KT7MXM2	
	220...250VAC/DC	KT7MXM3	
	100/130VAC/DC	KT7MXM5	
	48...60VAC/DC	KT7MXM7	
	24...30VAC/DC	KT7MXM9	

(1) For installation on T7 only
 (2) For installation on T7M only

T7-T7M
 1000A / 1200A, 600VAC Δ
 Accessories

Standard Cable Terminal (1)

Frame	Wire Size	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T7-T7M 1	(4) 4/0-500 kcmil	KT7X1200-3		KT7X1200-4	

(1) Comes standard with high profile terminal covers.

Terminal Covers for Fixed Breakers - Low Profile-Kit Includes Two Pieces

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T7-T7M	KT7XLTG-3		KT7XLTG-4	

Terminal Covers for Fixed Breakers - High Profile-Kit Includes Two Pieces

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T7-T7M	KT7XHTC-3		KT7XHTC-4	

Phase Barriers - Low Profile - 100mm - 3.93 in

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T7-T7M	KT7PBL-3		KT7PBL-4	

Phase Barriers - High Profile - 200mm - 7.87 in

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T7-T7M	KT7PBH-3		KT7PBH-4	

Extended Front Terminals - IEC

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T7-T7M	KT7EF-3		KT7EF-4	

Rear Terminals - IEC

Frame	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T7-T7M	KT7XR-3		KT7XR-4	

Variable Depth Handle Operators

Frame	Mechanism Part Number	List Price	Shaft Part Number	List Price	Handle Part Number	List Price
T7	KT7VD-M		OXF10X500 (19.7) KT7VD-S (19.7)		OH175J10X OHY175J10 OH175L10 KT7VD-H	

Direct Mount Rotary Operator Handle

Frame	Breaker Mounting	Part Number	List Price
T7	Fixed, Plug-In	KT7RH	

Early Make Contact

Frame	Part Number	List Price
T7	KT7EM	

Padlock Locking Device

Frame	Style	Locking Position	Breaker Mounting	Part Number	List Price
T7	PLL	OPEN	Fixed, Drawout	KT7LDO	
T7M	PLL	OPEN	Fixed, Draw-out	KT7MLDO	

Keylocks for the Rotary Handle Mechanism

Frame	Style	Locking Position	Keys	Part Number	List Price
T7	KLF-D	OPEN	Different	KT7KLD	
	KLF-S	OPEN	Same key # 20005	KT7KLS-20005	
	KLF-S	OPEN	Same key # 20006	KT7KLS-20006	
	KLF-S	OPEN	Same key # 20007	KT7KLS-20007	
	KLF-S	OPEN	Same key # 20008	KT7KLS-20008	

Keylocks on the Circuit-Breaker

Frame	Style	Locking Position	Keys	Part Number	List Price
T7	KLF-D	OPEN	Different	KT7KLD	
	KLF-S	OPEN	Same key # 20005	KT7KLS-20005	
	KLF-S	OPEN	Same key # 20006	KT7KLS-20006	
	KLF-S	OPEN	Same key # 20007	KT7KLS-20007	
	KLF-S	OPEN	Same key # 20008	KT7KLS-20008	
T7M	KLF-D	OPEN	Different	KT7MKLD	
	KLF-S	OPEN	Same key # 20005	KT7MKLS-20005	
	KLF-S	OPEN	Same key # 20006	KT7MKLS-20006	
	KLF-S	OPEN	Same key # 20007	KT7MKLS-20007	
	KLF-S	OPEN	Same key # 20008	KT7MKLS-20008	

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T7-T7ME
 1000A / 1200A, 600VAC Δ
 Accessories

T7

Draw-Out Kits

Item	Part Number Adaptor Moving Part	List Price	Part Number Fixed Part	List Price
T7 - 3 pole with RC-RC	KT7WMK		KT7WFRC	
T7 - 4 pole with RC-RC	KT7WMK-4		KT7WFRC-4	

Sliding Contact Blocks — T7-Draw-Out (1)

Item	Moving Part Breaker	List Price	Fixed Part Crate	List Price
Left Block Spring charging motor Spring charged contact Ready to close contact Early auxiliary contact Contact for trip coil release trip Trip rest	KT7XSCMP-L		KT7SCFP-L (T7) KT7MXSCFP-L (T7M)	
Center Block PR331 PR332	KT7XSCMP-C		KT7XSCFP-C	
Right Block Auxiliary contacts Shunt trip Closing Coil Undervoltage release	KT7XSCMP-R		KT7XSCFP-R	

Position Key Lock (Fixed Part) — T7 - T7M

Item	Part Number	List Price
Different key	KT7XPL-D	
Same key #20005	KT7XPL-20005	
Same key #20006	KT7XPL-20006	
Same key #20007	KT7XPL-20007	
Same key #20008	KT7XPL-20008	

Locks drawout breaker in racked-in / test isolation / racked-out position.

Position Key Lock Accessory (Fixed Part) — T7 - T7M

Item	Part Number	List Price
Key lock accessory	KT7XPLA	

Accessory added to position key lock allows breaker to be locked in racked-out position only.

Mechanical Interlocks

Item	Part Number	List Price
T7 (2) Cable T7 Mech. interlock plate-fixed Mech. interlock plate-draw-out	KT7XMLC KT7XMLPW KT7XMLPF	

Neutral Current Transformers (Required for 4-Wire Ground Fault System)

Frame	Rating	Part Number	List Price
T7	400...1200A	KT7XNCT1200	

Rating Plugs

Frame	Rating Plug	Part Number	List Price
T7	400A	KT70400RP	
	600A	KT70600RP	
	800A	KT70800RP	
	1000A	KT71000RP	
	1200A	KT71200RP	

Mechanical Accessories

Item	Part Number	List Price
Flange T7	KT7XFCO	
Mech. operation counter	KT7XEMC	
IP54 door cover	KT7XDC	

(1) If at least one of the accessories in table is installed on the breaker, respective pair of contact blocks must be installed on the fixed part (crate) and the moving part (breaker)
 (2) To interlock two circuit breakers, you have to order a cable kit and two plates.

T7

T7 / T7M 1000A / 1200A, 600VAC Δ Part-Numbering System

T7

⊗ **Locking Provisions:**
 X = None, A = Keylock,
 B = Button guard,
 C = Padlock Provision (open),
 D = Withdrawable Position
 Lock (Connected, test and
 disconnected positions),
 E = Withdrawable Position
 Lock (Test and
 disconnected positions)

⊗ **Accessories**
 X = None,
 A = Mechanical counter

⊗ **Undervoltage:**
 0 = None, A = 24VAC/DC, B = 30VAC/DC,
 C = 48VAC/DC, D = 60VAC/DC,
 E = 110..120VAC/DC, F = 120..127VAC/DC,
 G = 220..240VAC/DC, H = 240..250VAC/DC,
 J = 380..400VAC, K = 415..440VAC

⊗ **Shunt Trip:**
 0 = None, A = 24VAC/DC, B = 30VAC/DC, G = 48VAC/DC,
 D = 60VAC/DC, E = 110..120VAC/DC, F = 120..127VAC/DC,
 G = 220..240VAC/DC, H = 240..250VAC/DC,
 J = 380..400VAC, K = 415..440VAC

⊗ **Spring Charging Motor:**
 0 = None, A = 24..30VAC/DC, B = 48..60VAC/DC,
 C = 100..130VAC/DC, D = 220..250VAC/DC,
 E = 380..415VAC/DC

⊗ **Aux Contacts:**
 0 = None, A = 1 Form C + 1BA 400VAC (T7), B = 1 Form C + 1BA 24VDC (T7),
 C = 2 Form C 400VAC (T7-T7M), D = 2 Form C 24VDC (T7-T7M), E = S51 250VAC (T7),
 F = S51 250VAC (T7M), G = A+C (T7), H = B+D (T7), I = C+E (T7), J = C+F (T7M),
 K = D+E (T7), L = D+F (T7M), M = C+C (T7M), N = D+D (T7M)

⊗ **Closing Coil:**
 0 = None, A = 24VAC/DC, B = 30VAC/DC, C = 48VAC/DC,
 D = 60VAC/DC, E = 110..120VAC/DC, F = 120..127VAC/DC,
 G = 220..240VAC/DC, H = 240..250VAC/DC,
 J = 380..400VAC, K = 415..440VAC

⊗ **Trip Unit Accessories:**
 0 = None, A = PR330V, B = PR330/D-M, C = A + B

⊗ **Trip Unit:**
 X = Non-Automatic (MCS), B = PR231/P-LSA, C = PR232/P-LSI, E = PR331/P-LSIG,
 P = PR332/P-LI, R = PR332/P-LSI, S = PR332/P-LSIG

⊗ **Rating Plug:**
 0 = None Non-Automatic (MCS), A = 400, B = 600, C = 800, D = 1000A, E = 1200

⊗ **Frame Amp Rating:**
 1 = 1000A (toggle) 2 = 1200A (toggle) P = 1000A (motorized) B = 1200A (motorized)

⊗ **Version:**
 B = UL Fixed, Q = UL Fixed 100% Rated, 0 = Fixed Non-Automatic (MCS)
 W = UL Draw-out, X = UL Draw-out 100%, Y = Draw-out non-automatic

⊗ **Breaking Capacity**
 S, H, L

(†) Fixed part and accessories to be ordered separately.

Acc.

Accessories

Motor Operators

T1-T6

Electrical Operators

Allows remote opening and closing of circuit breaker

Frame Size	Voltage	Part Number	List Price
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Solenoid Operator

T1-T2-T3	48 - 60VDC	KT3M1	
	110 - 250VAC/DC	KT3M2	

Direct Action Motor Operator

Ts3	240VAC/250VDC	KTs3M2	
	120VAC/125VDC	KTs3M4	
	48VDC	KTs3M7	
	24VDC	KTs3M8	

Motor Operator Connector (Required for Ts3) ⁽¹⁾

Ts3	Fixed Mount	KTs3C-M	
	Plug-in / Draw-out	KTs3C-MP	

Stored Energy Motor Operator

T4-T5	220-250VAC/DC	KT5M2	
	110-125-VAC/DC	KT5M4	
	48-60VDC	KT5M7	
	24VDC	KT5M8	
	380VAC	KT5M3	

Stored Energy Motor Operator

T6	220-250VAC/DC	KT6M2	
	110-125-VAC/DC	KT6M4	
	48-60VDC	KT6M7	
	24VDC	KT6M8	
	380VAC	KT6M3	

Stored Energy Motor With Communication (IEC)

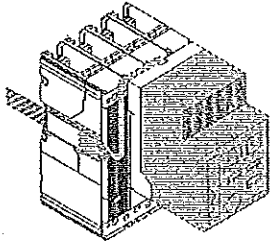
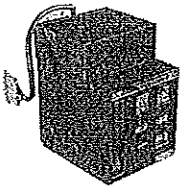
T4-T5	220-250VAC/DC	KT5M2-E	
	380VAC	KT5M3-E	
	110-125VAC/DC	KT5M4-E	
	48-60VDC	KT5M7-E	
	24VDC	KT5M8-E	
T6	220-250VAC/DC	KT6M2-E	
	380VAC	KT6M3-E	
	110-125VAC/DC	KT6M4-E	
	48-60VDC	KT6M7-E	
	24VDC	KT6M8-E	

Dry Contact for Remote/Manual Operation

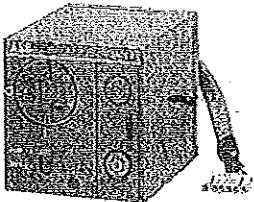
T4-T5-T6		KT6MA	
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KT3M1



KT5M2



KT6M2

(1) Must be ordered separately for field installation.

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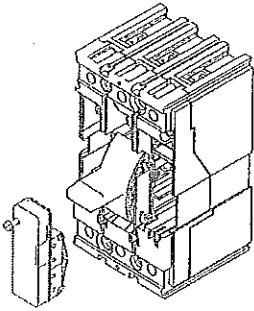
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Accessories

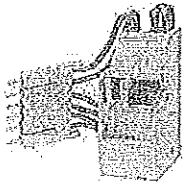
Electrical

T1-T6

Acc.



T1 with K3TAS



KTs3AS

Auxiliary Contacts - AUX ⁽¹⁾

Auxiliary contacts are for indication of the circuit breaker open-closed. Bell alarm contacts (BA) can be used to indicate circuit breaker tripped.

Frame Size		Factory Installation		Field Installation	
		Part Number Suffix	List Price Adder	Part Number	List Price
T1-T2-T3 ⁽²⁾	1 AUX 'C' + 1 BA 'C' 250VAC/DC	A		KT3AS	
	3 AUX 'C' + 1 BA 'C' 250VAC/DC	A3		KT3AS3	
T2 ⁽³⁾	2 AUX 'C' + 1 BA 'C' PR221DS	AE		KT2AS-E	
	1 AUX 'C' + 1 BA 'C' + 1S51 'C' PR221DS	AE2		KT2AS-E2	
Ts3	2 AUX 'C' 250VAC/DC	A		KTs3AS	
	1 AUX 'C' + 1 BA 'C' 250VAC/DC	BA		KTs3BA	
T4-T5-T6	1 AUX 'C' + 1 BA 'C' 250VAC/DC	A		KT6AS	
	2 AUX 'C' 400VAC	A2		KT6AS2	
	3 AUX 'C' + 1 BA 'C' 250VAC/DC	A3		KT6AS3	
	3 AUX 'C' + 1 BA 'C' 24VDC	A3L		KT6AS3L	

Auxiliary Contact Connector (Required for Ts3) ⁽⁴⁾

Ts3	Fixed Plug-In / Drawout	Not required for factory install Not required for factory installed	C-AB KTs3C-ABP

(1) Add suffix to circuit breaker part number. See p.4 for more details.
 (2) Not compatible for T2 with PR221DS trip unit.
 (3) For installation on T2 with PR221DS electronic trip unit.
 (4) Must be ordered separately for field installation.

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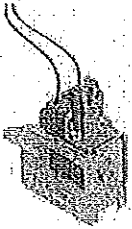
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Accessories

Electrical

T1-T6

Acc.



KT3U2

Undervoltage Release - UVR

Will trip circuit breaker when connected voltage drops to 35-70% of the undervoltage release voltage rating. Will allow circuit breaker to close when voltage is approximately 85% of the rated voltage. T1-T6 mounts in the left hand cavity cannot be used with shunt trip on 2-3P breakers

Frame Size	Voltage	Factory Installation ⁽¹⁾		Field Installation	
		Part Number Suffix	List Price Add-on	Part Number	List Price
T1-T2-T3	480 - 500VAC	U1		KT3U1	
	220-250VAC/DC	U2		KT3U2	
	380 - 440VAC	U3		KT3U3	
	110 - 125VAC/DC	U4		KT3U4	
	60VAC/DC	U5		KT3U5	
	48VAC/DC	U7		KT3U7	
	24 - 30VAC/DC	U8		KT3U8	
	Ts3	480VAC	U1		KTs3U1
240VAC		U2		KTs3U2	
24VAC		U3		KTs3U3	
120VAC		U4		KTs3U4	
250VDC		U5		KTs3U5	
125VDC		U6		KTs3U6	
48VDC		U7		KTs3U7	
24VDC		U8		KTs3U8	
T4-T5-T6	480-500VAC	U1		KT6U1	
	220/250VAC/DC	U2		KT6U2	
	380-440VAC	U3		KT6U3	
	110-125VAC/DC	U4		KT6U4	
	60VAC/DC	U5		KT6U5	
	48VAC/DC	U7		KT6U7	
	24VAC/DC	U8		KT6U8	

Undervoltage Trip Connector (Required for Ts3) ⁽²⁾

Ts3	Fixed Mount Plug-In/Draw-out	Not required for factory installed Not required for factory installed	KTs3C-SU KTs3C-SUP

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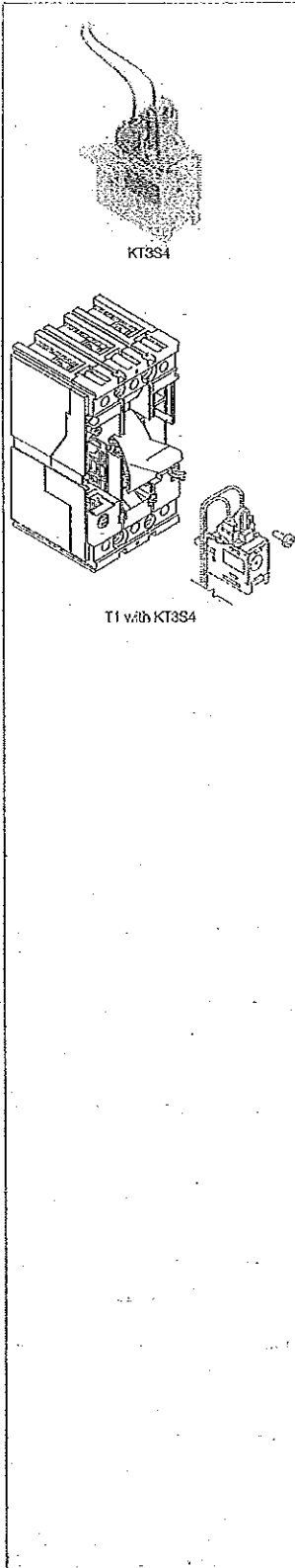
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(1) Add suffix to circuit breaker part number. See p.4 for more details.
 (2) Must be ordered separately for field installation.

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Accessories
Electrical
T1-T6

Acc.



Shunt Trips (Standard)⁽¹⁾

For remote opening of circuit breaker. Guaranteed operation for a voltage of between 75-110% of the rated power supply voltage. T1-T6 mounts in the left hand cavity cannot be used with UVR on 2-3P breakers

Frame Size	Voltage	Factory Installation ⁽²⁾		Field Installation		
		Part Number Suffix	List Price Adder	Part Number	List Price	
T1-T2-T3	480 - 500VAC	S1		KT3S1		
	220-250VAC/DC	S2		KT3S2		
	380 - 440VAC	S3		KT3S3		
	110 - 125VAC/DC	S4		KT3S4		
	48 - 60VAC/DC	S7		KT3S7		
	24 - 30VAC/DC	S8		KT3S8		
	12VDC	S9		KT3S9		
	Ts3	480VAC/250VDC	S1		KT3S1	
		240 VAC	S2		KT3S2	
120VAC/125VDC		S4		KT3S4		
48VDC		S7		KT3S7		
24VAC/VDC		S8		KT3S8		
12VDC		S9		KT3S9		
T4-T5-T6		480-500VAC	S1		KT6S1	
		220/250VAC/DC	S2		KT6S2	
		380-440VAC	S3		KT6S3	
	110-125VAC/DC	S4		KT6S4		
	48-60VAC/DC	S7		KT6S7		
	24VAC/DC	S8		KT6S8		
	12VDC	S9		KT6S9		

Shunt Trips (Permanent Supply)⁽¹⁾

For remote opening of circuit breaker. Guaranteed operation for a voltage of between 75-110% of the rated power supply voltage. These shunt trips have much lower power consumption.

Frame Size	Voltage	Factory Installation ⁽²⁾		Field Installation	
		Part Number Suffix	List Price Adder	Part Number	List Price
Ts3	24VDC	SA		KTs3SP4	
	120VAC	SB		KTs3SP8	
T4-T5-T6	24-30VDC	SP4		KT6SP4	
	110/120VAC	SP8		KT6SP8	

Shunt Trip Connector (Required for Ts3) ⁽²⁾

Frame Size	Mounting	Factory Installation	Field Installation	List Price
Ts3	Fixed Mount	Not required for factory installed	KTs3C-SU	
	Draw-out	Not required for factory installed	KTs3C-SUP	

(1) Add suffix to circuit breaker part number. See p.4 for more details.
(2) Must be ordered separately for field installation.

T8

T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
Part-Numbering System

T8V

Locking Provisions:

A = Keylock	D = A+B
B = Button guard	E = A+C
C = Padlock Provision	X = None

Accessories

X = None	G = A+C
A = Mechanical counter	H = A+D
B = Bell Alarm	J = A+E
C = Bell Alarm w/remote reset 24..30VAC/DC	
D = Bell Alarm w/remote reset 110..130VAC/DC	
E = Bell Alarm w/remote reset 220..240VAC/DC	
F = A+B	

Undervoltage:

0 = None	F = 120..127VAC/DC	Second shunt trip:
A = 24VDC	G = 220..240VAC/DC	L = 24VDC
B = 30VAC/DC	H = 240..250VAC/DC	M = 30VAC/DC
C = 48VAC/DC	J = 380..400VAC	N = 48VAC/DC
D = 60VAC/DC	J = 440 VAC	P = 60VAC/DC
E = 110..120VAC/DC		Q = 110..120VAC/DC
		R = 120..127VAC/DC
		S = 220..240VAC/DC
		T = 240..250VAC/DC
		U = 380..400VAC
		V = 440..480 VAC

Shunt Trip:

0 = none	F = 120..127VAC/DC
A = 24VDC	G = 220..240VAC/DC
B = 30VAC/DC	H = 240..250VAC/DC
C = 48VAC/DC	J = 380..400VAC
D = 60VAC/DC	K = 440VAC
E = 110..120VAC/DC	

Contacts¹:

0 = None		
A = 4 aux contacts D	= UVR De-Energized NC	G = B + E
B = 4 aux. contacts digital (24V)	E = A + D	
C = UVR De-Energized NO	F = A + E	
1 4 Aux. contacts supplied as standard with PR332.		

Spring Charging Motor:

0 = None	C = 100..130VAC/DC
A = 24..30VAC/DC	D = 220..250VAC/DC
B = 48..60VAC/DC	

Closing Coil:

0 = None	C = 48VAC/DC	F = 120..127VAC/DC	J = 380..400VAC
A = 24VDC	D = 60VAC/DC	G = 220..240VAC/DC	K = 440VAC
B = 30VAC/DC	E = 110..120VAC/DC	H = 240..250VAC/DC	

Trip Unit Accessories PR332/P only:

0 = None
B = Voltage measuring module
C = Modbus module

Trip Unit:

C = PR331/P-LSI	E = PR331/P-LSIG	R = PR332/P-LSI
D = Non-Automatic (MCS)	P = PR332/P-LI	S = PR332/P-LSIG

Rating Plug:

D = 1000	F = 1600	H = 2500	0 = Non-Automatic (MCS)
E = 1200	G = 2000	J = 3000	

Frame Amp Rating:

C = 1600 (3P)	E = 2500 (3P)	G = 1600 (4P)	J = 2500 (4P)
D = 2000 (3P)	F = 3000 (3P)	H = 2000(4P)	K = 3000 (4P)

Version:

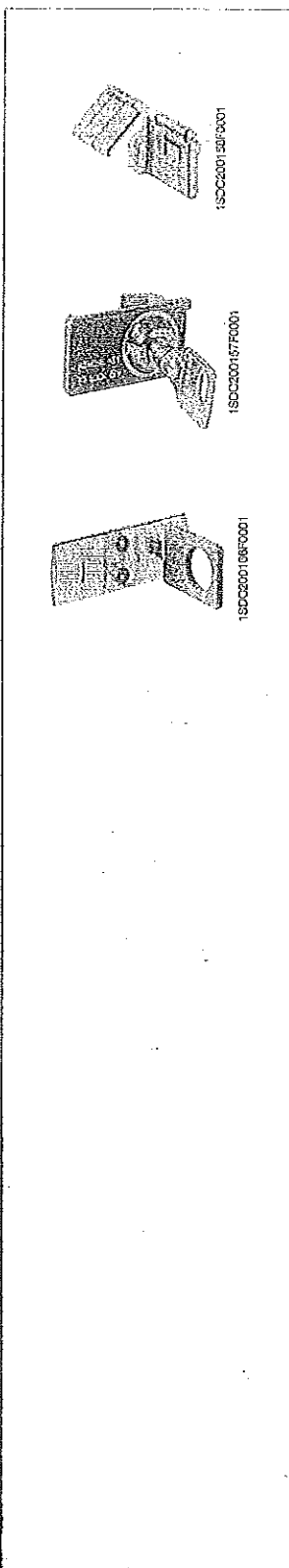
B = UL Fixed 80% rated	Q = UL Fixed 100% Rated	0 = Fixed Non-Automatic (MCS)
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Breaking Capacity V (I&UL)

T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
Accessories

T8



Locking Devices

Frame Size	Description	Part Number	List Price
T8	Key lock open position - different keys	KT8KL-D	
	Key lock open position - same key no. 20005	KT8KL-20005	
	Key lock open position - same key no. 20006	KT8KL-20006	
	Key lock open position - same key no. 20007	KT8KL-20007	
	Key lock open position - same key no. 20008	KT8KL-20008	
	Padlock device in open position	KT8EPD1	
	Padlock device in open position (HD)	KT8EPDHD1	
	Pushbuttons protection	KT8EPG	

Note: KT8EPD1/KT8EPDHD1 are mutually exclusive with KT8EPG

Connection Accessories

Frame Size	Description	Part Number	List Price
T8	Cable terminals 1600A (1/0 - 750MCM) - kit of 3	K8TL	
	Cable terminals 2500A (1/0 - 750MCM) - kit of 3	K8TM	
	Rear T terminal (2500A max.) - kit of 6	KT8VR2500	
	Rear T terminal (2500A max.) - kit of 8	KT8VR2500-4	

Note: K8TL/K8TM requires the installation of KT8PBH-3

Mechanical Accessories

Frame Size	Description	Part Number	List Price
T8	Door flange	KT8FCD	
	IP54 protection cover (NEMA 3S/13)	KT8EDC	
	Separating partition low PB100 3 pole - 2pcs	KT8PBL-3	
	Separating partition low PB100 4 pole - 3pcs	KT8PBL-4	
	Separating partition high PB200 3 pole - 2pcs	KT8PBH-3	
	Separating partition high PB200 4 pole - 2pcs	KT8PBH-4	
	Mechanical operation counter	KT8BMC	

Accessories for Trip Units

Frame Size	Description	Part Number	List Price
T8	Rating plug In=1000A	KT81000RP	
	Rating plug In=1200A	KT81200RP	
	Rating plug In=1600A	KT81600RP	
	Rating plug In=2000A	KT82000RP	
	Rating plug In=2500A	KT82500RP	
	Rating plug In=3000A	KT83000RP	
	PR330/V for PR332/P 3 pole (voltage measurement)	KT8PR330V-3	
	PR330/V for PR332/P 4 pole (voltage measurement)	KT8PR330V-4	
	PR330/D-M for PR332/P (MODBUS RTU communication)	KT8330MOD	
	PR330B - Battery power supply unit	KT8EPR330B	

Current Sensor for External Neutral

Frame Size	Description	Part Number	List Price
T8	Current sensor neutral In=1000-3000A	KT8NCT-3000	

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T8

T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
Accessories



1SDC200131F0001

Shunt Trips (YO) and Closing Coils (YC)

Frame Size	Voltage	YO Part Number	List Price	YC Part Number	List Price
T8	24VDC	KT8ES0		KT8EC0	
	30VAC/DC	KT8ES9		KT8EC9	
	48VAC/DC	KT8ES8		KT8EC8	
	60VAC/DC	KT8ES7		KT8EC7	
	110/120VAC/DC	KT8ES6		KT8EC6	
	120/127VAC/DC	KT8ES5		KT8EC5	
	220/240VAC/DC	KT8ES4		KT8EC4	
	250VAC/DC	KT8ES3		KT8EC3	
	380/400VAC	KT8ES2		KT8EC2	
	440/480VAC	KT8ES1		KT8EC1	

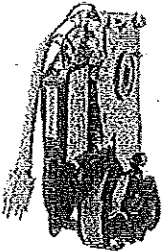


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Undervoltage Release (UVR) or Additional Shunt Trip (YO2)

Frame Size	Voltage	YO Part Number	List Price	YC Part Number	List Price
T8	24VDC	KT8EU0		KT8ES0-2	
	30VAC/DC	KT8EU9		KT8ES9-2	
	48VAC/DC	KT8EU8		KT8ES8-2	
	60VAC/DC	KT8EU7		KT8ES7-2	
	110/120VAC/DC	KT8EU6		KT8ES6-2	
	120/127VAC/DC	KT8EU5		KT8ES5-2	
	220/240VAC/DC	KT8EU4		KT8ES4-2	
	250VAC/DC	KT8EU3		KT8ES3-2	
	380/400VAC	KT8EU2		KT8ES2-2	
	440/480VAC	KT8EU1		KT8ES1-2	

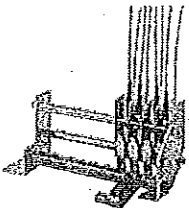
Note: UVR and YO2 are mutually exclusive (only one device can be installed)



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Stored Energy Motor (M)

Frame Size	Voltage	Part Number	List Price
T8	24/30VAC/DC	KT8EM9	
	48/60VAC/DC	KT8EM7	
	100/130VAC/DC	KT8EM5	
	220/250VAC/DC	KT8EM3	



1SDC200145F0001

Signaling Contacts

Frame Size	Voltage	Part Number	List Price
T8	4 aux. cont. open/close PR331	KT8AS4	
	4 aux. cont. open/close PR332	KT8AS4-332	
	4 aux. cont. open/close for PR232-331 (low power <24V)	KT8AS4L	
	4 aux. cont. open/close for PR332 (low power <24V)	KT8AS4L-332	
	BA - bell alarm contact (1 form "c")	KT8ETBA	
	BA + remote reset 24...30VAC/DC	KT8ETBAR9	
	BA + remote reset 110...130VAC/DC	KT8ETBAR5	
	BA + remote reset 220...240VAC/DC	KT8ETBAR4	
	UVR de-energized contact - NG	KT8EUE10	
	UVR de-energized contact - NO	KT8EUE01	

Note: 4 aux. cont. open/close supplied as standard with PR332 trip unit

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T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
100% Rated Electronic (AC Only)

T8

T8-1600A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ16CW	
		PR331/P	LSIG	T8VQ16EW	
		PR332/P	LI	T8VQ16PW	
		PR332/P	LSI	T8VQ16RW	
		PR332/P	LSIG	T8VQ16SW	

T8-2000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ20CW	
		PR331/P	LSIG	T8VQ20EW	
		PR332/P	LI	T8VQ20PW	
		PR332/P	LSI	T8VQ20RW	
		PR332/P	LSIG	T8VQ20SW	

T8-2500A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ25CW	
		PR331/P	LSIG	T8VQ25EW	
		PR332/P	LI	T8VQ25PW	
		PR332/P	LSI	T8VQ25RW	
		PR332/P	LSIG	T8VQ25SW	

Note: vertical terminals only

T8-3000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ30CW	
		PR331/P	LSIG	T8VQ30EW	
		PR332/P	LI	T8VQ30PW	
		PR332/P	LSI	T8VQ30RW	
		PR332/P	LSIG	T8VQ30SW	

Note: vertical terminals only

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T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
100% Rated Electronic (AC Only)

T8

T8-1600A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ16CW	
		PR331/P	LSIG	T8VQ16EW	
		PR332/P	LJ	T8VQ16PW	
		PR332/P	LSI	T8VQ16RW	
		PR332/P	LSIG	T8VQ16SW	

T8-2000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ20CW	
		PR331/P	LSIG	T8VQ20EW	
		PR332/P	LJ	T8VQ20PW	
		PR332/P	LSI	T8VQ20RW	
		PR332/P	LSIG	T8VQ20SW	

T8-2500A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ25CW	
		PR331/P	LSIG	T8VQ25EW	
		PR332/P	LJ	T8VQ25PW	
		PR332/P	LSI	T8VQ25RW	
		PR332/P	LSIG	T8VQ25SW	

Note: vertical terminals only

T8-3000A Frame, 100% Rated Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price
T8VQ	100kA	PR331/P	LSI	T8VQ30CW	
		PR331/P	LSIG	T8VQ30EW	
		PR332/P	LJ	T8VQ30PW	
		PR332/P	LSI	T8VQ30RW	
		PR332/P	LSIG	T8VQ30SW	

Note: vertical terminals only

T8V

T8V

1600A / 2000A / 2500A / 3000A, 600VAC Δ
Electronic (AC Only)

T8-1600A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T8V	100kA	PR331/P	LSI	T8V16CW		T8V16CW-4	
		PR331/P	LSIG	T8V16EW		T8V16EW-4	
		PR332/P	LI	T8V16PW		T8V16PW-4	
		PR332/P	LSI	T8V16RW		T8V16RW-4	
		PR332/P	LSIG	T8V16SW		T8V16SW-4	

T8-2000A Frame, Electronic Trip Unit (AC Only)

Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T8V	100kA	PR331/P	LSI	T8V20CW		T8V20CW-4	
		PR331/P	LSIG	T8V20EW		T8V20EW-4	
		PR332/P	LI	T8V20PW		T8V20PW-4	
		PR332/P	LSI	T8V20RW		T8V20RW-4	
		PR332/P	LSIG	T8V20SW		T8V20SW-4	

T8-2500A Frame, Electronic Trip Unit (AC Only)

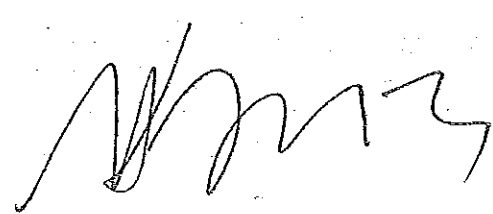
Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T8V	100kA	PR331/P	LSI	T8V25CW		T8V25CW-4	
		PR331/P	LSIG	T8V25EW		T8V25EW-4	
		PR332/P	LI	T8V25PW		T8V25PW-4	
		PR332/P	LSI	T8V25RW		T8V25RW-4	
		PR332/P	LSIG	T8V25SW		T8V25SW-4	

T8-3000A Frame, Electronic Trip Unit (AC Only)¹

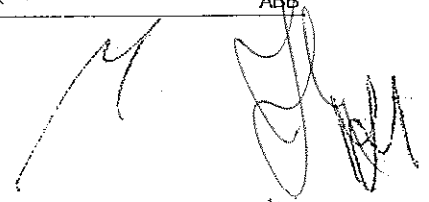
Breaker	IC at 600VAC	Trip Unit	Adjustment	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T8V	100kA	PR331/P	LSI	T8V30CW		T8V30CW-4	
		PR331/P	LSIG	T8V30EW		T8V30EW-4	
		PR332/P	LI	T8V30PW		T8V30PW-4	
		PR332/P	LSI	T8V30RW		T8V30RW-4	
		PR332/P	LSIG	T8V30SW		T8V30SW-4	

T8-3000A Frame, Molded Case Switch (AC Only)¹

Breaker	Rating	Magnetic Override	3-Pole, 600VAC Part Number	List Price	4-Pole, 600VAC Part Number	List Price
T8V-D	2000A	40000A	T8V20DW		T8V20DW-4	
	2500A		T8V25DW		T8V25DW-4	
	3000A (1)		T8V30DW		T8V30DW-4	



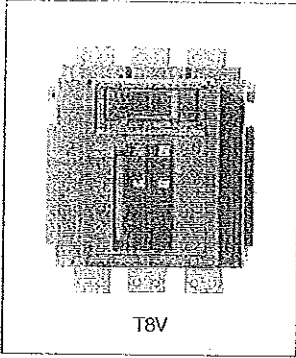

⁽¹⁾ Vertical terminals only



T8V

1600A / 2000A / 2500A / 3000A Insulated Case Circuit Breaker

T8



Dimensions 3P Version: 15.00" H x 16.8" W x 11.2"D
Weight 161 (lbs) 1600A/2000A/2500A
 236 (lbs) 3000A

The Tmax family, conforming to the UL489 and CSA C22.2 No. 5.0 Standards, is enriched with the TmaxT8 size, which allows 3000 A to be reached. Also available in the 1600A, 2000A and 2500A frames, Tmax T8 is equipped with the same electronic trip units as Tmax T7 thereby guaranteeing extremely high performances able to satisfy all installation requirements. Tmax T8 is able to interrupt the following short-circuit currents: 125kA@480VAC and 100kA@600 VAC.

- Available in 3 and 4 pole versions
- Four different frame ratings, 1600, 2000, 2500 & 3000 Amps
- Available 100% rated version up to 3000A
- Installation in vertical position only
- Wide range of CSA/UL field-installable accessories
- Solid state trip unit available in three different versions:
 - PR331/P-LSI
 - PR331/P-LSIG
 - PR332/P-LI (LCD display)
 - PR332/P-LSI (LCD display)
 - PR332/P-LSIG (LCD display)
- The ability to add internal modules for flexible and precise configuration:
 Optional modules includes:
 - Voltage module
 - Signaling module
 - Communications module

UL489 / CSA C22.2 Interrupting Capacity (kA RMS)

Voltage	V
240VAC	125
480VAC	125
600VAC	100

IEC 60947-2 Interrupting Capacity (kA RMS)

Voltage	V
230VAC	130
415VAC	130
440VAC	130
500VAC	100
600VAC	80

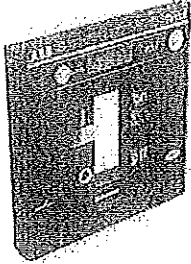
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Accessories
Trip Units

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KT5FDU

Neutral Current Transformers (Required for 4-Wire Ground Fault Systems)

Frame Size		Part Number	List Price
T4	100A	KT4NCT-100	
	150A	KT4NCT-150	
	250A	KT4NCT-250	
T5	300A	KT5NCT-300	
	400A	KT5NCT-400	
	600A	KT5NCT-600	
T6	600A	KT6NCT-600	
	800A	KT6NCT-800	

Note: X4 connector required for T4 - T5 - T6

Connector for PR222DS

T4-T5-T6	Fixed Circuit-Breaker		Plug-In or Draw-Out Circuit-Breaker	
	Part Number	List Price	Part Number	List Price
X3 Connector	KT6CX3		KT6CX3-P	
X4 Connector	KT6CX4		KT6CX4-P	

Front Display Unit

		Used with High Profile Cover	List Price
T4-T5	with PR222DS/P or PR2222DS/PD	KT5FDU	
T6	with PR222DS/P or PR2222DS/PD	KT6FDU	

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Technical Data

Shunt Trips/Undervoltages

Standard Shunt Trip

Voltage	Inrush Power Consumption							
	T1, T2, T3		T3		T4, T5, T6		T7	
	AC (VA)	DC (W)	AC (VA)	DC (W)	AC (VA)	DC (W)	AC (VA)	DC (W)
12 VDC	-	50	-	120	-	150	-	-
24 VAC/DC	-	-	100	100 or 4 (1)	-	-	300	300
24...30 VAC/DC	50	50	-	-	150	150	-	-
30 VAC/DC	-	-	-	-	-	-	300	300
48 VAC/DC	-	-	-	-	-	-	300	300
48...60 VAC/DC	60	60	-	120	-	-	-	-
60 VAC/DC	-	-	-	-	150	150	-	-
100...120 VAC/DC	-	-	100 or 4 (1)	-	-	-	300	300
120...127 VAC/DC	-	-	-	-	-	-	300	300
110...127 VAC 110...125 VDC	50	50	-	120	150	150	-	-
220...240 VAC/DC	-	-	-	-	-	-	300	300
220...240 VAC 220...250 VDC	50	50	100	120	150	150	-	-
240...250 VAC/DC	-	-	-	-	-	-	300	300
380...400 VAC	-	-	-	-	-	-	300	300
380...440 VAC	55	-	-	-	150	-	-	-
415...440 VAC	-	-	-	-	-	-	300	-
480 VAC	-	-	100	-	-	-	-	-
480...525 VAC	55	-	-	-	150	-	-	-
Opening Time (ms)	15	15	≤15	≤15	15	15	20	20

Permanent Supply Shunt Trip

Voltage	T4, T5, T6	
	AC (VA)	DC (W)
24 VAC/DC	4	4
100...120 VAC	4	-

Undervoltage

Voltage	Power Consumption During Permanent Operation							
	T1, T2, T3		T3		T4, T5, T6		T7	
	AC (VA)	DC (W)	AC (VA)	DC (W)	AC (VA)	DC (W)	AC (VA)	DC (W)
24 VAC/DC	-	-	6	3	-	-	3.5	3.5
24...30 VAC/DC	1.5	1.5	-	-	6	3	-	-
30 VAC/DC	-	-	-	-	-	-	3.5	3.5
48 VAC/DC	1	1	6	3	6	3	-	-
60 VAC/DC	1	1	-	-	6	3	-	-
110...120 VAC/DC	-	-	6	-	-	-	3.5	3.5
120...127 VAC/DC	-	-	-	-	-	-	3.5	3.5
110...127 VAC 110...125 VDC	2	2	-	-	6	3	-	-
220...240 VAC/DC	-	-	-	-	-	-	3.5	3.5
220...240 VAC 220...250 VDC	2.5	2.5	-	-	6	3	-	-
220...250 VAC	-	-	6	3	-	-	3.5	3.5
240...250 VAC/DC	-	-	-	-	-	-	3.5	3.5
380...400 VAC	-	-	-	-	-	-	3.5	3.5
380...440 VAC	3	-	-	-	6	-	-	-
415 - 440 VAC	-	-	-	-	-	-	3.5	-
480...525 VAC	4	-	-	-	6	-	-	-
480 VAC	-	-	6	-	-	-	-	-
Opening Time (ms)	15	15	≤18	≤18	≤25	≤25	≤25	≤25

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(1) Shunt trip permanent supply

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Technical Data

Electrical Operators

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Electrical Operator, T1-T3

Rated Voltage		AC	DC
		-	48...60
		110...250	110...250
Operating Voltage		85...110% Un	
Inrush power absorption during operation		1800 (VA)	1000 (W)
Power on stand by		< 100 (mW)	
Time	opening (s)	< 0.1	
	closing (s)	< 0.1	
Minimum control impulse time on opening and closing (ms)		>100	

This unit is permanently supplied on stand by, a control is applied by means of external contact in a low power circuit.
 Contact characteristics: Voltage AC/DC=24V
 Current 50 mA

Electrical Operator, Ts3

Rated Voltage		AC	DC
		-	24
		-	48...60
		120	125
		240	250
		440	
Operating Voltage		85...110 % Un	
Inrush power absorption		500 (VA)	500 (W)
Service power absorption		350 (VA)	350 (W)
Time constant (ms)		18	
Duration	opening (s)	0.1	
	closing (s)	0.1	
Minimum duration of the opening and closing command impulse (ms)		≥150	

Electrical Operator, T4-T5

Voltage		AC	DC
		-	24
		-	48...60
		110...125	110...125
		220-250	220-250
		380	
Operating Voltage		85...110%	
Inrush power consumption		≤ 300VA	≤ 300W
In service power consumption		≤ 150VA	≤ 150W
Duration	opening (s)	1.5	
	closing (s)	< 0.1	
	resetting (s)	3	
Minimum duration of the opening and closing command impulse (ms)		≥100	

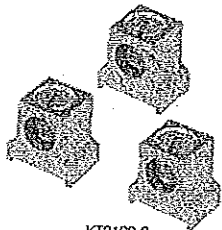
Electrical Operator, T6

Voltage		AC	DC
		-	24
		-	48...60
		110-125	110-125
		220-250	220-250
		380	
Operating Voltage		85...110%	
Inrush power consumption		≤ 400VA	≤ 400W
In service power consumption		≤ 150VA	≤ 150W
Duration	opening (s)	3	
	closing (s)	< 0.1	
	resetting (s)	5	
Minimum duration of the opening and closing command impulse (ms)		≥100	

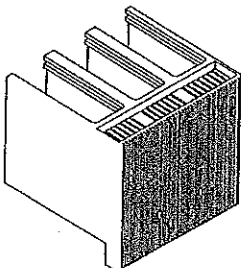
Accessories

Mechanical

T1-T6



KT3100-3



KT1HTC-3



KT4LTC-3

Standard Cable Terminal

Frame	Wire Size	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T1	100A (14 AWG-1/0)	Integral		Integral	
T2	100A (14 AWG-1/0)	KT2100-3		KT2100-4	
T3	100A (14 AWG - 1/0 kcmil) 225A (4 AWG - 350 kcmil)	KT3100-3 KT3225-3		KT3100-4 KT3225-4	
Ts3	100A (14 AWG - 1/0 kcmil) 150A (2 AWG - 4/0 kcmil) 225A (4 AWG - 300 kcmil)	KTs3100-3 KTs3150-3 KTs3225-3			
T4	100A (14 AWG - 1/0 kcmil) 250A (6 AWG - 350 kcmil)	KT4100-3 KT4250-3		KT4100-4 KT4250-4	
T5	300A (250 kcmil - 500 kcmil)	KT5300-3		KT5300-4	
T5 (1)	400A (2x 3/0 - 2x 250 kcmil)	KT5400-3		KT5400-4	
T5	600A (2x 3/0 - 2x 500 kcmil)	KT5600-3			
T6	600A (2x 250 - 2x 500 kcmil)	KT6600-3			
T6 (1)	800A (3x 2/0 - 3x 400 kcmil)	KT6800-3			

Note: for power control tap fugs, please consult your local ABB office

Terminal Cover Seals

Frame	Part Number (3-Pole)	List Price
T1 - T2 - T3 - T4 - T5	KT1SLC-S	

Terminal Covers for Fixed Breakers - Low Profile-Kit (kit of 2)

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T1	KT1LTC-3		KT1LTC-4	
T2	KT2LTC-3		KT2LTC-4	
T3	KT3LTC-3		KT3LTC-4	
Ts3	KTs3LTC-3		KTs3LTC-4	
T4	KT4LTC-3		KT4LTC-4	
T5	KT5LTC-3		KT5LTC-4	
T6	KT6LTC-3		KT6LTC-4	

Terminal Covers for Fixed Breakers - High Profile-Kit (kit of 2)

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
T1	KT1HTC-3		KT1HTC-4	
T2	KT2HTC-3		KT2HTC-4	
T3	KT3HTC-3		KT3HTC-4	
Ts3	KTs3HTC-3		KTs3HTC-4	
T4	KT4HTC-3		KT4HTC-4	
T5	KT5HTC-3		KT5HTC-4	
T6	KT6HTC-3		KT6HTC-4	

Terminal Cover Fixed Part of CB (kit of 2)

Frame	Part Number (3-Pole)	List Price	Part Number (4-Pole)	List Price
Ts3	KTs3TCP-3		KTs3TCP-4	
T4	KT4TCP-3		KT4TCP-4	
T5	KT5TCP-3		KT5TCP-4	

(1) Comes standard with high profile terminal covers.

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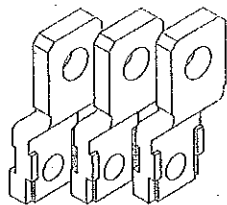
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Accessories

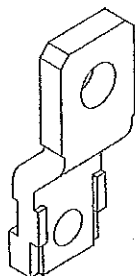
Mechanical

T1-T6

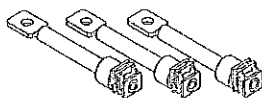
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KT2EF-3



KT4EF



KT2R-3

Phase Barriers - Low Profile 100mm - 3.93 in

Frame	Part Number (set of 4)	List Price	Part Number (set of 6)	List Price
T1-T3	KT3PBL-3		KT3PBL-4	
T4-T5	KT5PBL-3		KT5PBL-4	
T6	KT6PBL-3		KT6PBL-4	

Phase barriers - High Profile 200mm - 7.87 in

Frame	Part Number (set of 4)	List Price	Part Number (set of 6)	List Price
T1-T3	KT3PBH-3		KT3PBH-4	
T4-T5	KT5PBH-3		KT5PBH-4	

Saddle Terminals for Copper Cables - IEC

Frame	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T2	KT2100S-3		KT2100S-4	
T3	KT3225S-3		KT3225S-4	
Ts3	K4TES		K4TES-4	
T4	KT4250S-3		KT4250S-4	
T5	KT5300S-3		KT5300S-4	

Extended Front Terminals - IEC

Frame	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T2	KT2EF-3		KT2EF-4	
T3	KT3EF-3		KT3EF-4	
Ts3	KTs3EF-3		KTs3EF-4	
T4	KT4EF		KT4EF-4	
T5	KT5EF		KT5EF-4	
T6	KT6EF-3		KT6EF-4	

Rear Terminals - IEC

Frame	Part Number (set of 3)	List Price	Part Number (set of 4)	List Price
T2	KT2R-3		KT2R-4	
T3	KT3R-3		KT3R-4	
T4	KT4R-3		KT4R-4	
T5	KT5R-3		KT5R-4	
T6	KT6R-3		KT6R-4	

(1) Includes high profile terminal cover.

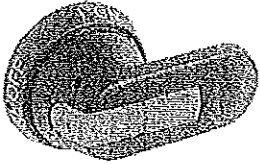
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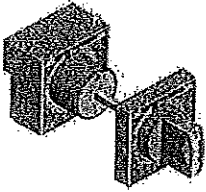
Accessories

Mechanical T1-T6

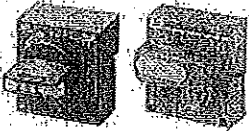
Locking Devices and Handle Operators



OHB65J6



KT5VD-M, KT5VD-S, KT5VD-H



KT5RH

Variable Depth Handle Operators

Frame	NEMA Rating	Mechanism Part Number	List Price	Shaft Part Number	List Price	Handle Part Number	List Price
T1-T2-T3	1, 3R, 12	KT3VD-M		OXF6X430 (16.9")		OHB65J6 OHY65J6	
	4, 4X 1			KT3VD-S (11.8")		OHB80L6 OHY80L6	
Ts3	1, 3R, 12	KTs3VD-M		OXF10X500 (19.7")		OHB125J10X	
	4, 4X 1			KTs3VD-S (20")		OHB125L10	
T4-T5	1, 3R, 12	KT5VD-M		OXF10X500 (19.7")		OHB125J10X	
	4, 4X 1			KT5VD-S (19.7")		OHB125L10	
T6	1, 3R, 12	KT6VD-M		OXF10X500 (19.7")		OHB125J10X	
	4, 4X 1			KT6VD-S (19.7")		OHB125L10	

Note: Discount schedule DS-H applies for part-numbers starting with OH and OX

Direct Mount Rotary

Frame	Breaker Mounting	Part Number	List Price
T1-T2-T3	Fixed, Plug-In	KT3RH	
Ts3	Fixed, Plug-In	KTs3RH	
Ts3	Draw-Out	KTs3RH-W	
T4-T5	Fixed, Plug-In	KT5RH	
T4-T5	Draw-Out	KT5RH-W	
T6	Fixed, Plug-In	KT6RH	
T6	Draw-Out	KT6RH-W	

Early Make Contact

Frame	Part Number	List Price
T2-T3	KT3EM	
T4-T5	KT5EM	
T6	KT6EM	

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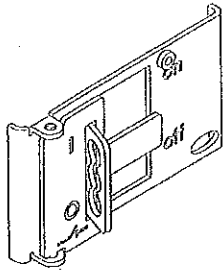
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Accessories

Mechanical T1-T6
Locking Devices and Handle Operators

Acc.



KT3LD



KT6KL-D

Padlock Locking Device

Frame	Style	Locking Position	Breaker Mounting	Part Number	List Price
T1-T2-T3	PLL	OPEN/CLOSED OPEN	Fixed	KT3LD KT3LDO	
Ts3	FLD	OPEN	Fixed, Plug-In Draw-Out	KTs3FLD KTs3LDW	
T4-T5	FLD	OPEN	Fixed, Plug-In Draw-out	KT6FLD KT6FLDW	
T6	FLD	OPEN	Fixed, Plug-In Draw-out	KT6FLD KT6FLDW	

Keylocks for the Rotary Handle Mechanism

Frame	Style	Locking Position	Keys	Part Number	List Price
T1-T2-T3	RHL	OPEN/CLOSED	Different	KT3RHL3	
Ts3	-	OPEN	Different Same	KTs3KLFD KTs3KLFD-2	
T4-T5	KLF-D KLF-S KLF-S KLF-S KLF-S	OPEN OPEN OPEN OPEN OPEN	Different Same key # 20005 Same key # 20006 Same key # 20007 Same key # 20008	KT5KL-D KT5KL-20005 KT5KL-20006 KT5KL-20007 KT5KL-20008	
T6	KLF-D KLF-S KLF-S KLF-S KLF-S	OPEN OPEN OPEN OPEN OPEN	Different Same key # 20005 Same key # 20006 Same key # 20007 Same key # 20008	KT6KLFD KT6KLF-S-20005 KT6KLF-S-20006 KT6KLF-S-20007 KT6KLF-S-20008	

Keylocks for the Motor Operator

Frame	Style	Locking Position	Keys	Part Number	List Price
T4-T5	MOL-D MOL-S MOL-S MOL-S MOL-S	OPEN OPEN OPEN OPEN OPEN	Different Same key # 20005 Same key # 20006 Same key # 20007 Same key # 20008	KT5KL-MO-D KT5KL-MO-20005 KT5KL-MO-20006 KT5KL-MO-20007 KT5KL-MO-20008	
T6	MOL-D MOL-S MOL-S MOL-S MOL-S	OPEN OPEN OPEN OPEN OPEN	Different Same key # 20005 Same key # 20006 Same key # 20007 Same key # 20008	KT6KL-MO-D KT6KL-MO-20005 KT6KL-MO-20006 KT6KL-MO-20007 KT6KL-MO-20008	

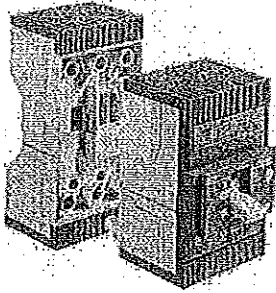
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Acc.

Accessories Mechanical T1-T6



KT2PFF + KT2PMK (on back of breaker) + breaker



KT4PMK (on back of breaker)



KT4PFVR

Plug-in Kits ⁽¹⁾

Frame	Part Number Adaptor/Moving Part	List Price	Part Number Fixed Part	List Price
T2 - 3 pole with front terminals	KT2PMK		KT2PFF	
T2 - 4 pole with front terminals	KT2PMK-4		KT2PFF-4	
T3 - 3 pole with front terminals	KT3PMK		KT3PFF	
T3 - 4 pole with front terminals	KT3PMK-4		KT3PFF-4	
Ts3 - 3 pole with extended front terminals			KTs3PFF	
Ts3 - 3 pole with rear terminals	KTs3PMK		KTs3PFR	
Ts3 - 4 pole with extended front terminals			KTs3PFF-4	
Ts3 - 4 pole with rear terminals	KTs3PMK-4		KTs3PFR-4	
T4 - 3 pole with extended front terminals			KT4PFF	
T4 - 3 pole with rear horizontal terminals	KT4PMK		KT4PFR	
T4 - 3 pole with rear vertical terminals			KT4PVR	
T4 - 3 pole with extended front terminals			KT4PFF-4	
T4 - 3 pole with rear horizontal terminals	KT4PMK-4		KT4PFR-4	
T4 - 3 pole with rear vertical terminals			KT4PVR-4	
T5 400A - 3 pole with extended front terminals			KT5PFF	
T5 400A - 3 pole with rear horizontal terminals	KT5PMK		KT5PFR	
T5 400A - 3 pole with rear vertical terminals			KT5PVR	
T5 400A - 4 pole with extended front terminals			KT5PFF-4	
T5 400A - 4 pole with rear horizontal terminals	KT5PMK-4		KT5PFR-4	
T5 400A - 4 pole with rear vertical terminals			KT5PVR-4	
T5 600A - 3 pole with extended front terminals			KT5PFF-6	
T5 600A - 3 pole with rear horizontal terminals	KT5PMK6		KT5PFR6	
T5 600A - 3 pole with rear vertical terminals			KT5PVR6	
T5 600A - 4 pole with extended front terminals			KT5PFF-6-4	
T5 600A - 4 pole with rear horizontal terminals	KT5PMK6-4		KT5PFR6-4	
T5 600A - 4 pole with rear vertical terminals			KT5PVR6-4	

Plug Connectors, T2-T3 ⁽¹⁾

Required when adding accessories to plug-in breakers

Plug Connector	Part Number	List Price
Shunt trip or UVR	KT3PC-3	
1 form C plus 1 BA	KT3PC-6	
3 form C plus 1 BA	KT3PC-12	

Adaptors, T4-T5-T6 ⁽¹⁾

Required when adding accessories to plug-in or drawout breakers

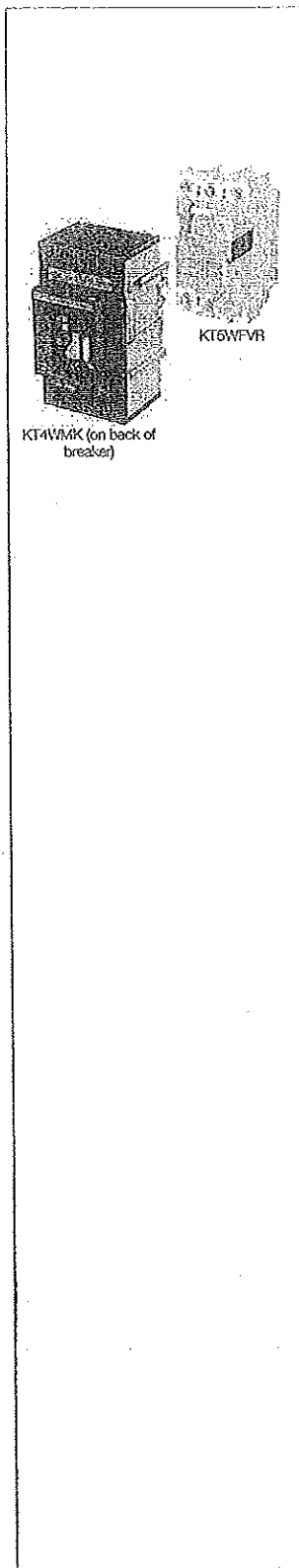
Adaptors	Part Number	List Price
1 form C plus 1 BA	KT6ADP-6	
Shunt trip/UVR	KT6ADP-5	
Stored energy operator	KT6ADP-10	
Stored energy operator plus shunt trip/UVR	KT6ADP-10	
3 form C plus 1 BA	KT6ADP-12	

(1) Plug connectors (T2-T3), adaptors (T4-T5-T6), required when adding accessories to plug-in breakers.

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Accessories Mechanical T1-T6

Acc.



Draw-Out Kits

Item	Part Number Adaptor Moving Part	List Price	Part Number Fixed Part	List Price
TS3 - 3 pole with front terminals	KTs3WMK		KTs3WFF	
TS3 - 3 pole with front cable terminals			KTs3WFC	
TS3 - 3 pole with rear terminals			KTs3WFR	
TS3 - 4 pole with front terminals	KTs3WMK-4		KTs3WFF-4	
TS3 - 4 pole with front cable terminals			KTs3WFC-4	
TS3 - 4 pole with rear terminals			KTs3WFR-4	
T4 - 3 pole with extended front terminals	KT4WMK		KT4WFEF	
T4 - 3 pole with rear horizontal terminals			KT4WFHR	
T4 - 3 pole with rear vertical terminals			KT4WFVR	
T4 - 4 pole with extended front terminals	KT4WMK-4		KT4WFEF-4	
T4 - 4 pole with rear horizontal terminals			KT4WFHR-4	
T4 - 4 pole with rear vertical terminals			KT4WFVR-4	
T5 - 400A 3 pole with extended front terminals	KT5WMK		KT5WFEF	
T5 - 400A 3 pole with rear horizontal terminals			KT5WFHR	
T5 - 400A 3 pole with rear vertical terminals			KT5WFVR	
T5 - 400A 4 pole with front extended terminals	KT5WMK-4		KT5WFEF-4	
T5 - 400A 4 pole with rear horizontal terminals			KT5WFHR-4	
T5 - 400A 4 pole with rear vertical terminals			KT5WFVR-4	
T5 - 600A 3 pole with extended front terminals	KT5WMK6		KT5WFEF6	
T5 - 600A 3 pole with rear horizontal terminals			KT5WFHR6	
T5 - 600A 3 pole with rear vertical terminals			KT5WFVR6	
T5 - 600A 4 pole with extended front terminals	KT5WMK6-4		KT5WFEF6-4	
T5 - 600A 4 pole with rear horizontal terminals			KT5WFHR6-4	
T5 - 600A 4 pole with rear vertical terminals			KT5WFVR6-4	
T6 - 800A 3 pole with extended front terminals	KT6WMK		KT6WFEF	
T6 - 800A 3 pole with rear horizontal terminals			KT6WFHR	
T6 - 800A 3 pole with rear vertical terminals			KT6WFVR	
T6 - 800A 4 pole with extended front terminals	KT6WMK-4		KT6WFEF-4	
T6 - 800A 4 pole with rear horizontal terminals			KT6WFHR-4	
T6 - 800A 4 pole with rear vertical terminals			KT6WFVR-4	

Adaptors — T4-T5-T6 (1)

Required when adding accessories to plug-in or drawout breakers

Adaptors	Part Number	List Price
1 form C plus 1 BA	KT6ADP-6	
Shunt trip/UVR	KT6ADP-5	
Stored energy operator	KT6ADP-10	
Stored energy operator plus shunt trip/UVR	KT6ADP-10	
3 form C plus 1BA	KT6ADP-12	

(1) Adaptors (T4-T5-T6), required when adding accessories to draw-out breakers.

Acc.

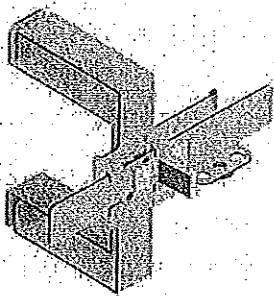
Accessories Mechanical T1-T6

DIN Rail Adapters

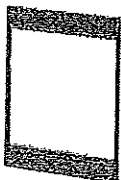
Item	Part Number	List Price
T1/T2 (mounts on 35 mm DIN rail 15mm high)	KT2DIN KT3DIN KTs3DMB	
T3 (mounts on 35mm DIN rail 15mm high)		
Ts3 (mounts on 75 mm DIN rail)		

Mechanical Interlocks

Item	Part Number	List Price
T1-T2-T3 Sliding bar interlock-front mounted (2 Breakers)	KT3MIF2 KT3MIF3	
Sliding bar interlock-front mounted (3 Breakers)		
T3 Rear Interlock-horizontal	KT3MI-H KT3MI-V	
Rear Interlock-vertical		
Ts3 Horizontal	KTs3MI-H KTs3MI-V	
Vertical		
T4-T5 (1) Interlock frame	KT5MI-H KT5MI-V	
Mechanical Interlock frame-horizontal		
Mechanical Interlock frame-vertical	KT5MIP-A KT5MIP-B KT5MIP-C KT5MIP-D KT5MIP-E KT5MIP-F	
Plate type		
A T4 (F-P-W) T4 (F-P-W)		
B T4 (F-P-W) T5 400 (F-P-W) OR T5 600 (F)		
C T4 (F-P-W) T5 600 (P-W)		
D T6 (F-P-W) T5 400 (F-P-W) OR 630 (F)		
E T5 (F-P-W) T5 600 (P-W)		
F T5v (F-P-W) T5 600 (P-W)		
T6 Horizontal	KT6MI-H KT6MI-V	
Vertical		
Flange	KT6FCD KT5FCD KT6FCD	
T1-T2-T3		
T4-T5		
T6		



KT3MIF2



KT5FCD

(1) T4-T5 Complete assembly consists of one interlock frame and one plate.

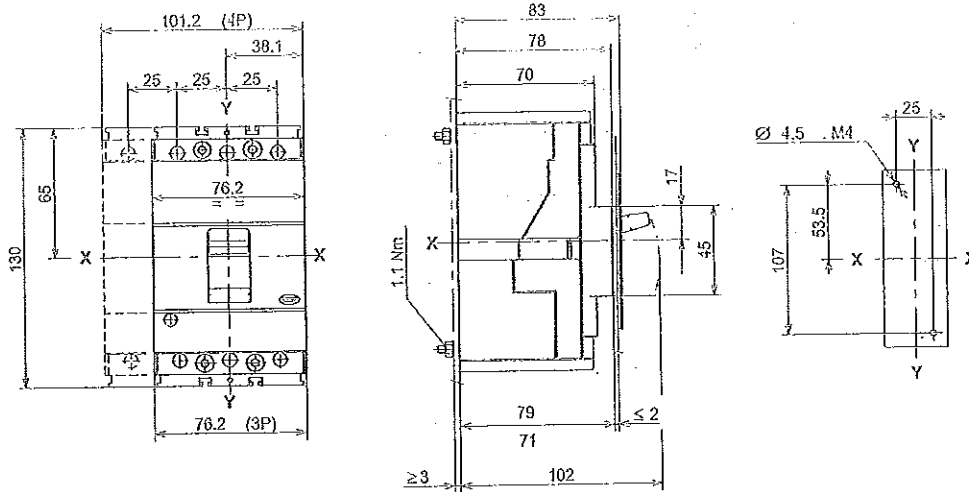
Handwritten signature and initials

Handwritten initials

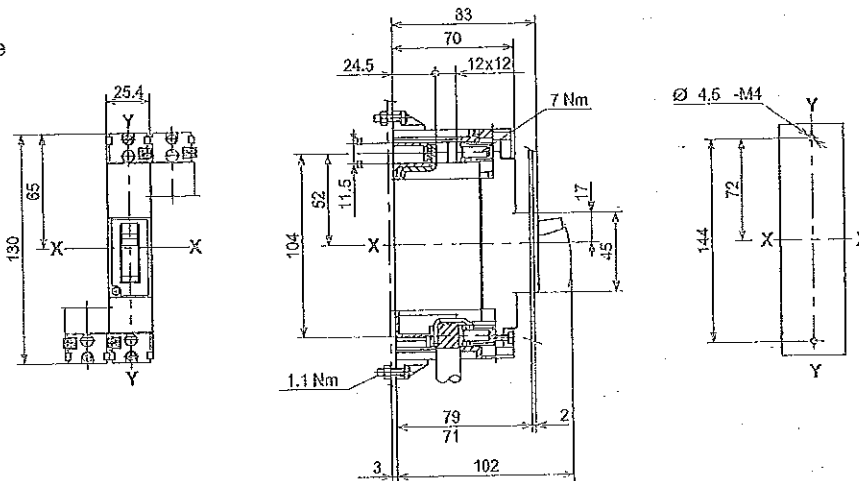
Approximate Dimensions T1 & T2

Dim.

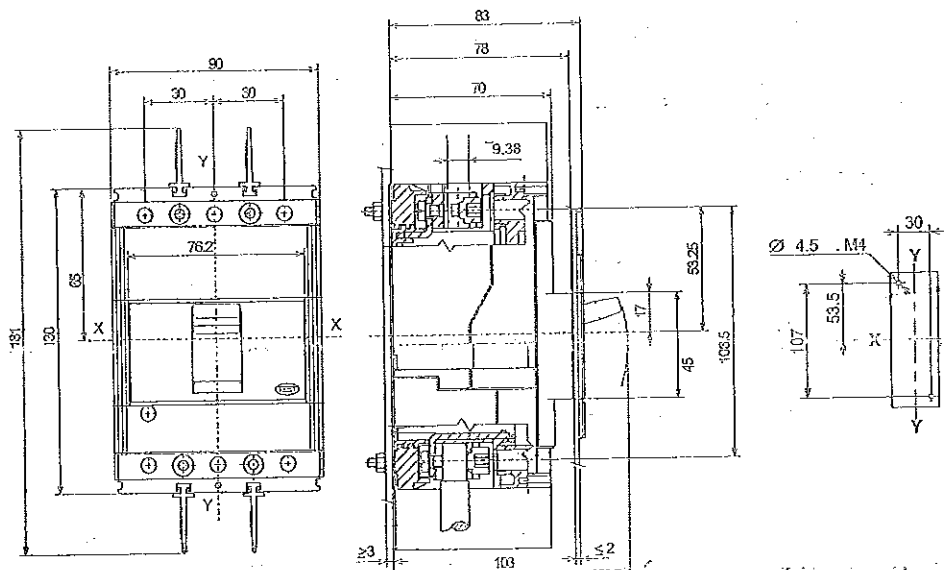
T1 — 3-Pole



T1 — Single Pole



T2 — 3 Pole

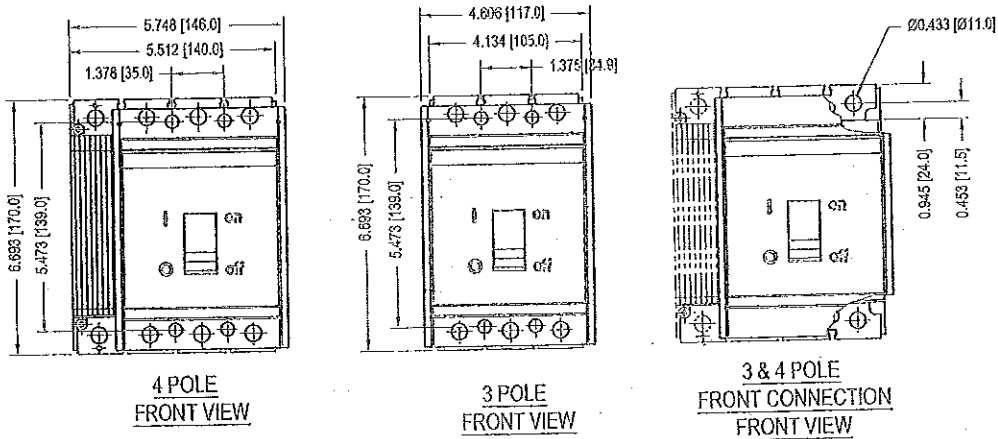
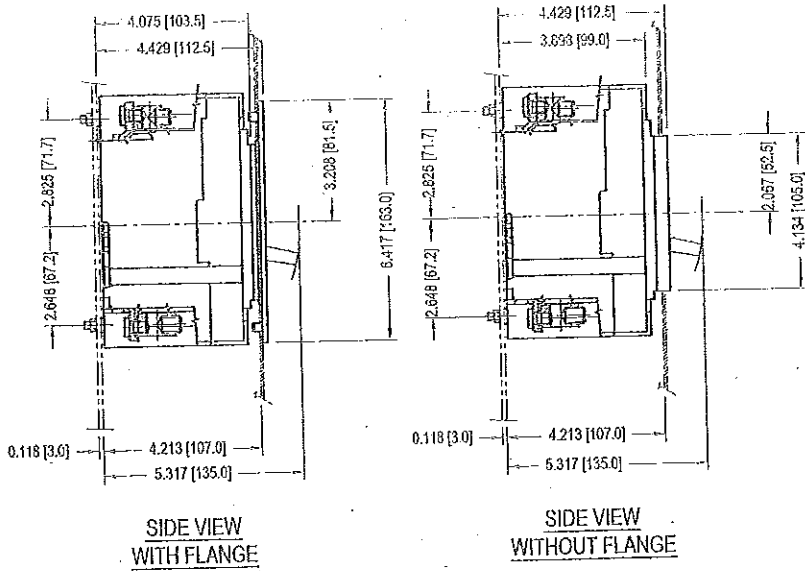


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Approximate Dimensions
Ts3

Dim.

Ts3 — 3 & 4 Pole



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Dim.

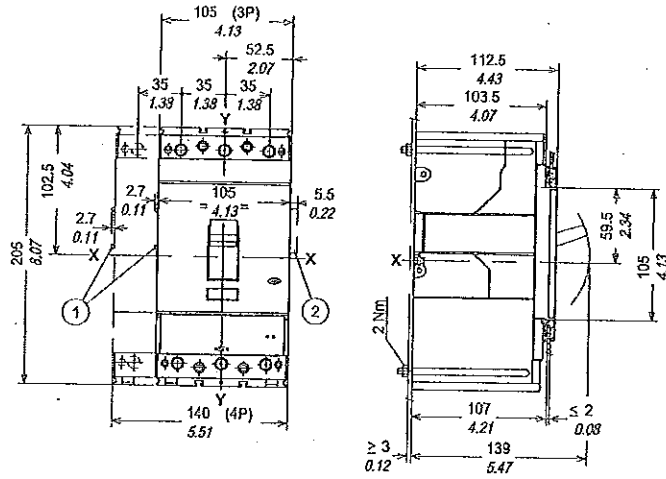
Approximate Dimensions

T4

T4 — 3 & 4 Pole

Caption

- ① Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC221-222)
- ② Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)



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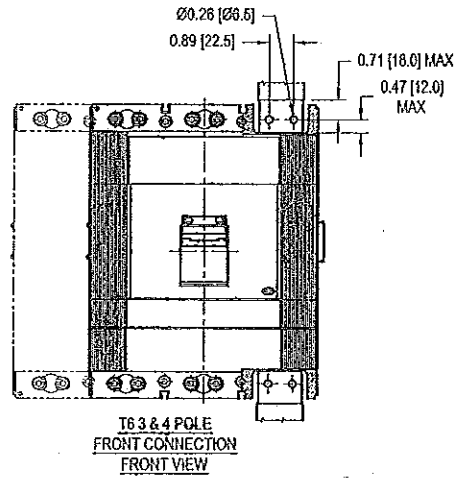
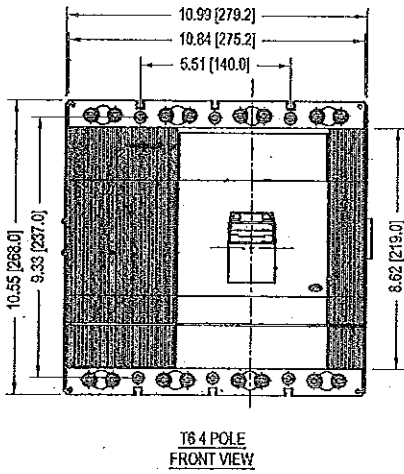
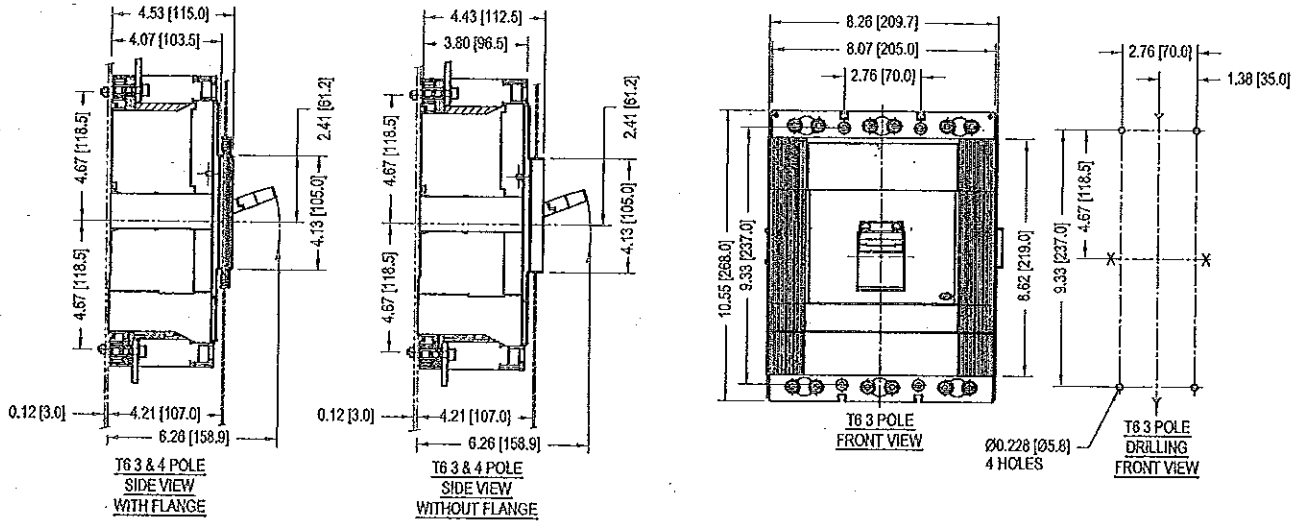
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Dim.

Approximate Dimensions

T6

T6 -- 3 & 4 Pole

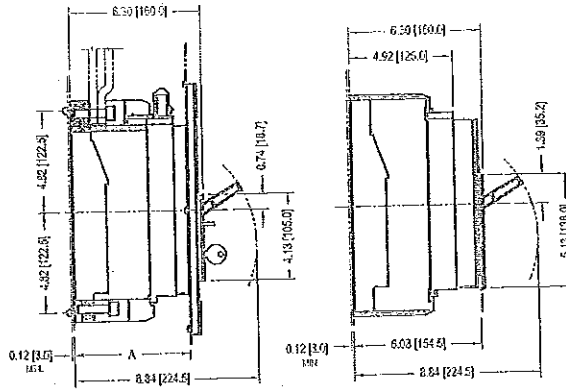


Approximate Dimensions

T7

Dim.

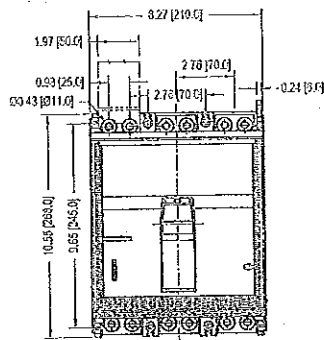
T7 - 3 & 4 Pole



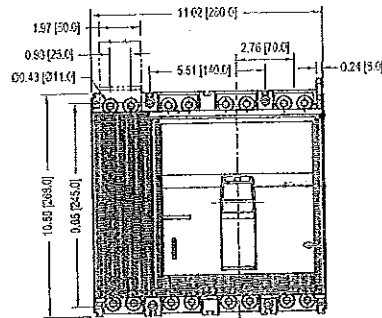
	WITH FLANGE	WITHOUT FLANGE
A	4.92 [125.0] - 5.55 [141.0]	5.79 [147.0]

T7 3 & 4 POLE
SIDE VIEW
WITH FLANGE

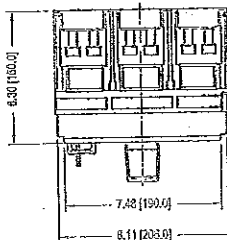
T7 3 & 4 POLE
SIDE VIEW
WITH REDUCED FLANGE



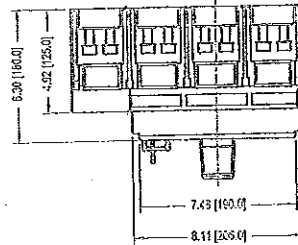
T7 3 POLE
FRONT VIEW



T7 4 POLE
FRONT VIEW



T7 3 POLE
TOP VIEW



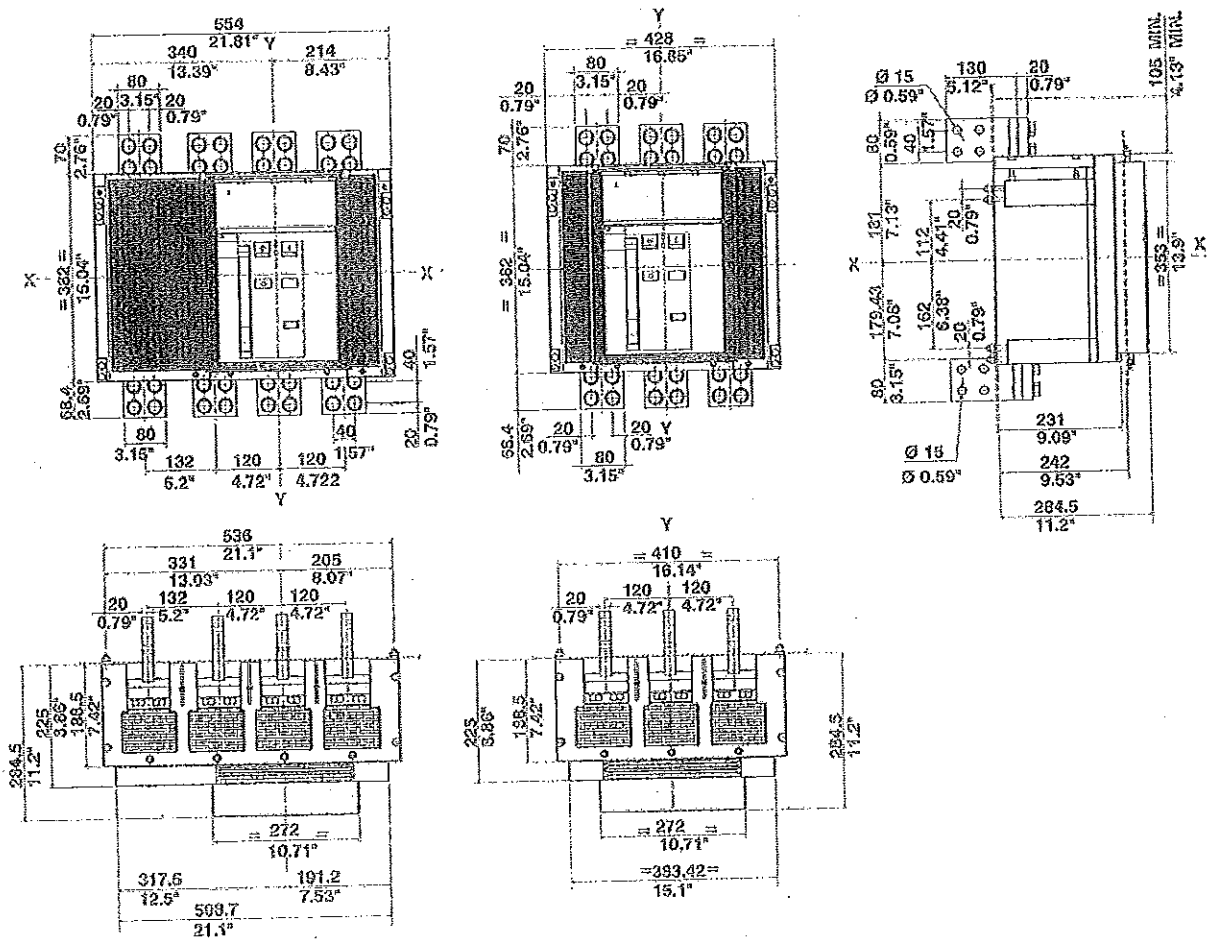
T7 4 POLE
TOP VIEW

Approximate Dimensions
T8

Dim.

Fixed circuit breaker - 1600/2000/2500 A

Rear vertical terminals - V1



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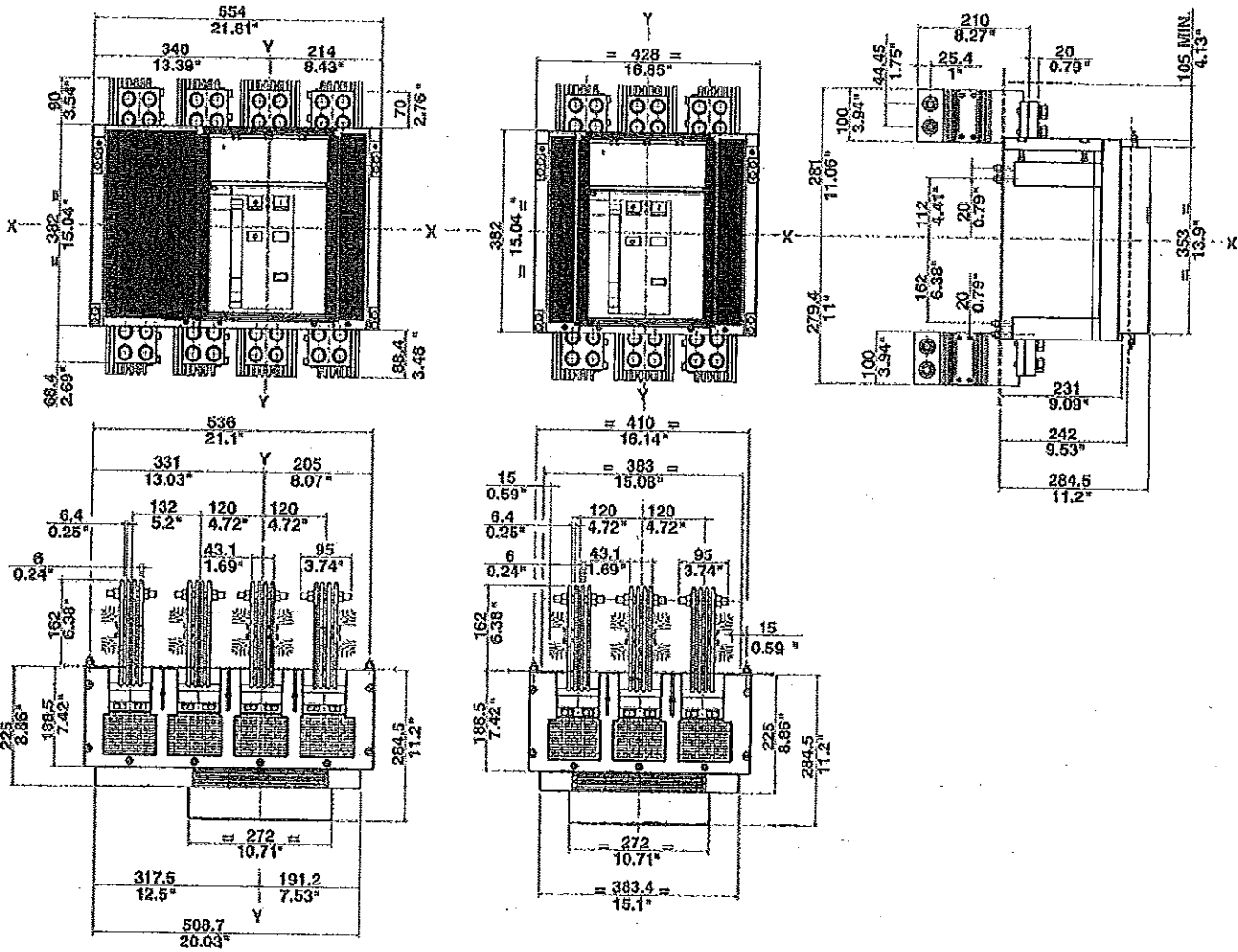
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Dim.

Approximate Dimensions T8

Fixed circuit breaker - 3000 A

Rear vertical terminals - VR



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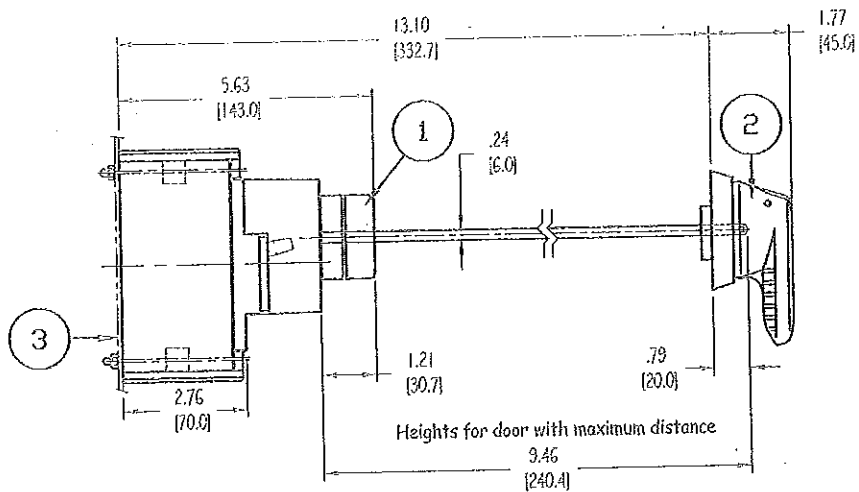
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Approximate Dimensions
Variable Depth Mechanism with OHB Handle
T1 - T3

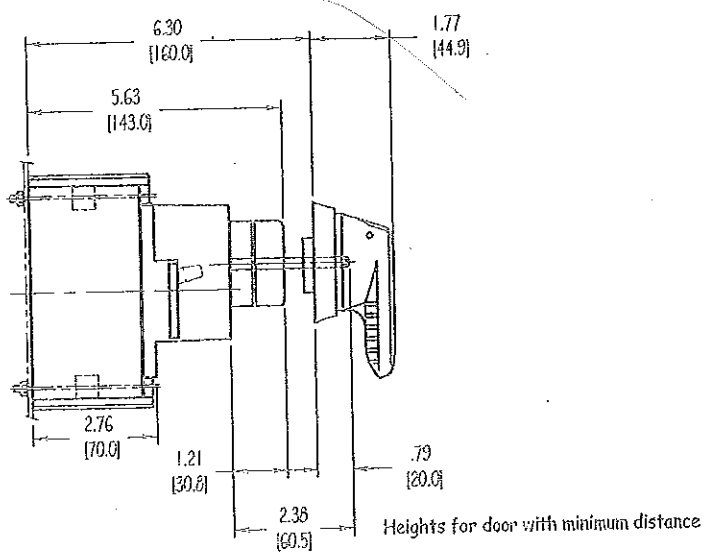
Dim.

Pistol handle operating mechanism on the compartment door



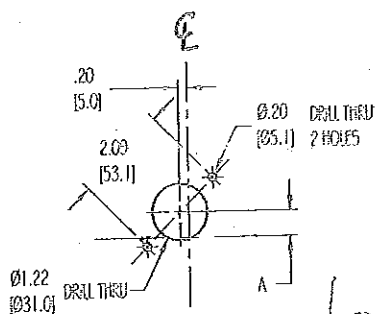
Caption

- ① Transmission unit
- ② Pistol handle operating mechanism on the compartment door
- ③ Insulating plate



Drilling template of the compartment door

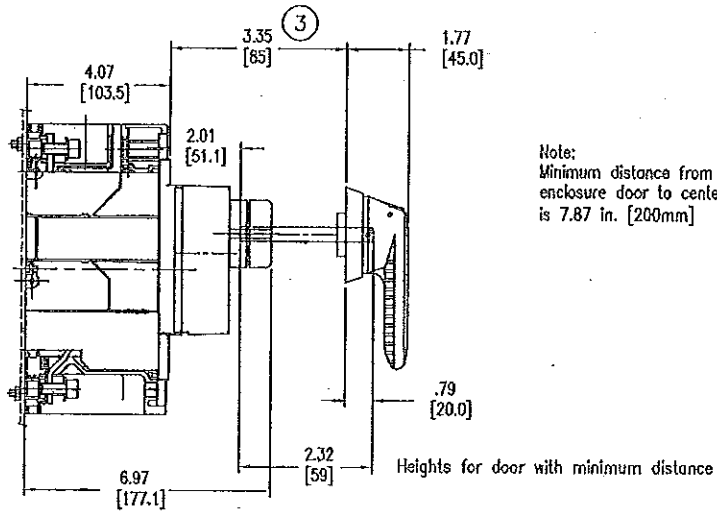
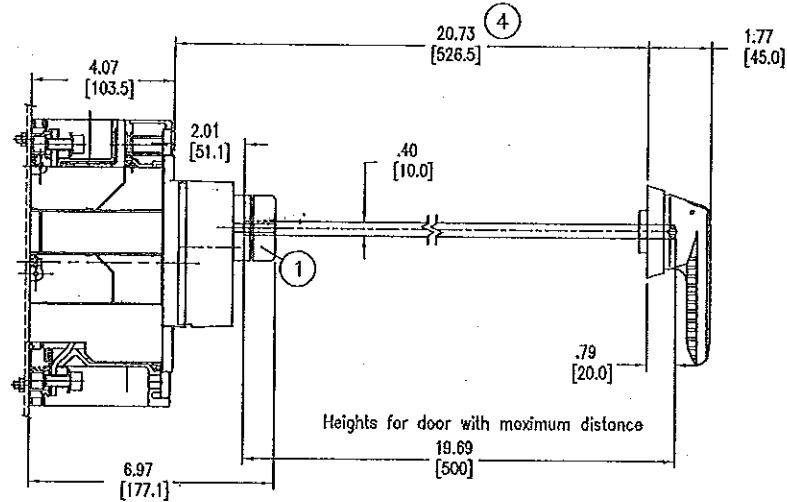
A	
T1 - T2	T3
0.55	0.37
(13.97)	(9.4)



Approximate Dimensions
Variable Depth Mechanism with OHB Handle
T4 - T5

Dim.

Pistol handle operating mechanism on the compartment door

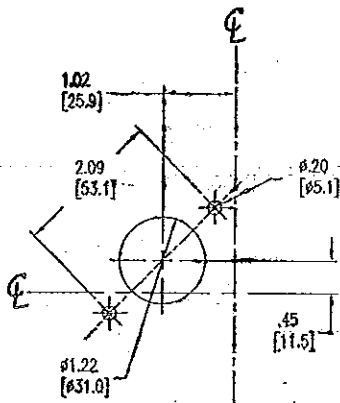


Note:
 Minimum distance from hinge of enclosure door to center of shaft is 7.87 in. [200mm]

Caption

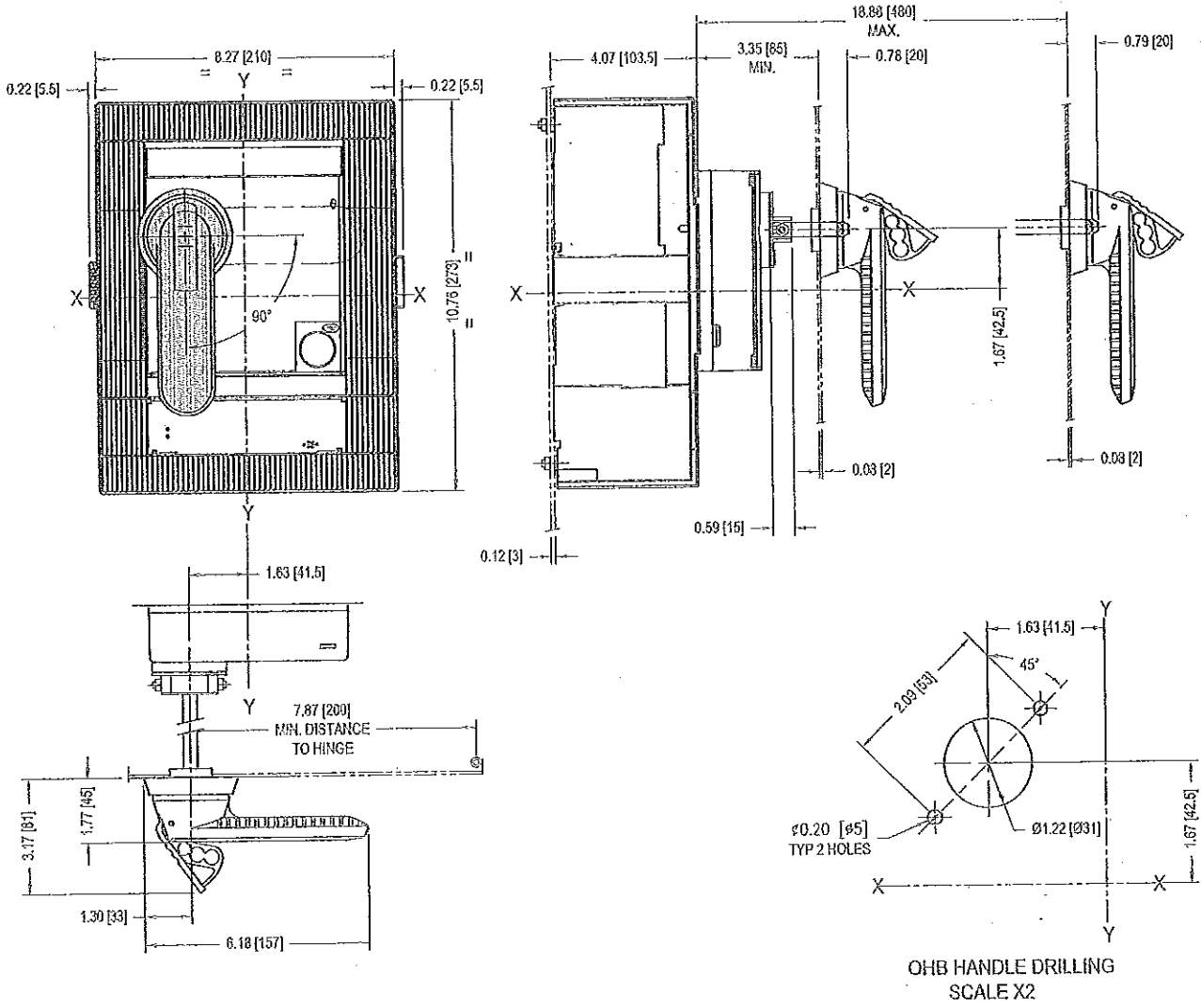
- ① Transmission unit
- ② Pistol handle operating mechanism on the compartment door
- ③ Minimum distance from the front door with accessory
- ④ Maximum distance from the front door with accessory

Drilling template of the compartment door



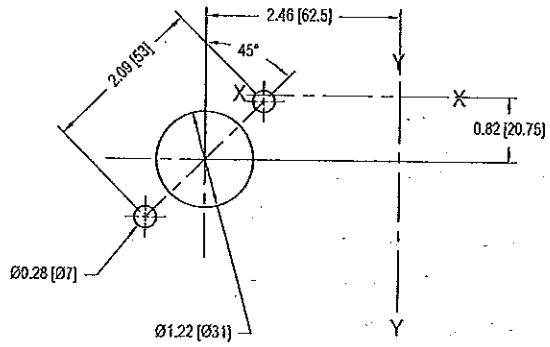
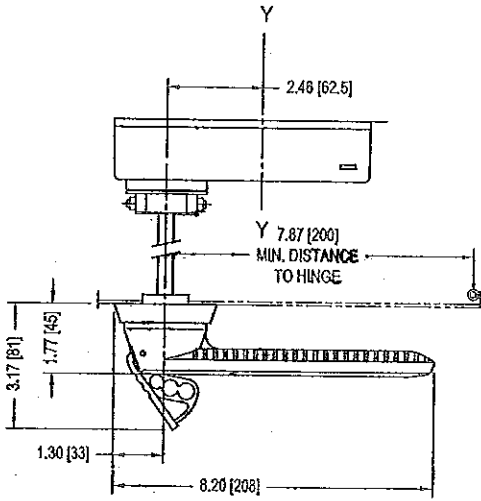
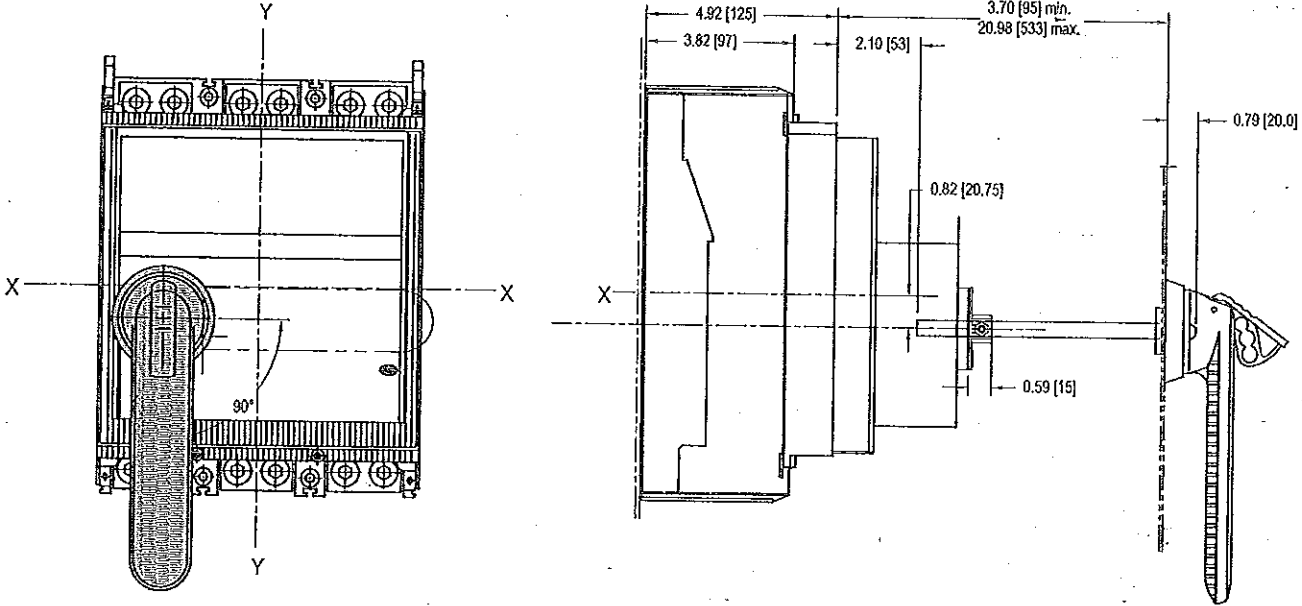
Approximate Dimensions
Variable Depth Mechanism
T6

Dim.



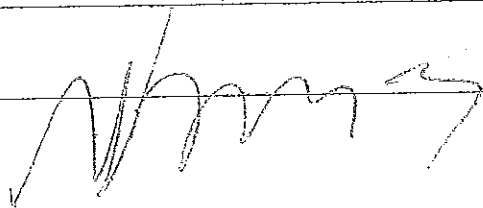
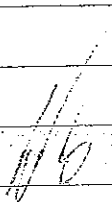
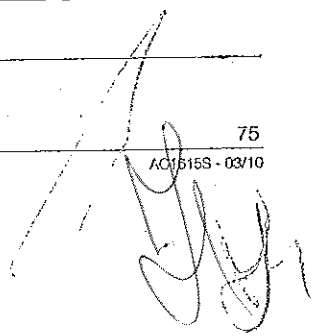
Approximate Dimensions
Variable Depth Mechanism
T7

Dim.



OHV HANDLE DRILLING
SCALE X2

Notes

A large, stylized handwritten signature in black ink, consisting of several loops and a long horizontal stroke.A handwritten mark or signature in black ink, appearing as a vertical stroke with a small loop at the top.A large, stylized handwritten signature in black ink, similar in style to the one on the left, with multiple loops and a long horizontal stroke.

Notes

[Handwritten signatures and initials]

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New revision

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A large, stylized handwritten signature in black ink, appearing to be 'Whm 3'.

Power and productivity
for a better world™



A large, stylized handwritten signature in black ink, appearing to be 'Whm 3'.

Contact us

ABB

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New revision
(September 2011)
Subject to modification.



Catalogue No. AC1615S (1SDCC210001C020)

[Handwritten signature]

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Техническо описание и чертежи с нанесени на тях размери

Техническо описание и чертежи с нанесени на тях размери



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ПРИЛОЖЕНИЕ 9.4.2

Техническо описание и чертежи с нанесени на тях размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

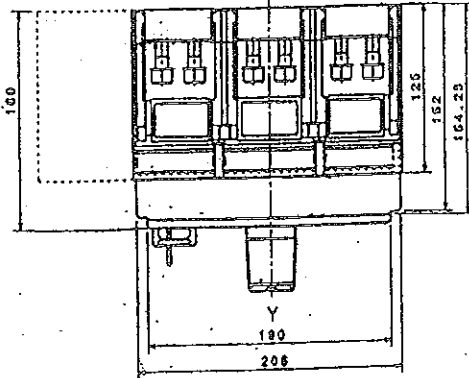
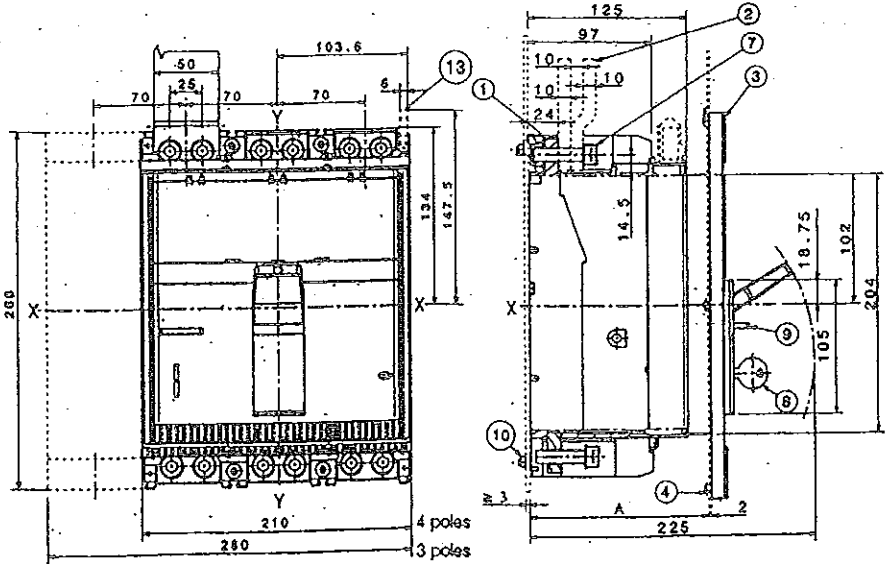
Overall dimensions

Tmax T7

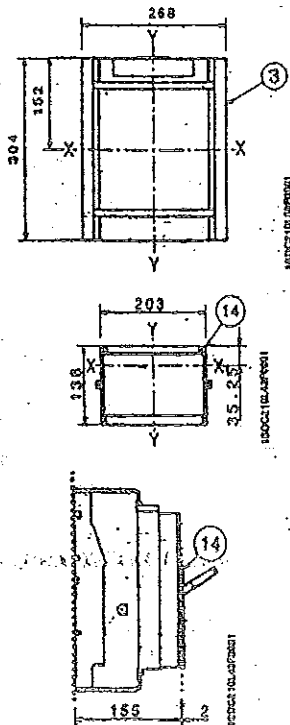
Fixed circuit-breaker Front - F

Caption

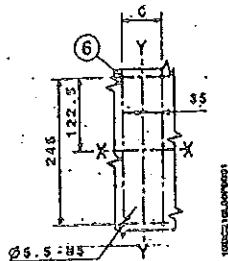
- ① Front terminals for flat connection
- ② Busbars
- ③ Flange for the compartment door
- ④ Flange fixing screws
- ⑥ Drilling template for fixing onto support sheet
- ⑦ Tightening torque: 18 Nm
- ⑧ Key lock (optional)
- ⑨ Padlock (optional)
- ⑩ Tightening torque: 2.5 Nm
- ⑪ Sheet drilling for compartment door with flange
- ⑫ Sheet drilling for compartment door for front 206 x 204
- ⑬ Terminal for auxiliary contacts
- ⑭ Reduce flange for the compartment door (optional)
- ⑮ Sheet drilling for compartment door with reduced flange
- ⑯ Sheet drilling for compartment door for front 190 x 105



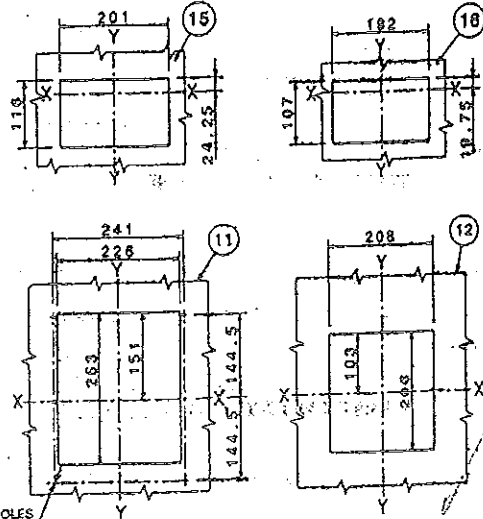
Flange for the compartment door (supplied as standard)



Drilling templates for support sheet



Drilling templates of the compartment door



Handwritten signature

Handwritten signature



Management System
ISO 14001:2004
OHSAS 18001:2007
www.tuev.com
ID: 3125028055



Management System
ISO 14001:2004
www.tuev.com
ID: 3125028055

ПРИЛОЖЕНИЕ 9.4.3

ЕО декларация за съответствие

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY



No CEImax 074R0.07

Il sottoscritto, rappresentante il seguente costruttore
The undersigned, representing the following manufacturer

costruttore: <i>manufacturer:</i>	ABB SACE SPA
indirizzo: <i>address:</i>	via Baioni 35 I 24123 Bergamo

dichiara qui di seguito che il prodotto:
herewith declares that the product

Identificazione del prodotto: <i>product identification:</i>	Tmax T7H 1250 e relativi accessori <i>and relevant accessories</i>
--	--

risulta in conformità a quanto previsto dalla(e) seguente(i) direttiva(e) comunitaria(e)
is in conformity with the provisions of the following EC directive(s)

riferimento n.ro <i>reference nr.</i>	titolo <i>title</i>
2006/95/CE (che sostituisce 73/23/CEE) <i>(which replaces 73/23/CEE)</i>	Direttiva Bassa Tensione <i>Low voltage directive</i>
89/336	Direttiva Compatibilità Elettromagnetica <i>Electromagnetic Compatibility Directive</i>

e che sono state applicate tutte le norme e/o specifiche tecniche indicate sul retro.
and that the standards and/or technical specifications referenced overleaf have been applied

Ultime due cifre dell'anno in cui è stata affissa la marcatura CE: 06

Last two digits of the years in which the CE marking was affixed

Bergamo li 17.01.07

(firma)

Giovanni Frassinetti R&D Manager - Low Voltage Breakers

(nome e funzione della persona incaricata di firmare per conto del costruttore o suo rappresentante)

(name and function of the signatory empowered to bind the manufacturer or his authorized representative)

DICHIARAZIONE DI CONFORMITA' DECLARATION OF CONFORMITY



No CEITmax 074R0.07

Riferimento relativo alle norme e/o specifiche tecniche, o parti di esse, utilizzate per la presente dichiarazione di conformità:

References of standards and/or technical specifications applied for this declaration of conformity, or parts thereof:

- norme armonizzate:
- harmonized standards:

n.ro nr	edizione issue	titolo title	parti parts
EN 60947-1	2004 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
EN 60947-2	2003 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers

- ~~altre~~ norme e/o specifiche tecniche:
- other standards and/or technical specifications

n.ro nr	edizione issue	titolo title	parti parts
IEC 60947-1	Ed.4.0 Consolidated Edition 2004-03 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
IEC 60947-2	Ed.3.0 Consolidated Edition 2003-04 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers

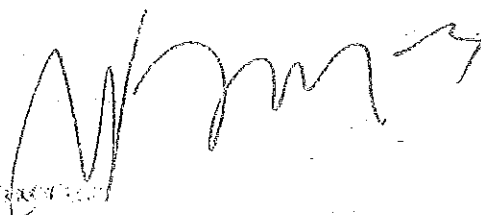




ABB SACE

ABB
ABB



DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

No CEITmax 074R0.07

- *altre soluzioni tecniche, i cui dettagli sono inclusi nella documentazione tecnica o fascicolo tecnico:*
- *other technical solutions, the details of which are included in the technical documentation or the technical construction file:*

catalogo tecnico ISDC210015D0901

technical catalogue ISDC210015D0901

Certificato di gestione della Qualità ISO 9001-2000

ISO 9001 Quality Management System Certificate

Certificato di gestione Ambientale ISO 14001...

ISO 14001 Environment Management System Certificate

- *altri riferimenti o informazioni richiesti dalla(e) direttiva(e) comunitaria(e) applicabile(i):*
- *other references or information required by the applicable EC directive(s):*

ABB SACE



DICHIARAZIONE DI CONFORMITA' DECLARATION OF CONFORMITY



No CEImax 074R0.07

Il sottoscritto, rappresentante il seguente costruttore
The undersigned, representing the following manufacturer

costruttore: manufacturer:	ABB SACE SPA
indirizzo: address:	via Baloni 35 I 24123 Bergamo

dichiara qui di seguito che il prodotto:
herewith declares that the product

Identificazione del prodotto: product identification:	Tmax T7H 1250 e relativi accessori and relevant accessories
--	---

risulta in conformità a quanto previsto dalla(e) seguente(i) direttiva(e) comunitaria(e)
is in conformity with the provisions of the following EC directive(s).

riferimento n.ro reference nr.	titolo title
2006/95/CE (che sostituisce 73/23/CEE) (which replaces 73/23/CEE)	Direttiva Bassa Tensione Low voltage directive
89/336	Direttiva Compatibilità Elettromagnetica Electromagnetic Compatibility Directive

e che sono state applicate tutte le norme e/o specifiche tecniche indicate sul retro.
and that the standards and/or technical specifications referenced overleaf have been applied

Ultime due cifre dell'anno in cui è stata affissa la marcatura CE: 06

Last two digits of the years in which the CE marking was affixed

Bergamo il 17.01.07

(firma)
(signature) Giovanni Frassinetti R&D Manager - Low Voltage Breakers
(nome e funzione della persona incaricata di firmare per conto del costruttore o suo rappresentante)
(name and function of the signatory empowered to bind the manufacturer or his authorized representative)

DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY



No CEITmax 074R0.07

Riferimento relativo alle norme e/o specifiche tecniche, o parti di esse, utilizzate per la presente dichiarazione di conformità:

References of standards and/or technical specifications applied for this declaration of conformity, or parts thereof:

- norme armonizzate:
- harmonized standards:

n.ro nr	edizione issue	titolo title	parti parts
EN 60947-1	2004 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
EN 60947-2	2003 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers

- altre norme e/o specifiche tecniche:
- other standards and/or technical specifications

n.ro nr	edizione issue	titolo title	parti parts
IEC 60947-1	Ed.4.0 Consolidated Edition 2004-03 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
IEC 60947-2	Ed.3.0 Consolidated Edition 2003-04 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers

ABB SACE



DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

No CEImax 074R0.07

- altre soluzioni tecniche, i cui dettagli sono inclusi nella documentazione tecnica o fascicolo tecnico:
- other technical solutions, the details of which are included in the technical documentation or the technical construction file:

catalogo tecnico ISDC210015D0901

technical catalogue ISDC210015D0901

Certificato di gestione della Qualità ISO 9001-2000

ISO 9001 Quality Management System Certificate

Certificato di gestione Ambientale ISO 14001

ISO14001 Environment Management System Certificate

- altri riferimenti o informazioni richiesti dalla(e) direttiva(e) comunitaria(e) applicabile(i):
- other references or information required by the applicable EC directive(s):

Превод от английски език

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

№ CE/Tmax 074R0.07

Подписаният, представляващ следния производител

Производител: ABB SACE SPA
 Адрес: via Baioni 35
 I 24123 Bergamo

Декларира, че продуктът: Tmax T7H 1250
 и съответните аксесоари

са в съответствие с разпоредбите на следните директиви на ЕО:

препатка № 2006/95/CE (заместваща 73/23/CEE)	наименование Директива за ниско напрежение
89/336	Директива за електромагнитна съвместимост

и че стандартите и/или техническите спецификации са приложени

Последните две цифри на годината, в която е поставена CE маркировката
 Bergamo 17.01.07

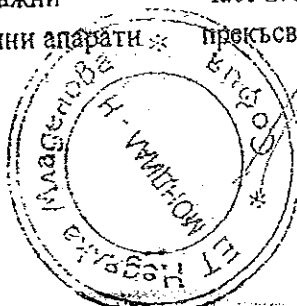
/подпис не се чете/

(подпис) Джовани Фрасинети Мениджър – Ниско волтажни прекъсвачи
 (име и позиция на подписалия, упълномощен от производителя)

Референции към стандарти и/или технически спецификации, приложени за тази декларация за съответствие или части от тях:

- Хармонизирани стандарти;

Номер	Издание	Наименование	Части
EN 60947-1	2004 (и следващи)	Ниско волтажни комутационни апарати	Част 1: Общи правила
EN 60947-2	2003 (и следващи)	Ниско волтажни комутационни апарати	Част 2: Верижни прекъсвачи



Вид

- Други стандарти и технически спецификации

Номер	Издание	Наименование	Части
IEC 60947-1	Издание 4.0 Консолидирано издание 2004-03 (и следващи)	Ниско волтажни комутационни апарати	Част 1: Общи правила
IEC 60947-2	Издание 3.0 Консолидирано издание 2003-04 (и следващи)	Ниско волтажни комутационни апарати	Част 2: Верижни прекъсвачи

- Други технически решения, детайли от които са включени в техническата документация или техническия файл:

Технически каталог ISDC210015D0901

ISO 9001 Сертификат по система за контрол на качеството

- Други референци или информация, изисквана от приложимите ЕО директиви:

Аз, долуподписаната Ива Николова Златарска, удостоверявам верността на извършения от мен превод на приложения документ – Декларация за съответствие № СЕ/Тпох 074R0.07 от английски на български език, преводът се състои от 2 /две/ страници.

Преводач Ива Николова Златарска



ТОВ "ЕЛЕКТРОТЕХНИКА" АД
булевард "Св. Кирил и Методий" № 10
1113 София, България
Тел: 00359 2 960 6698; факс: 00359 2 960 6334
www.electrotech.bg



Management System
ISO 9001:2008
DIN EN ISO 14001:2004
www.tuv.com
ID: 9105926855



Management System
ISO 14001:2004
www.tuv.com
ID: 9105926855

ПРИЛОЖЕНИЕ 9.4.4

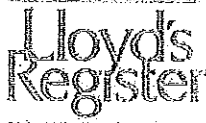
Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Type Approval Certificate

This is to certify that the undernoted products have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

This certificate is issued to:

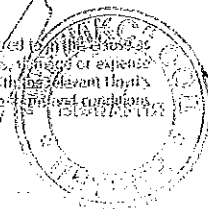
PRODUCER	ABB Sace S.p.A Via Baioni 35 Bergamo 24123 Italy
PLACE OF PRODUCTION	Via Enrico Fermi 14 Frosinone 03100 Italy
DESCRIPTION	Moulded case circuit breakers with electronic releases
TYPE	Tmax T7S/H/L/V <i>All units fitted with, PR231/P, PR232/P, PR331/P and PR332/P microprocessor based overcurrent release providing protection against overload, short circuit and earth faults.</i>
APPLICATION	Suitable for use in environmental categories ENV1, ENV2 and ENV3 as defined in LR Test Specification No.1 2002.
SPECIFIED STANDARDS	IEC 60947-1:2007 IEC 60947-2:2006 Utilisation category B
ADDITIONAL TESTS	Cold Temperature Test - -25°C for 16 hours

Certificate No.	10/00023
Issue Date	26 March 2010
Expiry Date	25 March 2015
Sheet	1 of 2

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

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A.B. Gunn
London Design Support Services
Lloyd's Register EMEA





RATING

Type	Normal Current In (A)	Voltage 50/60Hz (V)	Power Factor	Peak Making Icm (kA)	Ultimate S/C Breaking Capacity Icu (kA)	Service S/C Breaking Capacity Ics(%Icu)	Withstand Current for 1 sec (kA)
Tmax T7S	800/1000 /1250/1600	230	0.2	187	85	100	20
		400	0.25	105	50	100	20
		440	0.25	105	50	100	20
		500	0.25	84	40	100	20
		690	0.25	63	30	100	20
Tmax T7H	800/1000 /1250/1600	230	0.2	220	100	100	20
		400	0.2	154	70	100	20
		440	0.2	143	65	100	20
		500	0.25	105	50	100	20
		690	0.25	88.2	42	75	20
Tmax T7L	800/1000 /1250/1600	230	0.2	440	200	100	20
		400	0.2	264	120	100	20
		440	0.2	220	100	100	20
		500	0.2	187	85	75	20
		690	0.25	105	50	75	20
Tmax T7V	800/1000 /1250	230	0.2	440	200	100	15
		400	0.2	330	150	100	15
		440	0.2	286	130	100	15
		500	0.2	220	100	100	15
		690	0.2	132	60	75	15

"This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid certificate."

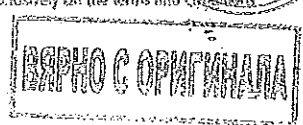
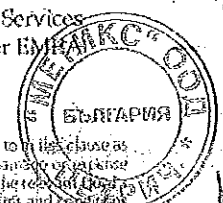
The Design Appraisal Document No. 10/00023 and its supplementary Type Approval Terms and Conditions form part of this Certificate.

Certificate No. 10/00023
 Issue Date 26 March 2010
 Expiry Date 25 March 2015
 Sheet 2 of 2

[Handwritten Signature]
[Handwritten Signature]
 A.B. Gunn
 London Design Support Services

Lloyd's Register EMEA
 71 Fenchurch Street, London EC3M 4BS

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Lloyd's Register EMEA (London Office)
LONDON DESIGN SUPPORT SERVICES
 71 Fenchurch Street, London, EC3M 4BS
 Telephone 020 7700 9166 Fax 020 7488 4796
 Email ldss.enquiries@lr.org

Page	1 of 3
Document number	10/00023
Issue number	1

DESIGN APPRAISAL DOCUMENT

Date	26 March 2010	Quote this reference on all future communications	LDSS/EIS/TAE/WO2085437/ABG/O-103170
------	---------------	---	-------------------------------------

LLOYD'S REGISTER TYPE APPROVAL SYSTEM, 2002.
 Issued to: **ABB SACE S.P.A**
 For: **MOULDED CASE CIRCUIT BREAKERS WITH ELECTRONIC RELEASES**
 Type: **TMAX T7 S/H/L/V**
TYPE APPROVAL CERTIFICATE No. 10/00023

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register Type Approval System, 2002 and this Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

Request Form	11.12.2008
LR Email	07.08.2009
ABB Email	22.09.2009
LR Email	07.10.2009
LR Email	20.10.2009
LR Email	14.01.2010
LR Email	04.02.2010
LR Email	16.03.2010
LR Milan Email	26.03.2010

DATASHEETS

Ratings T7 Spreadsheet	Undated
------------------------	---------

TEST REPORTS

SINAL Laboratory Accreditation Number 0062 Revision 2	07.02.2008
LOVAG Certificate of Conformity Certificate Number IT 07.001	26.01.2007
LOVAG Certificate of Conformity Certificate Number IT 07.002	26.01.2007
LOVAG Certificate of Conformity Certificate Number IT 07.003	19.02.2007
LOVAG Certificate of Conformity Certificate Number IT 07.005	22.02.2007
LOVAG Certificate of Conformity Certificate Number IT 07.006	26.02.2007
LOVAG Certificate of Conformity Certificate Number IT 07.007	28.02.2007
LOVAG Certificate of Conformity Certificate Number IT 07.008	28.02.2007
LOVAG Certificate of Conformity Certificate Number IT 07.009	01.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.010	06.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.011	05.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.012	05.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.013	02.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.014	12.03.2007
LOVAG Certificate of Conformity Certificate Number IT 07.040	05.06.2007
LOVAG Certificate of Conformity Certificate Number IT 07.062	16.07.2007
LOVAG Certificate of Conformity Certificate Number IT 07.075	01.10.2007
LOVAG Certificate of Conformity Certificate Number IT 07.076	05.10.2007
LOVAG Certificate of Conformity Certificate Number IT 07.077	01.10.2007

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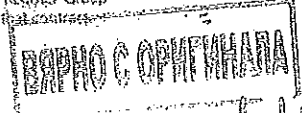
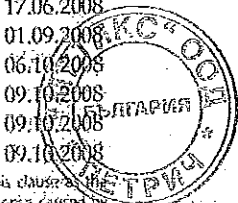
Lloyd's Register EMEA (London Office)
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 Telephone 020 7709 9166 Fax 020 7488 4796
 Email ldss.enquiries@lr.org

Page	2 of 3
Document number	10/00023
Issue number	1

DESIGN APPRAISAL DOCUMENT

Date	26 March 2010	Quote this reference on all future communications	LDSS/ETS/TAE/WO2085437/ABG/O-103170
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LOVAG Certificate of Conformity Certificate Number IT 07.078	05.10.2007
LOVAG Certificate of Conformity Certificate Number IT 08.009	14.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.010	14.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.018	16.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.019	14.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.020	16.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.051	28.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.052	24.04.2008
LOVAG Certificate of Conformity Certificate Number IT 08.053	04.06.2008
LOVAG Certificate of Conformity Certificate Number IT 08.054	17.06.2008
LOVAG Certificate of Conformity Certificate Number IT 08.074	20.10.2008
LOVAG Certificate of Conformity Certificate Number IT 08.075	20.10.2008
LOVAG Certificate of Conformity Certificate Number IT 08.078	09.10.2008
LOVAG Certificate of Conformity Certificate Number IT 08.079	18.09.2008
LOVAG Test Report Number 06.074	26.01.2007
LOVAG Test Report Number 06.075	26.01.2007
LOVAG Test Report Number 06.089	19.02.2007
LOVAG Test Report Number 06.090	22.02.2007
LOVAG Test Report Number 06.091	26.02.2007
LOVAG Test Report Number 06.092	28.02.2007
LOVAG Test Report Number 06.071	28.02.2007
LOVAG Test Report Number 06.115	01.03.2007
LOVAG Test Report Number 06.111	06.03.2007
LOVAG Test Report Number 06.107	05.03.2007
LOVAG Test Report Number 06.108	05.03.2007
LOVAG Test Report Number 06.109	02.03.2007
LOVAG Test Report Number 06.119	12.03.2007
LOVAG Test Report Number 07.016	05.06.2007
LOVAG Test Report Number 07.002	16.07.2007
LOVAG Test Report Number 07.005	01.10.2007
LOVAG Test Report Number 07.015	05.10.2007
LOVAG Test Report Number 07.075	01.10.2007
LOVAG Test Report Number 07.076	05.10.2007
LOVAG Test Report Number 07.053	14.04.2008
LOVAG Test Report Number 07.054	14.04.2008
LOVAG Test Report Number 08.005	16.04.2008
LOVAG Test Report Number 07.051	14.04.2008
LOVAG Test Report Number 08.010	16.04.2008
LOVAG Test Report Number 08.007	28.04.2008
LOVAG Test Report Number 07.073	24.04.2008
LOVAG Test Report Number 07.052	04.06.2008
LOVAG Test Report Number 07.074	17.06.2008
LOVAG Test Report Number 07.088A	01.09.2008
LOVAG Test Report Number 07.087	06.10.2008
LOVAG Test Report Number 07.090A	09.10.2008
LOVAG Test Report Number 07.090B	09.10.2008
LOVAG Test Report Number 07.090C	09.10.2008



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Lloyd's Register EMEA (London Office)

LONDON DESIGN SUPPORT SERVICES

71 Fenchurch Street, London, EC3M 4BS

Telephone 020 7709 9166 Fax 020 7488 4796

Email ldss.enquiries@lr.org

Page	3 of 3
Document number	10/00023
Issue number	1

DESIGN APPRAISAL DOCUMENT

Date	26 March 2010	Quote this reference on all future communications	LDSS/ETS/TAE/WO2085437/ABG/O-103170
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LOVAG Test Report Number 07.090C	09.10.2008
LOVAG Test Report Number 07.089	18.09.2008
ABB Test Report Number LBRP 7303/00	09.01.2008
ABB Test Report Number LBRP 7876/01	20.12.2007
ABB Test Report Number LBRP 8013/00 Rev 1	09.03.2010
ABB Test Report Number LBRP 8488/01 Rev 0	26.02.2010
ABB Test Report Number LBRP 9599/00 Rev 0	21.01.2010
ABB Test Report Number LBRP 9599/00 Rev 1	26.02.2010
Intertek Test Report Number E133S2207G5_25a	28.06.2007
Intertek Test Report Number E133S2207G5_25aR	28.06.2007
Intertek Test Report Number E133S2207G5_25b	28.06.2007
Intertek Test Report Number E133S2207G5_25bR	28.06.2007
Intertek Test Report Number 706688	06.02.2009
CESI Test Report Number A7027438	26.02.2008
RINA ISO 9001:2000 Certificate Number 8402/03/S	21.07.2008
LR Laboratory Visit Report Number ML.N0802243	22.01.2010
Production Facility Inspection Report NAP 0910046	10.07.2009

Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the products referred to herein have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any products designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.

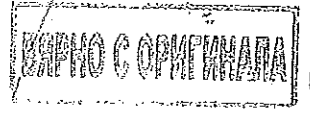
A.B. Gunn
London Design Support Services
Lloyd's Register EMEA

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Part 2
Circuit Breakers (ENV Tested) (Part 2)

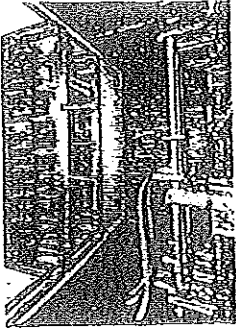
Producer/ Reference No.	Type	Standard	Rating						Short Circuit	Category/ Additional Tests	Remarks	Cert. No.					
			Normal Current Amperes	A.C. 50/60/400Hz		D.C.		Time Constant Seconds									
				Voltage	Power Factor	Voltage	Time Constant Seconds										
ABB Saco S.p.A Via Danton 35 Bergomo 24125 Italy	Mounted case circuit breakers with electronic releases	IEC 60947-1 IEC 60947-2 UL9810 category 8	800/1000/ 1250/1600	230	400	0.2	0.25	100	ENVI ENV2 ENV3 (2002)	Expires 25 March 2015	10/00023						
												Type Tmax T7 S	400	0.25	100	Low temperature test -25°C, 16 hours	All units fitted with PR28T/P, PR22/T, PR351/P and PR32/P microprocessor based overcurrent release providing protection against overload, short-circuit and earth faults
												Tmax T7 S	400	0.25	100		
												Tmax T7 H	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		
												Tmax T7 L	400	0.25	100		



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6.4.2010
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Power tests

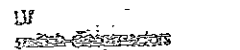


To check low- and medium-voltage equipment which requires tests in the high current field, the Power Tests Section is equipped with several generators including one which is capable of supplying a short-circuit power of 2800MVA and sophisticated digital systems for test data acquisition and processing. It is also equipped

with a wide variety of loads such as three-phase asynchronous motors, reactances, inductors, impedance coils and resistors, resistors, heating elements and empty lines (capacitors) which simulate different conditions encountered in the installation.



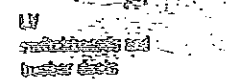
LV circuit breakers



LV switchgear

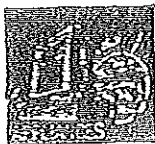


LV motors and starters

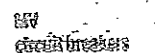


LV reactors and transformer coils

TYPE OF TEST	Short-lived	Opening and closing on short circuit in a.c. (50-55 Hz)	Opening and closing on short circuit in d.c.	Overload	Internal arc
STANDARDS					
CEI EN 60947-2	110kA for 1s 70kA for 3s	380V 200kA 600V 200kA 726V 100kA 1100V 80kA	250V 100kA 500V 100kA 1000V 100kA 1500V 30kA	up to 1100V 15kA	
CEI EN 60947-3	110kA for 1s 70kA for 3s	380V 200kA 600V 200kA 726V 100kA 1100V 80kA	250V 100kA 500V 100kA 1000V 100kA 1500V 30kA	up to 1100V 15kA	
CEI EN 60947-4-1	-	380V 200kA 600V 200kA 726V 100kA 1100V 80kA	250V 100kA 500V 100kA 1000V 100kA 1500V 30kA	up to 1100V 15kA	
CEI EN 60439-1 CEI EN 60439-2	110kA for 1s 70kA for 3s	380V 200kA 600V 200kA 726V 100kA 1100V 80kA	250V 100kA 500V 100kA 1000V 100kA 1500V 30kA		up to 1100V 15kA



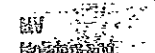
HV switchgear



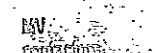
HV circuit breakers



HV switchgear



HV reactors and capacitor switches



HV reactors and capacitor switches

TYPE OF TEST	Short-lived	Opening and closing on short circuit in a.c. (50-55Hz)	Overload	Capacitive currents	Active load currents	Asynchronous motor	Magnetizing and inductive currents	Internal arc
STANDARDS								
CEI EN 60298	110kA for 1s 70kA for 3s							12kV 50kA 24kV 15kA
IEC 62271-100	110kA for 1s 70kA for 3s	12kV 60kA 24kV 32kA 36kV 20kA		12kV 550A 24kV 300A 36kV 250A		10kV 100A	24kV 10A 24kV 500A	
IEC 60265	110kA for 1s 70kA for 3s	12kV 60kA 24kV 32kA 36kV 20kA		12kV 550A 24kV 300A 36kV 250A	24kV 630A 36kV 430A	10kV 100A	24kV 10A 24kV 500A	
CEI EN 60129	110kA for 1s 70kA for 3s	12kV 60kA 24kV 32kA 36kV 20kA						
IEC 60473	110kA for 1s 70kA for 3s	12kV 60kA 24kV 32kA 36kV 20kA	up to 12kV 5kA	12kV 550A 24kV 300A 36kV 250A		10kV 100A	24kV 10A 24kV 500A	

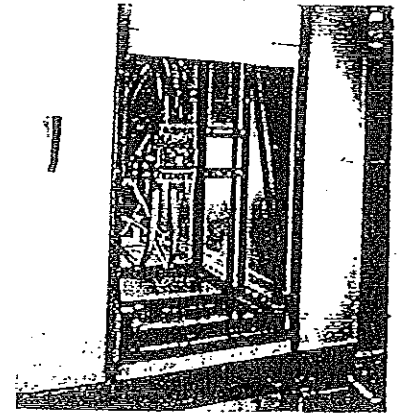
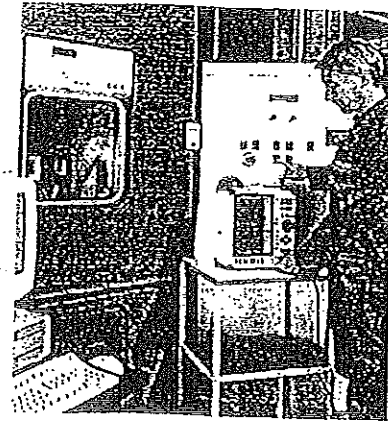
ВРЕНО С ОРИГИНАЛА

Handwritten signatures and a circular official stamp of the company.

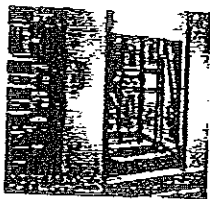
Experimental tests

The Experimental Tests Section is fully equipped with apparatus used to perform mechanical and electrical endurance tests and overload tests. It has power suppliers for tests with strong currents (to check the temperature-rise level and tripping characteristics of the protection releases) and power suppliers for dielectric tests with industrial impulse and frequency voltage.

The laboratory is also equipped with thermostatically-controlled climatic chambers which create the conditions for performing



accelerated endurance tests by combining synergetic stresses of environmental, mechanical and electrical origin



LV
circuit breakers

TYPE OF TEST

STANDARDS

CEI EN 60947-2

Test of dielectric properties

5kV 50Hz
20kV -
1,2/50ms

Heating test on primary and control circuits

In=6000A

Mechanical, electrica and overload life test

Vn=690 - In=2150A
Vn=1000V - In=6300A

Test on degree of protection

IP40

Tests on protection releases (thermal, magnetic, electronic)

6kA continuous
9kA per 120s
40kA for 0,5s

Ambient tests

from +20 to +75°C
from -40 to +180°C
and UR 98%

Shock resistance test

< 30g < 20ms

LV
switch-disconnectors

CEI EN 60947-3

5kV 50Hz
20kV -
1,2/50ms

In=6000A

Vn=690 - In=2150A
Vn=1000V - In=6300A

IP40

-

from +20 to +70°C
from -40 to +180°C
and UR 98%

< 30g < 20ms

LV
contactors and starters

CEI EN 60947-4-1

5kV 50Hz
20kV -
1,2/50ms

In=6000A

Vn=690 - In=2150A
Vn=1000V - In=6300A

IP40

6kA continuous
9kA per 120s
40kA for 0,5s

from +20 to +70°C
from -40 to +180°C
and UR 98%

< 30g < 20ms

LV
switchboards and busbar ducts

CEI EN 60439-1
CEI EN 60439-2

5kV 50Hz
20kV -
1,2/50ms

In=6000A

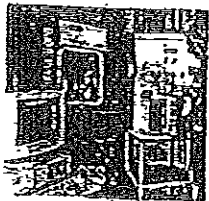
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IP40

-

-

-



TYPE OF TEST

STANDARDS

CEI EN 60298

Test on dielectric properties

Vp=80kV U=1

Heating test on primary and control circuits

In=4000A

Test on operation/mechanical duration

yes

Test on degree of protection

IP40

MV
switchboards

IEC 62277-100

Vp=80kV U=1

In=4000A

yes

IP40

MV
circuit breakers

IEC 60265

Vp=80kV U=1

In=4000A

yes

IP40

MV
switch-disconnectors

IEC 60422

Vp=80kV U=1

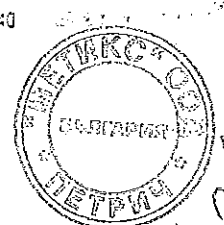
In=4000A

yes

IP40

MV
isolators and earthing switches

15
BIPROG OPTIMIZAMA





Сертификат за типово одобрение

Този сертификат удостоверява, че упоменатите по-долу продукти са тествани със задоволителни резултати в съответствие със съответните изисквания на Обединеното кралство на Системата на Lloyd's Register за типово одобрение.

Този сертификат е издаден на:

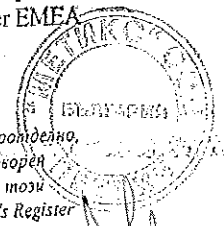
ПРОИЗВОДИТЕЛ	ABB Sace S.p.A Via Vaioni 35 Бергамо 24123 Италия
МЯСТО НА ПРОИЗВОДСТВО	Via Enrico Fermi 14 Frosinone 03100 Италия
ОПИСАНИЕ	Прекъсвачи с лят корпус с електронни блокове за изключване
ТИП	TmaxT7S/H/L/V <i>Всички блокове са оборудвани с микропроцесорни максималнотокови блокове за изключване PK231/P, PR132/P, PR331/P и PR332/P, осигуряващи максималнотокова защита, защита от късо съединение и защита от повреди към земя.</i>
ПРИЛОЖЕНИЕ	Подходящи за използване в категории ENV1, ENV2 и ENV3 по околна среда, както са определени в Тестовата спецификация No. 1 2002 на Lloyd's Register.
ОПРЕДЕЛЕНИ СТАНДАРТИ	IEC 60947-1:2007 IEC 60947-2:2006 Категория на прилагане B
ДОПЪЛНИТЕЛНИ ТЕСТОВЕ	Тест на ниска температура - -25°C за 16 часа

Сертификат No. 10/00023
Дата на издаване 26 March 2010
Валиден до дата 25 March 2015
Лист 1 от 2

A.B. Gunn
Лондон, Отдел за поддръжка на проектирането
Lloyd's Register EMEA

Lloyd's Register EMEA
71 Fenchurch Street, London EC3M 4BS

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НОМИНАЛНИ ПАРАМЕТРИ

Тип	Нормален ток In (A)	Напрежение при 50/60 Hz (V)	Фактор на мощността	Пиков ток Icm (kA)	Крайна S/C прекъсвана мощност Icu (kA)	Работна S/C прекъсвана мощност Ics (%Icu)	Ток, издържан за 1 s (kA)
Tmax ITS	800/1000 /1250/1600	230	0.2	187	85	100	20
		400	0.25	105	50	100	20
		440	0.25	105	50	100	20
		500	0.25	84	40	100	20
		690	0.25	63	30	100	20
Tmax T7H	800/1000 /1250/1600	230	0.2	220	100	100	20
		400	0.2	154	70	100	20
		440	0.2	143	65	100	20
		500	0.25	105	50	100	20
		690	0.25	88.2	42	75	20
Tmax T7L	800/1000 /1250/1600	230	0.2	440	200	100	20
		400	0.2	264	120	100	20
		440	0.2	220	100	100	20
		500	0.2	187	85	75	20
		690	0.25	105	50	75	20
Tmax T7V	800/1000 /1250	230	0.2	440	200	100	15
		400	0.2	330	150	100	15
		440	0.2	286	130	100	15
		500	0.2	220	100	100	15
		690	0.2	132	60	75	15

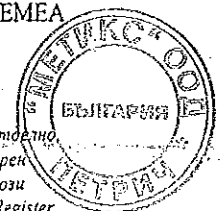
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Документът за одобрение на проекта No. 10/00023 и приложените към него Условия за одобряване на тип представляват част от този сертификат.

Сертификат No. 10 00023
 Дата на издаване 26 March 2010
 Валиден до дата 25 March 2015
 Лист 2 от 2

A.V. Gunn
 Лондон, Отдел за поддръжка на проектирането
 Lloyd's Register EMEA

Lloyd's Register EMEA
 71 Fendritch Street, London EC3M 4BS



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ВАЖНО С ОПРЕГНАНА

ДОКУМЕНТ ЗА ОДОБРЕНИЕ НА ПРОЕКТА

Дата 26 Март 2010	Цитирайте този номер при всички бъдещи комуникации LDSS/ETS/TAE/WO2085437/ABG/O-03170
----------------------	--

СИСТЕМА ЗА ТИПОВО ОДОБРЕНИЕ НА LLOYD'S REGISTER, 2002.

Издава се на ABB SACE S.P.A

За: Прекъсвачи с лят корпус с електронни блокове за изключване

Тип: TMAX T7 S/H/L/V

СЕРТИФИКАТ ЗА ТИПОВО ОДОБРЕНИЕ

№. 10/00023

Изброените по-долу документи са прегледани за съответствие с изискванията на Системата за типово одобрение на Lloyd's Register, 2002 и този Документ за одобрение на проекта представлява част от Сертификата.

ДОКУМЕНТАЦИЯ ЗА ОДОБРЕНИЕ

Форма за заявка	11.12.2008
Имейл от LR	07.08.2009
Имейл от ABB	22.09.2009
Имейл от LR	07.10.2009
Имейл от LR	20.10.2009
Имейл от LR	14.01.2010
Имейл от LR	04.02.2010
Имейл от LR	16.03.2010
Имейл от LR, Милано	26.03.2010

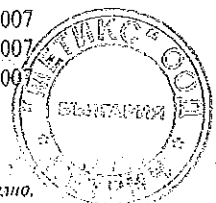
ТАБЛИЦИ С ДАННИ

Таблица с номиналните параметри T7	Без дата
------------------------------------	----------

АКТОВЕ ЗА ИЗПИТВАНИЯ

Лаборатория SINAL, Акредитация номер 0062, редакция 2	07.02.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.001	26.01.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.002	26.01.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.003	19.02.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.005	22.02.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.006	26.02.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.007	28.02.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.008	28.02.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.009	01.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.010	06.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.011	05.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.012	05.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.013	02.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.014	12.03.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.040	05.06.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.062	16.07.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.075	01.10.2007
LOVAG Сертификат за съответствие, Сертификат номер IT 07.076	05.10.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 07.077	01.10.2007

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Handwritten signatures and initials, including a large signature on the left and initials '16' on the right.



Lloyd's Register EMEA (Лондонски офис)

ЛОНДОН, ОТДЕЛ ЗА ПОДДРЪЖКА НА ПРОЕКТИРАНЕТО
71 Fendmrclt Street, London, EC3M 4BS
Telephone 020 7709 9166 Fax 020 7488 4796
Email lldss.enquiries@lr.org

Страница 2 of 3
Номер на документа 10/00023
Номер на изданието 1

ДОКУМЕНТ ЗА ОДОБРЕНИЕ НА ПРОЕКТА

Дата 26 Март 2010	Цитирайте този номер при всички бъдещи комуникации LDSS/ETS/TAE/WO2085437/ABG/ O-03170
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LOVAG, Сертификат за съответствие, Сертификат номер IT 07.078	05.10.2007
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.009	14.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.010	14.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.018	16.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.019	14.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.020	16.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.051	28.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.052	24.04.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.053	04.06.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.054	17.06.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.074	20.10.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.075	20.10.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.078	09.10.2008
LOVAG, Сертификат за съответствие, Сертификат номер IT 08.079	18.09.2008
LOVAG, Доклад от изпитване номер 06.074	26.01.2007
LOVAG, Доклад от изпитване номер 06.075	26.01.2007
LOVAG, Доклад от изпитване номер 06.089	19.02.2007
LOVAG, Доклад от изпитване номер 06.090	22.02.2007
LOVAG, Доклад от изпитване номер 06.091	26.02.2007
LOVAG, Доклад от изпитване номер 06.092	28.02.2007
LOVAG, Доклад от изпитване номер 06.071	28.02.2007
LOVAG, Доклад от изпитване номер 06.115	01.03.2007
LOVAG, Доклад от изпитване номер 06.111	06.03.2007
LOVAG, Доклад от изпитване номер 06.107	05.03.2007
LOVAG, Доклад от изпитване номер 06.108	05.03.2007
LOVAG, Доклад от изпитване номер 06.109	02.03.2007
LOVAG, Доклад от изпитване номер 06.119	12.03.2007
LOVAG, Доклад от изпитване номер 07.016	05.06.2007
LOVAG, Доклад от изпитване номер 07.002	16.07.2007
LOVAG, Доклад от изпитване номер 07.005	01.10.2007
LOVAG, Доклад от изпитване номер 07.015	05.10.2007
LOVAG, Доклад от изпитване номер 07.075	01.10.2007
LOVAG, Доклад от изпитване номер 07.076	05.10.2007
LOVAG, Доклад от изпитване номер 07.053	14.04.2008
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LOVAG, Доклад от изпитване номер 07.051	14.04.2008
LOVAG, Доклад от изпитване номер 08.010	16.04.2008
LOVAG, Доклад от изпитване номер 08.007	28.04.2008
LOVAG, Доклад от изпитване номер 07.073	24.04.2008
LOVAG, Доклад от изпитване номер 07.052	04.06.2008
LOVAG, Доклад от изпитване номер 07.074	17.06.2008
LOVAG, Доклад от изпитване номер 07.088A	01.09.2008
LOVAG, Доклад от изпитване номер 07.087	06.10.2008
LOVAG Доклад от изпитване номер 07.090A	09.10.2008
LOVAG, Доклад от изпитване номер 07.090B	09.10.2008
LOVAG, Доклад от изпитване номер 07.090C	09.10.2008

КОПИО С ОРИГИНАЛА



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Lloyd's Register EMEA (Лондонски офис)

ЛОНДОН, ОТДЕЛ ЗА ПОДДРЪЖКА НА ПРОЕКТИРАНЕТО

21 Fenchurch Street, London, EC3M 4BS

Telephone 020 7709 9166 Fax 020 77155 1796

Email lldss.enquiries@lr.org

Страница 3 of 3
Номер на документа 10/00073
Номер на изданието 1

ДОКУМЕНТ ЗА ОДОБРЕНИЕ НА ПРОЕКТА

Дата 26 Mapt 2010	Цитирайте този номер при всички бъдещи комуникации LDSS/ETS/TAE/WO2085437/ABG/ O-03170
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LOVAG, Доклад от изпитване номер 07.090C	09.10.2008
LOVAG, Доклад от изпитване номер 07.089	18.09.2008
ABB, Доклад от изпитване номер LBRP 7303/00	09.01.2008
ABB, Доклад от изпитване номер LBRP 7876/01	20.12.2007
ABB, Доклад от изпитване номер LBRP 8013/00 Rev 1	09.03.2010
ABB, Доклад от изпитване номер LBRP 8488/01 Rev 0	26.02.2010
ABB, Доклад от изпитване номер LBRP 9599/00 Rev 0	21.01.2010
ABB, Доклад от изпитване номер LBRP 9599/00 Rev 1	26.02.2010
Intertek, Доклад от изпитване номер E133S2207G5_25a	28.06.2007
Intertek, Доклад от изпитване номер E133S2207G5_25aR	28.06.2007
Intertek, Доклад от изпитване номер E133S2207G5_25b	28.06.2007
Intertek, Доклад от изпитване номер E133S2207G5_25bR	28.06.2007
Intertek, Доклад от изпитване номер 706688	06.02.2009
CESI, Доклад от изпитване номер A7027438	26.02.2008
RINA, сертификат по ISO 9001:2000 номер 8402/03/S	21.07.2008
LR, Доклад от посещение на лаборатория номер MLN0802243	22.01.2010
Доклад от инспекция на производствено съоръжение номер NAP 0910046	10.07.2009

Допълнителни условия за типово одобрение

Типовото одобрение удостоверява, че за представителна извадка от продуктите, описани тук, е било установено, че удовлетворяват критериите за проектиране за определеното тук използване. Това не означава или не подразбира одобрение за каквото и да е друго използване, нито одобрение на каквото и да е продукт, проектиран или произведен по друг начин, освен в стриктно съответствие с указаната представителна извадка.

Типовото одобрение е базирано на разбирането, че препоръките и инструкциите на производителя и всички съответстващи изисквания на Правилата и Нормите са удовлетворени.

Одобрението не отменя необходимостта от нормални процедури за инспекция и обслужване, изисквани от Правилата и Нормите.

Lloyd's Register EMEA си запазва правото да изтегли този Сертификат за типово одобрение в съответствие с Процедурата на системата за типово одобрение на Lloyd's Register.

A. B. Gunn
Лондон, Отдел за поддръжка на проектирането
Lloyd's Register EMEA

ВЕРНО С ОПРЕДЕЛЕНИЕТО

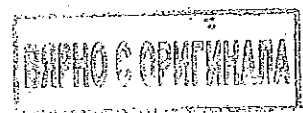
Lloyd's Register, неговите филиали и дочерни дружества и съответните им офиси, представящи услуги са, заедно и поотделно, посочени към тази клауза като на "Lloyd's Register Group". Lloyd's Register Group не носи никаква отговорност и не е отговорен пред което и да е лице за каквото и да е загуба, щета или разходи, причинени от предоставяне на информация или съвети по този документ или причинени независимо как, освен ако това лице е подписало договор на съответствие с представител на Lloyd's Register Group за предоставяне на тази информация или съвети и в този случай всякаква отговорност или загуба не са изключително според условията на този договор

Част 2

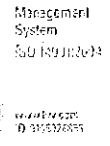
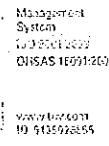
Прекъсвачи (Тест ENV) (Part 2)

Производител/ Лиценз No.	Тип	Стандарт	Номинални параметри			Постоянен ток			Късо съединение Icu(kA)	Ics(%Icu)	Категория/ Допълнителни тестове	Забележки	Сертификат No.
			Нормален ток, Ампер	Напрежение	Фактор на мощността	Напрежение	Времетрае на изпитане, секунди						
ABB Sacc S.p.A Via Etioni 35 Bergamo 24123 Italy	Прекъсвач с пълт корпус с електронни блокове за изключване Type: Tmax T7 S	IEC 60947-1 FEC 60947-2 Категория III прилагане B	800/1000/ 1250/1600	0.25	440	0.25	100	100	100	Тест при ниска температура - -25°C, 16 часа	Всички блокове са оборудвани с микропроцесорни максимално токони блокове за изключване PK231/P, PK132/P, PK331/P и PK332/P, осигуряващи максимално токони защита, защита от късо съединение и защита от повреди към зсмв.	10/00023	
			400	0.25	500	0.25	100						
			440	0.25	690	0.25	100						
			500	0.25	230	0.2	100						
			690	0.25	400	0.2	100						
			230	0.2	440	0.2	100						
	Tmax T7 H	800/1000/ 1250/1600	0.25	690	0.25	200	100	100	75				
										400	0.2	120	100
										440	0.2	100	100
	Tmax 17 L	800/1000/ 1250	0.25	690	0.25	50	75	100	75				
										400	0.2	200	100
										440	0.2	150	100
			500	0.2	100	100	100	75					
			690	1.12	60								

Handwritten signature



Handwritten initials



ПРИЛОЖЕНИЕ 9.4.5

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



DET NORSKE VERITAS

TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. E-12535

This is to certify that the
Circuit Breaker

with type designation(s)
Tmax T7 S/H/L/V/X

Manufactured by
ABB S.P.A. - ABB Sace Division
Bergamo BG, Italy

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application

Rated Voltage (V) 230 - 690 (AC)
Rated Current (A) 800 - 1600
Frequency (Hz) 50 - 60

This Certificate is valid until 2017-06-30.

Issued at Høvik on 2013-06-19

DNV local station: Milan

Approval Engineer: Nicolay Horn



for Det Norske Veritas AS
Digitally Signed By: Laumann, Marit

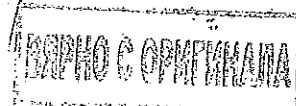
Location: DNV Høvik, Norway

Signing Date: 2013-06-23

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity data relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

If any person suffers loss or damage which is proved to have been caused by any negligent act or omission of Det Norske Veritas, then Det Norske Veritas shall pay compensation to such person for his proved direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question, provided that the maximum compensation shall never exceed USD 2 million. In this provision "Det Norske Veritas" shall mean the Foundation Det Norske Veritas as well as all its subsidiaries, directors, officers, employees, agents and any other acting on behalf of Det Norske Veritas.



Certificate No.: E-12525
 File No.: 823.10
 Job Id.: 262.1-003584-3

Name and place of manufacturer

ABB SpA – ABB Sace Division
 Frosinone, ITALY

Product description

Circuit breakers type TmaxT7. To be delivered with electronic trip units. Technical data:

	Tmax T7				
	S	H	L	V	X
Rated insulation voltage U_i (V)	1000	1000	1000	1000	1000
Rated impulse withstand voltage U_{imp} (kV)	8	8	8	8	8
Rated current I_n (A) at 40 °C (See application/ limitation)	800-1600	800-1600	800-1600	800-1250	800
Rated service voltage U_e (V)	690 AC	690 AC	690 AC	690 AC	690 AC
Rated frequency AC (Hz)	50-60	50-60	50-60	50-60	50-60
Rated ultimate short-circuit breaking capacity (kA) I_{cu}					
440 V AC (kA)	50	65	100	130	170
690 V AC (kA)	30	42	50	60	75
Rated service short-circuit breaking capacity I_{cs} (% I_{cu})	100 %	100 % *	100% *	100%*	100%
Utilisation category	B	B	B	B	B
Rated short-circuit making capacity I_{cm}					
440 V AC (kA)	105	143	220	286	374
690 V AC (kA)	63	88.2	105	132	165

* 75 % for 690 V and for 500 V L edition.

Application/Limitation

Suitable for use in an IT system with a capacity of 1.2 times the maximum trip current at 690 V AC.

Equipped with electronic releases which need no deration from 40 °C to 45 °C ambient temperature.

Type Approval documentation

Electrical data: Email from ABB SACE to DNV dated 2010-06-25.
 Technical catalogue "Tmax. T Generation- Low voltage moulded-case circuit breakers up to 1600 A" – 1SCD210015D0202 (parts).

Test Certificates: LOVAG test certificates nos. IT 10.049 & IT 10050. LOVAG certificates nos (including test reports): 07.001- 07.003, 007.005 – 07.014, 07.040, 07.062, 07.075 – 07.078, 08.009, 08.010, 08.018 – 08.020, 08.051 – 08.054, 08.074, 08.075, 08.078 & 08.079.

Test Reports: ABB SACE test report nos. LBRP 102/00 & 10210/01 dated 2010-06-01, 7876/01 dated 2007-12-20 & 8013/00 dated 2008-09-08. CESI test report nos. A9027591 & A9027593 dated 2009-09-30, A7027438 dated 2008-02-26.

Tests carried out

Type tests according to IEC 60947-2 sequence I, II, III & IV and Annex H. Vibration, inclination, EMC, dry heat, damp heat and low temperature test.

DNV VERITAS AS

Certificate No.: E-12535
File No.: 823.10
Job Id.: 262.1-003584-3

Marking of product

ABB SACE -- Type designation -- Electrical data

Certificate retention survey

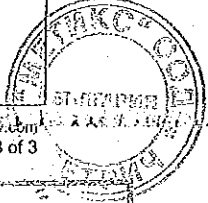
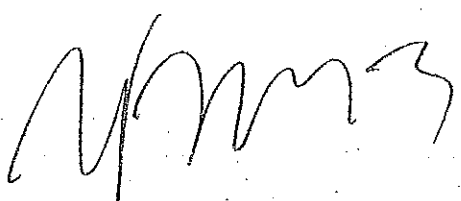
The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE





MARINE DIVISION

Certificate number: 20125/A0 BV

File number: ACE 02/010/20

Product code: 2633H

This certificate is not valid when presented without the full attached schedule composed of 7 sections

www.veristar.com

TYPE APPROVAL CERTIFICATE

This certificate is issued to

ABB SACE S.p.A.
Bergamo - ITALY

for the type of product

CIRCUIT BREAKERS (LOW VOLTAGE)

Low voltage moulded-case circuit-breakers Tmax type T1, T2, T3, T4, T5, T6, T7

Requirements:

BV Rules for the Classification of Steel Ships.
IEC 60947-1, IEC 60947-2.

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 02 Jul 2014

For BUREAU VERITAS,
At BV GENOA, on 02 Jul 2009,
Carlo Bozzetti



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not set a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

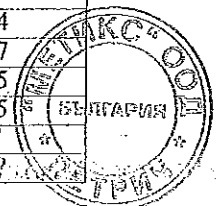
THE SCHEDULE OF APPROVAL**I. PRODUCT DESCRIPTION :**

Technical data of low voltage moulded case circuit-breakers Tmax type: T1, T2, T3, T4, T5, T6, T7.

- Rated insulation voltage, U_i : 1000V
- Rated impulse withstand voltage, U_{imp} : 8 kV
- Rated frequency: 50 - 60 Hz
- Poles: 3/4

Tmax T1				
		B	C	N
Rated uninterrupted current, I_u	(A)	160	160	160
Rated service voltage, U_e (AC)	(V)	690	690	690
	(DC) (V)	500	500	500
Rated ultimate short-circuit breaking capacity, I_{cu}				
220/230 V AC	(kA)	25	40	50
380/415 V AC	(kA)	16	25	36
440 V AC	(kA)	10	15	22
500 V AC	(kA)	8	10	15
690 V AC	(kA)	3	4	6
Rated service short-circuit breaking capacity, I_{cs}				
220/230 V AC	(% I_{cu})	100%	75%	75%
380/415 V AC	(% I_{cu})	100%	100%	75%
440 V AC	(% I_{cu})	100%	75%	50%
500 V AC	(% I_{cu})	100%	75%	50%
690 V AC	(% I_{cu})	100%	75%	50%
Utilization category				
		A	A	A
Rated short-circuit making capacity, I_{cm}				
220/230 V AC	(kA)	52,5	84	105
380/415 V AC	(kA)	32	52,5	75,6
440 V AC	(kA)	17	30	46,2
500 V AC	(kA)	13,6	17	30
690 V AC	(kA)	4,3	5,9	9,2
Version				
		F	F	F

Tmax T2					
		N	S	H	L
Rated uninterrupted current, I_u	(A)	160	160	160	160
Rated service voltage, U_e (AC)	(V)	690	690	690	690
	(DC) (V)	500	500	500	500
Rated ultimate short-circuit breaking capacity, I_{cu}					
220/230 V AC	(kA)	65	85	100	120
380/415 V AC	(kA)	36	50	70	85
440 V AC	(kA)	30	45	55	75
500 V AC	(kA)	25	30	36	50
690 V AC	(kA)	6	7	8	10
Rated service short-circuit breaking capacity, I_{cs}					
220/230 V AC	(% I_{cu})	100%	100%	100%	100%
380/415 V AC	(% I_{cu})	100%	100%	100%	75% (70 kA)
440 V AC	(% I_{cu})	100%	100%	100%	75%
500 V AC	(% I_{cu})	100%	100%	100%	75%
690 V AC	(% I_{cu})	100%	100%	100%	75%
Utilization category					
		A	A	A	A
Rated short-circuit making capacity, I_{cm}					
220/230 V AC	(kA)	143	187	220	264
380/415 V AC	(kA)	75,6	105	154	187
440 V AC	(kA)	63	94,5	121	165
500 V AC	(kA)	52,5	63	75,6	105
690 V AC	(kA)	9,2	11,9	13,6	17
Version					
		F-P	F-P	F-P	F-P



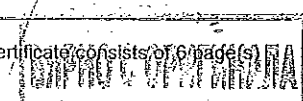
			Tmax T3	
			N	S
Rated uninterrupted current, Iu	(A)		250	250
Rated service voltage, Ue (AC)	(V)		690	690
	(DC)		500	500
Rated ultimate short-circuit breaking capacity, Icu				
220/230 V AC	(kA)		50	85
380/415 V AC	(kA)		36	50
440 V AC	(kA)		25	40
500 V AC	(kA)		20	30
690 V AC	(kA)		5	8
Rated service short-circuit breaking capacity, Ics				
220/230 V AC	(%Icu)		75%	50%
380/415 V AC	(%Icu)		75%	50% (27kA)
440 V AC	(%Icu)		75%	50%
500 V AC	(%Icu)		75%	50%
690 V AC	(%Icu)		75%	50%
Utilization category				
			A	A
Rated short-circuit making capacity, Icm				
220/230 V AC	(kA)		105	187
380/415 V AC	(kA)		75,6	105
440 V AC	(kA)		52,5	84
500 V AC	(kA)		40	63
690 V AC	(kA)		7,7	13,6
Version			F-P	F-P

			Tmax T4				
			N	S	H	L	V
Rated uninterrupted current, Iu	(A)		250/320	250/320	250/320	250/320	250/320
Rated service voltage, Ue (AC)	(V)		690	690	690	690	690
(DC)	(V)		750	750	750	750	750
Rated ultimate short-circuit breaking capacity, Icu							
220/230 V AC	(kA)		70	85	100	200	200
380/415 V AC	(kA)		36	50	70	120	200
440 V AC	(kA)		30	40	65	100	180
500 V AC	(kA)		25	30	50	85	150
690 V AC	(kA)		20	25	40	70	80
Rated service short-circuit breaking capacity, Ics							
220/230 V AC	(%Icu)		100%	100%	100%	100%	100%
380/415 V AC	(%Icu)		100%	100%	100%	100%	100%
440 V AC	(%Icu)		100%	100%	100%	100%	100%
500 V AC	(%Icu)		100%	100%	100%	100%	100%
Utilization category							
			A	A	A	A	A
Rated short-circuit making capacity, Icm							
220/230 V AC	(kA)		154	187	220	440	660
380/415 V AC	(kA)		75,6	105	154	264	440
440 V AC	(kA)		63	84	143	220	396
500 V AC	(kA)		52,5	63	105	187	330
690 V AC	(kA)		40	52,5	84	154	176
Version			F-P-W	F-P-W	F-P-W	F-P-W	F-P-W

Tmax T5					
	N	S	H	L	V
Rated uninterrupted current, Iu (A)	400/630	400/630	400/630	400/630	400/630
Rated service voltage, Ue (AC) (V)	690	690	690	690	690
(DC) (V)	750	750	750	750	750
Rated ultimate short-circuit breaking capacity, Icu					
220/230 V AC (kA)	70	85	100	200	200
380/415 V AC (kA)	36	50	70	120	200
440 V AC (kA)	30	40	65	100	180
500 V AC (kA)	25	30	50	85	150
690 V AC (kA)	20	25	40	70	80
Rated service short-circuit breaking capacity, Ics					
220/230 V AC (%Icu)	100%	100%	100%	100%	100%
380/415 V AC (%Icu)	100%	100%	100%	100%	100%
440 V AC (%Icu)	100%	100%	100%	100%	100%
500 V AC (%Icu)	100%	100%	100%	100%	100%
690 V AC (%Icu)	100%	100%	100%	100%	100%
Utilization category *)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)	B(400A) -A(630A)
Rated short-circuit making capacity, Icm					
220/230 V AC (kA)	154	187	220	440	660
380/415 V AC (kA)	75,6	105	154	264	440
440 V AC (kA)	63	84	143	220	396
500 V AC (kA)	52,5	63	106	187	330
690 V AC (kA)	40	52,5	84	154	176
Version	F-P-W	F-P-W	F-P-W	F-P-W	F-P-W

Tmax T6				
	N	S	H	L
Rated current, Iu (A)	630/800/1000	630/800/1000	630/800/1000	630/800/1000
Rated service voltage, Ue (AC) (V)	690	690	690	690
(DC) (V)	750	750	750	750
Rated ultimate short-circuit breaking capacity, Icu				
220/230 V AC (kA)	70	85	100	200
380/415 V AC (kA)	36	50	70	100
440 V AC (kA)	30	45	50	80
500 V AC (kA)	25	35	50	65
690 V AC (kA)	20	22	25	30
Rated service short-circuit breaking capacity, Ics				
220/230 V AC (%Icu)	100%	100%	100%	75%
380/415 V AC (%Icu)	100%	100%	100%	75%
440 V AC (%Icu)	100%	100%	100%	75%
500 V AC (%Icu)	100%	100%	100%	75%
690 V AC (%Icu)	75%	75%	75%	75%
Utilization category **)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)	B(630A-800A) -A(1000A)
Rated short-circuit making capacity, Icm				
220/230 V AC (kA)	154	187	220	440
380/415 V AC (kA)	75,6	105	154	220
440 V AC (kA)	63	94,5	105	176
500 V AC (kA)	52,5	73,5	105	143
690 V AC (kA)	40	46	52,5	63
Version	F-W	F-W	F-W	F-W

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		Tmax T7			
		S	H	L	V (7)
Rated current, I _n	(A)	800/1000/ 1250/1600	800/1000/ 1250/1600	800/1000/ 1250/1600	800/1000/ 1250/1600
Rated service voltage, U _e (AC)	(V)	690	690	690	690
	(DC)	-	-	-	-
Rated ultimate short-circuit breaking capacity, I _{cu}	(kA)	85	100	200	200
220/230 V AC	(kA)	50	70	120	150
380/415 V AC	(kA)	50	65	100	130
440 V AC	(kA)	40	50	85	100
500 V AC	(kA)	30	42	50	60
690 V AC	(kA)				
Rated service short-circuit breaking capacity, I _{cs}	(%I _{cu})	100%	100%	100%	100%
220/230 V AC	(%I _{cu})	100%	100%	100%	100%
380/415 V AC	(%I _{cu})	100%	100%	100%	100%
440 V AC	(%I _{cu})	100%	100%	100%	100%
500 V AC	(%I _{cu})	100%	100%	75%	100%
690 V AC	(%I _{cu})	100%	75%	75%	75%
Utilization category ***)		B	B	B	B
Rated short-circuit making capacity, I _{em}	(kA)	187	220	440	440
220/230 V AC	(kA)	105	154	264	330
380/415 V AC	(kA)	105	143	220	286
440 V AC	(kA)	84	105	187	220
500 V AC	(kA)	63	88,2	105	132
690 V AC	(kA)				
Version		F-W	F-W	F-W	F-W

*) I_{cw} = 5 kA,**) I_{cw} = 7,6 kA (630 A) - 10 kA (800 A),***) I_{cw} = 20 kA (S, H, L version) - 15 kA (V version).

F = Front,

P = Plug-in circuit-breakers,

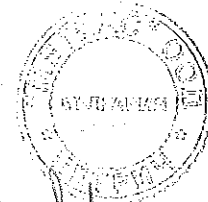
W = Withdrawable circuit-breakers.

Trip units:	T1	T2	T3	T4	T5	T6	T7
Thermomagnetic:							
T adjustable, M fixed TMD	X	X	X	X(2)	-	-	-
T adjustable, M adjustable (5...10 x I _n) TMA	-	-	-	X(3)	X(4)	X(6)	-
T adjustable, M fixed (3...5 x I _n) TMG	-	X	X	-	-	-	-
T adjustable, M adjustable (2,5...5 x I _n) TMG	-	-	-	-	X(5)	-	-
Magnetic only	-	X(1)	X	X	-	-	-
Electronic:							
PR221DS	-	X	-	X	X	X	-
PR222DS	-	-	-	X	X	X	-
PR223DS	-	-	-	X	X	X	-
PR231/P	-	-	-	-	-	-	X
PR232/P	-	-	-	-	-	-	X
PR331/P	-	-	-	-	-	-	X
PR332/P	-	-	-	-	-	-	X

- (1) - MF up to I_n 12,5 A,
 (2) - up to 50 A,
 (3) - up to 250 A,
 (4) - up to 500 A,
 (5) - up to 500 A,
 (6) - up to 800 A (W version is not available on T6 1000 A),
 (7) - only for T7 800/1000/1250 A.

2. DOCUMENTS AND DRAWINGS :

As per Manufacturer's technical catalogue N° 1SDC210015D0202.



3. TEST REPORTS :

ABB SACE test reports Nos LBRP 8013/00 issued on 08.09.2008 and LBRP 7876/01 issued on 20.12.2007.
Intertek test reports Nos E 133S220765_25a, E 133S220765_25aR, E 133S220765_25b and E 133S220765_25bR issued on 28.06.2007.

CESI test report No A7027438 issued on 26.02.2008.

LOVAG Certificates of Conformity Nos: IT 07.001 to IT 07.014, IT 07.040 ; IT 07.062, IT 07.075 to IT 07.078, IT 08.009, IT 08.010, IT 08.018 to IT 08.020, IT 08.051 to IT 08.054, IT 08.074, IT 08.075, IT 08.078 and IT 08.079 including performance test reports.

4. APPLICATION / LIMITATION :

4.1 - Approval also valid for ships to be granted with the notations: **AUT-UMS, AUT-CCS, AUT-PORT and AUT-IMS.**
4.2 - According to BV Rules for the Classification of Steel Ships and IEC 60947-2.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The above circuit breakers are to be manufactured, examined and tested by **ABB SACE S.p.A.**, in accordance with the type described in this certificate and Bureau Veritas Rules for the Classification of Steel Ships.
5.2 - Production sites are to be recognized by Bureau Veritas as per NR320 for HBV products. To this end **ABB SACE S.p.A.** have to make the necessary arrangements for a Society's Surveyor to perform visits and product audits at the production sites.
5.3 - **ABB SACE S.p.A.** have declared to Bureau Veritas that the type of products described in this certificate are manufactured at the following production site:

ABB SACE S.p.A.
Via Baloni 35
I-24123 Bergamo, Italy

6. MARKING OF PRODUCT :

According to IEC 60947-2 specifications.

7. OTHERS :

This approval is given on the understanding that the Society reserves the right to require check tests to be carried out on the units at any time and that **ABB SACE S.p.A. - Bergamo - Italy** will accept full responsibility for informing shipbuilders, shipowners or their sub-contractors of the proper methods of use and general maintenance of the units and the conditions of this approval.

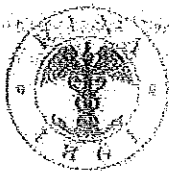
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This certificate consists of 6 page(s)



TYPE APPROVAL CERTIFICATE
No. EEE310910CS/001

This is to certify that the product below is found to be in compliance with the applicable requirements of the RINA type approval system.

<i>Description</i>	Moulded-case circuit breaker
<i>Type</i>	T7 & T7 M series equipped with electronic release type PR331/P-PR332/P-PR231/P-PR232/P T7S T7S M T7H T7H M T7L T7L M T7V T7V M T7X
<i>Applicant</i>	ABB S.P.A. - ABB SACE DIVISION VIA BAIONI, 35 24123 BERGAMO ITALY
<i>Manufacturer</i>	ABB S.P.A. - ABB SACE DIVISION
<i>Place of manufacture</i>	VIA ENRICO FERMI, 14 03100 FROSINONE ITALY
<i>Reference standards</i>	IEC 60947-2: 2003; IEC 60947-2: 2006

Issued in Genoa on January 29, 2012. This Certificate is valid until July 6, 2014

Valerio Bonanni

RINA
Valerio Bonanni



This certificate consists of this page and 1 enclosure (from page 1/3 to page 1/3)

Type Approval certifies that a representative sample of the product has been found to meet the applicable design criteria. In the case the Manufacturer intends to modify a certified product, the Society is to be informed on all the contemplated modifications.

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TYPE APPROVAL CERTIFICATE

No. ELE310910CS/001

Enclosure - Page 1 of 3

T7 & T7 M series equipped with electronic release type PR331/P-PR332/P-PR231/P-PR232/P

Product Description

Moulded-case circuit-breakers type T7 fitted with electronic releases type PR231/P, PR232/P, PR331/P and PR332/P with:
- manual operating mechanism or
- motorized stored energy operating mechanism (series M).

Technical Data

- Ambient air temperature: 40°C (**)
- Rated frequency: 50/60 Hz
- Number of poles: 3, 4
- Rated operational voltage (Ue): 690 V
- Rated current (In): 800, 1000, 1250, 1600 A
- Utilization Category: B
- Rated short-circuit capacity:

Rated service short circuit breaking capacity (Ics)
Rated ultimate short circuit breaking capacity (Icu)
Rated short circuit making capacity (Icm)
Rated short-time withstand current (Icw)

T7S 800 / T7S 1000 / T7S 1250 / T7S 1600
T7S 800 M / T7S 1000 M / T7S 1250 M / T7S 1600 M

Table with 5 columns: Ue (V), Ics (kA), Icu (kA), Icm (kA), Icw (kA). Rows for 230, 415, 440, 500, 690 V.

(*) See remarks

T7H 800 / T7H 1000 / T7H 1250 / T7H 1600
T7H 800 M / T7H 1000 M / T7H 1250 M / T7H 1600 M

Table with 5 columns: Ue (V), Ics (kA), Icu (kA), Icm (kA), Icw (kA). Rows for 230, 415, 440, 500, 690 V.

(*) See remarks

T7L 800 / T7L 1000 / T7L 1250 / T7L 1600
T7L 800 M / T7L 1000 M / T7L 1250 M / T7L 1600 M

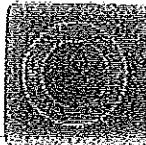
Table with 5 columns: Ue (V), Ics (kA), Icu (kA), Icm (kA), Icw (kA). Rows for 230, 415, 440, 500, 690 V.

(*) See remarks

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TYPE APPROVAL CERTIFICATE

No. ELE310910CS/001

Enclosure - Page 2 of 3

T7 & T7 M series equipped with electronic release type PR331/P-PR332/P-PR231/P-PR232/P

Technical Data

- Ambient air temperature: 40°C (**)
- Rated frequency: 50/60 Hz
- Number of poles: 3, 4
- Rated operational voltage (Ue): 690 V
- Rated current (In): 800, 1000, 1250 A
- Utilization Category: B
- Rated short-circuit capacity:

Rated service short circuit breaking capacity (Ics)

Rated ultimate short circuit breaking capacity (Icu)

Rated short circuit making capacity (Icm)

Rated short-time withstand current (Icw)

T7V 800 / T7V 1000 / T7V 1250

T7V 800 M / T7V 1000 M / T7V 1250 M

Ue (V)	Ics (kA)	Icu (kA)	Icm (kA)	Icw (kA)
230	200	200	440	15
415	150	150	330	15
440	130	130	286	15
500	100	100	220	15
690	45	60	132	15

(*) See remarks

Technical Data

- Ambient air temperature: 45°C
- Rated frequency: 50/60 Hz
- Number of poles: 3, 4
- Rated operational voltage (Ue): 690 V
- Rated current (In): 800 A
- Utilization Category: A
- Rated short-circuit capacity:

Rated service short circuit breaking capacity (Ics)

Rated ultimate short circuit breaking capacity (Icu)

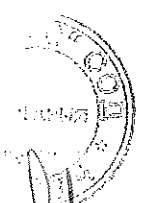
Rated short circuit making capacity (Icm)

T7X 800

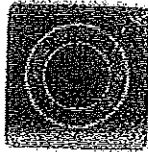
Ue (V)	Ics (kA)	Icu (kA)	Icm (kA)
230	170	170	374
415	170	170	374
440	170	170	374
500	75	75	165
690	75	75	165

(*) See remarks

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TYPE APPROVAL CERTIFICATE

No: ELE310910CS/001

Enclosure - Page 3 of 3

T7 & T7 M series equipped with electronic release type PR331/P-PR332/P-PR231/P-PR232/P

Documents

- CESI Test Report n° A07027438 issued on 26/02/2008.
- CESI Test Report n° A9027593 issued on 30/09/2009.
- ABB SACE Test Report n° LBRRP 7876/01 issued on 20.12.2007.
- ABB SACE Test Report n° LBRRP 10210/00 & LBRRP 10210/01 issued on 01.08.2010.
- ABB SACE Test Report n° LBRRP 8013/00 issued on 08.09.2008 & n° LBRS 8014/00 Rev. 1 issued on 11.05.2009.
- INTERTEK Test Report n° E13382207G5_25aR issued on 25/06/2007, n° E13382207G5_25aR issued on 28/06/2007, n° E13382207G5_25a issued on 28/06/2007 & n° E13382207G5_25b issued on 28/06/2007.
- LOVAG Test Reports n° IT 07.002, IT 07.005, IT 07.007, IT 07.008, IT 07.009, IT 07.013, IT 07.012, IT 07.003, IT 07.011, IT 07.006, IT 07.014, IT 07.010, IT 07.040, IT 07.002, IT 07.077, IT 07.078, IT 07.075, IT 07.076, IT 08.019, IT 08.010, IT 08.018, IT 08.020, IT 08.009, IT 08.051, IT 08.052, IT 08.053, IT 08.054, IT 08.079, IT 08.074, IT 08.075, IT 08.078.
- LOVAG Test Reports n° IT 10.050, IT 10.049 issued on 07.04.2010 and n° IT 11.003 issued on 01.12.2010,
- INTERTEK Test Report n° 706088 issued on 04.02.2009.
- INTERTEK Test Report n° 706088 issued on 06.02.2009.

Remarks

The present *Type Approval Certificate* annuls and replaces the *Type Approval Certificate* n° ELE588208CS/004 issued on 06/07/2009.

(*) Circuit breakers type T7S, T7S M, T7H, T7H M, T7L, T7L M, T7V, T7V M are type approved according to IEC 60947-2:2003. Circuit breakers type T7X are type approved according to IEC 60947-2:2006; they are suitable for use in an IT systems.

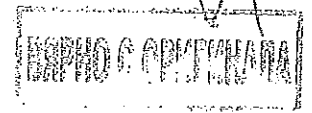
(**) A derating of the rated current is to be considered with an ambient temperature of 45 °C according to ABB Catalogue 1SDC210015D0903 Ed.2008.

Genoa January 20, 2012

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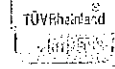
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Management
System
ISO 9001:2008
OHSAS 18001:2007

Management
System
ID: 515502455



Management
System
ISO 14001:2004

Management
System
ID: 514416535

ПРИЛОЖЕНИЕ 9.4.6

Техническо описание и чертежи с нанесени размери на монтажни планки, единичната цена на които не се включва в цената на прекъсвачите

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“
РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

Наименование на материала: Вертикален разединител NH 1000 A, с триполюсно управление

Съкратено наименование на материала: ВР NH 1000 A, 3-полюсно управление

Област: Н -- Трансформаторни постове Категория: 16 - Предпазители, основи за предпазители и предпазител- разединители

Мерна единица: Брой Аварийни запаси: Да

Характеристика на материала:

Триполюсен разединител с вертикална конструкция, с обявен работен ток 1000 А, с общо управление на полюсите, за директен монтаж върху събирателни шини с междусово разстояние 185 mm, съоръжен с твърди връзки (тоководещи шини), система А (NH система), размер 3, съответстващи на БДС EN 60269-1 и БДС HD 60269-2.

Използване:

Вертикалният предпазител-разединител е предназначен за свързване на шинните системи на разпределителните табла посредством едножилни кабели NH.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Триполюсният вертикален разединител за 1000 А, с общо управление на полюсите

трябва да отговаря най-малко на посочените по-долу стандарти или еквиваленти и на техните валидни изменения и допълнения:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и
- БДС EN 60947-3:2009 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товарови прекъсвач-разединители и апарати комбинирани със стопяеми предпазители (IEC 60947-3:2008)“;
- БДС EN 60269-1:2007 „Стопяеми предпазители за ниско напрежение. Част 1: Общи изисквания (IEC 60269-1:2006)“;
- БДС HD 60269-2:2013 „Стопяеми предпазители за ниско напрежение. Част 2: Допълнителни изисквания за стопяеми предпазители, предназначени за използване от квалифицирани лица (стопяеми предпазители предимно за промишлено приложение). Примери за стандартизирани системи за стопяеми предпазители от А до К (IEC 60269-2:2013, с промени)“;
- БДС EN 60664-1:2007 „Координация на изолацията за съоръжения в електроразпределителни мрежи за ниско напрежение. Част 1: Правила, изисквания и изпитвания (IEC 60664-1:2007)“;
- БДС EN 60529+A1:2004 „Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989 + A1:1999)“

и

да бъде оценен положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за

използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	SLT3-3SR/3X3/1000 Jean Muller, Германия, Приложение 9.2.1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.2.2
3.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.2.3
4.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 3 – заверено копие	Приложение 9.2.4
5.	ЕО декларация за съответствие	Приложение 9.2.5
6.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“ по-горе	Приложение 9.2.6

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от проверките и изпитванията могат да бъдат и само на английски.)

Технически данни:

1. Характеристики на работната среда

№ по ред	Наименование	Стойност
1.1	Място на монтиране	На закрито
1.2	Максимална температура на въздуха в околната среда	+ 40°C
1.3	Минимална температура на въздуха в околната среда	Минус 5°C
1.4	Максимална средна температура на въздуха в околната среда за период от 24 ч.	+ 35°C

№ по ред	Наименование	Стойност
1.5	Относителна влажност (при 20°C)	До 90 %
1.6	Степен на замърсяване	3
1.7	Надморска височина	До 2000 m

2. Параметри на електроразпределителната мрежата НН

№ по ред	Наименование	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Електроразпределителна мрежа	4 проводна мрежа (L ₁ , L ₂ , L ₃ , PEN)
2.5	Схема на електроразпределителната мрежа	TN-C

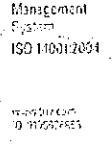
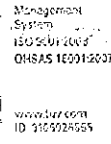
3. Технически параметри и други данни

№ по ред	Технически характеристики	Изискване	Гарантирано предложение
3.1	Обявено работно напрежение, U _e	690 (500) V AC	500 V AC
3.2	Брой на полюсите	3	3
3.3	Обявена честота	50 Hz	50 Hz
3.4	Категория по пренапрежение съгласно БДС EN 60664-1	IV	IV
3.5	Обявено издържано импулсно напрежение, U _{imp}	8 kV	12 kV
3.6	Обявено напрежение на изолацията, U _i , AC	min 800 V	1000 V AC

№ по ред	Технически характеристики	Изисквано	Гарантирано предложение
3.7	Обявен работен ток, I_b	1000 A	1000 A
3.8	Термичен ток със стопяема вложка, I_{th}	1000 A	1000 A
3.9	Условен ток на късо съединение (ефективна стойност) при 400 V AC	min 50 kA	120 kA
3.10	Размер на твърдите връзки/тоководещи шини (съгласно серията БДС EN 60269)	3	3
3.11	Максимален обявен ток на стопяемите вложки, I_n	1000 A	1000 A
3.12	Категория на приложение (при 400 V AC)	AC 20 B или по-висока	AC 22 B
3.13	Механична износоустойчивост, брой на комутационните цикли	min 500	800
3.14	Електрическа износоустойчивост, брой на комутационните цикли	min 100	100
3.15	Управление	Триполюсно (едновременно включване и изключване на трите полюса)	Триполюсно (едновременно включване и изключване на трите полюса)
3.16	Основни размери:	-	-
3.16а	широчина	max 100 mm	99 mm
3.16б	височина (измерена от края на клемните съединения)	680 mm - информативно	662 mm
3.17	Разстояние между осите на събирателните шини	185 mm	185 mm
3.18	Присъединяване към събирателните шини	Клеми за свързване без необходимост от пробиване на шините	Клеми за свързване без необходимост от пробиване на шините

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№ по ред	Технически характеристики	Изискване	Гарантирано предложение
3.19	Степен на защита срещу проникване на твърди тела и вода във вътрешността и допир до части под напрежение от лицевата страна съгласно БДС EN 60529+A1 или еквивалентно.	min IP20	IP30
3.20	Клемови съединения за токопроводимите жила на присъединяваните кабелни линии	Вертикалните разединители трябва да бъдат съоръжени с V-съединителна арматура за свързване на токопроводими кабелни жила в диапазона най-малко от 185 mm ² ге до 240 mm ² sm.	Присъединяването се осъществява чрез плоска съединителна клема за кабелни обувки съобразено с изискването за СЕКЦИОНИРАНЕ м/у двете РТ от 4 кабела 240мм2 на фаза.
3.21	Маркировка	Вертикалните разединители трябва да бъде маркирани с информацията съгласно т. 5.2 от БДС EN 60947-3 или еквивалентно и инициалите „СЕ“.	Вертикалните разединители са маркирани с информацията съгласно т. 5.2 от БДС EN 60947-3 или еквивалентно и инициалите „СЕ“.
3.22	Тегло, kg	Да се посочи	8,5 kg



ПРИЛОЖЕНИЕ 9.5.1

Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

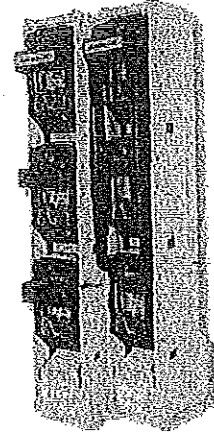
РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**

NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

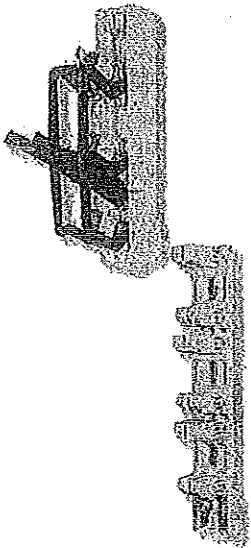
NH-Sicherungslastschaltleisten Größe 1-3 für
185mm Sammelschienensysteme
NH strip-type fuse-switch-disconnectors
size 1 to 3 for 185mm busbar systems



Vorteile, die überzeugen

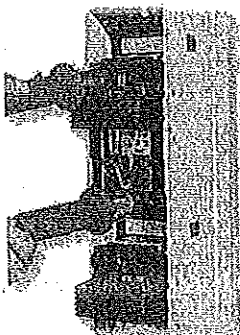
Schalthebel

- Langer Schalthebel für sicheres und schnelles Schalten
- Abschließbar mit bis zu 3 Vorhängeschlössern in EIN- und AUS-Stellung



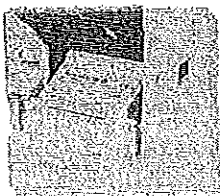
Montage

- Sichere Montage unter Spannung durch stets berührgeschütztes Kontaktsystem
- Nachrüstbare Montagehaken



Messung und Überwachung

- Sichere Spannungsmessung durch Prüflöcher über den Sicherungsaufnahmekontakten
- Elektronische Sicherungsüberwachung oder Sicherungsüberwachung durch Motorschutzschalter
- Einsatz von Wandlersicherungen für temporäre Strommessungen



Anschlussraumabdeckung

- Anschlussraumabdeckung im Gerät integriert
- Typenschild auch im eingebauten Zustand jederzeit lesbar

Convincing advantages

Operating lever

- Long operating lever for safe and reliable switching
- Lockable with up to 3 padlocks in both ON and OFF position

Installation

- Safe installation on live busbars due to always touch proof contacts
- Retrofittable mounting hooks

Measuring and monitoring

- Safe voltage testing through test holes leading to blade-contacts
- Electronic fuse monitoring or fuse-monitoring by means of motor circuit-breaker
- Current-transformer (c.t.) fuse-links for temporary current measurements

Terminal cover

- Integrated in NH strip-type fuse-switch-disconnector
- Markings always readable before and after installation

Größe 1-2 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > OMEGA Kontaktsystem > 1-polig schaltbar
 Size 1-2 > 185mm busbar system > Terminal at top or bottom side > OMEGA contact system > 1-pole switchable

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm)	I (A)	VE PU	Typ Type	Artikel-Nr. Article-No.
1	Flachanschluss M10 Flat terminal M10	25-150			SL1H-3X/3A	L193100103
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	250		SL1H-3X/9/KM2G-F	L199600403
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL1H-3X/9/KM2G	L199602903
2	Flachanschluss M12 Flat terminal M12	25-240		1	SL2H-3X/3A	L293100103
	Stehbolzenanschluss M12x35 Stud bolt terminal M12x35	25-240			SL2H-3X/4A	L294100203
	Stehbolzenanschluss M12x60 Stud bolt terminal M12x60	25-240	400		SL2H-3X/4A-60	L294100303
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240			SL2H-3X/9/KM2G-F	L299600403
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL2H-3X/9/KM2G	L299600503

NH-Sicherungs-
leisten
NH strip-
fuseways

NH-Sicherungs-
lastschaltleisten
NH strip
type fuse switch
disconnectors

Größe 2 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > OMEGA Kontaktsystem
 > 1-polig schaltbar > Versenkbarer Griff
 Size 2 > 185mm busbar system > Terminal at top or bottom side > OMEGA contact system
 > 1-pole switchable > Retractable handle

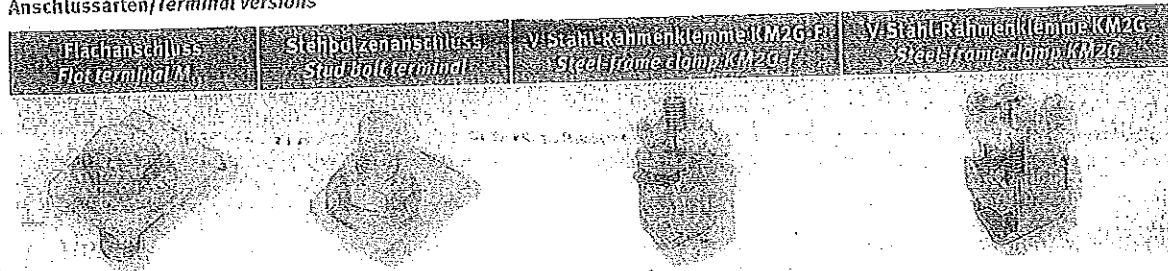
2	Flachanschluss M12 Flat terminal M12	25-240			SL2H-3X/3A/GV	L293100603
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	400	1	SL2H-3X/9/KM2G-F/GV	L299600903
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL2H-3X/9/KM2G/GV	L299601003

NH-Sicherungs-
lasttrenn-
schalter
NH fuse switch-
disconnectors

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CIOISMIO®

Klemmen
Terminals

Anschlussarten/Terminal versions



Anhang
Appendix

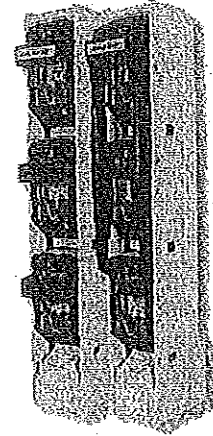
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NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

NH-Sicherungsleisten Größe 1-3 DELTA und OMEGA Kontaktsystem NH strip-fuseways size 1-3 DELTA and OMEGA contact system



Vorteile, die überzeugen

- OMEGA Kontaktsystem**
 - Maximale Sicherheit dank hohem Kurzschlussleistungsfähigkeit (120kA/500V)
 - Gefahrloser Betrieb durch hohe Schaltleistung bis zu AC-23B (400V/400A)
 - Korrosionsfreie Edelstahl-Fremdfederung
- Robustes und alterungsbeständiges Kontaktsystem mit hohen Rückstellleistungen



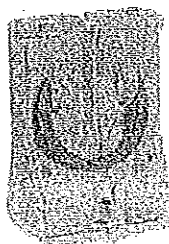
DELTA Kontaktsystem

- Gezielte Lichtbogenführung und geringer Kontaktverschleiß durch Opferelektroden
- Gefahrloser Betrieb durch hohe Schaltleistung bis zu AC-23B (400V/630A)
- Hohe Alterungsbeständigkeit durch zwei voneinander unabhängige Fremdfedermente
- Optimale Kontaktierung und niedrige Verlustleistung durch 2fach-Linienkontaktsystem
- Hohe Kurzschlussfestigkeit bis zu 120kA durch integrierte Kurzschlussblockade



Einsatz

- Das OMEGA Kontaktsystem bietet für die typischen Anwendungen im Bereich der Versorgungsnetzbetreiber für Geräte der Größe 1 und 2 ein ideal angepasstes Leistungsprofil
- Das DELTA Kontaktsystem sorgt mit seiner Stromtragfähigkeit von bis zu 1000A Dauerstrom insbesondere in industriellen Anwendungen sowie in Geräten mit einem Bemessungsstrom von >400A für hervorragende Lastschalteigenschaften



Convincing advantages

OMEGA contact system

- Maximum safety thanks to high short-circuit making capacity (120kA/500V)
- Riskless operation due to high switching capacity up to AC-23B (400V/400A)
- Corrosion-resistant external spring elements made by stainless steel
- Robust and age-resistant contact system with high restoring properties

DELTA contact system

- Defined arc initiation and low contact wear due to sacrificial electrodes
- Riskless operation due to high switching capacity up to AC-23B (400V/630A)
- High age resistance by two independent spring elements
- Optimal contacting and low power loss by dual line contact system
- High short-circuit strength up to 120kA by integrated short circuit pinch-stop

Application

- The OMEGA contact system offers an optimum performance profile for size 1 and 2 devices to be installed in power utility networks

- The DELTA contact system, having continuous current carrying capability up to 1000A, provides excellent load-break capability in industrial applications and in switching devices having rated currents above 400A



Größe 1-3 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem > 1-polig schaltbar
 Size 1-3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system > 1-pole switchable

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	VE (V)	Typ Type	Artikel-Nr. Article No.
1	Flachanschluss M10 Flat terminal M10	25-150			SL1-3X/3A	L1931001
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	250		SL1-3X/9/KM2G-F	L1996004
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL1-3X/9/KM2G	L1996029
2	Flachanschluss M12 Flat terminal M12	25-240			SL2-3X/3A	L2931001
	Stehbolzenanschluss M12x35 Stud bolt terminal M12x35	25-240			SL2-3X/4A	L2941002
	Stehbolzenanschluss M12x60 Stud bolt terminal M12x60	25-240	400		SL2-3X/4A-60	L2941003
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240		1	SL2-3X/9/KM2G-F	L2996004
3	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL2-3X/9/KM2G	L2996005
	Flachanschluss M12 Flat terminal M12	25-300			SL3-3X/3A	L3931001
	Stehbolzenanschluss M12x35 Stud bolt terminal M12x35	25-300			SL3-3X/4A	L3941002
	Stehbolzenanschluss M12x60 Stud bolt terminal M12x60	25-300	630		SL3-3X/4A-60	L3941003
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240			SL3-3X/9/KM2G-F	L3996018
2x3	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300			SL3-3X/9/KM2G	L3996004
	Flachanschluss 3 x M12 Flat terminal 3 x M12	3 x 300, 4 x 185	1250		SL3-3X2/1250/HA	L3921400

NH-Sicherungs-
leisten
NH strip-
fuseways



NH-Sicherungs-
lasttrenn-
schalter
NH fuse-switch-
disconnectors

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Größe 2-3 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem
 > 1-polig schaltbar > Versenkbarer Griff
 Size 2-3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system
 > 1-pole switchable > Retractable handle

Klemmen
Terminals

2	Flachanschluss M12 Flat terminal M12	25-240			SL2-3X/3A/GV	L2931006
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	400		SL2-3X/9/KM2G-F/GV	L2996009
3	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300		1	SL2-3X/9/KM2G/GV	L2996010
	Flachanschluss M12 Flat terminal M12	25-300			SL3-3X/3A/GV	L3931005
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	630		SL3-3X/9/KM2G-F/GV	L3996048

Anhang
Appendix

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NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

Größe 1-3 > 185mm Sammelschienenensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem > 3-polig schaltbar
 Size 1-3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system > 3-pole switchable



Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	VE PU	Typ Type	Artikel-Nr. Article No.
1	Flachanschluss M10 Flat terminal M10	25-150	250		SL1-3X3/3A	L1031001
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	250		SL1-3X3/9/KM2G-F	L1096004
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300	250		SL1-3X3/9/KM2G	L1096026
2	Flachanschluss M12 Flat terminal M12	25-240	400		SL2-3X3/3A	L2031001
	Stehbolzenanschluss M12x35 Stud bolt terminal M12x35	25-240	400		SL2-3X3/4A	L2041002
	Stehbolzenanschluss M12x60 Stud bolt terminal M12x60	25-240	400		SL2-3X3/4A-60	L2041003
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	400		SL2-3X3/9/KM2G-F	L2096015
3	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300	400		SL2-3X3/9/KM2G	L2096005
	Flachanschluss M12 Flat terminal M12	25-300	630		SL3-3X3/3A	L3031001
	Stehbolzenanschluss M12x35 Stud bolt terminal M12x35	25-300	630		SL3-3X3/4A	L3041002
	Stehbolzenanschluss M12x60 Stud bolt terminal M12x60	25-300	630		SL3-3X3/4A-60	L3041003
	V-Stahl-Rahmenklemme KM2G-F Steel-frame clamp KM2G-F	25-240	630		SL3-3X3/9/KM2G-F	L3096012
	V-Stahl-Rahmenklemme KM2G Steel-frame clamp KM2G	25-300	630		SL3-3X3/9/KM2G	L3096004
	Flachanschluss 3 x M12 Flat terminal 3 x M12	3 x 300, 4 x 185	1250		SL3-3X6/1250/HA	L3021400

Größe 1-3 > 185mm Sammelschienenensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem > 3-polig schaltbar >
 Elektronische Sicherungsüberwachung ES00
 Size 1-3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system > 3-pole switchable >
 Electronic fuse-monitoring unit ES00

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	VE PU	Typ Type	Artikel-Nr. Article No.
1	Flachanschluss M10 Flat terminal M10	25-150	250		SL1-3X3/3A/ES00	L1031720
2	Flachanschluss M12 Flat terminal M12	25-240	400	1	SL2-3X3/3A/ES00	L2031720
3	Flachanschluss M12 Flat terminal M12	25-300	630		SL3-3X3/3A/ES00	L3031720

Zubehör/Accessories	Technische Daten/Technical data	Maßzeichnungen/Dimensions
Seite/Page: SL-32ff.	Seite/Page: SL-4ff.	Seite/Page: SL-60f., SL-66

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Größe 3 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem > 1-polig schaltbar
Size 3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system > 1-pole switchable

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	U (V)	Typ Type	Artikel-Nr. Article-No.
3	Flachanschluss 2 x M12 Flat terminal 2 x M12	2 x 300, 3 x 120	1000		SL3-3X/1000/HA/TM3 ¹⁾	L3921300
	Flachanschluss 3 x M12 Flat terminal 3 x M12	3 x 300, 4 x 185	1600	1	SL3-3X2/1600/HA/TM3 ¹⁾	L3921402
2 x 3	Flachanschluss 4 x M12 Flat terminal 4 x M12	4 x 300	2000		SL3-3X2/2000/HA	L3921507

Größe 3 > 185mm Sammelschienensystem > Kabelabgang oben oder unten > DELTA Kontaktsystem > 3-polig schaltbar
Size 3 > 185mm busbar system > Terminal at top or bottom side > DELTA contact system > 3-pole switchable

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	U (V)	Typ Type	Artikel-Nr. Article-No.
3	Flachanschluss 2 x M12 Flat terminal 2 x M12	2 x 300, 3 x 120	1000		SL3-3X3/1000/HA/TM3 ¹⁾	L3021300
	Flachanschluss 3 x M12 Flat terminal 3 x M12	3 x 300, 4 x 185	1600	1	SL3-3X6/1600/HA/TM3 ¹⁾	L3021401
2 x 3	Flachanschluss 4 x M12 Flat terminal 4 x M12	4 x 300	2000		SL3-3X6/2000/HA	L3021501

1) Einschleiflich Trennmesser 1250A/Including solid link 1250A

Größe 3 > 185mm Sammelschienensystem > Einspeisung rücksseitig auf Sammelschienensystem > DELTA Kontaktsystem
Size 3 > 185mm busbar system > Supply at rear side to busbar system > DELTA contact system

Größe Size	Anschlussart Terminal version	Anschluss Connection (mm²)	I (A)	U (V)	Typ Type	Artikel-Nr. Article-No.
3	1-polig/1-pole	2 x 300	1000	1	SL3-3X/1000/ARO/TM3 ¹⁾	L3920303
	3-polig/3-pole				SL3-3X3/1000/ARO/TM3 ¹⁾	L3020303

1) Einschleiflich Trennmesser 1250A/Including solid link 1250A

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Anschlussarten/Terminal versions

Flachanschluss 2 x M12 Flat terminal 2 x M12	Flachanschluss 3 x M12 Flat terminal 3 x M12	Flachanschluss 4 x M12 Flat terminal 4 x M12
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NH-Sicherungs-
leisten
NH strip-
fuseways



NH-Sicherungs-
lasttrenn-
schalter
NH fuse-switch-
disconnectors

CIO/SIMIO[®]
CIO/SIMIO[®]

Klemmen
Terminals

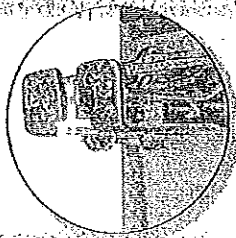
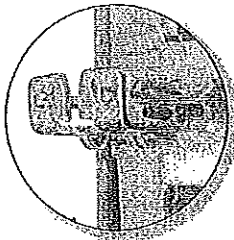
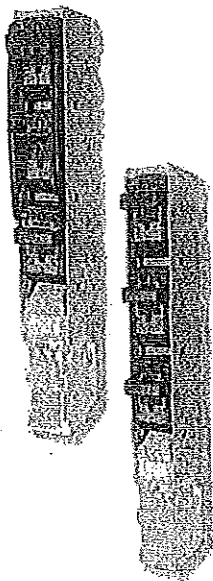
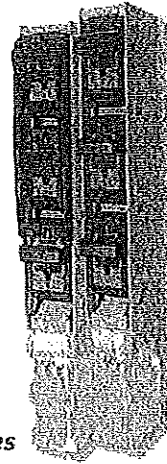
Anhang
Appendix

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NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

NH-Sicherungslastschaltleiste SL3/910A und SL3/910Aplus NH strip-type fuse-switch-disconnector SL3/910A and SL3/910Aplus



Vorteile, die überzeugen

Großzügige Dimensionierung

- Geringe Verlustleistung dank 480mm² Querschnitt bei Einspeisewinkeln und Abgangsschienen
- Niedrige Kontakttemperaturen durch gute Wärmeabführung

Gute Anschlussbedingungen

- Spezielle Anschlusselemente ermöglichen 2-Leiteranschluss bis 2x300mm² oder 3-Leiteranschluss bis 3x185mm²
- Einfache Montage auf Sammelschienen-system durch 100mm Baubreite

SL3/910A

- Standardgerät für übliche Anwendungen der Versorgungsnetzbetreiber
- DELTA Kontaktsystem für hohe Schaltleistung

SL3/910Aplus

- Kontaktsystem DELTAplus für erschwerte Einsatzbedingungen
- Sechs unabhängig befederte Linienkontakte pro Sicherungsaufnahmekontakt für beste Kontaktierung

Convincing advantages

Generously dimensioned

- Low power loss thanks to 480mm² cross section of feeding contacts and terminal bars
- Low contact temperature-rise due to excellent heat dissipation

Fast and easy connecting

- Special connectors enable the connection of two conductors up to 2x300mm² or three conductors up to 3x185mm² cross section
- Easy installation on busbars due to uniform 100mm width

SL3/910A

- Standard Product for regular power utility applications
- DELTA contacts for superior breaking capacity

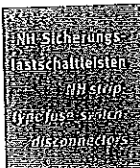
SL3/910Aplus

- DELTAplus contacts for severe operating conditions
- Six independent spring loaded linear contacts corresponding to each blade contact provide optimum contact performance

Größe 3/910A > 185mm Sammelschienensystem > Sekundärschutz von 630kVA-Transformatoren > DELTA Kontaktsystem
 Size 3/910A > 185mm busbar system > Secondary protection of 630kVA transformers > DELTA contact system

Schaltbarkeit Switching mode	Einspeisung Supply	Anschlussart terminal version	I (A)	VE PU	Typ Type	Artikel-Nr. Article No.
1-polig/1-pole	Oben oder unten Top or bottom side	2 x M12	910	1	SL3-3X/910/HA	L3921200
		1 x M16			SL3-3X/910/AO/AU-100	L3920208
		1 x M16			SL3-3X/910/AO/AU-75	L3920210
		2 x M12			SL3-3X/910/AO/AU-65	L3920214
		1 x M12			SL3-3X/910/ARO	L3920203
	Rückseitig From rear side	1 x M16			SL3-3X/910/ARO/110	L3920206
		1 x M16			SL3-3X/910/ARUS	L3920204
		1 x M16			SL3-3X/910/AORL	L3920220
		2 x M12			SL3-3X3/910/HA	L3021200
		1 x M16			SL3-3X3/910/AO/AU-100	L3020208
3-polig/3-pole	Oben oder unten Top or bottom side	1 x M16	SL3-3X3/910/AO/AU-75	L3020210		
		2 x M12	SL3-3x3/910/AO/AU-65	L3020214		
		1 x M12	SL3-3X3/910/AO-102	L3021229		
		1 x M12	SL3-3X3/910/ARO	L3020203		
		1 x M16	SL3-3X3/910/ARO/110	L3020218		
	Rückseitig From rear side	1 x M16	SL3-3X3/910/ARUS	L3020204		
		1 x M16	SL3-3X3/910/AORL	L3020216		
		1 x M16	SL3-3x3/910/AORK	L3020221		
		1 x M16				
		1 x M16				

NH-Sicherungs-
lasten
NH strip-
fuseways



NH-Sicherungs-
lasttrenn-
schalter
NH fuse-switch-
disconnectors

Größe 3/910Aplus > 185mm Sammelschienensystem > Sekundärschutz von 630kVA-Transformatoren > DELTA Kontaktsystem
 Size 3/910Aplus > 185mm busbar system > Secondary protection of 630kVA transformers > DELTA contact system

Schaltbarkeit Switching mode	Einspeisung Supply	Anschlussart terminal version	I (A)	VE PU	Typ Type	Artikel-Nr. Article No.
1-polig/1-pole	Oben oder unten Top or bottom side	2 x M12	910	1	SL3-3X/910+/HA	L392120099
		1 x M12			SL3-3X/910+/ARO	L392020399
3-polig/3-pole	Oben oder unten Top or bottom side	2 x M12			SL3-3X3/910+/HA	L302120099
		1 x M12			SL3-3X3/910+/ARO	L302020399
	Rückseitig From rear side	1 x M12				

CDS/MSO
CDS/MSO

Klemmen
Terminals

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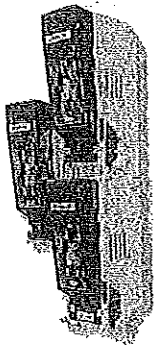
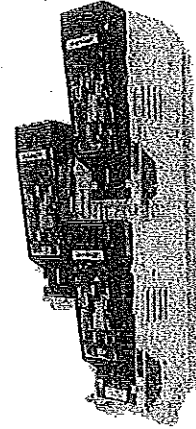
Weitere Ausführungen auf Anfrage/Further versions on request

NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

NH-Sicherungslastschaltleisten Größe 4a

NH strip-type fuse-switch-disconnectors size 4a



Vorteile, die überzeugen

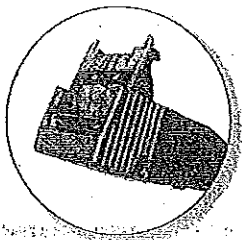
Kompatibilität

- Reduzierte Einbauhöhe bei 248mm Baubreite
- Verschiedene B erührschutzabdeckungen als Zubehör
- Nachrüstbar mit Mikroschaltern zur Sicherungsüberwachung (Schlagmelder-ausführung)
- Schaltstellungsanzeige nachrüstbar



LYRA-Kontaktsystem

- LYRA-Kontaktsystem mit Q-Einschaltilfje für hohes Schaltvermögen
- 4 unabhängig befederte Kontaktschenkel für niedrige Verlustleistung



Hohe Sicherheit

- Sichere Deckelverriegelung für hohe Kurzschlussfestigkeit bis 80kA

Convincing advantages

Compatibility

- Reduced installation height at 248mm width
- Various protective covers available
- Retrofit microswitch for fuse monitoring (striker fuse-links)
- Retrofit switch position monitoring

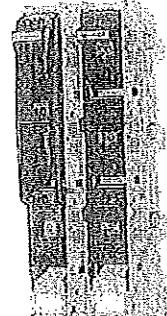
LYRA contact system

- LYRA contact system with Q-making feature
- Four independently spring loaded contact fingers ensure low power loss

High safety level

- Reliable fuse carrier latch for high short-circuit current withstand up to 80kA

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Größe 3 > 185mm Sammelschienenensystem > Sammelschienenlängsttrennung > DELTA Kontaktsystem
Size 3 > 185mm busbar system > Busbar disconnection > DELTA contact system

HH-Sicherungs-
leisten
HH strip-
fuseways



HH-Sicherungs-
lasttrenn-
schalter
HH fuse-switch
disconnectors

Größe Size	Schaltbarkeit Switching mode	Sammelschienenlängsttrennung Busbar disconnection	I _N (A)	VE PU	Typ Type	Artikel-Nr. Article No.
3	3-polig/3-pole	Linksseitig/Left side	630	1	SLT3-3SL/3X3	L3000001
		Rechtsseitig/Right side	630		SLT3-3SR/3X3	L3000002
		Linksseitig/Left side	1000		SLT3-3SL/3X3/1000/TM3 ¹⁾	L3000003
		Rechtsseitig/Right side	1000		SLT3-3SR/3X3/1000/TM3 ¹⁾	L3000004
2 x 3	3-polig/3-pole	Rechtsseitig/Right side	910	SLT3-3SR/3X3/910	L3000201	
		Rechtsseitig/Right side	2000	SLT3-3SR/3X6/2000/TM3 ¹⁾	L3000501	
		Linksseitig/Left side	630	SLT3-3SL/3X	L3900001	
		Rechtsseitig/Right side	630	SLT3-3SR/3X	L3900002	
3	1-polig/1-pole	Linksseitig/Left side	1000	SLT3-3SL/3X/1000/TM3 ¹⁾	L3900003	
		Rechtsseitig/Right side	1000	SLT3-3SR/3X/1000/TM3 ¹⁾	L3900004	
		Rechtsseitig/Right side	910	SLT3-3SR/3X/910	L3900201	
		Rechtsseitig/Right side	2000	SLT3-3SR/3X2/2000/TM3 ¹⁾	L3900501	

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Kleinmen
Terminals



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Größe 4a > 185mm Sammelschienenensystem > 1-polig schaltbar
Size 4a > 185mm busbar system > 1-pole switchable

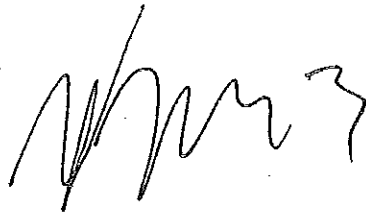
Baubreite Width	Anschlussart terminal type	Kabelanschl. terminal	I _N (A)	VE PU	Typ Type	Artikel-Nr. Article No.
248mm	1 x M16	Unten/Bottom side	1250	4	SLTL4A-3AS/3X/4	L4941000
		Oben/Top side	1250	1	SLTL4A-3AS/3X/4/AO	L4941001

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NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

Kompetenz Competence

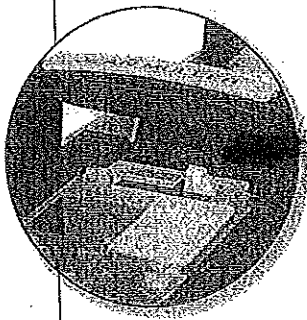


Sonderbauformen/Special versions

Die unterschiedlichen Anwendungsfälle unserer Kunden erfordern besondere Lösungen. Diese zu entwickeln, ist eine Herausforderung, der sich JEAN MÜLLER seit mehr als 115 Jahren erfolgreich stellt. Die Anpassung der Bauformen oder die Ergänzung mit Spezialteilen generiert Kundennutzen. In enger Abstimmung mit unseren Partnern werden solche individuellen technischen Lösungen für besondere Einbausituationen und Anforderungen geschaffen.

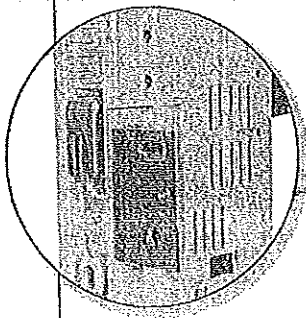
The different applications of our customers require special solutions. JEAN MÜLLER has successfully met the challenge of the development of those extraordinary solutions for more than 115 years. The adaptation of product-versions and the completion with special accessories generates customer's benefit. Individual technical solutions for special built-in applications and requirements are designed in close coordination with our partners.

Sie haben keine Lösung für Ihre Anwendung gefunden?/You haven't found any solution for your application?
Kontaktieren Sie uns!/Please contact us!



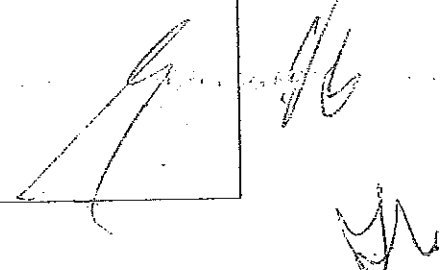
Eine zusätzliche Verriegelung sorgt bei Trennschaltleisten für eine Bemessungskurzzeitstromfestigkeit von 25kA/1s und ermöglicht damit einen Einsatz als Trennschalter auf der Sekundärseite von 630kVA-Transformatoren ($I_k = 22,75\text{kA}$ bei $u_k = 4\%$)

An additional interlock at switch-disconnectors makes sure a rated short-time withstand current of 25kA/1s and enables therewith an usage as switch-disconnector on the secondary side of 630kVA-transformers ($I_k = 22,75\text{kA}$ at $u_k = 4\%$)



Geschlitzte Einspelsewinkel ermöglichen das Einhängen des Schaltgerätes auf die vormontierten Befestigungsbolzen am Sammelschienensystem

Slotted feeding contacts allow to hook the disconnector into pre-assembled bolts on busbar system



NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

DIN VDE		SiS	SiS/910A	SiS/910A
Nach Norm/According to standard		DIN EN 60947-3		
Für NH-Sicherungen nach DIN VDE 0636-2 For NH fuse-links acc. to DIN VDE 0636-2		Größe Size	3	3
Bemessungsbetriebsspannung Rated operational voltage		U_c V	AC690	AC400
Bemessungsstrom ¹⁾ Rated operational current ¹⁾		I_n A	630	910
Konv. therm. Strom frei in Luft mit Sicherungen Conv. free air thermal current with fuse-links		I_{th} A	630	910 1000
Konv. therm. Strom frei in Luft mit Trennmessern Conv. free air thermal current with solid-links		I_{th} A	800	1250
Bemessungsfrequenz Rated frequency		Hz	40-60	40-60
Bemessungsisolationsspannung Rated insulation voltage		U_i V	AC1000	AC690
Elektrische Kenngrößen Electrical characteristics	Gesamtverlustleistung bei I_n (ohne Sicherungen) Total power loss at I_n (without fuse-links)	P_v W	115	155 140
	Verlustleistung bei 80% I_n (ohne Sicherungen) ²⁾ Power loss at 80% I_n (without fuse-links) ²⁾	P_v W	73,6	99,2 89,6
	Bemessungsstoßspannung Rated impulse withstand voltage	U_{imp} kV	12	8
Gebrauchskategorie Utilization category		-	AC-23B (630A/400V) AC-22B (630A/500V) AC-21B (630A/690V)	AC-22B (1250A/400V) AC-22B (910A/400V)
Bedingter Bemessungs Kurzschlussstrom Rated conditional short-circuit current		I_{cc} kA	120 ^{3a)}	50 ^{3b)}
Bemessungs kurzzeitstromfestigkeit Rated short-time withstand current		I_{cr} kA	10/15kA ⁴⁾	10/15kA ⁴⁾
Max. zul. Verlustleistung pro Sicherungseinsatz Max. permis. power loss per fuse-link		P_d W	48	61

- 1) Bei Einbau von mehreren Geräten in Niederspannungs-Schaltgerätekombinationen sind Bemessungsbelastungsfaktoren nach DIN EN 61439 zu beachten.
In case of mounting of several units in low voltage switchgear combinations, please consider rated diversity factors acc. to DIN EN 61439.
- 2) Bezugsgröße für Austausch von Geräten nach DIN EN 61439-1 Abs. 10.10.4.2.
Reference value for replacement of devices acc. to DIN EN 61439-1 clause 10.10.4.2.
- 3a) Typgeprüft bei AC420V mit NH-Sicherungseinsätzen 630A/500V Betriebsklasse gG, bei AC725V mit NH-Sicherungseinsätzen 500A/690V Betriebsklasse gG.
Type tested at AC420V with NH fuse-links 630A/500V characteristic gG, at AC725V with NH fuse-links 500A/690V characteristic gG.
- 3b) Typgeprüft mit NH-Sicherungseinsätzen 400V/910A Betriebsklasse gTr. / Type tested with NH fuse-links 400V/910A characteristic gTr.
- 4) 1-polig/3-polig schaltbar. / 1-pole/3-pole switchable.

Typ/Type	SL9	SL9/910A	SL9/910A+	
Kabelanschluss Cable terminal	Bolzendurchmesser Bolt diameter	M12	2 x M12	
	Flächenschluss Flat terminal	Kabelschuh Cable lug	1 x 25-300 Breite max 43mm Width max. 43mm	2 x 300, 3 x 185
		Flächschiene Flat bar	30 x 10	80 x 10
	Klemme Clamp	Anzugsdrehmoment Tightening torque	M ₀ Nm	35-40
		Klemmquerschnitt Clamping cross-section	mm ²	25-150/ 185-300
		Anzugsdrehmoment Tightening torque	Nm	32
		Klemmquerschnitt Clamping cross-section	mm ²	25-240 32
Schutzart Degree of protection	Frönsseitig, Gerät eingebaut mit Klemmen und Seitenabdeckung Front side, device fitted with clamp and lateral covers	Betriebszustand Operating condition	IP30	IP30
		Schaltdeckel geöffnet Switching element open	IP10	IP10
Betriebsbedingungen Operating conditions	Umgebungstemperatur ⁵⁾ /Ambient temperature ⁵⁾	T _{amb} °C	-25 bis/to +55	
	Bemessungsbetriebsart/Rated operating mode		Dauerbetrieb/Uninterrupted duty	
	Betätigung/Actuation		Abhängige Handbetätigung Dependent manual operation	
	Einbaulage/Mounting position		Senkrecht, waagrecht Vertical, horizontal	
	Höhenlage/Altitude	m	Bis zu 2000/Up to 2000	
Verschmutzungsgrad/Pollution degree		3		
Überspannungskategorie/Overvoltage category		IV		

NH-Sicherungs-
leisten
NH strip-
fuseways

NH-Sicherungs-
taschschaltleisten
NH strip
type fuse-switch
disconnectors

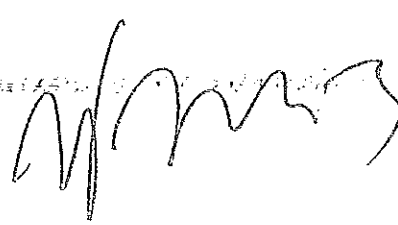
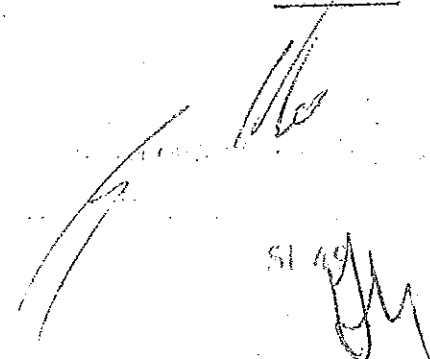
NH-Sicherungs-
lasttrenn-
schalter
NH fuse-switch-
disconnectors

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Klemmen
Terminals

Anhang
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5) 35°C Normaltemperatur, bei 55°C mit reduziertem Betriebsstrom / 35°C normal temperature, at 55°C with reduced operating current

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NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

30V/40V ¹⁾		35/4000V ¹⁾		518/4230	
Nach Norm/According to standard		DIN EN 60947-3			
Für NH-Sicherungen nach DIN VDE 0636-2 For NH fuse-links acc. to DIN VDE 0636-2		Größe Size	3	3	3
Bemessungsbetriebsspannung Rated operational voltage		U_c V	AC690	AC690	AC690
Bemessungsbetriebsstrom ¹⁾ Rated operational current ¹⁾		I_n A	1000	1250	1250
Konv. therm. Strom frei in Luft mit Sicherungen Conv. free air thermal current with fuse-links		I_{th} A	630	1250	1250
Konv. therm. Strom frei in Luft mit Trennmessern Conv. free air thermal current with solid-links		I_{th} A	1000	1600	1600
Bemessungsfrequenz Rated frequency		Hz	40-60	40-60	40-60
Bemessungsisolationsspannung Rated insulation voltage		U_i V	AC1000	AC1000	AC1000
Elektrische Kenngrößen Electrical characteristics	Gesamtverlustleistung bei I_n (ohne Sicherungen) Total power loss at I_n (without fuse-links)	P_v W	275	215	215
	Verlustleistung bei 80% I_n (ohne Sicherungen) ²⁾ Power loss at 80% I_n (without fuse-links) ²⁾	P_v W	176	138	138
	Bemessungsstoßspannung Rated impulse withstand voltage	U_{imp} kV	12	12	12
Gebrauchskategorie Utilization category		--	AC-22B (1000A/400V) AC-22B (800A/500V) AC-21B (630A/690V)	AC-22B (1250A/400V) AC-22B (1250A/500V) AC-21B (1250A/690V)	
Bedingter Bemessungs Kurzschlussstrom Rated conditional short-circuit current		I_{cc} kA	120 ³⁾	80	80
Bemessungskurzzeitstromfestigkeit Rated short-time withstand current		I_{cw} kA	10/15/25 ⁴⁾	20/25/46 ⁴⁾	20/25/46 ⁴⁾
Max. zul. Verlustleistung pro Sicherungseinsatz Max. permis. power loss per fuse-link		P_a W	51	48	48

- 1) Bei Einbau von mehreren Geräten in Niederspannungs-Schaltgerätekombinationen sind Bemessungsbelastungsfaktoren nach DIN EN 61439 zu beachten.
In case of mounting of several units in low voltage switchgear-combinations, please consider rated diversity factors acc. to DIN EN 61439.
- 2) Bezugsgröße für Austausch von Geräten nach DIN EN 61439-1 Abs. 10.10.4.2.
Reference value for replacement of devices acc. to DIN EN 61439-1 clause 10.10.4.2.
- 3) Typgeprüft bei AC420V mit NH-Sicherungseinsätzen 630A/500V Betriebsklasse gG, bei AC725V mit NH-Sicherungseinsätzen 500A/690V Betriebsklasse gG.
Type tested at AC420V with NH fuse-links 630A/500V characteristic gG, at AC725V with NH fuse-links 500A/690V characteristic gG.
- 4) 1-polig/3-polig schaltbar./1-pole/3-pole switchable.

Typ/Type		SI 3/1000-1M	SI 3/1250	
Kabelanschluss Cable terminal	Bolzendurchmesser Bolt diameter	-	-	
	Flachanschluss Flat terminal	Kabelschuh Cable lug	2 x M12	3 x M12
		Flachschiene Flat bar	2 x 300, 3 x 120	3 x 300, 4 x 185
	Klemme Clamp	Anzugsdrehmoment Tightening torque	80 x 10	-
		Klemmquerschnitt Clamping cross-section	M ₀ Nm	35-40
		Anzugsdrehmoment Tightening torque	-	35-40
		Klemmquerschnitt Clamping cross-section	-	-
	Schutzart Degree of protection	Frontseite, Gerät eingebaut mit Klemmen und Seitenabdeckung Front side, device fitted with clamp and lateral covers	Betriebszustand Operating condition	IP30
Schaltdeckel geöffnet Switching element open		IP10	IP30	
Betriebsbedingungen Operating conditions	Umgebungstemperatur ⁵⁾ /Ambient temperature ⁵⁾	T _{amb} °C	-25 bis/to +55	
	Bemessungsbetriebsart/Rated operating mode	-	Dauerbetrieb/Uninterrupted duty	
	Betätigung/Actuation	-	Abhängige Handbetätigung Dependent manual operation	
	Einbaulage/Mounting position	-	Senkrecht, waagrecht Vertical, horizontal	
	Höhenlage/Altitude	-	m	Bis zu 2000/Up to 2000
	Verschmutzungsgrad/Pollution degree	-	-	3
Überspannungskategorie/Overvoltage category	-	-	IV	

NH-Sicherungs-
leisten
NH strip-
fuseways

NH-Sicherungs-
lastschaltleisten
NH strip
type fuse switch-
disconnectors

NH-Sicherungs-
lasttrenn-
schalter
NH fuse-switch-
disconnectors

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Klemmen
Terminals

5) 35°C Normaltemperatur, bei 55°C mit reduziertem Betriebsstrom./35°C Normal temperature, at 55°C with reduced operating current.

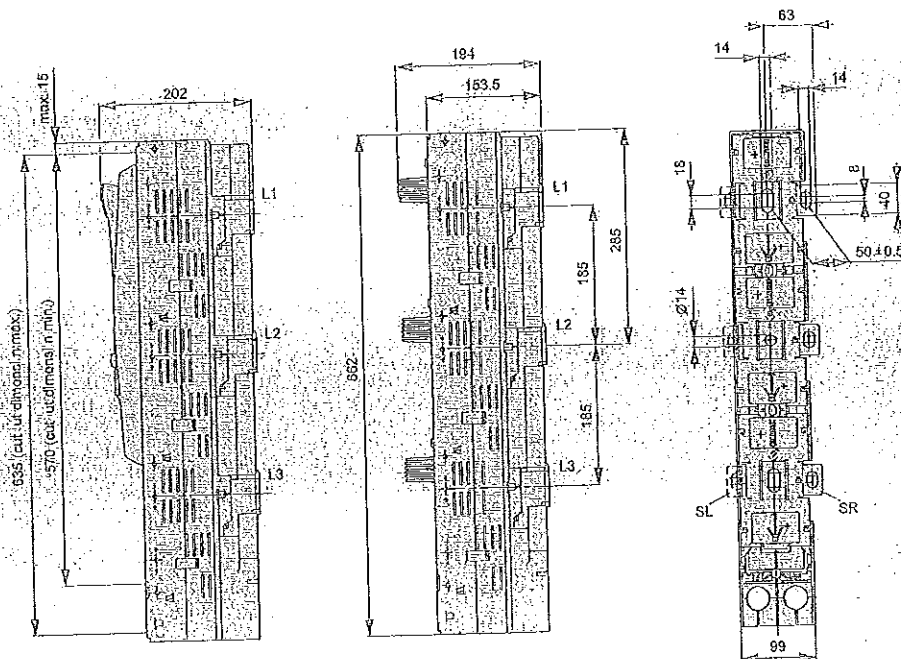
[Handwritten signatures and markings]

SL 5

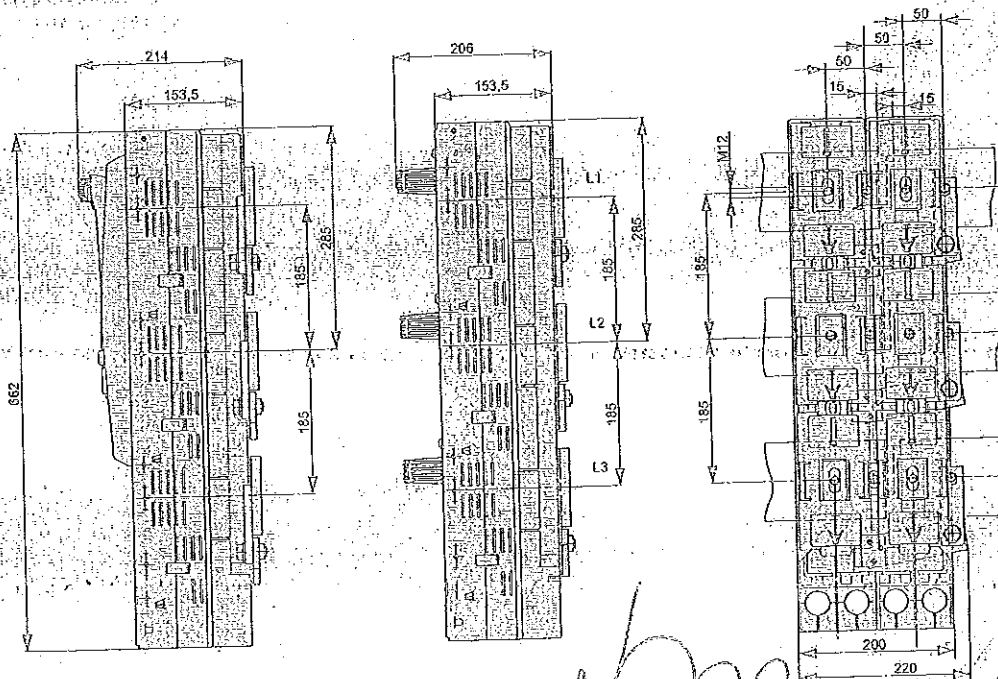
NH-Sicherungslastschaltleisten

NH strip-type fuse-switch-disconnectors

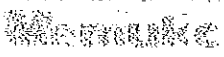
Modell	Artikelnummer	Spannung	Beschreibung/Abzeichen	Artikelnummer	Spannung
SLT3-3SL/3X...	L390000...	SL-25	SLT3-3SL/3X3...	L300000...	SL-25
SLT3-3SR/3X...	L390000...	SL-25	SLT3-3SR/3X3...	L300000...	SL-25



Modell	Artikelnummer	Spannung	Modell	Artikelnummer	Spannung
SLT3-3SR/3X6/2000/TM3	L3000501	SL-25	SLT3-3SR/3X2/2000/TM3	L3900501	SL-25



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Техническо описание и чертежи с нанесени на тях размери



Management System
ISO 9001:2008
OHSAS 18001:2007
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Management System
ISO 14001:2004
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ПРИЛОЖЕНИЕ 9.5.2

Техническо описание и чертежи с нанесени на тях размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

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ПРИЛОЖЕНИЕ 9.5.3

Протоколи от типови изпитвания на английски или български език, проведени от независима (изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език.

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от “ЧЕЗ Разпределение България” АД

СПИСЪК

на типовите изпитвания, проведени от независима изпитвателна лаборатория,
за предлаганите вертикални разединители, както следва:

Марка: Jean Muller
Продукт: вертикален предпазител-разединители
Серия: SL3

5.2 Маркировка

7.1 Конструкция

8.3.3 Основни характеристики

8.3.3.1 Повишаване на температурата

8.3.3.2 Диелектрични свойства

8.3.3.3 Работна и гранична изключвателна възможност при късо съединение

8.3.3.4 Проверка на диелектричните свойства

8.3.3.5 Ток на утечка

8.3.3.6 Проверка при повишаване на температурата

8.3.3.7 Експлоатационна възможност на задвижващия механизъм

8.3.4 Работни характеристики

8.3.4.1 Изпитване на експлоатационната възможност

8.3.4.2 Проверка на диелектричните свойства на прекъсвач-разединителя

8.3.4.3 Ток на утечка

8.3.4.4 Проверка при повишаване на температурата

8.3.5 Характеристики при късо съединение

8.3.5.1 Издържан импулсен ток

8.3.5.2 Работна изключвателна възможност при късо съединение

8.3.5.3 Проверка на диелектричните свойства

8.3.5.4 Ток на утечка

8.3.5.5 Проверка при повишаване на температурата

8.3.6 Условен ток на късо съединение

8.3.6.2 Издържан ток на късо съединение със стояем предпазител

8.3.6.3 Проверка на диелектричните свойства

8.3.6.4 Ток на утечка

8.3.6.5 Проверка при повишаване на температурата

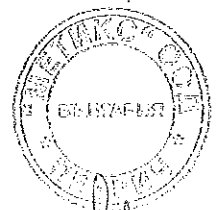
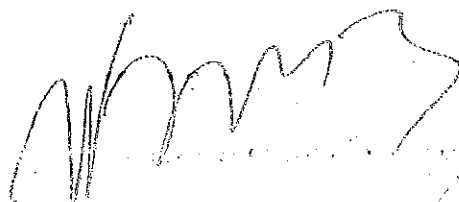
8.3.7 Характеристики при претоварване

8.3.7.1 Изпитване на претоварване

8.3.7.2 Проверка на диелектричните свойства

8.3.7.3 Ток на утечка

8.3.7.4 Проверка при повишаване на температурата



CCA

CENELEC CERTIFICATION AGREEMENT

ACCORD DE CERTIFICATION DU CENELEC

CENELEC-ZERTIFIZIERUNGS-ABKOMMEN

Ref. no. NTR-NL 4744

NOTIFICATION OF TEST RESULTS

Product fuse-switch-disconnectors

Tested by request of Jean Müller GmbH, Friedrichstrasse 21,
D-65343 Eltville am Rhein, Germany

Manufactured at (name and place) Jean Müller GmbH, Friedrichstrasse 21,
D-65343 Eltville am Rhein, Germany

Rating and principal characteristics Ui 1000V, Ith 722 A/1000 A

Pre-licence factory inspection carried out by VDE

Trade mark (if any) JEAN MÜLLER

Model/Type Ref. SL 3-3x/1000 and SL 3-3x3/1000

Additional information (if any) _____

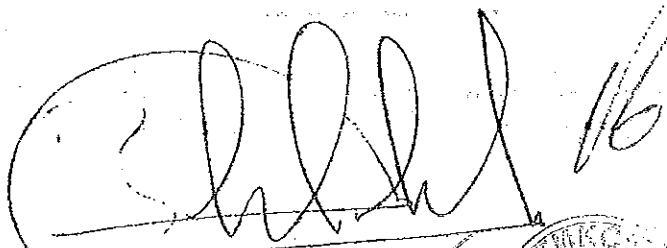
A sample of product has been tested and found to be in conformity with the current HD/EN and equivalent national standard, (number and edition) EN 60947-3:1999

as shown in the Test Report (ref.No.) 2001980.54 (36 pages)

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.

N.V. KEMA

Signature: 

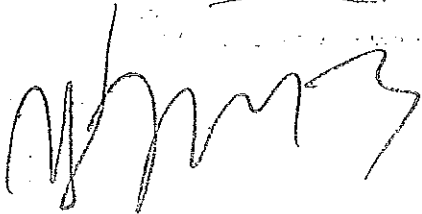

Arnhem

Date: December 6, 2000

Internal ref: HLS/Sc0

B.T.M. Hoitus

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem
P.O. Box 9035, 6800 ET Arnhem
The Netherlands
Telephone +31 26 3 56 28 50
Telefax +31 26 3 51 49 27



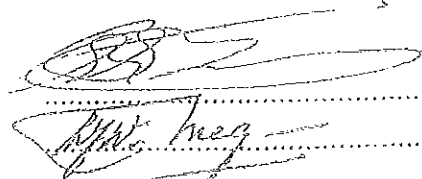
TEST REPORT

EN 60 947-3

Low-voltage switchgear and controlgear
Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

Report

Reference No. : 2001980.54
 Tested by (+ signature) : H.L. Schendstok
 Approved by (+ signature) : L.J.W. van Niegen
 Date of issue : 2000-11-30
 Contents : 36 pages



This report is based on a blank test report that was prepared by KEMA using information obtained from the TRF originator (see below).

Testing laboratory

Name : KEMA Registered Quality B.V.
 Address : Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
 Testing location : as above and
 : Holec Laagspanning B.V., Hengelo, The Netherlands
 All tests were observed by compiler

Client

Name : Jean Müller GmbH
 Address : Friedrichstrasse 21
 : D-65343 ELYVILLE am Rhein, Germany

Test specification

Standard : EN 60 947-3:99
 Test procedure : CCA-scheme
 Procedure deviation : N.A.
 Non-standard test method : N.A.

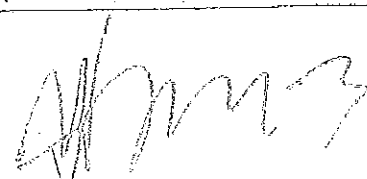
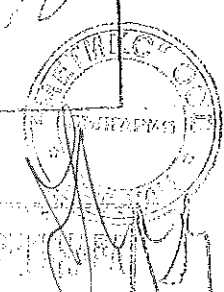
Test Report Form/blank test report

Test Report Form No. : 60947-3B/98-09
 TRF originator : KEMA
 Master TRF : dated 98-05

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Test item

Description : fuse-switch-disconnector
 Trademark : Jean Müller
 Model and/or type reference : SL 3-3x/1000 and SL 3-3x3/1000
 Manufacturer : Jean Müller GmbH, Elyville am Rhein, Germany

Rating(s) : *Ui 1000 V, Ith 722 A / 1000 A*

Particulars: test item vs. test requirements

- method of operation : *dependent manual operation*
- switching positions : *2 (on and off)*
- number of poles : *3-poles*
- kind of current : *AC*
- number of phases : *3*
- rated frequency (Hz) : *50 Hz*
- number of positions of the main contacts : *2 (on and off)*

Rated and limiting values, main circuit

- rated operational voltage U_e (V) : *400 V, 500 V and 690 V*
- rated insulation voltage U_i (V) : *1000 V*
- rated impulse withstand voltage U_{imp} (kV) : *12 kV*
- conventional free air thermal current I_{th} (A) : *fuse: 722 A*
disconnect knife: 1000 A
- conventional enclosed thermal current I_{the} (A) :
- rated operational current I_e (A) : *fuse: 722 A*
disconnect knife: 1000 A
- rated uninterrupted current I_u (A) : *fuse: 722 A*
disconnect knife: 1000 A
- utilization category : *with disconnect knife:*
AC-21B 630 A 690 V
AC-22B 1000 A 400 V
AC-22B 800 A 500 V

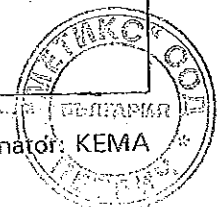
with fuse:
AC-21B 630 A 690 V
AC-22B 722 A 400 V
AC-22B 630 A 500 V

Short-circuit characteristic

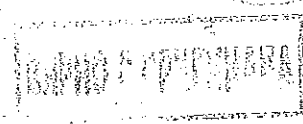
- rated short-time withstand current I_{cw} (kA) : -
- rated short-time making capacity I_{cm} (kA) : -
- rated conditional short-circuit current : *50 kA at 400 V*

Rated and limiting values, auxiliary circuits : *N*

- rated operational voltage (V)
- rated frequency (Hz)



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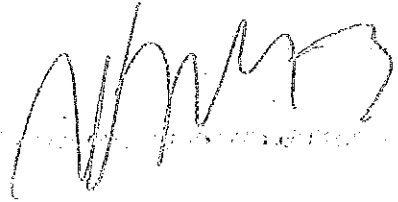


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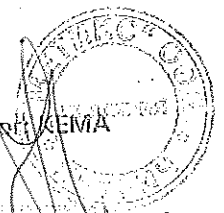
number of circuits	:	
- number and kind of contact elements	:	
Co-ordination of short-circuit protective devices	:	
- kind of protective device	:	<i>fuse-link, M3gTt722 NH3 500 kVA (722 A)</i>
Test case verdicts		
Test case does not apply to the test object	:	N(A.)
Test item does meet the requirement	:	P(ass)
Test item does not meet the requirement	:	F(ail)
.....		

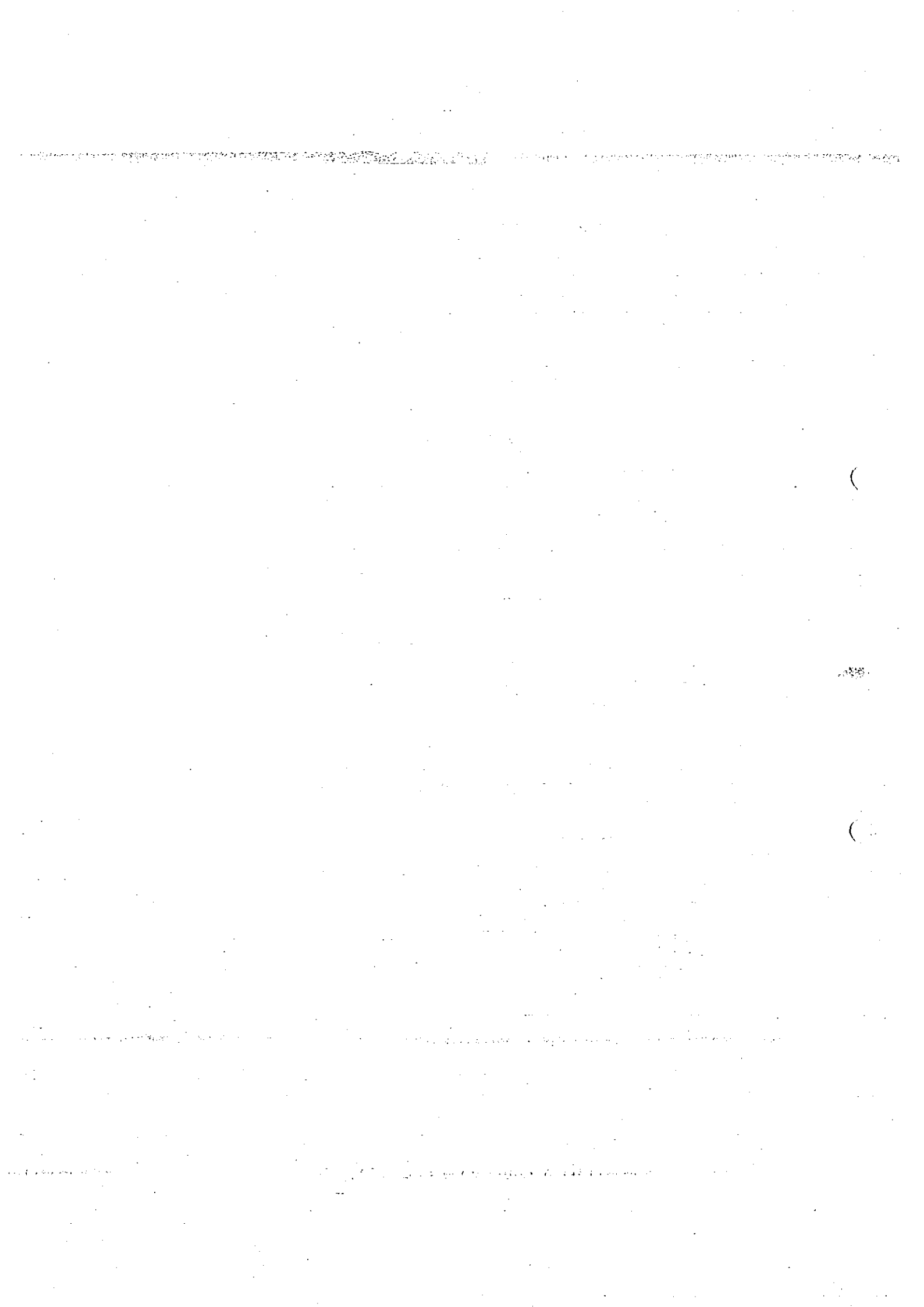
Testing	
Date of receipt of test item	: 2000-02-24
Date(s) of performance of test	: 2000-03 and 2000-05
.....	

TRF No.: 60947-3B



TRF originator KEMA





General remarks

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

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

"(see remark #)" refers to a remark appended to the report.

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

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

The making and breaking tests and short-circuit tests were carried out with a metallic screen placed at 165 mm at the top and 150 mm from the side of the fuse-switch-disconnector, with the cable terminals at the top.

The fuse-switch-disconnector type SL 3-3x/1000 were tested as follows:


Test sequence I and II: tests were done on phase L2, the load circuit was connected to phase L2, phases L1 and L3 were connected to the supply.

Test sequence IV: tests were done with a 3-phase supply, in the 'O-test' the load circuit was connected to all phases, in the 'CO-test' the load circuit was connected to L1 and L2.



16




Copy of marking plate



JEAN MULLER  CE
IEC/EN 60947-3 50Hz
400V -1000A - AC-22B



 max. 1000A 51W 
SL3-3X3/1000 L3021300
TM3-1000A NH3-722A

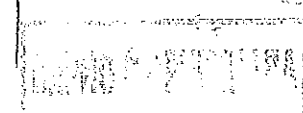
JEAN MULLER  CE
IEC/EN 60947-3 50Hz
400V -1000A - AC-22B



 max. 1000A 51W 
SL3-3X3/1000 L3921300
TM3-1000A NH3-722A

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Handwritten initials



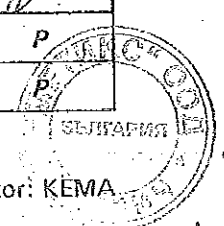
Handwritten initials

Clause	Requirement - Test	Result - Remark	Verdict
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Clause	Requirement - Test	Result - Remark	Verdict
5.2	MARKING		
	Marking on equipment itself or on nameplate or nameplates attached to the equipment and legible from the front after mounting		
	- indication of the open and closed position	<i>main contacts are visible in the open position</i>	P
	- suitability for isolation		P
	- disconnectors AC-20 and DC-20 only: marked "Do not open under load"		N
	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	<i>JEAN MÜLLER</i>	P
	- type designation or serial number	<i>SL 3-3x/1000 and SL 3-3x3/1000</i>	P
	- rated operational current	<i>1000 A AC-22B 400 V</i>	P
	- rated operational voltage	<i>400 V</i>	P
	- utilization category	<i>AC-22B</i>	P
	- rated frequency	<i>50 Hz</i>	P
	- manufacturer's claim for compliance with IEC 60 947-3	<i>IEC/EN 60947-3</i>	P
	- degree of protection	<i>IP</i>	N
	Marking on fuse-combination units:		
	- fuse type	<i>NH3-722A</i>	P
	- maximum rated current	<i>722 A</i>	P
	- power loss of the fuse-link	<i>51 W</i>	P
	Identification of terminals:		
	- line terminals	<i>immaterial</i>	P
	- load terminals	<i>L1, L2, L3</i>	P
	- neutral pole terminal		N
	- protective earth terminal		N
	Data in the manufacturer's published information:		
	- rated insulation voltage	<i>1000 V</i>	P
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	<i>12 kV</i>	P
	- pollution degree, if different from 3	<i>3</i>	P
	- rated duty	<i>uninterrupted duty</i>	P

EN 60.947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	- rated short-time withstand current and duration		N
	- rated short-circuit making capacity		N
	- rated conditional short-circuit current	50 kA	P

7.1	CONSTRUCTION		
7.1.2	Current-carrying parts and their connection	<i>no contact pressure through insulation material</i>	P
7.1.3	Clearances		
	Rated impulse withstand voltage	(see test sequence I)	P
	Creepage distances		
	Pollution degree	3	-
	Comparative tracking index (V)	600 V, 450 V, 375 V	-
	Material group	I, II, IIIa	-
	Rated insulation voltage U _i (V)	1000 V	-
	Minimum creepage distances (mm)	16 mm	-
	Measured creepage distances (mm)	> 16 mm	P
	In case U _{imp} is not indicated		N
7.1.4	Actuator		
7.1.4.1	Insulation		
7.1.4.2	Direction of movement	(IEC 447)	P
7.1.5	Indication of contact position		
7.1.5.1.	Indicating means	<i>by actuator</i>	P
7.1.5.2	Indication by the actuator	<i>all main contacts are visible in the open position</i>	P
7.1.6	Additional safety requirements for equipment suitable for isolation		
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (U _e > 50 V):		
	- marking according to 5.2b		P
	- indication of the position of the contacts	<i>all main contacts are visible in the open position</i>	P
	- construction of the actuating mechanism		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm)	14 mm	
	- measured clearances (mm)	> 14 mm	P
	- test U _{imp} across gap (kV)	18,5 kV	

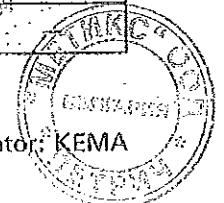


Clause	Requirement - Test	Result - Remark	Verdict
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N
	auxiliary switch shall be rated according to IEC 60 947-5-1		
	minimum time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles (ms)		
	measured time interval (ms)		
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		
	test force F applied to the actuator in an attempt to operate to the closed position (N)		
	rated impulse withstand voltage (kV)		
	test Uimp on open main contacts at the test force		
7.1.7	Terminals		
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	(see 8.2.4 below)	P
	Terminal connections shall be such that necessary contact pressure is maintained	(see 8.2.4 below)	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	(see 8.2.4 below)	P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	(see 8.2.4 below)	P
8.2.4	Mechanical properties of terminals		P
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm ²)	(cable lugs or busbars)	
	diameter of thread (mm)	M12	
	torque (Nm)	40 Nm x 110% = 44 Nm	

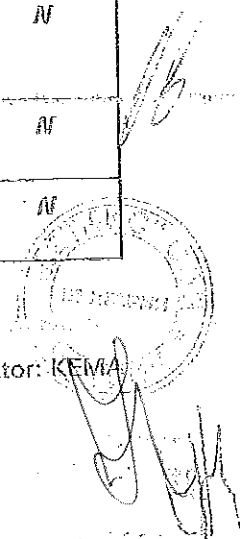
Clause	Requirement - Test	Result - Remark	Verdict
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		N
	conductor of the smallest cross-sectional area (mm ²)		-
	number of conductor of the smallest cross section		-
	diameter of bushing hole (mm)		-
	height between the equipment and the platen ..		-
	mass at the conductor(s) (kg)		-
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test		N
	force (N)		-
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	conductor of the largest cross-sectional area (mm ²)		-
	number of conductor of the largest cross section		-
	diameter of bushing hole (mm)		-
	height between the equipment and the platen ..		-
	mass at the conductor(s) (kg)		-
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test		N
	force (N)		-
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	conductor of the largest and smallest cross-sectional area (mm ²)		-
	number of conductor of the smallest cross section, number of conductor of the largest cross section		-
	diameter of bushing hole (mm)		-
	height between the equipment and the platen ..		-
	mass at the conductor(s) (kg)		-

TRF No.: 60947-3B

TRF originator: KEMA



Clause	Requirement - Test	Result - Remark	Verdict
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test		N
	force (N)		--
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
7.1.7.2	Connection capacity		
	type of conductors : (cable lugs or busbars)		--
	minimum cross-sectional area of conductor (mm ²)		--
	maximum cross-sectional area of conductor (mm ²)		--
	number of conductors simultaneously connectable to the terminal		--
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals	L1, L2, L3	P
7.1.8	Additional requirements for equipment provided with a neutral pole		N
	Marking of neutral pole		N
	The switched neutral pole shall not break before and shall not make after the other poles		N
	Conventional thermal current of neutral pole		N
7.1.9	Provisions for protective earthing		N
7.1.9.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
7.1.9.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N



Clause	Requirement - Test	Result - Remark	Verdict
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N
7.1.9.3	Protective earth terminal marking and identification		N
7.1.10	Enclosure for equipment		N
7.1.10.1	Design		N
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N
	Sufficient space shall be provided inside the enclosure		N
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N
7.1.10.2	Insulation		N
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N
7.1.11	Degree of protection of enclosed equipment		N



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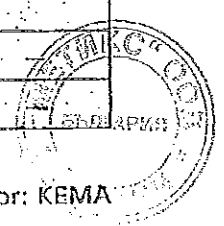
Clause	Requirement - Test	Result - Remark	Verdict
	Degree of protection	IP	N

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Temperature-rise		
	ambient temperature 10-40 °C	23 °C	-
	test enclosure W x H x D (mm x mm x mm)	-	-
	material of enclosure	-	-
	Main circuits, test conditions:		
	- conventional thermal current Ith (A)	722 A with fuse-links 1000 A with disconnect knives	-
	- conventional enclosed thermal current Ithe (A) :		-
	- cable/busbar cross-section (mm ²) / (mm)	fuse-links: 50 x 10 mm busbar and 2 x 240 mm ² cable disconnect knives: 60 x 10 mm horizontal busbar and 2 x 60 x 5 mm outgoing terminals	-
	Fuse-link details (fuse-combination units only):		
	- manufacturer's name, trademark or identification mark	Jean Müller	
	- manufacturer's model or type reference	M3gTr722 NH3	
	- rated current (A)	500 kVA (722 A)	
	- power loss (W)	51 W	
	- rated breaking capacity (kA)	100 kA	
	Temperature-rise	(see appended table)	P
	Auxiliary circuits: temperature rise of connecting terminals (K)		N
	idem, requirement (K)	≤	
	rated operation current (A)		
	cross-section (mm ²)		
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
	- rated impulse withstand voltage (kV)	12 kV	
	- test Uimp main circuits (kV)	14,8 kV	

Clause	Requirement – Test	Result - Remark	Verdict
	- test Uimp auxiliary circuits (kV)		N
	- test Uimp on open main contacts (equipment suitable for isolating) (kV)	18,5 kV	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		N
	- rated insulation voltage (V)		—
	- main circuits, test voltage for 1 min (V)		
	- control and auxiliary circuits, test voltage for 1 min (V)		

8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type</i> <i>SI 3-3x3/1000</i>	
	utilization category	AC-22B	—
	rated operational voltage Ue (V)	400 V	—
	rated operational current Ie (A) or power (kW) ..	1000 A	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: 421 V L2: 421 V L3: 420 V	—
	- test current I/Ie = (A)	L1: 3800 A L2: 3830 A L3: 3860 A	—
	- power factor/time constant	L1: 0,64 L2: 0,64 L3: 0,64	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: L3:	—
	- test current I/Ie = (A)	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	transient recovery voltage (V)	L1: 421 V L2: 421 V L3: 420 V	—
	current duration (ms)	440 ms	—
	time interval between operations	180 s	—

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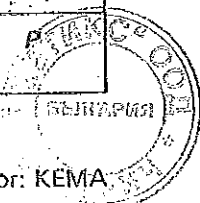
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Clause	Requirement - Test	Result - Remark	Verdict
	Number of make/break or make and break operations	5 x make/break	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz)	86,3 kHz	—
	Measured oscillatory frequency (kHz)	L1: 87,1 kHz L2: 87,1 kHz L3: 87,1 kHz	P
	Factor y	L1: 1,11 L2: 1,11 L3: 1,11	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 U _i) for 1 min (V)	2000 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		M
	Leakage current (other utilization categories) ≤ 2 mA)	< 5 μA	P
	test voltage (1,1 U _e) (V)	440 V	—
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 38 K - 60 K disconnect knives: 52 K - 80 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 50 x 10 mm busbar and 2 x 240 mm ² cable disconnect knives: 60 x 10 mm busbar and 4 x 150 mm ² cable	—
	test current I _e (A)	fuse-links: 722 A disconnect knives 1000 A	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and U _e > 50 V only)		
	actuator type (fig.)	one-hand operated (e)	

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Clause	Requirement – Test	Result - Remark	Verdict
	actuating force for opening (N)	215 N	—
	test force with blocked main contacts (N)	400 N	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

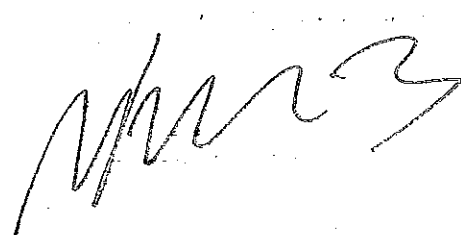
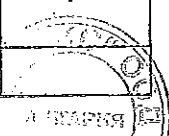
8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type</i> SL 3-3x/1000	
	utilization category	AC-22B	—
	rated operational voltage U _e (V)	400 V	—
	rated operational current I _e (A) or power (kW) ..	1000 A	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/U _e = 1,05 (V)	L1: L2: 426 V L3:	—
	- test current I/I _e = (A)	L1: L2: 3768 A L3:	—
	- power factor/time constant	L1: L2: 0,64 L3:	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/U _e = 1,05 (V)	L1: L2: L3:	—
	- test current I/I _e = (A)	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	transient recovery voltage (V)	L1: L2: 426 V L3:	—
	current duration (ms)	600 ms	—
	time interval between operations	180 s	—
	Number of make/break or make and break operations	5 x make/break	—



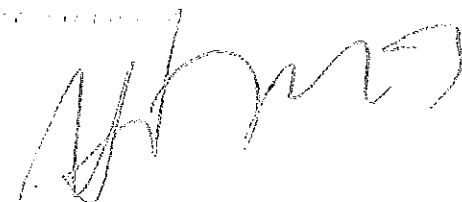

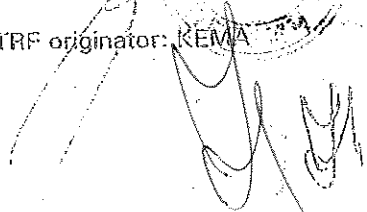
Clause	Requirement - Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz)	85,9 kHz	-
	Measured oscillatory frequency (kHz)	L1: L2: 89,6 kHz L3:	P
	Factor γ	L1: L2: 1,11 L3:	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	2000 V	-
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		N
	Leakage current (other utilization categories) ≤ 2 mA)	4,0 μ A - 8,3 μ A	P
	test voltage (1,1 Ue) (V)	440 V, tested with 800 V	-
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 49 K - 72 K disconnect knives: 51 K - 74 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 50 x 10 mm busbar and 2 x 240 mm ² cable disconnect knives: 60 x 10 mm horizontal busbar and 2 x 60 x 5 mm outgoing terminals	-
	test current Ie (A)	fuse-links: 722 A disconnect knives 1000 A	-
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.)	one-hand operated (e)	
	actuating force for opening (N)	181 N	

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Clause	Requirement - Test	Result - Remark	Verdict
	test force with blocked main contacts (N)	400 N	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type</i> <i>SL 3-3x3/1000</i>	
	utilization category	AC-21B	—
	rated operational voltage Ue (V)	690 V	—
	rated operational current Ie (A) or power (kW) ..	630 A	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: 747 V L2: 747 V L3: 747 V	—
	- test current I/Ie = (A)	L1: 974 A L2: 986 A L3: 985 A	—
	- power factor/time constant	L1: 0,95 L2: 0,95 L3: 0,95	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: L3:	—
	- test current I/Ie = (A)	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	transient recovery voltage (V)	L1: 741 V L2: 747 V L3: 748 V	—
	current duration (ms)	460 ms	—
	time interval between operations	60 s	—
	Number of make/break or make and break operations	5 x make/break	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		

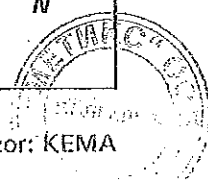




Clause	Requirement - Test	Result - Remark	Verdict
	oscillatory frequency (kHz)	kHz	—
	Measured oscillatory frequency (kHz)	L1: L2: L3:	N
	Factor γ	L1: L2: L3:	N
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 U _i) for 1 min (V)	2000 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		N
	Leakage current (other utilization categories) ≤ 2 mA)	4,6 μ A - 8,2 μ A	P
	test voltage (1,1 U _e) (V)	759 V, tested with 800 V	—
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 57 K - 74 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 40 x 10 mm bushbar and 2 x 185 mm ² cable	—
	test current I _e (A)	fuse-links: 630 A	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and U _e > 50 V only)		
	actuator type (fig.)	one-hand operated (e)	—
	actuating force for opening (N)	275 N	—
	test force with blocked main contacts (N)	400 N	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type</i> <i>SL 3-3x/1000</i>	
	utilization category	<i>AC-21B</i>	—
	rated operational voltage Ue (V)	<i>690 V</i>	—
	rated operational current Ie (A) or power (kW) ..	<i>630 A</i>	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: <i>747 V</i> L3:	—
	- test current I/Ie = (A)	L1: L2: <i>991 A</i> L3:	—
	- power factor/time constant	L1: L2: <i>0,94</i> L3:	—
	Conditions, break operation AC-23A and AC-23B only:		
	- test voltage U/Ue = 1,05 (V)	L1: L2: L3:	—
	- test current I/Ie = (A)	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	transient recovery voltage (V)	L1: L2: <i>744 V</i> L3:	—
	current duration (ms)	<i>360 ms</i>	—
	time interval between operations	<i>60 s</i>	—
	Number of make/break or make and break operations	<i>5 x make/break</i>	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		
	oscillatory frequency (kHz)	kHz	—
	Measured oscillatory frequency (kHz)	L1: L2: L3:	N
	Factor y	L1: L2: L3:	N

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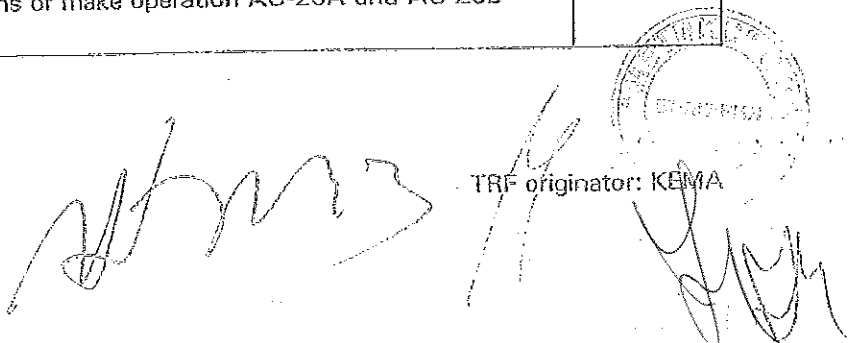


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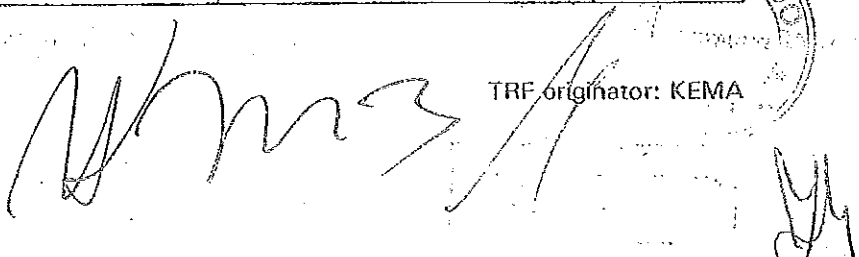
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Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	2000 V	--
	No flashover or breakdown		P
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		N
	Leakage current (other utilization categories) ≤ 2 mA)	4,4 µA - 8,1 µA	P
	test voltage (1,1 Ue) (V)	759 V, tested with 800 V	--
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 58 K - 73 K	P
	conductor cross-sectional area (mm²)	fuse-links: 40 x 10 mm busbar and 2 x 185 mm² cable	--
	test current Ie (A)	fuse-links: 630 A	--
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.)	one-hand operated (e)	--
	actuating force for opening (N)	187 N	--
	test force with blocked main contacts (N)	400 N	--
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type SL 3-3x3/1000</i>	
	utilization category	AC-22B	
	rated operational voltage Ue (V)	500 V	
	rated operational current Ie (A) or power (kW) ..	800 A	
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		



Clause	Requirement – Test	Result - Remark	Verdict
	- test voltage $U/U_e = 1,05$ (V)	L1: 528 V L2: 532 V L3: 533 V	—
	- test current $I/I_e =$ (A)	L1: 2466 A L2: 2456 A L3: 2410 A	—
	- power factor/time constant	L1: 0,65 L2: 0,65 L3: 0,65	—
Conditions, break operation AC-23A and AC-23B only:			
	- test voltage $U/U_e = 1,05$ (V)	L1: L2: L3:	—
	- test current $I/I_e =$ (A)	L1: L2: L3:	—
	- power factor	L1: L2: L3:	—
	transient recovery voltage (V)	L1: 528 V L2: 532 V L3: 533 V	—
	current duration (ms)	360 ms	—
	time interval between operations	60 s	—
	Number of make/break or make and break operations	5 x make/break	P
Characteristic of transient recovery voltage for AC-22 and AC-23 only			
	oscillatory frequency (kHz)	65,75 kHz	—
	Measured oscillatory frequency (kHz)	L1: 66,7 kHz L2: 67,6 kHz L3: 65,8 kHz	P
	Factor γ	L1: 1,12 L2: 1,11 L3: 1,11	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage ($2 U_i$) for 1 min (V)	2000 V	—
	No flashover or breakdown		

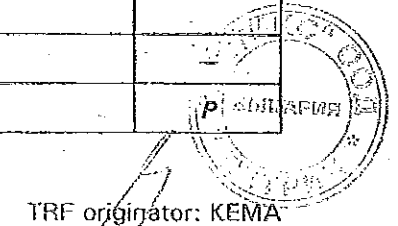


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Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		N
	Leakage current (other utilization categories) ≤ 2 mA)	3,9 μ A - 8,4 μ A	P
	test voltage (1,1 Ue) (V)	550 V, tested with 800 V	-
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	<i>fuse-links: 61 K - 78 K</i> <i>disconnect knives: 48 K - 61 K</i>	P
	conductor cross-sectional area (mm ²)	<i>fuse-links: 40 x 10 mm busbar and 2 x 185 mm² cable</i> <i>disconnect knives: 50 x 10 mm busbar and 2 x 240 mm² cable</i>	-
	test current Ie (A)	<i>fuse-links: 630 A</i> <i>disconnect knives 800 A</i>	-
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.)	<i>one-hand operated (e)</i>	-
	actuating force for opening (N)	275 N	-
	test force with blocked main contacts (N)	400 N	-
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.3.3	Making and breaking capacity	<i>fuse-switch-disconnector type SL 3-3x/1000</i>	
	utilization category	AC-22B	-
	rated operational voltage Ue (V)	500 V	-
	rated operational current Ie (A) or power (kW) ..	800 A	-
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		

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Clause	Requirement - Test	Result - Remark	Verdict
	- test voltage $U/U_e = 1,05$ (V)	L1: L2: 528 V L3:	-
	- test current $I/I_e =$ (A)	L1: L2: 2414 A L3:	-
	- power factor/time constant	L1: L2: 0,66 L3:	-
Conditions, break operation AC-23A and AC-23B only:			
	- test voltage $U/U_e = 1,05$ (V)	L1: L2: L3:	-
	- test current $I/I_e =$ (A)	L1: L2: L3:	-
	- power factor	L1: L2: L3:	-
	transient recovery voltage (V)	L1: L2: 532 V L3:	-
	current duration (ms)	480 ms	-
	time interval between operations	60 s	-
	Number of make/break or make and break operations	5 x make/break	P
Characteristic of transient recovery voltage for AC-22 and AC-23 only			
	oscillatory frequency (kHz)	65,75 kHz	-
	Measured oscillatory frequency (kHz)	L1: L2: 66,7 kHz L3:	P
	Factor γ	L1: L2: 1,12 L3:	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification		
	test voltage ($2 U_i$) for 1 min (V)	2000 V	
	No flashover or breakdown		P



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Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.5	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		N
	Leakage current (other utilization categories) ≤ 2 mA	4,7 μ A - 8,3 μ A	P
	test voltage (1,1 Ue) (V)	550 V, tested with 800 V	--
8.3.3.6	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 55 K - 73 K disconnect knives: 52 K - 60 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 40 x 10 mm busbar and 2 x 185 mm ² cable disconnect knives: 50 x 10 mm busbar and 2 x 240 mm ² cable	--
	test current Ie (A)	fuse-links: 630 A disconnect knives 800 A	--
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only)		
	actuator type (fig.)	one-hand operated (e)	
	actuating force for opening (N)	187 N	
	test force with blocked main contacts (N)	400 N	
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts		N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY <i>fuse-switch-disconnector type SL3-3x/1000</i>		
8.3.4.1	Operational performance test		
	utilization category	AC-22B	
	rated operational voltage (V)	400 V	
	rated operational current (A)	1000 A	
	Test conditions electrical operation cycles:		

Clause	Requirement - Test	Result - Remark	Verdict
	test voltage (V)	L1: - L2: 413 V L3: -	---
	test current (A)	L1: - L2: 1003 A L3: -	---
	power factor/time constant	L1: - L2: 0,81 L3: -	---
	Number of cycles with current	100	P
	Number of cycles without current	500	P
	First test sequence (with/without current)	with current	---
	Second test sequence (with/without current)	without current	---
	time interval between first and second test sequence	1 hour	---
8.3.4.2	Dielectric verification		
	test voltage (2 U _i) for 1 min (V)	2000 V	---
	No breakdown or flashover		P
8.3.4.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		N
	Leakage current (other utilization categories) ≤ 2 mA	5,7 μA - 7,1 μA	P
	test voltage (1,1 U _e) (V)	440 V, tested with 800 V	---
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 59 K - 71 K disconnect knives: 47 K - 57 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 50 x 10 mm busbar and 2 x 240 mm ² cable disconnect knives: 60 x 10 mm horizontal busbar and 2 x 60 x 5 mm outgoing terminals	---
	test current I _e (A)	fuse-links: 722 A disconnect knives: 1000 A	---



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EN 60 947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY <i>fuse-switch-disconnector type SL3-3x/1000</i>		
8.3.4.1	Operational performance test		
	utilization category	AC-22B	-
	rated operational voltage (V)	500 V	-
	rated operational current (A)	800 A	-
	Test conditions electrical operation cycles:		
	test voltage (V)	L1: - L2: 510 V L3: -	-
	test current (A)	L1: - L2: 814 A L3: -	-
	power factor/time constant	L1: - L2: 0,80 L3: -	-
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current)	with current	-
	Second test sequence (with/without current)	without current	-
	time interval between first and second test sequence	1 hour	-
8.3.4.2	Dielectric verification		
	test voltage (2 U _i) for 1 min (V)	2000 V	-
	No breakdown or flashover		P
8.3.4.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		N
	Leakage current (other utilization categories) ≤ 2 mA	4,8 µA - 7,3 µA	P
	test voltage (1,1 U _e) (V)	550 V, tested with 800 V	-
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 56 K - 72 K disconnect knives: 45 K - 60 K	P

EN 60 947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	conductor cross-sectional area (mm ²)	<i>fuse-links: 40 x 10 mm busbar and 2 x 185 mm² cable</i> <i>disconnect knives: 50 x 10 mm busbar and 2 x 240 mm² cable</i>	--
	test current I _e (A)	<i>fuse-links: 630 A</i> <i>disconnect knives: 800 A</i>	-

8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY <i>fuse-switch-disconnector type SL3-3x/1000</i>		
8.3.4.1	Operational performance test		
	utilization category	<i>AC-21B</i>	--
	rated operational voltage (V)	<i>690 V</i>	--
	rated operational current (A)	<i>630 A</i>	--
	Test conditions electrical operation cycles:		
	test voltage (V)	<i>L1: - L2: 689 V L3: -</i>	-
	test current (A)	<i>L1: - L2: 632 A L3: -</i>	-
	power factor/time constant	<i>L1: - L2: 0,95 L3: -</i>	-
	Number of cycles with current	<i>200</i>	P
	Number of cycles without current	<i>800</i>	P
	First test sequence (with/without current)	<i>with current</i>	-
	Second test sequence (with/without current) ...	<i>without current</i>	-
	time interval between first and second test sequence	<i>1 hour</i>	-
8.3.4.2	Dielectric verification		
	test voltage (2 U _i) for 1 min (V)	<i>2000 V</i>	-
	No breakdown or flashover		P
8.3.4.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		-

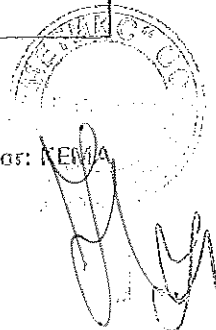
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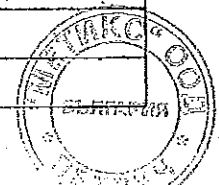
Clause	Requirement - Test	Result - Remark	Verdict
	Leakage current (other utilization categories) ≤ 2 mA	5,6 μ A - 7,8 μ A	P
	test voltage (1,1 Ue) (V)	759 V, tested with 800 V	--
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 55 K - 76 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 40 x 10 mm busbar and 2 x 185 mm ² cable	--
	test current Ie (A)	fuse-links: 630 A	--

8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY <i>fuse-switch-disconnector type SL3-3x3/1000 only without current</i>		
8.3.4.1	Operational performance test		
	utilization category	AC-22B	-
	rated operational voltage (V)	400 V	-
	rated operational current (A)	1000 A	-
	Test conditions electrical operation cycles:		
	test voltage (V)	L1: - L2: - L3: -	-
	test current (A)	L1: - L2: - L3: -	-
	power factor/time constant	L1: - L2: - L3: -	-
	Number of cycles with current		P
	Number of cycles without current	500 + 100	P
	First test sequence (with/without current)	without current	-
	Second test sequence (with/without current)		-
	time interval between first and second test sequence		-
8.3.4.2	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	2000 V	-
	No breakdown or flashover		P
8.3.4.3	Leakage current		



Clause	Requirement - Test	Result - Remark	Verdict
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		N
	Leakage current (other utilization categories) ≤ 2 mA	4,8 μ A - 7,3 μ A	P
	test voltage (1,1 Ue) (V)	440 V, tested with 800 V	-
8.3.4.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	fuse-links: 51 K - 68 K disconnect knives: 51 K - 74 K	P
	conductor cross-sectional area (mm ²)	fuse-links: 50 x 10 mm busbar and 2 x 240 mm ² cable disconnect knives: 60 x 10 mm horizontal busbar and 2 x 60 x 5 mm outgoing terminals	-
	test current Ie (A)	fuse-links: 722 A disconnect knives: 1000 A	-

8.3.5	TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY		N
8.3.5.1	Short-time withstand current test		
	Rated short-time withstand current Icw (A)		
	test voltage (V)	L1: L2: L3:	-
	r.m.s. test current (A)	L1: L2: L3:	-
	peak test current (A)	L1: L2: L3:	-
	power factor/time constant	L1: L2: L3:	-
	test duration (s)		
	Equivalent with		
8.3.5.1.5	Behaviour of the equipment during the test		



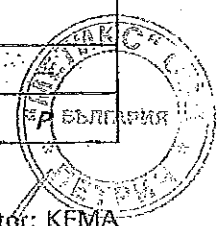
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Clause	Requirement - Test	Result - Remark	Verdict
8.3.5.1.6	Conditions of the equipment after the test		
8.3.5.2	Short-circuit making capacity		
	Rated short-circuit making capacity I_{cm} (A)		
	test voltage (V)	L1: L2: L3:	---
	r.m.s. test current (A)	L1: L2: L3:	---
	peak test current (A)	L1: L2: L3:	---
	power factor/time constant	L1: L2: L3:	---
	current duration (s)		---
	number of making cycles		---
8.3.5.2.5	Behaviour of the equipment during the test		
8.3.5.2.6	Conditions of the equipment after the test		
8.3.5.3	Dielectric verification		
	test voltage ($2 U_i$) for 1 min (V)		---
	No flashover or breakdown		
8.3.5.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		
	Leakage current (other utilization categories) $\leq 2,0$ mA		
	test voltage ($1,1 U_e$) (V)		---
8.3.5.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K		
	cross-sectional area (mm ²)		---
	test current I_e (A)		---

8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT <i>fuse-switch-disconnector type SL 3-3x3/1000</i>		
	Protective device details:		

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Clause	Requirement - Test	Result - Remark	Verdict
	- manufacturer's name, trademark or identification mark	<i>Jean Müller</i>	-
	- manufacturer's model or type reference	<i>M3gTr722 NH3</i>	-
	- rated voltage (V)	<i>400 V</i>	-
	- rated current (A)	<i>500 kVA (722 A)</i>	-
	- rated breaking capacity (kA)	<i>100 kA</i>	-
8.3.6.2	Fuse protected short-circuit withstand		
	test voltage (1,05 Ue) (V)	L1: <i>420 V</i> L2: <i>420 V</i> L3: <i>420 V</i>	-
	test current (kA)	L1: <i>50,4 kA</i> L2: <i>51,8 kA</i> L3: <i>50,0 kA</i>	-
	rated frequency (Hz)	<i>50 Hz</i>	-
	power factor	<i>0,22</i>	-
	Fuse protected short-circuit withstand		
	- max. let-through current (kA)	L1: <i>40,4 kA</i> L2: <i>48,8 kA</i> L3: <i>40,4 kA</i>	-
	- Joule integral I ² dt (A ² s)	L1: <i>3690 kA²s</i> L2: <i>3970 kA²s</i> L3: <i>3710 kA²s</i>	-
	Fuse protected short-circuit making		
	- mean velocity of 15 manually under no-load conditions operations (m/s)	<i>1,77 m/s</i>	-
	- point at which the measurement is made		-
	- test speed during the fuse protected short-circuit making (m/s)	<i>0,65 m/s</i>	-
	- max. let-through current (kA)	L1: <i>42,7 kA</i> L2: <i>42,7 kA</i> L3: <i>5,50 kA</i>	-
	- Joule integral I ² dt (A ² s)	L1: <i>3390 kA²s</i> L2: <i>3240 kA²s</i> L3: <i>88,2 kA²s</i>	-
8.3.6.2.5	Behaviour of the equipment during the test		P
8.3.6.2.6	Conditions of the equipment after the test		P
8.3.6.3	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	<i>2000 V</i>	-
	No flashover or breakdown		-



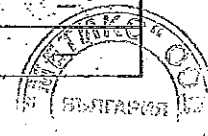
EN 60 947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.6.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA		
	Leakage current (other utilization categories) $\leq 2,0$ mA	4,2 μ A - 9,3 μ A	P
	test voltage (1,1 Ue) (V)	440 V, tested with 800 V	--
8.3.6.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	50 K - 69 K	P
	cross-sectional area (mm ²)	50 x 10 mm busbar and 2 x 240 mm ² cable	-
	test current Ie (A)	fuse-links: 722 A	--

8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		
	<i>fuse-switch-disconnector type SL 3-3x/1000</i>		
	Protective device details:		
	- manufacturer's name, trademark or identification mark	Jean Müller	-
	- manufacturer's model or type reference	M3gTr722 NH3	--
	- rated voltage (V)	400 V	--
	- rated current (A)	722 A	--
	- rated breaking capacity (kA)	100 kA	--
8.3.6.2	Fuse protected short-circuit withstand		
	test voltage (1,05 Ue) (V)	L1: 420 V L2: 420 V L3: 420 V	--
	test current (kA)	L1: 50,4 kA L2: 51,8 kA L3: 50,0 kA	--
	rated frequency (Hz)	50 Hz	--
	power factor	0,22	--
	Fuse protected short-circuit withstand		
	- max. let-through current (kA)	L1: 38,7 kA L2: 50,2 kA L3: 38,7 kA	--
	- Joule integral I ² dt (A ² s)	L1: 3840 kA ² s L2: 4160 kA ² s L3: 3300 kA ² s	--

Clause	Requirement - Test	Result - Remark	Verdict
	Fuse protected short-circuit making		
	- mean velocity of 15 manually under no-load conditions operations (m/s)	1,15 m/s	-
	- point at which the measurement is made		-
	- test speed during the fuse protected short-circuit making (m/s)	0,65 m/s	-
	- max. let-through current (kA)	L1: 39,7 kA L2: 39,7 kA L3:	-
	- Joule integral I ² dt (A ² s)	L1: 2960 kA ² s L2: 2960 kA ² s L3:	-
8.3.6.2.5	Behaviour of the equipment during the test		P
8.3.6.2.6	Conditions of the equipment after the test		P
8.3.6.3	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	2000 V	-
	No flashover or breakdown		P
8.3.6.4	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		-
	Leakage current (other utilization categories) ≤ 2,0 mA	4,0 μA - 8,7 μA	P
	test voltage (1,1 Ue) (V)	440 V, tested with 800 V	-
8.3.6.5	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K	51 K - 74 K	P
	cross-sectional area (mm ²)	50 x 10 mm busbar and 2 x 240 mm ² cable	-
	test current Ie (A)	fuse-links: 722 A	-

8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		
8.3.7.1	Overload test		
	ambient temperature 10-40 °C	23 °C	-
	test enclosure W x H x D (mm x mm x mm)	-	-
	material of enclosure		-
	test current 1,6 Ithe or 1,6 Ith (A)	1155 A	-

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EN 60 947-3

Clause	Requirement – Test	Result - Remark	Verdict
	cable/busbar cross-section (mm ²) / (mm)	busbar 50 x 10 mm cable 2 x 240 mm ²	—
	Fuse-link details:		
	- manufacturer's name, trademark or identification mark	Jepp Müller	—
	- rated current (A)	500kVA (722 A)	—
	- power loss (W)	57 W	—
	- rated breaking capacity (kA)	100 kA	—
	- time duration of the overload test (s)	1860 s	—
	Within 3 min after the fuse(s) has(have) operated (or 1 h), the equipment shall be operated once, i.e. opened and closed		P
	The equipment shall not have undergo any impairment hindering such operation		P
8.3.7.2	Dielectric verification		
	test voltage (2 Ui) for 1 min (V)	2000 V	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA		
	Leakage current (other utilization categories) ≤ 2 mA)	5,9 µA – 7,4 µA	P
	test voltage (1,1 Ue) (V)	440 V, tested with 800 V	—
8.3.7.4	Temperature-rise verification		
	Temperature rise of main circuit terminals ≤ 80 K (K)	53 K – 70 K	P
	cross-sectional area (mm ²)	50 x 10 mm busbar and 2 x 240 mm ² cable	—
	test current Ie (A)	fuse-links: 722 A	—



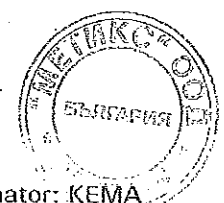
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Clause	Requirement - Test	Result - Remark	Verdict

TABLE: temperature rise measurements <i>with fuse-links</i>			
temperature rise dT of part:	phase	dT (K)	required dT (K)
<i>terminal to horizontal busbar system (line terminal)</i>	L1	48	70
	L2	53	70
	L3	62	70
<i>terminal to cable(s) (load terminal)</i>	L1	66	70
	L2	66	70
	L3	58	70
<i>internal busbar near insulation material</i>	L1	122	145
<i>actuator</i>	-	3	25

TABLE: temperature rise measurements <i>with contact knives</i>			
temperature rise dT of part:	phase	dT (K)	required dT (K)
<i>terminal to horizontal busbar system (line terminal)</i>	L1	53	70
	L2	49	70
	L3	47	70
<i>terminal to cable(s) (load terminal)</i>	L1	62	70
	L2	64	70
	L3	61	70

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Remarks

Additional test:


- Parts of insulation material necessary to retain current carrying parts were subjected to a glow-wire test according EN 60947-1, at 960 °C for the other insulation materials 650 °C.
These tests withstood the requirements.

description:

Type SL 3-3x/1000 : fuse-switch-disconnector, 3-poles, switching pole after pole

Type SL 3-3x3/1000 : fuse-switch-disconnector, 3-poles, switching 3-poles

TRF No.: 60947-3B

TRF originator: KEMA 

ТЕХНИЧЕСКА СЕРТИФИКАЦИЯ

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ПРИЛОЖЕНИЕ 9.5.4

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 3 – заверено копие

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

Annex to ISO/IEC 17025:2005 declaration
of accreditation for registration number: L 020

of **KEMA Nederland B.V.**
High-Power Laboratory

This annex is valid from: **19-03-2015 to 01-04-2018**

Replaces annex dated: **26-01-2015**

Location where activities are performed under accreditation

Head Office

Utrechtseweg 310, Building no. R11
6812 AR
Arnhem
The Netherlands

No.	Material or product	Type of activity ¹	Internal reference number
1	Power Transformers	Short-circuit tests	IEC 60076-5 IEC 60076-11 EN 50464-1 IEEE Std C57.12.90 IEEE Std. C57.12.00
2	Current Transformers	Short-time current tests Transient instantaneous error measurement	IEC 61869-2 IEEE Std C57.13 IEC 61869-1
3	Reactors	Short-time current tests	IEC 60076-6 IEEE Std C57.21
4	Line traps for A.C. power systems	Short-time current tests	IEC 60353
5	Metal-enclosed A.C. switchgear 1 - 52 kV resp > 1 kV and prefabricated substations	Short-time current tests Verification of making and breaking capacities Mechanical operation tests Arcing due to internal fault	IEC 62271-200 IEC 62271-202 IEEE C37.74 IEEE Std C37.20.2 IEEE Std C37.20.7 ANSI C37.54 ANSI C37.55
6	Metal-enclosed A.C. switchgear >52kV	Short-time current tests Verification of making and breaking capacities Mechanical operation tests Arcing due to internal fault	IEC 62271-203 IEEE Std C37.122

This annex has been approved by:

Ir. J.C. van der Poel
Chief Executive



¹ If there is a referral to a scope (Sxxx), this constitutes a scheme of an accepted scheme owner. The accepted version is mentioned on the concerning scope of the scheme owner.
Dutch Accreditation Council RvA

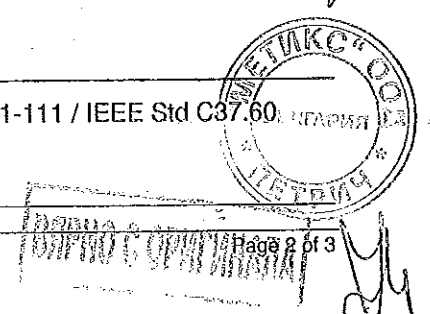
Annex to ISO/IEC 17025:2005 declaration
of accreditation for registration number: L 020

of **KEMA Nederland B.V.**
High-Power Laboratory

This annex is valid from: 19-03-2015 to 01-04-2018

Replaces annex dated: 26-01-2015

No.	Material or product	Type of activity ¹	Internal reference number
7	Low-voltage A.C. switchgear and control gear assemblies	Short-time current tests	IEC 61439-1 IEC 61439-2 IEC 60439-2
8	Insulation-enclosed A,C switchgear 1-52kV	Short time current tests Verification of making and breaking capacities Mechanical operation test Arcing due to internal fault	IEC 62271-201
9	High-voltage AC circuit breakers	Short-time current tests Making and breaking tests Switching tests Mechanical and environmental tests	IEC 62271-100 IEC 62271-110 IEC 62271-101 IEEE Std C37.09 IEEE Std C37.09a IEEE Std C37.09b IEEE Std C37.081
10	High-voltage generator Circuit breaker	Short circuit test	IEEE Std C37.013 IEEE Std C37.013a
11	AC circuit breakers for Railway applications	Making and Breaking test	EN 50152-1 IEC 60077-4
12	High-voltage A.C. switches for rated Voltages above 1 kVUp to and including 52 kV	Short-time current tests Making and breaking tests Mechanical endurance tests	IEC 62271-103
13	Alternating current switches for rated voltages of 52 kV and above	Short-time current tests Making and breaking tests Mechanical endurance tests	IEC 62271-104 IEEE Std C37.247
14	High-voltage A.C. disconnectors and earthing switches	Short-time current tests Switching tests Short-circuit making performance Operating and mechanical endurance tests Operation under severe ice conditions Operation at the temperature limits Contact zone tests	IEC 62271-102. IEEE Std C37.34
15	Alternating current contactors and motor starters	Making and breaking capacities Coordination with short-circuit protective device	IEC 62271-106
16	Automatic circuit reclosers and fault interrupters	Interruption tests Operating duty tests	IEC 62271-111 / IEEE Std C37.60



Annex to ISO/IEC 17025:2005 declaration
of accreditation for registration number: L 020

of **KEMA Nederland B.V.**
High-Power Laboratory

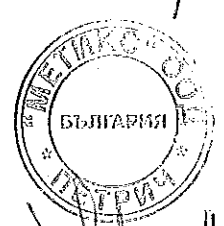
This annex is valid from: 19-03-2015 to 01-04-2018

Replaces annex dated: 26-01-2015

No.	Material or product	Type of activity ¹	Internal reference number
17	Surge arresters	Pressure-relief tests	IEC 60099-1 IEC 60099-4 IEEE Std C62.11
18	High-voltage A.C. switchfuse combinations for rated Voltages above 1 kV Up to and including 52 kV	Making and breaking tests Tests on the mechanism	IEC 62271-105 IEEE Std C37.41
19	Current limiting fuses	Breaking tests	IEC 60282-1 IEC 60549 IEEE Std C37.41 ANSI C37.44
20	Expulsion fuses	Breaking tests	IEC 60282-2
21	High Voltage fuse-links for motor circuit applications	Breaking tests	IEC 60644
22	Equipment for networks for transmission and distribution of electrical power	Test as mentioned above (1-16)	In accordance with or equivalent to the reference methods as mentioned above (1-16). IEC 61467 IEC 62067 IEC 61284

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Page 3 of 3

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ПРИЛОЖЕНИЕ 9.5.5

ЕО декларация за съответствие

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

EG-Konformitätserklärung
EC Conformity Declaration

Dok.-Nr. L_98_01
Doc. No.

Hersteller, Anschrift Manufacturer, Address	Jean Müller GmbH Elektrotechnische Fabrik H.J.-Müller-Straße 7, D-65343 Eltville am Rhein
Produktbezeichnung Product designation	NH-Sicherungslastschaltleisten Baureihe SL, für Schalttafeleinbau und Schalttafel Aufbau inklusive Zubehör. LV HRC Strip type fuse switch disconnectors, series SL and accessories, for panel board building. DIN-Size 00 (160A): SL00-3x3/100/; SL00-3x(3); SL00-3x/400A DIN-Size 1 to 3 (250A/400A/630A):SL123-3x(3) DIN-Size 3: SL3-3x(3)/1000A (NH-Trennleiste) (LV HRC Busbar disconnect strip 1-and 3 pole switchable) DIN-Size 3: SL3-3x2/1.250A or 1.600A DIN-Size 3: SL3-3x(3)/910A DIN-Size 3; SL3-3X6/2.000A DIN-Size 3: SLT3-3SRSL/3x(3)/50 (NH-Stromschienen-Trennleiste) (busbar disconnect strip)

Jahr der Anbringung der CE-Kennzeichnung : 1998
Affixing of the CE marking

Das bezeichnete Produkt stimmt mit den Vorschriften folgender EG-Richtlinie/n überein:
The designated product conforms to the provisions of the following European directives

2006/95/EG

Richtlinie des Rates vom 12. Dezember 2006 zur Angleichung der Rechtsvorschriften der Mitgliedsstaaten betreffend elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen.

Directive of the European Parliament and of the council of 12. December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.


Die Übereinstimmung des bezeichneten Produktes mit den Vorschriften der oben genannten Richtlinie/n wird nachgewiesen durch die Einhaltung folgender Normen:

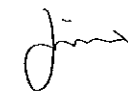
The conformity of the designated product with the provisions of the above mentioned Directives is proved by full compliance with the following standards

Europäische Normen Harmonized European standards	EN 60947-3
IEC-Standards IEC standards	
Nationale Normen National standards	VDE 0660 Teil 107

Aussteller / Issuer	G / QM
Ort, Datum / Place, Date	Eltville, den 16. Jan. 2008

Rechtsverb. Unterschriften
Legally binding signature


Dr. B. Müller


I.V. A. Göllert

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Mitgelieferte Sicherheitshinweise sind zu beachten.
This declaration certifies compliance with the indicated directives but implies no warranty of properties. The safety instructions of the accompanying product documentation shall be observed.

CE_L_98_01_A_SL00 bis SL3.doc

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Владимир Лазаров,

Управител на фирма "ВиВ Изоматик" ООД, София, ул.Пирин 40А

В качеството си на търговски представители на JEAN MULLER GMBH

Декларираме, че продуктът:

Марка:	JEAN MULLER
Продукт:	Разединител 1000А
Серия:	SLT3-3S

За който се отнася тази декларация, при условие, че е инсталиран, обслужван и използван за приложения, за които е предназначен, е в съответствие със следните стандарти, технически одобрения или други нормативни актове:

IEC/EN 60947-1
IEC/EN 60947-3

София, 14.08.2012

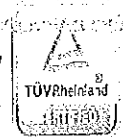
Владимир Лазаров, управител
ВиВ Изоматик ООД

СЕРТИФИКАЦИЯ

ТОВ РЪЙНЛАНД БУЛГАРИЯ
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ПРИЛОЖЕНИЕ 9.5.6

Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“

Триполюсен разединител с вертикална конструкция, с обявен работен ток 1000 А, с общо управление на полюсите, за директен монтаж върху събирателни шини с междуосово разстояние 185 mm, съоръжен с твърди връзки (тоководещи шини), система А (НН система), размер 3, съответстващи на БДС EN 60269-1 и БДС HD 60269-2

Вертикалният предпазител-разединител е предназначен за свързване на шинните системи на разпределителните табла посредством едножилни кабели НН.

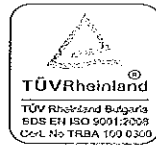
Триполюсният вертикален разединител за 1000 А, с общо управление на полюсите отговаря на посочените по-долу стандарти или еквиваленти и на техните валидни изменения и допълнения:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и
- БДС EN 60947-3:2009 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товарови прекъсвач-разединители и апарати комбинирани със стопяеми предпазители (IEC 60947-3:2008)“;
- БДС EN 60269-1:2007 „Стопяеми предпазители за ниско напрежение. Част 1: Общи изисквания (IEC 60269-1:2006)“;
- БДС HD 60269-2:2013 „Стопяеми предпазители за ниско напрежение. Част 2: Допълнителни изисквания за стопяеми предпазители, предназначени за използване от квалифицирани лица (стопяеми предпазители предимно за промишлено приложение). Примери за стандартизирани системи за стопяеми предпазители от А до К (IEC 60269-2:2013, с промени)“;
- БДС EN 60664-1:2007 „Координация на изолацията за съоръжения в електроразпределителни мрежи за ниско напрежение. Част 1: Правила, изисквания и изпитвания (IEC 60664-1:2007)“;
- БДС EN 60529+A1:2004 „Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989 + A1:1999)“

и
е оценен положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

ТОВ "МЕТИКС" АД
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С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

гр. Петрич -
21.10.2015г.

Декларатор:
инж. Николай Джамбазов
/Управител/



Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

**„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“
РЕФ. № PPD 15-065**

организиран от "ЧЕЗ Разпределение България" АД

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ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Владимир Лазаров,

Управител на фирма "ВиВ Изоматик" ООД, София, ул.Пирин 40А

В качеството си на търговски представители на JEAN MULLER GMBH

Декларираме, че продуктът:

Марка:	JEAN MULLER
Продукт:	Разединител 1000А
Серия:	SLT3-3S

За който се отнася тази декларация, при условие, че е инсталиран, обслужван и използван за приложения, за които е предназначен, е в съответствие със следните стандарти, технически одобрения или други нормативни актове:

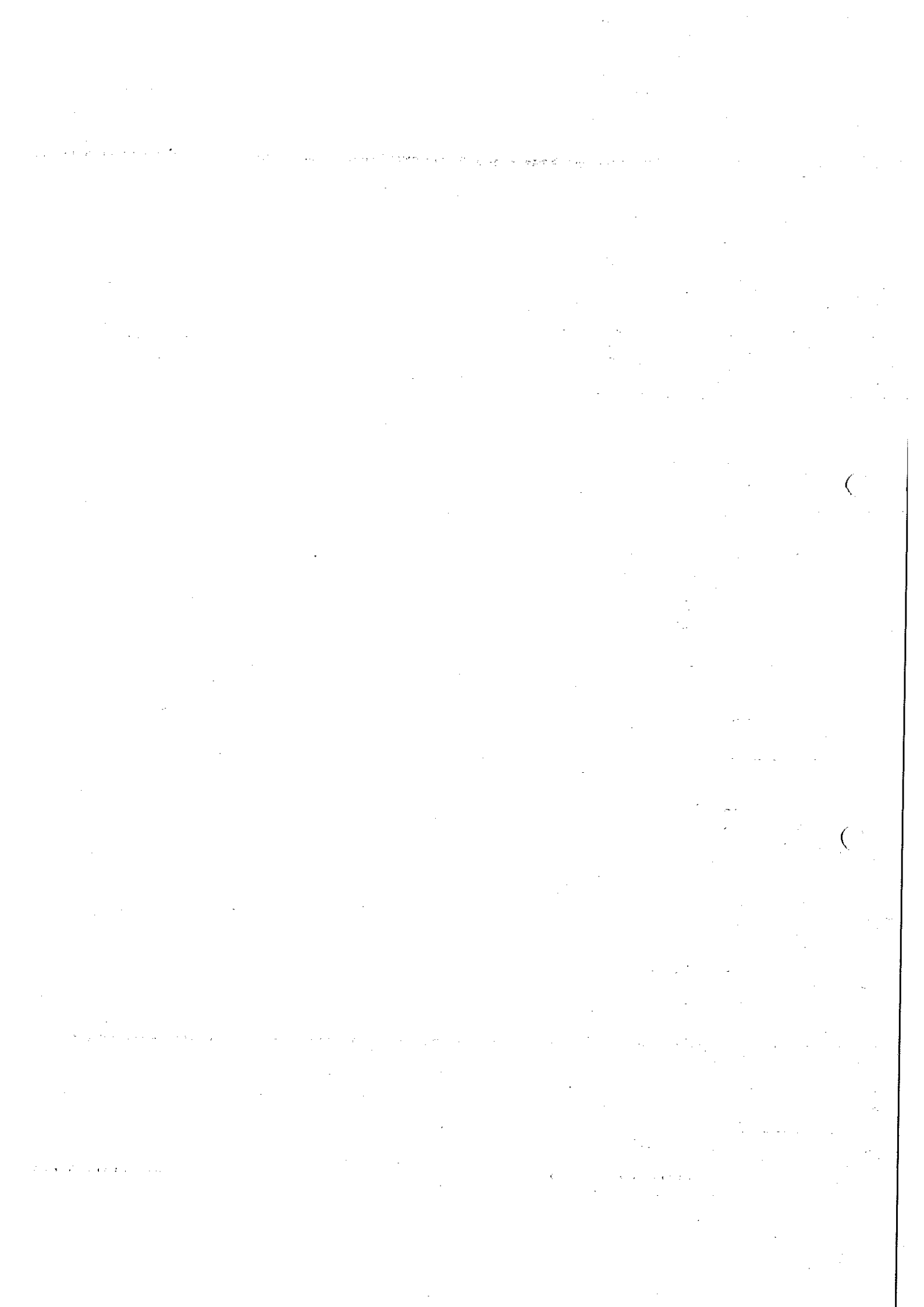
IEC/EN 60947-1
IEC/EN 60947-3

София, 14.08.2012

.....
Владимир Лазаров, управител
ВиВ Изоматик ООД

ВЕРНО С ОПРИЧАТА





Наименование на материала: Вертикален предпазител-разединител НН 400 А, с триполюсно управление

Съкратено наименование на материала: ВПР НН, 400 А, 3-полюсно управление

Област: Н – Трансформаторни постове

Категория: 16 - Предпазител, основи за предпазител и предпазител-разединители

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Триполюсен предпазител-разединител с вертикална конструкция, с обявен работен ток 400 А, с общо управление на полюсите, за директен монтаж върху събирателни шини с междуосово разстояние 185 mm, за високомошни предпазител със стопяема вложка НН, система А (NH система), с характеристика gG, размер 2, съответстващи на БДС EN 60269-1:2007 и БДС HD 60269-2:2007.

Използване:

Вертикалният предпазител-разединител е предназначен за включване, изключване, разединяване и защита на кабелни линии НН.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Триполюсният вертикален предпазител-разединител за 400 А, с общо управление на полюсите трябва да отговаря на приложимите български и международни стандарти или еквиваленти и на техните валидни изменения и поправки:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и
 - БДС EN 60947-3:2002 „Комутационни апарати за ниско напрежение. Част 3: Товари прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазител (IEC 60947-3:1999 + поправка юли 1999)“
- и

да бъде оценен положително по реда и при условията на Наредбата за съществени изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	ZLBM, ABB, България: приложение 9.6.1
2.	Техническо описание и чертежи с нанесени на тях размери	приложение 9.6.2
3.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	приложение 9.6.3
4.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 3 – заверено копие	приложение 9.6.4
5.	ЕО декларация за съответствие	приложение 9.6.5
6.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“ по-горе	приложение 9.6.6

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от проверките и изпитванията могат да бъдат и само на английски.)

Технически данни:

1. Характеристики на работната среда

№ по ред	Наименование	Стойност
1.1	Място на монтиране	На закрито
1.2	Максимална температура на въздуха в околната среда	+ 40°C
1.3	Минимална температура на въздуха в околната среда	Минус 5°C
1.4	Максимална средна температура на въздуха в околната среда за период от 24 ч.	+ 35°C
1.5	Относителна влажност (при 20°C)	До 90 %
1.6	Степен на замърсяване	3
1.7	Надморска височина	До 2000 m

2. Параметри на електроразпределителната мрежата НН

№ по ред	Наименование	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Електроразпределителна мрежа	4 проводна мрежа (L1, L2, L3, PEN)
2.5	Схема на електроразпределителната мрежа	TN-C

3. Технически параметри и други данни

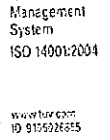
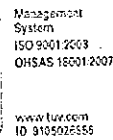
№ по ред	Технически характеристики	Изискване	Гарантирано предложение
3.1	Обявено работно напрежение, U_e	min 690 (500) V AC	690 V AC
3.2	Брой на полюсите	3	3
3.3	Обявена честота	50 Hz	50 / 60 Hz
3.4	Категория по пренапрежение съгласно БДС EN 60664-1:2007	IV	IV
3.5	Обявено издържано импулсно напрежение, U_{imp}	8 kV	8 kV
3.6	Обявено напрежение на изолацията, U_i AC	min 800 V	1000 V
3.7	Обявен работен ток, I_e	400 A	400 A
3.8	Термичен ток със стопяема вложка, I_{th}	400 A	400 A
3.9	Условен ток на късо съединение (ефективна стойност) при 400 V AC	min 50 kA	50 kA
3.10	Размер на стопяемите вложки (съгласно серията БДС EN 60269)	2	2
3.11	Максимален обявен ток на стопяемите вложки, I_n	400 A	400 A
3.12	Категория на приложение (при 400 V AC)	AC 22 В или по висока	AC 23 В
3.13	Механична износоустойчивост, брой на комутационните цикли	min 800	800
3.14	Електрическа износоустойчивост, брой на комутационните цикли	min 200	200

№ по ред	Технически характеристики	Изискване	Гарантирано предложение
3.15	Управление	Триполюсно (едновременно включване и изключване на трите полюса)	да
3.16	Основни размери:	-	-
3.16a	широчина	max 100 mm	99 mm
3.16b	височина (измерена от края на клемните съединения)	680 mm - информативно	662 mm
3.17	Разстояние между осите на събирателните шини	185 mm	185 mm
3.18	Присъединяване към събирателните шини	Клеми за свързване без необходимост от пробиване на шините	да
3.19	Степен на защита срещу проникване на твърди тела и вода във вътрешността и допир до части под напрежение от лицевата страна съгласно БДС EN 60529+A1:2004 или еквивалентно.	min IP20	IP20
3.20	Клемови съединения за токопроводимите жила на присъединяваните кабелни линии	Вертикалните предпазител-разединители трябва да бъдат съоръжени с V-съединителна арматура за свързване на токопроводими кабелни жила в диапазона най малко от 35 mm ² ге до 185mm ² sm.	да
3.21	Маркировка	Вертикалните предпазител-разединители трябва да бъдат маркирани с информацията съгласно т. 5.2 от БДС EN 60947-3:2002 или еквивалентно и инициалите „CE“.	Да, Вертикалните предпазител-разединители трябва да бъдат маркирани с информацията съгласно т. 5.2 от БДС EN 60947-3:2002
3.22	Тегло, kg	Да се посочи	4.8 kg

AM

ИКОМБАНКЪТ

ТОВУРХАЙНЛАНД България
ТОВУРХАЙНЛАНД България
ТОВУРХАЙНЛАНД България
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ПРИЛОЖЕНИЕ 9.6.1

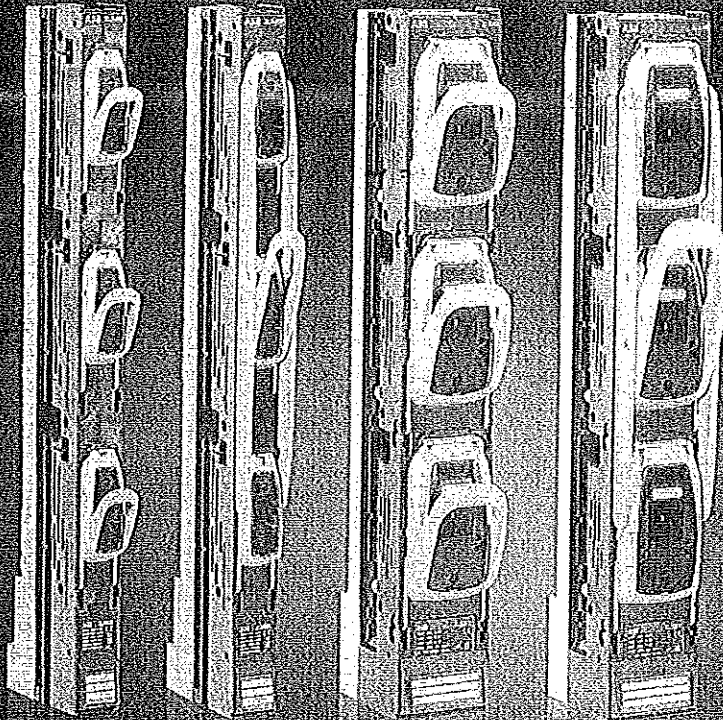
Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Catalogue | March 2015

InLine II - ZLBM/ZHBM Fuse Switch Disconnecter

Power and productivity
for a better world™



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Introduction

Fuse protection

1

Fuse protection - Easy and reliable

The fuse is a superior short circuit protection element regarding the maximum allowed cut-off current (peak let through current) and energy value.

This is more important the higher the voltage and prospective fault levels are. The InLine fuse switch disconnecter fulfils the highest requirements for modern switch fuses with a total safety concept. The fuse switches are tested according to the EN/IEC 60947-3 standard with more stringent requirements for isolation, making, performance and safety.

The melting curves and current limiting diagrams for NH fuse links are given in the EN/IEC 60269-2 standard. The standardised fuse characteristics and high degree of current limitation ensure that there is a simple and effective co-ordination with fuse links and other devices.

Fuse links utilise a simple procedure for selecting the right fuse type for your installation, without complicated calculations or calculation tools. Fuses prevent "blackouts". Only the fuse nearest a fault trips without upstream fuses (feeders or mins) being affected. Fuses thus provide selective coordination.

When more power is needed in an installation, more feeders can be added without changing the present structure or any new selectivity calculations. Fuse links will assure selectivity in the installation by 1,6:1 difference in the rated current.

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Economical installation

Lifetime costs of fuse systems are low. Fuse links which can withstand a high fault level and a fault current, are available at economical prices.

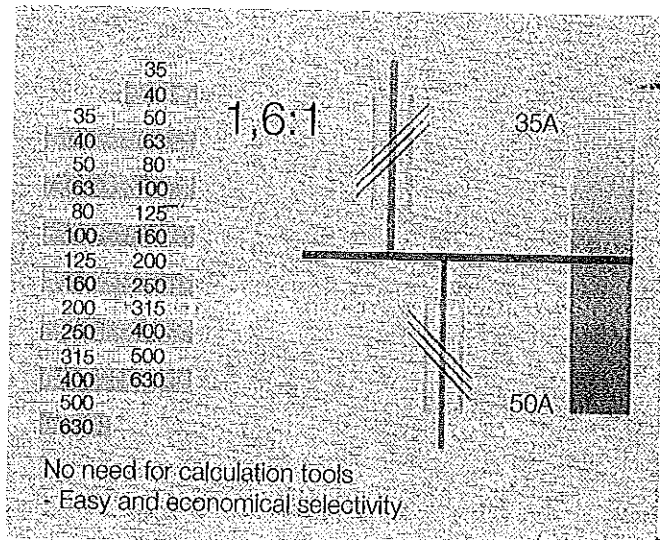
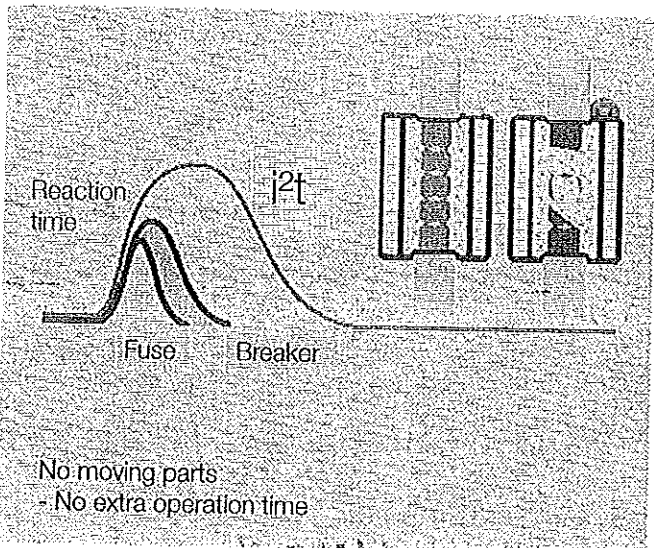
After fuse operation, only the fuse link has to be changed. Because the fuse links can be rapidly and easily replaced, plant down time and maintenance are substantially reduced with a fuse link system.

Because the fusing elements operate in a cylinder, they are not affected by their surroundings. Thus their protecting characteristics remain stable year after year. The dynamic stress on the network and its equipment is dependent of the let through energy (I^2t) at a short circuit. The fuse link provides the best protection compared to other solutions, at high short circuit currents.

As the fuse link body is filled with quartz sand, there will be no emission of gases or arcs when a short circuit occurs. This again leads to less stress on the network and a higher degree of personal safety.

- Economical installation
- Easy and economical selectivity
- No need for calculation tools
- No need to change the present structure when power is needed
- No moving parts
- No extra operation time
- No arc space
- No emission of gases at short circuits

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Introduction

General

Designed for the future

Family presentation

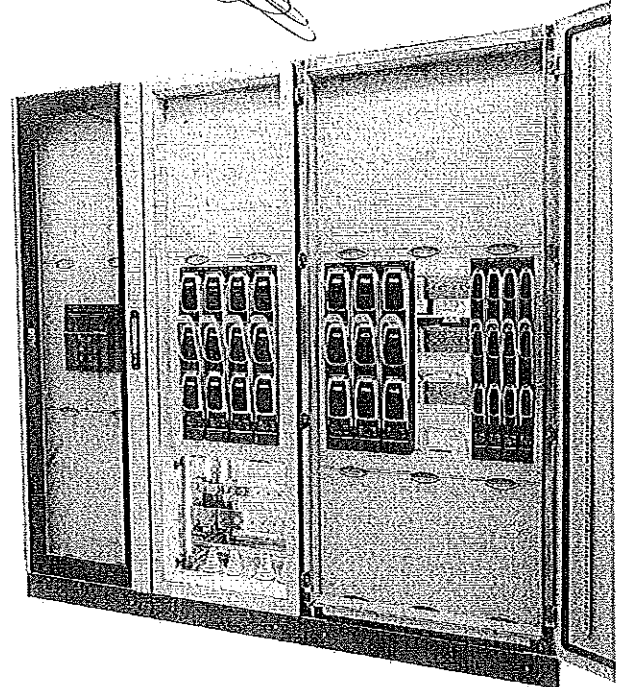
InLine is the new generation of vertical fuse switch disconnectors, fuse rails and disconnectors from ABB.

ABB has a long tradition in producing these types of devices, and the first generation was introduced already in 1967.

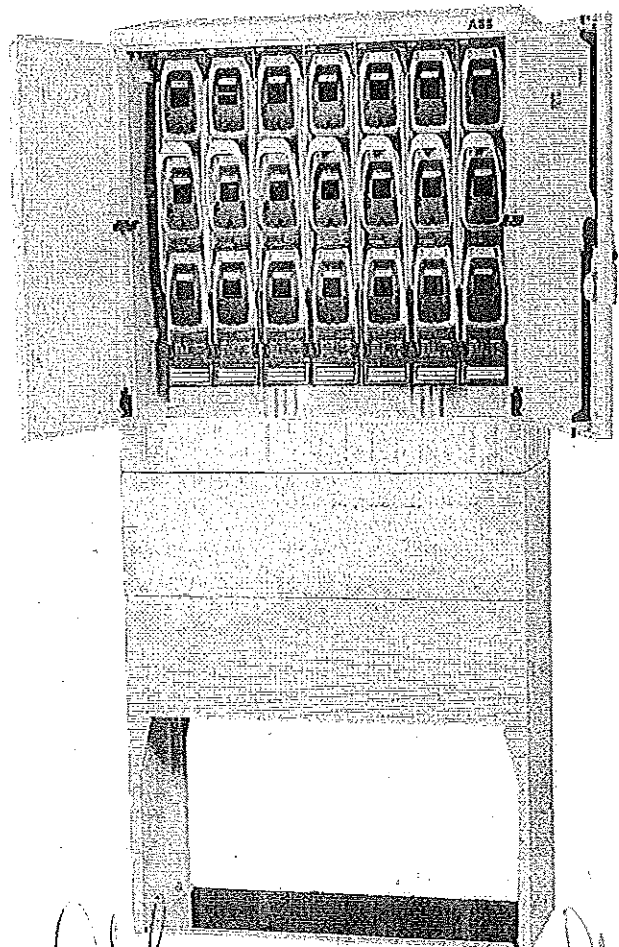
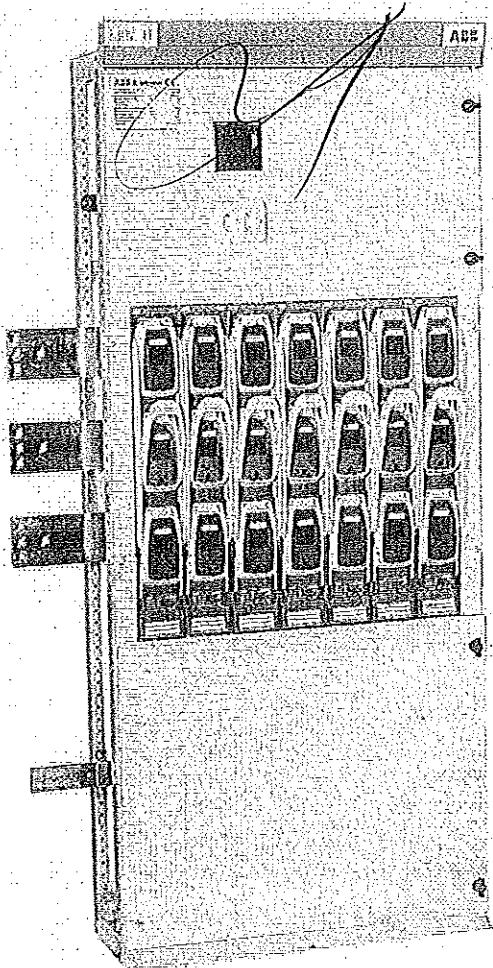
The new InLine family consists of single pole and triple pole operated fuse switch disconnectors.

Areas of applications

- Cable distribution cabinets (CDC)
- Low voltage distribution panel in compact secondary substations (CSS)
- Distribution boards for industry, housing and office buildings
- Installations



1



Introduction General

1

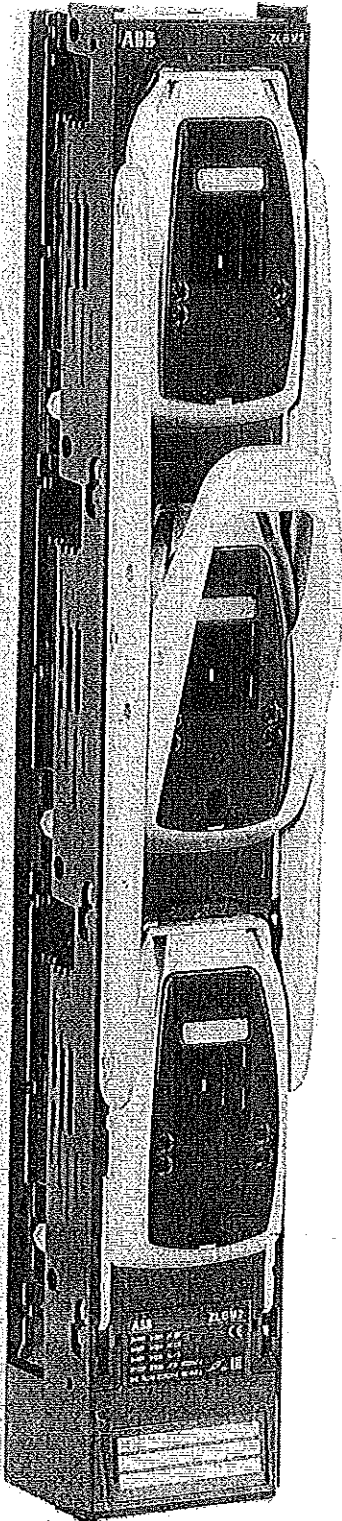


ABB is proud to introduce the latest technology of Fuse Switch Disconnectors to ensure the best stability and highest safety in the power distribution network. The new generation InLine II offers the highest level of personal safety during operation and service.

Advantages:

- High level of personal safety by:
 - Safe and reliable operation ON/OFF
 - Safe and easy replacement of the NH fuse links
- Universal terminal bolts offering standing bolt or fixed nut for high flexibility of cable connections
- Variants with integrated V-clamps
- Available in two alternative depths: ZLBM and ZHBM
 - ZLBM - version will save space in Cable Distribution Cabinets by offering reduced depth.
 - ZHBM - version +32,5mm for easy integration of current transformers at the rear side. Identical dimensions to the main actors in the market.
- Variants with non corrosive steel materials (stainless steel)
- Designed for intelligent communication to support a high level of stability in the electrical distribution network

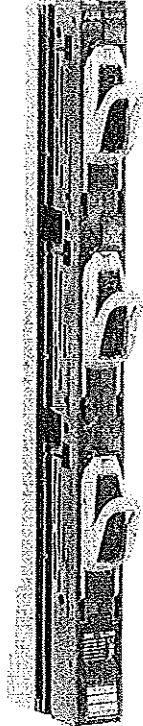
Properties:

- Available as 160A, 250A, 400A and 630A types in combination with NH/DIN HRC Fuse Links acc. to EN/IEC 60269
- Type tested in accordance to EN/IEC 60947-3
- 1 - pole and 3 - pole variants
- For vertical and horizontal installations
- Designed for 185mm busbar distance
- IP30 degree of protection **from the front**
 - Padlocking in open and closed position at the 3 - pole version
 - Padlocking in closed position at the 1 - pole version
- Park position with possible padlocking at the 1 - pole type
- Sealing solutions
- Wide range of accessories and cable terminal connections
- Compatible dimensions to equivalent products in the market

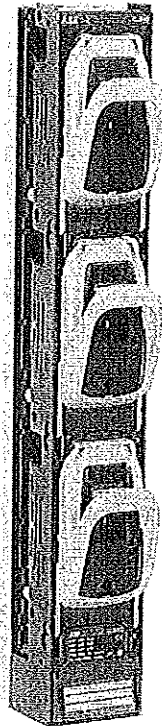
Apparatus

Variants size NH00-3 / 160-630A

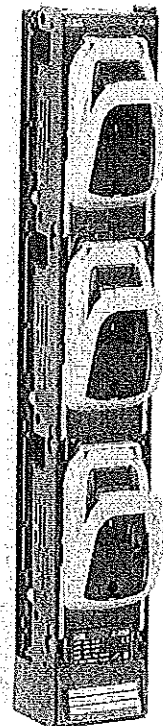
1-pole operated



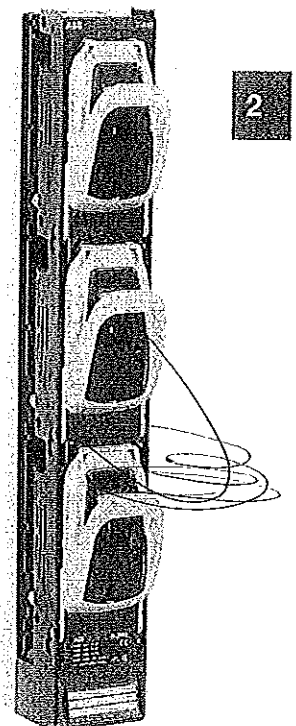
ZLBM 00
160A



ZLBM 1
250A

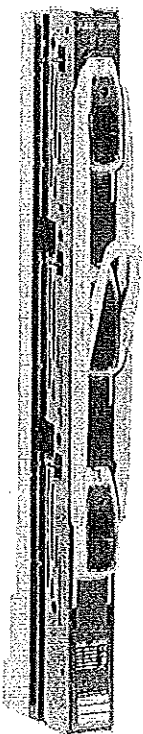


ZLBM 2
400A

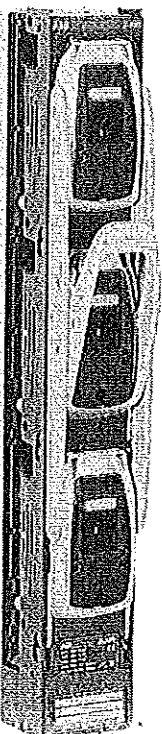


ZLBM 3
630A

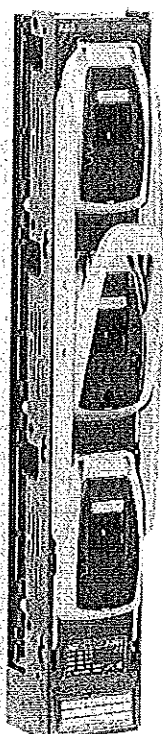
3-pole operated



ZLBM 00
160A



ZLBM 1
250A



ZLBM 2
400A

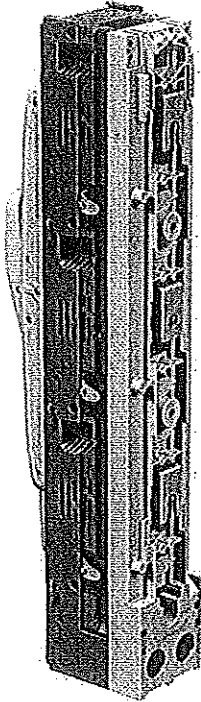


ZLBM 3
630A

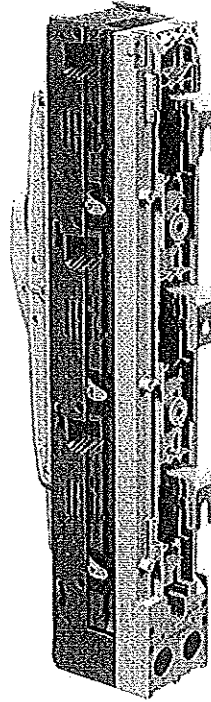
Apparatus

Two alternative depths ZLBM - ZHBM

ZLBM



ZHBM



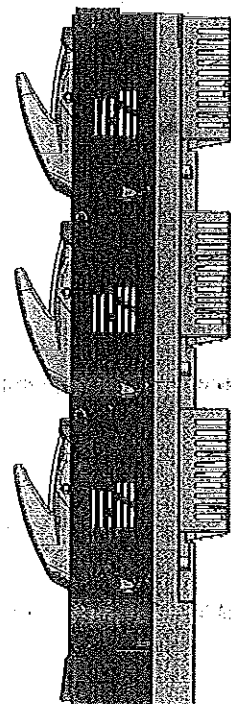
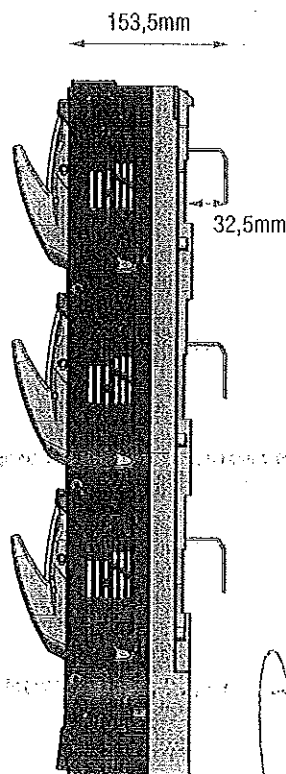
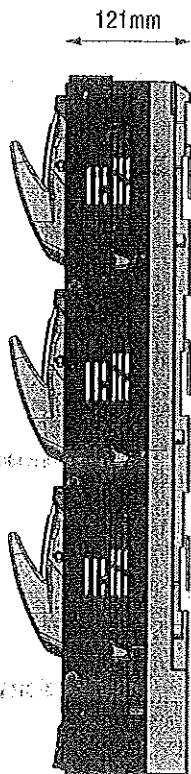
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2

ZLBM with reduced depth.

ZHBM depth, +32,5mm, for integration of current transformers at the rear side. The ZHBM has compatible dimensions to equivalent products in the market.

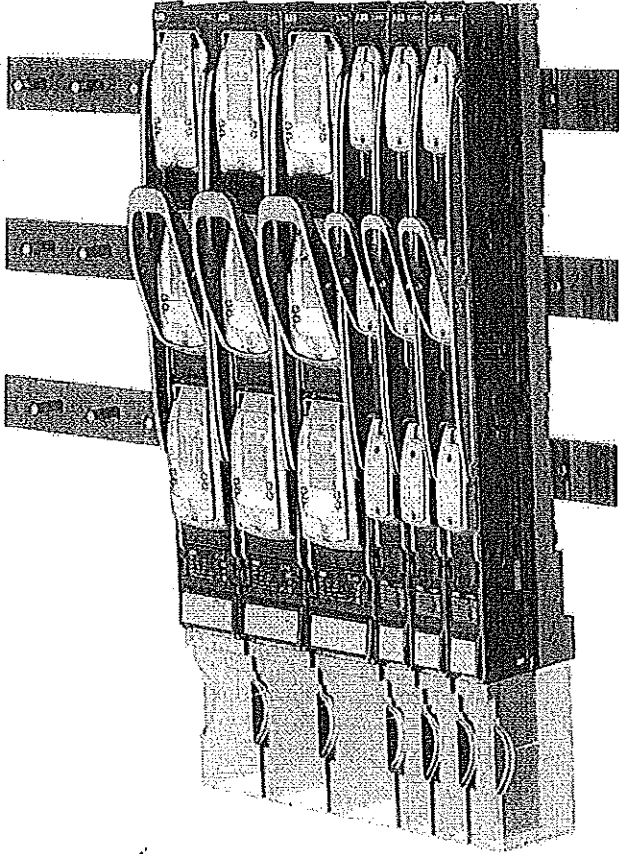
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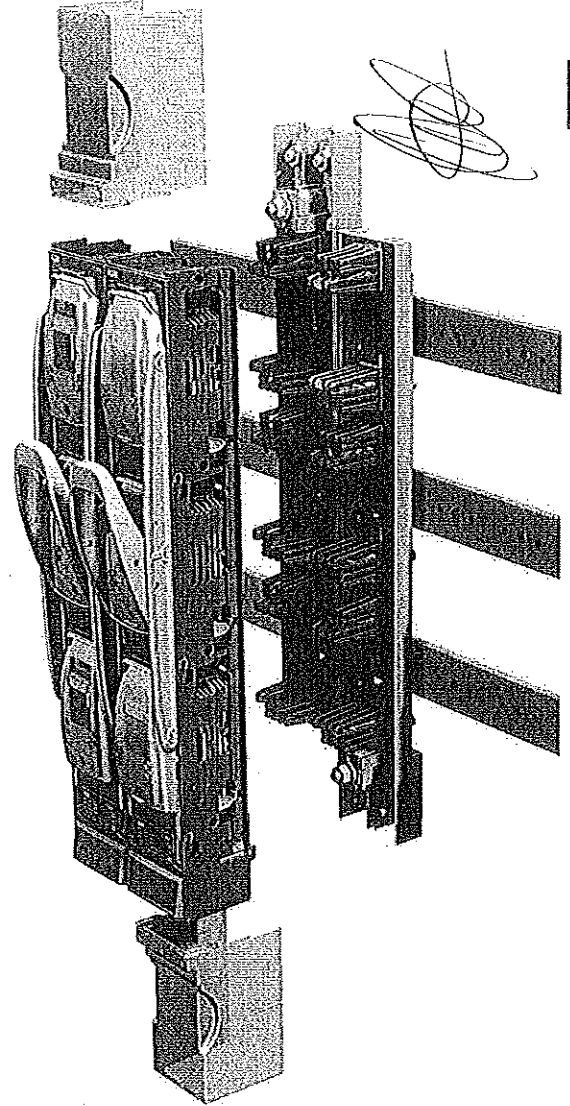
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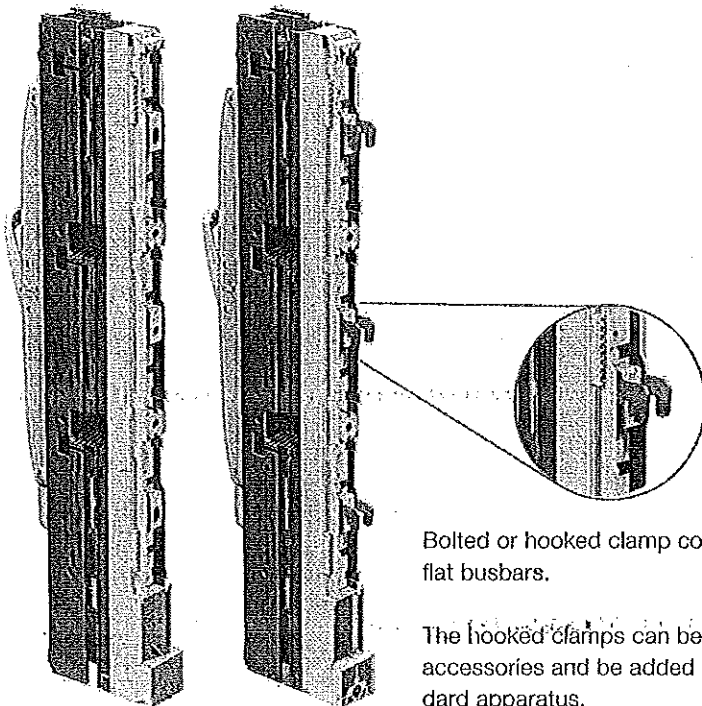
Apparatus Installation



Installation at busbars with 185mm
centre distance between the phases



Symmetric front position independent of
the cable terminations are UP or DOWN



Bolted or hooked clamp connection to the
flat busbars.

The hooked clamps can be ordered as
accessories and be added on the stan-
dard apparatus.

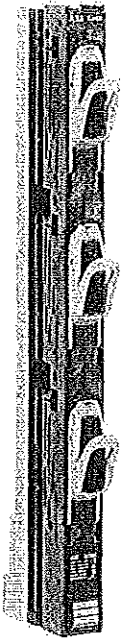
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Apparatus Operation

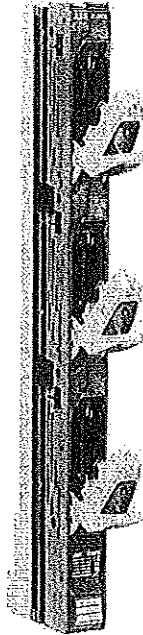
ZLBM - ZHBM 1-pole

2

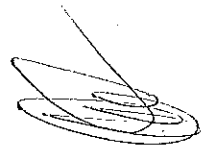
ON - Closed position



OFF - Open position

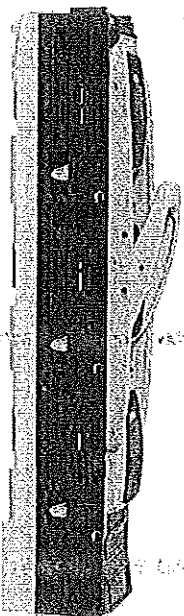


Replacement of fuses position

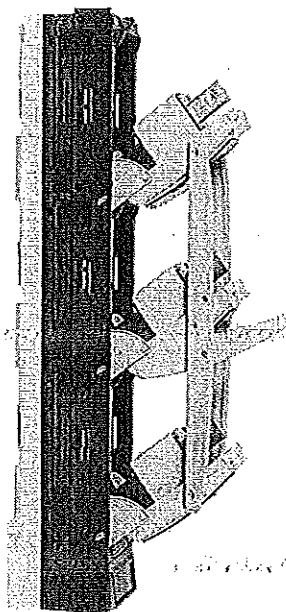


ZLBM - ZHBM 3-pole

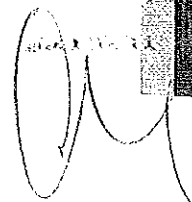
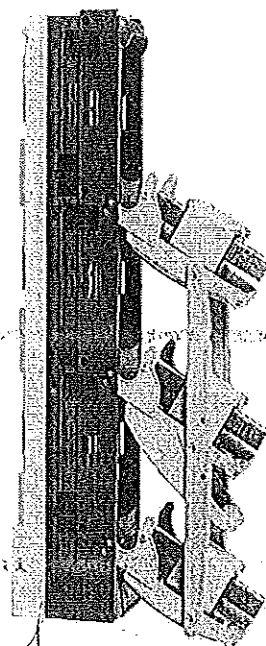
ON - Closed position



OFF - Open position



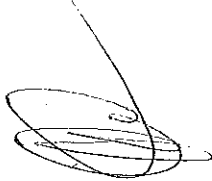
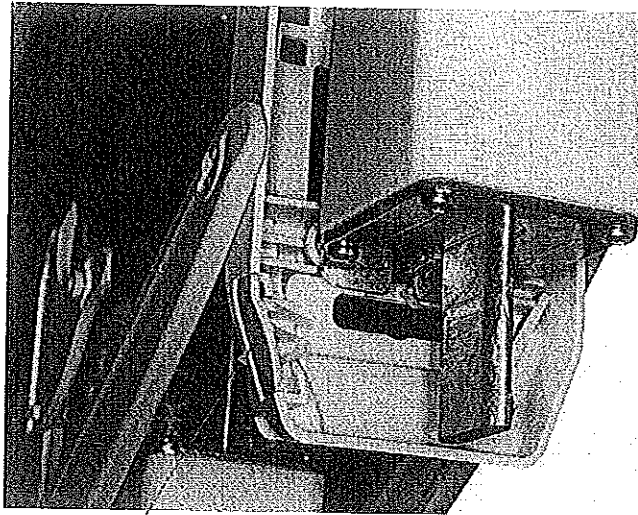
Replacement of fuses position



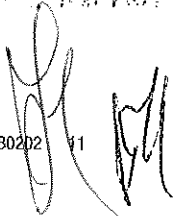
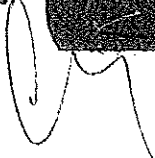
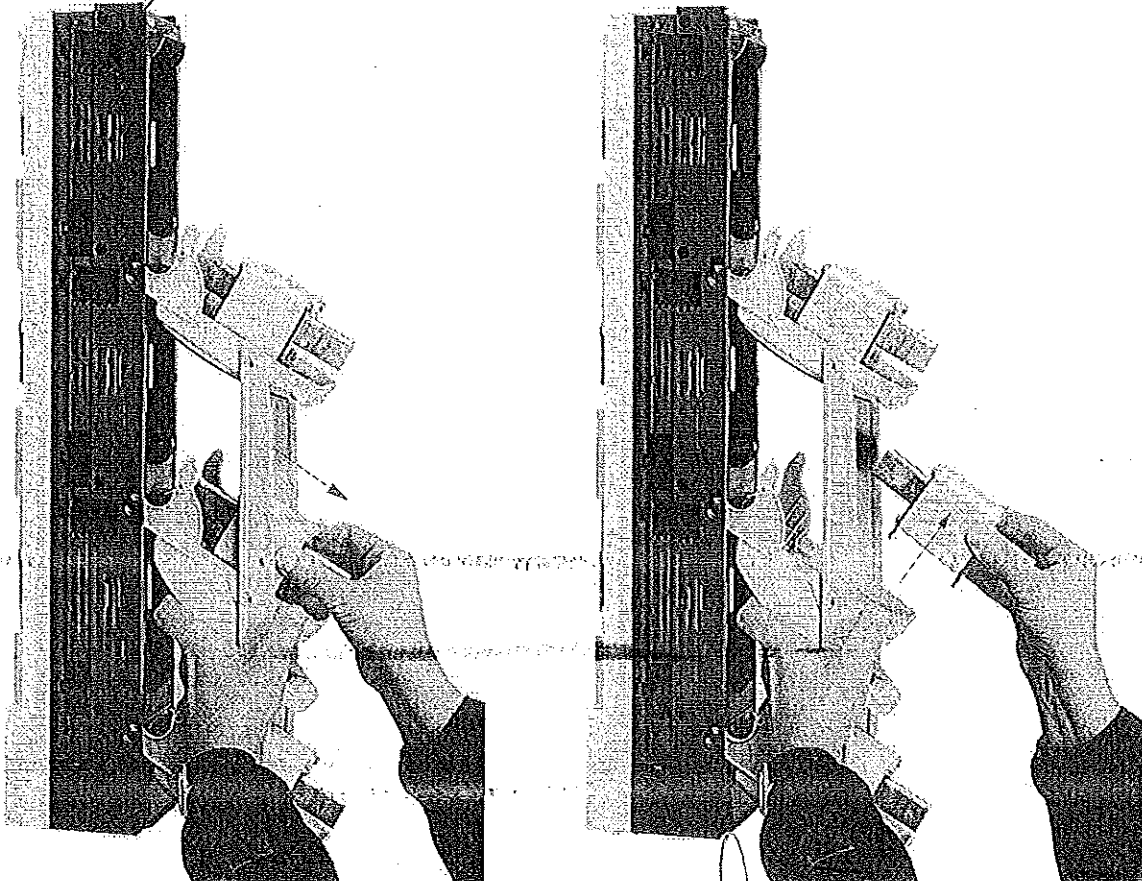
Apparatus

Replacement of the NH Fuse links

Safe and easy replacement of the NH Fuse links by using the integrated yellow release button



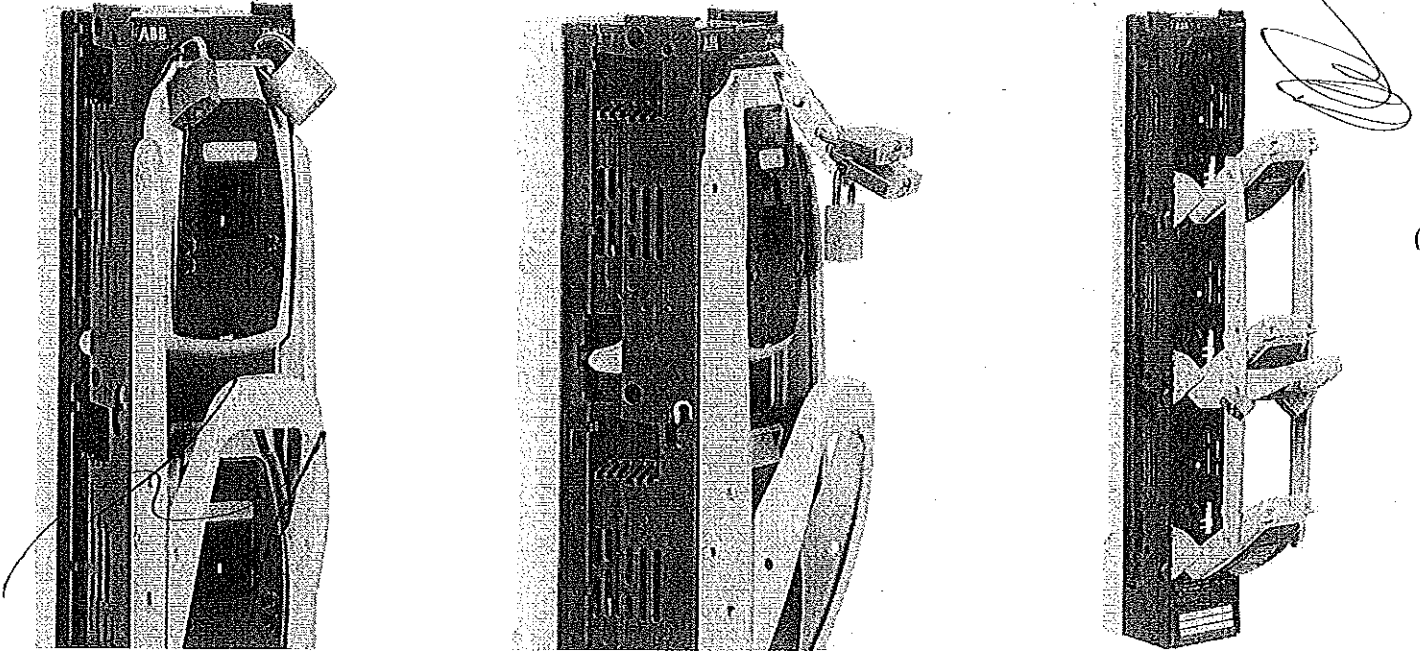
Release button



Apparatus Padlocking and sealing

Each front cover can be padlocked with up to 2 padlocks pr phase, or up to 3 padlocks pr phase by using the padlock hasp. The ZLBM/ZHBM 3-pole, can also be padlocked with up to 2 padlocks in open position. Sealing can be done in the same way as done with the padlocks.

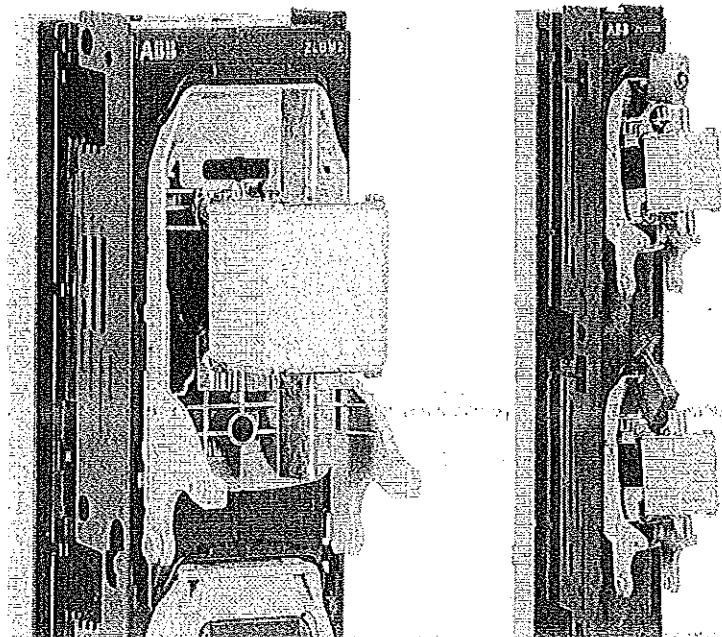
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Park position

The front covers of the ZLBM/ZHBM 1-pole variants can be placed in park position with the possibility to be padlocked.

The padlock hasp can also be used in this position when up to 3 padlocks pr phase is requested.

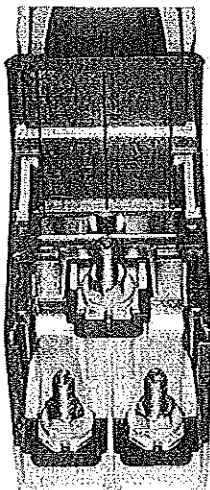


Apparatus Cable termination

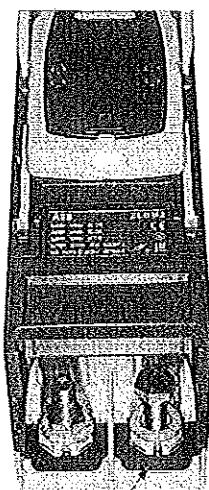
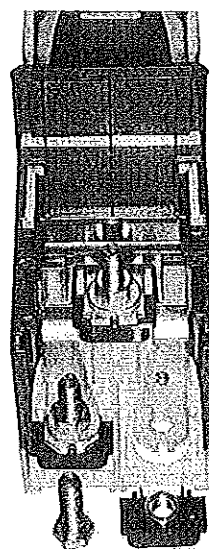
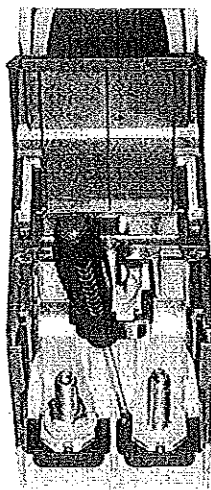
Universal terminal bolts

The ZLBM/ZHBM 123 are delivered with standing M12 bolts at the cable terminals as standard. However, if the demand is to insert the M12 bolt from the front, the nut and the bolt can easily be exchanged as shown below:

2



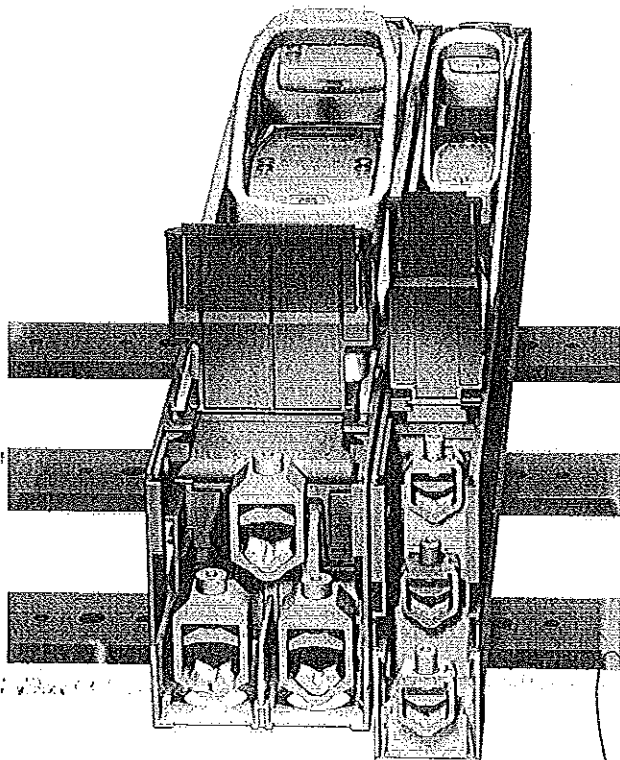
Standing bolt



Fixed nut

Integrated terminal V-clamps

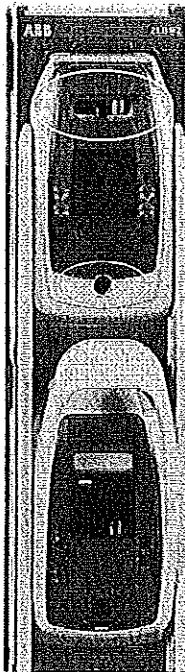
The ZLBM/ZHBM 00/123 can be delivered with integrated V-clamps



Apparatus Properties

Voltage measurement

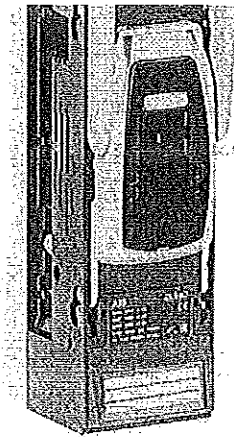
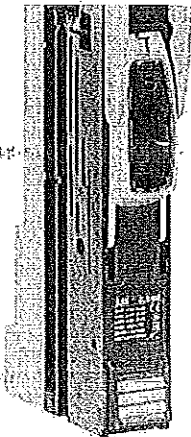
The front windows can be slid up to give access for voltage measurement at the fuse contacts



Circuit labels

The integrated front terminal shroud has a dedicated area for circuit labels.

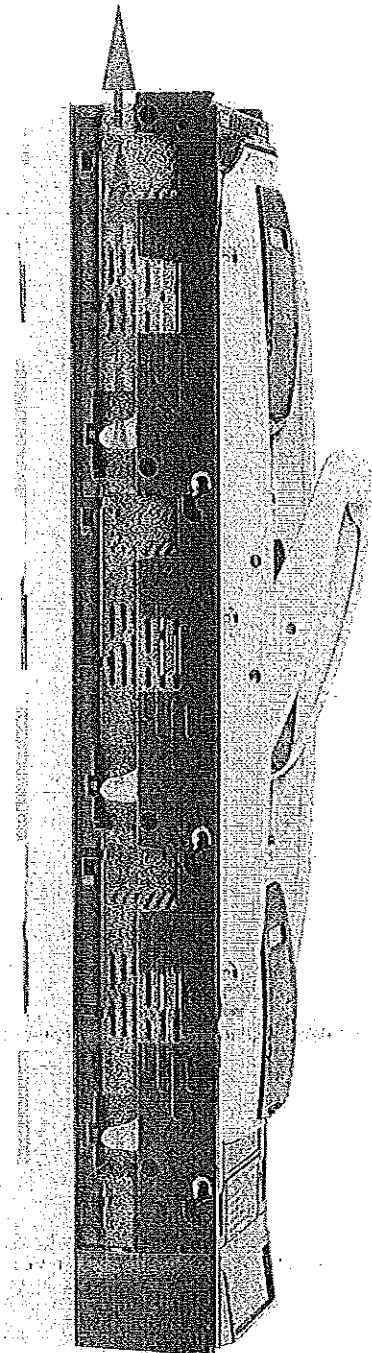
This integrated front terminal shroud is interlocked when the cable terminal shroud is mounted.



Optimized ventilation ribs

The design of the ZLBM/ZHBM body has been given priority to give the most optimized ventilation of the apparatus.

An integrated ventilation channel at the side of the body will also support the air ventilation upwards between the apparatuses when they are installed side by side.



Accessories

Electronic Fuse Monitoring (EFM)

Electronic Fuse Monitoring (EFM)

The ZLBM/ZHBM electronic fuse monitoring (EFM) gives an alarm if any fault conditions i.e. if 1, 2, and/or 3 fuses are blown.

An internal output relay (1NC + 1NO) will ensure a signal for a remote fuse blown alarm.

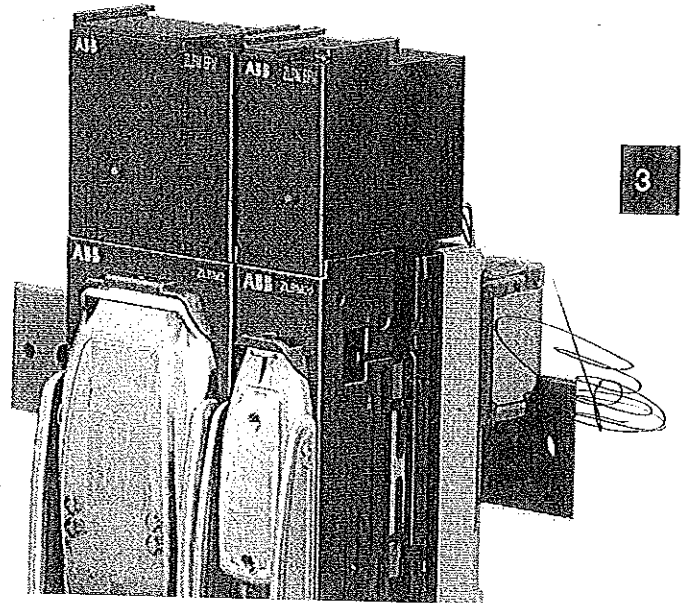
The EFM unit is self supplied, which means no additional power supply is required.

The EFM unit can be completely disconnected from the live fuse contacts by pulling the unit out from the EFM house. This is an advantage when doing a dielectric insulation test of the whole installation in a switchboard.

The green LED in the front panel indicates all fuses are OK. The red LED will turn on in the case of one or more fuses are blown.

The EFM will automatically be reset after the blown fuse has been replaced and the ZLBM/ZHBM is switched into ON position again.

NOTE: The EFM require voltage from the busbar side to be active. EFM is expected available beginning of 2015



EFM Technical data:

Operational voltage	340 - 770VAC from the busbar side
Uimp. over a blown fuse	12,3kV
Uimp. between phases	9,8kV
Uimp. between main circuit / relay contacts	9,8kV
Dielectric test voltage input / output	1,9kV
Electrostatic Discharge	EN 61000-4-2 ± 4kV
Electrical Fast Transient	EN 61000-4-4 ± 2kV
Conducted Fast Transient	EN 61000-4-6 10Vrms / 150kHz - 80MHz
MTBF	1.103.137 hours at 80°C
Wire size	AWG 22-12 / 0,2-2,5mm ²
EFM Relay:	
Nominal current	8A
Nominal switching capacity	2000VA, AC1
Maximum switching voltage	440VAC, 250VDC
Switching voltage at 8A	250VAC, AC1
Reset time of the relay after a lost voltage supply	Appr. 5 seconds

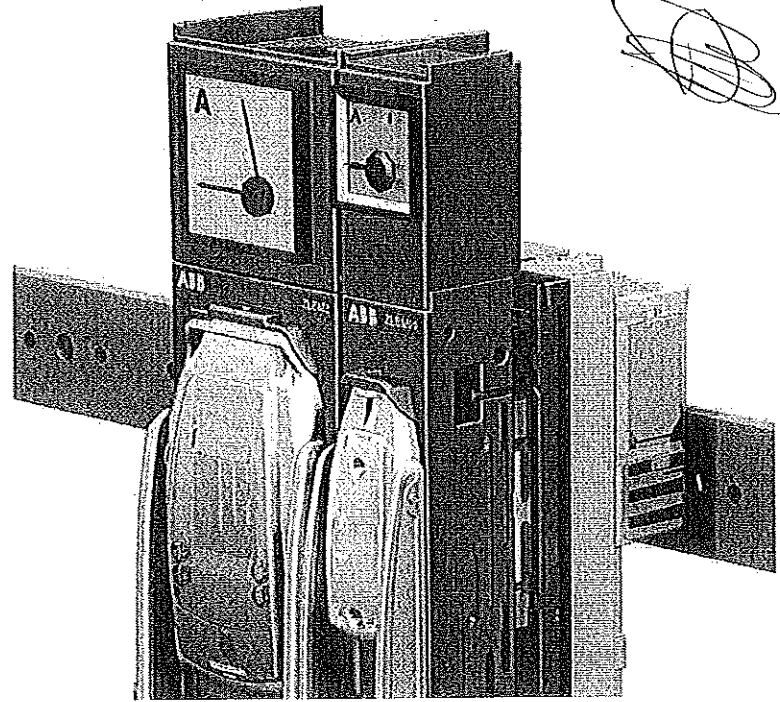
Accessories

Ammeters

Ammeter can be installed into the ammeter house which can be clicked into position at the top of the ZLBM/ZHBM or at the bottom side if the cable terminals are upwards.

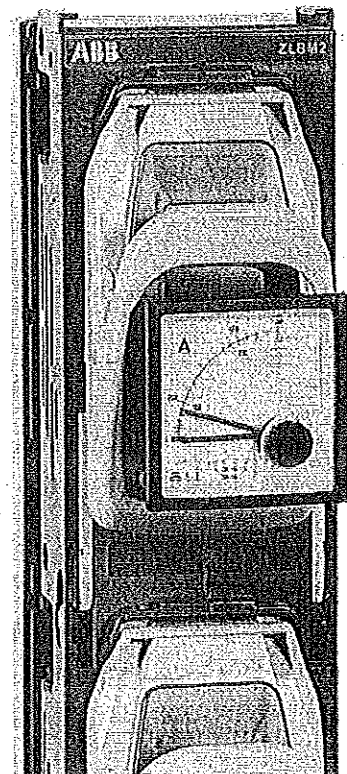
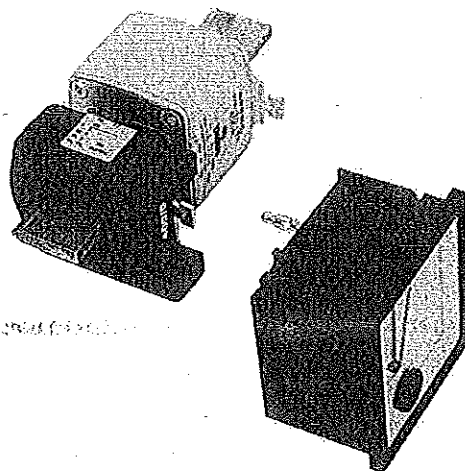
3

- 48x48 mm ammeter at ZLBM / ZHBM 00
- 72x72 mm ammeter at ZLBM / ZHBM 1/2/3



Plug in Ammeters

Plug in Ammeter through the front window by using a special NH2 Fuse link together with a slide in CT.



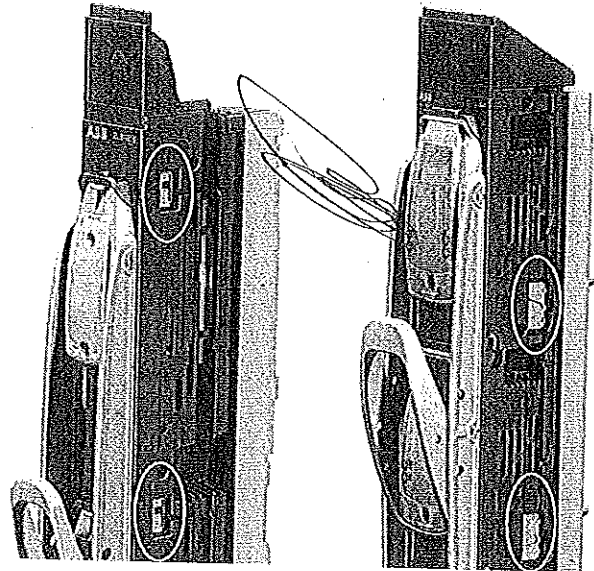
Accessories

Auxiliary switches

In the ZLBM / ZHBM the auxiliary switches 1 NO or 1 NC can be clicked into position at the side of the apparatus.

The body of the apparatus have integrated cable channels for easy connection down or up to a possible multi plug for external connection.

- ZLBM/ZHBM 00: 1 Aux. Switch pr phase
- ZLBM/ZHBM 123: 2 Aux. Switches pr phase



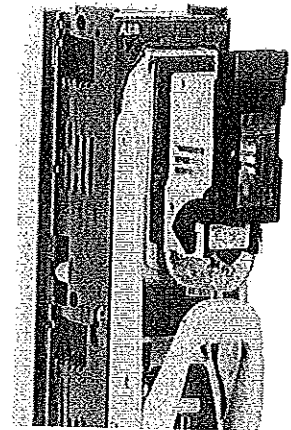
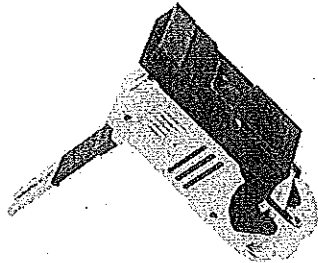
ZLBM/ZHBM 00

ZLBM/ZHBM 123

Huckepack

A plug in Huckepack for temporary additional output can be plugged through the front window into the incoming fuse contact in the apparatus.

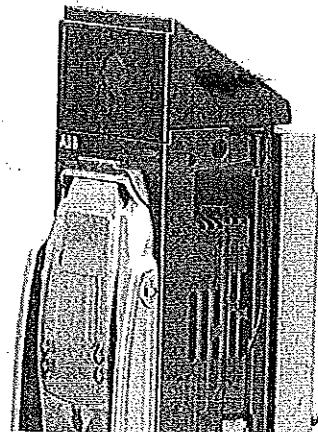
The huckepack is prepared for a NH 00 fuse link inside, and is equipped with its own cable terminal at the bottom side.



Label holder

A label holder is available for both ZLBM/ZHBM00 and ZLBM/ZHBM123.

The label holder is prepared with a hole to be used with a selection switch in case it is needed together with an A-meter/CT solution.

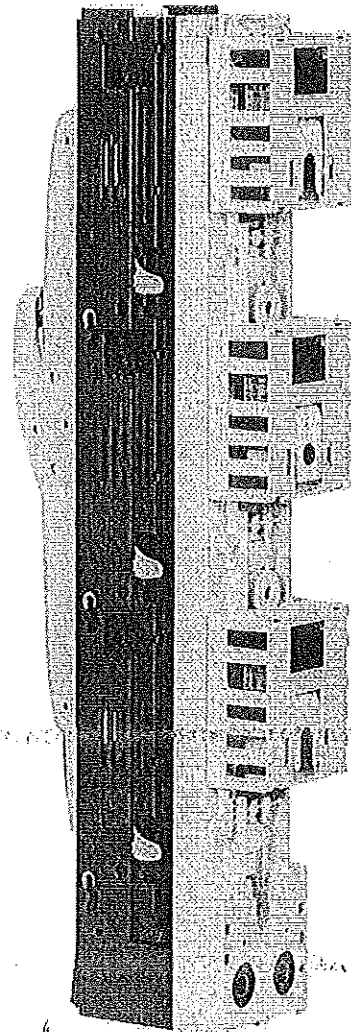
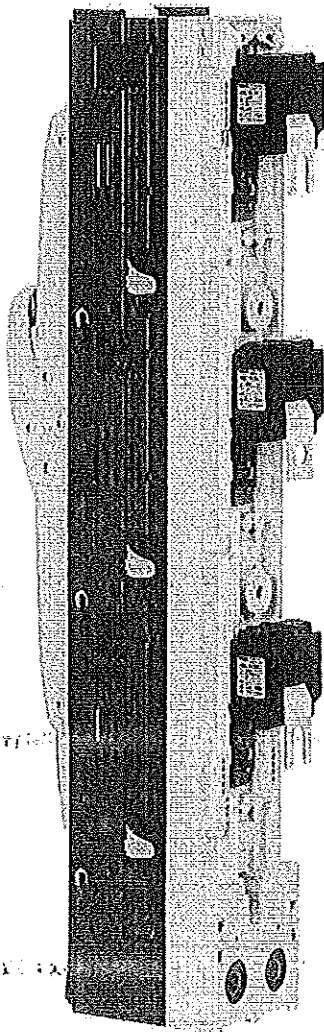
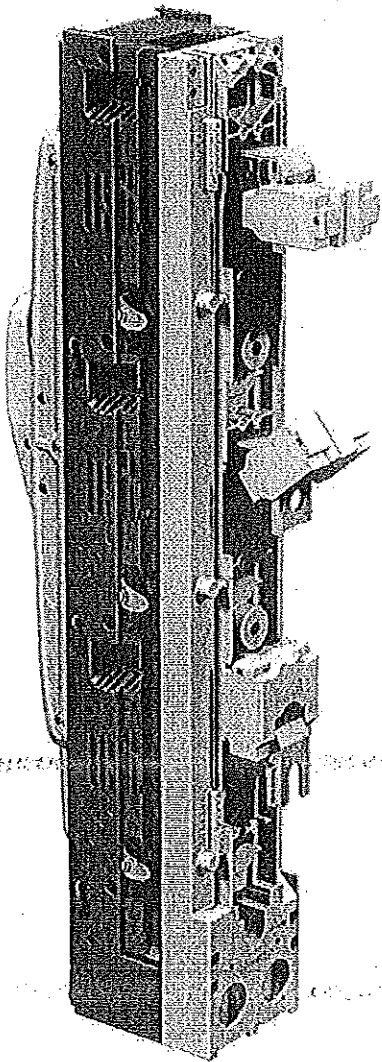
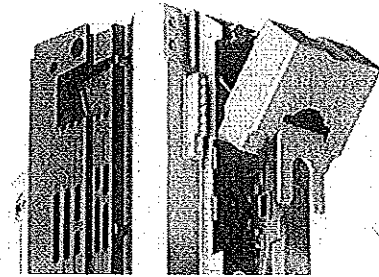


Accessories

Current Transformers in ZHBM

The ZHBM 00/123 variants (with the additional depth +32,5mm) makes it possible to slide on one current transformer (CT) at the rear side pr phase.

6 The CT shrouds have integrated cable channels for easy cabel supply up to a multi plug for external connection.

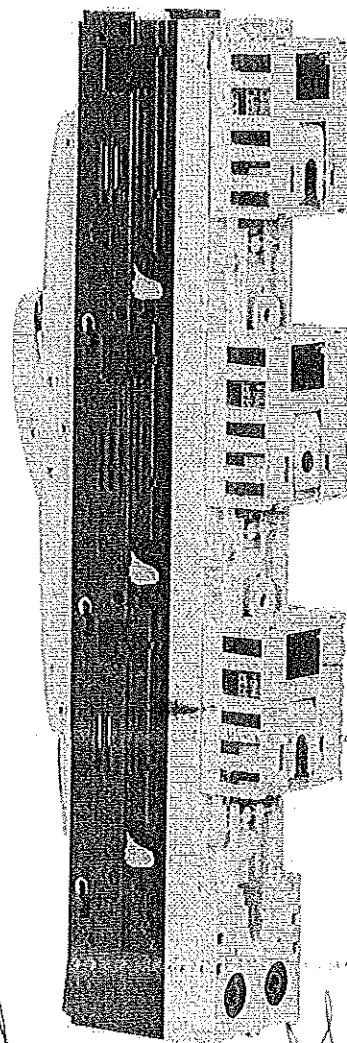
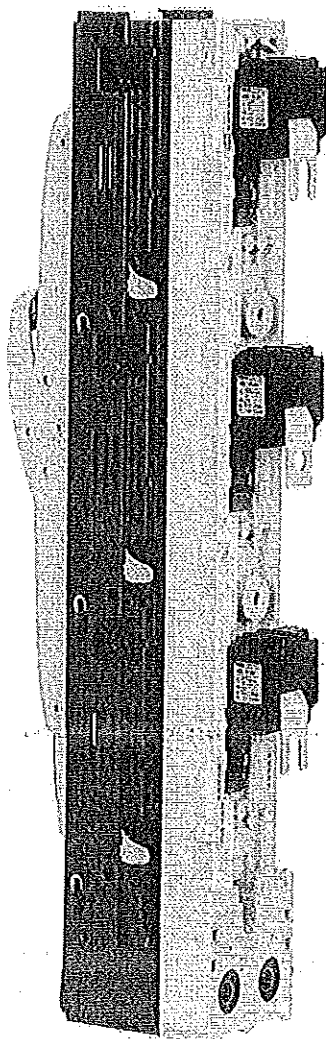
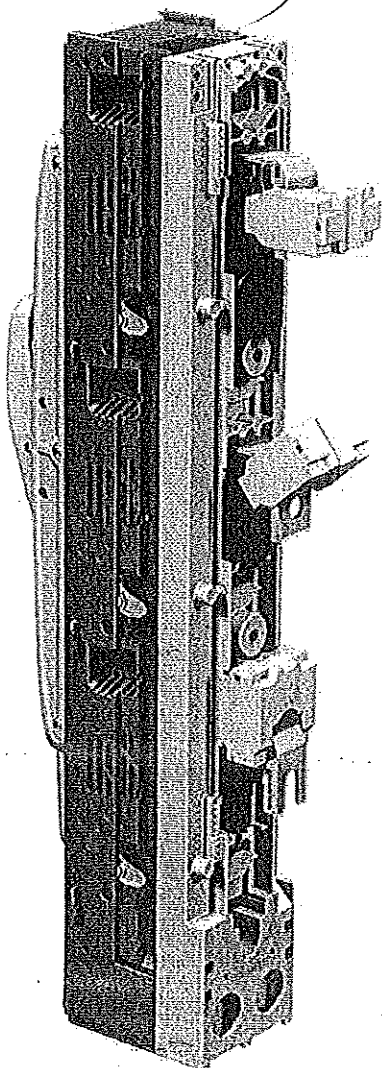
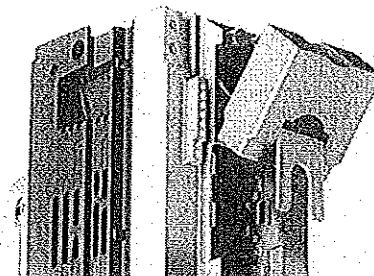


Accessories

Current Transformers in ZHBM

The ZHBM 00/123 variants (with the additional depth +32,5mm) makes it possible to slide on one current transformer (CT) at the rear side pr phase.

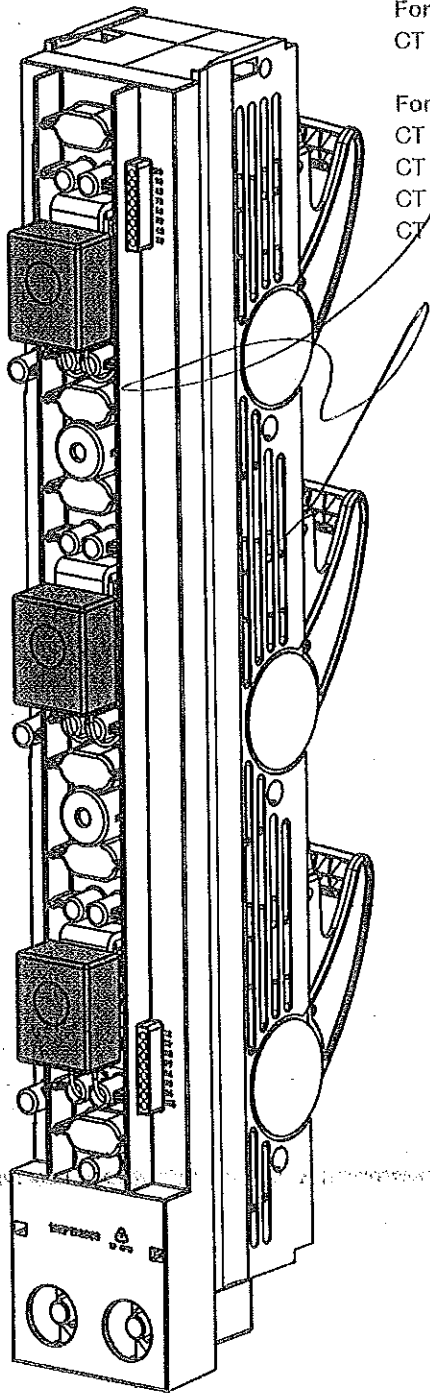
3 The CT shrouds have integrated cable channels for easy cable supply up to a multi plug for external connection.



Accessories

Current Transformers in ZLBM

Current transformers can also be installed at the rear side of the ZLBM 00 and ZLBM 1,2,3 , by using the CT busbar kits, which is a complete kit of 3 CT's and 3 Cu Tubes of 32 mm.



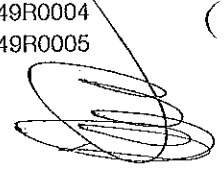
For ZLBM 00:
CT busbar 160/5A 2,5VA cl.1 (kit incl. 3pcs CT's)

1SEP408149R0001

For ZLBM 1,2,3:
CT busbar 200/5A 3,75VA cl.1 (kit incl. 3pcs CT's)
CT busbar 400/5A 5VA cl.1 (kit incl. 3pcs CT's)
CT busbar 600/5A 5VA cl.1 (kit incl. 3pcs CT's)
CT busbar 600/5A 5VA cl.0,5 (kit incl. 3pcs CT's)

1SEP408149R0002
1SEP408149R0003
1SEP408149R0004
1SEP408149R0005

3



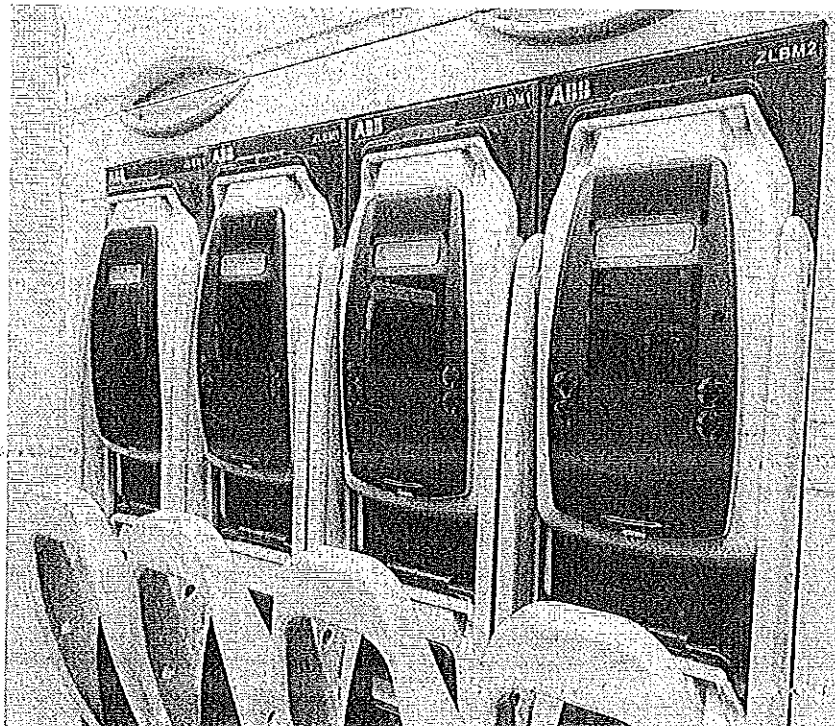
Technical data

ZLBM/ZHBM

ZLBM/ZHBM Fuse Switch Disconnecter

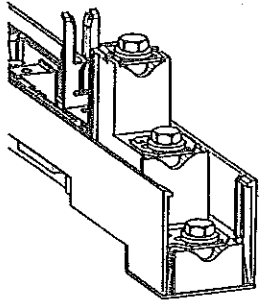
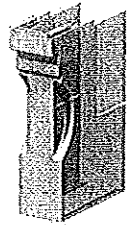
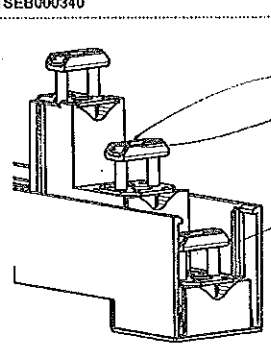
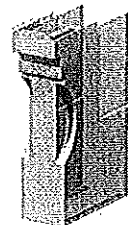
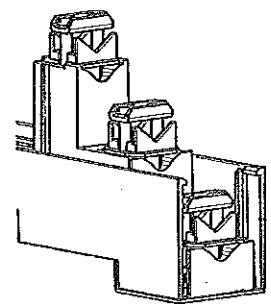
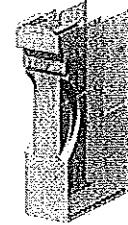
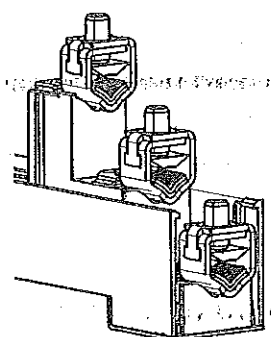

		ZLBM/ZHBM 00	ZLBM/ZHBM 1	ZLBM/ZHBM 2	ZLBM/ZHBM 3
Rated operational voltage U _e	(V)	400/500/690	400/500/690	400/500/690	400/500/690
Rated operational current I _e	(A)	160/160/125	250	400	630
Rated insulation voltage U _i	(V)	1000	1000	1000	1000
Rated impulse withstand voltage U _{imp}	(kV)	8	8	8	8
Fuse protected short circuit withstand current	(kA _{rms})	100	100	100	100
Fuse protected short circuit making	(kA _{rms})	100	100	100	100
Rated making and breaking capacity		AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC23B/AC22B/AC21B
Rated frequency	(Hz)	50/60	50/60	50/60	50/60
Electrical durability		200	200	200	200
Mechanical durability		1400	1400	800	800
Degree of protection from the front	Open	IP20	IP20	IP20	IP20
	Closed	IP30	IP30	IP30	IP30

Type tested according to EN/IEC 60947-3



Cable terminations and cable shrouds ZLBM00/ZHBM00



	Type of clamp/bolt with order code	Conductor cross section min-max		Torque (Nm)	Type of cable shroud (up/down)
		Rm/Sm (mm ²)	Re/Se (mm ²)		
 1SEB000340	Bolt M8x16 (Standard)	Max 95	Max 95	10	 1SEP619207R0001
 1SEB000347	Bridge clamp (3 x BC) 1SEP407733R0001	1,5 - 50	1,5 - 50	3,5	 1SEP619207R0001
 1SEB000346	Single Prism clamp (3 x SPC) 1SEP407732R0005	1,5 - 95	1,5 - 95	3,5	 1SEP619207R0001
 1SEB000341	V-clamp (Integrated)	1,5 - 95	1,5 - 95	3,5	 1SEP619207R0001

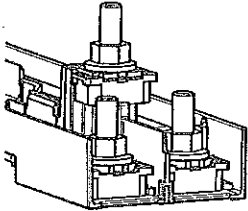
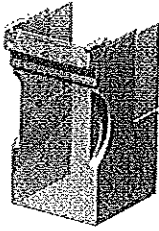
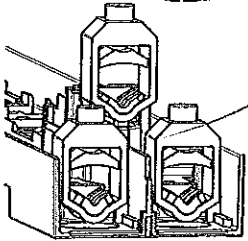








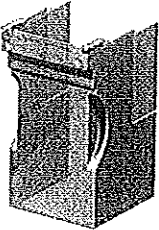
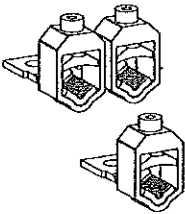









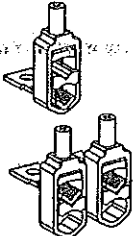
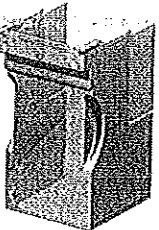


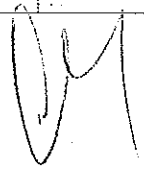
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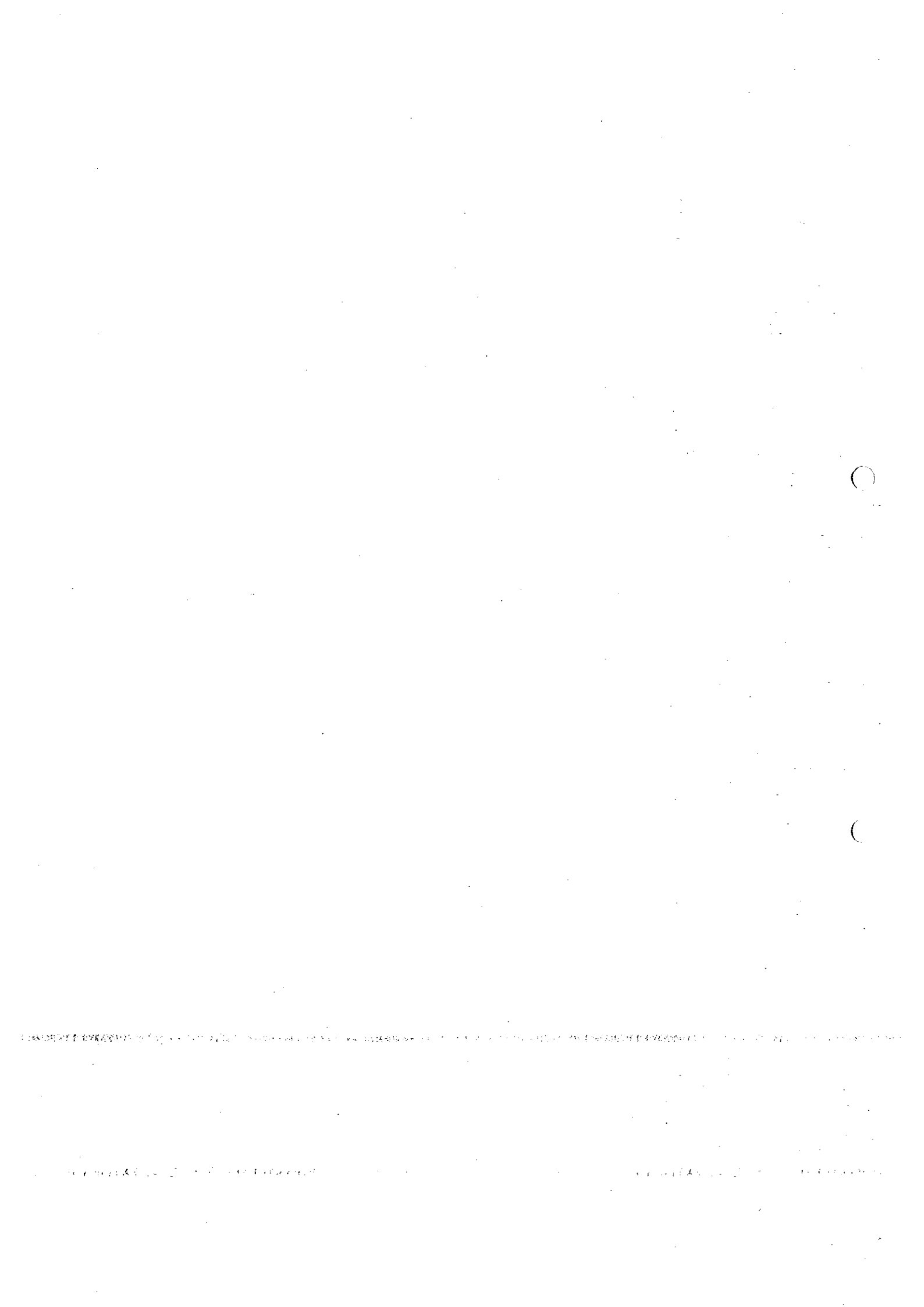
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Cable terminations and cable shrouds ZLBM123/ZHBM123



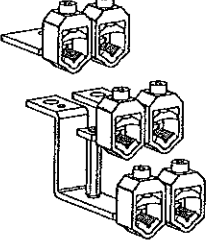








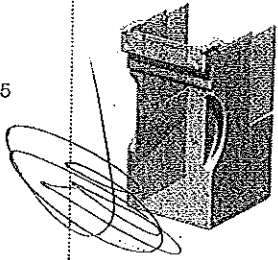
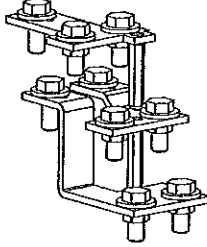

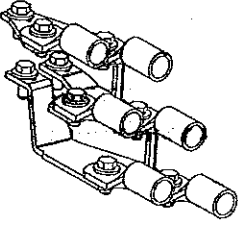
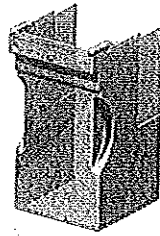
	Type of clamp/bolt with order code	Conductor cross section min-max		Torque (Nm)	Type of cable shroud (up/down)
		Rm/Sm (mm ²)	Re/Se (mm ²)		
 1SEB000336	Bolt M12x40 (Standard)	Max 240	Max 240	25	 1SEP619210R0001
 1SEB000337	V-clamp (Integrated)	Rm: 16-35  50-185  Sm: 35-50  70-240 	Re: 16-70  70-150  Se: 35-70  95-300 	25	 1SEP619210R0001
 1SEB000149	V-clamp kit	Rm: 16-35  50-185  Sm: 35-50  70-240 	Re: 16-70  70-150  Se: 35-70  95-300 	25	 1SEP619210R0001
 1SEB000145	Double V-clamp kit for CDC	Rm: 2 x 50-185 Sm: 2 x 95-240	Re: 2 x 70-240 Se: 2 x 120-300	22	 1SEP619210R0001





Cable terminations and cable shrouds

ZLBM123/ZHBM123

	Type of clamp/bolt with order code	Conductor cross section min-max		Torque (Nm)	Type of cable shroud (up/down)
		Rm/Sm (mm ²)	Re/Se (mm ²)		
 1SEB000146	Double V-clamp kit for switchboards	Rm: 2 x 16-35  2 x 50-185  Sm: 2 x 35-50  2 x 70-240 	Re: 2 x 16-70  2 x 70-150  Se: 2 x 35-70  2 x 95-300 	25	 1SEP619210R0001
 1SEB000147	Double cable lug kit	2 x Max 240	2 x Max 240	25	 1SEP619210R0001
 1SEB000283	Bolt kit	2 x Max 300	2 x Max 300	25	 1SEP619210R0001

5

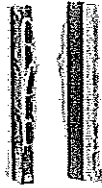
Ordering tables ZLBM/ZHBM



ZLBM00-1P



ZLBM123-1P



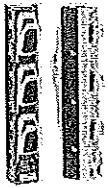
ZLBM00-3P



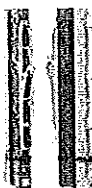
ZLBM123-3P



ZHBM00-1P



ZHBM123-1P

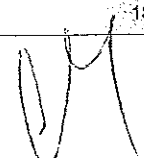


ZHBM00-3P



ZHBM123-3P

Type	le (A)	Description	Ident No.	Weight (kg)
ZLBM 1 pole		ZLBM Depth 121 mm		
ZLBM00-1P-M8	160	3 x M8 Bolt	1SEP620010R1000	2,2
ZLBM00-1P-V	160	3 x V-Clamps	1SEP620010R1020	2,2
ZLBM1-1P-M12	250	3 x M12 Universal Bolt	1SEP620011R1000	4,2
ZLBM1-1P-V	250	3 x V-Clamps	1SEP620011R1020	4,2
ZLBM2-1P-M12	400	3 x M12 Universal Bolt	1SEP620012R1000	4,7
ZLBM2-1P-V	400	3 x V-Clamps	1SEP620012R1020	4,7
ZLBM3-1P-M12	630	3 x M12 Universal Bolt	1SEP620013R1000	5,2
ZLBM3-1P-V	630	3 x V-Clamps	1SEP620013R1020	5,2
ZLBM 3 pole		ZLBM Depth 121 mm		
ZLBM00-3P-M12	160	3 x M8 Bolt	1SEP620010R3000	2,3
ZLBM00-3P-V	160	3 x V-Clamps	1SEP620010R3020	2,3
ZLBM1-3P-M12	250	3 x M12 Universal Bolt	1SEP620011R3000	4,3
ZLBM1-3P-V	250	3 x V-Clamps	1SEP620011R3020	4,3
ZLBM2-3P-M12	400	3 x M12 Universal Bolt	1SEP620012R3000	4,8
ZLBM2-3P-V	400	3 x V-Clamps	1SEP620012R3020	4,8
ZLBM3-3P-M12	630	3 x M12 Universal Bolt	1SEP620013R3000	5,3
ZLBM3-3P-V	630	3 x V-Clamps	1SEP620013R3020	5,3
ZHBM 1 pole		ZHBM Depth 153,5 mm		
ZHBM00-1P-M8	160	3 x M8 Bolt	1SEP620020R1000	2,4
ZHBM00-1P-V	160	3 x V-Clamps	1SEP620020R1020	2,4
ZHBM1-1P-M12	250	3 x M12 Universal Bolt	1SEP620021R1000	4,4
ZHBM1-1P-V	250	3 x V-Clamps	1SEP620021R1020	4,4
ZHBM2-1P-M12	400	3 x M12 Universal Bolt	1SEP620022R1000	4,9
ZHBM2-1P-V	400	3 x V-Clamps	1SEP620022R1020	4,9
ZHBM3-1P-M12	630	3 x M12 Universal Bolt	1SEP620023R1000	5,4
ZHBM3-1P-V	630	3 x V-Clamps	1SEP620023R1020	5,4
ZHBM 3 pole		ZHBM Depth 153,5 mm		
ZHBM00-3P-M12	160	3 x M8 Bolt	1SEP620020R3000	2,5
ZHBM00-3P-V	160	3 x V-Clamps	1SEP620020R3020	2,5
ZHBM1-3P-M12	250	3 x M12 Universal Bolt	1SEP620021R3000	4,5
ZHBM1-3P-V	250	3 x V-Clamps	1SEP620021R3020	4,5
ZHBM2-3P-M12	400	3 x M12 Universal Bolt	1SEP620022R3000	5,0
ZHBM2-3P-V	400	3 x V-Clamps	1SEP620022R3020	5,0
ZHBM3-3P-M12	630	3 x M12 Universal Bolt	1SEP620023R3000	5,5
ZHBM3-3P-V	630	3 x V-Clamps	1SEP620023R3020	5,5



Ordering tables Accessories



00 Cable shroud



A-meter housing



123 Cable shroud

Type	Ident No.	Weight (kg)
ZLBM/ZHBM 00 Accessories		
ZLBM00 Cable shroud	1SEP619207R0001	0,2
ZLBM00 Label holder	1SEP619208R0001	0,1
ZLBM00 A-meter house for A-meter 48x48 mm	1SEP619209R0001	0,1
00 Bridge clamp 1,5-50mm ² (3pcs)	1SEP407733R0001	0,1
CT busbar 160/5A 2,5VA cl.1 (3pcs)	1SEP408149R0001	0,6
ZHBM 00 CT Slide on rear side 100/5A 1,5VA Cl.1	1SEP619510P0001	0,15
ZHBM 00 CT Slide on rear side 150/5A 2,5VA Cl.1	1SEP619511P0001	0,15
CT terminal 160A/5A 5VA cl.0,5	1SEP408149R0006	0,6
00 Single prism clamp 1,5-95mm ² (3pcs)	1SEP407732R0005	0,1
00 Single adapter M12 to M8 for 185mm busbar dist.	1SEP304072R0001	0,4
00 Double adapter M12 to M8 for 185mm busbar dist.	1SEP304071R0001	0,7
00 Spare way cover	1SEP304069R0001	0,2
ZLBM/ZHBM 1/2/3 Accessories		
ZLBM123 Cable shroud	1SEP619210R0001	0,2
ZLBM123 Label holder	1SEP619214R0001	0,1
ZLBM123 Label holder (250 pcs in a package)	1SEP619214R0250	NA
ZLBM123 A-meter housing for A-meter 72x72 mm	1SEP619215R0001	0,1
Max A-meter QB72, 0-150-180/5A	NHSN714004P2206	0,2
Max A-meter QB72, 0-200-300/5A	NHSN714004P2208	0,2
Max A-meter QB72, 0-400-480/5A	NHSN714004P2210	0,2
Max A-meter QB72, 0-600-720/5A	NHSN714004P2212	0,2
ZLBM/XLBM CT rear side with Cu Tube 200A/5A 3,75VA cl.1	1SEP408149R0002	1,3
ZLBM/XLBM CT rear side with Cu Tube 400A/5A 5VA cl.1	1SEP408149R0003	1,3
ZLBM/XLBM CT rear side with Cu Tube 600A/5A 5VA cl.1	1SEP408149R0004	1,3
ZLBM/XLBM CT rear side with Cu Tube 600A/5A 5VA cl.0,5	1SEP408149R0005	1,3
ZHBM CT Slide on rear side 250/5A 5VA Cl.1	1SEP619512P0001	0,15
ZHBM CT Slide on rear side 400/5A 5VA Cl.1	1SEP619513P0001	0,15
ZHBM CT Slide on rear side 600/5A 5VA Cl.1	1SEP619514P0001	0,15
CT terminal 200/5A 3,75VA cl.1	1SEP408149R0007	0,6
CT terminal 400/5A 5VA cl.1	1SEP408149R0008	0,6
CT terminal 600/5A 5VA cl.1	1SEP408149R0009	0,6
CT terminal 600/5A 5VA cl.0,5	1SEP408149R0010	0,6

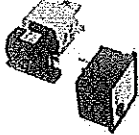
6

Ordering tables

Accessories



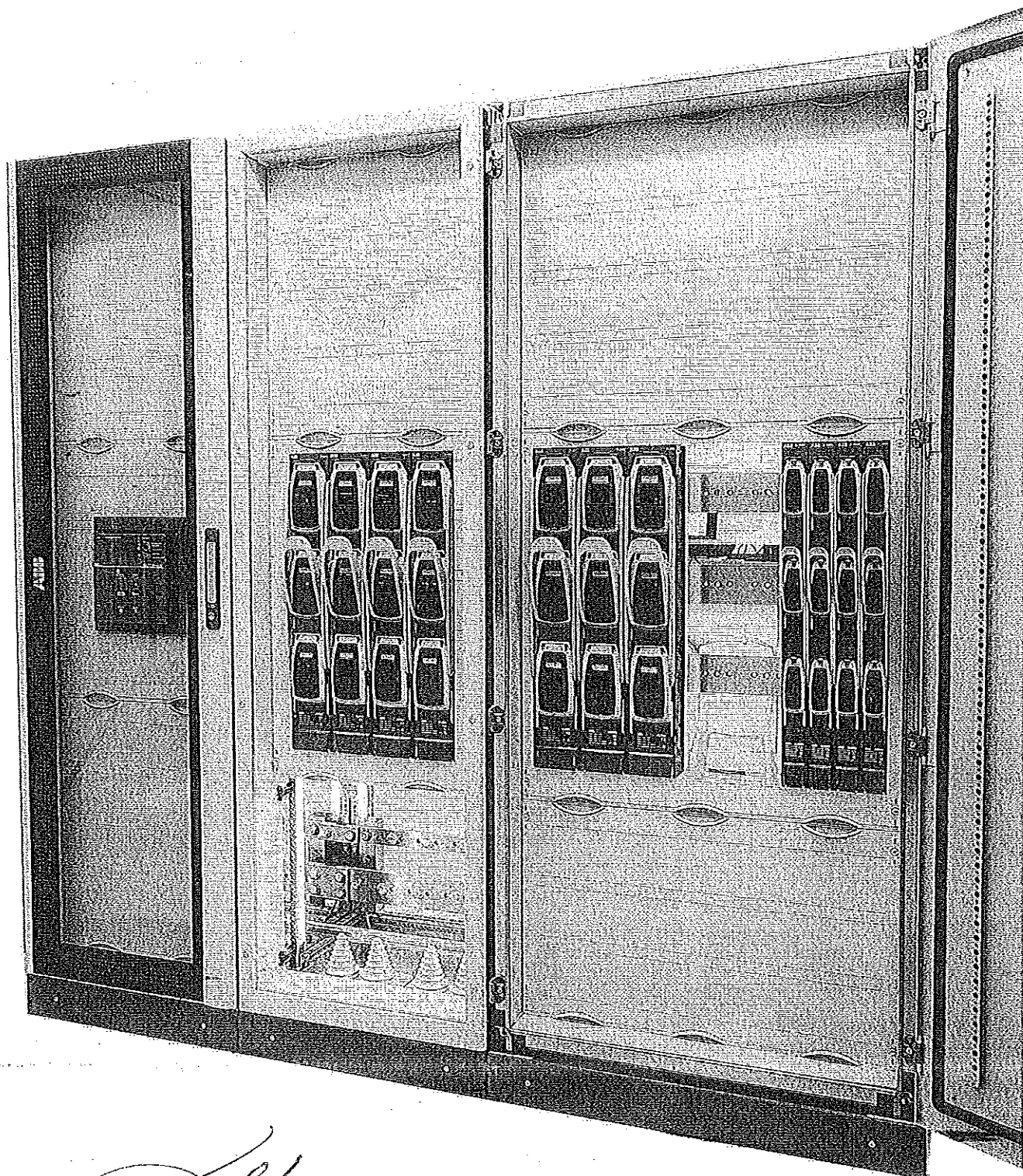
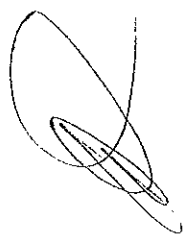
Huckepack



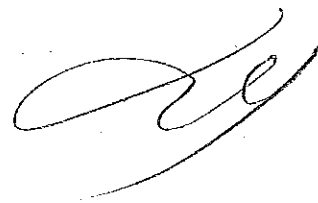
Plug In A-meter and CT at NH2 fuse link

Type	Ident No.	Weight (kg)
ZLBM/ZHBM 1/2/3 Accessories		
ZLBM/XLBM123 Huckepack	NHSN722068P0002	0,3
ZLBM/XLBM123 V-clamp kit	1SEP304446R0001	0,5
ZLBM123 Double V-clamp kit for CDC	1SEP696219R0001	0,5
ZLBM123 V-clamp kit double for CDC (2x240)	1SEP619274R0001	
ZLBM123 Double V-clamp kit for switchboards	1SEP696220R0001	0,5
ZLBM123 V-clamp kit double f/SWB (2x240)	1SEP619275R0001	
ZLBM123 Double cable lug kit for switchboards	1SEP696221R0001	0,5
ZLBM123 Cable lug kit double f/SWB (2x240)	1SEP619276R0001	
ZLBM123 Cable lug kit 2x300 mm2	1SEP696222R0001	0,5
ZLBM123 Cable lug terminal kit (2x300)	1SEP619277R0001	
Plug in A-meter, front cover inst. 200-400/5A	NHPL046270R0001	0,2
Plug in CT for front cover inst. A-meter 200/5A 3,5VA cl.3	NHSN718050P2525	0,1
Plug in CT for front cover inst. A-meter 400/5A 5VA cl.3	NHSN718050P2540	0,1
NH2 Fuse link 400V/100A for plug in CT	NHPL046265R0001	0,5
NH2 Fuse link 400V/125A for plug in CT	NHPL046266R0001	0,5
NH2 Fuse link 400V/160A for plug in CT	NHPL046267R0001	0,5
NH2 Fuse link 400V/200A for plug in CT	NHPL046268R0001	0,5
NH2 Fuse link 400V/224A for plug in CT	NHPL046269R0001	0,5
NH2 Fuse link 400V/250A for plug in CT	NHPL046272R0001	0,5
NH2 Fuse link 400V/315A for plug in CT	NHPL046273R0001	0,5
NH2 Fuse link 400V/400A for plug in CT	NHPL046275R0001	0,5
ZLBM/ZHBM Common Accessories		
ZLBM Aux switch NC	1SEP619554R0001	0,02
ZLBM Aux switch NO	1SEP619555R0001	0,02
Padlock extension (up to 3 padlocks)	1SEP408753R0001	0,1

InLine II in proE power switchboard



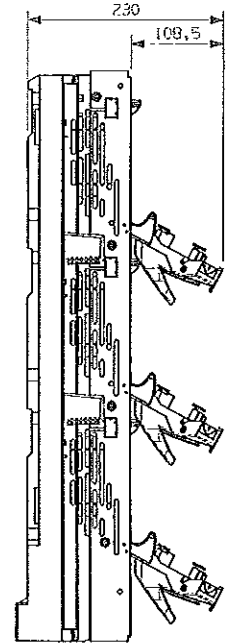
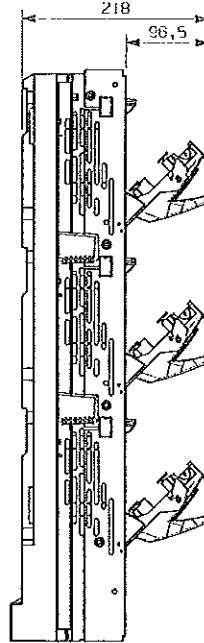
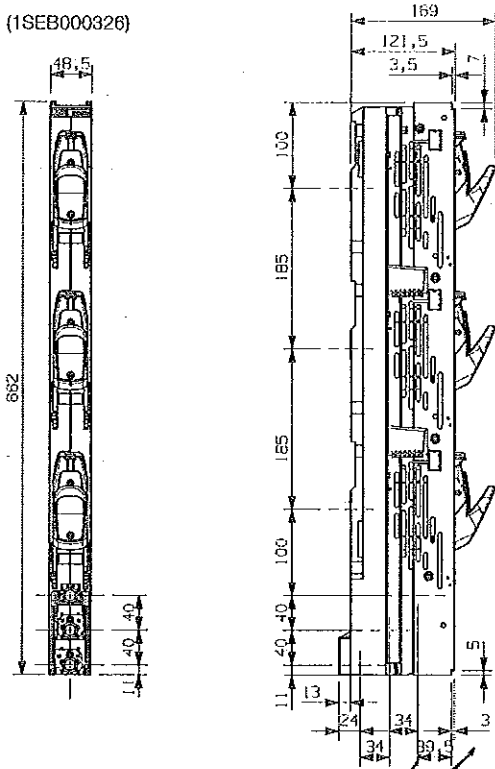
7



Dimension drawings ZLBM00

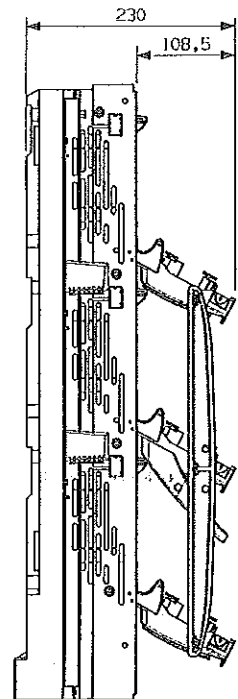
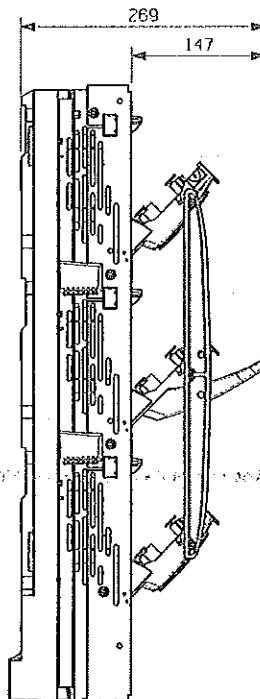
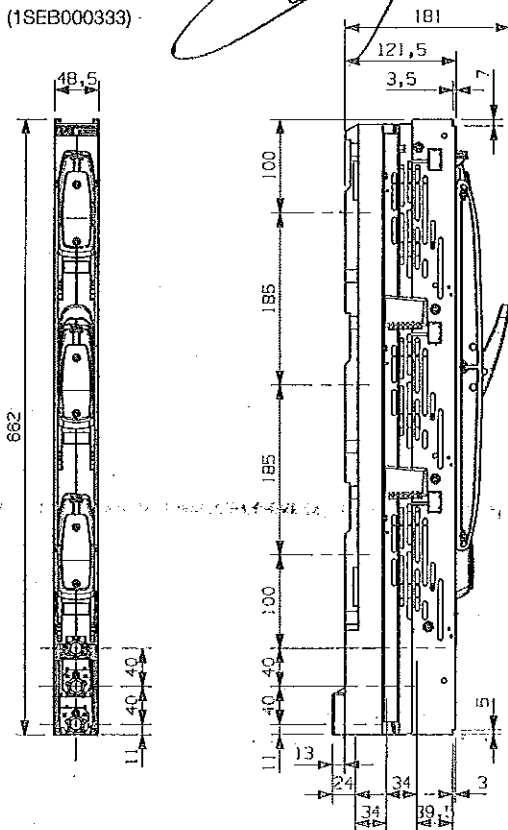
ZLBM00-1P

(1SEB000326)



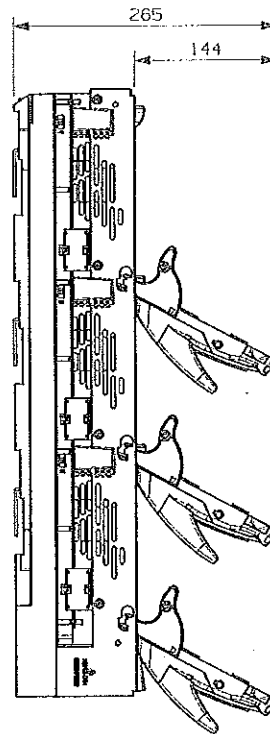
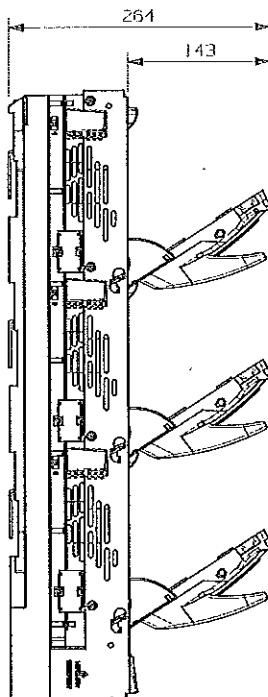
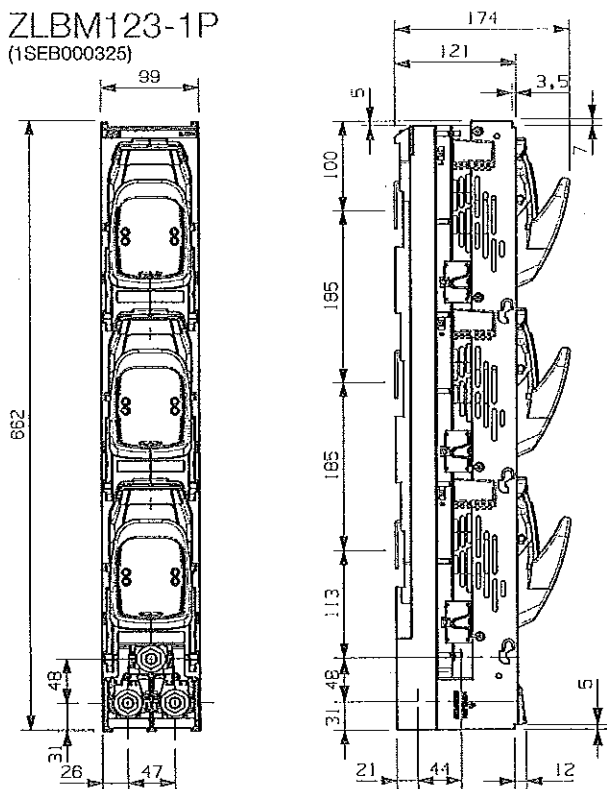
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(1SEB000333)

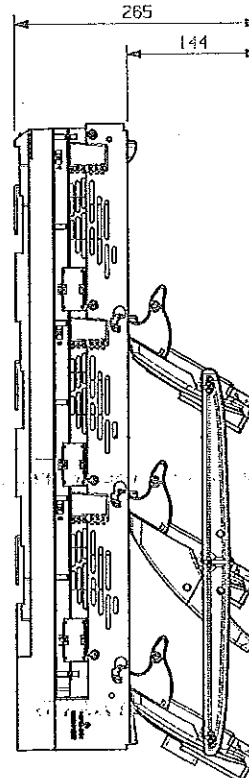
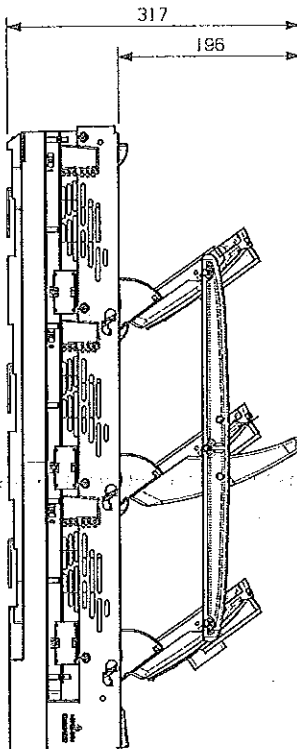
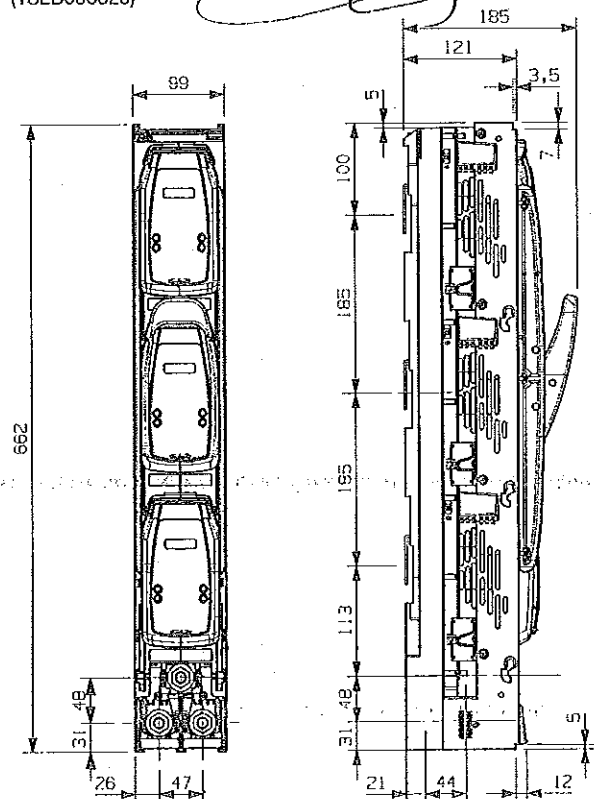


Dimension drawings ZLBM123

ZLBM123-1P
(1SEB000325)

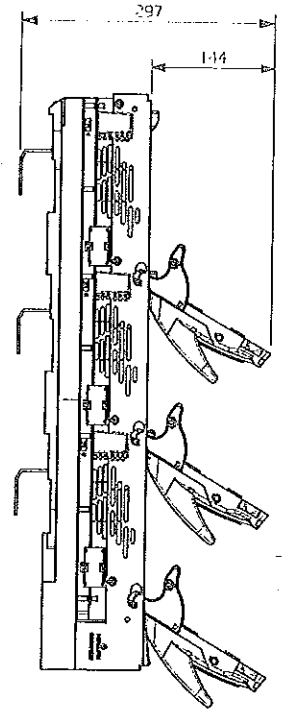
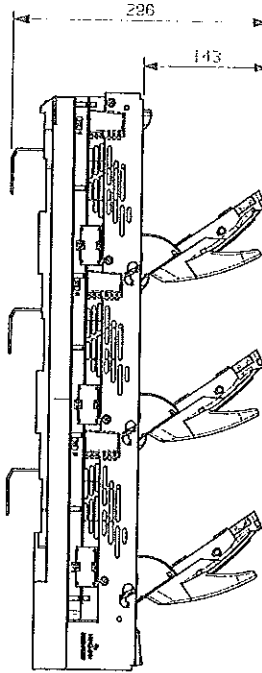
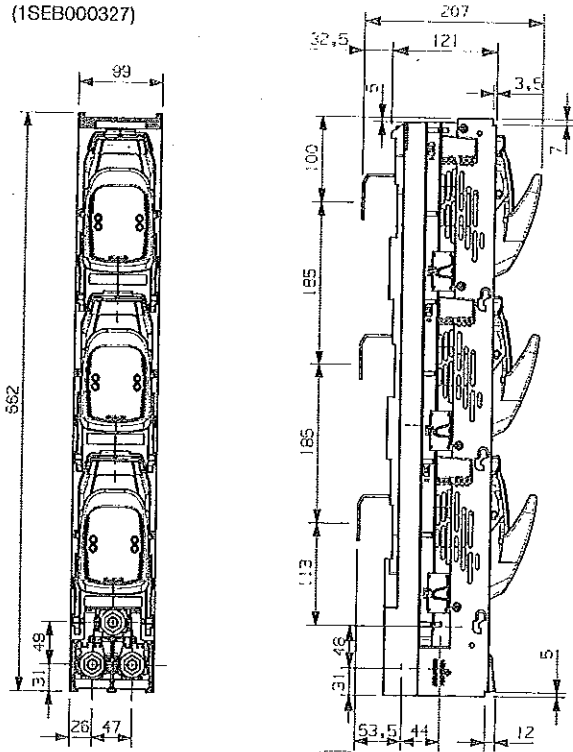


ZLBM123-3P
(1SEB000328)



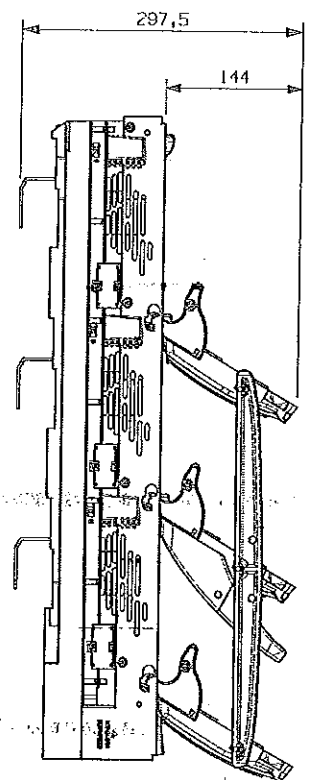
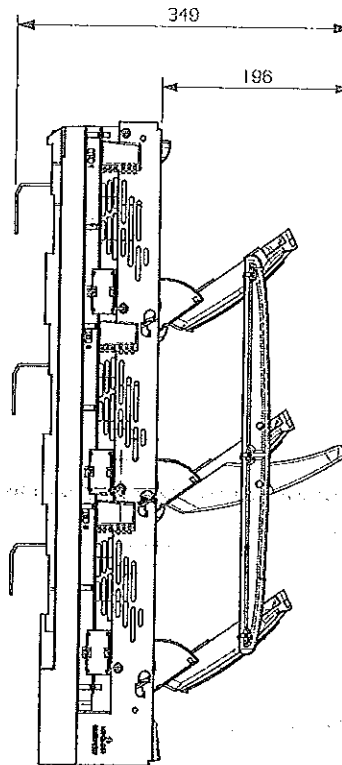
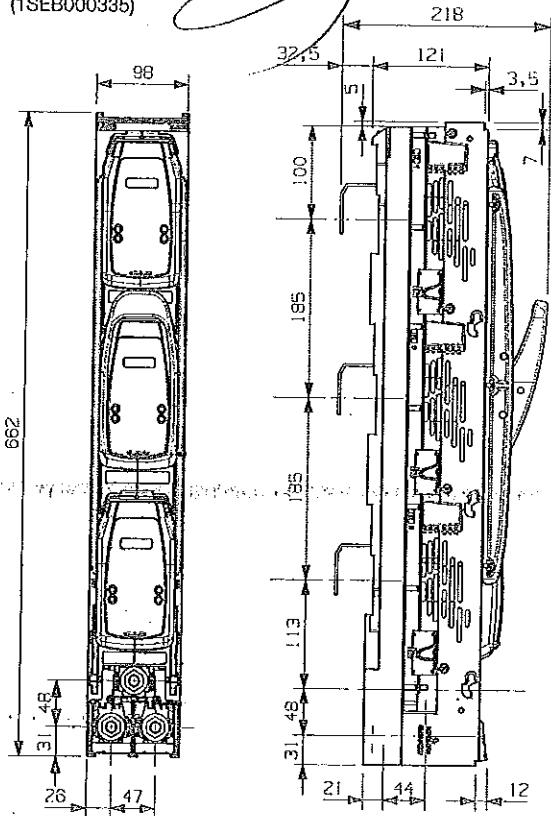
Dimension drawings ZHBM123

ZHBM123-1P
(1SEB000327)



8

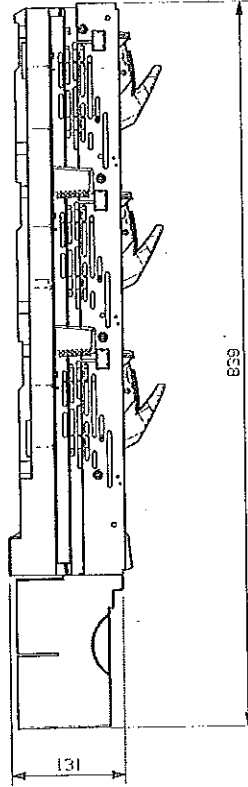
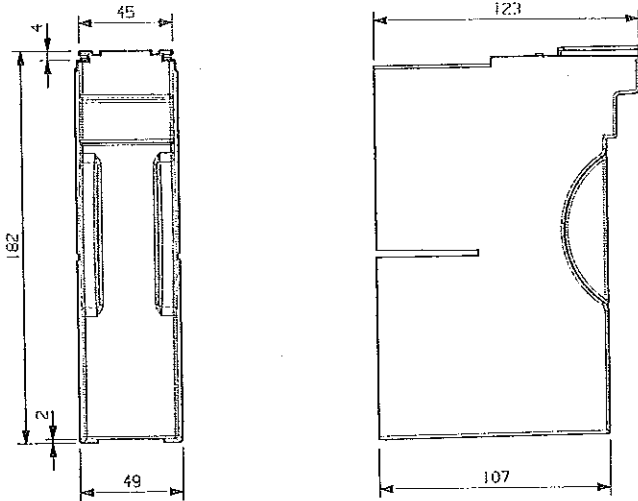
ZHBM123-3P
(1SEB000335)



Dimension drawings Cable shroud

[Handwritten signature]

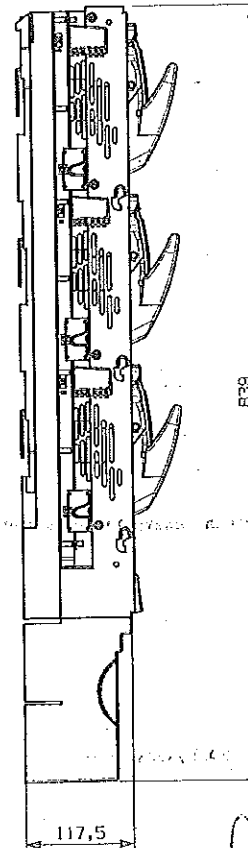
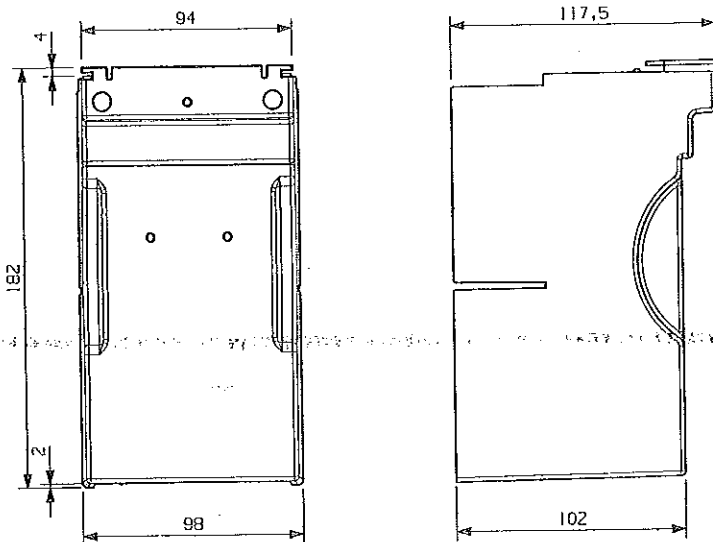
ZLBM00
(1SEB000345)



8

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ZLBM123
(1SEB000329)



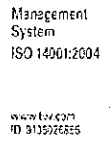
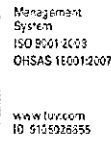
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БЪЛГАРСКИ
ЕЛЕКТРОЕН ЕНЕРЖИТИКАЛЕН
КОРПОРАЦИОНЕН ГРУП

Бул. Витоша 267В, София 1013, БГ
Тел: 02 924 40 21; 4 000 00 20 3 365 00 00
Факс: 02 924 40 21
www.eek.bg
Бул. Витоша 100Б, "Електроен Енержитикален" ЕООС
Тел: 02 924 40 21; 4 000 00 20 3 365 00 00
Факс: 02 924 40 21
www.eek.bg

Бул. Витоша 267В, София 1013, БГ



ПРИЛОЖЕНИЕ 9.6.2

Техническо описание и чертежи с нанесени на тях размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

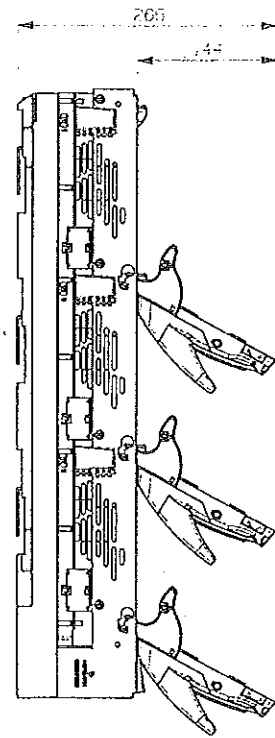
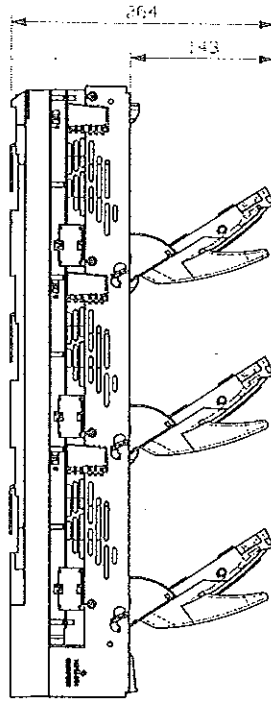
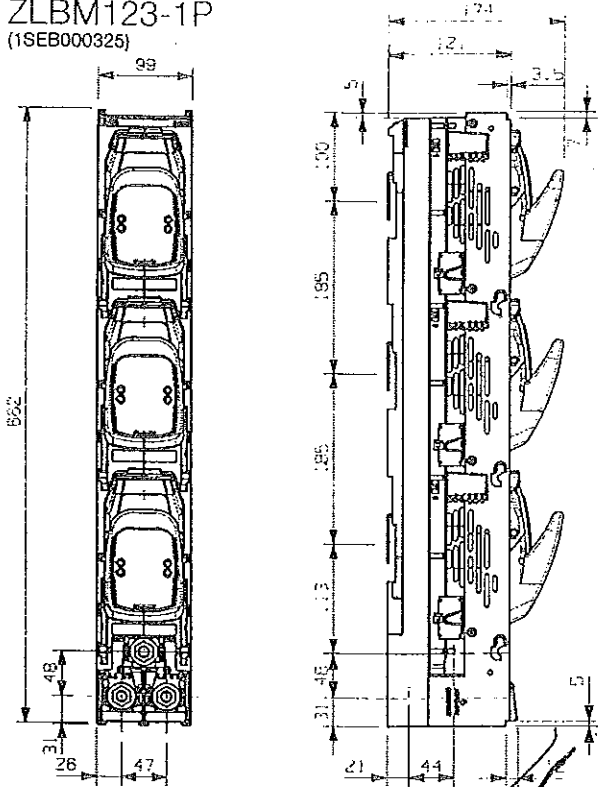
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

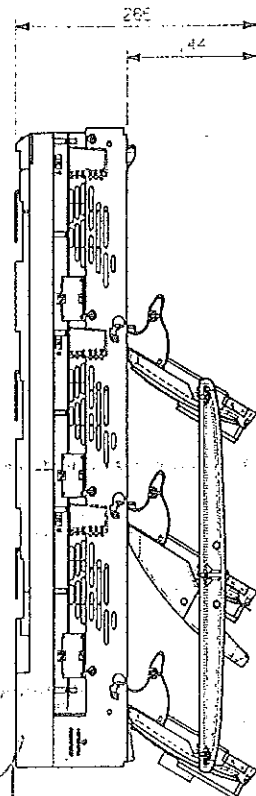
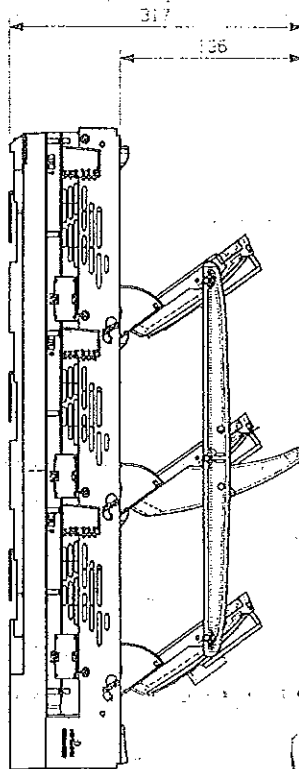
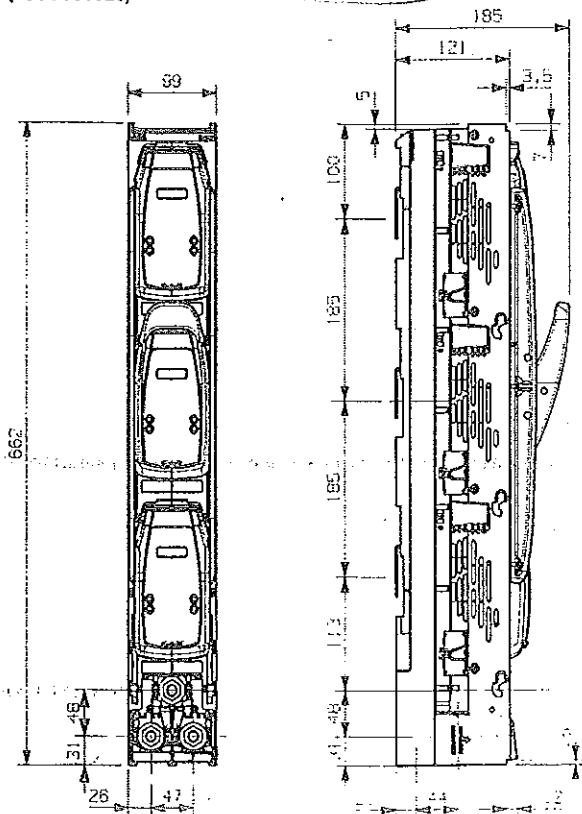
организиран от "ЧЕЗ Разпределение България" АД

Dimension drawings ZLBM123

ZLBM123-1P
(1SEB000325)

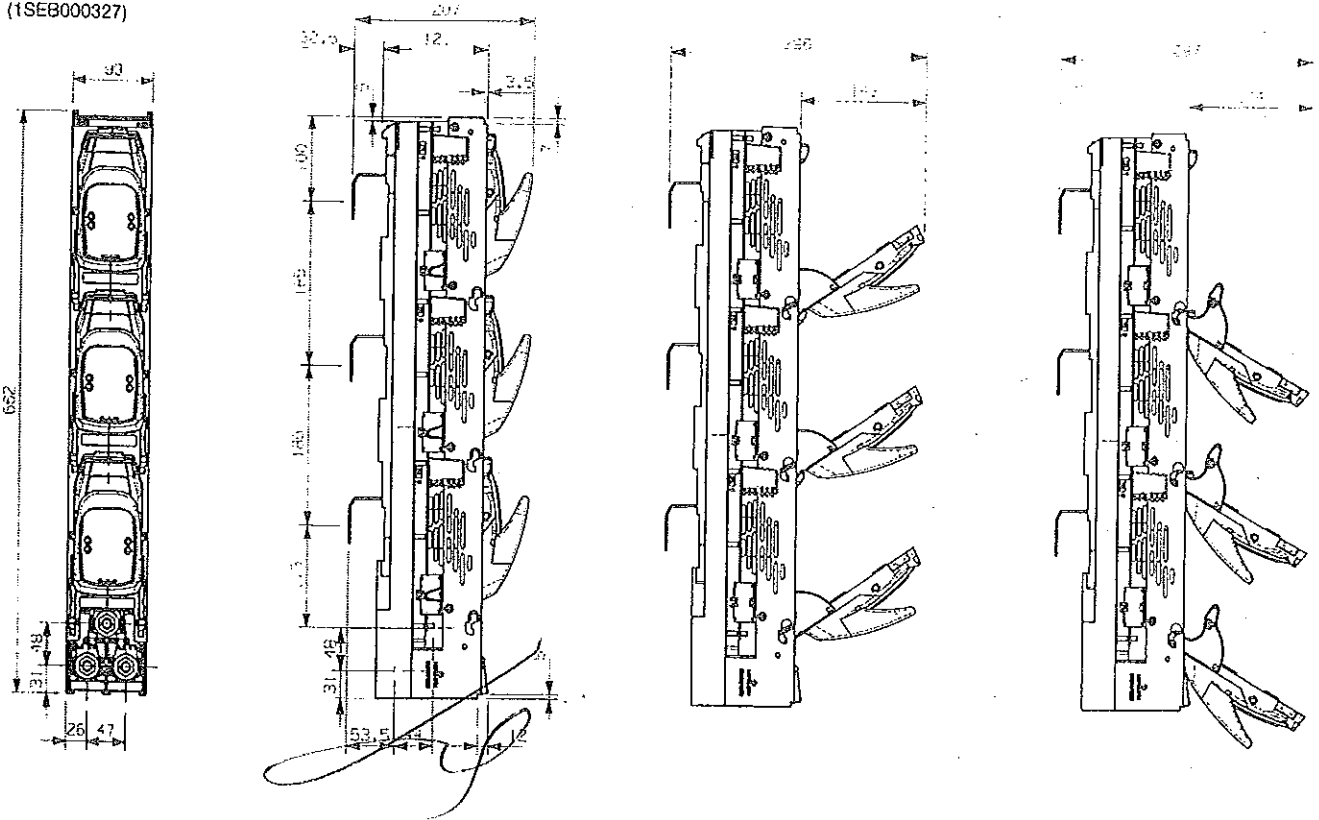


ZLBM123-3P
(1SEB000328)



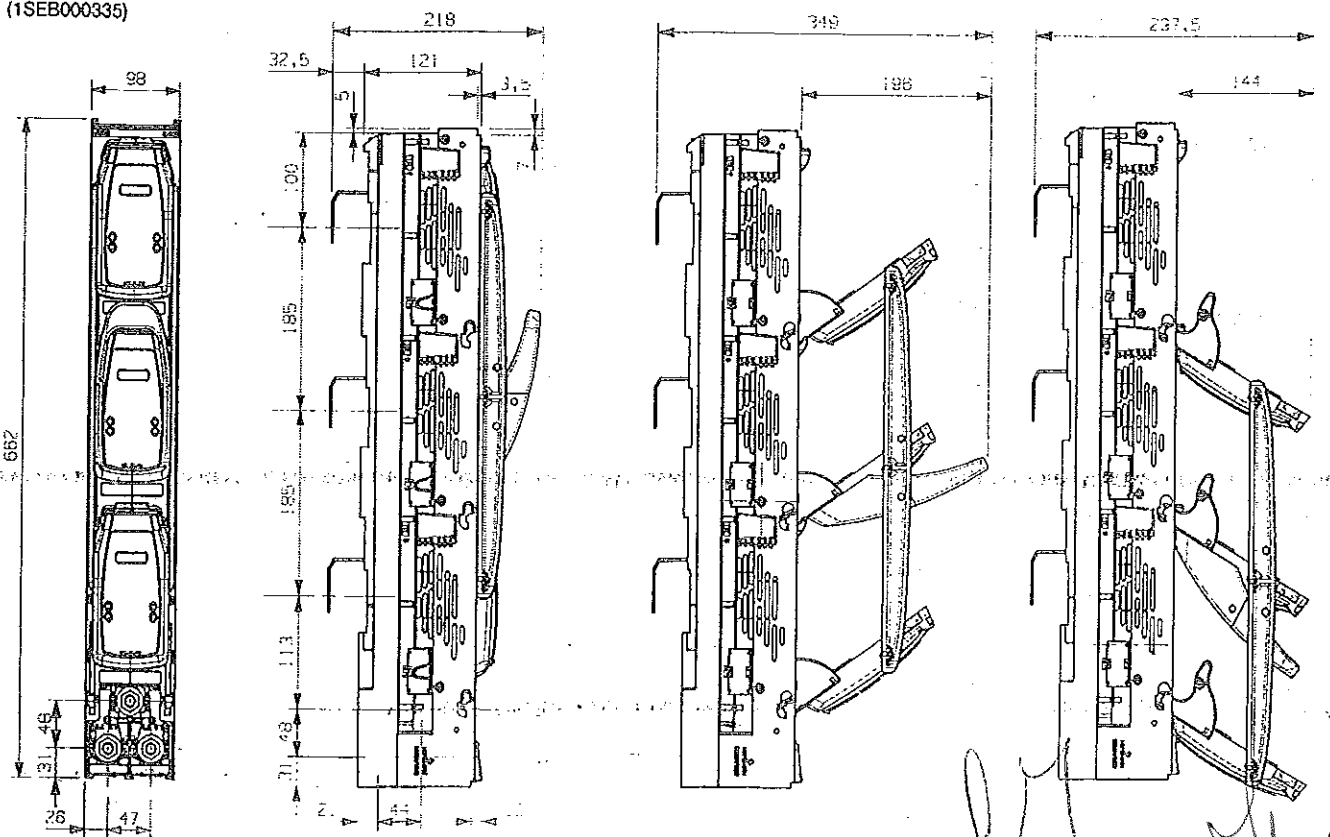
Dimension drawings ZHBM123

ZHBM123-1P
(1SEB000327)



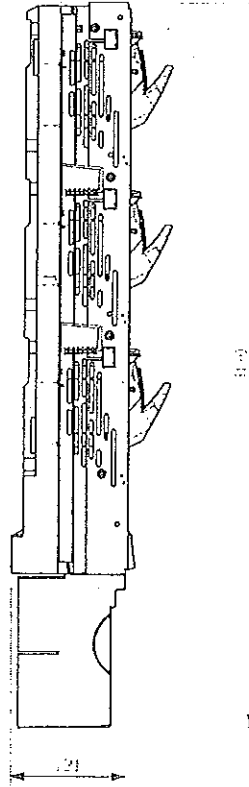
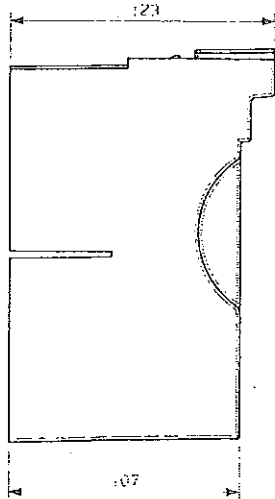
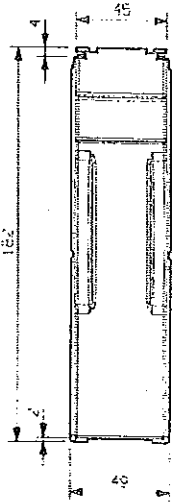
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ZHBM123-3P
(1SEB000335)



Dimension drawings Cable shroud

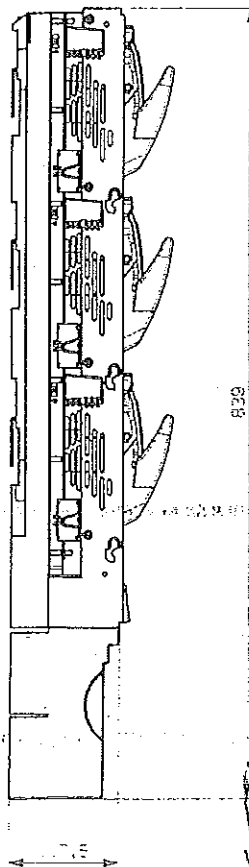
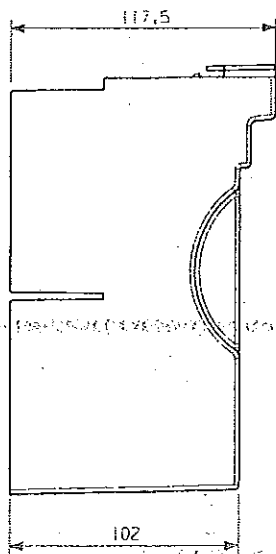
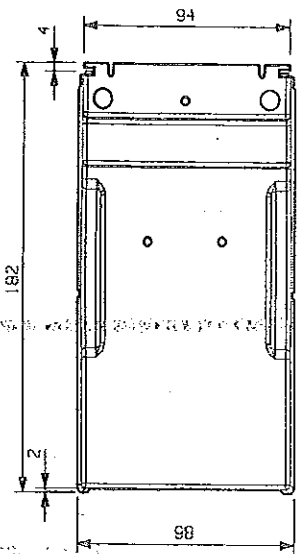
ZLBM00
(1SEB000345)



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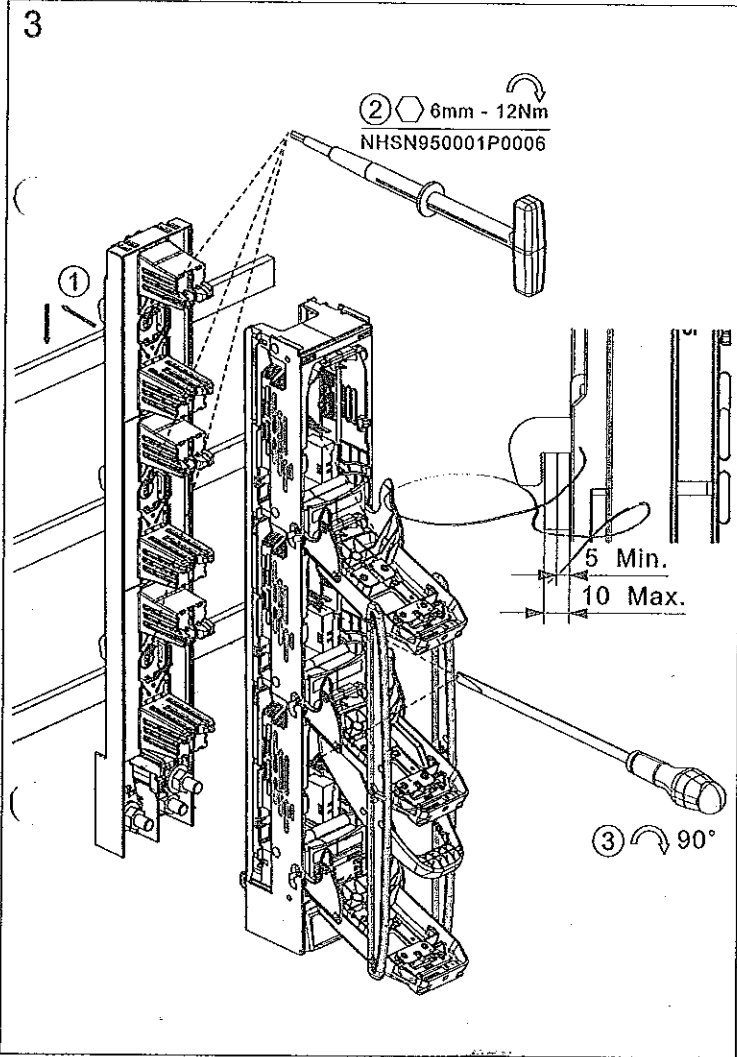
ZLBM123
(1SEB000329)



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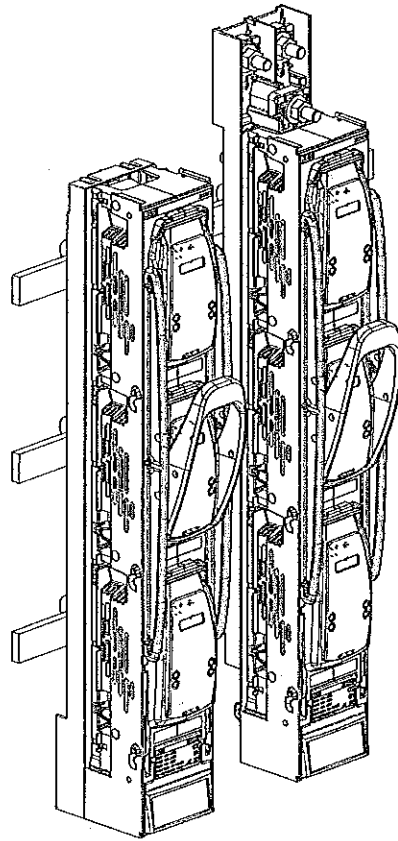
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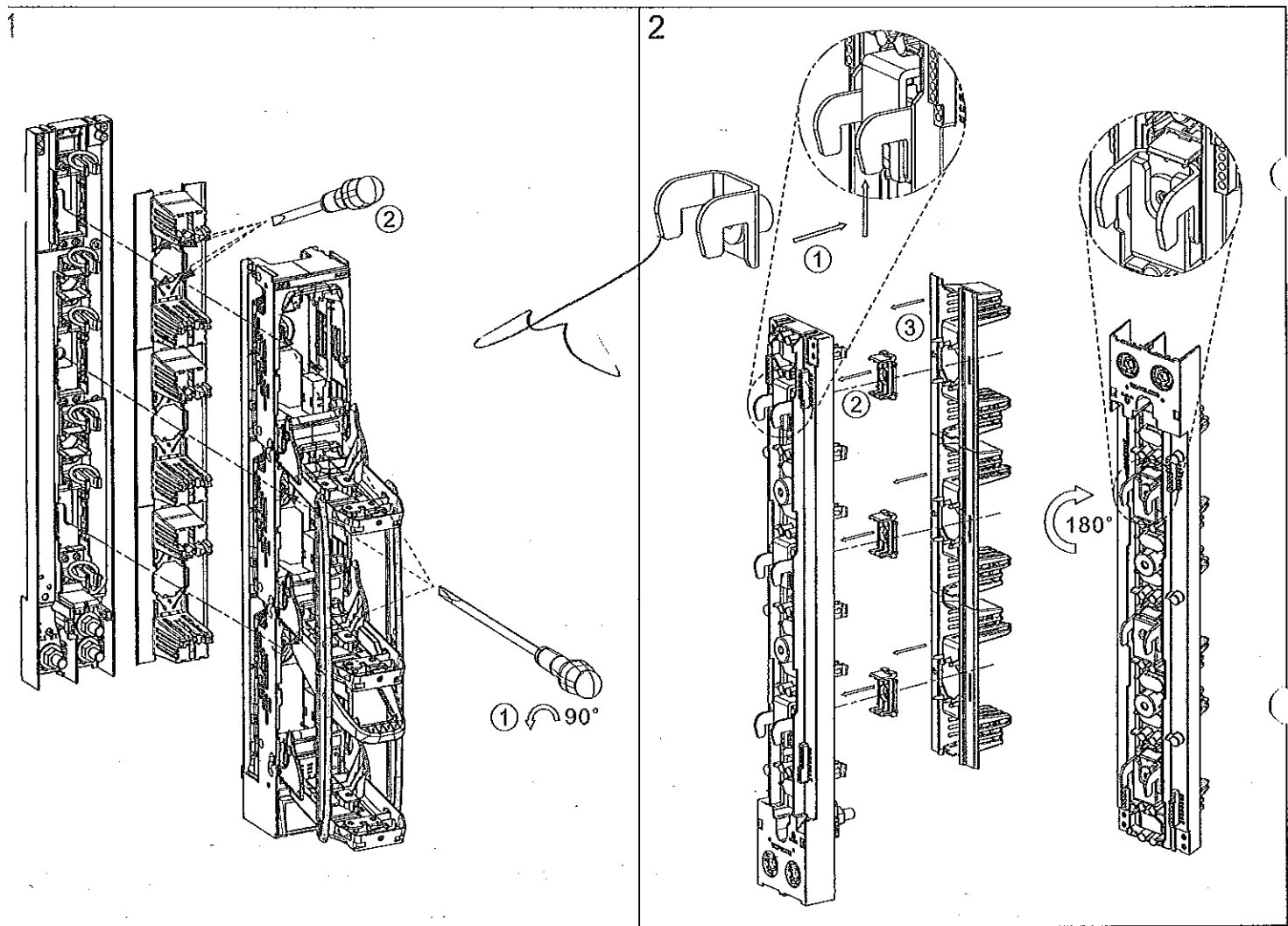
Montasjeveiledning
Installation Instruction
Montageanleitung

Title ZLPM23 back clamp installation instructions
Document number ISEP619521P0001
Revision A

ABB ABB AS Division Low Voltage Products
Skien Norway



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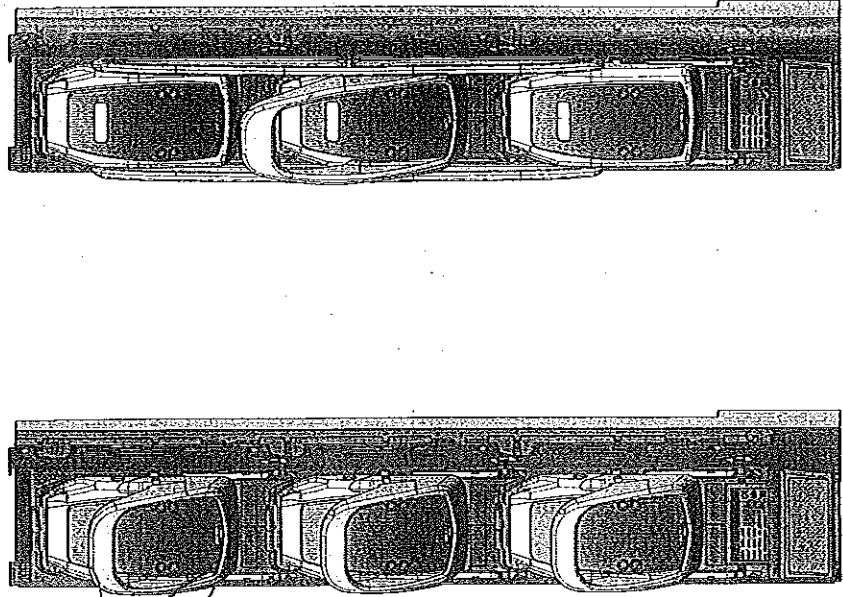
Handwritten signature or initials.

Handwritten initials.

Montasjefølleledning	Tittel	ZLBM123 Installation Instruction
Installation Instruction	Document	ISEP619302P0001
Montageanleitung	Revision	A
ABB ABB AS Division Low Voltage Products Skien Norway		

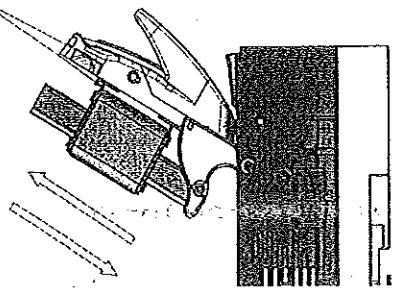
Sikrings-lastskillebryter 1P/3P
 Fuse-switch disconnecter 1P/3P
 Sicherungslasttrennschalter 1P/3P

1 Pole 3 Pole

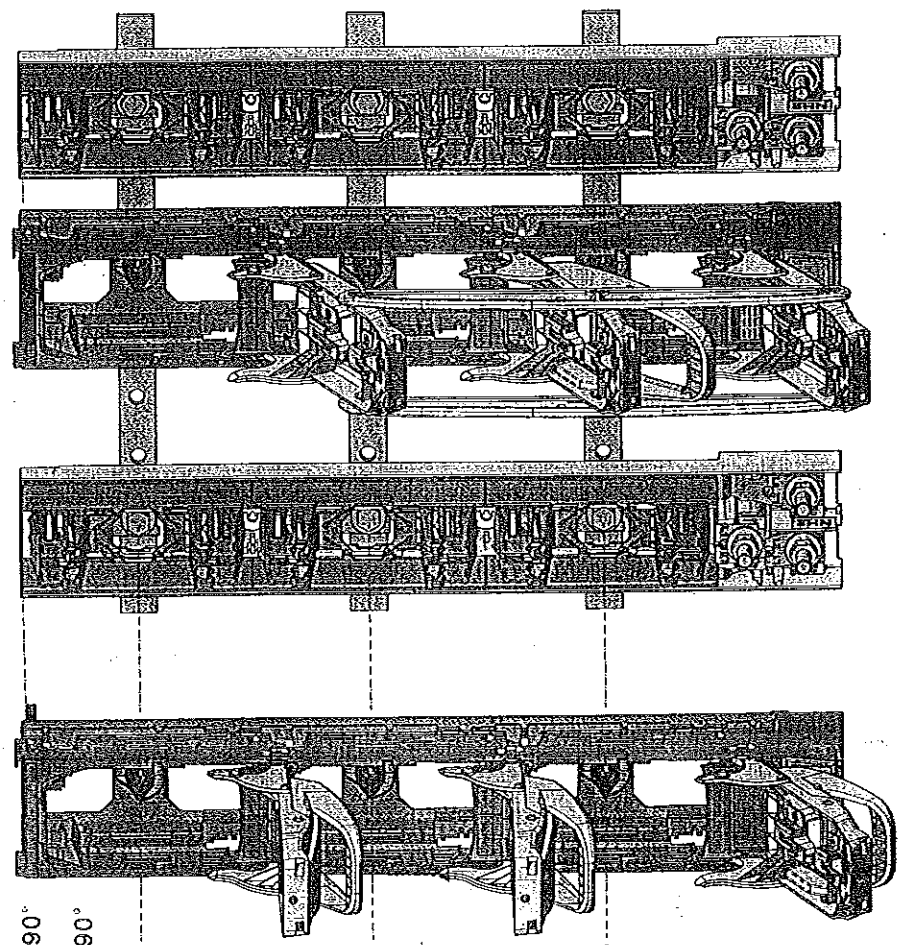


ZLBM1/2/3 = Low version
 ZHBM1/2/3 = High version

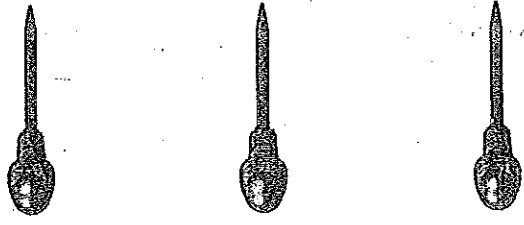
Insert and remove of NI-link.
 Press the release button and slide
 the fuse gripping-lugs in or out.



1 Pole 3 Pole

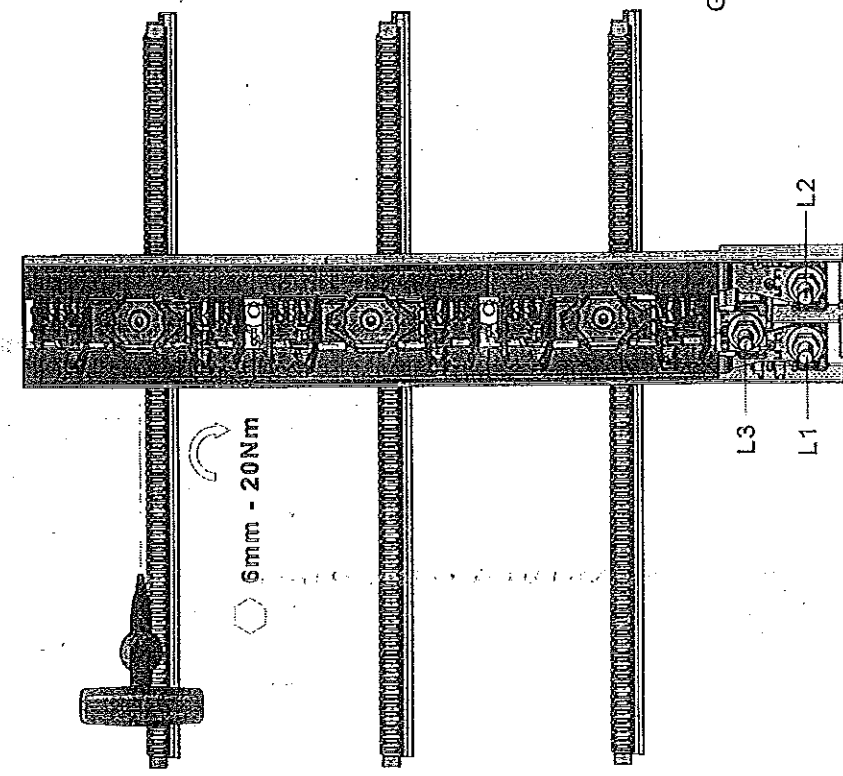


Close 90°
 Open 90°

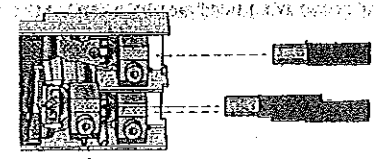


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Z-Busbar system



V-clamp connection

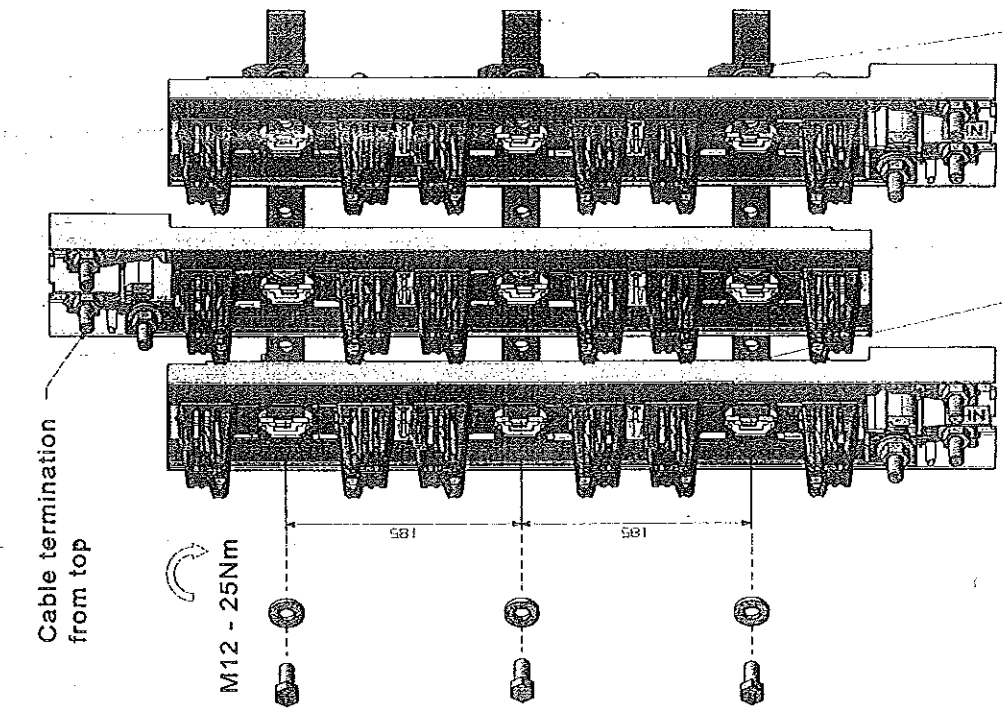


6 mNm - 25 Nm

Rm	Re	Sm	So
16-35	16-70	35-50	35-70
50-185	70-150	70-240	95-300

Note!
Pressure pad can be turned

185mm-Busbar system

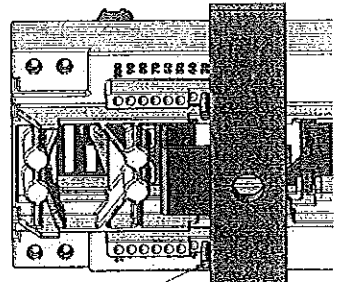
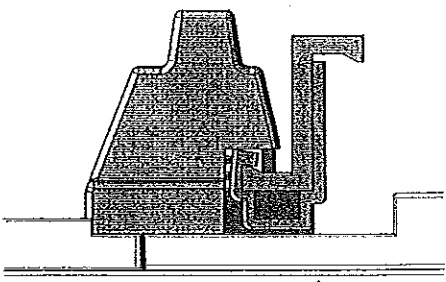


Low version
ZLBM

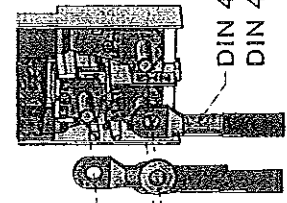
High version
ZHBM

Al-ledere børstes og innsettes med fett før tilkobling.
Al-conductors have to be brushed and greased before connection.
Al-leiter mussen vor den anschliessen gebursted und eingefettet werden.

*Kabelsko må være forfinnet
Cable lug must be tin-coated
kabelschuh muss verzinnt sein



Standard connection



DIN 46235 (Cu)
DIN 46329 (Al)*

M12 - 25 Nm

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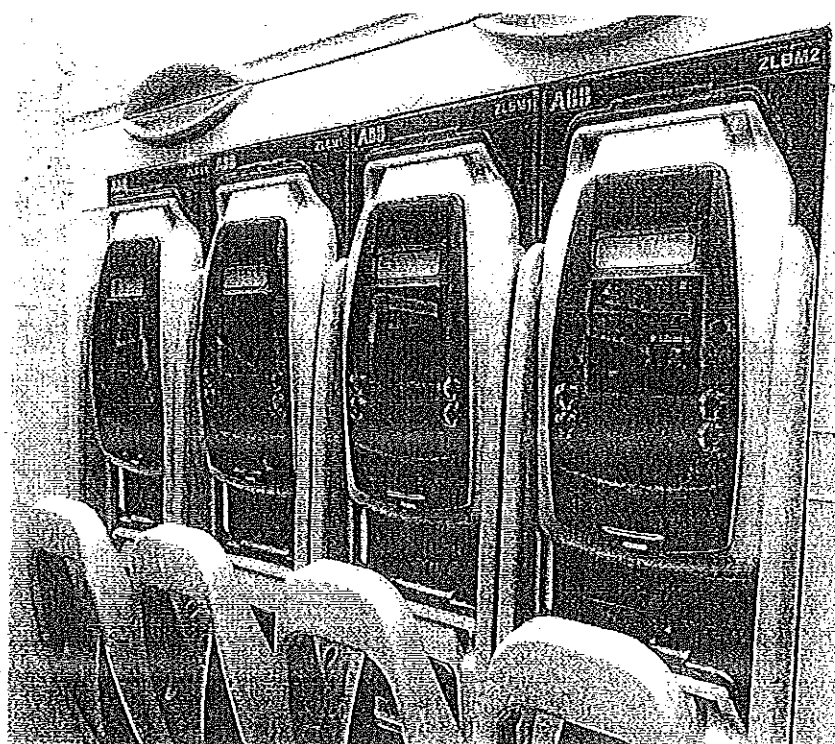
Technical data

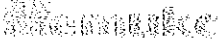
ZLBM/ZHBM

ZLBM/ZHBM Fuse Switch Disconnecter

		ZLBM/ZHBM 00	ZLBM/ZHBM 1	ZLBM/ZHBM 2	ZLBM/ZHBM 3
Rated operational voltage U_e	(V)	400/500/690	400/500/690	400/500/690	400/500/690
Rated operational current I_e	(A)	160/160/125	250	400	630
Rated insulation voltage U_i	(V)	1000	1000	1000	1000
Rated impulse withstand voltage U_{imp}	(kV)	8	8	8	8
Fuse protected short circuit withstand current	(kA _{ms})	100	100	100	100
Fuse protected short circuit making	(kA _{ms})	100	100	100	100
Rated making and breaking capacity		AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC23B/AC22B/AC21B	AC23B/AC22B/AC21B
Rated frequency	(Hz)	50/60	50/60	50/60	50/60
Electrical durability		200	200	200	200
Mechanical durability		1400	1400	800	800
Degree of protection from the front	Open	IP20	IP20	IP20	IP20
	Closed	IP30	IP30	IP30	IP30

Type tested according to EN/IEC 60947-3





ТОВ "ЧЕЗ Разпределение България"
 145 00743, Београдска 145 00743
 www.chez.bg
 Регистър: BG150150150
 ООП: 2345 0663; 4400 00159 2 061 4334
 www.chez.bg



Management System
 ISO 9001:2008
 OHSAS 18001:2007
 www.tuv.com
 ID 9134926555



Management System
 ISO 14001:2004
 www.tuv.com
 ID 9134926555

ПРИЛОЖЕНИЕ 9.6.3

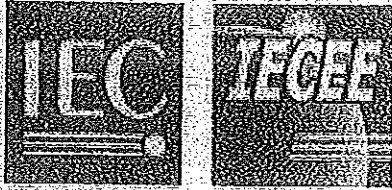
Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

Настоящото приложение се прилага във връзка с участието ми в:
 търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



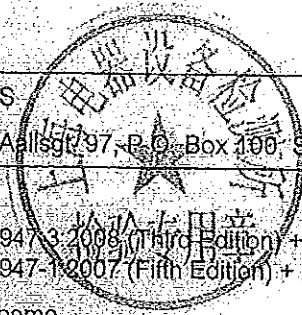
Test Report issued under the responsibility of:



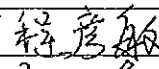
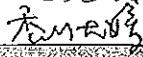
TEST REPORT
IEC 60947-3

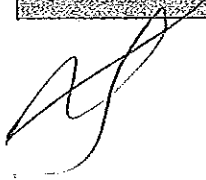
Low-voltage switchgear and controlgear
Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

Report Number.....	00901-CB2014CQC-060737-M1
Date of issue	2014-11-17
Total number of pages	41
Applicant's name	ABB AS
Address.....	Amtm Aallsgt 97, P.O. Box 100, Sentrum NO-3701 Skien, Norway
Test specification:	
Standard	IEC 60947-3:2008 (Third Edition) + A1:2012 in conjunction with IEC 60947-1:2007 (Fifth Edition) + A1:2010
Test procedure	CB-Scheme
Non-standard test method.....	N/A
Test Report Form No.....	IEC60947_3C
Test Report Form(s) Originator.....	OVE
Master TRF	Dated:2013-05
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Test item description.....	Fuse switch disconnector
Trade Mark.....	ABB
Manufacturer.....	ABB AS
Model/Type reference.....	ZLBM2,ZHBM2
Ratings.....	See page 9



ВАРНО С ОПИФИКАЦИЯ

Testing procedure and testing location:		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Shanghai Testing & Inspection Institute for Electrical Equipment (STIEE)
Testing location/ address		505 Wu Ning Rd. Shanghai 200063, P.R. CHINA
<input type="checkbox"/>	Associated CB Laboratory:	
Testing location/ address		
Tested by (name + signature)		Cheng Yanmin 
Approved by (name + signature) ..		Wei Qingyuan 
Testing procedure: TMP		
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature) ..		
Testing procedure: WMT		
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name + signature) ..		
Approved by (name + signature) ..		
Testing procedure: SMT		
Testing location/ address		
Tested by (name + signature)		
Approved by (name + signature) ..		
Supervised by (name + signature) :		



ВЯРНО С ОРИГИНАЛА





List of Attachments (including a total number of pages in each attachment): N/A

Remark:

This test report must be read in conjunction with the original test report 00901-CB2014CQC-063189.

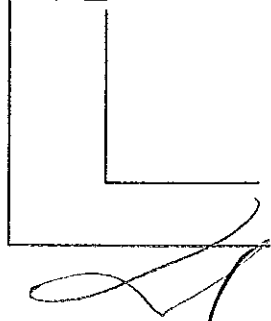
The latest CB certificate No. is CN30901.

The latest test report 00901-CB2014CQC-063189, dated 2014-07-24 was modified on 2014-11-17 to include the following changes:

Serial No.	Item	Before change	After change
1	Add type	ZLBM2	ZLBM2,ZHBM2
2	Explanation of model/ type	See below	See below

Before change:

ZLBM 2



Fuse-links type: NH2

ZLBM fuse-switch-disconnector

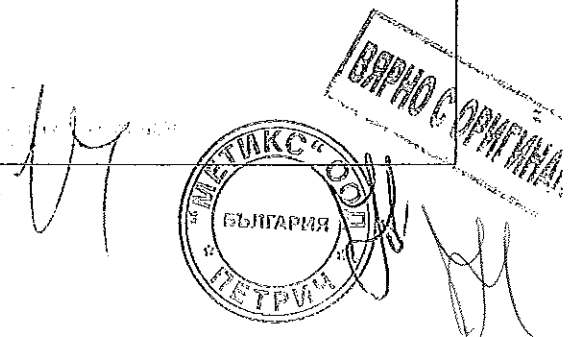
After change:

Z L B M 2 - 1P - Z - M12
 ① ② ① ① ③ ④ ⑤ ⑥

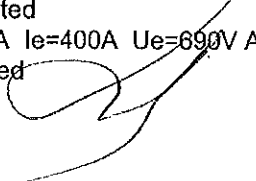
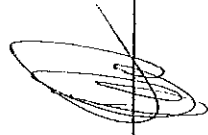
- ① It is basic.
- ② L/H. L is normal version; H is deeper version.
- ③ The size of fuse link is NH2.
- ④ 1P/3P. 1P is single pole operated switch, 3P is three pole operated switch.
- ⑤ Blank/Z. Blank is the application to normal busbar connection, Z is the application to Z-busbar connection.
- ⑥ M12/M12SS/V. M12 is normal bolt M12 for cable connection, M12SS is stainless steel bolt M12 for cable connection. V is integrated V- clamp for cable connection.

Z L B M 2
 ① ② ① ① ③

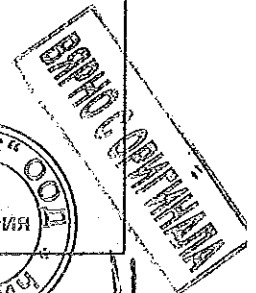
- ① It is basic.
- ② L/H, L is normal version; H is deeper version.
- ③ The size of fuse link is NH2.



Summary of testing:	
<p>Tests performed (name of test and test clause):</p> <p>ZLBM2 Test seq. I, IV</p> <p>Test Sequence I: #01: ZLBM2 Z-calmp Ith=400A Ie=400A Ue=500V AC-22B 3P three poles operated #02: ZLBM2 Integrated V Ith=400A Ie=400A Ue=500V AC-22B 3P three poles operated #03: ZLBM2 Z-calmp Ith=400A Ie=400A Ue=500V AC-22B 3P single pole operated #04: ZLBM2 Integrated V Ith=400A Ie=400A Ue=500V AC-22B 3P single pole operated #05: ZHBM2 Ith=400A Ie=400A Ue=500V AC-22B 3P three poles operated #06: ZHBM2 Ith=400A Ie=400A Ue=500V AC-22B 3P single pole operated</p> <p>Test Sequence IV: #07: ZLBM2 Z-clamp Ith=400A Ie=400A Ue=690V Ui=1000V AC-21B 3P three poles operated #08: ZLBM2 Z-clamp Ith=400A Ie=400A Ue=690V AC-21B 3P single pole operated #09: ZHBM2 Ith=400A Ie=400A Ue=690V AC-21B 3P three poles operated #10: ZHBM2 Ith=400A Ie=400A Ue=690V AC-21B 3P single pole operated</p> <p>Remark #01~#06:only for Clause 8.3.3.1</p>	<p>Testing location:</p> <p>Shanghai Testing & Inspection Institute for Electrical Equipment (STIEE) 505 Wu Ning Rd. Shanghai 200063, P.R. CHINA</p>
Summary of compliance with National Differences	
List of countries addressed: N/A	
<input type="checkbox"/> The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis or delete the whole sentence if not applicable)	



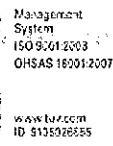
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булевард "Св. Кирил и Методий" № 10, гр. София
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ПРИЛОЖЕНИЕ 9.6.4

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 3 – заверено копие

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



CERTIFICATE OF ACCEPTANCE

TO PARTICIPATE IN THE IECEE CB-SCHEME

has been assessed and determined to fully comply with the requirements of ISO/IEC 17025: 2005-05, The Basic Rules, IECEE 01: 2012-06 and Rules of Procedure IECEE 02: 2012-06, and the relevant IECEE CB-Scheme Operational Documents

is therefore entitled to operate as a Chinese CB Testing Laboratory under the responsibility of [redacted] as National Certification Body and to carry out testing within the IECEE CB Scheme for the Scope (Product Category(ies) and Standard(s)) as listed in the relevant part of the IECEE Web Site at www.iecee.org, and is subject to all other terms as set forth in the IECEE Basic Rules and Rules of Procedure

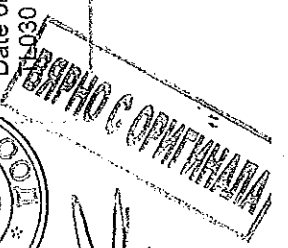
This certificate remains valid until December 5th 2016 at which time it will be reissued by the IECEE Executive Secretary upon successful completion of the normally scheduled 3-year Reassessment Programme administered by the IECEE CB Scheme.



Date of Issue: 2014-02-05

Signed by:

Kerry McMANAMA
IECEE EXECUTIVE SECRETARY AND COO



IEC

IECEE
CB
SCHEME

Ref. Certif. No.

CN31569

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE)
CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE

Product
Produit

Fuse-switch-disconnector

Name and address of the applicant
Nom et adresse du demandeur

ABB AS
Årstadveien 97, P.O. Box 100, Sentrum NO-3701 Skien, Norway

Name and address of the manufacturer
Nom et adresse du fabricant

ABB AS
Årstadveien 97, P.O. Box 100, Sentrum NO-3701 Skien, Norway

Name and address of the factory
Nom et adresse de l'usine

ABB Bulgaria EOOD - Rakovski branch
Industrial Zone, Plovdiv District, Rakovski Municipality, 4150
RAKOVSKI, BULGARIA

Note: When more than one factory, please report on page 2
Note: Lorsqu'il y a plus d'une usine, veuillez utiliser la 2^{ème} page

Rating and principal characteristics
Valeurs nominales et caractéristiques principales

U: 1000V; Ith= 400A; Uc/Ic: AC-21B: AC690V/400A; AC-22B: AC500V/400A; AC-23B: AC400V/400A; Iq= 100kA, 3P

Trademark (if any)
Marque de fabrique (si elle existe)

ABB

Model / Type Ref.
Ref. De type

ZLBM2

Additional information (if necessary may also be reported on page 2)
Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2^{ème} page)

A sample of the product was tested and found to be in conformity with
Un échantillon de ce produit a été essayé et a été considéré conforme à la

As shown in the Test Report Ref. No. which forms part of this Certificate
Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat

PUBLICATION EDITION

IEC 60947-3:2008(3rd Edition)+A1:2012 in conjunction with IEC 60947-1:2007(5th Edition)+A1:2010

00901-CB2014CQC-060737

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification



CHINA QUALITY CERTIFICATION CENTRE

Date: 2014-08-27

Signature:

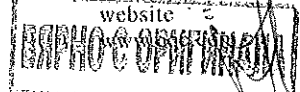
Wang Kejiao

Issued 2003-05
China Quality Certification Centre
Section 9, No. 188, Nansihuan Xilu, Beijing 100070 P.R. China

Tel: +86-10-83886666
Fax: +86-10-83886282

website

CB 0025846





Samsvarserklæring

Declaration of Conformity

Vi : ABB AS , Low Voltage Products
We : ABB AS , Low Voltage Products
(Fabrikantens navn / name of the manufacturer)

Adresse : Postboks 100, N 3702 SKIEN, Norway
Address : Postbox 100, N 3702 SKIEN, Norway

erklærer herved som eneansvarlig at produktet: / declare under our sole responsibility that the product:

Type/Betegnelse : Sikringslastskillebryter/Fuse Switch Disconnecter
Type/Designation : ZLBM00, ZLBM1, ZLBM2, ZLBM3
ZHBM00, ZHBM1, ZHBM2, ZHBM3

Denne samsvarserklæring er i overensstemmelse med europeisk standard EN 45014: «Generelle kriterier for samsvarserklæring». Basis for innholdet er å finne i internasjonal dokumentasjon, hovedsakelig ISO/IEC veiledning 22, 1982: «Informasjon om samsvarserklæring med standarder eller andre tekniske spesifikasjoner».

This Declaration of Conformity is in accordance with the European Standard EN 45014 «General criteria for declarations of Conformity». The basis for the contents has been found in international documentation, particularly in: ISO/IEC Guide 22, 1982, «Informations on manufacturer's declaration of conformity with standards or other technical specifications».

Er konstruert og produsert i h.h.t. relevante europeiske standarder:/ are designed and manufactured according to relevant European Standards:

- IEC 60947-1 Ed. 5.0 (2007 and later)
- IEC 60947-3 Ed. 3.0 (2008 and later)

og europeiske direktiv såsom / and European Directives like:

LVD 2006/95/EC publisert i Offentlig Journal (OJ) 2006/12/27
published in Official Journal (OJ) 2006/12/27

EMC 2004/108/EC publisert i Offentlig Journal (OJ) 2004/12/31
published in Official Journal (OJ) 2004/12/31

År for CE-merking:/
Year of CE-marking: 2014

Ansvarlig: / Person in charge:

Skien, 27.- Nov - 2014

(Sted, dato og år for utstedelse/
Place, date and year of issue)

Jon Arvid Zinke
(Signature / sign)



Erklæringsidentnr.
Declarationidentno. 1 SEP 500046P0001



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Decl. No. 18BA 100 0200



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ПРИЛОЖЕНИЕ 9.6.6

Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“

Триполюсен предпазител-разединител с вертикална конструкция, с обявен работен ток 400 А, с общо управление на полюсите, за директен монтаж върху събирателни шини с междуосово разстояние 185 mm, за високомощни предпазители със стопяема вложка НН, система А (НН система), с характеристика gG, размер 2, съответстващи на БДС EN 60269-1:2007 и БДС HD 60269-2:2007. Вертикалният предпазител-разединител е предназначен за включване, изключване, разединяване и защита на кабелни линии НН.

Триполюсният вертикален предпазител-разединител за 400 А, с общо управление на полюсите отговаря на приложимите български и международни стандарти и на техните валидни изменения и поправки:

БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и

БДС EN 60947-3:2002 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазители (IEC 60947-3:1999 + поправка юли 1999)“

и е оценен положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

гр. Петрич
21.10.2015г.

Декларатор:
инж. Николай Джамбазов
Управител



Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“
РЕФ. № PPD 15-065

организиран от „ЧЕЗ Разпределение България“ АД

Наименование на материала: Токови измервателни трансформатори НН X/5 А, проходен тип

Съкратено наименование на материала: ТИТ НН X/5 А, проходни

Област: Н - Трансформаторни постове

Категория: 27 – Измервателни

J - Уредби за търговско измерване

трансформатори

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Сухи неразглобяеми токови измервателни трансформатори НН от проходен тип, в пластмасов корпус, за монтиране на закрито, с клас на точност 0,5 и обявен вторичен ток $I_{sn} = 5$ А. Токовете трансформатори са преминали през първоначална метрологична проверка и са маркирани със съответния знак, по реда и при условията на Закона за измерванията.

Използване:

Сухите токови измервателни трансформатори НН от проходен тип са предназначени за трансформиране на тока в първичните вериги във вторичен ток за захранване на токовете вериги на електромерите за търговско измерване на използваните от потребителите количества електрическа енергия и на контролно-измервателните апарати.

Съответствие на предложеното изпълнение със стандартизационните документи:

Токовете измервателни трансформатори трябва да отговарят на БДС EN 60044-1:2001 „Измервателни трансформатори. Част 1: Токови трансформатори (IEC 60044-1:1996, с промени)“ и на неговите валидни изменения и допълнения или еквиваленти.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № (или текст)
1.	Точно обозначение на типа на токовете измервателни трансформатори (ТИТ), производителя и страна на произход и последно издание на каталога на производителя	Приложение 9.7.1
2.	Удостоверение за одобряване на типа на ТИТ, издадено по реда и при условията на Закона за измерванията	Приложение 9.7.2
3.	Техническо описание на ТИТ, гарантирани параметри и характеристики, включително клас на изолацията, тегло и др.	Приложение 9.7.3

№ по ред	Документ	Приложение № (или текст)
4.	Протоколи от типови изпитвания на ТИТ на английски или български език, проведени от независима изпитвателна лаборатория с приложени резултати от изпитванията	Приложение 9.7.4
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4.	Типовите изпитвания на ТТ са проведени в Български Институт по Метрология
6.	Информация за провежданите от производителя контролни (рутинни) изпитвания	Приложение 9.7.6
7.	Чертежи с размери	Приложение 9.7.7
8.	Инструкция за монтиране, въвеждане в експлоатация, изисквания за поддържане, включително изисквания за периодичност на необходимите контролни изпитвания по време на експлоатация и др.	Приложение 9.7.8
9.	Изисквания за съхранение и транспортиране	Приложение 9.7.9
10.	Декларация за възможностите за рециклиране на използваните материали при производството на ТИТ или за начина на тяхното ликвидиране	Приложение 9.7.10
11.	Описание на потенциалната заплаха за увеличаване опасността и рисковете от замърсяване на околната среда и класификация на отпадъците съгласно Наредба №3/2004 г. за класификация на отпадъците, издадена от министъра на околната среда и водите и министъра на здравеопазването, обн. ДВ, бр. 44 от 25.05.2004 г.	Приложение 9.7.11

Технически данни

1. Параметри на електрическата разпределителна мрежа

№ по ред	Параметър	Стойност
1.1	Обявено напрежение	400/230 V
1.2	Максимално работно напрежение	440/253 V
1.3	Обявена честота	50 Hz
1.4	Електроразпределителна мрежа	4 - проводникова (L1, L2, L3, PEN)
1.5	Схема на разпределителната мрежа	TN-C
1.6	Ток на късо съединение	15 kA

2. Характеристики на работната среда и място на монтиране

№ по ред	Характеристика / място на монтиране	Стойност/описание
2.1	Максимална околна температура	+ 40°C
2.2	Минимална околна температура	Минус 5°C
2.3	Относителна влажност	До 95 %
2.4	Замърсяване с прах, пушек, агресивни газове и пари	Умерено
2.5	Надморска височина	До 1000 m
2.6	Място на монтиране	В комплектни комутационни устройства (ККУ) - главни трансформаторни и главни разпределителни табла, електромерни табла и др.


3. Конструктивни характеристики и др. данни.

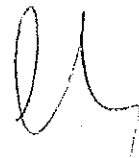
№ по ред	Характеристика	Изискване	Гарантирано предложение
3.1	Конструкция	а) ТИТ трябва да бъде от проходен тип с отвор за преминаване на тоководещата част на първичната верига - правоъгълни шини или изолирани проводници	ДА
		б) Корпусът на ТИТ трябва да бъде: неразглобяем, изграден от синтетична твърда изолация; или разглобяем, надеждно осигурен против разглобяване в процеса на експлоатация и защитен с два противоположно разположени холограмни, саморазрушаващи се при разлепване стикери, съдържащи фабричния номер на трансформатора. (Да се посочи)	разглобяем, надеждно осигурен против разглобяване в процеса на експлоатация и защитен с два противоположно разположени холограмни, саморазрушаващи се при разлепване стикери, съдържащи фабричния номер на трансформатора и името на фирмата производител
3.2	Вторични намотки - брой и предназначение	Една вторична намотка за целите на измерването	ДА
3.3	Монтиране	а) ТИТ трябва да позволяват монтиране в произволно положение.	ДА
		б) ТИТ трябва да бъдат снабдени с приспособление за механично закрепване към тоководещата част на първичната верига.	ДА

AM

CH

№ по ред	Характеристика	Изискване	Гарантирано предложение
		в) ТИТ трябва да бъдат снабдени с приспособления за закрепване към монтажна плоча посредством винтови съединения.	ДА
		г) Приспособленията за закрепване трябва да бъдат устойчиви на корозия.	ДА
3.4	Клемен блок за свързване на вторичните вериги	а) Клемният блок трябва да бъде от винтов тип с възможност за свързване на многожични проводници на вторичните вериги със сечение до 4 mm ² .	ДА
		б) Всеки извод на клемния блок трябва да бъде с min два винта, гарантиращи ниски стойности на контактното съпротивление.	ДА
		в) Клемният блок трябва да бъде защитен с капак с възможност за пломбиране.	ДА
		г) Клемният блок и резбовите съединения трябва да бъдат изработени от подходящи некорозиращи метали или метални сплави.	ДА
3.5	Маркиране на обявените стойности	а) Токовете измервателни трансформатори трябва да бъдат маркирани с информация за обявените стойности, нанесена върху корпуса или табелка от устойчив на корозия материал или самозалепващо се фолио, съгласно изискванията на т. 11.7 от БДС EN 60044-1 или еквивалент.	ДА, информацията е лазерно гравирана върху корпуса

№ по ред	Характеристика	Изискване	Гарантирано предложение
		б) Маркировката трябва да бъде нанесена трайно и четливо по начин, по който да не може да бъде заличена или променена.	ДА, маркировката е лазерно гравирана върху кутийката
в) Табелката трябва да бъде фиксирана здраво към корпуса на токовите измервателни трансформатори, без възможност за подмяна или запазване на целостта и при демонтиране.		ДА, лазерно гравирана	
г) Табелката от самозалепващо се фолио трябва да бъде: саморазрушаваща се при разлепване; или защитена с прозрачна капачка с възможност за пломбиране. (Да се посочи)		Табелката е лазерно гравирана	
д) Препоръчително е върху изолацията на токовите измервателни трансформатори допълнително да бъде маркиран с вдлъбнат или релефен печат обявения коефициент на трансформация.		ДА, коефициента на трансформация е лазерно гравиран	
3.6	Маркиране на изводите	Изводите на ТИТ трябва да бъдат маркирани трайно и четливо съгласно изискванията на т. 10.1 от БДС EN 60044-1 или еквивалент.	ДА
3.7	Първоначална проверка и знаци за удостоверяване (съгласно разпоредбите на Закона за измерванията)	а) Токовете измервателни трансформатори трябва да бъдат доставени след извършване на първоначална метрологична проверка.	ДА



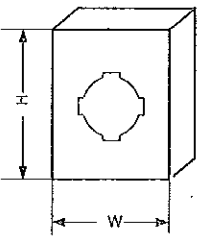

№ по ред	Характеристика	Изискване	Гарантирано предложение
		б) Първоначална метрологична проверка трябва да бъде удостоверена със знак за първоначална проверка и копието на протокола от проведените изпитвания.	ДА, холограмни стикери и протоколи от изпитания
3.8	Транспортна опаковка	ТИТ трябва да бъдат опаковани в подходяща опаковка предпазваща ги от атмосферни влияния и механични повреди.	ДА
3.9	Експлоатационна дълготрайност	min 25 години	25 години

4. Общи технически параметри

№ по ред	Параметър	Изискване	Гарантирано предложение
4.1	Най-високо напрежение за съоръженията - U_m	min 0,72 kV (ефективна стойност)	0,72 kV (ефективна стойност)
4.2	Обявено издържано напрежение с промишлена честота на изолацията	min 3 kV (ефективна стойност)	3 kV (ефективна стойност)
4.3	Клас на точност	0,5	0,5
4.4	Обявен продължителен термичен ток	min 1,2 x I_{pn}	1,2 x I_{pn}
4.5	Номинален коефициент на безопасност - FS	5	5

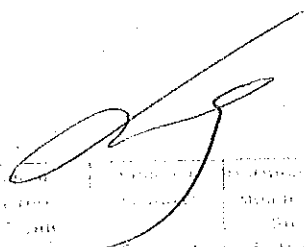
5. Технически параметри на токовите измервателни трансформатори

5.1 Токов измервателен трансформатор НН, проходен тип, 150/5 А

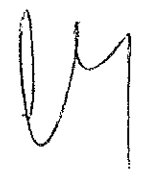
Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 27 1402		Да се посочи	
Наименование на материала		Токов измервателен трансформатор НН, проходен тип, 150/5 А	
Съкратено наименование на материала		ТИТ НН, проходен - 150/5 А	
№ по ред	Параметър	Изискване	Гарантирано предложение
1.	Обявен първичен ток, I_{pn}	150 А	150 А
2.	Обявен първичен ток на термична устойчивост - 1 sec, I_{th}	min 9 kA	9 kA
3.	Обявен първичен ток на динамична устойчивост, I_{dyn}	min 22,5 kA	22,5 kA
4.	Обявен вторичен ток, I_{sn}	5 А	5 А
5.	Обявен коефициент на трансформация	150/5 А	150/5 А
6.	Обявен вторичен товар	min 5 VA	5 VA
7.	Габаритни размери 	H = max 100 mm W = max 85 mm	H = 95 mm W = 83 mm
8.	Светъл отвор за тоководещата част на първичната верига за: правоъгълно сечение / кръгло сечение	min 40,3x10,5 mm / $\varnothing 30$	41x11 mm / $\varnothing 36$
9.	Тегло, kg	Да се посочи	0,940 kg

"ПРОМБ" ООУ ПАЛНАС

СЧЕТ ЗА РАБОТАТА ЗА ПЕРИОДА ОТ 01.01.2017 Г. ДО 31.12.2017 Г.




№	ИЗМЕНЕНИЕ	ПОСЛЕДОВАТЕЛНО	ПОСЛЕДОВАТЕЛНО	ПОСЛЕДОВАТЕЛНО	ПОСЛЕДОВАТЕЛНО	ПОСЛЕДОВАТЕЛНО
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www.tuv.com

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т. +359 02 945 0143; факс +359 02 945 0142
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OHSAS 18001:2007
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ISO 14001:2004
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ID: 9105026355

ПРИЛОЖЕНИЕ 9.7.2

Удостоверение за одобряване на типа на ТИТ, издадено по реда и при условията на Закона за измерванията

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

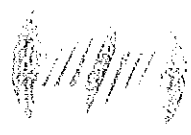
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**

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СЪЮЗНАТА РЕПУБЛИКА БЪЛГАРИЯ
МИНИСТЕРСТВО НА ИКОНОМИКАТА
И ЗАЩИТАТА НА ПОТРЕБИТЕЛЯ



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УДОКОВОЛЕНИЕ
ПОДПИСАНО ОТ ПРЕДИКАТОРА

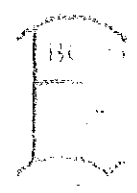
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№ 10001/84

ИЗДАВА
СЪЮЗНАТА РЕПУБЛИКА БЪЛГАРИЯ

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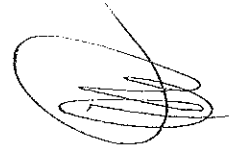
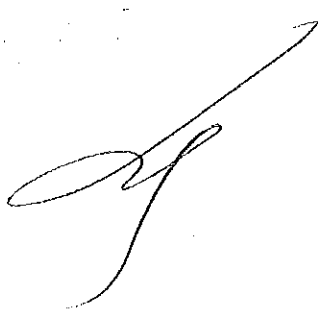
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10.10.2017

СЪЮЗНА АГЕНЦИЯ ЗА СЪЩИНОСТ И ЗАЩИТА



Директор на Съюза за същност и защита



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КОНТРАКТ № 001/07/154



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ВЕРНО С ОПТИМАЛНА

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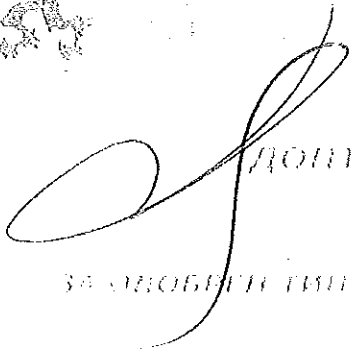


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Република България



ДОПЪЛНЕНИЕ № 1 к Д.П. 1547.2

КЪМ УДОСТОВЕРЕНИЕ
ЗА ОБОБЩЕНИ СРЕДСТВО ЗА ИЗМЕРВАНЕ № 06/01/01.1

Областен център
г. Пловдив

г. Пловдив, ул. „Св. Кирил“ № 1

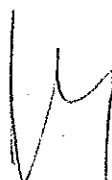


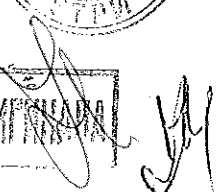
Телефон

Сметка в БНБ
Местен отдел
Сметков номер

Пощенски адрес

Съставено е за измерване в
СНС на предметна
добродетелна и по-точно
за обобщено средство за
измерване № 06/01/01.1

Изпълнено е в съответствие с
задължителния срок
до удостоверение за
добродетелност

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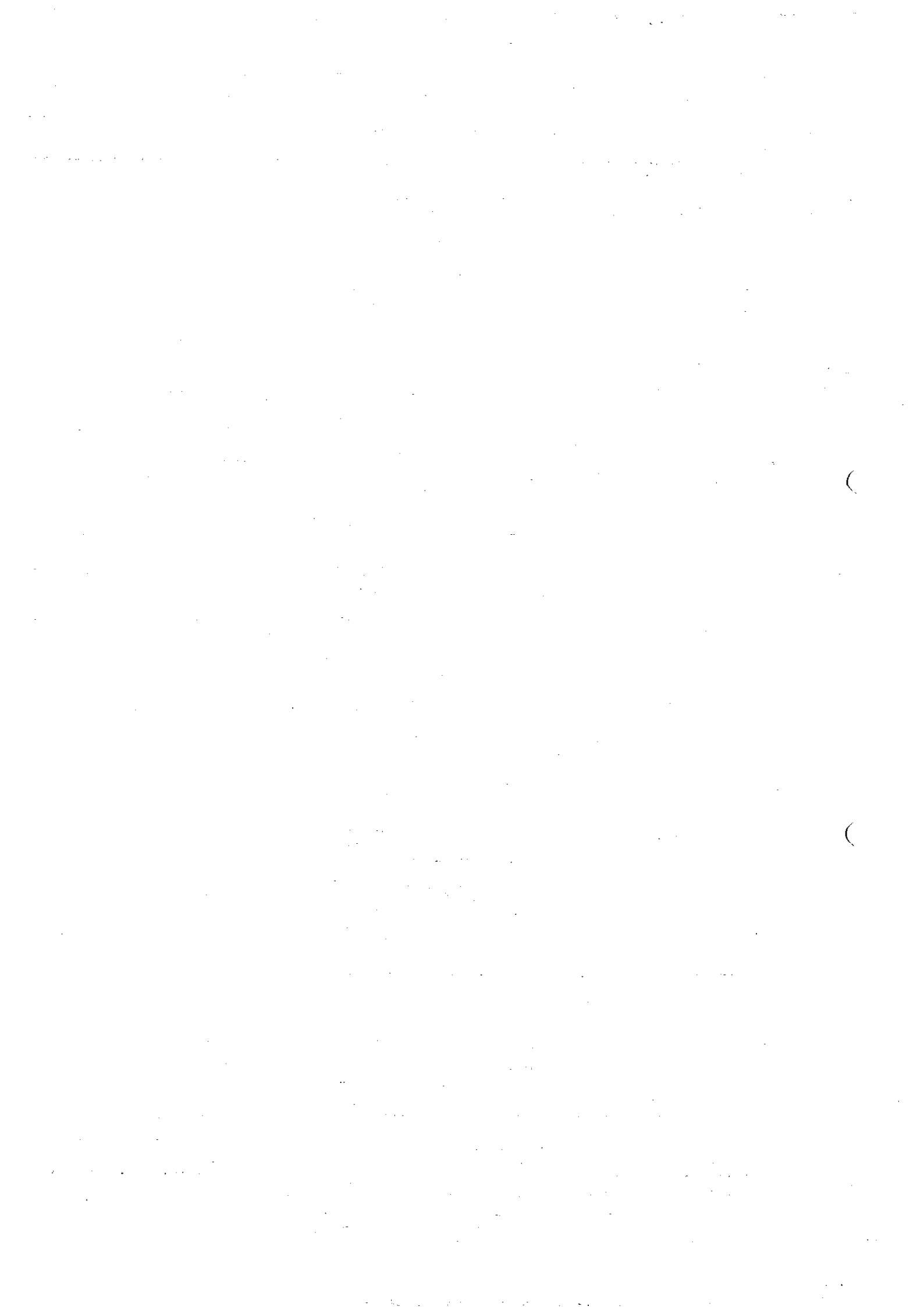
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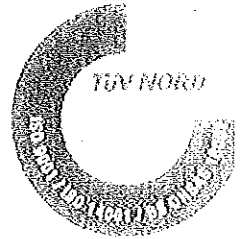
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ВЕРНО С ОРИГИНАЛА

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“ЕЛПРОМ ЕМЗ” ООД град ШАБЛА



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ТЕХНИЧЕСКО ОПИСАНИЕ

РАМА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ
тип СТ-1, СТ-2, СТ-3 и СТ-4 за НН до 1000V
ПРОИЗВОДСТВО НА “ЕЛПРОМ ЕМЗ” ООД град ШАБЛА

Токкови измервателни трансформатори тип СТ-1; тип СТ-2,
тип СТ-3 и тип СТ-4 са за ниско напрежение до 1000V за
вътрешен монтаж с клас на точност 0.2; 0.5 или 0.5S и
номинална мощност до 50VA в диапазона от номинални
токове до 3000A съгласно БНС EN 60044-1:2001 и IEC 60044-
1:1999.

■ Тип СТ-1 се състои от торондаден магнитопровод с първична
и вторична намотки, помещени в кутията от пластмаса
изработена от пластмаса тип P-сва В4285 с клас на
изпламенност съгласно IEC 607 - V-0.

Трансформациите токкови трансформатори са в диапазона
3075 A до 33075 A с клас на точност 0.2; 0.5 или 0.5S
мощност 5VA и 10VA.

■ Тип СТ-2 Тип СТ-3 и Тип СТ-4 са прожектирани типове с рамки
измервателни трансформатори прилагани съответно за шини или
кабели състоят се от торондаден магнитопровод с първична
намотка, помещена в кутията от пластмаса изработена от
пластмаса тип P-сва В4285 с клас на изпламенност съгласно
IEC 607 - V-0.

Трансформациите токкови трансформатори са в диапазона
100 VA до 2000 VA с клас на точност 0.5 или 0.5S и мощност
5VA, 10VA и 15VA.

ТЕХНИЧЕСКИ ДАННИ Тип СТ-1, Тип СТ-2, Тип СТ-3 и Тип СТ-4

Синоним на работи: Трансформатори електроенергетични с номинално напрежение до 1000 V, номинална мощност до 2500 VA, температура на изолация клас до F, номинална честота до 50 Hz.

- 1. Номинално напрежение до 1000 V
- 2. Честота - 50 Hz
- 3. Номинална номинална ток $I_{\text{н}}$ - до 2500 VA
- 4. Номинален коефициент на трансформация $K_{\text{т}}$ - 5 VA
- 5. Клас на изолация на изолацията на керена - 0.2, 0.5, 150
- 6. Номинална мощност 5, 10, 15 VA
- 7. Температурен клас на изолацията $T_{\text{из}}$, $K_{\text{в}}$ - 50 Hz
- 8. Номинален ток на номинална изолация $I_{\text{доп}}$, $K_{\text{в}}$ - 2.5 VA
- 9. Номинален коефициент на безопасност $K_{\text{б}}$ - 5 или 10
- 10. Маса m и относителна плътност ρ - 0.485 до 1.0 VA
- 11. Изолация: суха клас на трансформация $K_{\text{т}}$



Съгласуваните документи: Изделието отговаря на БДС EN 60044-1:2001 и IEC 60044-1:1999.

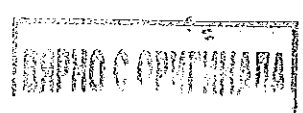
При всички производствени етапи "ЕЛПРОМ-ЕМЗ" ООД град Тарнава гарантира високо качество на трансформаторите и предоставя възможност за индивидуални услуги на клиентите на трансформаторите с ползвателските услуги на адекватно ниво, което да гарантира високо качество на продуктите и на обслужването на клиентите. Като цяло, клиентите на услугите на "ЕЛПРОМ-ЕМЗ" са гарантирани.

ОТВЕТСТВЕНОСТ

инж. Д. Димитров



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ИЗДАНИЕ 1.0

ИЗДАНИЕ 1.0

ИЗДАНИЕ 1.0



Management System ISO 9001:2008 OHSAS 18001:2007 www.tuv.com ID: 9165026895



Management System ISO 14001:2004 www.tuv.com ID: 9165026895

ПРИЛОЖЕНИЕ 9.7.4



Протоколи от типови изпитвания на ТИТ на английски или български език, проведени от независима изпитвателна лаборатория с приложени резултати от изпитванията

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

9. Технически и метрологични характеристики:

Тип на трансформатора	СТ-1	СТ-2	СТ-3	СТ-4
Вид на ток измерване	20, 50, 75, 100, 150	100, 150	400, 500, 600	1000, 1500
Температурен диапазон, °C			0	
Вид на измерване			± 0,1	
Максимално работно напрежение, kV			0,72	
Средна гр.			± 0,1	
Домашна мощност, VA	5, 10	5, 10	5, 10, 15	1, 2, 3

10. Технически средства използвани при изпитването:

10.1. Уредба за проверка на токови трансформатори тип АИИ ф. № 45/49/2 с еталонен трансформатор тип Т1 50 ф. № 2217-45? свидетелство за калибриране № 037- ВЦИ/ 16 03.20 06 год.

10.2. Уредба за измерване на диелектрично състояние тип РГО 110 в. № 5/189/2008

10.3. Метрологичен тип Ф-411 ф. № 62862

11. Резултати от изпитванията:

11.1. Проверка на мерещите средства

11.1.1. Маршрутна проверка

ВНС ЕН 60904 / 1
10.11.2006 г.

Протокол № 013/06 от 10.07.2006 г.

Протокол № 040/06 от 11.07.2006 г.

Протокол № 12/12/07 2006 г.

11.1.2. Свидетелство за калибриране

ВНС ЕН 60904 / 1
10.11.2006 г.

Протокол № 013/06 от 10.07.2006 г.

Протокол № 040/06 от 11.07.2006 г.

Протокол № 12/12/07 2006 г.

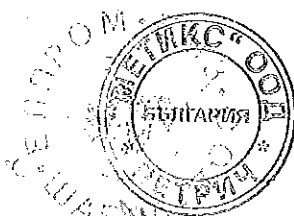
11.2. Маршрутна проверка на токовите измервателни данни

ВНС ЕН 60904 / 1
10.11.2006 г.

Протокол № 14/06 от 10.07.2006 г.

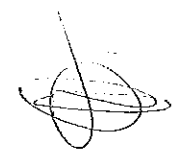
Протокол № 040/06 от 11.07.2006 г.

Протокол № 12/12/07 2006 г.



11.1. Проверка на действителността на измервателните средства - 734V-4-001

БДК ЕН 60044-1
11.1



Протоколи № 01-03 (10.07.2006 г.)
Протоколи № 04-06 (11.07.2006 г.)
Протокол № 12 (12.07.2006 г.)

11.2. Проверка на действителността на измервателните средства - 734V-4-001

БДК ЕН 60044-1
11.2

Протоколи № 01-03 (10.07.2006 г.)
Протоколи № 04-06 (11.07.2006 г.)
Протокол № 12 (12.07.2006 г.)

11.3. Съвместимост на преводите на трансформаторите

БДК ЕН 60044-1
11.3

Протоколи № 01-03 (10.07.2006 г.)
Протоколи № 04-06 (11.07.2006 г.)
Протокол № 12 (12.07.2006 г.)

11.5. Проверка на коефициента на безреактивност

БДК ЕН 60044-1
11.5

Протоколи № 01-03 (10.07.2006 г.)
Протоколи № 04-06 (11.07.2006 г.)

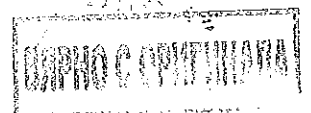
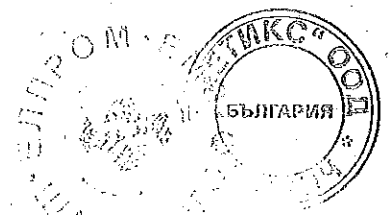
Извършвали на изпитването:

Младши експерт:

инж. Р. Мулярова

Членове на журито:

инж. П. Стойкова



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ТОВ Райнланд България
ТОВ Райнланд България
ТОВ Райнланд България
ТОВ Райнланд България
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ТОВ Райнланд България
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ТОВ Райнланд България
ТОВ Райнланд България

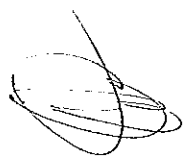


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ПРИЛОЖЕНИЕ 9.7.6



Информация за провежданите от производителя контролни (рутинни) изпитвания

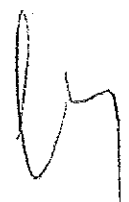
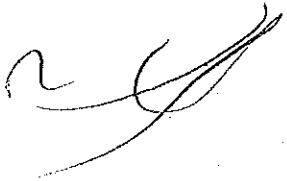
С настоящето декларираме съответствието на предлаганото изпълнение с
изискванията
на техническата спецификация

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД





Общество с ограничена отговорност
"ЧЕЗ ЕНЕРДЖИ"
ул. "Трън" 53, 1000 София
Тел: 00359 2 839 6000, факс: 00359 2 832 3321
www.chez.bg



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ID: 910526585



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www.tuv.com
ID: 910526585

ПРИЛОЖЕНИЕ 9.7.7



Чертежи с размери

С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

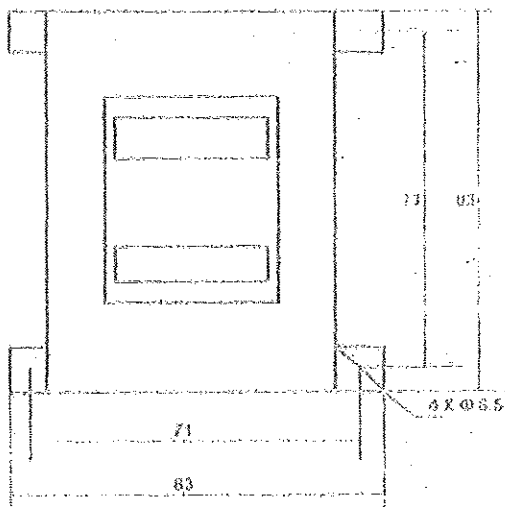
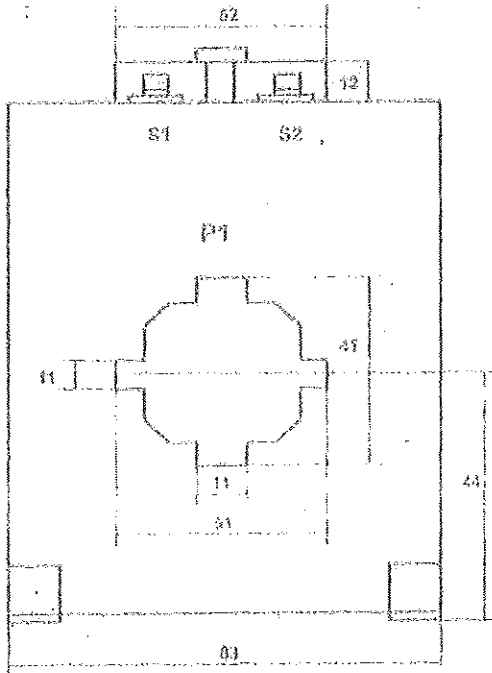
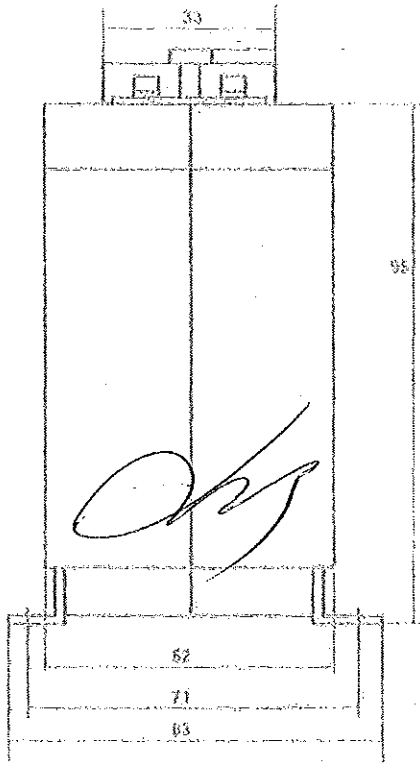
*Настоящото приложение се прилага във връзка с участието ми в:
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„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

ПРИСЪЕДИНИТЕЛНИ РАЗМЕРИ ЗА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ
ТИП СТ - 2 с відношавани преобразовани отношения 150/5А, 200/5А, 250/5А и 300/5А



Handwritten signature and a rectangular stamp containing the text "ИЗРИНО С ОРДИНАРА" and another handwritten signature.

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ул. "Пирот" № 49
1000 София, България
Тел: +359 02 950 0150; факс: +359 02 950 0250
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ПРИЛОЖЕНИЕ 9.7.8

Инструкция за монтиране, въвеждане в експлоатация, изисквания за поддържане, включително изисквания за периодичност на необходимите контролни изпитвания по време на експлоатация

С настоящето декларирам съответствието на предлаганото изпълнение с изискванията на техническата спецификация

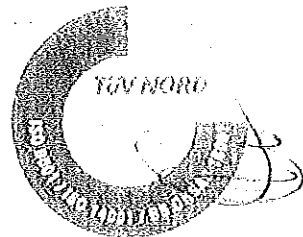
*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

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РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

ТРАНСФОРМИРАЩИ СЪОБРАЗНИ ТРАНСФОРМАТОРИ



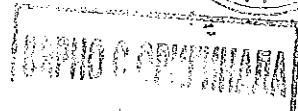
ИНСТРУКЦИЯ ЗА МОНТАЖ И ВЪВЕЖДАНЕ В ЕКСПЛУАТАЦИЯ НА
ТОКОВИ ИЗМЕРИТЕЛНИ ТРАНСФОРМАТОРИ за НН за тип СТ-2, СТ-3, СТ-4

Място на монтаж: въ закрито
Вид на свързване:

Експлоатационни условия на работа:

ПРИ ВЕКОВЕНА СЪВ ВЕРИГАТА ПЪРВИЧНА НАМОТКА
ВТОРИЧНАТА НАМОТКА НА ТРАНСФОРМАТОРА
НЕ ТРЯБВА ДА ОСТАВА ОТВОРЕНА !

Безопасност и хигиена на труда:





Обавовка, Трансперт и Технолози

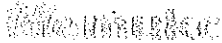
СЪМ ПРЕДПАЗВАНЕ НА НАСТАВНИЦИТЕ, ЦАЛЕНИ В НАСТОЯЩАТА ПРЕДУВИДИМ
АДРЕСЪТ ПРЕДПАЗВАНЕ НЕ ПРИЕМА РЕКЛАМАЦИИ, НАПРАВЕНИ В САМАЛЦИОННА
СРОК НА ИЗДЕЛИЕТО



ДИРЕКТОР И БЕЧАТ
(ТРАНСПЕРТ И ТЕХНОЛОГИИ АГЕНТСТВО)

Датум: 19.12.2012 година





ТОВ "ЧЕЗ Разпределение България"
ул. "Св. Кирил" № 1
1000 София, България
Тел: 02 92 2 288 0158; факс: 02 92 2 288 2337
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ПРИЛОЖЕНИЕ 9.7.9

Изисквания за съхранение и транспортиране

С настоящето декларираме съответствието на предлаганото изпълнение с
изискванията
на техническата спецификация

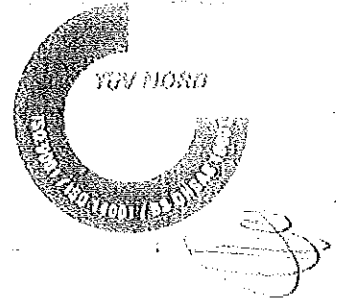
Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

„ЕЛПРОМ ЕМВ“ ООД град ШАБЛЯ



ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И ТРАНСПОРТ НА
ТОКОВИ ИЗМЕРИТЕЛНИ ТРАНСФОРМАТОРИ за НН за тип СТ-2, СТ-3 СТ-4

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- 1. Пакетите токкови измервателни трансформатори тип СТ-2, тип СТ-3 и тип СТ-4 се поставят в специални кашони от картон - размери: 12/дванадесет/ броя трансформатори в кашон, 56/петдесет и шест/ кашона пощенски върху аеронавес правят една транспортна единица.
- 2. Съхранение : токвите измервателни трансформатори трябва да се съхраняват в закрити помещения и складове.
- 3. Транспорт : токвите измервателни трансформатори се транспортират във всякакъв вид закрити транспортни средства.

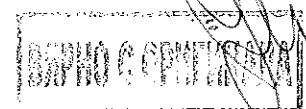
ЗА ВЕСНАЗНАНЕ НА НАСЪВЪЩЕНИЯТА, ДАДЕНИ В НАСТОЯЩАТА ИНСТРУКЦИЯ
ПОСЛЕДЪТ НАЧИНУЩИТЕЛ НЕ ПЕЛОЖА РЕКЛАМАЦИИ, НАПРАВЕНИ В СЪРАВИЩОНИИ
ПРОК НА ИЗВЕЛИЕТО.

КОПИЕ И ПЕЧАТ

„ЕЛПРОМ ЕМВ“ ООД
 (иже ДИМИТЪР АРНАУДОВ)
 УПРАВЛЕНИЕ
 Дата : 02.02.2012 година

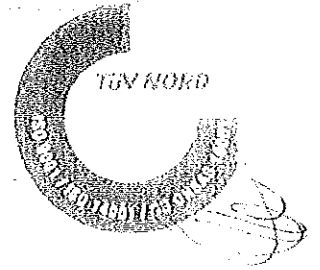


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“ЕЛПРОМ ЕНТЗ” ООД - град ШАБЛА



УСТАВНО СЪДЪРЖАНИЕ
ИМЕНА И ПОЗИЦИИ
ИМЕНА И ПОЗИЦИИ
ИМЕНА И ПОЗИЦИИ
ИМЕНА И ПОЗИЦИИ
ИМЕНА И ПОЗИЦИИ

ДЕКЛАРАЦИЯ

Аз, подписаният **ИНЖ. ДИМИТЪР ИВАНОВ АРНАУДОВ** - УПРАВИТЕЛ на **“ЕЛПРОМ ЕНТЗ” ООД** град **ШАБЛА** със седалище и адрес на управление в град Шабла ул. “Нефтчици” № 38 живуя в град Шабла ул. “Борис П. Палав” блок Волна, ап. 9, притежавам лична карта № 641710391 издадена на 19.01.2011 година от МВР град Добрич с ЕГН 66060700.

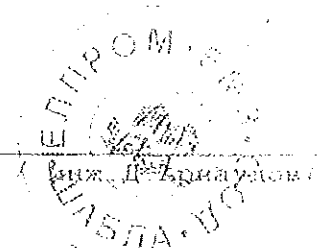
ДЕКЛАРИРАМ:

Че всички материали използвани от **“ЕЛПРОМ ЕНТЗ” ООД** град **ШАБЛА** при производството на трансформатори високо напрежение тип **СТ-3** и **СТ-4** за всички проводни отношения - могат да се рециклират.

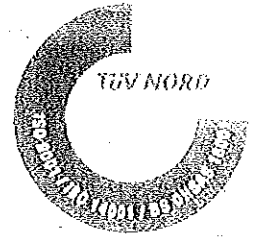
Известно ми е, че за неверни данни несъответстват на чл. 311

Град Шабла,
19.02.2014 година

ДЕКЛАРАТОР



ЕЛПРОМ ЕМЗ ООД град ШАБЛА



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Д Е К Л А Р А Ц И Я

Далю подписаният г-н ДИМИТЪР ИВАНЧЪ АРНАУДОВ - УПРАВЛЯВАЩ НА ЕЛПРОМ ЕМЗ ООД град ШАБЛА със телажиние и адрес на управление в град Шабла ул. "Воеваница" № 28 живуи в град Шабла ул. "Бонна" № 85, общин Бяла, ул. 9, притежаващ лична карта № 647719490 издадена на 19.01.2012 година от МВР град Добрич, с ЕГН 6609077027

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Д Е К Л А Р И Р А М :

Че всички материали използвани от ЕЛПРОМ ЕМЗ ООД град ШАБЛА при производството на Гамата токени измервателни трансформатори за ниско напрежение до 1000V за тип СТ-2 тип СТ-3 и тип СТ-4 НЕ СА ПОТЕНЦИАЛНА ЗАПЛАХА ЗА УВЕЛИЧАВАНЕТО ОПАСНОСТТА И РИСКОВЕТЕ ЗА ЗАМЪРСЯВАНЕ НА ОКОЛНАТА СРЕДА и класификацията на отпадъците съгласно ЗАРЕДБА №3 /2004 година за класификация на отпадъците издадена от министъра на околната среда и водите и министъра на здравеопазването, обнародвана в ДВ брой 44/25.05.2004 година

Правявам си ясна отговорна длъжност и съм отговорен за данните

Град Шабла
20.12.2012 година

ДЕКЛАРАТОР

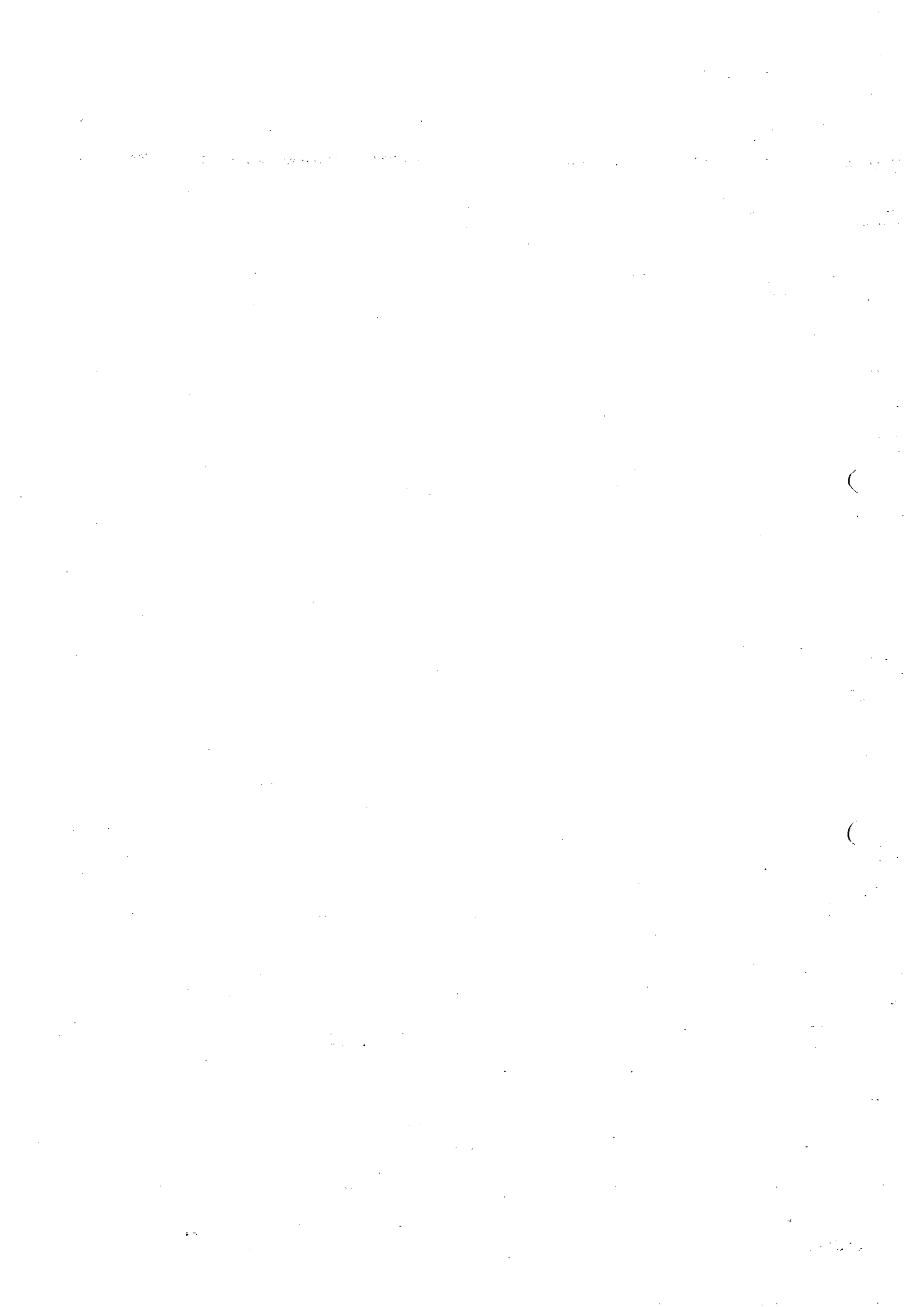
инж. П. Арнаудов



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ВЕРНО СЕРТИФИКАТ
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Наименование на материала: Токови измервателни трансформатори НН X/5 А, проходен тип

Съкратено наименование на материала: ТИТ НН X/5 А, проходни

Област: Н - Трансформаторни постове

Категория: 27 – Измервателни

J - Уредби за търговско измерване

трансформатори

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Сухи неразглобяеми токови измервателни трансформатори НН от проходен тип, в пластмасов корпус, за монтиране на закрито, с клас на точност 0,5 и обявен вторичен ток $I_{sn} = 5$ А. Токовете трансформатори са преминали през първоначална метрологична проверка и са маркирани със съответния знак, по реда и при условията на Закона за измерванията.

Използване:

Сухите токови измервателни трансформатори НН от проходен тип са предназначени за трансформиране на тока в първичните вериги във вторичен ток за захранване на токовете вериги на електромерите за търговско измерване на използваните от потребителите количества електрическа енергия и на контролно-измервателните апарати.

Съответствие на предложеното изпълнение със стандартизационните документи:

Токовете измервателни трансформатори трябва да отговарят на БДС EN 60044-1:2001 „Измервателни трансформатори. Част 1: Токови трансформатори (IEC 60044-1:1996, с промени)“ и на неговите валидни изменения и допълнения или еквиваленти.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № (или текст)
1.	Точно обозначение на типа на токовете измервателни трансформатори (ТИТ), производителя и страна на произход и последно издание на каталога на производителя	СТ-4 Елпром ЕМЗ ООД, гр.Шабла, Р България, Приложение 9.8.1

№ по ред	Документ	Приложение № (или текст)
2.	Удостоверение за одобряване на типа на ТИТ, издадено по реда и при условията на Закона за измерванията	Приложение 9.8.2
3.	Техническо описание на ТИТ, гарантирани параметри и характеристики, включително клас на изолацията, тегло и др.	Приложение 9.8.3
4.	Протоколи от типови изпитвания на ТИТ на английски или български език, проведени от независима изпитвателна лаборатория с приложени резултати от изпитванията	Приложение 9.8.4
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4.	Типовите изпитвания на ТТ са направени в Български Институт по Метрология
6.	Информация за провежданите от производителя контролни (рутинни) изпитвания	Приложение 9.8.6
7.	Чертежи с размери	Приложение 9.8.7

Технически данни

1. Параметри на електрическата разпределителна мрежа

№ по ред	Параметър	Стойност
1.1	Обявено напрежение	400/230 V
1.2	Максимално работно напрежение	440/253 V
1.3	Обявена честота	50 Hz
1.4	Електроразпределителна мрежа	4 - проводникова (L1, L2, L3, PEN)
1.5	Схема на разпределителната мрежа	TN-C
1.6	Ток на късо съединение	15 kA

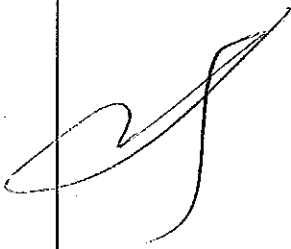
2. Характеристики на работната среда и място на монтиране

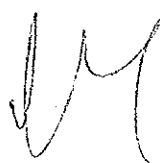
№	Характеристика /място на монтиране	Стойност/описание

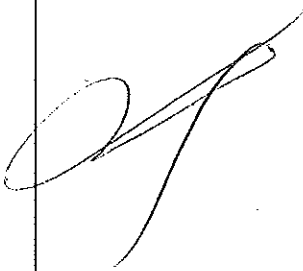

по ред		
2.1	Максимална околна температура	+ 40°C
2.2	Минимална околна температура	Минус 5°C
2.3	Относителна влажност	До 95 %
2.4	Замърсяване с прах, пушек, агресивни газове и пари	Умерено
2.5	Надморска височина	До 1000 m
2.6	Място на монтиране	В комплектни комутационни устройства (ККУ) - главни трансформаторни и главни разпределителни табла, електромерни табла и др.

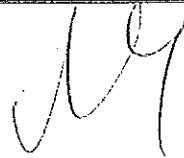
3. Конструктивни характеристики и др. данни.


№ по ред	Характеристика	Изискване	Гарантирано предложение
3.1	Конструкция	а) ТИТ трябва да бъде от проходен тип с отвор за преминаване на тоководещата част на първичната верига - правоъгълни шини или изолирани проводници	ДА, ТИТ от проходен тип с отвор за преминаване на тоководещата част на първичната верига - правоъгълни шини или изолирани проводници

№ по ред	Характеристика	Изискване	Гарантирано предложение
		<p>б) Корпусът на ТИТ трябва да бъде: неразглобяем, изграден от синтетична твърда изолация; или разглобяем, надеждно осигурен против разглобяване в процеса на експлоатация и защитен с два противоположно разположени холограмни, саморазрушаващи се при разлепване стикери, съдържащи фабричния номер на трансформатора.</p> <p>(Да се посочи)</p>	<p>разглобяем, надеждно осигурен против разглобяване в процеса на експлоатация и защитен с два противоположно разположени холограмни, саморазрушаващи се при разлепване стикери, съдържащи фабричния номер на трансформатора.</p>
3.2	Вторични намотки - брой и предназначение	Една вторична намотка за целите на измерването	ДА
3.3	Монтиране	<p>а) ТИТ трябва да позволяват монтиране в произволно положение.</p> <p>б) ТИТ трябва да бъдат снабдени с приспособление за механично закрепване към тоководещата част на първичната верига.</p> <p>в) ТИТ трябва да бъдат снабдени с приспособления за закрепване към монтажна плоча посредством винтови съединения.</p> <p>г) Приспособленията за закрепване трябва да бъдат устойчиви на корозия.</p>	<p>ДА</p> <p>ДА</p> <p>ДА</p> <p>ДА</p>
3.4	Клемен блок за свързване на вторичните вериги	а) Клемният блок трябва да бъде от винтов тип с възможност за свързване на многожични проводници на вторичните вериги със сечение до 4 mm ² .	ДА




№ по ред	Характеристика	Изискване	Гарантирано предложение
		б) Всеки извод на клемния блок трябва да бъде с min два винта, гарантиращи ниски стойности на контактното съпротивление.	ДА
		в) Клемният блок трябва да бъде защитен с капак с възможност за пломбиране.	ДА 
		г) Клемният блок и резбовите съединения трябва да бъдат изработени от подходящи некорозиращи метали или метални сплави.	ДА
3.5	Маркиране на обявените стойности	а) Токовете измервателни трансформатори трябва да бъдат маркирани с информация за обявените стойности, нанесена върху корпуса или табелка от устойчив на корозия материал или самозалепващо се фолио, съгласно изискванията на т. 11.7 от БДС EN 60044-1 или еквивалент.	ДА, информацията е лазерно гравирана върху корпуса
		б) Маркировката трябва да бъде нанесена трайно и четливо по начин, по който да не може да бъде заличена или променена.	ДА, маркировката е лазерно гравирана върху кутийката
		в) Табелката трябва да бъде фиксирана здраво към корпуса на токовете измервателни трансформатори, без възможност за подмяна или запазване на целостта и при демонтиране.	ДА, лазерно гравирана
		г) Табелката от самозалепващо се фолио трябва да бъде: саморазрушаваща се при разлепване; или защитена с прозрачна капачка с възможност за пломбиране. (Да се посочи)	лазерно гравирана




№ по ред	Характеристика	Изискване	Гарантирано предложение
		д) Препоръчително е върху изолацията на токовете измервателни трансформатори допълнително да бъде маркиран с вдлъбнат или релефен печат обявения коефициент на трансформация.	ДА , лазерно гравирани , обявения коефициент на трансформация.
3.6	Маркиране на изводите 	Изводите на ТИТ трябва да бъдат маркирани трайно и четливо съгласно изискванията на т. 10.1 от БДС EN 60044-1 или еквивалент.	ДА, Изводите на ТИТ са маркирани трайно и четливо съгласно изискванията на т. 10.1 от БДС EN 60044-1
3.7	Първоначална проверка и знаци за удостоверяване (съгласно разпоредбите на Закона за измерванията)	а) Токовете измервателни трансформатори трябва да бъдат доставени след извършване на първоначална метрологична проверка.	ДА
		б) Първоначална метрологична проверка трябва да бъде удостоверена със знак за първоначална проверка и копието на протокола от проведените изпитвания.	Холограмни стикери и протокол от изпитания
3.8	Транспортна опаковка	ТИТ трябва да бъдат опаковани в подходяща опаковка предпазваща ги от атмосферни влияния и механични повреди.	ДА
3.9	Експлоатационна дълготрайност	min 25 години	25 години

4. Общи технически параметри

№ по ред	Параметър	Изискване	Гарантирано предложение
4.1	Най-високо напрежение за	min 0,72 kV	0,72 kV

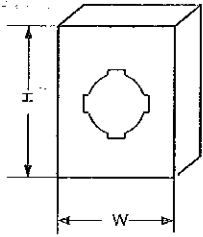


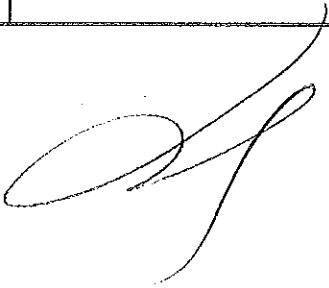

	съоръженията - Um	(ефективна стойност)	
4.2	Обявено издържано напрежение с промишлена честота на изолацията	min 3 kV (ефективна стойност)	3 kV
4.3	Клас на точност	0,5	0,5
4.4	Обявен продължителен термичен ток	min 1,2 x Ipn	1,2 x Ipn
4.5	Номинален коефициент на безопасност - FS	5	5

5. Технически параметри на токовете измервателни трансформатори

5.1 Токов измервателен трансформатор НН, проходен тип, 1200/5 А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 27 1410		СТ-4	
Наименование на материала		Токов измервателен трансформатор НН, проходен тип, 1200/5 А	
Съкратено наименование на материала		ТИТ НН, проходен - 1200/5 А	
№ по ред	Параметър	Изискване	Гарантирано предложение
1.	Обявен първичен ток, Ipn	1200 А	1200 А
2.	Обявен първичен ток на термична устойчивост - 1 sec, Ith	min 72 kA	72 kA
3.	Обявен първичен ток на динамична устойчивост, Idyn	min 180 kA	180 kA
4.	Обявен вторичен ток, Isn	5 А	5 А
5.	Обявен коефициент на трансформация	1200/5 А	1200/5 А
6.	Обявен вторичен товар	min 5 VA	5 VA

7.	Габаритни размери 	$H = \max 142 \text{ mm}$ $W \approx \max 124 \text{ mm}$	$H = 134 \text{ mm}$ $W = 122 \text{ mm}$
8.	Светъл отвор за тоководещата част на първичната верига за: правоъгълно сечение / кръгло сечение	$\min 60,5 \times 10,5 \text{ mm} /$ $2 \times 50,5 \times 10,5 \text{ mm} / \varnothing 44$	ДА до $81 \times 11 \text{ mm} / \varnothing 73$
9.	Тегло, kg	Да се посочи	0,920кг.






ABB

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ул. "България" № 10
1113 СОФИЯ, БЪЛГАРИЯ
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www.electrotech.bg



Management System
ISO 9001:2008
OHSAS 18001:2007



Management System
ISO 14001:2004

ПРИЛОЖЕНИЕ 9.8.1

Точно обозначение на типа на токовете измервателни трансформатори (ТИТ), производителя и страна на произход и последно издание на каталога на производителя

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

" ЕЛПРОМ ЕМЗ " ООД ГРАД ШАБЛА

ГАМА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ НИИ ТИП СТ-1; СТ-2; СТ-3 И СТ-4

ТЕЛЕФОНИ ЗА КОНТАКТИ:

Управление 05743 / 48 - 68

Е.сметководител 05743 / 42 - 84

Тел. Офис 05743 / 41 - 84

Факс/телекс/факс 05743 / 50 - 20

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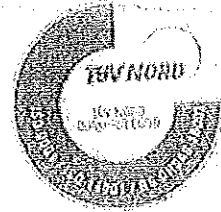


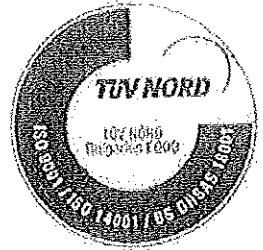
таблица 1.

Тип Type	Проводно отношение I _{pn} /I _{sn} Rated current ratio A/A	Най-високо работно напряжение Rated voltage power network KV	Клас на точност Class of accuracy %	Номинална мощност Sn Rated power VA	Номинален ток на терм. устойчивост Rated short-time thermal stability I _{th} , KA	Номинален ток на дин. устойчивост Rated short-time dynamic stability I _{dyn} , KA	Номинален коэффициент на безоп. Security factor for apparatus Fs	Заводски шифър Serial number
1	2	3	4	5	6	7	8	9
СТ-1 паралел и вторич	30 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1210302 - XXXX
	50 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1210502 - XXXX
	75 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1210762 - XXXX
	100 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1211002 - XXXX
	150 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1211502 - XXXX
СТ-2 шина 30x10 40x10 кабел φ36	150 / 5	0,72	0,5	5	60 Ipn	2,5 Ith	5; 10	1221505 - XXXX
	200 / 5	0,72	0,5	5	60 Ipn	2,5 Ith	5; 10	1222005 - XXXX
	280 / 5	0,72	0,5	5	60 Ipn	2,5 Ith	5; 10	1222505 - XXXX
	300 / 5	0,72	0,5	6	60 Ipn	2,5 Ith	5; 10	1223005 - XXXX
СТ-3 шина 30x10 40x10 φ36	300 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1233005 - XXXX
	400 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1234005 - XXXX
	600 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1235005 - XXXX
	800 / 5	0,72	0,2; 0,5; 0,5S	5; 10	60 Ipn	2,5 Ith	5; 10	1236005 - XXXX
СТ-3 шина 60x10 φ48	600 / 5	0,72	0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1235005 - XXXX
	600 / 5	0,72	0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1236005 - XXXX
	750 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1237505 - XXXX
	800 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1238005 - XXXX
СТ-4 за шина 60x10 или кабел φ73	300 / 5	0,72	0,5; 0,5S	5	60 Ipn	2,5 Ith	5; 10	1243005 - XXXX
	400 / 5	0,72	0,5; 0,5S	5	60 Ipn	2,5 Ith	5; 10	1244005 - XXXX
	500 / 5	0,72	0,5; 0,5S	5	60 Ipn	2,5 Ith	5; 10	1245005 - XXXX
	600 / 5	0,72	0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1246005 - XXXX
	600 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1247505 - XXXX
	750 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1248005 - XXXX
	800 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1249005 - XXXX
	1000 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1241005 - XXXX
	1200 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1241505 - XXXX
	1250 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1241505 - XXXX
	1500 / 5	0,72	0,2; 0,5; 0,5S	5; 10; 15	60 Ipn	2,5 Ith	5; 10	1241505 - XXXX

УПРАВИТЕЛ

ИГОСЛАВИЧАНОВ

“ЕЛПРОМ ЕМЗ” ООД град ШАБЛА



ИНСТРУКЦИЯ ЗА МОНТАЖ И ВЪВЕЖДАНЕ В ЕКСПЛОАТАЦИЯ НА ТОКОВИ ИЗМЕРИТЕЛНИ ТРАНСФОРМАТОРИ за НН за тип СТ-2, СТ-3, СТ-4,

1. Място на монтаж : на закрито.
2. Начин на свързване : Първичната намотка на токовите трансформатори се свързва последователно към захранващите проводници на монтажа, а релетата и апаратите - последователно на вторичната намотка.
3. Експлоатационни условия на работа : При ползване на токовите трансформатори трябва да се спазват следните условия :

- А/ Трансформаторите да се монтират в закрити помещения.
- Б/ Съединителните проводници да са свързани добре към източника и консуматора. Когато изводите са на винтове, съединителните проводници трябва да се затегнат здраво между две месингови шайби или кабелна обувка.
- В/ Токът, който се черпи от трансформатора, по специално мощността на трансформатора, да не е по-голяма от мощността, посочена на табелката. Претоварването на трансформаторите се ограничава от допустимите температури на загряване на изоляциите.
- Г/ Токовите трансформатори трябва да работят при непрекъснат или периодичен контрол.
- Д/ При обслужване на токовите трансформатори е задължително да се спазва следното условие:

**ПРИ ВКЛЮЧЕНА ВЪВ ВЕРИГАТА ПЪРВИЧНА НАМОТКА
ВТОРИЧНАТА НАМОТКА НА ТРАНСФОРМАТОРА
НЕ ТРЯБВА ДА ОСТАВА ОТВОРЕНА !**

Когато се налага прекъсване на вторичната верига, вторичните клеми на трансформаторите трябва да се свързват на късо с проводник със сечение 2,5 кв. мм. Във вторичната верига на токов трансформатор предпазители не се поставят.

В/ При работа на трансформатора единият извод на вторичната намотка се заземява.

4. Безопасност и хигиена на труда : За осигуряване на безопасна работа на обслужващия персонал е необходимо да се спазват следните условия:

А/ Единият извод на вторичната намотка да се заземи.



Б/ При включване на първичната намотка във веригата, вторичната намотка да не се оставя отворена.

В/ След извършване на монтажа на трансформаторите към таблата и уредите, върху клемите НН на първичната намотка, да се постави предпазна капачка и да се пломбира.

Г/ При ревизия на трансформаторите, същите да не са под напрежение.

Д/ При проверка на трансформаторите откъм ниската страна обслужващия

персонал да работи с лични предпазни средства.

При добри условия на работа и при периодичен контрол, трансформаторите могат да работят продължително време без повреда.

Б. Опаковка, транспорт и съхранение : Трансформаторите се поставят в специални кутии от картон - велпана. Транспортират се във всякакъв вид транспортни средства.

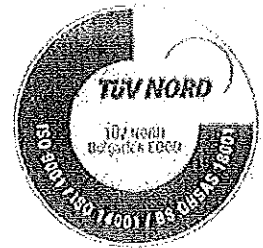
ПРИ НЕСПАЗВАНЕ НА НАСТАВЛЕНИЯТА, ДАДЕНИ В НАСТОЯЩАТА ИНСТРУКЦИЯ, ЗАВОДЪТ ПРОИЗВОДИТЕЛ НЕ ПРИЕМА РЕКЛАМАЦИИ, НАПРАВЕНИ В ГАРАНЦИОННИЯ СРОК НА ИЗДЕЛИЕТО.



ПОДПИС И ПЕЧАТ:

УПРАВИТЕЛ (инж. ДИМИТЪР АРНАУДОВ)

Дата: 09.02.2012 година



„ЕЛПРОМ ЕМЗ“ ООД град ШАБЛА

ИНСТРУКЦИЯ ЗА СЪХРАНЕНИЕ И ТРАНСПОРТ НА
ТОКОВИ ИЗМЕРИТЕЛНИ ТРАНСФОРМАТОРИ за НН за тип СТ-2, СТ-3, СТ-4,

1. Опаковка: токовете измервателни трансформатори тип СТ-2, тип СТ-3 и тип СТ-4 се поставят в специални кашони от картон - велпане по 12/дванадесет/ броя трансформатори в кашон, 56/петдесет и шест/ кашона подредени върху европалет правят една транспортна единица.
2. Съхранение : токовете измервателни трансформатори трябва да се съхраняват в закрити помещения и складове.
3. Транспорт: токовете измервателни трансформатори се транспортират във всякакъв вид закрити транспортни средства.

ПРИ НЕСПАЗВАНЕ НА НАСТАВЛЕНИЯТА, ДАДЕНИ В НАСТОЯЩАТА ИНСТРУКЦИЯ, ЗАВОДЪТ ПРОИЗВОДИТЕЛ НЕ ПРИЕМА РЕКЛАМАЦИИ, НАПРАВЕНИ В ГАРАНЦИОННИЯ СРОК НА ИЗДЕЛИЕТО.

ПОДПИС И ПЕЧАТ:

(инж. ДИМИТЪР АУНАУЦОВ)

УПРАВЛЕНИЕ

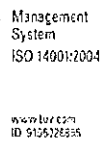
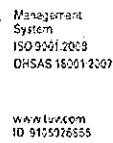
Дата: 09.02.2012 година



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ТОВ "ЕЛЕКТРОТЕХНИКА"

ТОВ "ЕЛЕКТРОТЕХНИКА" - България
Улица "Св. Кирил и Методи" № 10
1000 София, България
Тел: +359 2 961 0000; факс: +359 2 961 0001
www.electrotech.bg



ПРИЛОЖЕНИЕ 9.8.2

Удостоверение за одобряване на типа на ТИТ, издадено по реда и при условията на Закона за измерванията

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



РЕПУБЛИКА
БЪЛГАРИЯ

ДЪРЖАВНА АГЕНЦИЯ
ЗА МЕТРОЛОГИЯ И
ТЕХНИЧЕСКИ НАДЗОР
STATE AGENCY FOR METROLOGY
AND TECHNICAL SURVEILLANCE



УДОСТОВЕРЕНИЕ
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ
Measuring Instrument Type-approval Certificate

№ 06.04.4547

Издадена на:
Issued to:

"ЕЛПРОМ-ЕМЗ" ООД, 9680 Шабла,
обл. Добричка, ул. "Нефтяни" № 38

На основание на:
In Accordance with:

чл. 32, арт. 1 от Закона за измерванията
(ЗЗ, бр. 46 от 2002 г.)

Относно:
In Respect of:

Три фаза токони измервателни трансформатори, тип С1-X

Производител:
Manufacturer:

"ЕЛПРОМ-ЕМЗ" ООД, гр. Шабла

Знак за одобрен тип:
Type Approval Mark:



Технически и метрологични
характеристики:
*Technical and metrological
characteristics:*

приложение, различна част от настоящото удостоверение
за одобрен тип средство за измерване

Срок на валидност:
Valid until:

03.04.2016 г.

Вписана е и регистрана
одобренията за използване
типове средства за
измерване под №:
Reference №:

4547

Дата на издаване на
удостоверението за одобрен
тип:
Date:

03.04.2006 г.

ПРЕДСЕДАТЕЛ



Върно с оригинала

ВЪРНО С ОРИГИНАЛА

Приложение към удостоверение за одобрен тип № 06.04.4547

Издано на: "ЕЛПРОМ-ЕМЗ" ООД, гр. Шабля

Относно: гама токови измервателни трансформатори, тип СТ-х

1. Описание на типа:

Токовете трансформатори тип СТ-х са предназначени за измерване на ток и за защита на разпределителни съоръжения (уредби) във вътрешно изпълнение.

Токовете трансформатори тип СТ-х се състоят от торондаден магнитопровод с първична и вторична намотка, поместени в кутия от пластмаса с тена на възпламеняемост съгласно ТЕС 707-V-0.

Изолацията спрямо магнитопровода и намотките е суха е клас на токоустойчивост В.

Трансформаторите тип СТ-х са предназначени за експлоатация при надморска височина до 1000 m за закрит монтаж при температура на въздуха от минус 5° C до + 40° C и относителната влажност на въздуха до 70 % за условия на умерен климат.

1.1. Технически и метрологични характеристики:

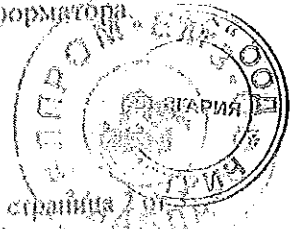
Номинален първичен ток, А	СТ - 1	30, 50, 75, 100, 150
	СТ - 2	200, 250, 300
	СТ - 3	400, 500, 600
Номинален вторичен ток, А		5
Клас на точност	СТ - 1	0,2; 0,5
	СТ - 2	0,5
	СТ - 3	0,5
Коефициент на безопасност - Ps		5, 10
Номинална мощност, VA	СТ - 1	5, 10
	СТ - 2	5, 10
	СТ - 3	5, 10, 15
Максимално работно напрежение, kV		0,72

Забелужка: * Номиналната мощност 10 VA не се отнася за трансформатори с токово отношение 150/5 А.

1.2. Означаване на типа:

Означението на типа е СТ-х (СТ-1, СТ-2 и СТ-3):

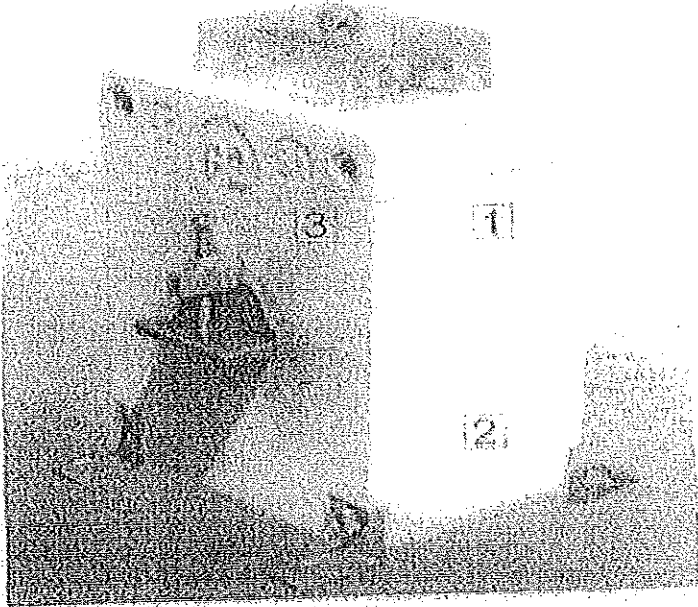
Параметрите като клас на точност, първичен ток, вторичен ток, номинално напрежение и коефициент на сигурност са посочени на табелката на трансформатора.



ВЯРНО С ОРГИНАЛА

Приложение към удостоверение за одобрен тип № 06.04.4547

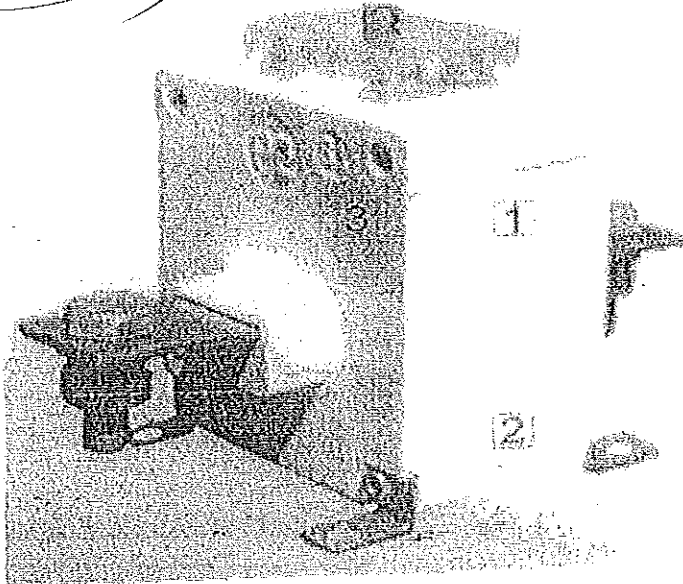
2. Схеми на местата за поставяне на знаците, удостоверяващи резултатите от контрола и места за изпитване.



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- 1 - Знак за първоначална проверка (марка за залепване)
- 2 - Знак за последваща проверка (марка за залепване)
- 3 - Знак за одобрен тип

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- 1 - Знак за първоначална проверка (марка за залепване)
- 2 - Знак за последваща проверка (марка за залепване)
- 3 - Знак за одобрен тип



Всичко е оригинално

ВАРНО С ОРИГИНАЛА

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Зримено



РЕПУБЛИКА
БЪЛГАРИЯ

БЪЛГАРСКИ ИНСТИТУТ ПО МЕТРОЛОГИЯ

BULGARIAN INSTITUTE OF
METROLOGY

ДОПЪЛНЕНИЕ № 06.07.4547.1

КЪМ УДОСТОВЕРЕНИЕ

ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ № 06.04.4547

Measuring Instrument Type-approval Certificate-Revision 1

Издадено на:
Issued to:

"ЕЛПРОМ-ЕМЗ" ООД, 9630 Шабла,
обл. Добричка, ул. "Нефтяник" № 38

На основание на:
In Accordance with:

чл. 32, ал. 1 от Закона за измерванията
(ДВ, бр. 46 от 2002 г.)

Относно:
In Respect of:

токов измервателен трансформатор, тип СТ-х

Производител:
Manufacturer:

"ЕЛПРОМ-ЕМЗ" ООД, гр. Шабла

Технически и метрологични
характеристики:
Technical and metrological
characteristics:

приложение, неразделна част от настоящото удостоверение
за одобрен тип средство за измерване.

Срок на валидност:
Valid until:

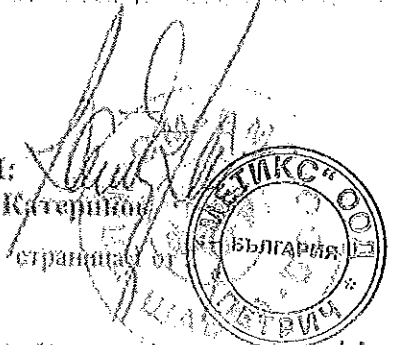
03.04.2016 г.

Средството за измерване е
вписано в регистъра на
одобренията за използване
типове средства за
измерване под №:
Reference №:

4547

Дата на издаване на
допълнението към
удостоверението за одобрен
тип:
Date:

17.07.2006 г.



Вярно а оригинала

ВАРНО С ОРИГИНАЛА

Приложение А

Приложение към Допълнение № 06.07.4547.1 към удостоверение № 06.04.4547

Изработено на: "ЕЛПРОМ-ЕМЗ" ООД, гр. Шабля

Обект: токов измервателен трансформатор, тип СТ-х

Описание на допълнението

1. Към т. 1 Описание на типа, се добавя:

Токовите трансформатори в клас на точност 0,5 S са за специални цели. Свързват се с електромери, които измерват стойности на тоци между 50 mA и 6 A, което е от 1 % до 120 % от номиналния ток на трансформатори ~ 5 A.

Токовете и загубата гръзва при 1 % от номиналния ток не превишават стойностите, посочени в стандарт БДС EN 60044-1:2001.

2. Към т. 1.1 Технически и метрологични характеристики:

2.1 Включва се токов измервателен трансформатор тип СТ-4 със следните метрологични характеристики:

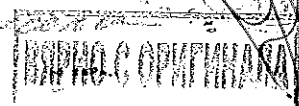
Номинален първичен ток, A	750, 800, 1000, 1200, 1250 и 1500
Номинален вторичен ток, A	5
Клас на точност	0,3 и 0,5 S
Коефициент на безопасност - Fs	5, 10
Номинална мощност, VA	5, 10 и 15
Максимално работно напрежение, kV	0,72

2.2 Включва се клас на точност 0,5 S за трансформатори тип СТ-1, тип СТ-2 и тип СТ-3;

2.3 Отпада забележката.

Верно е

с оригинала



Арименкова



РЕПУБЛИКА БЪЛГАРИЯ
БЪЛГАРСКИ ИНСТИТУТ НА МЕТРОЛОГИЯТА
РЕПУБЛИС OF BULGARIA
Bulgarian Institute of Metrology



ДОПЪЛНЕНИЕ № 13.11.4547.2

**КЪМ УДОСТОВЕРЕНИЕ
ЗА ОДОБРЕН ТИП СРЕДСТВО ЗА ИЗМЕРВАНЕ № 06.04.4547**
Measuring Instrument Type-approval Certificate-Revision 1



Издадено на
производител: „Випром ЕМЗ“ ООД, гр. Шабла
Issued to manufacturer:

На основание на: чл. 32, ал. 1 от Закона за измерванията (ДВ. бр. 46 от
In Accordance with: 2002 г., изм. бр. 08 от 05 г., изм. и доп. бр. 95 от 2005 г.)

Относно: токови измервателни трансформатори тип СТ-х
In Respect of:

Технически и метрологични характеристики: приложение, неразделна част от настоящото
Technical and metrological characteristics: удостоверение за одобрен тип средство за измерване

Срок на валидност: 03.04.2016 г.
Valid until:

Средството за измерване е вписано в регистъра на одобрените за използване типове средства за измерване под №: 4547
Reference No:

Дата на издаване на допълнението към удостоверението за одобрен тип: 04.11.2013 г.
Date:

Върно с оригинала

ПРЕДСЕДАТЕЛ
Динка Иванова
РЕПУБЛИКА БЪЛГАРИЯ
ИНСТИТУТ НА МЕТРОЛОГИЯТА
"ЕМЗ" ООД
БЪЛГАРИЯ
ВЕРНО С ОРИГИНАЛА

Трансформатор

Приложение към Допълнение № 13.11.4547.2 към удостоверение № 06.04.4547

Издадено на произвождател: „Елфрон ЕМЗ“ ООД, гр. Шабла

Обект: токови измервателни трансформатори тип СТ-2

Описание на допълнението към удостоверение за одобрен тип № 06.04.4547



В т. 1.1 „Технически и метрологични характеристики“ към „Номинален първичен ток, А“ в графата за СТ-2 се добавят следните стойности:

Номинален първичен ток, А	СТ-2	100; 150
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Върне с оригинал

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СТРАНИЦА 2 ОТ 4

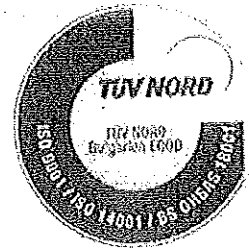
БЪЛГАРИЯ

ШАБЛА

ЕЛФРОН ЕМЗ ООД

ВЕРНО С ОРИГИНАЛ

“ЕЛПРОМ ЕМЗ” ООД град ШАБЛЯ



ТЕЛЕФОНИ ЗА КОНТАКТИ:
 Управител 05743 / 45 - 68
 Гл. счетоводител 05743 / 42 - 84
 Търг. Отдел 05743 / 41 - 84
 Факс/ген. секретар 05743 / 50 - 20
 E-mail : elpromemz@mbos.infotel.bg

ТЕХНИЧЕСКО ОПИСАНИЕ

ГАМА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ
 тип СТ-1, СТ-2, СТ-3 и СТ-4 за НН до 1000V
 ПРОИЗВОДСТВО НА “ ЕЛПРОМ ЕМЗ ” ООД град ШАБЛЯ

Токови измервателни трансформатори тип СТ-1; тип СТ-2, тип СТ-3 и тип СТ-4 са за ниско напрежение до 1000V за вътрешен монтаж с клас на точност 0.2; 0.5 или 0.5S и номинална мощност до 50VA в диапазона от номинални токове до 3000A съгласно ВДС EN 60044-1:2001 и IEC 60044-1:1999

■ Тип СТ-1 се състои от тороидален магнитопровод с първична и вторична намотки, поместени в кутийка от пластмаса изработена от пластмаса тип Rosap - B4235 с клас на възпламеняемост съгласно IEC 707 - V-0.

Произвежданите токови трансформатори са в диапазона от 30/5 A до 150/5 A с клас на точност 0.2, 0.5 или 0.5S с мощност 5VA и 10VA.

• Тип СТ-2 Тип, СТ-3 и Тип СТ-4 са проходни типове токови измерителни трансформатори пригодени съответно за шина или кабел - състоят се от тороидален магнитопровод с вторична намотка, поместени в кутийка от пластмаса изработена от пластмаса тип Rosap - B4235 с клас на възпламеняемост съгласно IEC 707 - V-0.

Произвежданите токови трансформатори са в диапазона от 150/5A до 2000/5A с клас на точност 0.5 или 0.5S и мощност 5VA; 10VA и 15VA.

ТЕХНИЧЕСКИ ДАННИ Тип СТ-1, Тип СТ-2, Тип СТ-3 и Тип СТ-4

Условия на работа: Токовете измервателни трансформатори за средно напрежение се монтират на закрито при температура на околната среда от -35С до +45С и височина над морското равнище до 1000м.

- | | |
|--|------------------|
| 1. Номинално напрежение | - до 0,75 kV |
| 2. Честота | - 50 Hz |
| 3. Номинален първичен ток I_{pn} | - до 2000 A |
| 4. Номинален вторичен ток I_{sn} | - 5 A |
| 5. Клас на точност на ядрото за мерене | - 0,2, 0,5, 0,5S |
| 6. Номинална мощност | - 5, 10, 15VA |
| 7. Номинален ток на термична устойчивост I_{th} , kA | - 60 I_{pn} |
| 8. Номинален ток на динамична устойчивост I_{dyn} , kA | - 2,5 I_{th} |
| 9. Номинален коефициент на безопасност K_s | - 5 или 10 |
| 10. Маса, в кг в зависимост от преводното отношение от | - 0,485 до 1,070 |
| 11. Изолация - суха, клас на топлоустойчивост | B |

Стандартизирани документи: Изделието отговаря на БДС EN 60044-1:2001 и IEC 60044-1:1999.

При всичките произведени от "ЕЛПРОМ ЕМЗ" ООД град Шабла токови измервателни трансформатори е предвидена възможност за plombиране както на кутията на трансформатора с цел предотвратяване на неправилен достъп до матнитопровода и самите намотки, така и на предназначата капачка, която предпазва клемите на вторичната намотка на трансформатора.

УПРАВИТЕЛ :

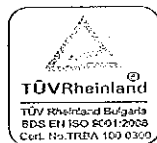
/ инж. Д. Абрамидов



Микромултка

ТОВ "Микромултка" (MicroMolts Ltd)
булевард "Св. Кирил и Методий" № 10, гр. София
тел: 00359 2 948 0163; факс: 00359 2 948 0162
e-mail: info@micromolts.com
булевард "1000 г.л." (Bulgarian Boulevard) № 10
тел: 00359 2 948 0163; факс: 00359 2 948 0162
e-mail: info@micromolts.com

ТОВ "МИКРОМУЛТКА" АДМИНИСТРАТИВНО-ТЕХНИЧЕСКОЕ ОТДЕЛЕНИЕ, БУЛЕВАРД "СВ. КИРИЛ И МЕТОДИЙ" № 10



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OHSAS 18001:2007
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ID: 9105926355

ПРИЛОЖЕНИЕ 9.8.4

Протоколи от типови изпитвания на ТИТ на английски или български език, проведени от независима изпитвателна лаборатория с приложени резултати от изпитванията

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

БЪЛГАРСКИ ИНСТИТУТ ПО МЕТРОЛОГИЯ

Главна дирекция Мерки и измервателни уреди
отдел "Изследване на типа на средства за измерване"
сектор "Електрични величини"
София, бул. Г.М.Димитров 52 Б, тел. 873-52-98.

ПРОТОКОЛ ОТ ИЗПИТВАНЕ

№ 19-ЕВ / 13.07.2006 г.

1. **Обект на изпитването:** Токов измервателен трансформатор тип СТ- X
2. **Номер и дата на заявката:** АУ-03-654/27.06.2006 г.
3. **Заявител:** "ЕЛПРОМ - ЕМЗ" ООД гр. Шабла
4. **Производител:** "ЕЛПРОМ - ЕМЗ" ООД гр. Шабла
5. **Метод на изпитване:** БДС EN 60044-1 Измервателни трансформатори
Част 1: Токови трансформатори.
6. **Период на изпитване:** 07.07.2006 г. до 14.07.2006 г.
7. **Изпитани образци:** ф. № 20218, 33063, 29967, 29477, 34805, 32820

8. Описание на типа:

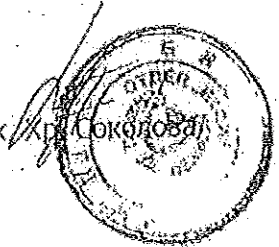
Гамата измервателни токови трансформатори тип СТ-х са за мрежи ниско напрежение.

Токовите трансформатори тип СТ-1 се състоят от тороидален магнитопровод с първична и вторична намотка, а тип СТ-2, тип СТ-3 и тип СТ-4 са проходен тип трансформатори, пригодени за шина или кабел, с вторична намотка.

Резултатите в протокола се отнасят само за изпитваните образци.

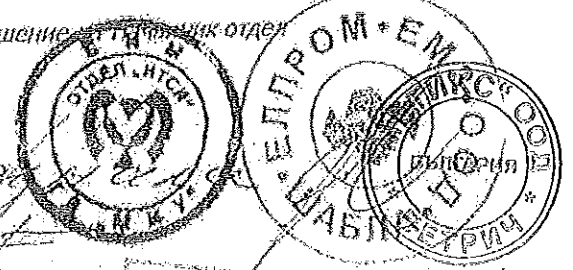
Началник отдел ИТСИ:

/инж. Христо Соколов/



Протокола може да бъде разпечатван единствено и само с разрешение на началника на отдела "Изследване на типа на средствата за измерване"

Върна с оригинала



ВЕРНО С ОПРИГИНАЛА

9. Технически и метрологични характеристики:

Тип на трансформатора	СТ-1	СТ-2	СТ-3	СТ-4
Номинален първичен ток, А	30, 50, 75, 100, 150	200, 250, 300	400, 500, 600	1200, 1250, 1500
Номинален вторичен ток, А	5			
Клас на точност	0,5 S			
Максимално работно напрежение, kV	0,72			
Честота, Hz	50			
Номинална мощност, VA	5, 10	5, 10	5, 10, 15	5, 10, 15

10. Технически средства използвани при изпитването:

10.1. Уредба за проверка на токови трансформатори тип АИТ ф. № 45/1972 с еталонен трансформатор тип Т1 50 ф. № 7210453, свидетелство за калибриране № 037-ЕЕИ/ 16.03.2005 год.

10.2. Уредба за изпитване на диелектрична якост тип РЕО 3/50 ф. № 671897308

10.3. Мегаомметър тип Ф 41/2, ф. № 62862.

11. Резултати от изпитванията:

11.1. Проверка на маркировката

11.1.1. Маркировка на изводите –

БДС EN 60044-1
т. 10.1.1 и 10.1.2

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.

11.1.2 Означение на полярностите –

БДС EN 60044-1
т. 10.1.3

Протоколи № 01+ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.

11.2. Маркировка на табелките с технически данни –

БДС EN 60044-1
т. 10.2 и т. 11.7

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.

Съгласно с оригинала



11.3. Проверка на диелектричната якост на първичната намотка – /3 kV за 60 s/

БДС EN 60044-1
т. 5.1.4

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.



11.4. Проверка на диелектричната якост на вторичната намотка – /3 kV за 60 s/

БДС EN 60044-1
т. 5.1.4

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.

11.5. Определяне грешките на трансформаторите –

БДС EN 60044-1
т.11.2

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.
Протокол № 12/12.07.2006 г.

11.6. Проверка – коефициент на безопасност –

БДС EN 60044-1
т.11.6

Протоколи № 01÷ 03 /10.07.2006 г.
Протоколи № 04÷ 06 /11.07.2006 г.

Присъствали на изпитването:

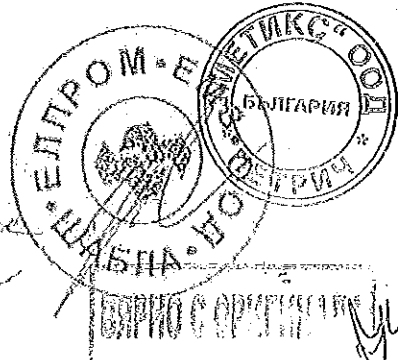
Младши експерт:

/инж. Р. Малинова/

Началник сектор "ЕВ":

/инж. Л. Сотирова/

Свързано с оригинала



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145 66743; (02) 80305 175 0000
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ТОВ "ТЕХНИЧЕСКО ИЗПЪЛНЕНИЕ БЪЛГАРИЯ"
145 66743; (02) 80305 175 0000
www.tuv.com



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ID: 9105026585



Management System
ISO 14001:2004
www.tuv.com
ID: 9105126555

ПРИЛОЖЕНИЕ 9.8.6

Информация за провежданите от производителя контролни (рутинни) изпитвания

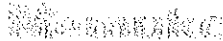
С настоящето декларирам съответствието на предлаганото изпълнение с
изискванията
на техническата спецификация

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



булевард „България“ 104, София 1000
Тел: 00359 02 945 60743; Факс: 00359 02 945 60732
www.tuvrheind.com

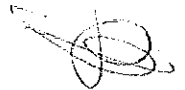


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ID: 915526555

ПРИЛОЖЕНИЕ 9.8.7



Чертежи с размери

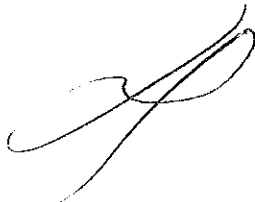
С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

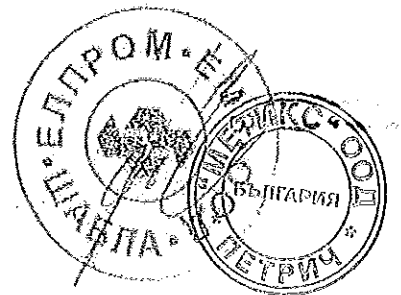
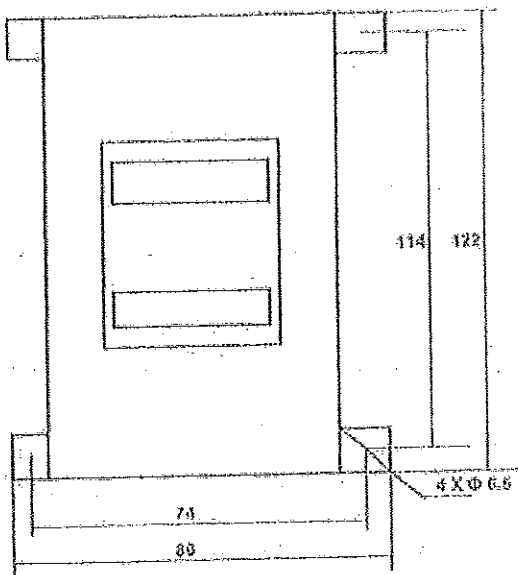
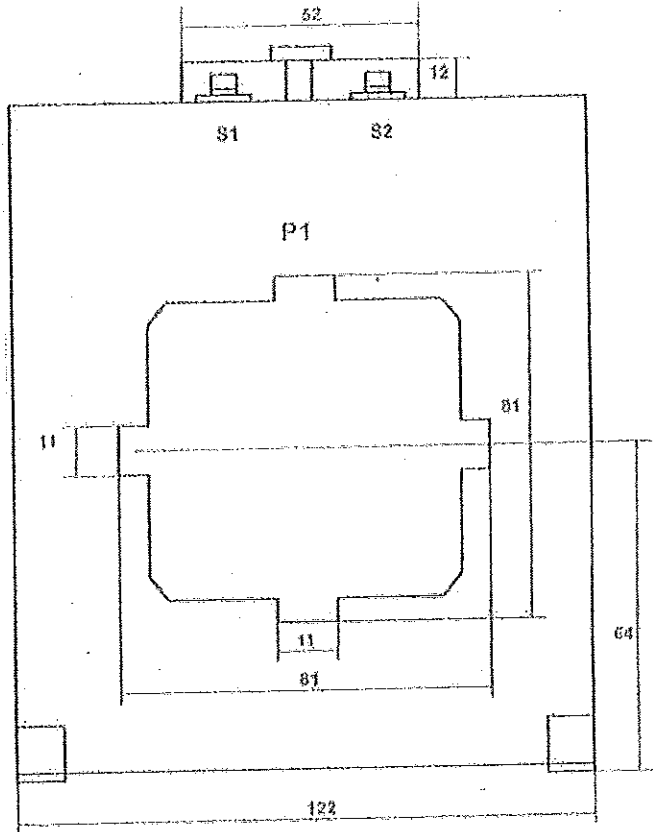
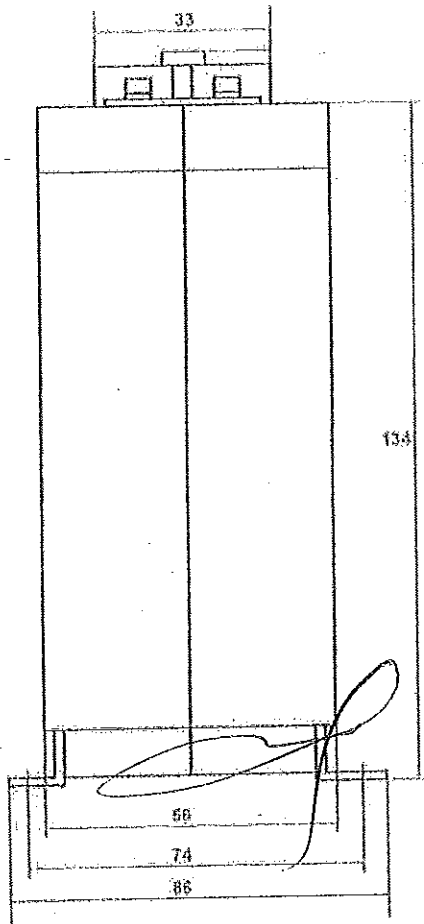
РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**



ПРИСЪЕДИНИТЕЛНИ РАЗМЕРИ ЗА ТОКОВИ ИЗМЕРВАТЕЛНИ ТРАНСФОРМАТОРИ

тип СТ-4 включващи преводните отношения 800/5А, 1000/5А, и 1200/5А



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Наименование на материала: Щепселни кабелни глави за КРУ за едножилни полиетиленови кабели 10 kV и 20 kV

Съкратено наименование на материала: Щепселни каб. глави за КРУ 10 kV и 20 kV

Област: Н - Електрически уредби СрН/НН

Категория: 11 - Кабелни комплекти, кабелни накрайници, клеми, конектори

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Щепселни глави за проходни изводи на компактни комплектни комутационни устройства с SF₆ изолация с външен конус. Изолиращото тяло на щепселните глави е изработено от устойчив на външни въздействия и на пропълзяване на токове по повърхността еластомерен изолационен материал на силиконова основа. В щепселните глави са включени необходимите елементи и материали за управление на разпределението на електрическото поле, за възстановяване на изолационните характеристики на свързаните кабели и за реализиране на контактното съединение.

В зависимост от типа на проходните изводи на комплектните разпределителни устройства щепселните кабелни глави се доставят в две основни разновидности: кабелни глави за проходни изводи тип „А“ - за свързване на кабелите на трансформаторното присъединение; и кабелни глави за проходни изводи тип „С“ - за свързване на входящите/изходящите кабелни линии.

Щепселните глави за проходни изводи тип „А“ се доставят с „Г“ - образна форма или прави, а щепселните глави за проходни изводи тип „С“ се доставят в две разновидности: щепселни глави с „Г“ - образна форма (условно), които се използват самостоятелно за свързване на една кабелна линия; и щепселни глави с „Т“ - образна форма, които се използват в комбинация с „Г“ - образни глави за свързване на паралелни кабелни линии на един проходен извод на КРУ (или свързване на „сандвич“).

Щепселните глави са предназначени за едножилни кабели с полиетиленова изолация с номинални напрежения U₀/U - 6/10 kV и 12/20 kV съгласно БДС HD 620 S1:2003 „Разпределителни кабели с екструдирана изолация за обявено напрежение от 3,6/6 (7,2) kV до 20,8/36 (42) kV или БДС 2581:1986 „Кабели силови за неподвижно полагане с изолация от полиетилен и химически омрежен полиетилен“.

Щепселните глави се доставят пакетирани поединично в картонена опаковка с всички необходими крепежни и монтажни елементи, материали и приспособления, вкл. грес/паста и почистващи средства. В комплектуването са включени също така и заземленията с необходимата кабелна обувка за свързване на щепселната глава към заземителния контур на разпределителната уредба.

Щепселните кабелни глави се придружава с подробна добре илюстрирана монтажна инструкция на български език и списък на монтажните елементи и материали, чиито означения съответстват на посочените в списъка.

На картонената опаковка е залепен етикет на български език със следната информация: наименованието и/или логото на производителя; наименованието и означението на щепселните кабелни глави; сечението на свързаните токопроводими жила, за които са предназначени; датата на производство; датата на изтичане на годността; и референтния номер на стандарта – (БДС) HD 629.1 S2:2006.

Използване:

Щепселните кабелни глави се използват за монтиране на едножилни кабели с полиетиленова изолация с номинални напрежения U₀/U - 6/10 kV и 12/20 kV и присъединяване към проходните изводи (бушинги) с външен конус на комплектните комутационни устройства - тип А или тип С съгласно БДС EN 50181:2001.

Съответствие на предложеното изпълнение със стандартизационните документи:

Щепселните кабелни глави за едножилни кабели с полиетиленова изолация трябва да отговарят на посочените по-долу стандарти или еквиваленти, включително на техните валидни изменения и поправки:

- БДС HD 629.1 S2:2006 "Изисквания за изпитване на аксесоари за използване със силови кабели с обявено напрежение от 3,6/6(7,2) kV до 20,8/36(42) kV. Част 1: Кабели с екструдирана изолация";
- БДС HD 629.1 S2:2006/A1:2008 "Изисквания за изпитване на аксесоари за използване със силови кабели с обявено напрежение от 3,6/6(7,2) kV до 20,8/36(42) kV. Част 1: Кабели с екструдирана изолация"; и
- БДС EN 50181:2001 „Прходни изводи щепселен тип над 1 kV до 36 kV и от 250 A до 3,15 kA за съоръжения, различни от маслени трансформатори“.
- БДС HD 620 S2:2010 „Разпределителни кабели с екструдирана изолация за обявено напрежение от 3,6/6 (7,2) kV до 20,8/36 (42) kV

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № (или текст)
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	DE250, COOPER – CAЦ, CTS 24kV/630A/EGA, Cellpack, Швейцария Приложение 9.10.1
2.	Техническо описание и чертежи с нанесени размери	Приложение 9.10.2
3.	Протоколи от типови изпитвания на английски или на български език съгласно таблица 3 от БДС HD 629.1 S2:2006, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.10.3
4.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания - заверено копие	Приложение 9.10.4
5.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение със стандартизационните документи“ по-горе	Приложение 9.10.5
6.	Инструкция за монтиране	Приложение 9.10.6
7.	Експлоатационна дълготрайност, min 20 год.	20 год.

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от изпитванията могат да бъдат и само на английски език).

Технически данни**1. Параметри на електрическата разпределителна мрежа**

№ по ред	Параметър	Стойност	
1.1	Номинални напрежения	10 000 V	20 000 V
1.2	Максимални работни напрежения	12 000 V	24 000 V
1.3	Номинална честота	50 Hz	
1.4	Брой на фазите	3	
1.5	Заземяване на звездния център	<ul style="list-style-type: none">• През активно съпротивление;• през дъгогасителна бобина; или• изолиран звезден център.	

2. Характеристики на работната среда

№ по ред	Характеристика	Стойност/място
2.1	Максимална температура на околната среда	До + 40°C
2.2	Минимална температура на околната среда	Минус 5°C
2.3	Относителна влажност	До 90 %
2.4	Надморска височина	До 1000 m
2.5	Условия на работа	На закрито

3. Общи технически параметри, характеристики и др. данни

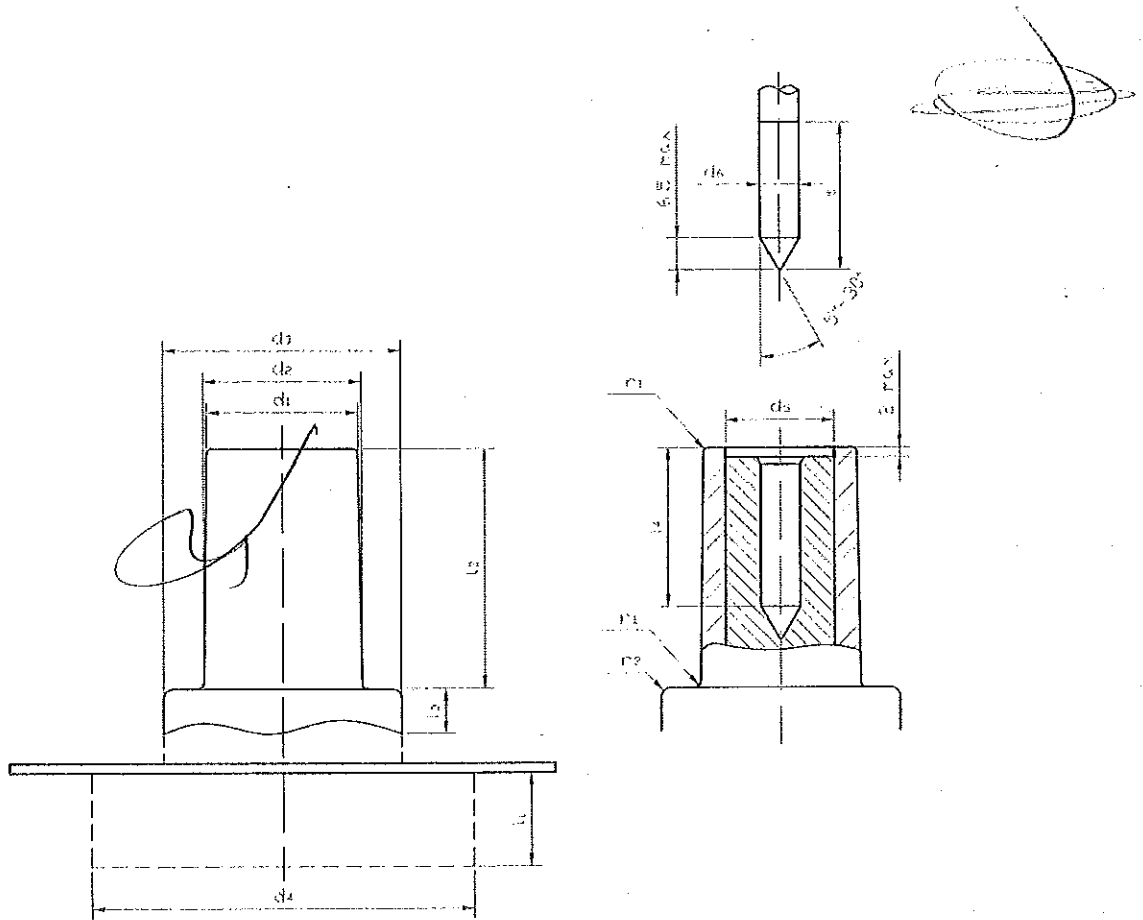
№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
----------	--------------------------	-----------	-------------------------



№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
3.1	Конструкция	Щепселните кабелни глави се състоят от изолиращо тяло и необходимите елементи и материали за: управление на разпределението на електрическото поле; възстановяване на изолационните характеристики на присъединяваните кабели; реализиране на контактното съединение; свързване на тествача апаратура за изпитване с повишено напрежение на присъединените кабели, без необходимост от демонтиране на щепселната кабелна глава; и свързване към заземителния контур.	ДА
3.1.1	Изолиращо тяло	Изолиращото тяло трябва да бъде изработено от устойчив на външни въздействия и на пропълзяване на токове по повърхността еластомерен изолационен материал на силиконова основа.	ДА
3.1.2	Изолационни и полупроводими материали	Изолационните и полупроводимите материали трябва да осигуряват съответно възстановяването на изолационните характеристики на свързаните кабели и управление на разпределението на електрическото поле.	ДА
3.1.3	Реализиране на контактното съединение	Плъзгащо щепселно съединение за проходни изводи от тип „А“ и проходен болт М16 за проходни изводи от тип „С“	ДА
3.1.4	Свързване към заземителния контур	Заземления с необходимите кабелни обувки за свързване на щепселните глави към заземителния контур на разпределителната уредба	ДА
3.2	Приложимост на щепселните кабелни глави към:		-
3.2.1	вида на кабелите	Едножилни кабели с полиетиленова изолация 10 kV и/или 20 kV	ДА

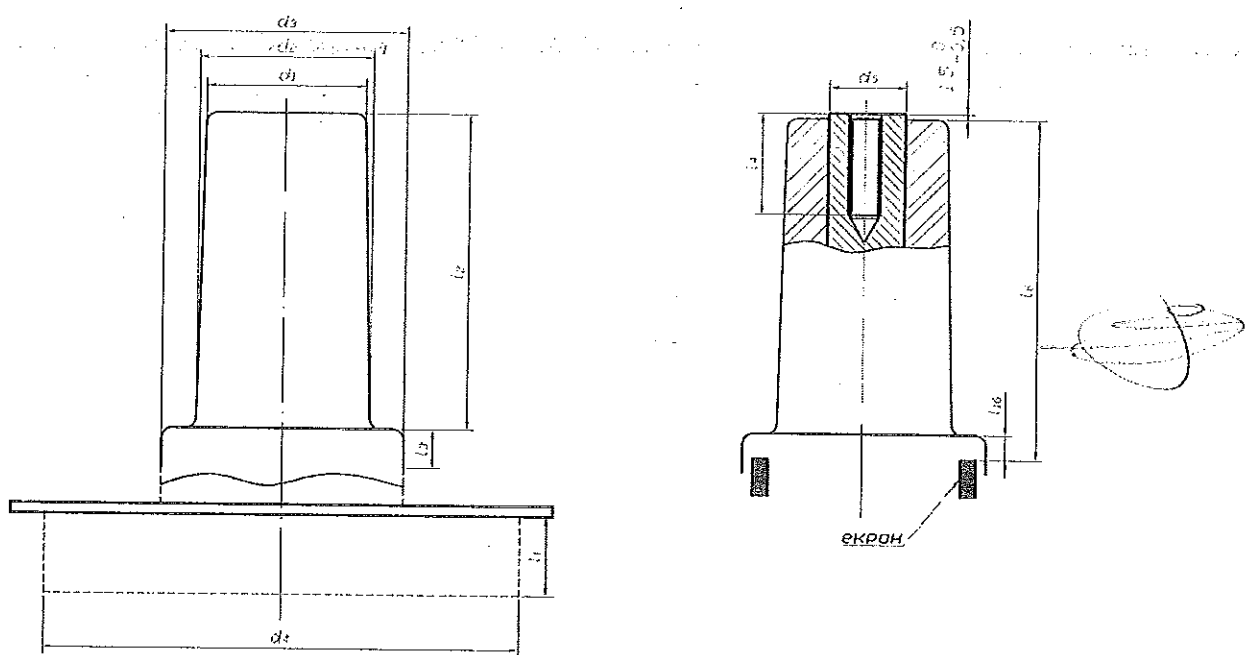
№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
3.2.1.1	конструкцията на кабелите	Съгласно БДС 2581-86, БДС HD 620 S2:2010 или еквивалент	ДА, Съгласно БДС 2581-86, БДС HD 620 S2:2010
3.2.1.2	материала на токопроводимите кабелни жила	Алуминий/Мед	ДА
3.2.1.3	конструкцията на токопроводимите кабелни жила	Плътни, многожични или многожични уплътнени	ДА
3.2.2	типа на проходните изводи на КРУ	Проходни изводи от щепселен тип с външен конус : <ul style="list-style-type: none"> • тип „А” - 250 А; или • тип „С” - 630 А. 	ДА
3.2.2.1	конструкция и размери	Съгласно табл. 1 и табл. 2 от БДС EN 50181:2001 или еквивалент и фиг. 1 и фиг. 2, както са показани по-долу.	ДА
3.3	Комплектация	Една щепселна кабелна глава, комплектувана с всички необходими крепежни и монтажни елементи и материали за присъединяване към проходните изводи на КРУ, с кабелни обувки и съоръжения за свързване на щепселната глава към заземителния контур на разпределителната уредба.	ДА
3.4	Опаковка	Картонена опаковка, на която е залепен етикет на български език със следната информация: наименованието и/или логото на производителя; наименованието и означението на щепселната кабелна глава; сечението на свързаните токопроводими жила, за които е предназначена; датата на производство; датата на изтичане на годността; и референтния номер на стандарта -- (БДС) HD 629.1 S2:2006 или еквивалент	ДА
3.5	Монтажна инструкция	На български език във всяка опаковка	ДА
3.6	Списък на монтажните елементи и материали	На български език във всяка опаковка	ДА
3.7	Означение на монтажните елементи и материали	Да	ДА

№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
3.8	Срок на годност (считано от датата на производството), месеци	min 36	36 месеца
3.9	Експлоатационна дълготрайност, години	min 20	20 год.



Фиг. 1. - Прходни щепселни изводи тип „А”

Фиг. 2. - Проходни щепселни изводи тип „С”



4. Щепселни кабелни глави за едножилни полиетиленови кабели 10 kV и 20 kV, за проходни изводи тип „А” и тип „С”, на трансформаторни (Т) и кабелни (К) присъединения, на комплектни комутационни устройства

4.1 Щепселна кабелна глава за едножилни полиетиленови кабели 20 kV, 50 mm², за трансформаторно присъединение на КРУ - права

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20.11.3426		DJ 250-2	
Наименование на материала		Щепселна кабелна глава - права, за едножилни полиетиленови кабели 20 kV, 50 mm ² , за трансформаторно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, права, модул „Т”, 20 kV, 50 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.1.1	Обявено напрежение, $[U_0/U (U_m)]$	12/20 (24) kV	Да, 12/20 (24) kV
4.1.2	Обявен ток, I_r	250 A	Да, 250 A
4.1.3	Номинално сечение на токопроводимите кабелни жила	50 mm ²	50 mm ²
4.1.4	Приложимост към:		
4.1.4.1	типа на проходните изводи (бушинги) на КРУ	Тип А	Тип А
4.1.4.2	диаметъра на основната кабелна изолация:		
4.1.4.2a	min диаметър	$\leq 20,2 \text{ mm}$	19,6 mm
4.1.4.2b	max диаметър	$\geq 21,7 \text{ mm}$	24,1 mm

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
4.1.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.1.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.1.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20.8 kV
4.1.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.1.9	Тегло, kg	Да се посочи	2.9 кг.

4.2 Щепселна кабелна глава за едножилни полиетиленови кабели 20 kV, 95 mm², за трансформаторно присъединение на КРУ - права

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3427		DJ 250-2	
Наименование на материала		Щепселна кабелна глава - права, за едножилни полиетиленови кабели 20 kV, 95 mm ² , за трансформаторно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, права, модул „Т“, 20 kV, 95 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.2.1	Обявено напрежение, $[U_0/U (U_m)]$	12/20 (24) kV	Да, 12/20 (24) kV
4.2.2	Обявен ток, I _r	250 A	Да, 250 A
4.2.3	Номинално сечение на токопроводимите кабелни жила	95 mm ²	95 mm ²
4.2.4	Приложимост към:	-	-
4.2.4.1	типа на проходните изводи (бушинги) на КРУ	Тип А	Тип А
4.2.4.2	диаметъра на основната кабелна изолация:	-	-
4.2.4.2a	min диаметър	≤ 23,5 mm	19,6 mm
4.2.4.2b	max диаметър	≥ 25,0 mm	24,1 mm
4.2.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.2.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.2.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20.8 kV

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
4.2.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.2.9	Тегло, kg	Да се посочи	2.9 кг.

4.3 Щепселна кабелна глава за едножилни полиетиленови кабели 20 kV, 50 mm², за трансформаторно присъединение на КРУ – „Г” образна

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3420		DE250	
Наименование на материала		Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 50 mm ² , за трансформаторно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Г-обр.,модул „Т”, 20 kV, 50 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.3.1	Обявено напрежение, $[U_0/U (U_m)]$	12/20 (24) kV	12/20 (24) kV
4.3.2	Обявен ток, I _r	250 A	250 A
4.3.3	Номинално сечение на токопроводимите кабелни жила	50 mm ²	50 mm ²
4.3.4	Приложимост към:	-	-
4.3.4.1	типа на проходните изводи (бушинги) на КРУ	Тип А	Тип А
4.3.4.2	диаметъра на основната кабелна изолация:	-	-
4.3.4.2a	min диаметър	≤ 20,2 mm	19,6 mm
4.3.4.2b	max диаметър	≥ 21,7 mm	24,1 mm
4.3.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.3.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.3.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.7.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
4.3.9	Контактно съединение	Плъзгащо щепселно съединение - \varnothing 7,9 mm	ДА
4.3.10	Тегло, kg	Да се посочи	2,9kg.

4.4 Щепселна кабелна глава за едножилни полиетиленови кабели 20 kV, 95 mm², за трансформаторно присъединение на КРУ – „Г” образна

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3421		DE250	
Наименование на материала		Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 95 mm ² , за трансформаторно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Г-обр., модул „Т”, 20 kV, 95 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.4.1	Обявено напрежение, $[U_d/U (U_m)]$	12/20 (24) kV	12/20 (24) kV
4.4.2	Обявен ток, I _r	250 A	250 A
4.4.3	Номинално сечение на токопроводимите кабелни жила	95 mm ²	95 mm ²
4.4.4	Приложимост към:	-	-
4.4.4.1	типа на проходните изводи (бушинги) на КРУ	Тип А	Тип А
4.4.4.2	диаметъра на основната кабелна изолация:	-	-
4.4.4.2a	min диаметър	$\leq 23,5$ mm	19,6 mm
4.4.4.2b	max диаметър	$\geq 25,0$ mm	24,1 mm
4.4.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.4.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.4.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.4.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.4.9	Контактно съединение	Плъзгащо щепселно съединение - \varnothing 7,9 mm	ДА

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
4.4.10	Тегло, kg	Да се посочи	2,9кг.

4.5 Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 95 mm², за кабелно присъединение на КРУ

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3422		CTS	
Наименование на материала		Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 95 mm ² , за кабелно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Г-обр., модул „К”, 20 kV, 95 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.5.1	Обявено напрежение, $[U_0/U (U_m)]$	12/20 (24) kV	12/20 (24) kV
4.5.2	Обявен ток, I _r	630 A	630 A
4.5.3	Номинално сечение на токопроводимите кабелни жила	95 mm ²	95 mm ²
4.5.4	Приложимост към:	-	-
4.5.4.1	типа на проходните изводи (бушинги) на КРУ	Тип С	Тип С
4.5.4.2	диаметъра на основната кабелна изолация:	-	-
4.5.4.2a	min диаметър	≤ 23,5 mm	22,0 mm
4.5.4.2b	max диаметър	≥ 25,0 mm	34,0 mm
4.5.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.5.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.5.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.5.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.5.9	Контактно съединение	Проходен болт M16	ДА, проходен болт М 16
4.5.10	Тегло, kg	Да се посочи	2,9кг.

4.6 Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 185 mm², за кабелно присъединение на КРУ

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3423		CTS	
Наименование на материала		Щепселна кабелна глава с „Г” - образна форма, за едножилни полиетиленови кабели 20 kV, 185 mm ² , за кабелно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Г-обр., модул „К”, 20 kV, 185 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.6.1	Обявено напрежение, [U ₀ /U (U _m)]	12/20 (24) kV	12/20 (24) kV
4.6.2	Обявен ток, I _r	630 A	630 A
4.6.3	Номинално сечение на токопроводимите кабелни жила	185 mm ²	185 mm ²
4.6.4	Приложимост към:	-	-
4.6.4.1	типа на проходните изводи (бушинги) на КРУ	Тип С	Тип С
4.6.4.2	диаметъра на основната кабелна изолация:	-	-
4.6.4.2a	min диаметър	≤ 27,4 mm	22,0 mm
4.6.4.2b	max диаметър	≥ 30,1 mm	34,0 mm
4.6.5	Издържано постоянно напрежение - изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.6.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.6.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.6.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.6.9	Контактно съединение	Проходен болт М16	ДА, проходен болт М 16
4.6.10	Тегло, kg	Да се посочи	2,9кг.

4.7 Щепселна кабелна глава с „Т” - образна форма, за едножилни полиетиленови кабели 20 kV, 95 mm², за кабелно присъединение на КРУ

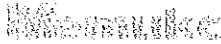
Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3424		СТКС	
Наименование на материала		Щепселна кабелна глава с „Т” - образна форма, за едножилни полиетиленови кабели 20 kV, 95 mm ² , за кабелно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Т-обр., модул „К”, 20 kV, 95 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.7.1	Обявено напрежение, [U _o /U (U _m)]	12/20 (24) kV	12/20 (24) kV
4.7.2	Обявен ток, I _r	630 A	630 A
4.7.3	Номинално сечение на токопроводимите кабелни жила	95 mm ²	95 mm ²
4.7.4	Приложимост към:	-	-
4.7.4.1	типа на проходните изводи (бушинги) на КРУ	Тип С	Тип С
4.7.4.2	диаметъра на основната кабелна изолация:	-	-
4.7.4.2a	min диаметър	≤ 23,5 mm	22,0 mm
4.7.4.2b	max диаметър	≥ 25,0 mm	34,0 mm
4.7.5	Издържано постоянно напрежение -изпитване в сухо състояние	min 72 kV / 15 min	72 kV / 15 min
4.7.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	54 kV / 5 min
4.7.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.7.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	15 kV / 300 h
4.7.9	Контактно съединение	Проходен болт M16	ДА, проходен болт M16
4.7.10	Тегло, kg	Да се посочи	2,9кг.



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4.8 Щепселна кабелна глава с „Т“ - образна форма, за едножилни полиетиленови кабели 20 kV, 185 mm², за кабелно присъединение на КРУ

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 11 3425		СТКС	
Наименование на материала		Щепселна кабелна глава с „Т“ - образна форма, за едножилни полиетиленови кабели 20 kV, 185 mm ² , за кабелно присъединение на КРУ	
Съкратено наименование на материала		Каб. глава, Т-обр., модул „К“, 20 kV, 185 mm ²	
№ по ред	Технически параметър	Изискване	Гарантирано предложение
4.8.1	Обявено напрежение, $[U_0/U (U_m)]$	12/20 (24) kV	12/20 (24) kV
4.8.2	Обявен ток, I _r	630 A	630 A
4.8.3	Номинално сечение на токопроводимите кабелни жила	185 mm ²	185 mm ²
4.8.4	Приложимост към:	-	-
4.8.4.1	типа на проходните изводи (бушинги) на КРУ	Тип С	ДА
4.8.4.2	диаметъра на основната кабелна изолация:	-	-
4.8.4.2a	min диаметър	≤ 27,4 mm	22,0 mm
4.8.4.2b	max диаметър	≥ 25,0 mm	34,0 mm
4.8.5	Издържано постоянно напрежение -изпитване в сухо състояние	min 72 kV / 15 min	ДА
4.8.6	Издържано напрежение с промишлена честота 50 Hz, изпитване в сухо състояние	min 54 kV / 5 min	ДА
4.8.7	Допустимо ниво на частичния разряд	max 10 pC / 20,8 kV	10 pC / 20,8 kV
4.8.8	Издържано напрежение с промишлена честота 50 Hz, изпитване във влажна среда	min 15 kV / 300 h	ДА
4.8.9	Контактно съединение	Проходен болт М16	ДА
4.8.10	Тегло, kg	Да се посочи	2,9кг.



булевард 2158, Булевардния център
ул. "Три Цвети" № 48
1113 София, България, телефон: 02 95 70 792
факс: 02 95 70 792
www.tlv.com



Management
System
ISO 9001:2008
OHSAS 18001:2007



Management
System
ISO 14001:2004

ПРИЛОЖЕНИЕ 9.10.1

Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

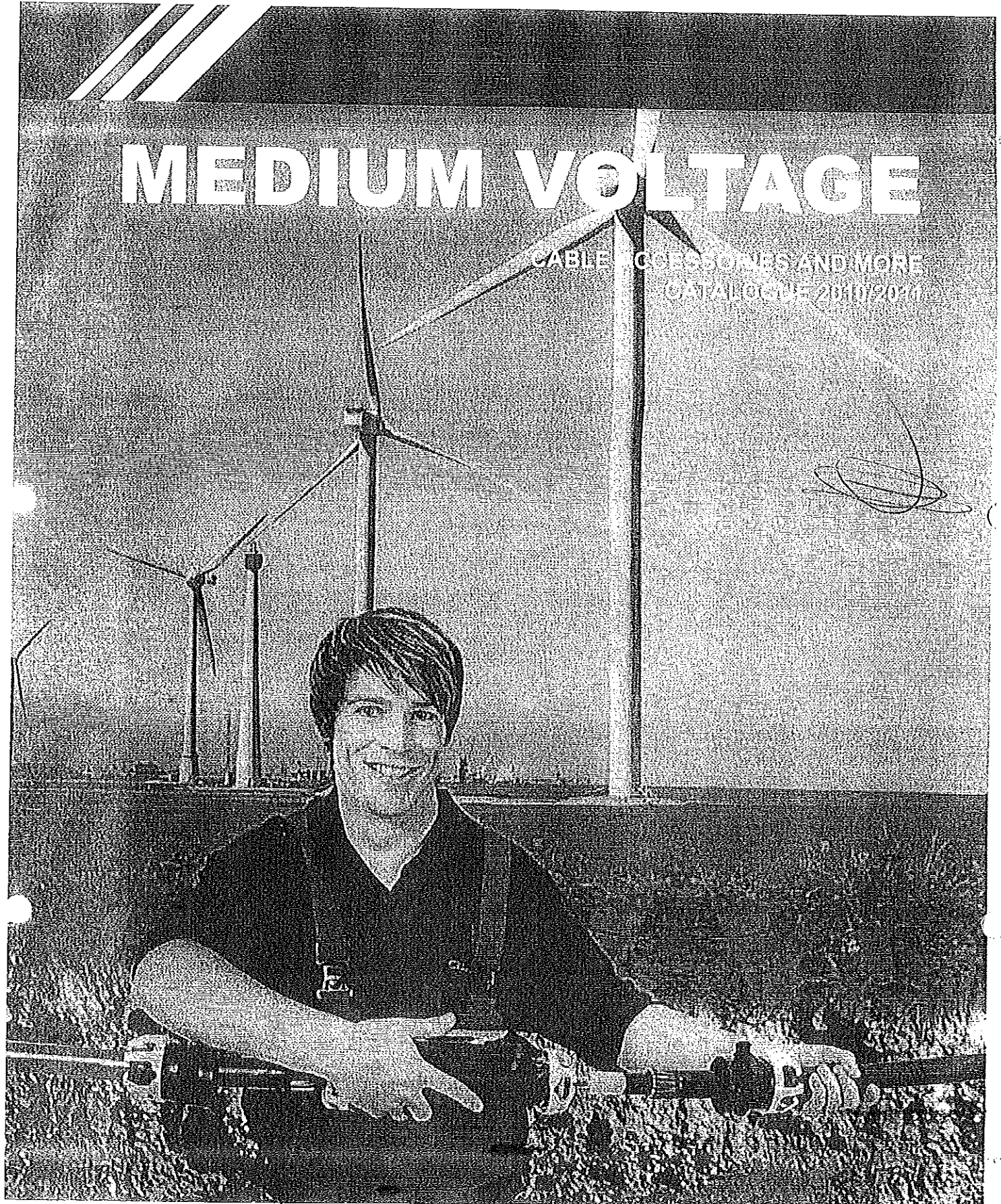
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

MEDIUM VOLTAGE

CABLE ACCESSORIES AND MORE
CATALOGUE 2010/2011



Systems For Professionals

CELLPACK

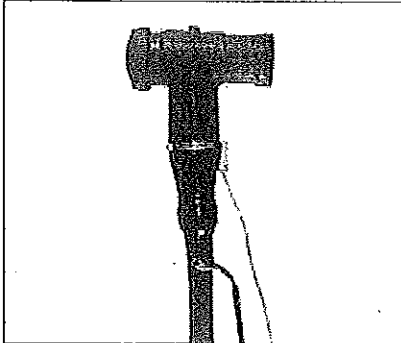
Electrical Products



CTS 630A

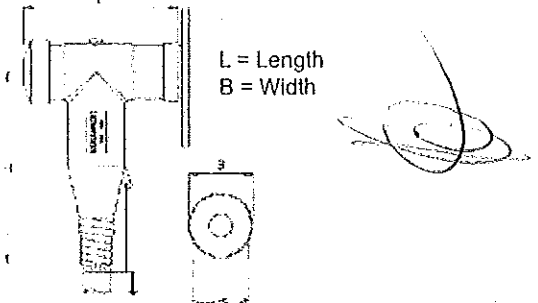
T-socket connexion

for all polymeric single-core cables



CTS shear bolt Cellplux plug-in cable connectors are suitable for connecting all plastic-insulated single-core cables (PVC, PE, XLPE, EPR) with different types of semi-conducting layers (graphite-coated or strippable) and screening (wire or tape) to substations and transformers for a maximum system voltage of 36 kV, with plug-type connections for Type C Taper Male Plug System complying with EN 50180 and EN 50181.

Dimensions



Characteristics

- Individually tested
- Outer semi-conducting layer made of semi-conductive EPDM provides protection from exposed electrical parts.
- Cable sheath insulation fault test may be performed under voltage
- For both copper and aluminium conductors
- Quick, safe and easy assembly
- Suitable for a wide range of applications due to integrated screw cable lug

Application

- Indoor areas

Storage conditions/Shelf life

- Unlimited shelf life

Scope of delivery

- Earthing kit (EGA)
- Screw cable lugs
- Set of 3 separable cable connectors
- Assembly accessories
- Assembly instructions

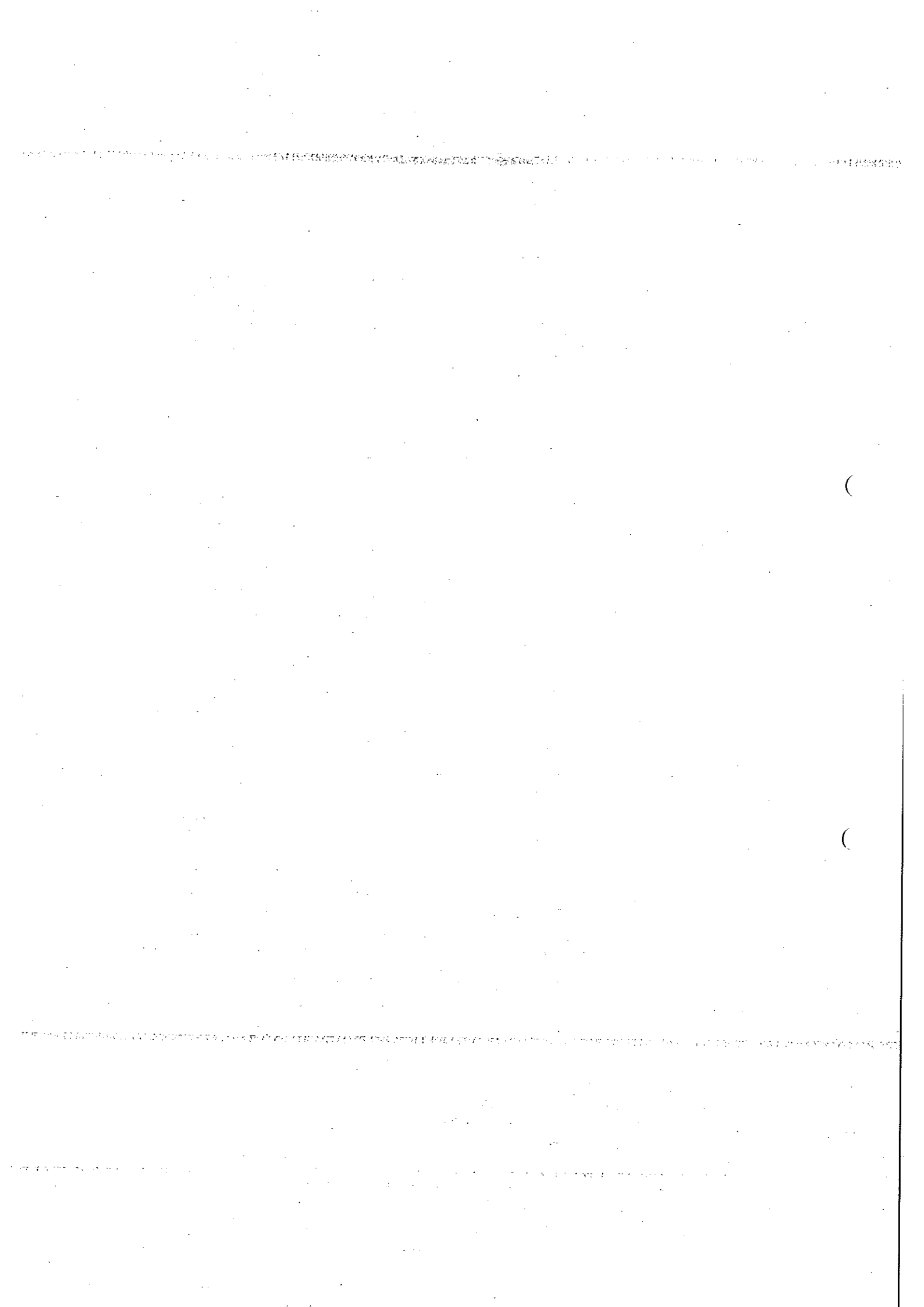
Tests

- CENELEC HD 629.1 (DIN VDE 0278, part 629-1)



Cable accessories for screened cables

Type	L mm	B mm	H mm	min. Ø over conductor insulation after removal of outer semi-conducting layer mm	Cross section mm ²				Art.-No.	
					12 kV	17.5 kV	24 kV	36kV		
U₀/U_n (U_m) 8.7/15 (17.5)kV - 12.7/22 (24)kV										
CTS 630A 24kV	25-70	194	85	250	14.7		25 - 95	25 - 70		250710
	95-240	194	85	250	22		120 - 240	95 - 240		206748
U₀/U_n (U_m) 6/10 (12)kV - 12.7/22 (24)kV										
CTS 630A 24kV	25-70 EGA	194	85	250	14.7	50 - 95	25 - 95	25 - 70		250711
	95-240 EGA	194	85	250	22	150 - 240	120 - 240	95 - 240		220775
U₀/U_n (U_m) 12/20 (24)kV - 19/33 (36)kV										
CTS 630A 36kV	50-95	194	85	250	22			95 - 95	50 - 95	250713
	50-95 EGA	194	85	250	22			95 - 95	50 - 95	250715
	95-150 EGA	194	85	250	22			95 - 240	95 - 150	256010
	150-240	194	85	250	30.8			240 - 240	150 - 240	224825
	150-240 EGA	194	85	250	30.8			240 - 240	150 - 240	224826
	240-400	194	85	265	31.5			300 - 400	240 - 400	252236
	240-400 EGA	194	85	265	31.5			300 - 400	240 - 400	256328

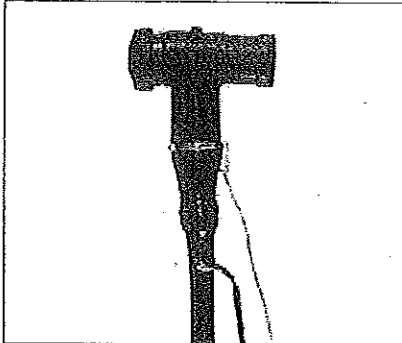




CTS 630A

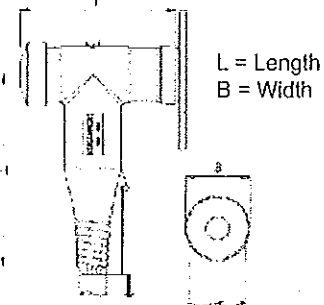
T-socket connexion

for all polymeric single-core cables



CTS shear bolt Cellplux plug-in cable connectors are suitable for connecting all plastic-insulated single-core cables (PVC, PE, XLPE, EPR) with different types of semi-conducting layers (graphite-coated or strippable) and screening (wire or tape) to substations and transformers for a maximum system voltage of 36 kV, with plug-type connections for Type C Taper Male Plug System complying with EN 50180 and EN 50181.

Dimensions



Characteristics

- Individually tested
- Outer semi-conducting layer made of semi-conductive EPDM provides protection from exposed electrical parts.
- Cable sheath insulation fault test may be performed under voltage
- For both copper and aluminium conductors
- Quick, safe and easy assembly
- Suitable for a wide range of applications due to integrated screw cable lug

Application

- Indoor areas

Storage conditions/Shelf life

- Unlimited shelf life

Scope of delivery

- Earthing kit (EGA)
- Screw cable lugs
- Set of 3 separable cable connectors
- Assembly accessories
- Assembly instructions

Tests

- CENELEC HD 629.1 (DIN VDE 0278, part 629-1)

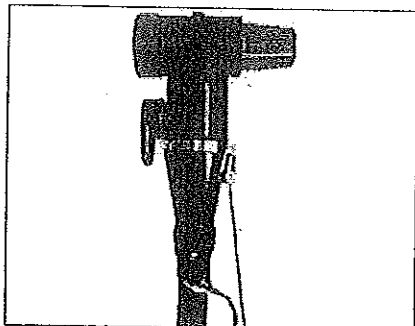


Cable accessories for screened cables

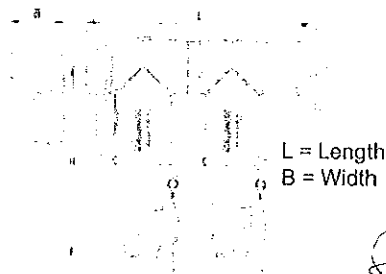
Type	L mm	B mm	H mm	min. Ø over conductor insulation after removal of outer semi-conducting layer mm	Cross section mm ²				Art.-No.	
					12 kV	17.5 kV	24 kV	36kV		
U₀/U_n (U_m): 8.7/15 (17.5)kV - 12.7/22 (24)kV										
CTS 630A 24kV	25-70	194	85	250	14.7		25 - 95	25 - 70		250710
	95-240	194	85	250	22		120 - 240	95 - 240		206748
U₀/U_n (U_m): 6/10 (12)kV - 12.7/22 (24)kV										
CTS 630A 24kV	25-70 EGA	194	85	250	14.7	50 - 95	25 - 95	25 - 70		250711
	95-240 EGA	194	85	250	22	150 - 240	120 - 240	95 - 240		220775
U₀/U_n (U_m): 12/20 (24)kV - 19/33 (36)kV										
CTS 630A 36kV	50-95	194	85	250	22			95 - 95	50 - 95	250713
	50-95 EGA	194	85	250	22			95 - 95	50 - 95	250715
	95-150 EGA	194	85	250	22			95 - 240	95 - 150	256010
	150-240	194	85	250	30.8			240 - 240	150 - 240	224825
	150-240 EGA	194	85	250	30.8			240 - 240	150 - 240	224826
	240-400	194	85	265	31.5			300 - 400	240 - 400	252236
240-400 EGA	194	85	265	31.5			300 - 400	240 - 400	256328	

**CTKS 630A****T-plug and socket connexion**

for all polymeric single-core cables



The CTKS coupling connectors are suitable for connecting all plastic-insulated single-core cables (PVC, PE, XLPE, EPR) with different types of semi-conducting layers (graphite-coated or strippable) and screening (wire or tape), to the back of Cellplux plug-in cable connectors, model CTS 630 A 24 kV and 36 kV.

Dimensions

L = Length
B = Width

Characteristics

- Individually tested
- Outer semi-conducting layer made of semi-conductive EPDM provides protection from exposed electrical parts.
- Cable sheath insulation fault test may be performed under voltage
- For both copper and aluminium conductors
- Quick, safe and easy assembly
- Suitable for a wide range of applications due to integrated screw cable lug

Application

- Indoor areas

Storage conditions/Shelf life

- Unlimited shelf life

Scope of delivery

- Screw cable lugs with shear bolt
- Set of 3 coupling elements
- Assembly accessories
- Assembly instructions

Tests

- CENELEC HD 629.1 (DIN VDE 0278, part 629-1)

Type	L mm	B mm	H mm	min. Ø over conductor insulation after removal of outer semi-conducting layer mm	Cross section mm ²				Art.-No.	
					12kV	17.5kV	24 kV	36kV		
U_v/U_m (U_m) 6/10 (12)kV - 12.7/22 (24)kV										
CTKS 630A 24kV	25-70 EGA	290	74	250	14.7	50 - 95	25 - 95	25 - 70		256838
	95-240 EGA	290	74	250	22	150 - 240	120 - 240	95 - 240		256839
U_v/U_m (U_m) 12/20 (24)kV - 19/33 (36)kV										
CTKS 630A 36kV	50-95	310	85	250	22			95 - 95	50 - 95	257581
	150-240	310	85	250	30.8			240 - 240	150 - 240	257582

Quality system

All production sites have been certified according to ISO 9001, 2008 revision and ISO 14001, 2004 revision.



Cellpack Technologie

CERTIFICATE

DQS GmbH
Deutsche Gesellschaft für Zertifizierung von Managementsystemen

Hereby certify that the company

CELLPACK

Electrical Products

CELLPACK AG Electrical Products
Angelsbergstr. 22
D-51652 Kitzbühler

<p>CELLPACK GmbH Carl-Zeiss-Str. 20 D-73761 Wetzlar-Tiefen T</p>	<p>Behr Bircher Cellpack BBO Radeberg GmbH Carl-Engelshaus-Str. 11 D-01454 Radeberg T</p>
---	--

has implemented and maintains a
Quality and Environmental Management System

Scope:
Design, manufacture and sales of cable fits and accessories

Through an audit, documented in a report, it was verified that the management system
fulfills the requirements of the following standards:

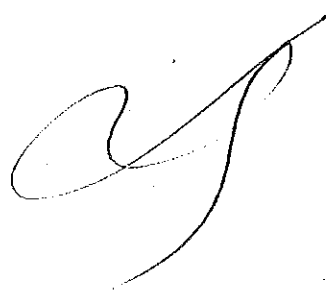
ISO 9001 : 2008 ISO 14001 : 2004

Certificate registration no. 273576 GMCS UM	
Date of certification 2010-02-10	
Valid until 2013-02-10	

Wolfgang Dehler
Managing Director

Dr. Ingrid
Managing Director

Angelsbergstr. 22, 51652 Kitzbühler am Wald



THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

DQS GmbH Deutsche Gesellschaft für Zertifizierung von Managementsystemen
Hereby certify that the company

CELLPACK AG Electrical Products

Angelsbergstr. 22
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Date of certification 2010-02-10

Valid until 2013-02-10

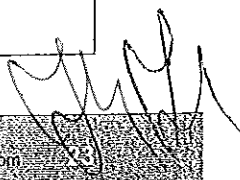
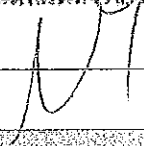
Registration Number DE-273576 GMCS UM

Reinhold
First Deputy Director of DQS

Andreas
Managing Director of DQS GmbH

J. Dehler

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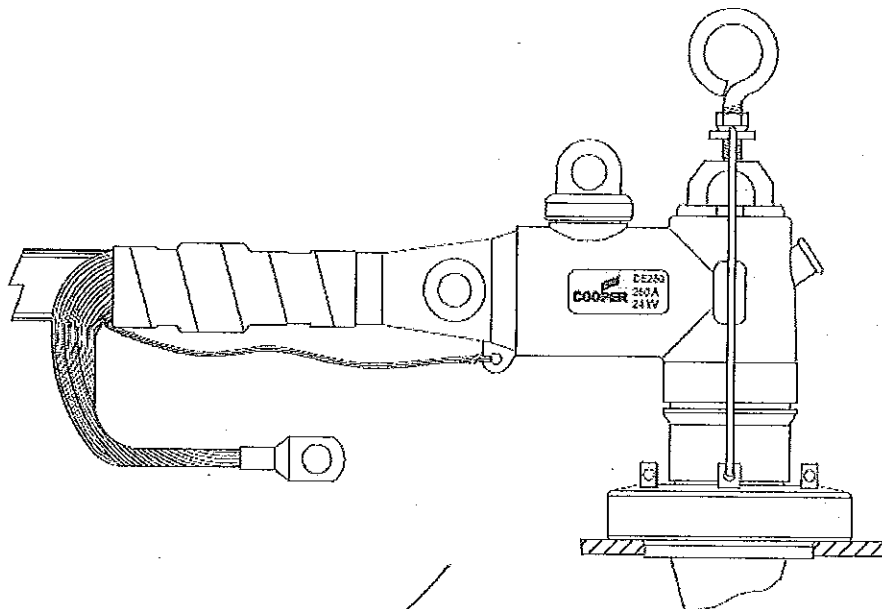


ЩЕПСЕЛНА Г-ОБРАЗНА ГЛАВА

ЗА ВЪНШЕН КОНУС С КОНТАКТ 250 А
ЗА КАБЕЛИ СРН С ЕКСТРУДИРАНА ИЗОЛАЦИЯ И РАДИАЛНО ПОЛЕ

Предварителна подготовка

- V Прочетете внимателно инструкциите преди монтажа.
- V Проверете дали всички необходими компоненти са включени в комплекта.



Електрически данни:

Номинално напрежение (U_0/U):	12/20 kV
Макс. напрежение на системата (U_{max}):	24 kV
Продължителен ток:	250 A

СЪДЪРЖАНИЕ НА КОМПЛЕКТА:

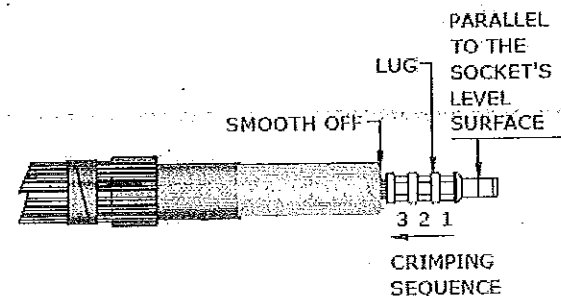
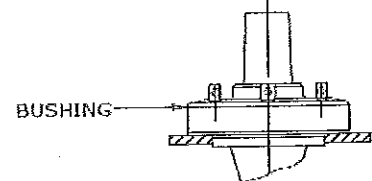
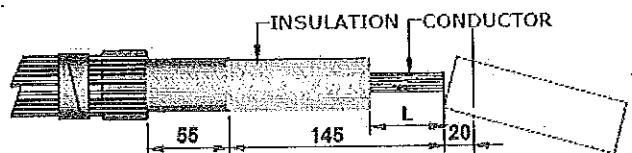
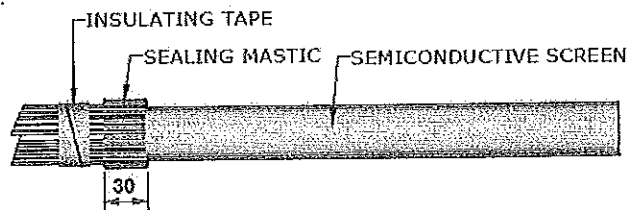
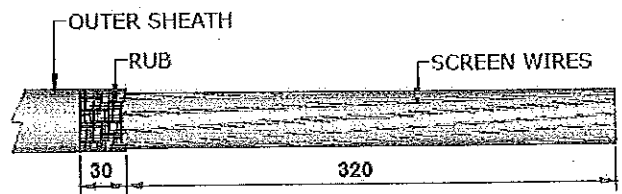
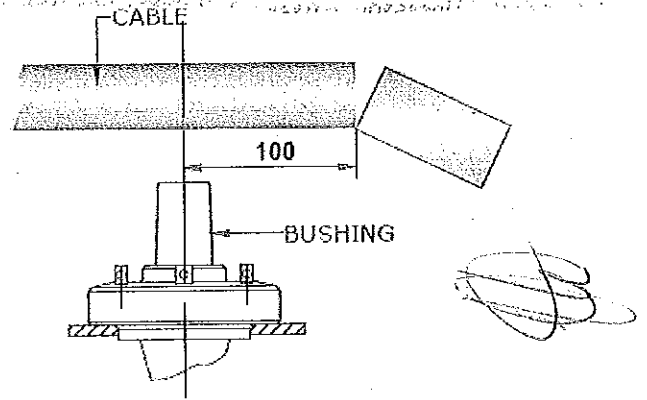
- 1 тяло
- 1 контактен проводник (обувка)
- 1 контактен щифт
- 1 шестограмен ключ
- 1 монтажнен винт
- силиконова смазка
- уплътняваща мастик лента
- изолационна PVC лента
- хартиена кърпа
- шкурка



ВНИМАНИЕ: Тази щепселна глава е проектирана да работи в съответствие с нормалните безопасни оперативни процедури. Тези указания не заместват или заменят съществуващите правила за безопасност и процедури на работа. Щепселната глава трябва да се инсталира и обслужва само от персонал, запознат с добрите практики по безопасност за работа с високо напрежение и електрически съоръжения. Всички прилежащи съоръжения не трябва да бъдат под напрежение по време на монтаж и/или поддръжка.

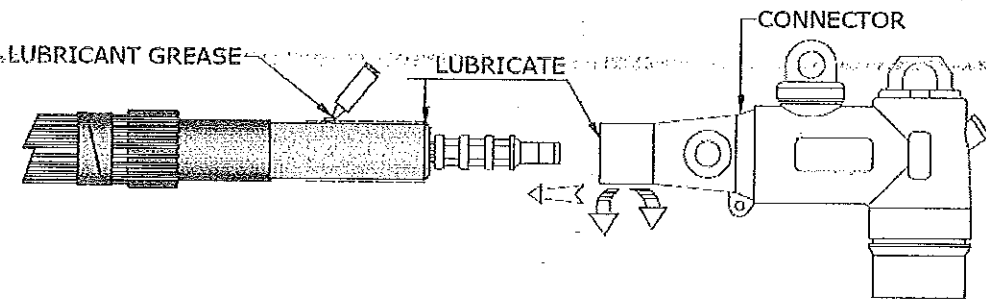
ПОДГОТОВКА НА КАБЕЛА (екран от проводници)

- 1 Позиционирайте кабела близо до изолятора, както е показано на чертежа.
- 2 Уверете се, че дължината на кабела е достатъчна, за да достигне спокойно изолятора.
- 3 Разделете мислено със симетрична линия изолятора, както е показано и отстранете **100 mm** от външната изолация на кабела и почистете края му с подходящ инструмент.
- 4 Това е временна дължина, която да улесни възстановяването на екрана от проводници. Кабелът ще бъде отрязан до крайната си дължина по-късно.
- 5 Отстранете **320 mm** от външната изолация. Почистете приблизително **30 mm** от изолацията със шкурка.
- 6 Нанесете слой от уплътняваща мастик лента на **30 mm** от края на външната изолация.
- 7 Обърнете назад екрана от проводници, опънете ги равномерно и ги притиснете с уплътняващата лента.
- 8 Бандажирайте екрана с PVC изолационна лента на няколко сантиметра от запълващата лента.
- 9 Поставете кабела във финална позиция.
- 10 Отрежете кабела на **20 mm** от центъра на изолятора и отстранете излишъка.
- 11 Внимателно отстранете последните **145 mm** от полупроводящия слой.
- 12 Отстранете основната изолация на разстояние **L**:
40 mm за медни кабелни обувки (Cu),
50 mm за биметални кабелни обувки (Al/Cu).

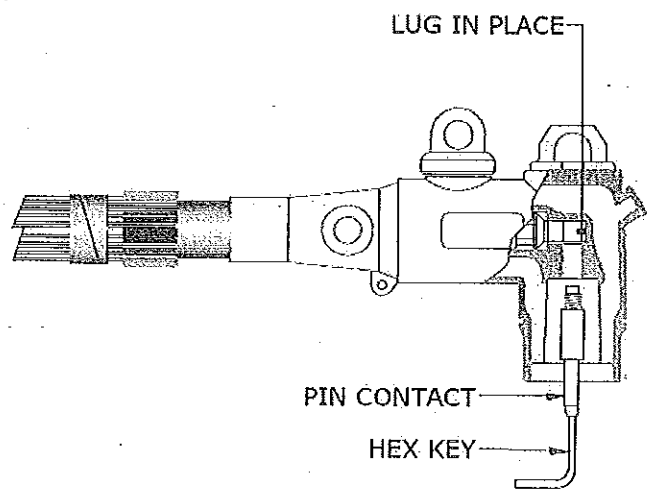


МОНТАЖ НА ЩЕПСЕЛНАТА ГЛАВА

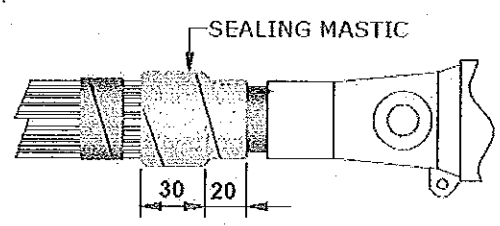
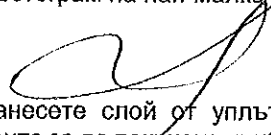
- 13 Поставете кабелната обувка: плоската част на обувката трябва да бъде паралелна на повърхността на изолятора.
- 14 Кербовайте, както е показано на фигурата.
- 15 Завъртете на 90° и кербовайте. Повторете.
- 16 Почистете излишната грес.
- 17 Почистете края на изолацията, за да улесните вкарването на конектора.
- 18 Почистете изолацията със шкурка до отстраняване на всякакви следи от полупроводящия слой. Уверете се, че няма наранявания или дракотини върху основната изолация.



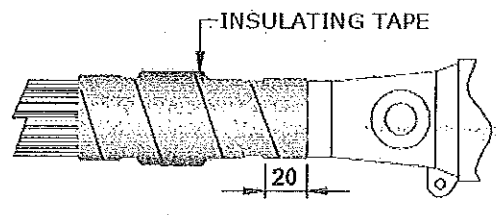
- 19 Почистете основната изолация и нанесете тънък пласт силиконова паста. Разпределете равномерно.
- 20 Нанесете паста и във входа на тялото на конектора.
- 21 Проверете дали тялото на конектора е ориентирано под правилен ъгъл спрямо обувката и го приплъзнете с леки въртеливи движения върху кабела до крайно възможно положение на обувката.
- 22 Проверете дали входа на обувката е поставен правилно в тялото на конектора.
- 23 Отстранете излишната грес от главата.
- 24 Вкарайте резбования край на контактния щифт във входа на обувката. Уверете се, че резбите не се пресичат. Стегнете с шестограм на най-малко на 90 градуса.



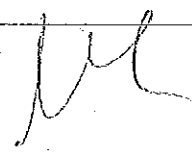
- 25 Нанесете слой от уплътняващата мастик лента за да покриете приблизително 30 mm от предишния мастик слой като започнете на разстояние 20 mm от края на полупроводящия слой, както е показано на чертежа.



- 26 Нанесете два слоя самовулканизираща се лента, така че да покрие уплътняващата лента. Лентата се нанася с 50 % припокриване и опън, при който тя да намали ширината си почти наполовина.

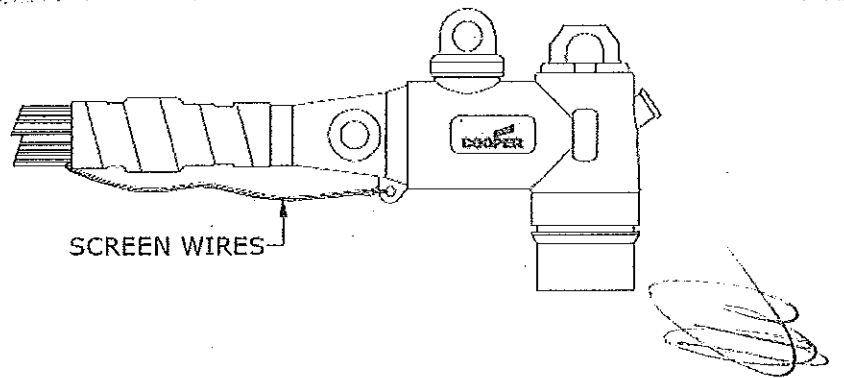


- 27 Лентовото покритие трябва да обхваща около 40 mm от екрана и да покрие тялото на конектора с около 20 mm.



28 Свържете един или два проводника от екрана към ухото на конектора.

29 Почистете вътрешността на конектора и повърхността на изолятора, след това смажете с тънък слой силиконова паста, за да улесните свързването.



30 Вкарайте конектора върху изолятора до максимално крайно положение.

31 Стегнете конектора към изолятора със скобите.

32 Скобите се пристягат към ушите на изолятора.

33 Фиксирайте конектора като завинтите без да използвате сила, както е показано на чертежа.

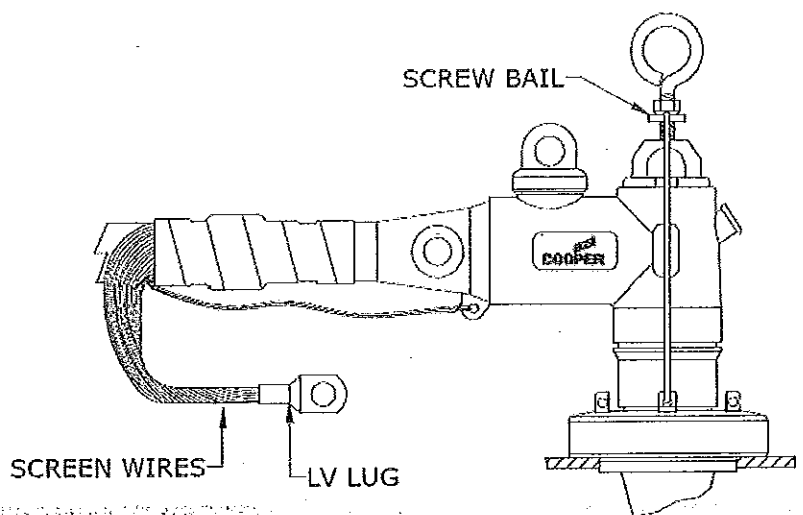
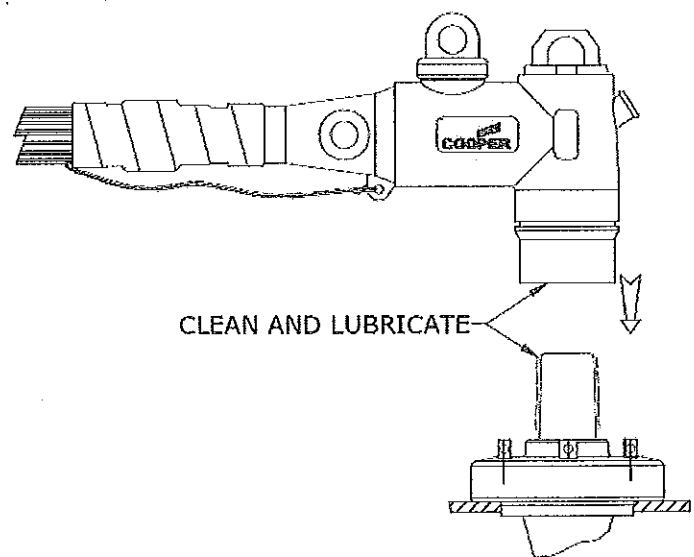
34 Фиксирайте устройството използвайки гайката под ухото.

35 Съберете екрана от проводници и поставете кабелната обувка за ниско напрежение.

36 Свържете кабелната обувка за ниско напрежение към заземителната система.

37 Стегнете кабела близо до конектора.

38 Г-образната глава е готова за употреба.



ВНИМАНИЕ: Всички прилежащи съоръжения не трябва да бъдат под напрежение по време на монтаж и/или поддръжка

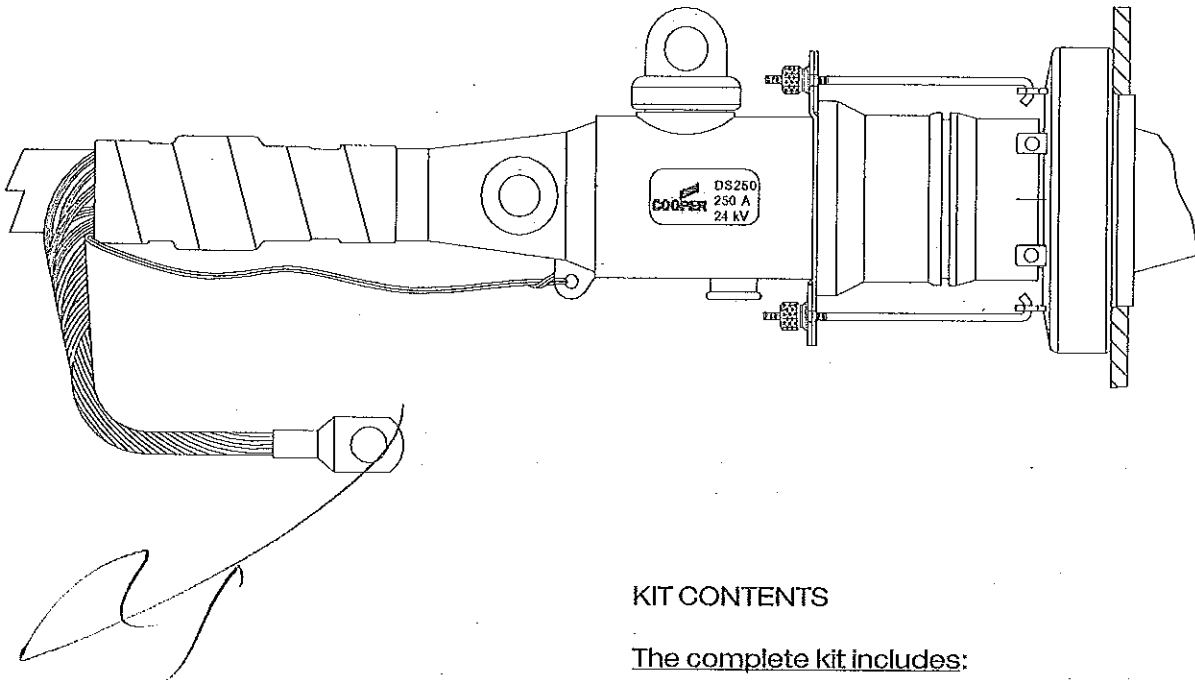
SEPARABLE STRAIGHT CONNECTOR

FOR OUTER CONE BUSHING WITH CONTACT PLUG **250 A**
ON MEDIUM VOLTAGE RADIAL FIELD CABLE WITH EXTRUDED INSULATION



Preliminary operations

- ✓ Read assembly instructions carefully before installation.
- ✓ Check that all components required for correct assembly are included in the packaging.



KIT CONTENTS

The complete kit includes:

- 1 moulded straight housing
- 1 conductor contact (lug)
- 1 bail assembly
- silicone lubricant
- sealing mastic tape
- insulating PVC tape
- paper towel
- abrasive cloth

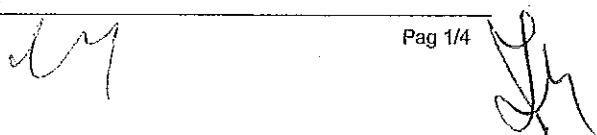
Electrical Rating:

Rated voltage (U₀/U): **12/20 kV**
Maximum system voltage (U_{max}): **24 kV**
Continuous current: **250 A**



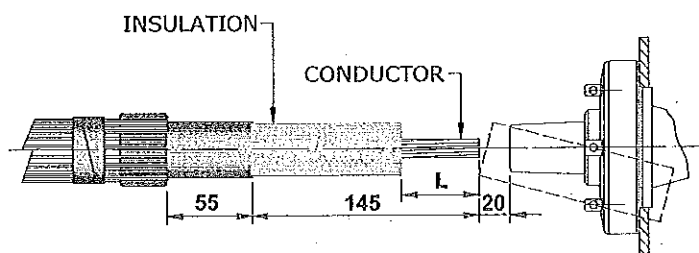
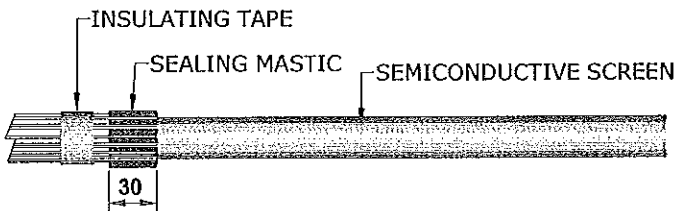
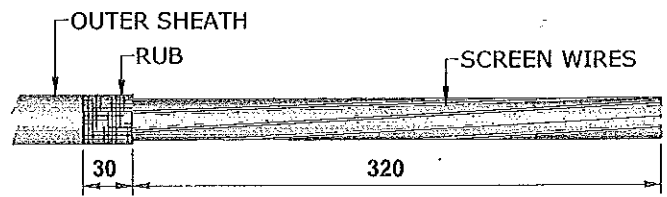
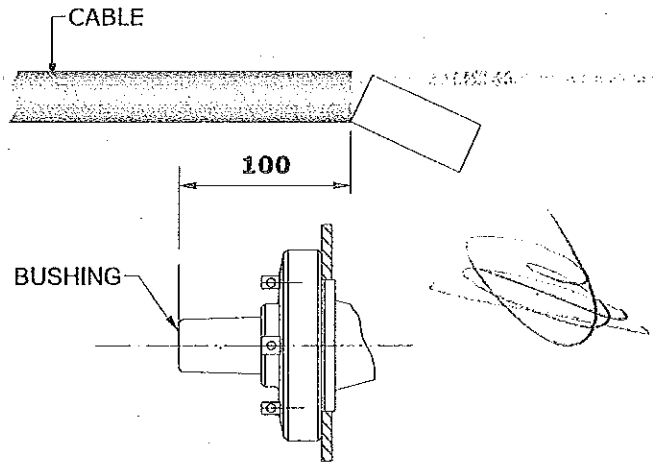
CAUTION: This separable straight connector is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace existing safety and operating procedures. The separable straight connector should be installed and serviced only by personnel familiar with good safety practices and the handling of high-voltage electrical equipment.

All associated apparatus must be de-energized during installation and/or maintenance.



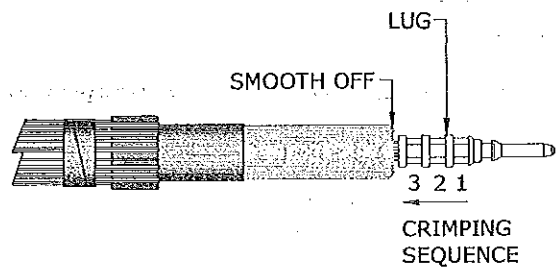
CABLE PREPARATION (screen wires)

- 1 Place the cable next to the equipment bushing in its final position.
- 2 Ensure the cable is long enough to comfortably reach the bushing.
- 3 Identify the flat surface of the bushing and from this point score the outer sheath **100 mm** and strip off the excess with an appropriate tool.
- 4 This is a provisional length to facilitate screen wires retrieval. The cable will be cut to its final length later.
- 5 Stripp off **320 mm** of the outer sheath.
- 6 Rub approximately **30 mm** of the sheath with abrasive cloth.
- 7 Apply a layer of sealing mastic around the last **30 mm** of the outer sheath.
- 8 Bend back the screen wires, spread them evenly and press them into the sealing mastic tape.
- 9 Wrap insulating tape (PVC) to fasten the wires a few centimetres from the sealing compound.
- 10 Place the cable in its final position. Cut the **20 mm** from the flat surface of the bushing head and remove the excess.
- 11 Carefully remove the last **145 mm** of the cable's semiconductive screen.
- 12 Remove **L** of core insulation:
40 mm for copper lugs (Cu)
50 mm for bimetallic lugs (Al/Cu).



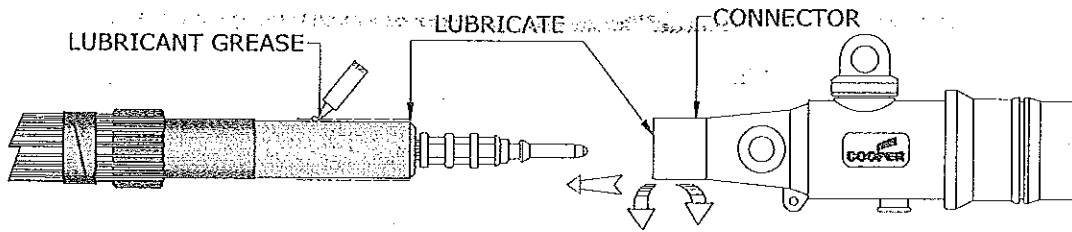
STRAIGHT CONNECTOR ASSEMBLY

- 13 Insert the lug provided.
- 14 Use crimping pliers as shown in the figure.
- 15 Turn 90° and crimp. Repeat.
- 16 Clean off excess grease.
- 17 Smooth off the end of insulator to facilitate connector insertion.
- 18 Rub the insulation with abrasive cloth to remove any traces of semiconductive screen.

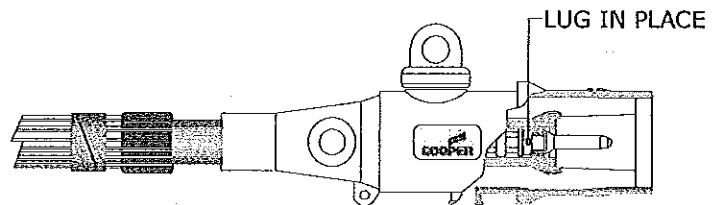


M

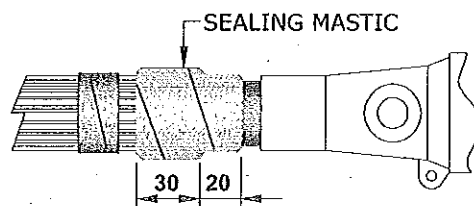
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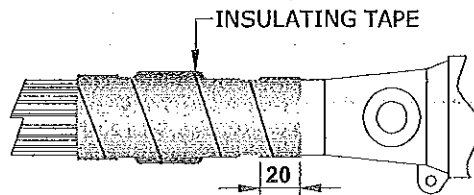
- 19 Clean the cable insulation and apply silicon grease lubricant. Spread evenly.
- 20 Lubricate inside the connector's cable entry hole.
- 21 Slide the connector on the cable with slight alternating rotations and slide in until the lug is in place: cannot advance any further.
- 22 Clean off excess grease from the connector housing.



- 23 Apply a coating of sealing mastic tape to cover approximately 30 mm of the previous layer to 20 mm beyond the semiconductive screen of the bare cable.



- 24 Apply at least two layers of PVC insulating tape to cover the sealing mastic.
- 25 Ensure the tape covers about 40 mm of the cable's screen wires, and 20 mm of the connector.

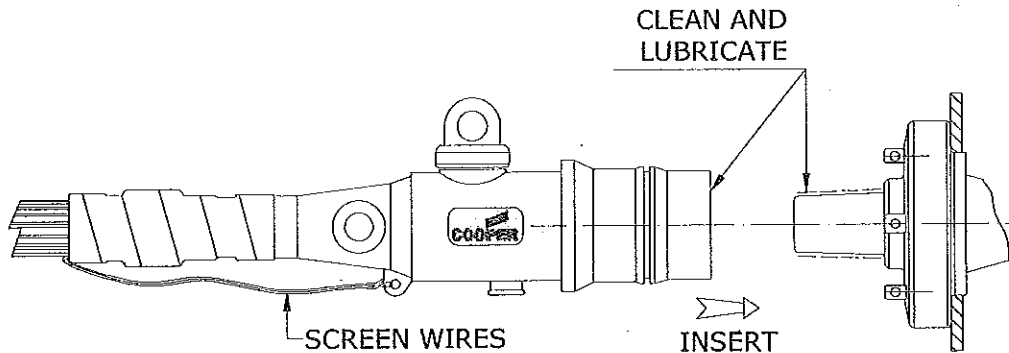


M

JH

CONNECTOR INSTALLATION

26 Connect one-two screen wires to the eyelet on the connector.



27 Clean the inside of the connector and the outside of the bushing, then lubricate sufficiently with silicone grease to ease coupling.

28 Fully insert the connector on the bushing.

29 Fasten the connector to the bushing with the fastening tool provided.

30 The pins of the device fasten into eyelets on the bushing.

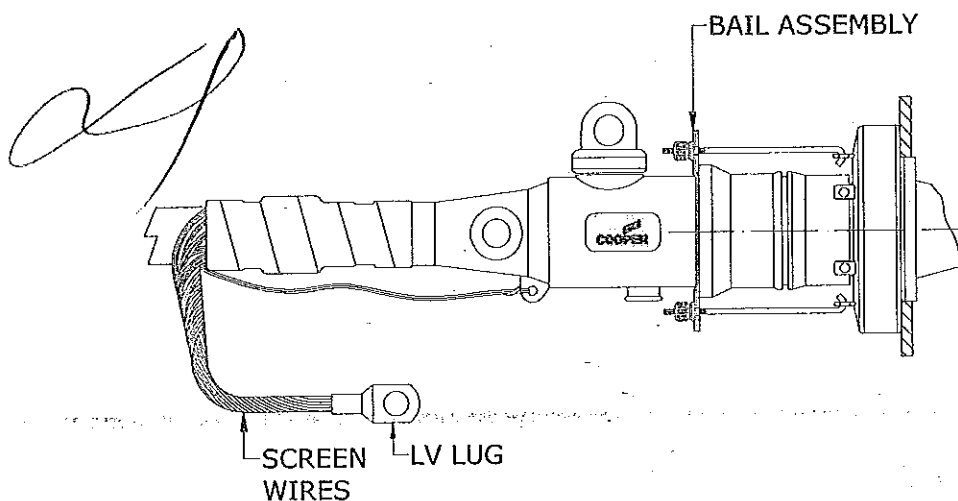
31 Block the connector by acting on the milled nuts of the threaded pins without using excessive force.

32 Gather the screen wires and insert the low voltage lug.

33 Connect the low voltage ground lug.

34 Clamp the cable near the connector.

35 The straight connector is ready for use.



CAUTION: This separable straight connector is designed for a **deadbreak system**. All associated apparatus must be **de-energized** during installation and/or maintenance.



SAFETY FOR LIFE



Cooper Power Systems products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Cooper Power Systems employees involved in product design, manufacture, marketing and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high-voltage lines and equipment and support our "Safety For Life" mission.

SAFETY INFORMATION

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians, who are familiar with this equipment should install, operate and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

DANGER:

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING:

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION:

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in equipment damage only.

Safety Instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

DANGER:

Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.

WARNING:

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

WARNING:

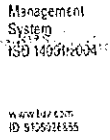
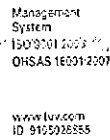
This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply may result in death, severe personal injury and equipment damage.

WARNING:

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.

Технически чертеж

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Тел: +359 02 945 6111; Факс: +359 02 945 6112
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www.chez.bg



ПРИЛОЖЕНИЕ 9.10.2

Техническо описание и чертежи с нанесени размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

250 A Deadbreak Elbow Connector

DE250

COOPER

Cooper Power Systems

Electrical Apparatus

1550-10

250 A, 24 kV Class

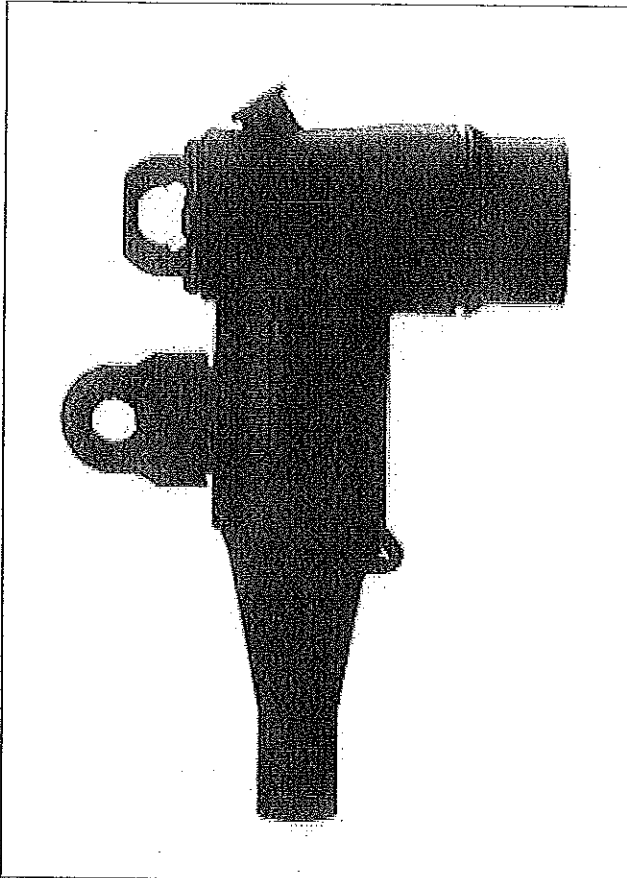


Figure 1.
DE250 Deadbreak Elbow Connector.

RELATED PRODUCTS

- DRC250 Receptacle Cap
- DPD250 Dead End Plug
- DPS250 Standoff Plug
- DPE250 Earthing Plug
- DJ2503 3-Way Junction

INSTALLATION

- No special tools, heating, taping, or potting are required.
- Connector may be energised immediately after installation on its mating part.
- Mates with bushings, plugs, and junction devices complying with the listed standards.

APPLICATION

- For connection of polymeric cable to transformers, switchgear, motors and other equipment with a premoulded separable connector.
- For indoor and outdoor installations.
- System voltage up to 24 kV.
- Continuous current 250 A (300 A overload for 8 hours).
- Cable particulars:
 - Polymeric cable (XLPE, EPR, etc.)
 - Copper or aluminum conductors
 - Semiconducting or metallic screens
- Conductor size 16-120 mm²

FEATURES

- Provides a fully screened and fully submersible separable connection when mated with the proper bushing or plug.
- Built-in capacitive test point to determine the circuit status or install a fault indicator.
- No minimum phase clearance requirements.
- Mounting can be vertical, horizontal, or any angle in between.
- 100% factory tested.

STANDARDS

- Will meet the requirements of VDE 0278, IEC 502-4, EDF HN 52-S-61, ANSI/IEEE 386, BS 7215 and others.

QUALITY ASSURANCE

- Our manufacturing facility is registered to ISO 9001-1994 by third party audit.
- Required Production Tests
- Periodic X-Ray Analysis

PACKAGING

- Supplied in a kit with all necessary parts, approximate weight 1 kg.

TABLE A
Electrical Ratings

Maximum System Voltage (U _m)	24 kV
Impulse	125 kV
AC Withstand (5 min.)	54 kV
Continuous Current	250 A
Overload (8 hrs Max.)	300 A
Short Circuit Withstand, 1 sec. (rms sym.)	12.5 kA

Note: Ratings are based on IEC Standards and do not reflect maximum capability.

Features and Detailed Description

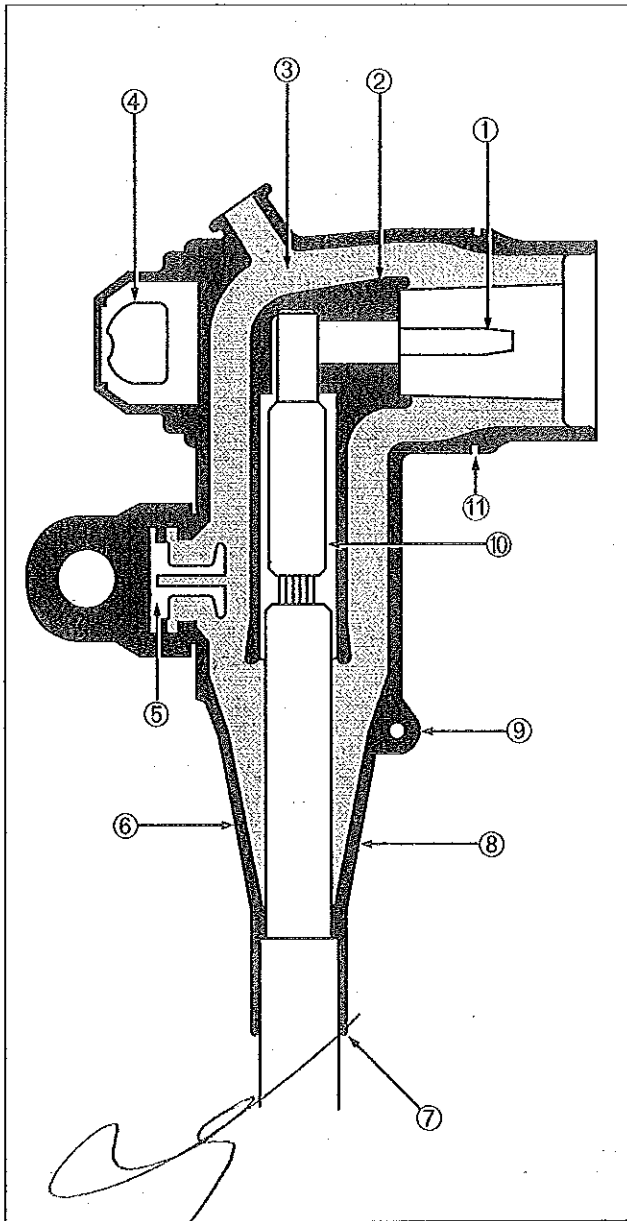


Figure 2.
250 A, 24 kV Class DE250 Deadbreak Elbow Connector.

1. Pin Contact

Tin-plated copper pin screws into the conductor connector with the supplied hex key.

2. Internal Screen

Moulded EPDM conducting rubber screen controls electrical stress.

3. Insulation

Moulded EPDM insulating rubber is formulated and mixed in-house to ensure high quality.

4. Pulling Eye

Encapsulated stainless steel pulling eye with a detent to position the bail.

5. Capacitive Test Point

Capacitive test point provides means to check circuit status. A moulded EPDM conducting rubber cap provides a watertight seal.

6. Stress Relief

The configuration of the outer screen and insulation provides cable stress relief.

7. Cable Entrance

The sized opening provides an interference fit to maintain a watertight seal.

8. External Screen

Moulded EPDM conducting rubber mates with the cable screen to maintain screen continuity and ensure that the assembly is at earth potential.

9. Earthing Eye

Moulded into the external screen for connection of an earthing wire.

10. Conductor Contact

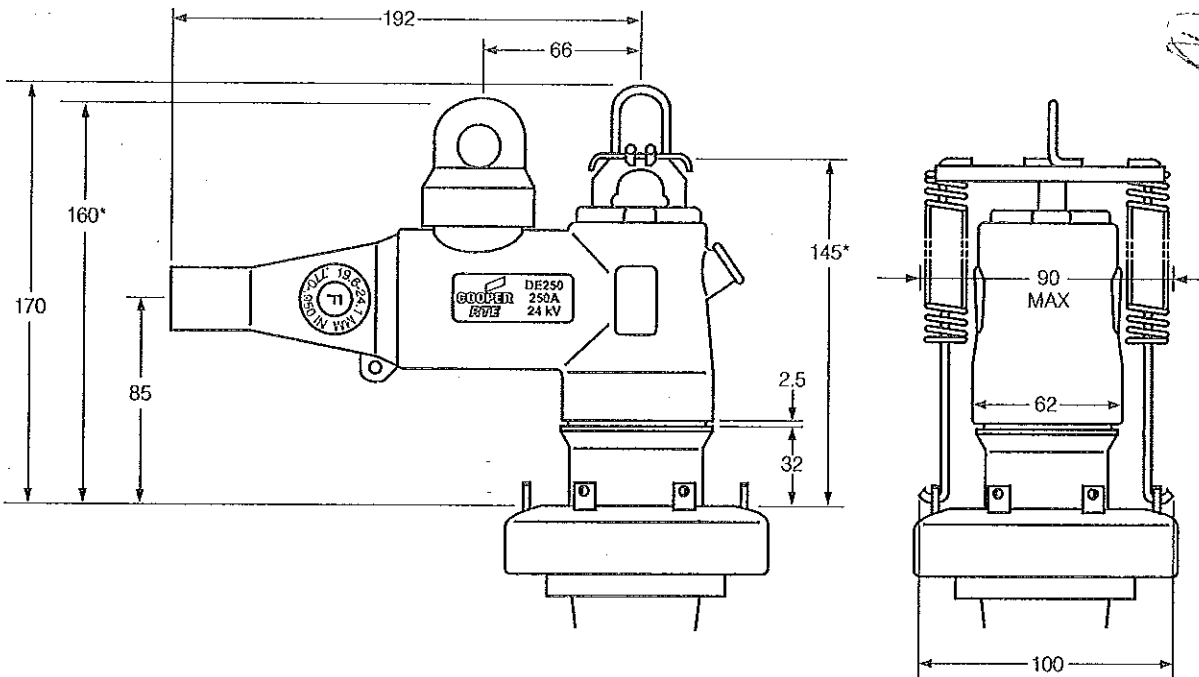
Inertia welded bimetallic compression connector accepts copper or aluminum conductors.

11. Locking Ring Groove

Provision for an optional three-phase locking ring.

12. Stainless Steel Bail (Not Shown)

Secures the connector to its mating bushing or accessory.



Dimensions in mm
*Add 55 mm to disconnect

Figure 3.
DE250 Deadbreak Elbow Connector dimensional information.

ORDERING INFORMATION

The ordering formula for the DE250 Separable Connector is **DE250-R-C**. Substitute for R and C as described below. Select the range from Table R that best fits the diameter of the core insulation. Select the code from Table C for the conductor size and type of connector required.

TABLE R
Cable Insulation Range

Insulation Range Designation	Cable Insulation Range Ø (mm)	
	Min.	Max.
B	13.5	17.4
D	16.3	20.8
F	19.6	24.1
H	23.1	28.7
J	27.9	33.5

Ordering Example: For 20 kV cable, 50 mm² aluminum conductor, 21.0 mm core insulation diameter, unplated, DIN connector, specify **DE250-F-50**

NOTE: Bimetallic connectors can be used with aluminum or copper conductors.

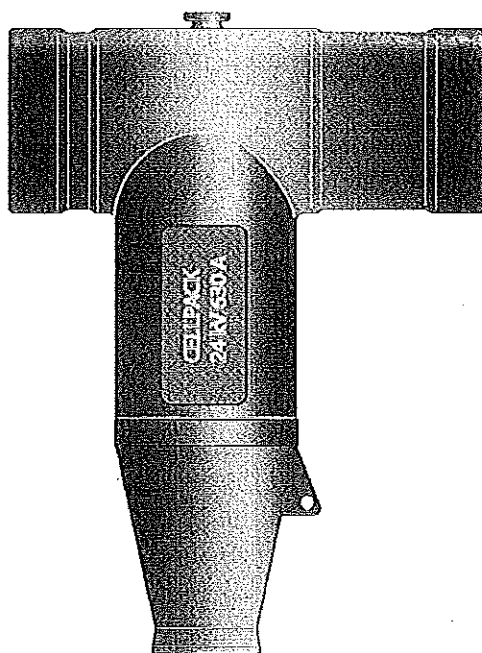
Cable seal adapters are ordered separately.

TABLE C
Conductor Code

Stranded Conductor Size (mm ²)	DIN Unplated	DIN Plated	EDF Type	DIN Copper
16	16	P16	E16	C16
25	25	P25	E25	C25
35	35	P35	E35	C35
50	50	P50	E50	C50
70	70	P70	E70	C70
95	95	P95	E95	C95
120	120	P120	-	C120

Средно напрежение

CELLPLUX



CTS 630A 24kV 95 - 240
U₀/U(U_m) 8,7/15(17,5) kV – 12,7/22(24) kV

Инструкция за монтаж

Кабелна глава щепселна, Т-образна за едножилни кабели с полимерна изолация за напрежения до 24 kV

206742/0908/4/7

CELLPACK GmbH
Electrical Products
D-79761 Waldshut-Tiengen
Tel. +49(0)7741/60 07 11
Fax +49(0)7741/60 07 83
www.cellpack.com
e-mail: electrical.products@cellpack.com

CELLPACK AG
Electrical Products
CH-5612 Villmergen
Tel. +41(0)56/618 12 34
Fax +41(0)56/618 12 45

CELLPACK
Electrical Products

Общи указания:

- Проверете дали обхватът на кабелните аксесоари е подходящи за размера на кабела.
- Проверете съдържанието на комплекта съгласно опаковъчния лист.
- Старателно прочетете инструкциите за монтаж.

Монтажът трябва да се извършва само от компетентен персонал.

Производителят не носи отговорност за повреди, причинени от неправилен монтаж.

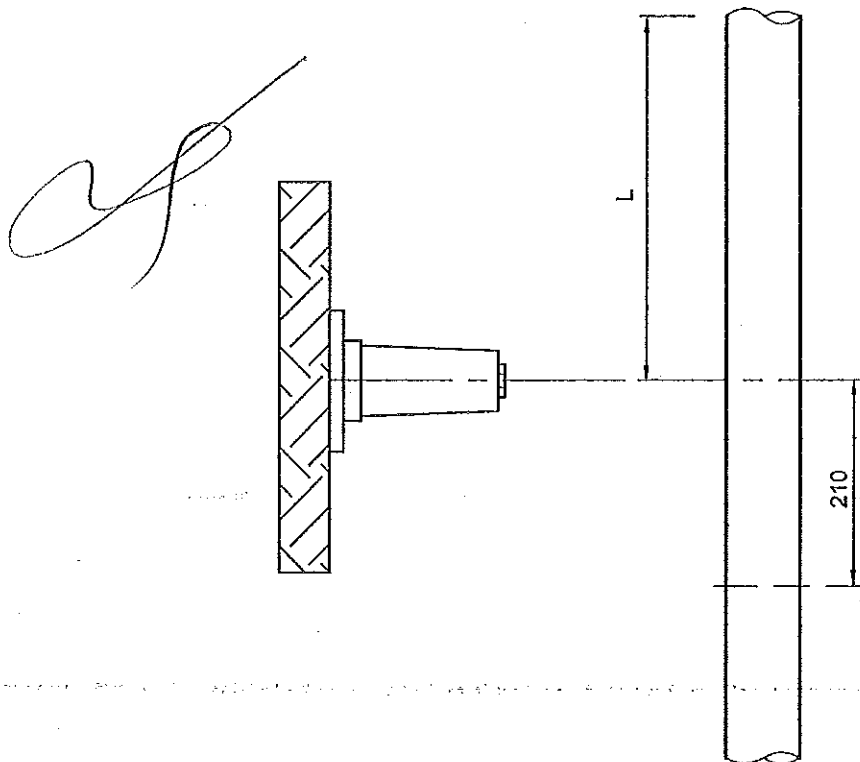
Кабелна глава щепселна, Т-образна тип CELLPLUX CTS 630A 24kV 95-240 :

Сечения:

Напрежение $U_0/U(U_m)$ kV	Сечение на кабела (*) mm ²
8,7/15(17,5) kV	120 – 240 *)
12/20(24) kV	95 – 240 *)

(*) Минимален диаметър над кабелната изолация от 22 мм

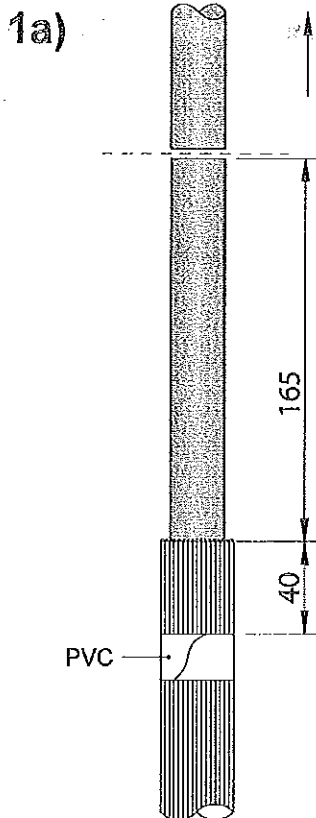
Нагласяне



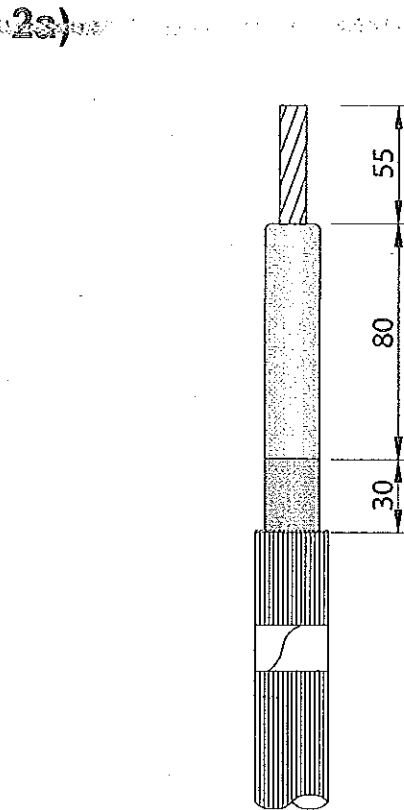
- Почистете грижливо краищата на кабела до 1м.
- Нагласете кабела спрямо оста на клемата за присъединяване, оставяйки свободна дължина $L = 200-500$ мм. Изрежете излишното.
- Маркирайте кабела на 210 мм от центъра на клемата.

Подготовка на кабела

Кабел с екран от медни жички:

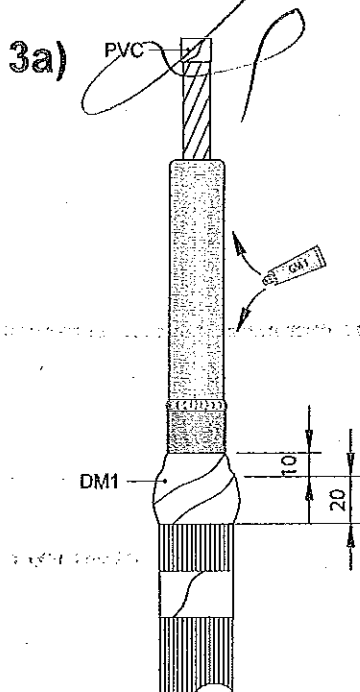


- Отстранете външната изолация на кабела до маркировката.
- Подгънете назад медните жици на екрана и ги фиксирайте към външната изолация на кабела с PVC лента (Fig. 1a).
- Отрежете кабела на дължина **165 mm**.
- Внимателно отстранете външния полупроводим слой, така че да



остане слой с дължина 30 mm. Уверете се, че ръбът на слоя е гладък.

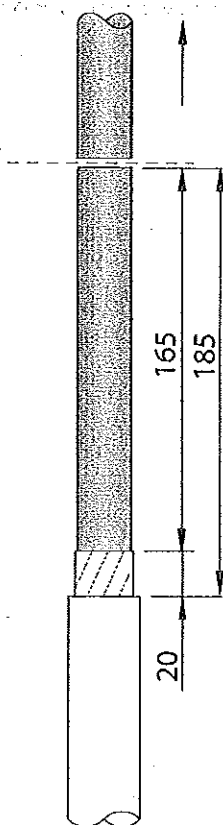
- Отстранете XLPE изолацията на кабела на размер **55 mm**.
- Почистете старателно XLPE изолацията и външния полупроводим слой на кабела.



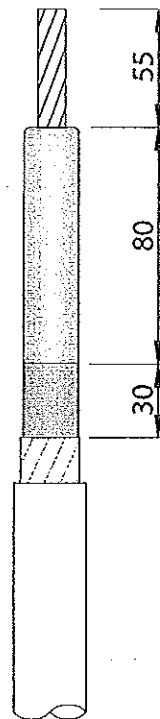
- Защитете края на жилото с PVC-лента.
- Навийте 2/3 от дължината на уплътняващата лента DM1 върху **20 mm** от екрана и върху **10 mm** от полупроводящия слой (с разтягане 50%)
- Нанесете на и около ръбът на полупроводящия слой смазка и пълнеж GM1 (оформете пръстен).
- Навлажнете изолацията със смазка и пълнеж GM1.

Кабел с лентов екран:

1b)



2b)

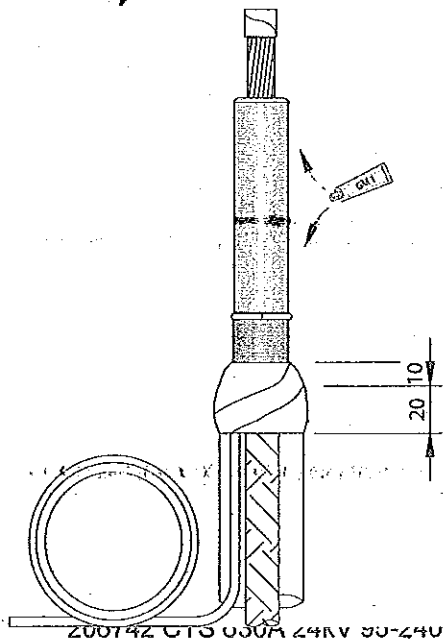


- Отстранете външната изолация на кабела до маркировката + 20mm.
- Отрежете кабела както е показано на фигурата.
- Отрежете лентовия екран, така че върху кабела да остане 20 mm от него.
- Внимателно отстранете външния полупроводим слой, така че да остане слой с дължина 30 mm.

Уверете се, че ръбът на слоя е гладък.

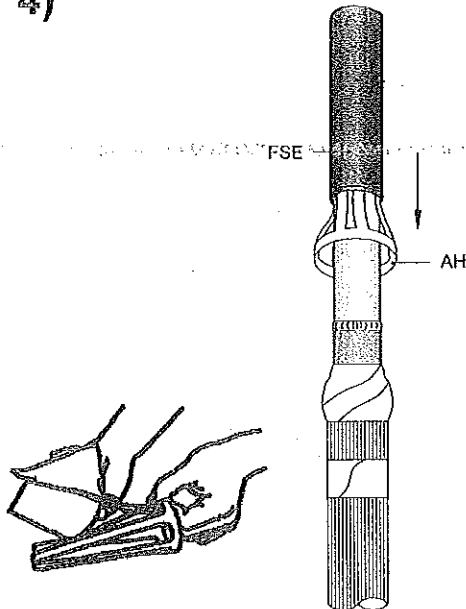
- Отстранете XLPE изолацията на кабела на размер 55 mm.
- Почистете старателно изолацията и външния полупроводим слой на кабела.

3b)



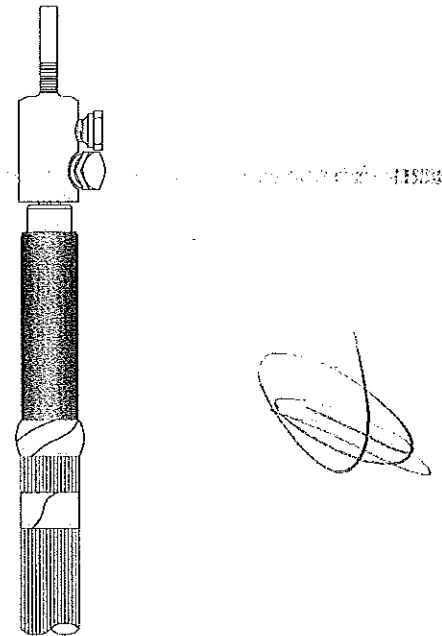
- Защитете края на жилото с PVC-лента.
- Фиксирайте заземителната оплетка и заземителния проводник чрез ролкова пружина към лентовия екран (заземителния комплект се поръчва отделно).
- Навийте 2/3 от дължината на уплътняващата лента DM1 върху 20 mm от екрана и върху 10 mm от полупроводящия слой (фиг. 3b).
- Нанесете на и около ръбът на полупроводящия слой смазка и пълнеж GM1 (оформете пръстен).
- Навлажнете изолацията със смазка и пълнеж GM1.

4)



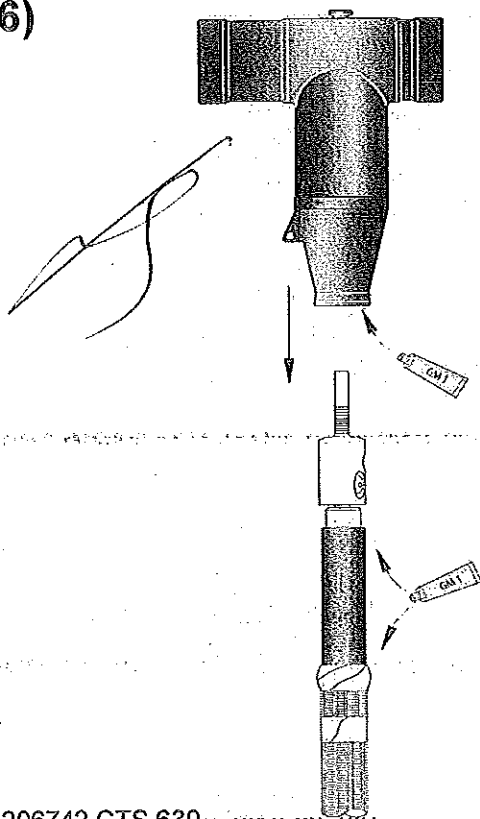
- Навлажнете лентите на апликатора AH със силиконовата кърпичка.
- Вмъкнете апликатора AH в елемента за контрол на полето FSE и ги нахлузете върху кабела до достигане на уплътняващата обвивка.
- Отстранете апликатора, издърпвайки лентите му една по една.
- Позиционирайте елемента за контрол на полето като леко го завъртате (фиг. 5).
- Отстранете PVC лентата от края на жилото на кабела.

5)



- Монтирайте кабелна обувка с болтове с откъсващи се глави, съгласно отделна инструкция. Моля, обърнете под внимание, че отвората на кабелната обувка трябва да бъде съосен оста на клемата за присъединяване.
- Почистете старателно повърхността на елемента за контрол на полето FSE.

6)

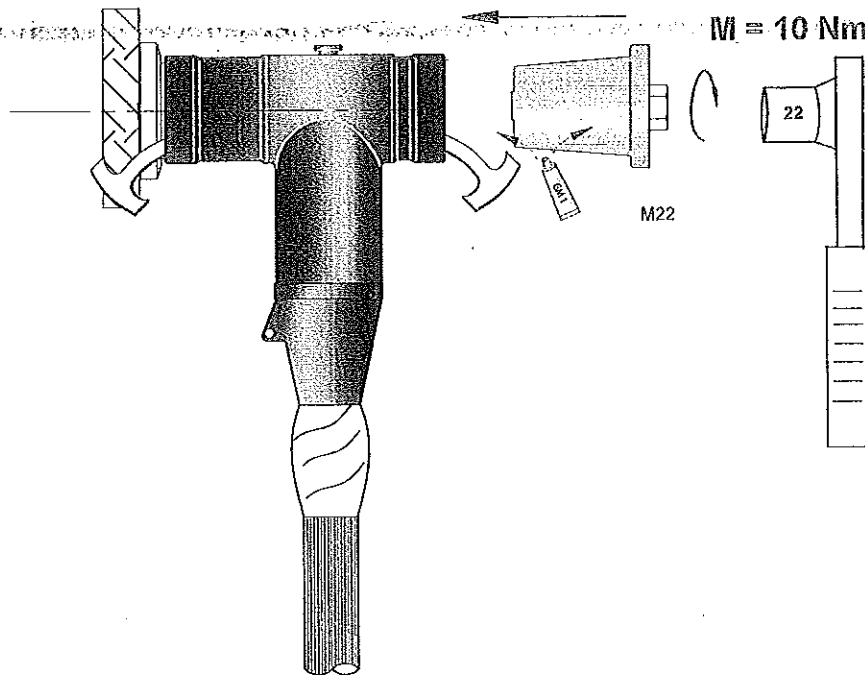


- Навлажнете тялото на T-образната щепселна глава и повърхността на елемента за контрол на полето FSE със смазка и пълнеж GM1. **Внимание: Кабелната обувка да не се навлажнява.**
- Нахлузете тялото на T-образна щепселна глава върху кабела докато отвората на кабелната обувка се центрира в него

Внимание:

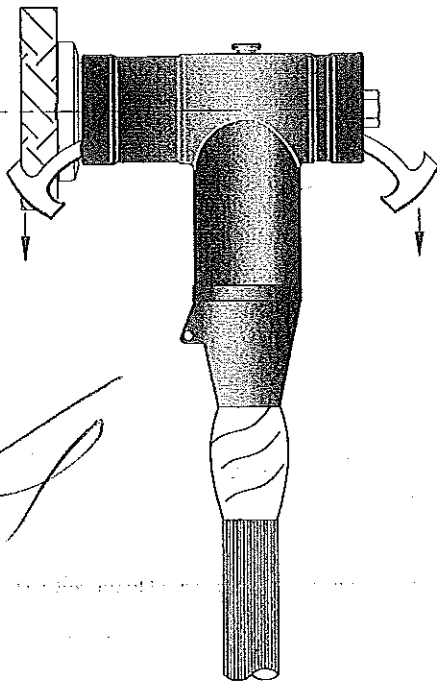
За повторно използване на контактния болт, при затягане на последния, трябва да бъде приложен срязващ момент от 50 Nm.

10)

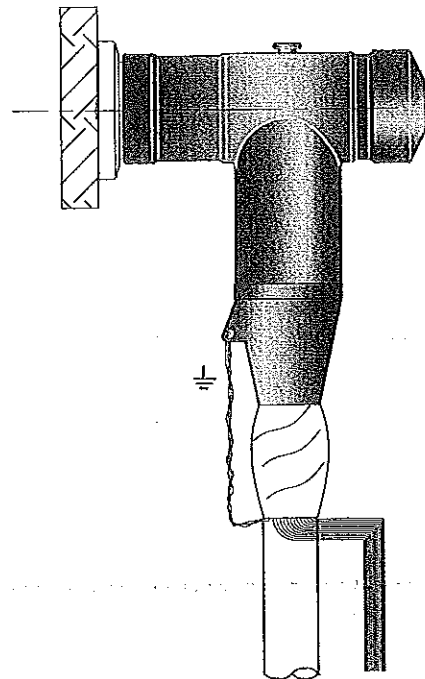


- Навлажнете Т-образното тяло и екранирания изолационен конус със смазката и пълнежа GM1.
- Отрежете втора лента от апликатора АН и го поставете в Т-образното тяло.
- Вкарайте екранирания изолационен конус в Т-образното тяло. Затегнете го с подходящ инструмент. Не прилагайте срязващ момент по-голям от 10 Nm.

11)



12a)



- Издърпайте внимателно приспособлението за изтегляне на въздуха и отстранете остатъците от смазката и пълнежа GM1.

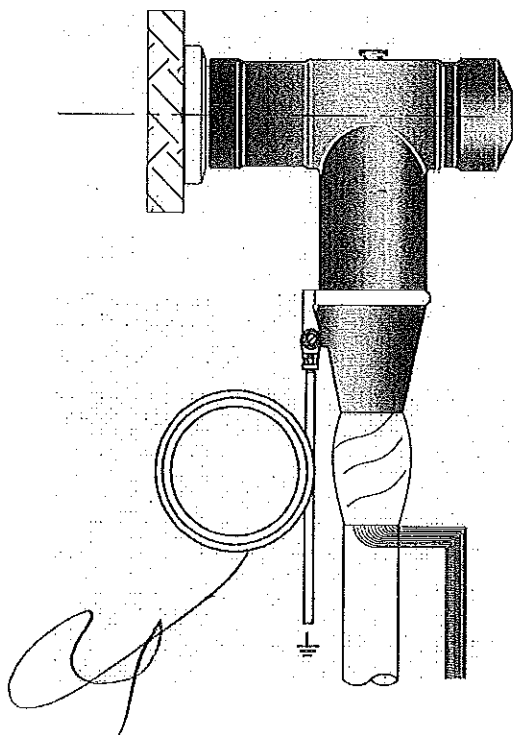
- Поставете полупроводящата защитна капачка върху Т-образното тяло.

Версия без заземителен комплект

- Усчете 3 жички от екрана и ги фиксирайте към отвора на Т-образното тяло.

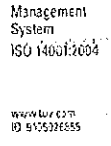
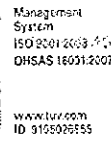
Версия със заземителен комплект -- версия EGA

12b)



- Инсталирайте заземителния комплект към Т-образното тяло и го заземете (съгласно фиг. 12b).
- Допълнителните мерки за заземяване да бъдат съобразени със местните законови разпоредби.

ТОВ "ЕЛЕКТРОТЕХНИКА" - БУЛГАРИЯ
ул. "Солунска" № 10
1000 СФ.П. БУЛГАРИЯ
тел. 00359 2 550 0400, факс: 00359 2 550 0401
e-mail: eltech@eltech.bg
www.eltech.bg



ПРИЛОЖЕНИЕ 9.10.3



Протоколи от типови изпитвания на английски или на български език съгласно таблица 3 от БДС HD 629.1 S2:2006, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Independent, accredited testing station · Member laboratory of STL and LOVAG

TYPE TEST REPORT



NO. 2829.0345.8.887

Cooper Power Systems 2300 Badger Drive Waukesha, WI 53188 USA	CLIENT
--	--------

Cooper Electric Technology (Shanghai) Co. Pudong, Shanghai 201201 PR CHINA	MANUFACTURER
--	--------------

Screened separable connector for extruded Insulation cables	TEST OBJECT
---	-------------

DS 250, 250A Deadbreak plug in straight Connector	TYPE
---	------

14 test samples	SERIAL NO.
-----------------	------------

Rated voltage	U_0/U	12.7/22 kV	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Maximum value between two phase conductors	U_m	24 kV	
Rated current		250 A	
Rated cross section range		16 - 120 mm ²	

CENELEC Harmonization Document HD 629.1 S2: 2006-02 IEC 60502-4: 2005-02 DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06 EN 61442: 2005-04 DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01	NORMATIVE DOCUMENT
--	-----------------------

Test series D1, D2 and additional tests No. 17, 18, 19 and 21	RANGE OF TESTS PERFORMED
---	-----------------------------

12 June 2008 to 10 August 2010	DATE OF TEST
--------------------------------	--------------

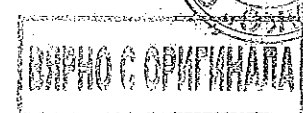
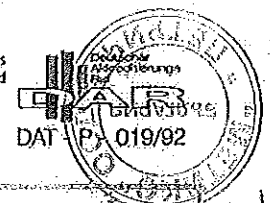
The test of test series D1, D2 and additional tests No. 17, 18, 19 and 21 have been PASSED.	TEST RESULT
--	-------------

H. ZINNBAUER
Head of Centre of Competence
High Power/High Voltage
Berlin, 26 August 2010

D. JEGUST
Test engineer in charge



Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DAkT) e.V. in the fields of HV apparatus and switchgear, power cables and power cable accessories, LV apparatus and switchgear, installation equipment and switching and control equipment.
Institut „Profifeld für elektrische Hochleistungstechnik“ GmbH (IPH Berlin) is a subsidiary of CESI SpA, Milan.



TEST REPORT



NO. 2829.0907.7.666

Cooper Power Systems
2300 Badger Drive
Waukesha, WI 53188
USA

CLIENT

Cooper Electronic Technologies (Shanghai) Co.
Pudong, Shanghai 201201
P.R. China

MANUFACTURER

Screened separable cable connector for single-core cables with extruded plastic insulation

TEST OBJECT

DE250, Deadbreak Elbow Connector

TYPE

13 test samples

SERIAL NO.

Rated voltage	U_0/U	12.7/22 kV	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Maximum value between two phase conductors	U_m	24 kV	
Rated current		250 A	
Rated cross-section range		16 - 120 mm ²	

CENELEC Harmonization Document HD 629.1 S2: 2006-02
IEC 60502-4: 2005-02
DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06
IEC 61442: 2005-03
DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

NORMATIVE DOCUMENT

Test sequences D1, D2 and D3 as well as Special tests Nos. 17 to 21

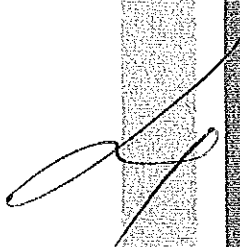
RANGE OF TESTS PERFORMED

25 June 2007 to 7 December 2007

DATE OF TEST

See Sub-clauses 4.7, 5.7, 6.7 and 7.7.

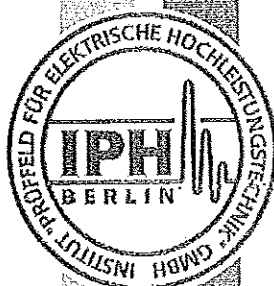
TEST RESULT



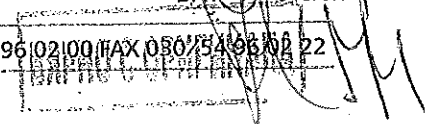

PROF. DR. J. PANNICKE
Managing director
Berlin, 28 August 2008



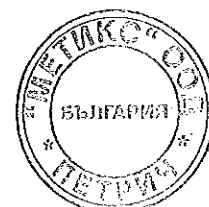
D. JEGUST
Test engineer in charge



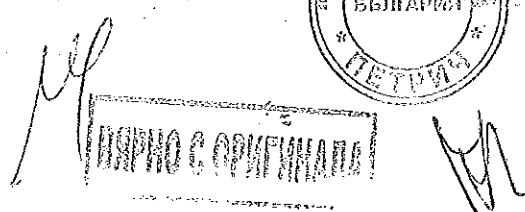
Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DAkT) e.V. in the fields of hv. apparatus and switchgear, power cables and power cable accessories, lv. apparatus and switchgear, installation equipment and switching and control equipment.

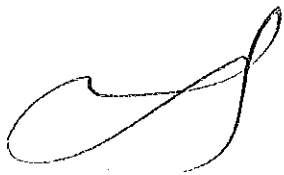
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3. Identity of the test object.....	6
3.1 Technical data and characteristics.....	6
3.2 Identity documents.....	6
4. Tests of test sequence D1.....	7
4.1 Test laboratory.....	7
4.2 Normative document.....	7
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4.5 Test and measuring circuits.....	12
4.6 Test results.....	17
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5. Tests of test sequence D2.....	28
5.1 Test laboratory.....	28
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10.	Drawings.....	65
11.	Identification of test cable.....	69



This test document consists of 69 sheets.

Distribution

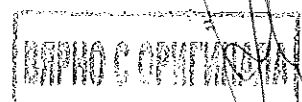
Copy No. 1

Copies Nos. 1 and 2 in English:

Cooper Power Systems
1045 Hockory Street, Pewaukee Wisconsin, 53072
USA

The test results relate only to the object tested.

This document is confidential. Its transfer to third parties as well as its reproduction in extracts require the consent of the client.



1. Participants in the test

- Mr. Jegust IPH test engineer in charge
- Mr. Georgias IPH test engineer
(short-circuit tests and screen fault current initiation test)
- Mr. Makal Cooper Power Systems



2. Test performed

All tests of the test sequences D1, D2, D3 as well as Special tests Nos. 17 to 21 in the following order:

Test sequence	Test	Type of test
D1	1	DC voltage dry test
	2	AC voltage dry test
	3	Partial discharge test at ambient temperature
	4	Impulse voltage test at elevated temperature
	5	Heating cycle voltage test ¹⁾ in air
	6	Heating cycle voltage test ¹⁾ in water
	7	Disconnection/connection
	8	Partial discharge test at elevated and ambient temperatures
	9	Impulse voltage test at ambient temperature
	10	AC voltage dry test

Test sequence	Test	Type of test
D2	1	DC voltage dry test
	2	AC voltage dry test
	3	Thermal short-circuit test of the screen
	4	Thermal short-circuit test of the conductor
	5	Disconnection/connection
	6	Impulse voltage test at ambient temperature
	7	AC voltage dry test

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ВЕРНО С ОПИШВАНАТА

Handwritten signature

Handwritten signature

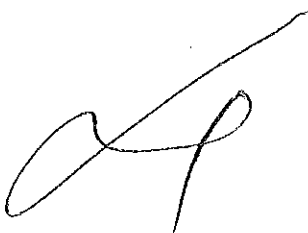
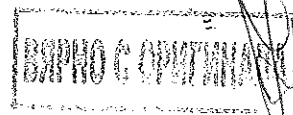
Test performed (continued)

Test sequence	Test	Type of test
D3	14	Operating eye test
	15	Partial discharge test at ambient temperature

Special tests	17	Screen resistance measurement
	18	Screen leakage current measurement ²⁾
	19	Screen fault current initiation test ³⁾
	20	Operating force test
	21	Capacitive test point performance ⁴⁾

The thermal short-circuit test of the screen does not apply because the test object is equipped neither with a connection to the metal screen nor with an adapter for the metal screen of the cable.

Special tests Nos. 17 to 21 have been carried out on separate test objects.

3. Identity of the test object

3.1 Technical data and characteristics

The technical data and characteristics of the test object are defined by the following parameters and specified by the client

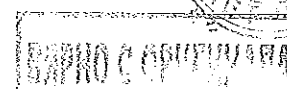
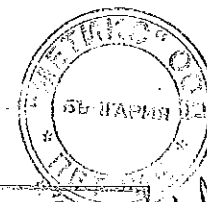
Test object:	Screened separable cable connector for single-core cables with extruded plastic insulation	
Type:	DE250, Deadbreak Elbow Connector	
Manufacturer:	Cooper Electronic Technologies (Shanghai) Co.	
Serial No.:	13 test samples	
Year of manufacture:	2006	
Rated characteristics:	Rated voltage U_0/U	12.7/22 kV
	Maximum value between two phase conductors U_m	24 kV
	Rated current	250 A
	Rated cross-section range of the conductor	16 - 120 mm ²
Design:	Type of cable connection	Screened separable elbow connector, (moulded conductive external layer on EPDM rubber insulation) with capacitive test point
	Cable	Screened single-core cable with extruded insulation, screened
	Cable marking	ENEL ARE4H5EX 12/20kV 70
	Designation of manufacturer	ENEL
	Material of conductor	Al
	Material of screen	Al

3.2 Identity documents

The manufacturer confirms that the test object has been manufactured in compliance with the documents listed in the table below. IPH did not verify this compliance in detail. The Identity of the test object is fixed by the listed documents as following and data submitted by the client:

Name of drawing	Drawing No.	Date of drawing	Author	Notes
Type DE250 Elbow Connector Installation Instructions	IS550-10-1	07/1999	COOPER Power Systems	Sheets 65 to 68

Entry of test objects at IPH: 22 June 2007



4. Tests of test sequence D1

4.1 Test laboratory

High-voltage test laboratory, high-voltage hall 2



4.2 Normative document

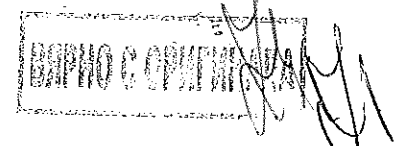
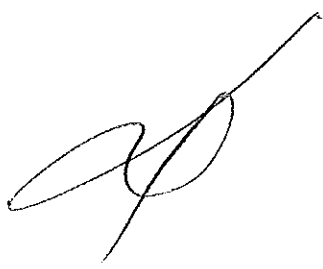
CENELEC Harmonization Document HD 629.1 S2: 2006-02

DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06

IEC 60502-4: 2005-02

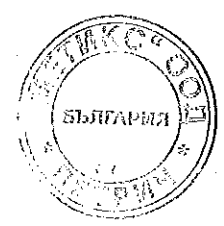
IEC 61442: 2005-03

DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01



4.3 Required test parameters

Test No.	Type of test	Required test parameters
1	DC voltage dry test	Test voltage $6 \times U_0$: 76 kV Duration of test: 15 min Polarity: Negative
2	AC voltage dry test	Test voltage $4.5 \times U_0$: 57 kV Test frequency: 50 Hz Duration of test: 5 min
3	Partial discharge test at ambient temperature	Prestress voltage $2.25 \times U_0$: 29 kV Measuring voltage $2.00^{(1)} \times U_0$: 25 kV Prestress duration: 1 min Measuring time: 1 min
4	Impulse voltage test at elevated temperature	Front time: 1.2 μ s Virtual time to half value: 50 μ s Test voltage: 125 kV Number of impulses: 10 impulses Polarity: pos./neg. Conductor temperature: 95 .. 100 °C ²⁾
5	Heating cycle voltage test in air	<ul style="list-style-type: none"> • Continuous AC voltage Test voltage $2.5 \times U_0$: 32 kV Test frequency: 50 Hz Duration of test: 21 day • Thermal cycles Number of cycles: 63 Cycle (8 h): 5 hours of heating + 3 hours of cooling Conductor temperature during the last 2 hours of heating cycle: 95 .. 100 °C ²⁾
6	Heating cycle voltage test in water	See test No. 5, additionally Height of water: 1 m
7	Disconnection/connection	Number of complete operations: 5
8	Partial discharge test at ambient temperature and elevated temperature	See test No. 3, except Conductor temperature: U_0 resp. 95..100 °C ²⁾
9	Impulse voltage test at ambient temperature	See test No. 4, except Conductor temperature: U_0 Duration of test: 15 min



ВЕРНО С ОРИГИНАЛОМ

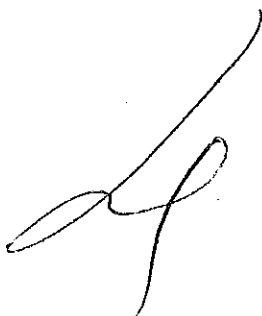
Required test parameters (continued)

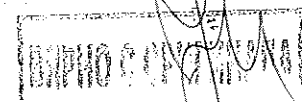
Test No.	Type of test	Required test parameters
10	AC voltage dry test	Test voltage $2.5 \times U_0$: 32 kV Test frequency: 50 Hz Duration of test: 15 min



Notes to the table of required test parameters:

- 1) CENELEC Harmonization Document HD 629.1 S2: 2006-02, Table 7, requires the partial discharge to be measured at a measuring voltage of $1.73 \times U_0$ or $2.00 \times U_0$ respectively. The measurement was done at $2 \times U_0$ because the standard of the cable used for the test requires a test voltage $> 1.73 \times U_0$.
- 2) Acc. to IEC 61442: 2005-03, Clause 9, the heating current to be applied in this test depends on the set conductor temperature. HD 620 specifies that this shall be 5 K to 10 K above the maximum permissible cable conductor temperature of 90 °C for XLPE-insulated cables. In the given case this requirement resulted in a heating current, which exceeded the current carrying capacity respectively the rated current of the bushing. The resulting higher thermal load of the bushing was accepted and was agreed with the client before the test was started.




4.4 Test arrangement

The client arranged each of the four cable connectors under test (test objects) on a test line. Every two of the test objects were connected by a coupling unit of DE250 type (manufacturer: Cooper). The test objects were mounted on cable lines of approx. 3 m length of above mentioned cable type. To apply the test voltage, each of the test lines was equipped with a heat shrinkable termination. All test voltages were applied to the core against the cable screen, which was connected to the test earth.

The tests did not start earlier than 24 hours after the installation of the accessories on the cable lines.

4.4.1 DC voltage dry test (test 1)

Test arrangement to IEC 61442: 2005-03, Clause 5

4.4.2 AC voltage dry test (test 2)

Test arrangement to IEC 61442: 2005-03, Clause 4

4.4.3 Partial discharge test at ambient temperature (test 3)

Test arrangement to IEC 61442: 2005-03, Clause 7, with the following simplifications:

Due to the short cable lengths, neither double impulse diagram nor terminating impedance or reflexion suppressor were used. The PD calibrator was connected in parallel to the test object only at the detector-remote end.

4.4.4 Impulse voltage test at elevated temperature (test 4)

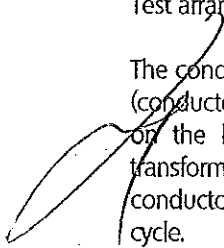
Test arrangement to IEC 61442: 2005-03, Clause 6

The conductors of the four test objects were connected in series. To obtain the necessary elevated (conductor) temperature, the conductor of the single-core cable was heated with single-phase AC on the basis of the induction principle by leading the conductor loop through a heating transformer. The supply voltage of the heating circuit was automatically controlled. So, the elevated conductor temperature remained constant ± 2 K during the last 2 hours of the 5-hour heating cycle.

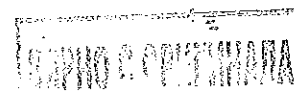
4.4.5 Heating cycle voltage test in air (test 5)

Test arrangement to IEC 61442: 2005-03, Clauses 4 and 9

For the test arrangement of the heating circuit see Sub-clause 4.4.4. The ambient temperature was kept to $20 \text{ }^\circ\text{C} \pm 5 \text{ K}$. The thermal cycling was implemented by a test cycle control facility.



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Test arrangement (continued)

4.4.6 Heating cycle voltage test in water (test 6)

In addition to the test arrangement to Sub-clause 4.4.5, the test objects were arranged in a water-filled tank (water bath). The water-level was 1 m above the upper edge of the test objects (see Figure 1).

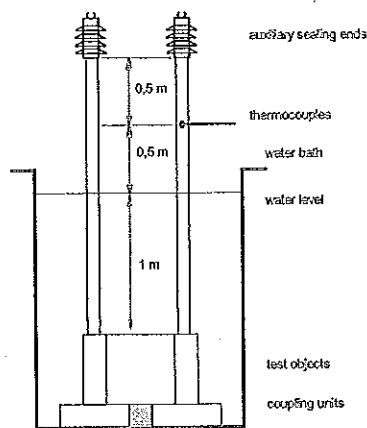


Figure 1: Test of the connectors in the water bath

4.4.7 Disconnection/connection (test 7)

None

4.4.8 Partial discharge test at elevated and ambient temperatures (test 8)

See Sub-clause 4.4.3

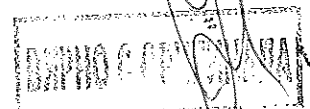
For the test at elevated temperature see also Sub-clause 4.4.4.

4.4.9 Impulse voltage test at ambient temperature (test 9)

See Sub-clause 4.4.4, but without additional conductor heating

4.4.10 AC voltage dry test (test 10)

See Sub-clause 4.4.2



4.5 Test and measuring circuits

4.5.1 DC voltage dry test (test 1)

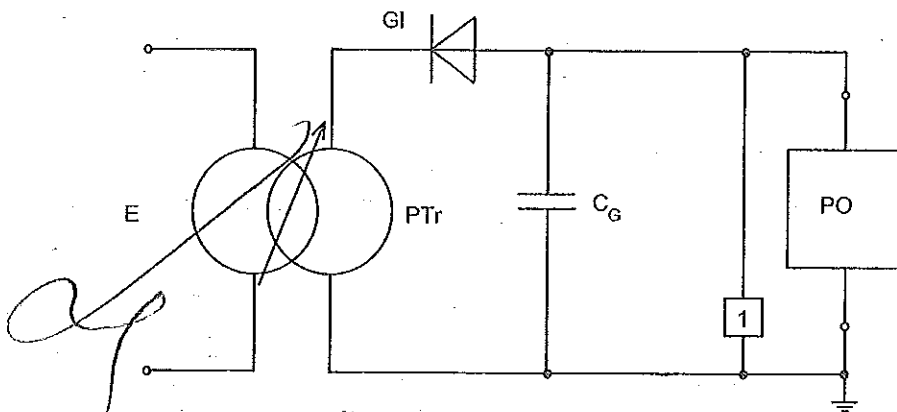
Technical data of test circuit

DC voltage source

Test transformer:	Rated voltage	100 kV
	Rated power	8 kVA
	Rated frequency	50 Hz
Rectifier:	Rated voltage	135 kV
	Rated current	15 mA
Smoothing capacitor:	Capacitance	10 nF

Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	Ohmic divider with MU11 (TuRD) peak voltmeter	Ratio 560



- E Supply
- PTr Test transformer with variable transformer connected in series
- Gl Rectifier
- CG Smoothing capacitor
- 1 Measuring point
- PO Test object

Figure 2: Test and measuring circuit for the DC voltage dry test



ОБНОВЕН СЕРТИФИКАТ

Test and measuring circuits (continued)

4.5.2 AC voltage dry test (tests 2 and 10)

Technical data of test circuit

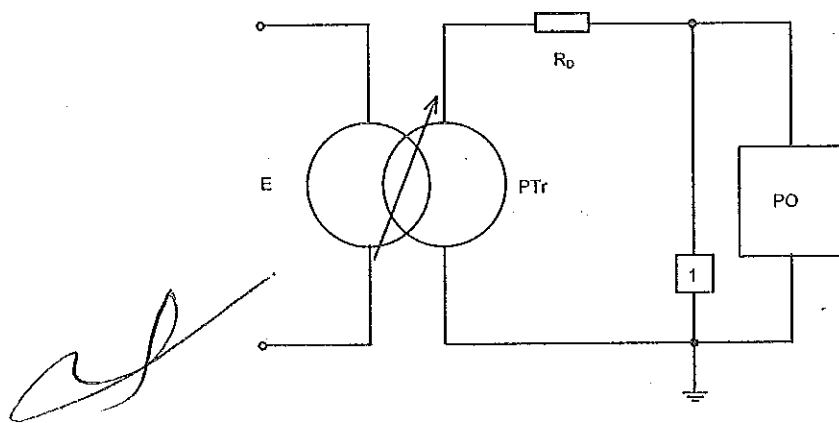
Single-phase AC voltage source

Test transformer:	Rated voltage	125 kV
	Rated power	100 kVA
	Rated frequency	50 Hz
	Damping resistance	0.67 kΩ



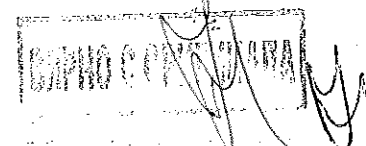
Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	Capacitive divider with MU11 (TuRD) peak voltmeter	Ratio 864



- E Supply
- PTr Test transformer with variable transformer connected in series
- R_d Damping resistance
- 1 Measuring point
- PO Test object

Figure 3: Test and measuring circuit for the AC voltage dry test



Test and measuring circuits (continued)

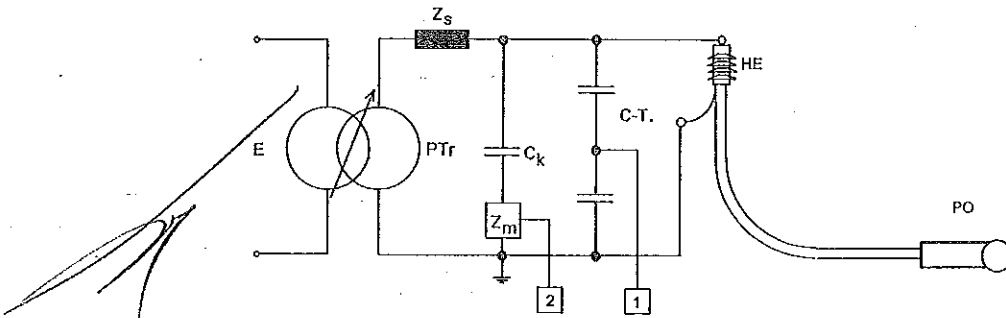
4.5.3 Partial discharge test at elevated and ambient temperatures (tests 3 and 8)

Technical data of test circuit

Test transformer:	Rated voltage	125 kV
	Rated power	100 kVA
	Rated frequency	50 Hz
	Damping resistance	0.67 kOhm

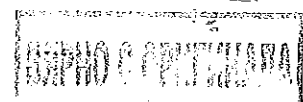
Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	- Capacitive divider with MU11 peak voltmeter (TuRD)	Ratio 864
2	Partial discharges	- Coupling capacitor of WMCF type (TuRD) - Coupling four pole of COPL542A type - PD measuring station of MPD540 type - USB interface 502 - PD calibrator of CAL542 type (mtronix)	$C_k = 1 \text{ nF}$ Band width = 300 MHz Center frequency 400 kHz Output 10 pC



- E Supply
- PTr Test transformer with variable transformer connected in series
- Z_s Blocking impedance
- C_k Coupling capacitor
- Z_m Coupling four pole (measuring impedance)
- C-T. Capacitive divider
- HE Auxiliary sealing end
- 1, 2 Measuring points
- PO Test object

Figure 4: Test and measuring circuit for the partial discharge test (schematic without heating circuit, for the heating circuit see Figure 6, Sheet 16)

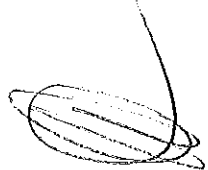


Test and measuring circuits (continued)

4.5.4 Impulse voltage test at elevated and ambient temperatures (tests 4 and 9)

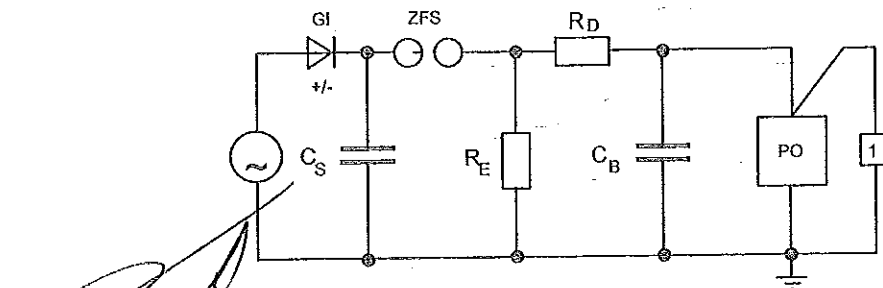
Technical data of test circuit

Impulse circuit:	Number of stages	$n = 2$
	Impulse capacitance	$C_S = 70 \text{ nF}$
	Loading capacitance	$C_B = 1.5 \text{ nF}$
	Damping resistance	$R_D = 122 \text{ } \Omega$
	Discharge resistance	$R_E = 1100 \text{ } \Omega$



Technical data of measuring circuit

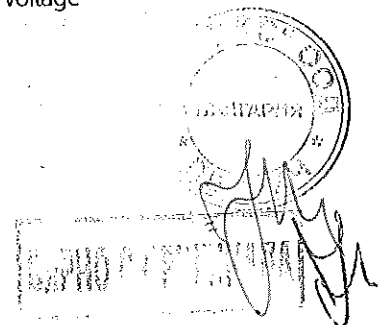
Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	R divider of SMR 10/770 type (made by TuRD) with digital measuring instrument of DMI 551 type (made by Haefely) and TDS 220 digital oscilloscope (made by Tektronix)	Ratio 466.9



- GI Rectifier
- C_S Impulse capacitance
- ZFS Spark gap
- R_E Discharge resistance
- R_D Damping resistance
- C_B Loading capacitance
- PO Test object
- 1 Measuring point

Figure 5: Test and measuring circuit for the impulse voltage test (without heating circuit; for this see Figure 6, but connection of impulse generator instead of single-phase AC voltage source)

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Test and measuring circuits (continued)

4.5.5 Heating cycle in air and in water, resp. (tests 5 and 6)

Technical data of test circuit

Single-phase continuous AC voltage source

Test transformer:	Rated voltage	125 kV
	Rated power	100 kVA
	Rated frequency	50 Hz

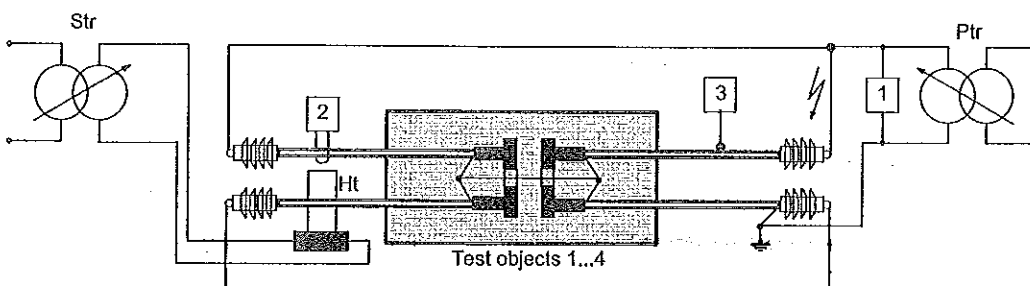
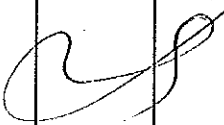
Heating circuit

Heating transformers:	Rated primary voltage	380 V
	Rated power	57 kVA
	Max. secondary current	1000 A
	Rated frequency	50 Hz



Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	Capacitive divider with MU11 peak voltmeter (TuRD)	Ratio 864
2	Heating current	LH 2040 prong-type ammeter	2000-A (AC) measuring range
3	Temperature	CoCo thermocouples in connection with Almeno temperature measuring system of 2290-3 type (made by Ahlborn)	--



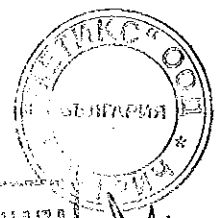
- Str Variable transformer
- Ht Heating transformer
- 1 - 3 Measuring points
- Ptr Test transformer with variable transformer connected in series

Figure 6: Test and measuring circuit for the heating cycle tests in air and in water, resp.

4.5.6 Disconnection/connection (test 7)

None

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4.6 Test results

4.6.1 DC voltage dry test (test 1)

Polarity: Negative

Duration of test after having reached full voltage: 15 min

Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C

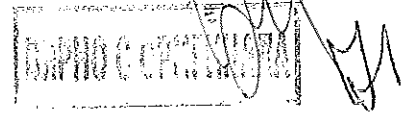


Test arrangement			Test voltage	Result
No. of test object	Voltage applied to	Earthed		
			kV	
1	Conductor	Screen	-76	No disruptive discharge
2	Conductor	Screen		No disruptive discharge
3	Conductor	Screen		No disruptive discharge
4	Conductor	Screen		No disruptive discharge

Notes:

Two test lines were tested together, they were connected by a coupling unit.





Test results (continued)

4.6.2 AC voltage dry test (test 2)

Duration of test after having reached full voltage: 5 min

Test frequency: 50 Hz

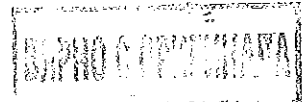
Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C



Test arrangement			Test voltage	Result
No. of test object	Voltage applied to	Earthed	kV	
1	Conductor	Screen	57	No disruptive discharge
2	Conductor	Screen		No disruptive discharge
3	Conductor	Screen		No disruptive discharge
4	Conductor	Screen		No disruptive discharge

Notes:

Two test lines were tested together, they were connected by a coupling unit.



Test results (continued)

4.6.3 Partial discharge test at ambient temperature (test 3)

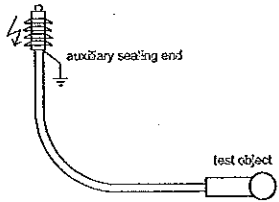
Test frequency: 50 Hz

Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C

Calibration of the test circuit by calibrator output 10 pC



Measured PD values

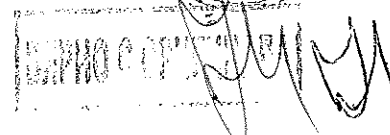
Test arrangement			Prestress voltage	Measuring voltage	Measured PD value
			(1 min)	(1 min)	
No. of test object	Voltage applied to	Earthed	kV	kV	pC
1	Conductor	Screen	29	25	< 1 ¹⁾
2	Conductor	Screen			
3	Conductor	Screen	29	25	< 1 ¹⁾
4	Conductor	Screen			

Notes:

Two test lines were tested together, they were connected by a coupling unit.

¹⁾ Basic disturbance level at same value





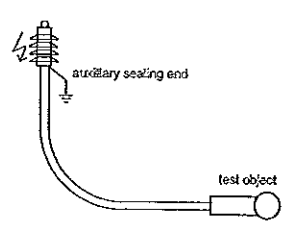
Test results (continued)

4.6.4 Impulse voltage test at elevated temperature (test 4)

Full wave: Front time $T_1 = 2.67 \mu s$
 Virtual time to half value $T_2 = 54 \mu s$

Test temperature: Ambient temperature $25 \text{ }^\circ\text{C}$
 Conductor temperature $95..100 \text{ }^\circ\text{C}$

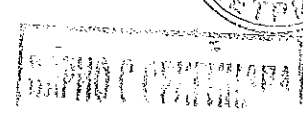


Test arrangement			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	Number of impulses/disruptive discharges
1	Conductor	Screen		
2	Conductor	Screen	+125 ¹⁾	10/0 ¹⁾
3	Conductor	Screen	-125 ¹⁾	10/0 ¹⁾
4	Conductor	Screen		

Notes:

¹⁾ All four test lines were connected to form one closed conductor loop for heating the latter. Therefore, all test lines were simultaneously tested. Providing separate test results for each of the test lines is not possible.






Test results (continued)

4.6.5 Heating cycle voltage test in air (test 5)

Duration of test: 21 days
 Test frequency: 50 Hz
 Test temperature: Ambient temperature 25 °C
 Conductor temperature 95-100 °C
 Number of load cycles: 63



Test arrangement			Continuous AC withstand voltage	Heating current	Result
No. of test object	Voltage applied to	Earthed	kV	A	
1	Conductor	Screen	32 ¹⁾	310 ^{1),2)}	No disruptive discharge
2	Conductor	Screen			No disruptive discharge
3	Conductor	Screen			No disruptive discharge
4	Conductor	Screen			No disruptive discharge

Notes:

¹⁾ All four test lines were connected to form one closed conductor loop for heating the latter. Therefore, all test lines were simultaneously tested. Providing separate test results for each of the test lines is not possible.

²⁾ The heating current was regulated in such a way that a constant conductor temperature was obtained after approx. 3 hours of heating. This was kept constant ± 2 K for the remaining 2 hours of the 5-hour heating period.



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Test results (continued)

4.6.6 Heating cycle voltage test in water (test 6)

Duration of test: 21 days
 Test frequency: 50 Hz
 Test temperature: Ambient temperature 20 °C
 Water temperature 21 °C
 Conductor temperature 95..100 °C
 Number of load cycles: 63

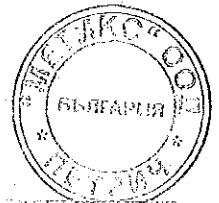
Test arrangement			Continuous AC withstand voltage	Heating current	Result
No. of test object	Voltage applied to	Earthed			
			kV	A	
1	Conductor	Screen	32 ¹⁾	310 ^{1), 2)}	No disruptive discharge
2	Conductor	Screen			No disruptive discharge
3	Conductor	Screen			No disruptive discharge
4	Conductor	Screen			No disruptive discharge

Notes:

- 1) All four test lines were connected to form one closed conductor loop for heating the latter. Therefore, all test lines were simultaneously tested. Giving separate test results for each of the test lines is not possible.
- 2) The heating current was regulated in such a way that a constant conductor temperature was obtained after approx. 3 hours of heating. This was kept constant ± 2 K for the remaining 2 hours of the 5-hour heating period.

4.6.7 Disconnection/connection (test 7)

Each of the four test objects was disconnected and connected altogether five times as specified by the manufacturer's assembly instructions. No visible damage was found on the contact.



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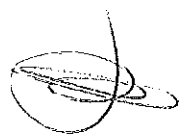
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Test results (continued)

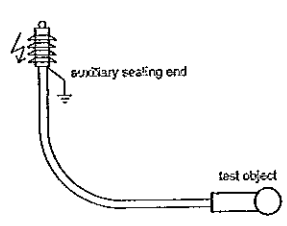
4.6.8 Partial discharge test at elevated and ambient temperatures (test 8)

Test frequency: 50 Hz
 Test temperature: Ambient temperature 20 °C
 Conductor temperature 20 °C and elevated, resp. 95-100 °C

Calibration of the test circuit by calibrator output 10 pC

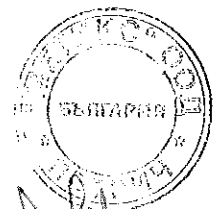


Measured PD values

Test arrangement			Prestress voltage (1 min)	Measuring voltage (1 min)	Measured PD value
					
No. of test object	Voltage applied to	Earthed	kV	kV	pC
Measured PD values at elevated temperature					
1	Conductor	Screen	29	25	< 1.2 ¹⁾
2	Conductor	Screen			
3	Conductor	Screen	29	25	< 1 ¹⁾
4	Conductor	Screen			
Measured PD values at ambient temperature					
1	Conductor	Screen	29	25	< 1 ¹⁾
2	Conductor	Screen			
3	Conductor	Screen	29	25	< 1 ¹⁾
4	Conductor	Screen			

Notes:

¹⁾ Two of the respective test lines were connected to form one closed conductor loop for heating the latter. Thus, two test lines were simultaneously tested. Giving separate test results for each of the test lines is not possible.



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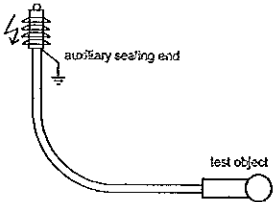
Test results (continued)

4.6.9 Impulse voltage test at ambient temperature (test 9)

Full wave: Front time $T_1 = 1.54 \mu s$
 Virtual time to half value $T_2 = 52.0 \mu s$

Test temperature: Ambient temperature $20 \text{ }^\circ\text{C}$
 Conductor temperature $20 \text{ }^\circ\text{C}$

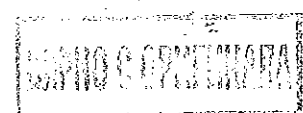


Test arrangement			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	Number of impulses/disruptive discharges
1	Conductor	Screen		
2	Conductor	Screen	+125	10/0
3	Conductor	Screen	-125	10/0
4	Conductor	Screen		

Notes:

All test lines were tested simultaneously.






Test results (continued)

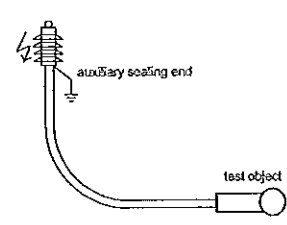
4.6.10 AC voltage dry test (test 10)

Duration of test after having reached full voltage: 15 min

Test frequency: 50 Hz

Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C

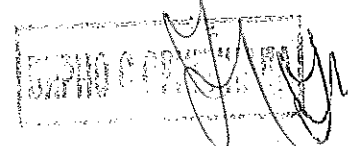


Test arrangement			Test voltage	Result
				
No. of test object	Voltage applied to	Earthed	kV	
1	Conductor	Screen	32	No disruptive discharge
2	Conductor	Screen		
3	Conductor	Screen		
4	Conductor	Screen		

Notes:

All test lines were tested simultaneously.





4.7 Assessment of the results of test sequence D1

• Test 1

In the DC voltage dry test at -76 kV/15 min, no disruptive discharge occurred on any of the four test objects.

• Test 2

In the 50-Hz AC voltage dry test at 57 kV/5 min, no disruptive discharge occurred on any of the four test objects.

• Test 3

In the partial discharge test at ambient temperature and at 50-Hz AC voltage of 25 kV, none of the four test objects exceeded the permissible maximum partial discharge value of 10 pC. The partial discharge value measured was not higher than 1.0 pC.

• Test 4

In the impulse voltage test at elevated temperature with 10 test impulses of 125-kV lightning impulse voltage 1.2/50 of each polarity, no disruptive discharge occurred on any of the four test objects.

• Test 5

All of the four test objects were subjected to 63 electrical heat cycles in air. In the simultaneous 50-Hz continuous AC voltage dry test at 32 kV, no disruptive discharge occurred on any of the four test objects.

• Test 6

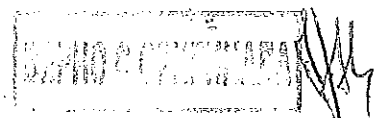
All of the four test objects were subjected to 63 electrical heat cycles in water. No disruptive discharge occurred on any of the four test objects, when they were tested simultaneously in water and by 50-Hz continuous AC voltage of 32 kV.

• Test 7

After 5 complete operations of disconnection and connection, no visible damage was found on the contact.

• Test 8

In the partial discharge test at elevated and ambient temperatures at 50-Hz AC voltage of 25 kV, none of the four test objects exceeded the permissible maximum partial discharge value of 10 pC. The partial discharge value measured was not higher than 1.2 pC.



Assessment of the results of test sequence D1 (continued)

• Test 9

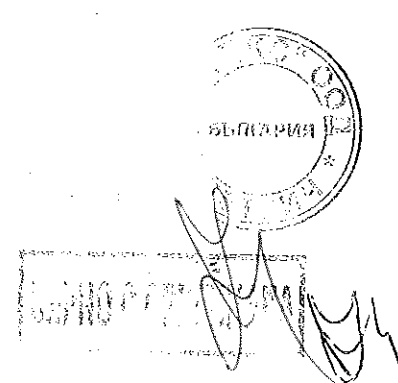
In the impulse voltage test at ambient temperature with 10 test impulses of 125-kV lightning impulse voltage 1.2/50 of each polarity, no disruptive discharge occurred on any of the four test objects.

• Test 10

In the 50-Hz AC voltage dry test at 32 kV/15 min, no disruptive discharge occurred on any of the four test objects.

All of the four test objects meet the requirements specified by CENELEC Harmonization Document HD 629.1 S2: 2006-02.

The tests of the test sequence D1 have been PASSED.



5. Tests of test sequence D2

5.1 Test laboratory

High-voltage test laboratory, high-voltage hall 2 and
High-power test laboratory, high-current bay

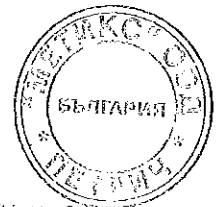


5.2 Normative document

CENELEC Harmonization Document HD 629.1 S2: 2006-02
DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06
IEC 61442: 2005-03
DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

5.3 Required test parameters

Test No.	Type of test	Required test parameters	
1	DC voltage dry test	Test voltage $6 \times U_0$: Duration of test: Polarity:	76 kV 15 min Negative
2	AC voltage dry test	Test voltage $4.5 \times U_0$: Test frequency: Duration of test:	57 kV 50 Hz 5 min
3	Thermal short-circuit test of the screen	Short-circuit-screen final temperature: Number of short-circuits:	250 °C 2
4	Thermal short-circuit test of the conductor	Short-circuit-conductor final temperature: Number of short-circuits:	250 °C 2
5	Disconnection/connection	Number of complete operations:	5
6	Impulse voltage test at ambient temperature	Front time: Virtual time to half value: Test voltage: Number of impulses: Polarity: Conductor temperature:	1.2 μs 50 μs 125 kV 10 impulses pos./neg. θ_U
7	AC voltage dry test	Test voltage $2.5 \times U_0$: Test frequency: Duration of test:	32 kV 50 Hz 15 min



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5.4 Test arrangement

Each of the three connectors under test was arranged on a test line by the client. The connectors were completed by bushings or terminations. The test objects were mounted on cable lines of approx. 3-m length of above mentioned cable type. To apply the test voltage, each of the test lines was equipped with a heat shrinkable termination.

All test voltages were applied to the core against the cable screen, which was connected to the test earth. The tests did not start earlier than 24 hours after the installation of the accessories on the cable lines.



5.4.1 DC voltage dry test (test 1)

Test arrangement to IEC 61442: 2005-03, Clause 5

5.4.2 AC voltage dry test (test 2)

Test arrangement to IEC 61442: 2005-03, Clause 4

5.4.3 Thermal short-circuit test of the screen (test 3)

Test arrangement to IEC 61442: 2005-03, Clause 10

5.4.4 Thermal short-circuit test of the conductor (test 4)

Test arrangement to IEC 61442: 2005-03, Clause 11

The three test objects were arranged on an assembly plate on equal level with phase centre distances of 110 mm. Additionally the cables were fixed by cable clamps at a distance of 350 mm from the axis of the cable connector centre. For the test, a short-circuit bridge of 30 mm x 10 mm was connected at the three bushings, and the auxiliary sealing end sides of the three test lines were connected three-pole to the short-circuit current source.

5.4.5 Disconnection/connection (test 5)

None

5.4.6 Impulse voltage test at ambient temperature (test 6)

Test arrangement to IEC 61442: 2005-03, Clause 6

5.4.7 AC voltage dry test (test 7)

See Sub-clause 5.4.2



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5.5 Test and measuring circuits

5.5.1 DC voltage dry test (test 1)

See Sub-clause 4.5.1

5.5.2 AC voltage dry test (test 2)

See Sub-clause 4.5.2

5.5.3 Thermal short-circuit test of the screen (test 3)

See following sheet

5.5.4 Thermal short-circuit test of the conductor (test 4)

See following sheet

5.5.5 Disconnection/connection (test 5)

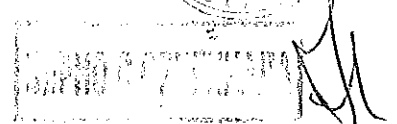
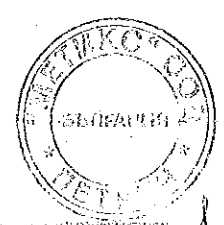
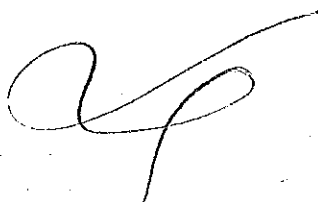
None

5.5.6 Impulse voltage test at ambient temperature (test 6)

See Sub-clause 4.5.4

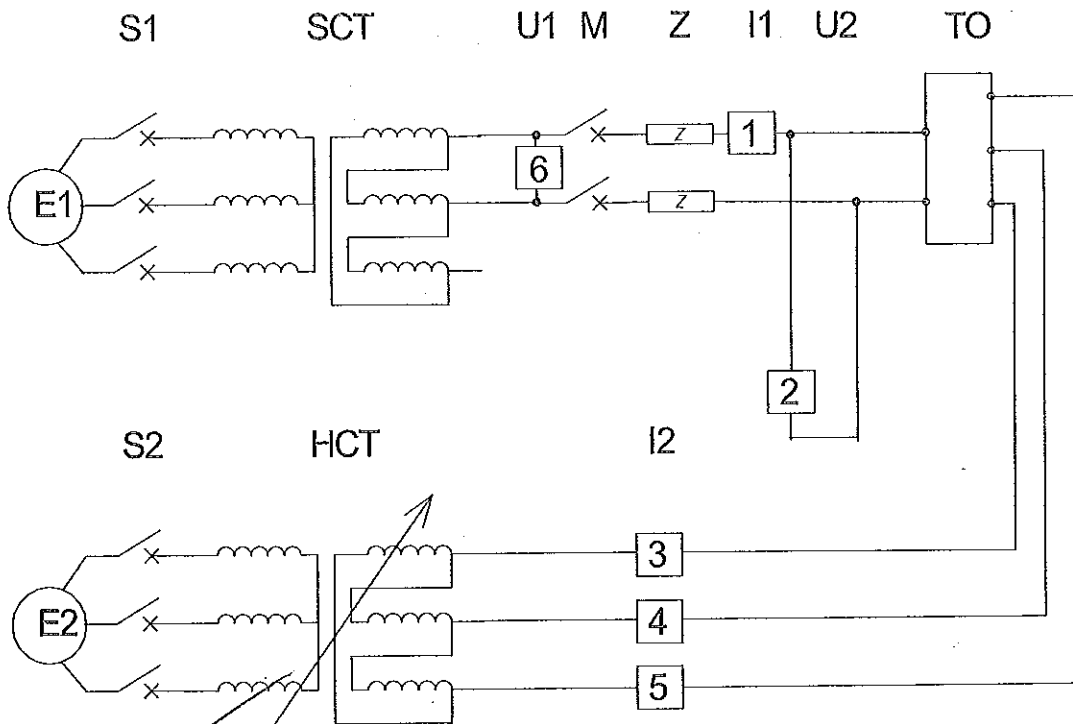
5.5.7 AC voltage dry test (test 7)

See Sub-clause 4.5.2



Test and measuring circuits (continued)

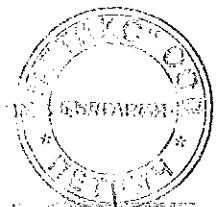
Thermal short-circuit test of the screen (test 3)



- E1 Power supply for short circuit test
- E2 Power supply for preheating
- S1 Master breaker for SCT
- S2 Main switch for HCT
- SCT Short-circuit transformer
- HCT High-current transformer
- Z Test circuit impedance
- M Making switch
- U Measurement of voltage drop or transient voltage, resp.
- I1 Measurement of short-circuit current
- I2 Measurement of heating current
- TO Test object
- 1-6 Measuring points

Screens were connected in series.

Figure 7: Test and measuring circuits for the short-time current test of the screens with heated cable conductors



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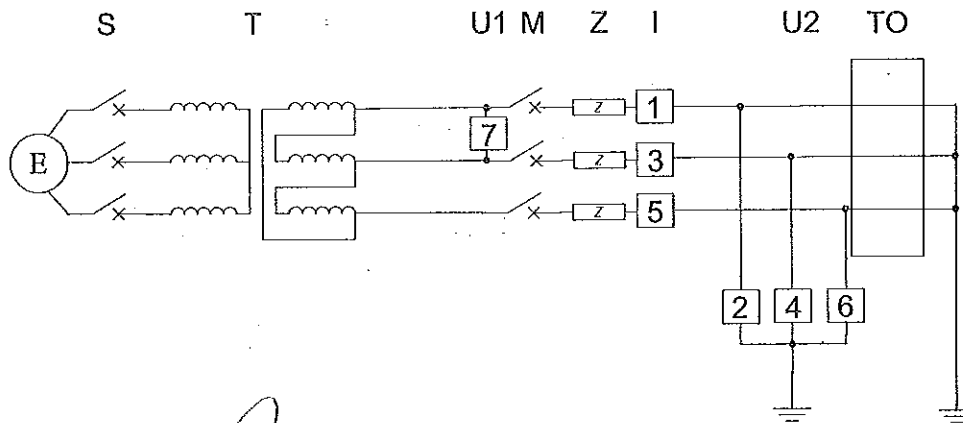
Technical data of measuring circuits

Test No.	Measuring point	Measured quantity	Measuring sensor/device
207 4371	1	Current	Shunt
and	2	Voltage	RC divider
207 4372	3	Current L1	CT
	4	Current L2	CT
	5	Current L3	CT
	6	Test voltage	R divider
Recording instruments: Measuring points 1 to 2: BAKKER BE 256 transient recorder			




Test and measuring circuits (continued)

Thermal short-circuit test of the conductor (test 4)



- E Power supply
- S Master breaker
- T Short-circuit transformer
- U1 Test voltage measurement
- Z Test circuit impedance
- M Making switch
- U2 Measurement of voltage drop or transient voltage, resp.
- I Measurement of short-circuit current
- TO Test object
- 1 - 6 Measuring points

Figure 8: Test and measuring circuit for the thermal short-circuit test of the conductor

Technical data of measuring circuits

Test No.	Measuring point	Measured quantity	Measuring sensor/device
207 4375	1	Current L1	Shunt
and	3	Current L2	Shunt
207 4376	5	Current L3	Shunt
	2	Voltage L1	RC divider
	4	Voltage L2	RC divider
	6	Voltage L3	RC divider
Recording Instruments: Measuring points 1 to 6: BAKKER BE 256 transient recorder			



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5.6 Test results

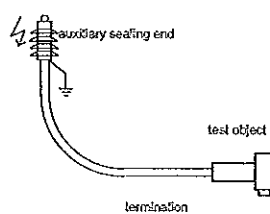
5.6.1 DC voltage dry test (test 1)

Polarity: Negative

Duration of test after having reached full voltage: 15 min

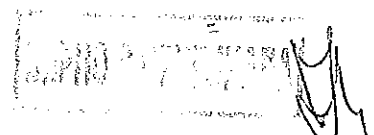
Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C



Test arrangement			Test voltage	Result
No. of test object	Voltage applied to	Earthed		
			kV	
5	Conductor	Screen	-76	No disruptive discharge
6	Conductor	Screen	-76	No disruptive discharge
7	Conductor	Screen	-76	No disruptive discharge

Notes:





Test results (continued)

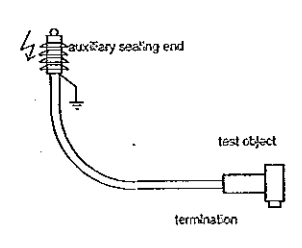
5.6.2 AC voltage dry test (test 2)

Duration of test after having reached full voltage: 5 min

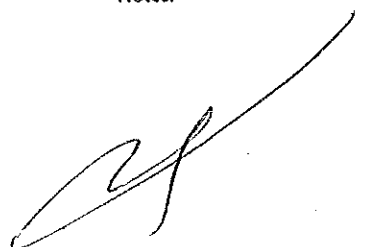
Test frequency: 50 Hz

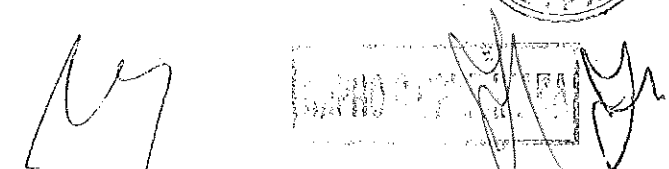
Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C



Test arrangement			Test voltage kV	Result
No. of test object	Voltage applied to	Earthed		
				
5	Conductor	Screen	57	No disruptive discharge
6	Conductor	Screen	57	No disruptive discharge
7	Conductor	Screen	57	No disruptive discharge

Notes: -





Test results (continued)

5.6.3 Thermal short-circuit test of the screen (test 3)

Test object: Elbow connector, screen
 Condition of test object before test: Prestressed
 Ambient temperature: 18 °C



Test parameters:

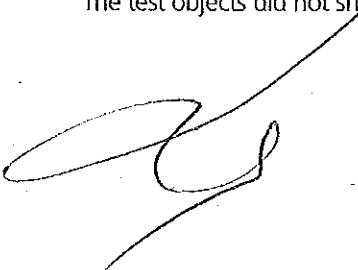
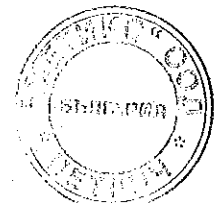
Test No.		207 4371	207 4372
Test voltage	V	470	470
Peak short-circuit current	kA	L1	3.70
		L2	-
		L3	-
Symmetrical short-circuit current	kA	L1	2.44
		L2	-
		L3	-
		Average	-
Duration of short-circuit	ms	1080	1082
Joule integral 10 ⁶	A ² s	L1	6.41
		L2	-
		L3	-
Symmetrical short-circuit current 1 s	kA	2.54	2.54
Notes		1 st thermal test	2 nd thermal test
Evaluation		OK	OK

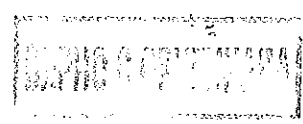
Notes:

OK: The test object is able to carry the short-circuit current.

Condition of test object after test:

The test objects did not show any externally visible changes or damage.




5.6.4 Thermal short-circuit test of the conductor (test 4)

Condition of test object before test: Prestressed by previous tests
 Connection of the test object: By 70-mm² cable
 Short-circuit point: At the bushings
 Ambient temperature: 18 °C

Test parameters:

Test No.	207 4375		207 4376	
Test voltage	V	470	470	470
Peak short-circuit current	kA	L1	13.1	13.1
		L2	11.3	11.2
		L3	12.7	12.8
Symmetrical short-circuit current	kA	L1	8.52	8.54
		L2	8.13	8.10
		L3	8.42	8.41
		Average	8.36	8.35
Duration of short-circuit	ms	1083	1080	1080
Joule integral 10 ⁶	A ² s	L1	79.3	78.7
		L2	72.0	71.9
		L3	76.6	76.4
Symmetrical short-circuit current 1 s	kA	8.70	8.68	8.68
Notes		1 st thermal test	2 nd thermal test	2 nd thermal test
Evaluation		OK	OK	OK



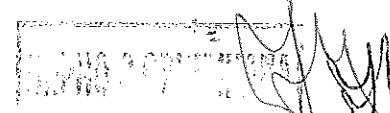
Notes:

OK: The test object is able to carry the short-circuit current.

Condition of test object after test:

The test objects did not show any externally visible changes or damage.



Test results (continued)

5.6.5 Disconnection/connection (test 5)

Each of the three test objects was disconnected and connected altogether five times as specified by the manufacturer's assembly instructions. No visible damage was found on the contact.

5.6.6 Impulse voltage test at ambient temperature (test 6)

Full wave: Front time $T_1 = 1.17 \mu s$
 Virtual time to half value $T_2 = 46 \mu s$

Test temperature: Ambient temperature 20 °C
 Conductor temperature 20 °C

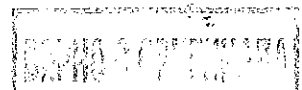
Test arrangement			Test voltage	Result
No. of test object	Voltage applied to	Earthed	kV	Numbers of impulses/disruptive discharges
5	Conductor	Screen		
6	Conductor	Screen	+125 -125	10/0 10/0
7	Conductor	Screen		

Notes:

All test lines were tested simultaneously.



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Test results (continued)

5.6.7 AC voltage dry test (test 7)

Duration of test after having reached full voltage: 15 min

Test frequency: 50 Hz

Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C

Test arrangement			Test voltage	Result
No. of test object	Voltage applied to	Earthed		
			kV	
5	Conductor	Screen	32	No disruptive discharge
6	Conductor	Screen		
7	Conductor	Screen		

Notes:

All test lines were tested simultaneously.



5.7 Assessment of the tests of test sequence D2

• Test 1

In the DC voltage dry test at -76 kV/15 min, no disruptive discharge occurred on any of the three test objects.

• Test 2

In the 50-Hz AC voltage dry test at 57 kV/5 min, no disruptive discharge occurred on any of the three test objects.

• Test 3

In the thermal short-circuit test of the screen with a thermally equivalent current of 2.54 kA/1 s, no visible damage was detected on any of the three test objects.

• Test 4

In the thermal short-circuit test of the conductor with a thermally equivalent current of 8.7 kA/1 s, no visible damage was detected on any of the three test objects.

• Test 5

After 5 complete operations of disconnection and connection, no visible damage was found on the contact.

• Test 6

In the impulse voltage test at ambient temperature with 10 test impulses of 125-kV lightning impulse voltage 1.2/50 of each polarity, no disruptive discharge occurred on any of the three test objects.

• Test 7

In the 50-Hz AC voltage dry test at 32 kV/15 min, no disruptive discharge occurred on any of the three test objects.

All of the three test objects meet the requirements specified by CENELEC Harmonization Document HD 629.1 S2: 2006-02.

The tests of the test sequence D2 have been PASSED.



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6. Tests of test sequence D3

6.1 Test laboratory

High-voltage test laboratory, high-voltage hall 2



6.2 Normative document

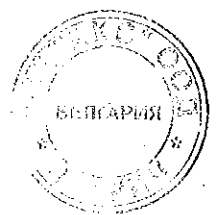
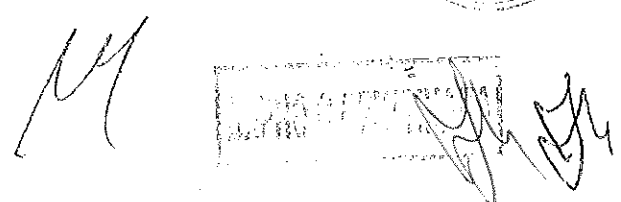
CENELEC Harmonization Document HD 629.1 S2: 2006-02
 DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06
 IEC 60502-4: 2005-02
 IEC 61442: 2005-03
 DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

6.3 Required test parameters

Test No.	Type of test	Required test parameters
14	Operating eye test	Axial force 1300 N, 1 min Torque 14 Nm Duration of test: 1 min
15	Partial discharge test at ambient temperature	Prestress voltage $2.25 \times U_0$: 29 kV Measuring voltage $2.00^{1)} \times U_0$: 25 kV Prestress duration: 1 min Measuring time: 1 min

Notes to the table of required test parameters:

¹⁾ CENELEC Harmonization Document HD 629.1 S2: 2006-02, Table 7; requires the partial discharge to be measured at a measuring voltage of $1.73 \times U_0$ or $2.00 \times U_0$ respectively. The measurement was done at $2 \times U_0$ because the standard of the cable used for the test requires a test voltage $> 1.73 \times U_0$

6.4 Test arrangement

The client arranged each of the cable connectors under test (test object) on a test line. The test objects were mounted on cable lines of approx. 1 m length of above mentioned cable type. To apply the test voltage, each of the test line had additionally been equipped with one auxiliary sealing end. All test voltages were applied to the core against the cable screen, which was connected to the test earth.

The tests did not start earlier than 24 hours after the installation of the accessories on the cable lines.

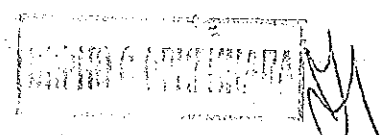
6.4.1 Operating eye test

Test arrangement to IEC 61442: 2005-03, Clause 19

6.4.2 Partial discharge test at ambient temperature

Test arrangement to IEC 61442: 2005-03, Clause 7, with the following simplifications:

Due to the short cable lengths, neither double impulse diagram nor terminating impedance or reflexion suppressor were used. The PD calibrator was connected in parallel to the test object only at the detector-remote end.



6.5 Test and measuring circuits

6.5.1 Operating eye test

None



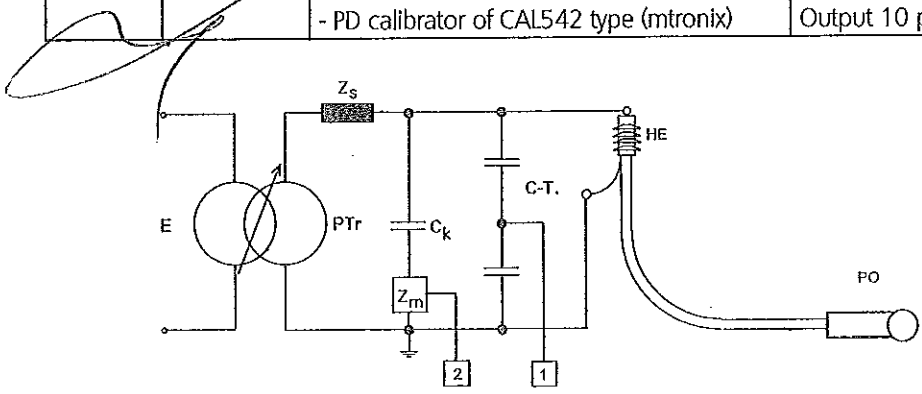
6.5.2 Partial discharge test at ambient temperature

Technical data of test circuit

Test transformer:	Rated voltage	125 kV
	Rated power	100 kVA
	Rated frequency	50 Hz
	Damping resistance	0.67 kOhm

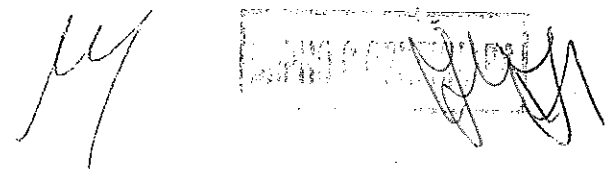
Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	- Capacitive divider with MU11 peak voltmeter (TuRD)	Ratio 864
2	Partial discharges	- Coupling capacitor of WMCF type (TuRD) - Coupling four pole of COPL542A type - PD measuring station of MPD540 type - USB interface 502 - PD calibrator of CAL542 type (mtronix)	$C_k = 1 \text{ nF}$ Band width = 300 MHz Center frequency 400 kHz Output 10 pC



- E Supply
- PTr Test transformer with variable transformer connected in series
- Z_s Blocking impedance
- C_k Coupling capacitor
- Z_m Coupling four pole (measuring impedance)
- C-T. Capacitive divider
- HE Auxiliary sealing end
- 1, 2 Measuring points
- PO Test object

Figure 9: Test and measuring circuit for the partial discharge test

6.6 Test results

6.6.1 -Operating eye test

The connector releases at an axial force of 22 N, but is capable of tightening again.



6.6.2 Partial discharge test at ambient temperature

Test frequency: 50 Hz

Test temperature: Ambient temperature 20 °C
Conductor temperature 20 °C

Calibration of the test circuit by calibrator output 10 pC

Measured PD values

Test arrangement			Prestress voltage	Measuring voltage	Measured PD value
			(1 min)	(1 min)	
No. of test object	Voltage applied to	Earthed	kV	kV	pC
8	Conductor	Screen	29	25	< 1 ¹⁾

Notes:

1) Basic disturbance level at same value



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6.7 Assessment of the results of test sequence D3

• Test 1

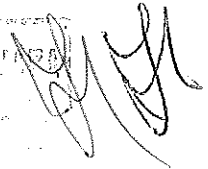
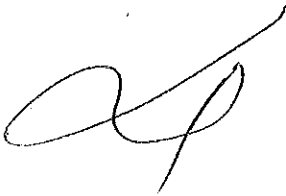
No visible damage was found after the operating eye test.

• Test 2

In the partial discharge test at ambient temperature and at 50-Hz AC voltage of 25 kV, none of the test object exceeded the permissible maximum partial discharge value of 10 pC. The partial discharge value measured was not higher than 1.0 pC.

All of the test object meet the requirements specified by CENELEC Harmonization Document HD 629.1 S2: 2006-02.

The tests of the test sequence D3 have been PASSED.



7. Special tests (tests Nos. 17 to 21)

7.1 Test laboratory

Low-voltage test laboratory, test room 7 (test No. 17)
 High-voltage test laboratory, high-voltage hall 2 (tests Nos. 18, 20 and 21)
 High-power test laboratory, test bay 3 (test No. 19)

7.2 Normative documents

CENELEC Harmonization Document HD 629.1 S2: 2006-02
 DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06
 IEC 60502-4: 2005-02
 IEC 61442: 2005-03
 DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

7.3 Required test parameters

Test No.	Type of test	Required test parameters
17	Screen resistance measurement	Temperature during exposure to heat: (120±2) °C Duration of thermal ageing: 168 h
18	Screen leakage current measurement	Test voltage U_m : 24 kV
19	Screen fault current initiation test	<ul style="list-style-type: none"> • Solidly earthed system Test voltage: 12.7 kV ¹⁾ Test current: 10 kA Duration of current flow: 0.2 s Number of tests: 2 • Unearthed or impedance-earthed system Test voltage: 12.7 kV ¹⁾ Test current: Minimum 10 A Test procedure: Start C-1 s O-2 min C-2 min O-2 min C 1 min O end
20	Operating force test	Temperature during exposure: (-20±2) °C Duration of thermal ageing: 12 h
21	Capacitive test point performance	Capacitance of test point to cable conductor: $C_w > 1$ pF Ratio $C_{te} : C_{le} / C_{tc}$: ≤ 12.

Note:

1) Test parameter complies with normative document. If lower values are applied the test will become more severe.



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7.4 Test arrangement

7.4.1 Screen resistance measurement (test No. 17)

Test arrangement to IEC 61442: 2005-03, Clause 15

Only one single connector body was used for the measurement. For the definite and reproducible measurement of the resistance on the screen two rings made of bare copper wire and of approx. 1-mm width were fixed to the screen. They served as fixed electrodes for the resistance measurement.



7.4.2 Screen leakage current measurement (test No. 18)

Test arrangement to IEC 61442: 2005-03, Clause 16

The client installed one test object on a short length of cable, which was equipped with an auxiliary sealing end on its other end, and completed it with a bushing. Subsequently, a square metal foil of 25 cm² was fitted to the outer conductive layer of the test object in the region of the bushing. When the AC test voltage was applied to the test object, the leakage current from metal foil to earth was measured.

7.4.3 Screen fault current initiation test (test No. 19)

Test arrangement to IEC 61442: 2005-03, Clause 17

A bushing was centrally arranged in a metal plate of 600 x 600 x 5, which was vertically fixed to a test rack. Each of the test objects, installed on a short length of cable by the client, was fixed to the bushing and the screen was earthed in accordance with the manufacturer's instructions. The other end of each length of cable was equipped with an auxiliary sealing end. For the test with solidly earthed system, a threaded rod of 10 mm Ø was arranged in the region of the transition from the conductor to the cable lug in the body of the connector under test so that a connection was established from the cable lug through a drilled hole to the inner and outer conducting layers of the connector body. For the test with unearthed or impedance earthed systems, a drilled hole was used instead of the rod. It had a copper wire of 0.2 mm Ø for bridging the insulation between the inner and outer screens and for initiating the arc. In both cases, neither the rod nor the wire protruded beyond the outer conducting layer of the connector body.

7.4.4 Operating force test of the cable connector (test No. 20)

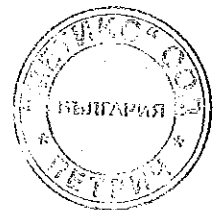
Test arrangement to IEC 61442: 2005-03, Clause 18

One connector was assembled according to the client's instructions and was mounted on a bushing using a gliding agent provided by the client.

7.4.5 Capacitive test point performance (test No. 21)

Test arrangement to IEC 61442: 2005-03, Clause 20

One connector was installed on a short length of cable by the client and the screen was earthed in accordance with the manufacturer's instructions. The test object was equipped with a mating bushing.



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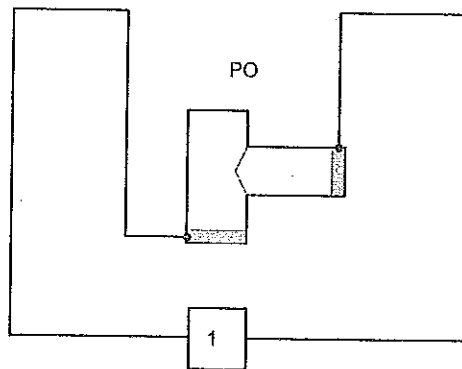
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7.5 Test and measuring circuits

7.5.1 Screen resistance measurement (test No. 17)

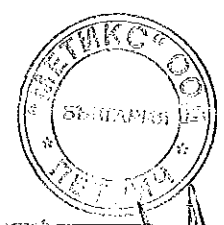
Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Resistance	Digital hand multimeter of 137 type (KEITHLEY)	Measuring range R - 2 kΩ



1 Measuring point
PO Test object

Figure 10: Measuring circuit for resistance measurement on the screen



Test and measuring circuits (continued)

7.5.2 Screen leakage current measurement (test No. 18)

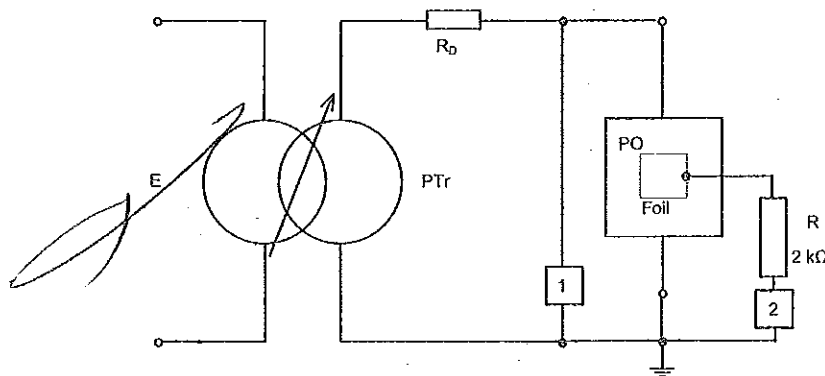
Technical data of test circuit

Single-phase AC voltage source

Test transformer:	Rated voltage	125 kV
	Rated power	100 kVA
	Rated frequency	50 Hz
	Damping resistance	0.67 kΩ

Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Test voltage	Capacitive divider with MU11 (TURD) peak voltmeter	Ratio 864
2	Test current	Digital hand multimeter of 137-type (KEITHLEY)	MB 0.2 mA AC



- E Supply
- PTr Test transformer with variable transformer connected in series
- R_D Damping resistance
- R Resistance
- 1, 2 Measuring points
- PO Test object

Figure 11: Test and measuring circuit for the leakage current measurement



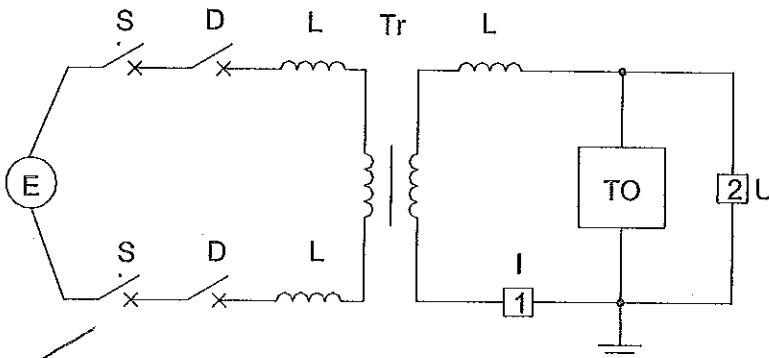
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Test and measuring circuits (continued)

7.5.3 Screen fault current initiation test (test No. 19)

Technical data of test circuit

Test requirement		Screen fault current test
Test No.		107 6212
Number of phases	(Test circuit)	2
Number of poles/phases	(Test object)	1
Power frequency	Hz	50
Power factor $\cos \varphi$		< 0.15
Connection of short-circuit transformers		I/I
Short-circuit power		120 MVA
Earthing conditions	Grid	Not earthed
	Short-circuit transformer	Earthed



- E Power supply (grid)
- S Master breaker
- Dr Making switch
- L Current limiting reactors
- Tr Short-circuit transformer
- 1, 2 Measuring points
- I Current measurement
- U Voltage measurement
- TO Test object

Figure 12: Test and measuring circuit for the screen fault current initiation test

Technical data of measuring circuits

Test No.	Measuring point	Symbol	Measured quantity	Measuring sensor/device
107 6212	1	i	Short-circuit current	Current transformer
	2	u	Test voltage	RC divider
Recording instrument: BE 256 transient recorder				



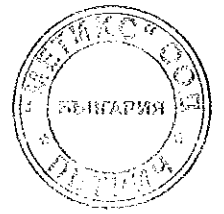
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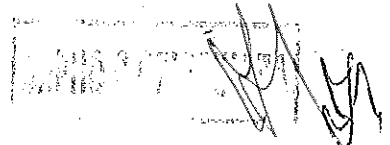
Test and measuring circuits (continued)

7.5.4 Operating force test of the cable connector (test No. 20)

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Force	Load sensor of Novatech F 256 - UFROKN-1 kN type and digital display device of AD3-SWD-A10S-TR2 type (made by Althen)	1-kN range







Test and measuring circuits (continued)

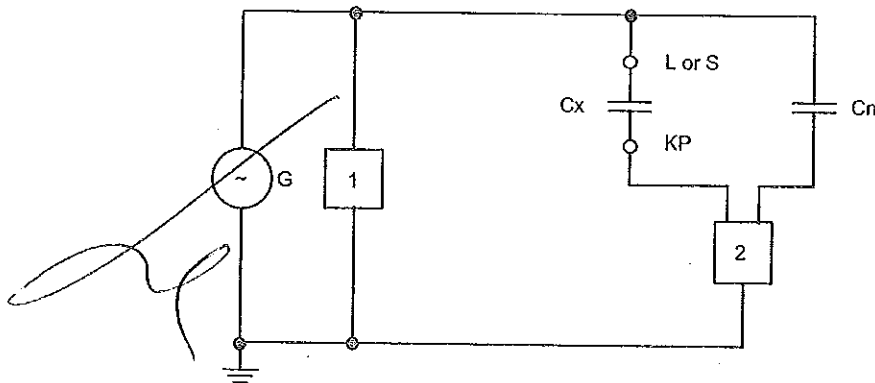
7.5.5 Capacitive test point performance (test No. 21)

Capacitance measurement by differential bridge

The capacitance C_x to be measured was connected to a capacitance measuring bridge together with the well-known capacitance C_n .

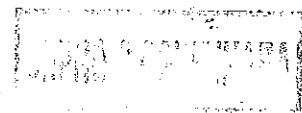
Technical data of measuring circuit

Measuring point	Measured quantity	Measuring sensor/device	Technical parameters
1	Capacitance	C-tan δ measuring bridge of VFM type (made by MWB)	Measuring range x 100 pF
2	Test voltage	Capacitive divider with MU11 (made by TuRD) peak voltmeter	



- G Sine-wave generator
- C_x Capacitance to be determined
- L, S Cable conductor or cable screen
- KP Capacitive test point
- C_n Comparison capacitance
- 1, 2 Measuring points

Figure 13: Test and measuring circuit for determining the capacitive test point performance

7.6 Test results

7.6.1 Screen resistance measurement (test No. 17)

Test temperature: Ambient temperature 20 °C
 Temperature during exposure to heat: 120 °C
 Time of exposure to heat: 168 h



Test arrangement		Resistance	Result
No. of test object	Condition of test object	Ω	
9	Before exposure to heat	1600	OK
9	After exposure to heat	500	OK

OK: The resistance measured before and after the exposure to heat was significantly below the maximum permissible value of 5000 Ω.

7.6.2 Screen leakage current measurement (test No. 18)

Test temperature: Ambient temperature 20 °C

Test arrangement			Test voltage	Leakage current	Result
No. of test object	Voltage applied to	Earthed	kV	μA	
10	Conductor	Screen	24	45	OK

OK: The leakage current was below the maximum permissible value of 0.5 mA.



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Test results (continued)

7.6.3 Screen fault current initiation test (test No. 19)

Test requirement: Screen fault current test for impedance-earthed systems

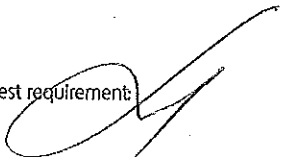
Type of test object: DE250

Ambient temperature: 11 °C

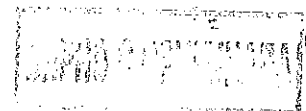
Test No.	107	4007	6212		
Test object	No.	-	11		
Cycle		-	C _{1s} - O _{2min} - C _{2min} - O _{2min} - C _{1min} - O		
Test voltage	kV	12.8	12.8	12.8	12.8
Test current	A	15.5	16.0	16.0	16.0
Time of test	s	0.2	1	120	60
Notes		1)	2)	2)	2)
Evaluation		-	OK	OK	OK

Notes:

- 1) Current setting
 - 2) The test object is capable of properly carrying the fault current.
- OK: During the making cycle the arc was ignited or re-ignited, respectively.
During the making time, the current flow was present.
A fault in the insulation is reliably detectable.

Test requirement:  Screen fault current test for solidly earthed systems

The test was not carried out according the client



Test results (continued)

7.6.4 Operating force test (test No. 20)

Cold conditioning temperature:

-20 °C

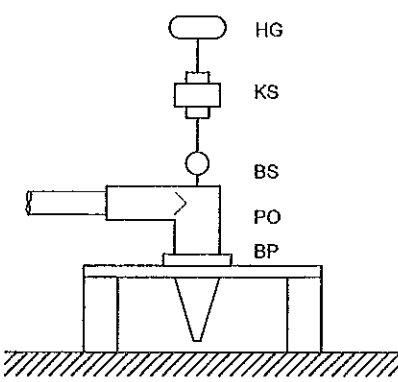
Time of exposure to heat:

12 h

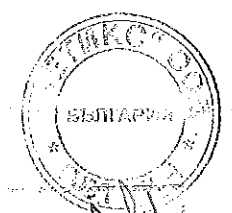
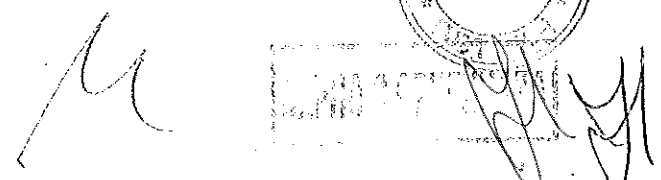
Maximum time after removal from climatic chamber:

5 min



<p>Test arrangement</p> 		Withdrawal force	Result
No. of test object	Condition of test object	N	
12	Exposed to cold	322	OK

OK: The withdrawal force measured before and after the exposure to cold was below the maximum permissible value of 900 N.

Test results (continued)

7.6.5 Capacitive test point performance (test No. 21)

Test temperature:

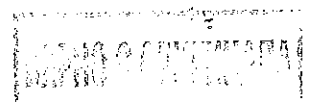
Ambient temperature

23 °C

Test arrangement			Capacitance of test point KP		Notes
No. of test object	Voltage applied to	Earthed	Towards cable screen C_{te}	Towards cable conductor C_{tc}	
			pF	pF	
12	L (conductor)	Screen connection of the connector body	-	10.4	OK
12	S (screen)	Conductor	14	-	OK

Notes:

OK: The capacitance ratio between measuring point and cable conductor, C_{tc} , was larger than 1 pF. The ratio $C_{te} : C_{tc} / C_{tc}$ was equal to ≈ 7.7 and thus < than the value of 12 as specified by the normative document.

7.7 Assessment of special tests

• Test 17

The resistance measured before and after the exposure to heat at 120 °C/168 h was 1600 and 500 Ω, resp. This was significantly below the maximum permissible value of 5000 Ω.

• Test 18

The leakage current measured at an applied AC test voltage of 24 kV fell below the maximum permissible value of 0.5 mA with a measured value of 45 μA.

• Test 19

- Solidly earthed systems

The test was not carried out according the client.

- Unearthed or impedance-earthed systems

During the making cycle, the arc was ignited resp. re-ignited at 12.8 kV. During the making time, the current flow was present at 12.8 kV. A fault in the insulation is reliably detectable.

• Test 20

The withdrawal force was determined to be 322 N. Thus it is below the maximum permissible value of 900 N.

• Test 21

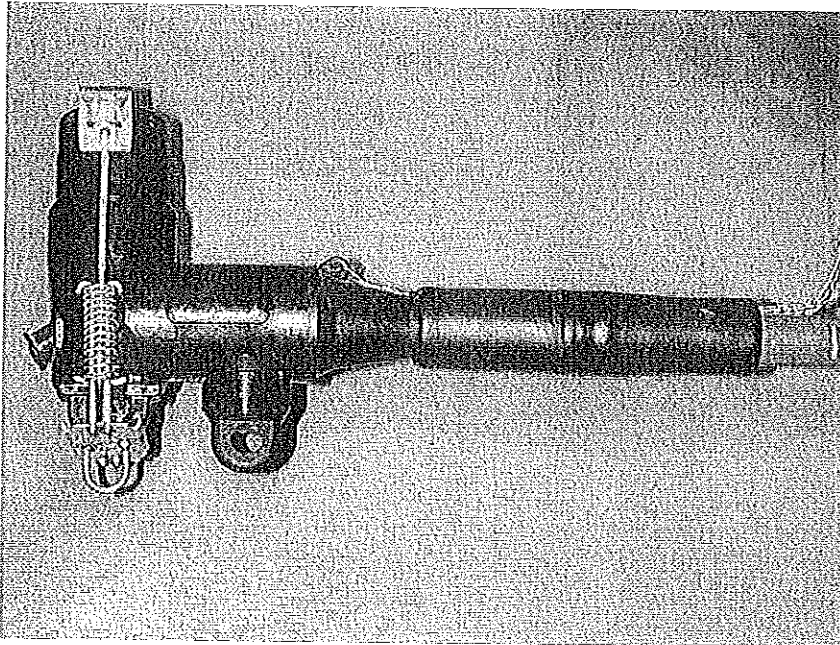
The ratio of C_{te} to C_{tc} was determined to be 1.35, which is ≤ 12 as specified by the normative document.

The test objects meet the requirements specified by CENELEC Harmonization Document HD 629.1 S2: 2006-2, except Test No. 19.



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8. Photos



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Figure 14: View of one test object

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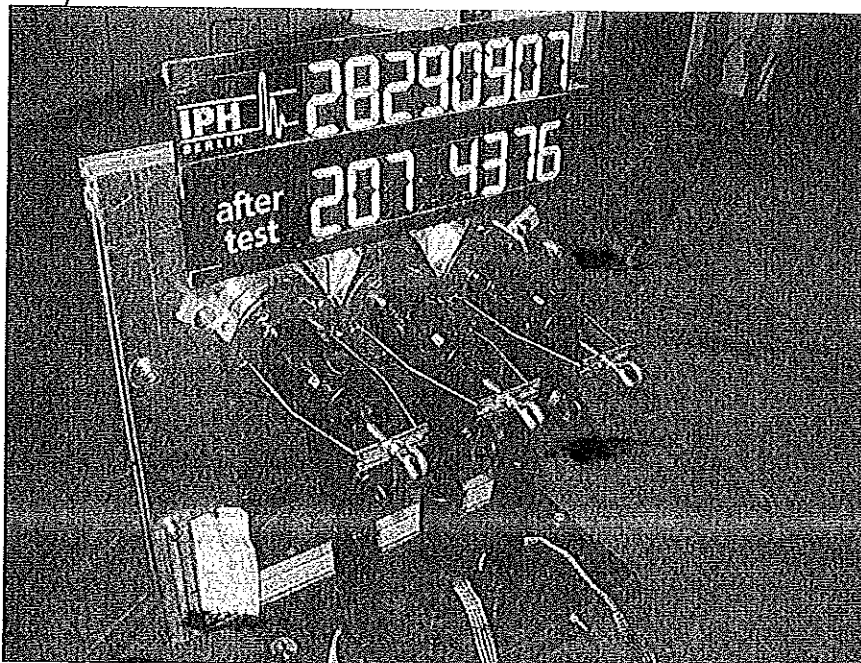
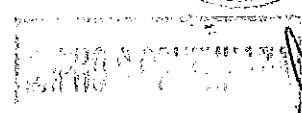


Figure 15: View of the test objects for the test sequence D2 (mounted on bushings)



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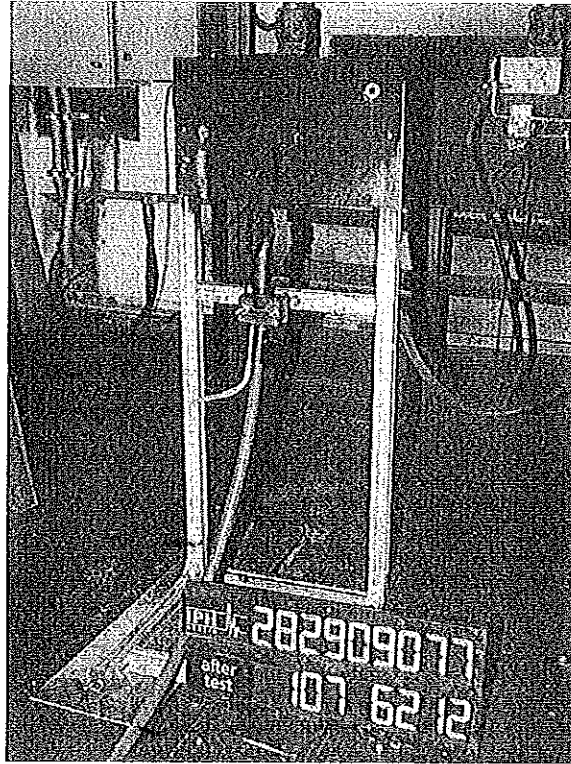
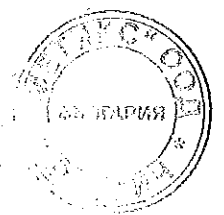


Figure 16: Test object No. 11 after the screen fault current initiation test (unearthed or Impedance-earthed systems)

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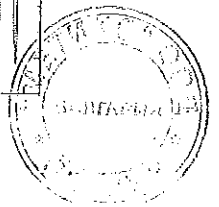
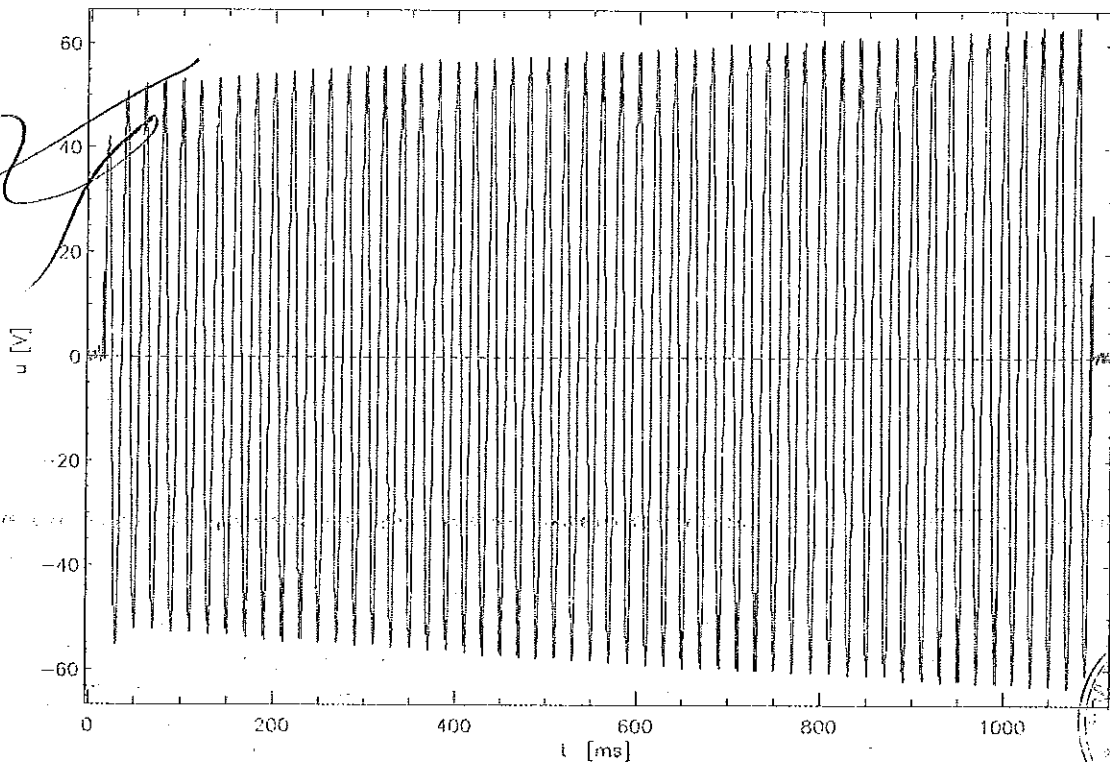
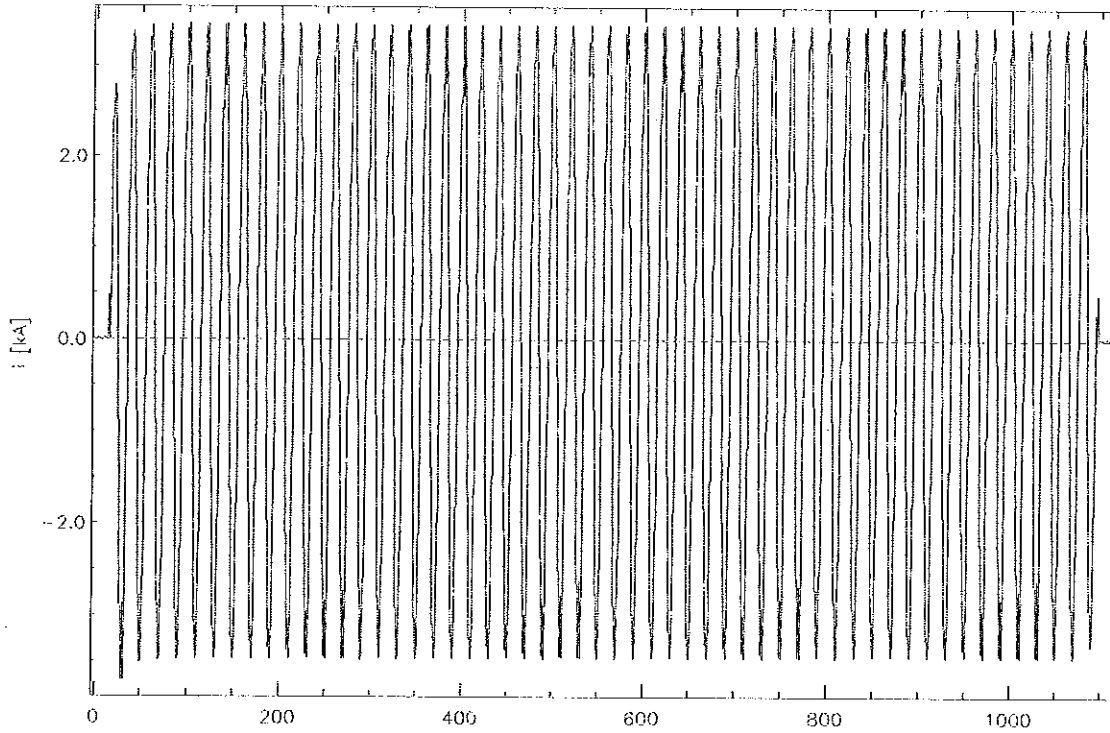


A handwritten signature, possibly 'M', is located at the bottom center of the page.

A handwritten signature and a date stamp are located at the bottom right of the page. The date stamp appears to be '2010.09.07'.

9. Oscillograms

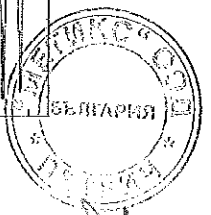
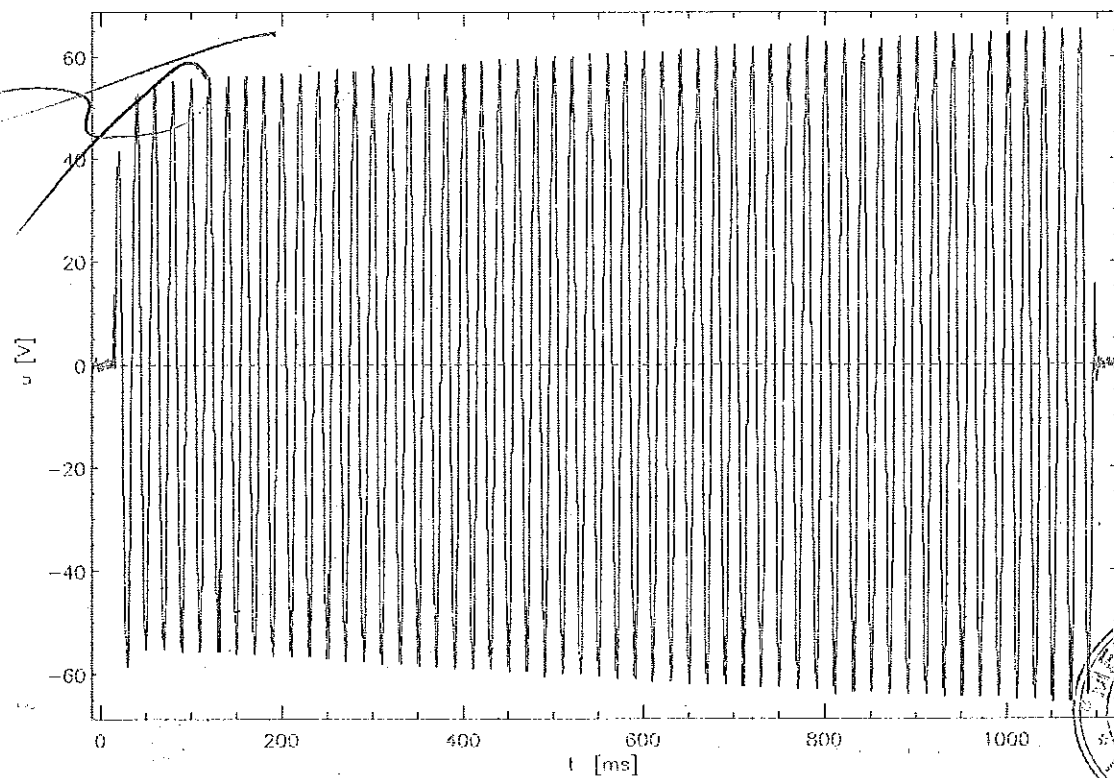
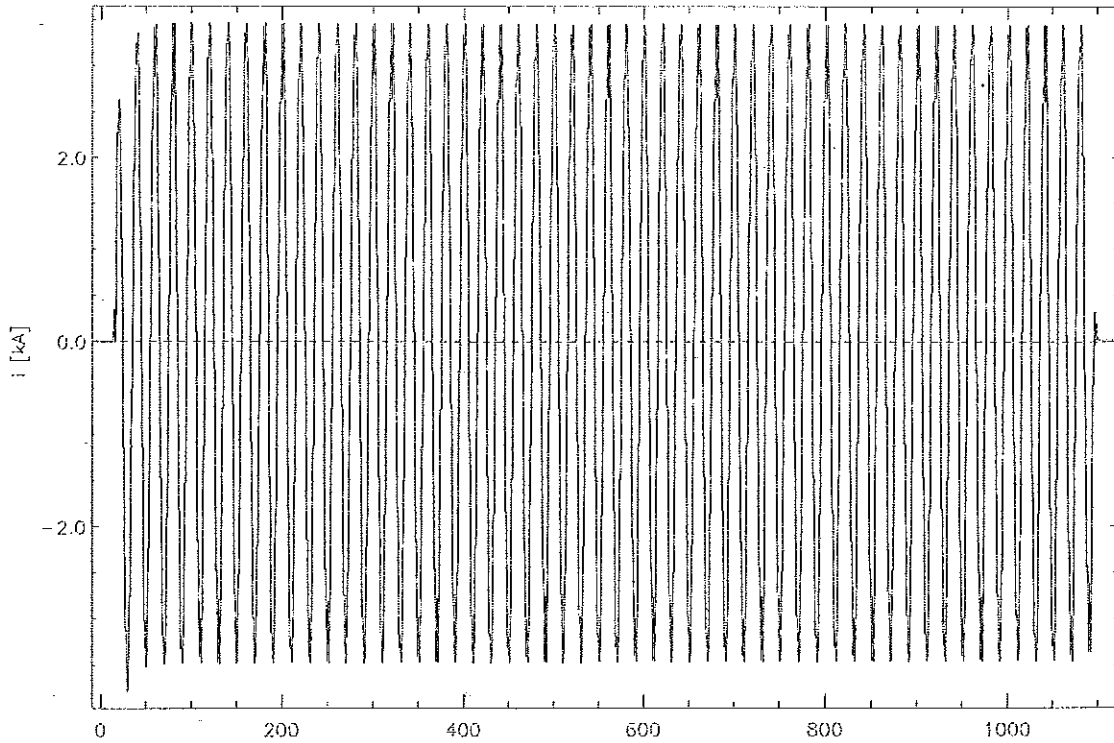
Test-No. 2074371



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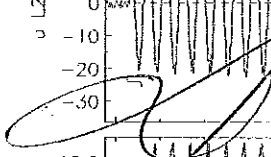
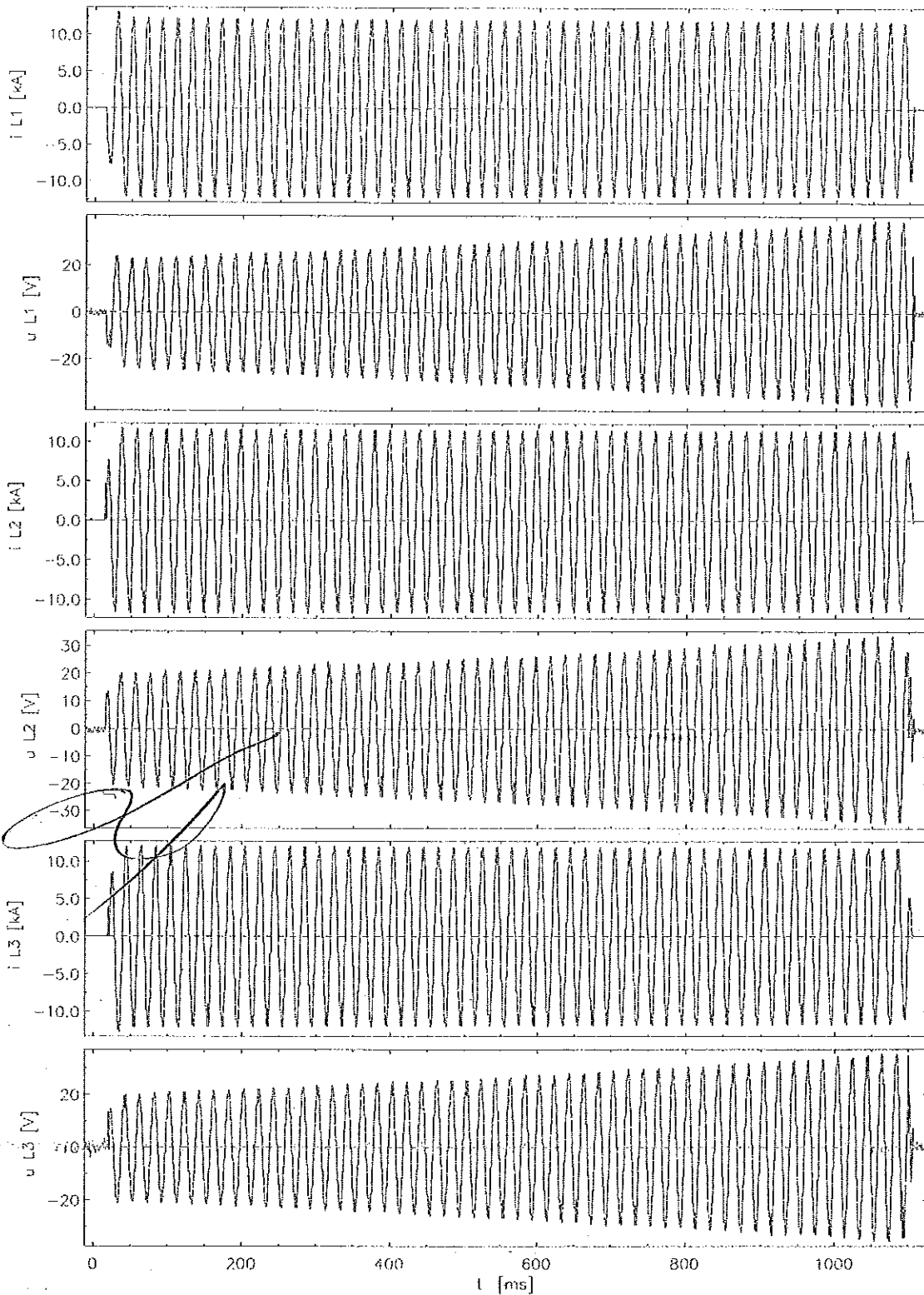
Test-No. 2074372



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Test-Nr. 2074375

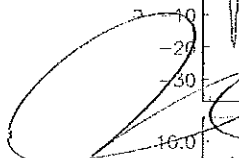
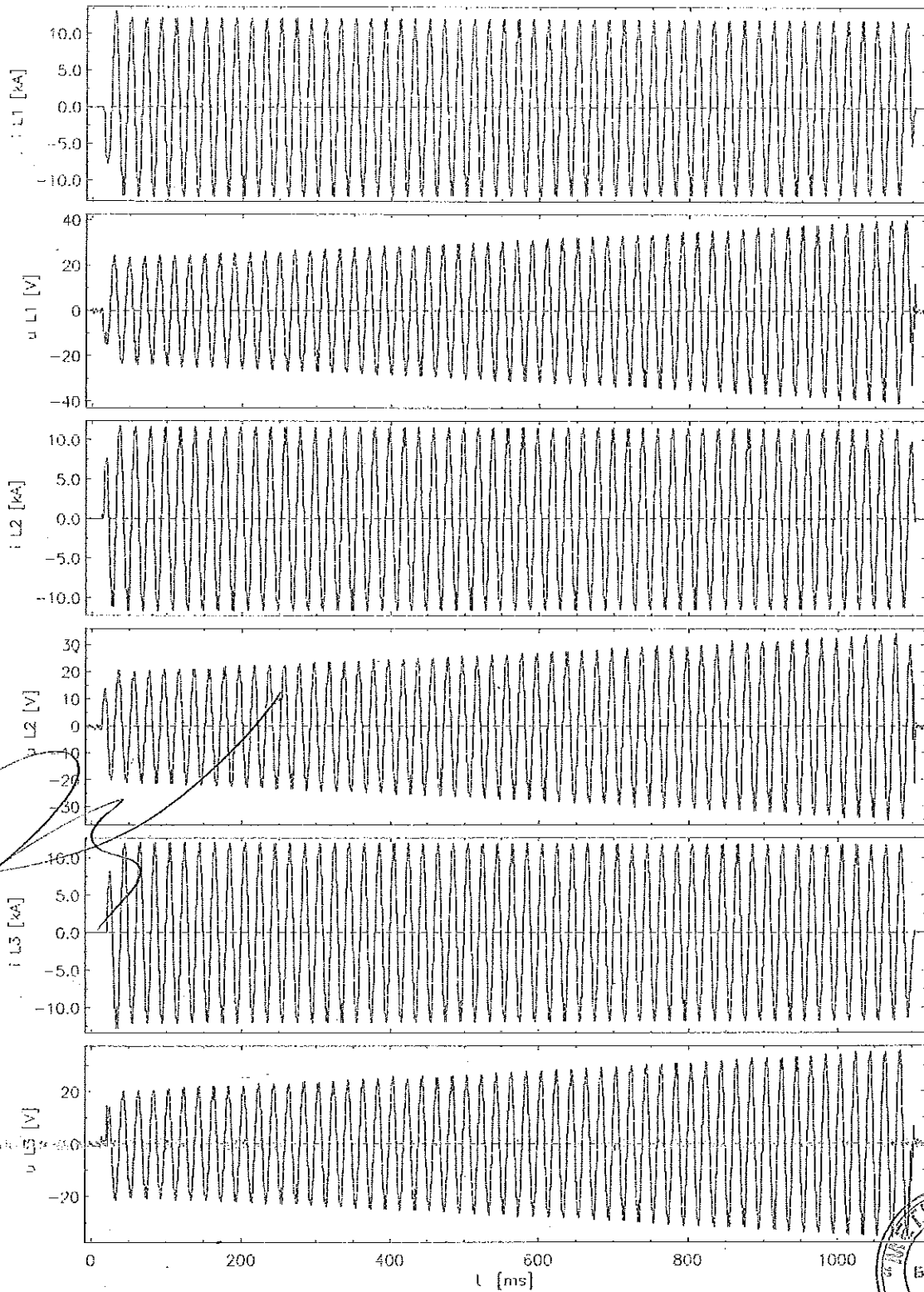


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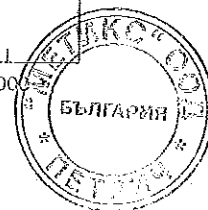
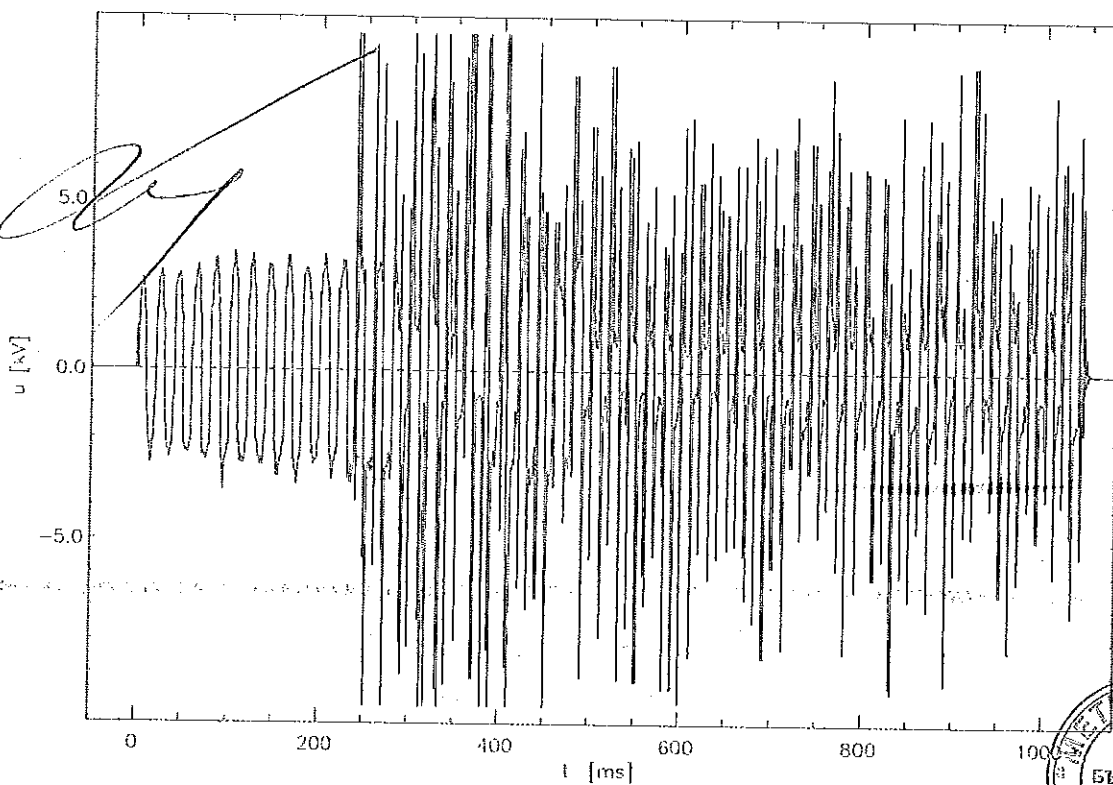
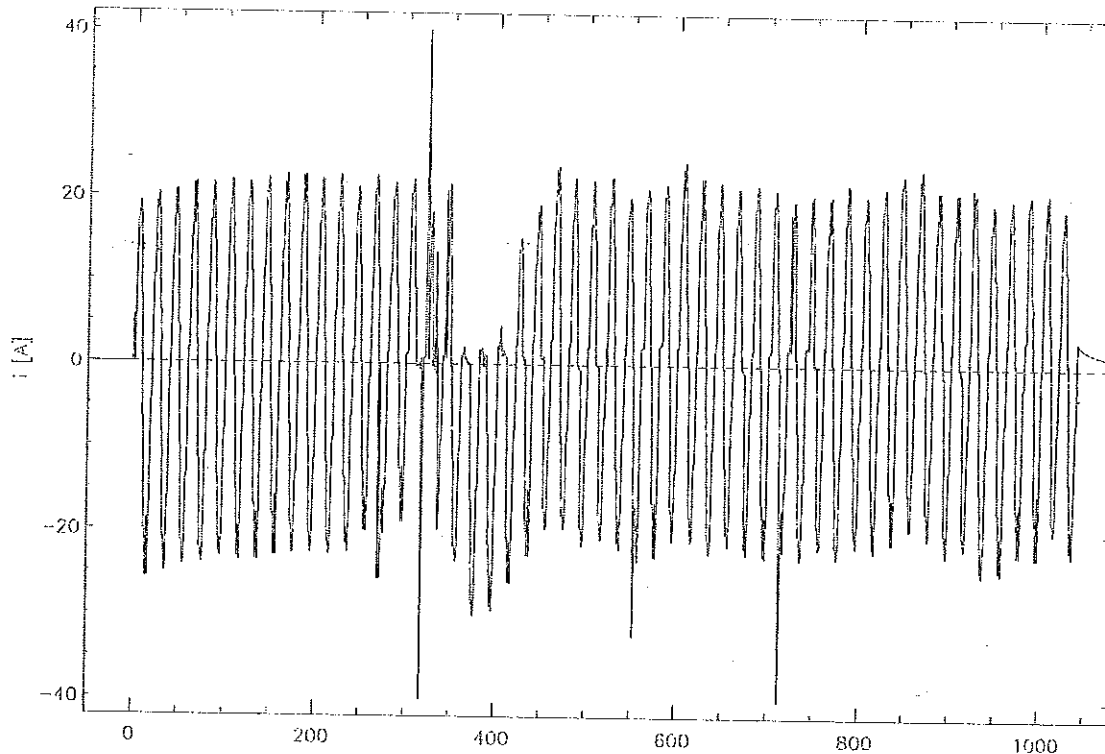
Test-No. 2074376



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Rectangular official stamp with illegible text and handwritten signatures.

Test-No. 1076212



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ИНС. СЕРТИФИКАТ

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10. Drawings

**DE250 Deadbreak
Elbow Connector**

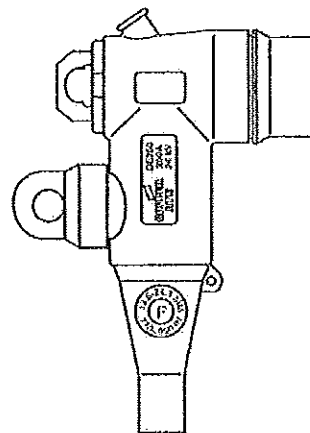
COOPER Power Systems

**DE250 Elbow Connector
Installation Instructions**

Electrical Apparatus

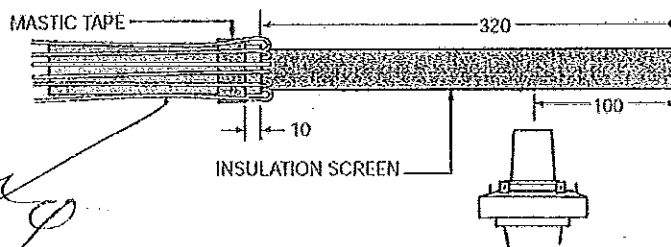
IS550-10-1

- Complete Elbow Connector Kit includes
- 1 – moulded elbow connector, with test point cap
 - 1 – conductor contact
 - 1 – probe contact
 - 1 – hex key
 - 1 – spring bail assembly
 - 1 – SB250 cable screen adapter
 - sealing (mastic) tape
 - vinyl tape
 - silicone lubricant
 - paper towel
 - installation instructions



CAUTION: All associated apparatus must be de-energized during installation and/or maintenance.

Step 1



1. Train the cable to the desired finished position. Be sure that the cable is long enough to permit movement of the elbow connector from the apparatus bushing to a standoff bushing.
2. Cut the cable 100 mm past the centerline of the bushing.

NOTE: This is the initial length of the cable to ensure that the screen wires are long enough to reach the system earthing point and the earthing eye on the elbow connector. The cable will be cut to its final length below.

3. Remove the cable sheath for a distance of 320 mm from the end of the cable.
4. Apply one wrap of mastic tape approximately 10 mm from the end of the sheath.

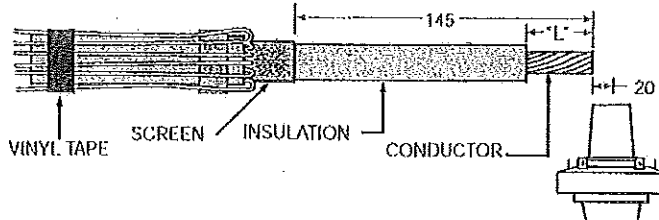


M

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DE250 Elbow Connector Installation Instructions

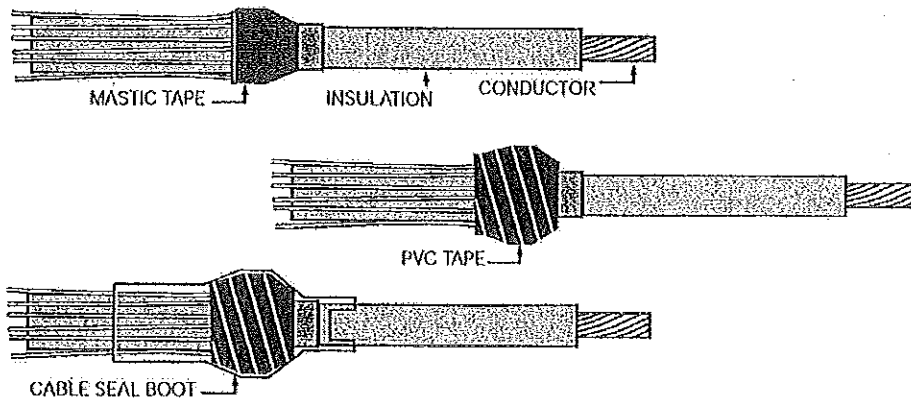
Step 2



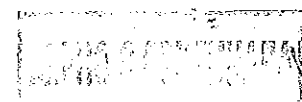
1. Fold the screen wires back over the sheath and secure them with two wraps of vinyl tape. Press the screen wires into the mastic.
2. Reposition the cable to its final position and cut it 20 mm from the bushing centerline.
3. Remove 145 mm of insulation screen.
4. Remove "L" mm of core insulation.

CONNECTOR	L
BIMETALLIC	50
COPPER	40

Step 3

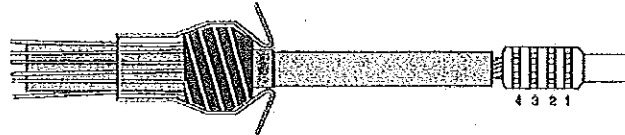


1. Apply a layer of mastic tape over the screen wires and the previously applied mastic tape. Press firmly to eliminate gaps between the tape and the screen wires.
2. Apply another layer of mastic tape over the junction of the insulation screen, the screen wires and the previously applied mastic. Press firmly to eliminate gaps.
3. Wrap one half-lapped layer of vinyl tape over the mastic tape.
4. Apply a thin layer of lubricant to the vinyl tape.
5. Slide the large diameter end of the cable screen adapter over the vinyl tape, using the tabs. Fold over the small diameter end.



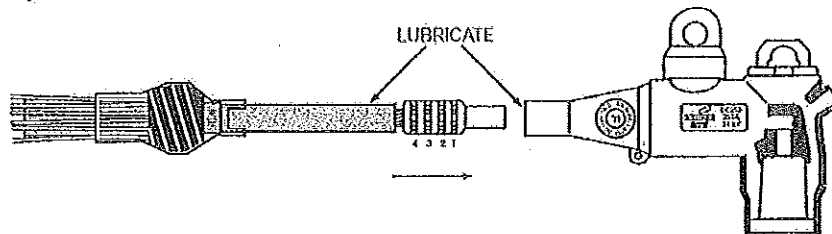
IS550-10-1

Step 4



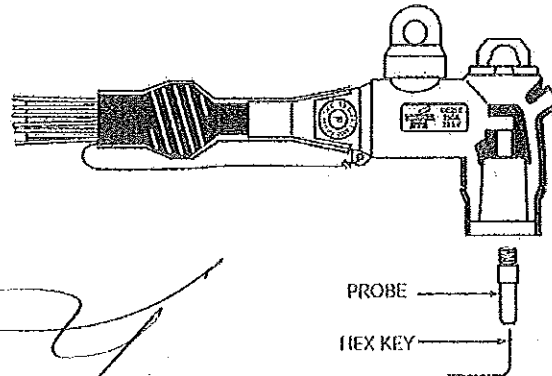
1. If the conductor is aluminum, thoroughly wire brush the exposed conductor.
2. Immediately insert the conductor into the crimp barrel as far as it will go. Ensure that the flat surface of the copper faces the bushing.
3. Crimp the connector starting at the shoulder, as shown. Rotate the crimping tool 90 degrees for each successive crimp.
4. Remove any excess inhibitor that may have come out of the connector.

Step 5



1. Clean the insulation with a lint-free cloth and a suitable cleaner.
2. Apply a thin layer of lubricant to the core insulation and the interior of the cable end of the moulded elbow housing.
3. Push the elbow onto the cable as far as it will go. Ensure that the threaded hole of the connector is visible through the interface end of the elbow.

Step 6



1. Insert the probe into the threaded hole of the connector. Ensure that the threads are not crossed.
2. Tighten the probe with the supplied hex wrench. The proper torque is reached when the hex key has bent 90° to 180°.
3. Using the tabs, pull the end of the cable screen adapter over the end of the elbow, as shown.
4. Connect one of the screen wires to the earthing eye on the elbow.

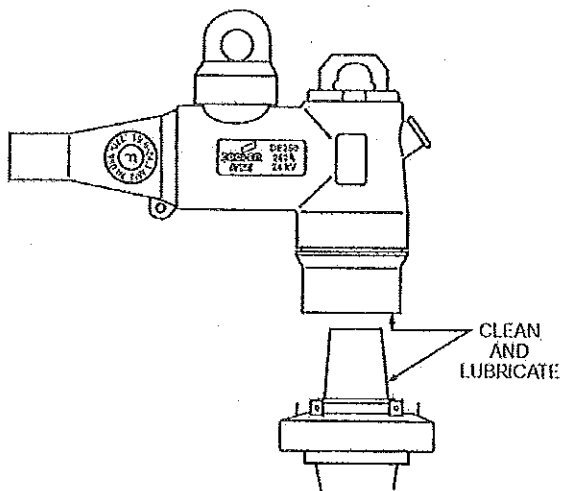


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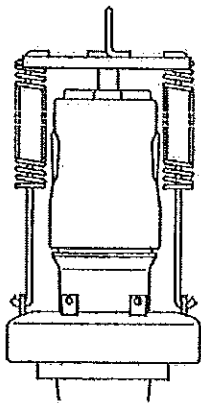
DE250 Elbow Connector Installation Instructions

Step 7



1. Clean the bushing and connector interfaces and apply a thin layer of lubricant to each.
2. Push the elbow onto the bushing until it is fully seated.

Step 8

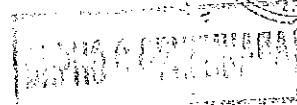
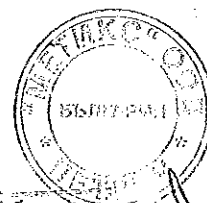


1. Hook the legs of the spring bail onto the bushing bail tabs.
2. Pull the ball over the pulling eye of the elbow, as shown.

COOPER Power Systems

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Waukesha, WI 53187
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11. Identification of test cable

To CENELEC Harmonization Document 629.1 S1: 2006 Annex A
for cable with plastic insulation

Rated voltage $U_0/U (U_m)$ 12/20 (24) kV

- | | | |
|------------------------------------|---|---|
| Cable construction | <input checked="" type="checkbox"/> 1-core | <input checked="" type="checkbox"/> screened |
| | <input type="checkbox"/> 3-core | <input type="checkbox"/> individually screened |
| | <input type="checkbox"/> 4-core | <input type="checkbox"/> not individually screened |
| Conductors | <input checked="" type="checkbox"/> Al | <input type="checkbox"/> Cu |
| | <input checked="" type="checkbox"/> stranded | <input type="checkbox"/> solid |
| | <input checked="" type="checkbox"/> round | <input type="checkbox"/> shaped |
| | <input type="checkbox"/> 120 mm ² | <input type="checkbox"/> 150 mm ² <input type="checkbox"/> 185 mm ² |
| | <input checked="" type="checkbox"/> other cross-section | 70 mm ² |
| | <input type="checkbox"/> cross-section branch | mm ² |
| Cable insulation | <input type="checkbox"/> PVC | <input checked="" type="checkbox"/> XLPE |
| | <input type="checkbox"/> EPR | <input type="checkbox"/> HEPR |
| Insulation screen | <input checked="" type="checkbox"/> bonded | <input type="checkbox"/> strippable |
| | <input type="checkbox"/> wires | <input type="checkbox"/> tapes <input type="checkbox"/> none |
| Oversheath | <input type="checkbox"/> PVC | <input checked="" type="checkbox"/> PE (state type) <input type="checkbox"/> other material |
| Water blocking
(if any, where?) | <input type="checkbox"/> in conductor | <input type="checkbox"/> under oversheath <input type="checkbox"/> other place |
| Diameter | <input checked="" type="radio"/> conductor | 9.5 mm |
| | <input checked="" type="radio"/> insulation | 20.5 mm |
| | <input checked="" type="radio"/> insulation screen | 24 mm |
| | <input checked="" type="radio"/> oversheath | 35 mm |

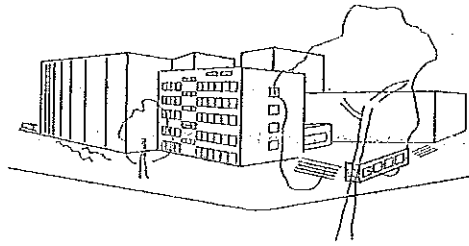
Cable marking ARE4H5EX 12/20 kV 70
ENEL 2006





Bereich Hochspannungsprüftechnik

Institut für Elektroenergiesysteme und Hochspannungstechnik



Universität Fridericiana (TH) Karlsruhe
76128 Karlsruhe - Kaiserstraße 12

Telefon (0721) 608 2520 Telefax (0721) 69 52 24

Test Report No 2006-115

Type Test of Separable Connectors Type CELLPLUX-CTS 630 A 24 kV

Customer: Cellpack GmbH
Carl-Zeiss-Str. 20
79761 Waldshut-Tiengen

Reporter: Dr.-Ing. R. Badent
Dr.-Ing. B. Hoferer

This report includes 22 numbered pages and is only valid with the original signature. Copying of extracts is subject to the written authorization of the test laboratory. The test results concern exclusively to the tested objects.



1 Purpose of Test

4 resp. 3 separable connectors for $V_0 / V_n / V_m = 12,7 / 22 / 24$ kV were subjected to a type test according to CENELEC HD 629.1 S1 06/2002 table 7 test sequence D1 resp. D2. 3 separable connectors for $V_0 / V_n / V_m = 12,7 / 22 / 24$ kV were subjected to additional tests according to CENELEC HD 629.1 S1 06/2002, table 7 test pos. 19-22.

2 Miscellaneous Data

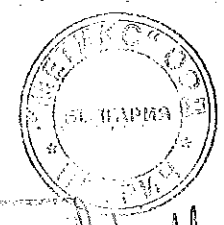
Test object: - 10 separable connectors type CELLPLUX-CTS 630 A
24 kV 95 - 250
 $V_m = 24$ kV, Figure 2.1
Type of the cable: The test object was mounted on a
single-wire XLPE-cable,
type: N2X(F)2Y 1x185RM/25 12/20kV
Cable length Connector - sealing end: 3 m

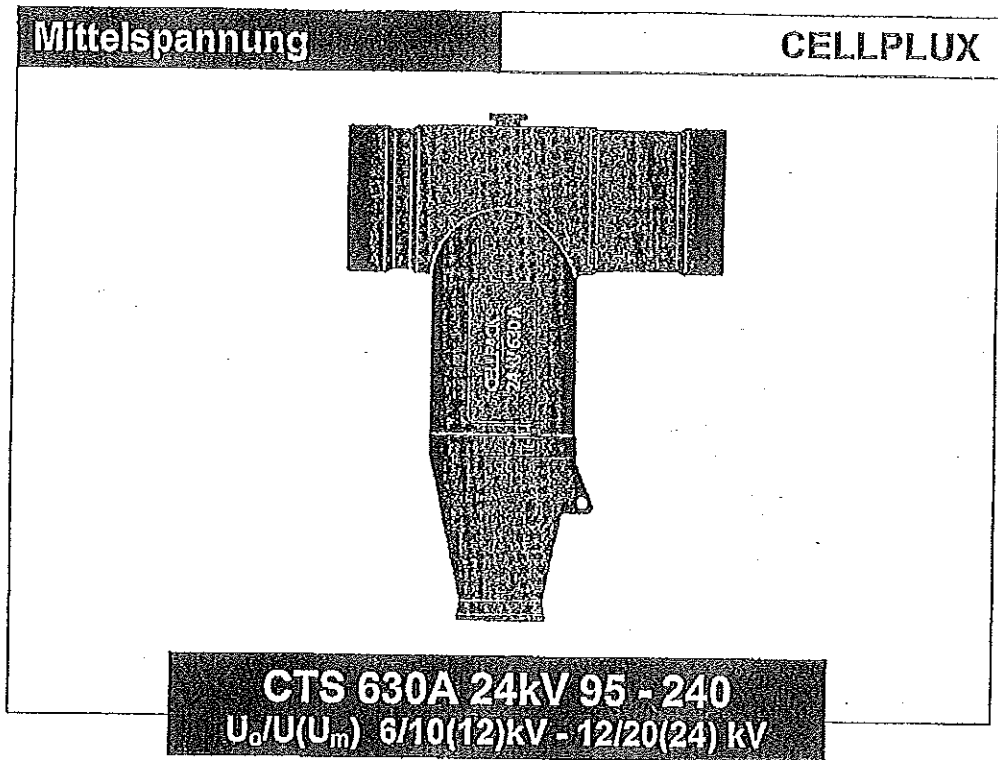
Place of test: *Institute of Electric Energy Systems and High Voltage
Technology* - University of Karlsruhe
Kaiserstraße 12 - 76128 Karlsruhe

Testing dates: Delivery: 10.10.2006
Mounting: 10.10.2006
Test period: 12.10. - 21.12.2006

Atmospheric conditions: Temperature: $19^{\circ}\text{C} - 24^{\circ}\text{C}$
Air pressure: 980 - 1025 mbar
rel. humidity: 35 % - 60 %

Representatives:
Dr.-Ing. R. Badent
Dr.-Ing. B. Hoferer
Mr. O. Müller





Montageanleitung

T-Steckanschluss für
Einleiter Kunststoffkabel
bis 24 kV

206741/1006/1/7

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Electrical Products
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e-mail: electrical.products@cellpack.com
CTS 630A 24kV 95-240 206741/1006/1/7

CELLPACK AG
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Tel. +41(0)56/618 12 34
Fax +41(0)56/618 12 45

CELLPACK
Electrical Products



Figure 2.1: Separable connector.

Tests:

Test volume, chronological order and requirements conform to CENELEC HD 629.1 S1 06/2002 test sequence D1 and D2, table 7 and additional test pos. 19 - 22.

The PD-test was performed at $2 V_0$. The tests were carried out in accordance with the test methods described in CENELEC HD 628 S1 06/2002.

Test sequence D1:

- Pos. 1. *DC voltage withstand test*
 $V = 6 V_0 = -76 \text{ kV}$; $t = 15 \text{ min}$
- Pos. 2. *AC voltage withstand test*
 $\hat{V}/\sqrt{2} = 4,5 V_0 = 57 \text{ kV}$; $t = 5 \text{ min}$
- Pos. 3. *Partial discharge test*
 $\hat{V}/\sqrt{2} = 2,0 V_0 = 25 \text{ kV}$; $\text{PD} \leq 10 \text{ pC}$
- Pos. 4. *Impulse voltage withstand test at elevated temperature*
 $\hat{V} = 125 \text{ kV}$; positive and negative polarity each 10 impulses
- Pos. 5. *Partial discharge test at ambient temperature and elevated temperature*
 $\hat{V}/\sqrt{2} = 2,5 V_0 = 32 \text{ kV}$; $\text{PD} \leq 10 \text{ pC}$
- Pos. 6. *Electrical heat cycling in air*
each loading cycle had a 5 hour heating period and a 3 hour no-load cooling period;
test voltage: $\hat{V}/\sqrt{2} = 32 \text{ kV}$
number of cycles: 3
- Pos. 10. *Electrical heat cycling in air*
each loading cycle had a 5 hour heating period and a 3 hour no-load cooling period;
test voltage: $\hat{V}/\sqrt{2} = 32 \text{ kV}$
number of cycles: 60
- Pos. 11. *Electrical heat cycling in water*
each loading cycle had a 5 hour heating period and a 3 hour no-load cooling period;
test voltage: $\hat{V}/\sqrt{2} = 32 \text{ kV}$
number of cycles: 63
- Pos. 12. *Disconnection / Connection*
5 complete operations,
no visible damage to contact



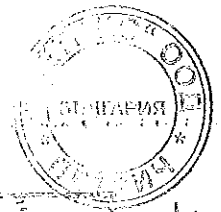
- Pos. 13. *Partial discharge test at ambient temperature and elevated temperature*
 $\dot{Q}/\sqrt{2} = 2,0$ $V_0 = 25$ kV ; PD ≤ 10 pC
- Pos. 14. *Impulse voltage withstand test,*
 $\dot{Q} = 125$ kV; positive and negative polarity each 10 impulses
- Pos. 15. *AC voltage withstand test*
 $\dot{Q}/\sqrt{2} = 2,5$ $V_0 = 32$ kV; t = 15 min

Test sequence D2:

- Pos. 1. *DC voltage withstand test*
V = 6 $V_0 = -76$ kV ; t = 15 min
- Pos. 2. *AC voltage withstand test*
 $\dot{Q}/\sqrt{2} = 4,5$ $V_0 = 57$ kV; t = 5 min
- Pos. 8. *Short circuit test, conductor*
 $\theta_{Sc} = 250^\circ\text{C}$; 2 stresses
- Pos. 12. *Disconnection / Connection*
5 complete operations,
no visible damage to contact
- Pos. 14. *Impulse voltage withstand test,*
 $\dot{Q} = 125$ kV; positive and negative polarity each 10 impulses
- Pos. 15. *AC voltage withstand test*
 $\dot{Q}/\sqrt{2} = 2,5$ $V_0 = 32$ kV; t = 15 min

Additional Tests:

- Pos. 19. *Screen resistance measurement*
R ≤ 5000 Ω
- Pos. 20. *Leakage current measurement*
 $\dot{Q}/\sqrt{2} = 2,5$ $V_m = 24$ kV
I $\leq 0,5$ mA
- Pos. 21. *Screen fault current initiation*
Fault current to flow continuously
- Pos. 22. *Operating force test*
F ≤ 900 N



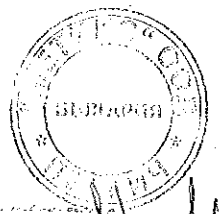
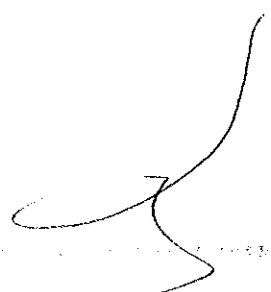
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3 Mounting

Final assembling of the separable connector was executed in the high-voltage laboratory of the IEH



4 Test Setups

4.1 DC Voltage Withstand Test

The DC-voltage was generated according to Figure 4.1. The voltage measurement was carried out with an ohmic-capacitive divider (ratio 2000:1). The measurement uncertainty was 3%.

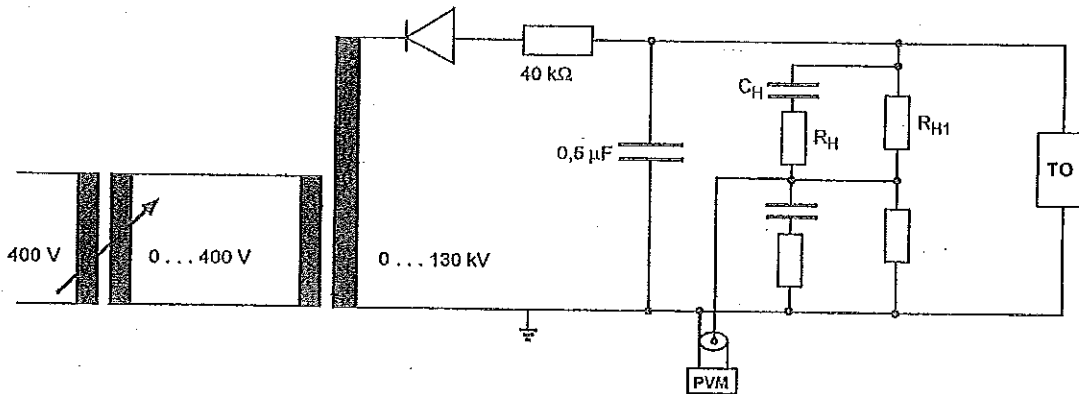


Figure 4.1: Scheme of DC voltage test circuit.

$R_H = 3,6 \text{ k}\Omega$, $R_{H1} = 360 \text{ M}\Omega$, $C_H = 180 \text{ pF}$, ratio 2.000:1, PVM: Peak Voltmeter, TO: Test object, measurement uncertainty 3%

4.2 AC Voltage Withstand Test

The test voltage was generated by an 60-kVA transformer. The voltage measurement was carried out with a capacitive divider ($C_H = 180 \text{ pF}$; ratio = 2.000) and a peak voltmeter calibration $\diamond/\sqrt{2}$.

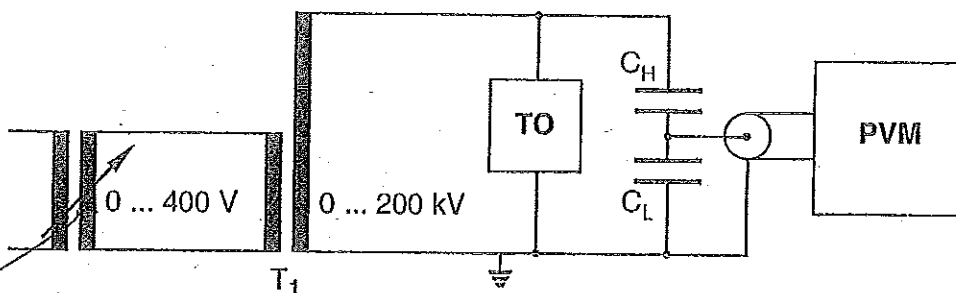


Figure 4,2: Scheme of AC test circuit

T_1 : transformer 400V / 200000V ; 60 kVA ; $v_K = 3,5 \%$; 50 Hz

C_H : 180 pF ; ratio 2000:1 ; PVM : Peak-Voltmeter

TO: Test object; measurement uncertainty 3 %

4.3 Partial-Discharge Test

The PD-measurement was performed with an analog bridge according to *Kreuger*, Figure 4.3. External PDs producing common mode signals at the detector are rejected by the differential amplifier. Internal PDs represent differential mode signals and are amplified. The background noise level at 25 kV_{rms} was 0,8 pC.

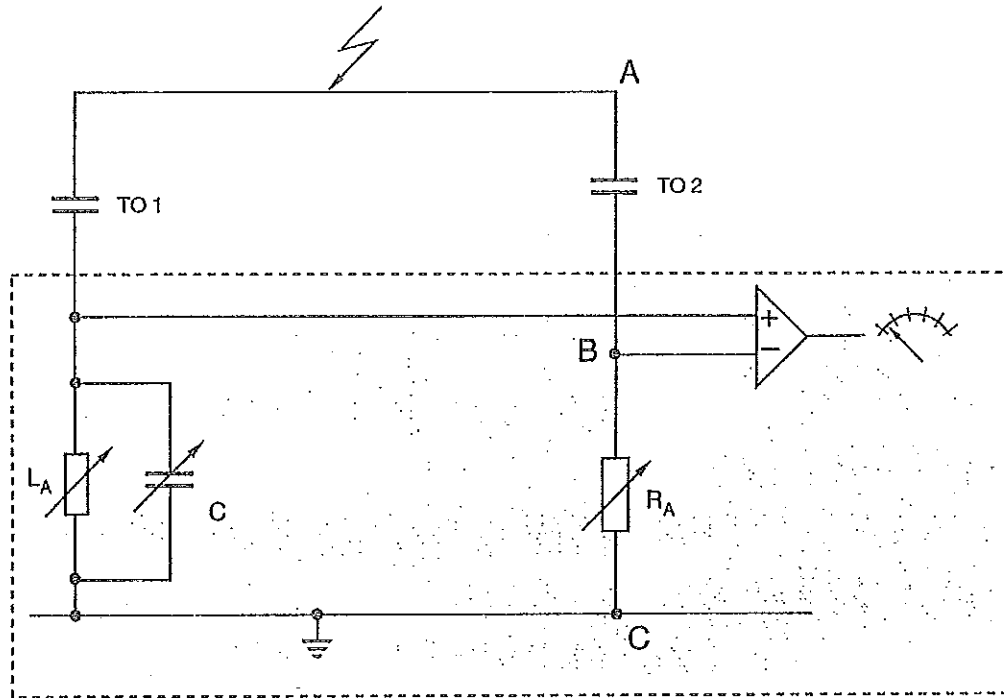


Figure 4.3: Scheme of PD test circuit
 TO1: Test object 1
 TO2: Test object 2

For balancing the bridge a calibrating impulse with $q_A = 10.000 \text{ pC}$ is applied between the terminals A (high-voltage) and C (ground) and the amplifier output is minimized. A pulse between the terminals A and C corresponds to an external PD. For the calibration a PD pulse, $q_A = 10 \text{ pC}$, is applied between A and B. Subsequently, the amplifier output of the PD measuring unit is adapted to the applied pulse.

Starting from zero the AC-voltage was steadily raised up to 28,1 kV and kept constant for 60 s, then slowly reduced to 25 kV including pd-reading.

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4.4 Lightning Impulse Voltage Withstand Test

For impulse testing was used a two-stage Marx generator (Haefely) with a maximum cumulative charging voltage of $V = 400 \text{ kV}$ and a maximum impulse energy of $E_{\text{max}} = 20 \text{ kW}$ s. At this test, the capacity of the energy storage capacitor was $C_S = 0.25 \text{ }\mu\text{F}$. The crest value of the impulse voltage was measured by a damped capacitive divider and a subsequent impulse peak voltmeter (Haefely). The front time and the time to half value were evaluated from the oscillographs.

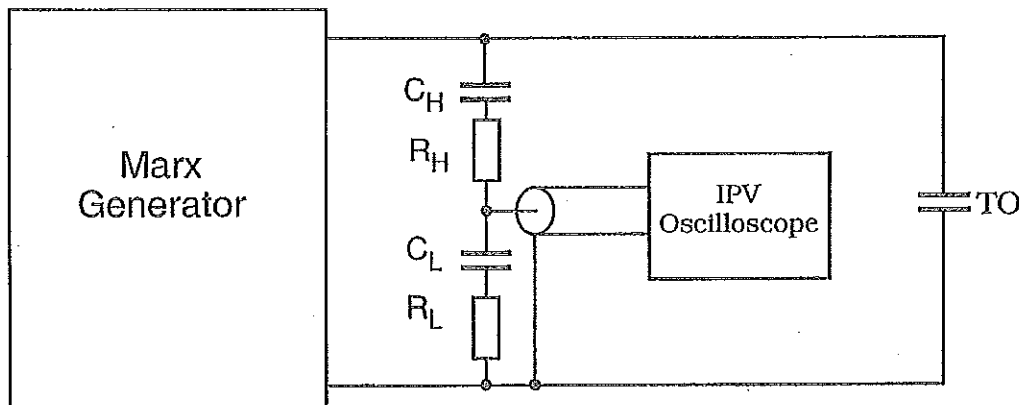


Figure 4.4: Scheme of impulse voltage test circuit

C_H : 1200 pF ; $R_H = 70 \text{ }\Omega$; ratio: 3225;

IPV: impulse-peak-voltmeter (Haefely) – measurement uncertainty 3%

Oscilloscope: Tektronix TDS 3044B – measurement uncertainty 2%

The waveform parameters were determined at reduced charging voltage.

Positive impulse: $T_1 = 1.35 \text{ }\mu\text{s}$ $T_2 = 46.8 \text{ }\mu\text{s}$

Negative impulse: $T_1 = 1.34 \text{ }\mu\text{s}$ $T_2 = 47.2 \text{ }\mu\text{s}$



4.5 Electrical Heat Cycling in Air

The test objects must be heated by a current of $I = 630$ A. Current inception was accomplished by a transformer ($V_1 = 400$ V; $V_2 = 8$ V) which used the cable as secondary winding. The current was measured by an current transformer, 1500/5, and a digital multimeter. The measurement uncertainty was 1%.

4.6 Electrical Heat Cycling in Water

The test object were placed in a tank and filled with water. The height of the water was 1000 mm above the test object. The conductivity of the water at 20°C was 63 mS/m.

4.7 Thermal Short Circuit Current Test

According IEC 986 for Cu with $q = 185$ mm² $I^2t = 1091,4 \cdot 10^6$ A²s with $\theta_{sc} = 250^\circ\text{C}$ and $\theta_i = 25^\circ\text{C}$. That means $I_K(1s) = 33,04$ kA. The short-circuit during test was $I_K = 18,74$ kA, resulting in a short-circuit duration of $t_K = 3,20$ s. The test object was tested with two thermal short-circuit currents. Between two tests the specimen cooled down to ambient temperature. The current was measured with a $10 \mu\Omega$ -shunt connected to a digital storage oscilloscope (Tektronix 2430 A). The measurement uncertainty was 2%.

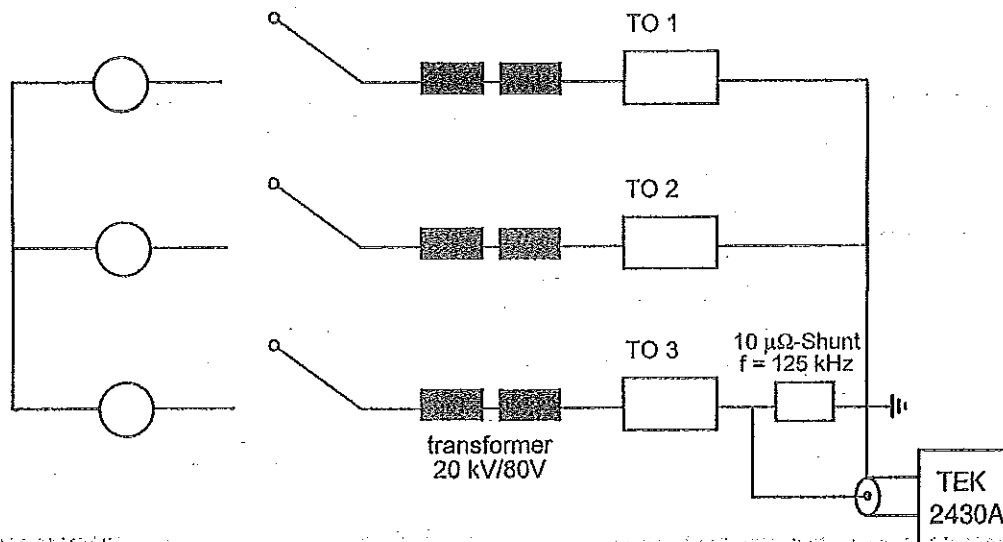


Figure 4.7.1: Scheme of short-circuit test.

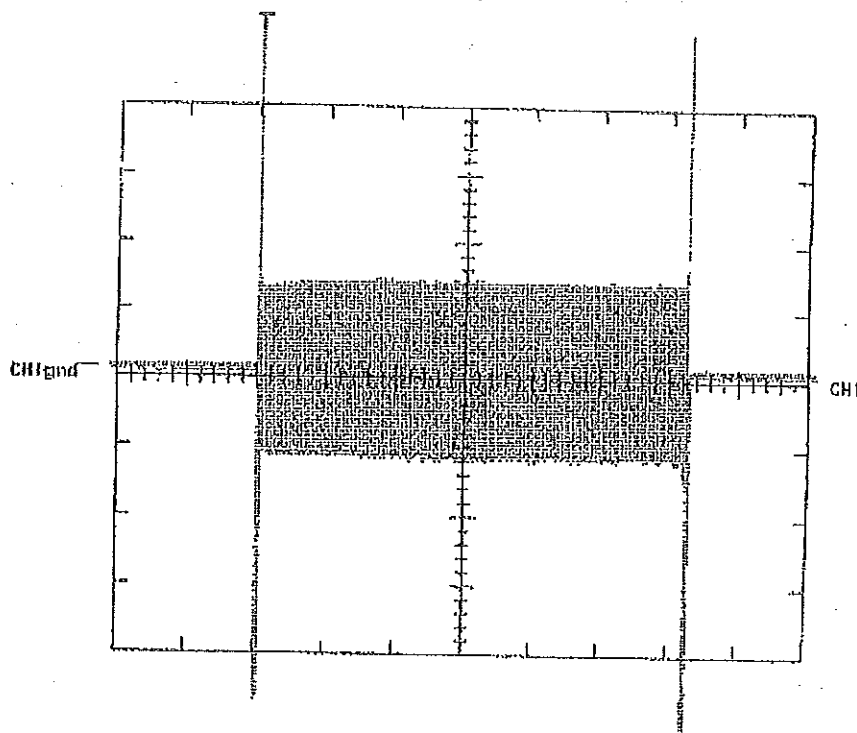


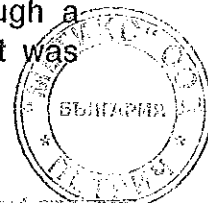
Figure 4.7.2: Short circuit current
Hor: 200 ms/Div; Vert: 20 kA/DIV

4.8 Screen Resistance Measurement

Prior to the test silver-painted electrodes were installed. The screen resistance of the plug-in termination was measured at ambient temperature between the two electrodes. Then the test object was subjected to thermal ageing in an air oven at $(120 \pm 2)^\circ\text{C}$ for 168 h. After thermal ageing the screen resistance at ambient temperature was measured again.

4.9 Leakage Current Measurement

Prior to the test a metal foil of 25 cm^2 was fixed without any air gap to the outer screen of the plug-in termination. The metal foil was placed at the end of the plug-in termination opposite to the earth bend and earthed through a milliamperemeter and a resistance of 2000 ohms. The leakage current was measured with a test voltage of V_m applied between conductor and earth.



4.10 Screen Fault Current Initiation

Prior to the test a faulting wire of approx. 0.2 mm was placed in the area of the hexagonal connecting bolt through a drilled hole. The wire was connected with the inner and outer screens and did not protrude beyond the outer screen surface.

The test voltage was generated by a 630 kVA-transformer. A capacitor bank was connected in series to the test object, resulting in a short-circuit current of 10A, Figure 4.10. The sequence of the test was as follows:

1. voltage switched on for 1 s
2. voltage switched off for 2 min
3. voltage switched on for 2 min
4. voltage switched off for 2 min
5. voltage switched on for 1 min
6. voltage switched off

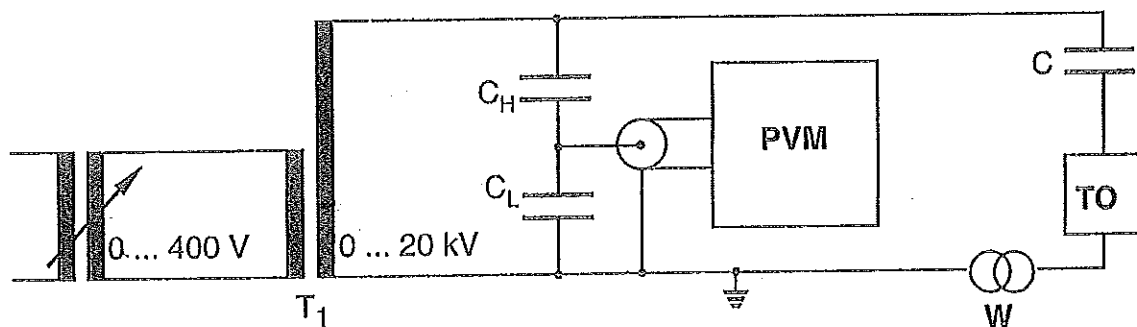


Figure 4.10: Scheme of AC test circuit
 T_1 : Transformer 400V/20.000V; 630 kVA
 C_H : 180 pF; $\ddot{u} = 2000:1$; PVM; peak-voltmeter
 C : 2,66 μ F; W: current transformer; TO: test object

4.11 Operation Force Test

The test object was placed in a climate chamber and conditioned at $(-20 \pm 2)^\circ\text{C}$ for at least 12h. The test was carried out within 5 min after removal from the climate chamber. The plug-in termination was clamped by means of a tool which allows operation along the axis of the test object. The force was gradually applied to the plug-in termination and measured by means of a tractive dynamometer.

5 Results

5.1 Test Sequence D1

5.1.1 DC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 12.10.2006

Test voltage: $V = -76 \text{ kV}$; $t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the DC voltage withstand test.

The test was passed successfully.



5.1.2 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 12.10.2006

Test voltage: $\hat{V}/\sqrt{2} = 57 \text{ kV}$, $t = 5 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.

5.1.3 Partial Discharge Test

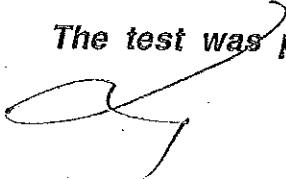
This test was carried out as described in 4.

Test date: 12.10.2006

Voltage: $\hat{V}/\sqrt{2} = 28,1 \text{ kV}$, $t = 60 \text{ s}$ thereafter
 $\hat{V}/\sqrt{2} = 25 \text{ kV}$ with pd reading

PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.



5.1.4 Impulse Voltage Withstand Test at elevated Temperature

This test was carried out as described in 4

Test date: 13.10.2006
Test voltage: $\hat{U} = 125 \text{ kV}$
Heating current: $I = 630 \text{ A}; t = 5 \text{ h}$
Number of tests: 10 positive polarity, 10 negative polarity

Neither flashover nor breakdown occurred at the test objects during all lightning impulse voltage withstand tests.

The test was passed successfully.

5.1.5 Electrical Heat Cycling in Air

This test was carried out as described in 4.

Test date: 02.11. - 03.11.2006
Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$
Heating current: $I = 630 \text{ A}$
Cycle: 5 h heating; 3 h cooling
Number of cycles: 3

Neither flashover nor breakdown occurred.

The test was passed successfully.

5.1.6 Partial Discharge Test

5.1.6.1 Partial Discharge Test at ambient temperature

This test was carried out as described in 4.

Test date: 06.11.2006
Voltage: $\hat{U}/\sqrt{2} = 28,1 \text{ kV}, t = 60 \text{ s thereafter}$
 $\hat{U}/\sqrt{2} = 25 \text{ kV with pd reading}$

PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.



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5.1.6.2 Partial Discharge Test at elevated temperature

This test was carried out as described in 4

Test date: 06.11.2006
Heating current: $I = 630 \text{ A}$, $t = 5 \text{ h}$
Voltage: $\diamond/\sqrt{2} = 28,1 \text{ kV}$, $t = 60 \text{ s}$ thereafter
 $\diamond/\sqrt{2} = 25 \text{ kV}$ with pd reading
PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.

5.1.7 Electrical Heat Cycling in Air

This test was carried out as described in 4.

Test date: 07.11. - 27.11.2006
Test voltage: $\diamond/\sqrt{2} = 32 \text{ kV}$
Heating current: $I = 630 \text{ A}$
Cycle: 5 h heating; 3 h cooling
Number of cycles: 60

Neither flashover nor breakdown occurred.

The test was passed successfully.

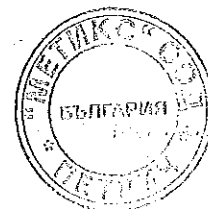
5.1.8 Electrical Heat Cycling in Water

This test was carried out as described in 4.

Test date: 27.11.-18.12.2006
Conductivity: 63 mS/m
Test voltage: $\diamond/\sqrt{2} = 32 \text{ kV}$
Heating current: $I = 630 \text{ A}$
Cycle: 5 h heating; 3 h cooling
Number of cycles: 63
Heat of water: 1000mm

Neither flashover nor breakdown occurred.

The test was passed successfully.



5.1.9 Disconnection / Connection

Test date: 20.12.2006
Number: 5 complete operations

With each test object there was no visible damage to contact.

The test was passed successfully.

5.1.10 Partial Discharge Test

5.1.10.1 Partial Discharge Test at ambient temperature

This test was carried out as described in 4.

Test date: 21.12.2006
Voltage: $\sqrt{2} = 28,1$ kV, t = 60 s thereafter
 $\sqrt{2} = 25$ kV with pd reading
PD magnitude (25 kV): < 10 pC

The test was passed successfully.

5.1.10.2 Partial Discharge Test at elevated temperature

This test was carried out as described in 4

Test date: 21.12.2006
Heating current: I = 630 A, t = 5 h
Voltage: $\sqrt{2} = 28,1$ kV, t = 60 s thereafter
 $\sqrt{2} = 25$ kV with pd reading
PD magnitude (25 kV): < 10 pC

The test was passed successfully.



5.1.11 Impulse Voltage Withstand Test

This test was carried out as described in 4.

Test date: 21.12.2006

Test voltage: $\hat{U} = 125 \text{ kV}$

Number of tests: 10 positive polarity, 10 negative polarity

Neither flashover nor breakdown occurred at the test objects during all lightning impulse voltage withstand tests.

The test was passed successfully.

5.1.12 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 21.12.2006

Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$, $t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.



5.2 Test Sequence D2

5.2.1 DC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 11.11.2006

Test voltage: $V = -76 \text{ kV}$; $t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the DC voltage withstand test.

The test was passed successfully.



5.2.2 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 11.11.2006

Test voltage: $\hat{U}/\sqrt{2} = 57 \text{ kV}$, $t = 5 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.

5.2.3 Thermal Short Circuit, Conductor

This test was carried out as described in 4.

Test date: 04.12.2006

current: $I_K = 18,74 \text{ kA}$

$t_K = 3,20 \text{ s}$

number of stresses: 2

time between stresses: 2h

The test was passed successfully.



5.2.4 Disconnection / Connection

Test date: 20.12.2006
Number: 5 complete operations
With each test object there were no visible damage to contact.

The test was passed successfully.

5.2.5 Impulse Voltage Withstand Test

This test was carried out as described in 4.

Test date: 21.12.2006
Test voltage: $\hat{U} = 125 \text{ kV}$
number of tests: 10 positive polarity, 10 negative polarity

Neither flashover nor breakdown occurred at the test objects during all lightning impulse voltage withstand tests.

The test was passed successfully.

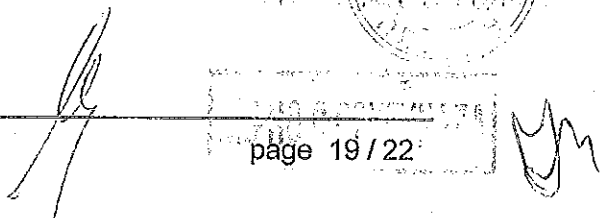
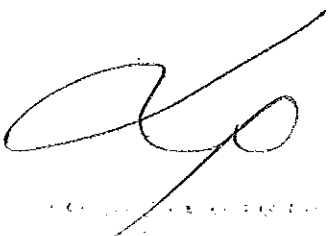
5.2.6 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 21.12.2006
Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$, $t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.



5.3 Additional Tests

5.3.1 Screen Resistance Measurement

This test was carried out as described in 4.

Test date: 30.11. - 07.12.2006

Resistance prior to thermal ageing < 5000 Ω

Resistance after thermal ageing < 5000 Ω

Requirement: resistance \leq 5000 Ω

The test was passed successfully.

5.3.2 Leakage Current Measurement

This test was carried out as described in 4.

Test date: 11.12.2006

Test voltage: $\hat{U}/\sqrt{2} = V_m = 24$ kV

Leakage current: $I < 0,5$ mA

Requirement: $I \leq 0,5$ mA

The test was passed successfully.

5.3.3 Screen Fault Current Initiation

This test was carried out as described in 4.

Test date: 15.12.2006

Test voltage: $\hat{U}/\sqrt{2} = V_0 = 12,7$ kV

Short-circuit current: $I = 10,3$ A

Fault current flow continuously.

The test was passed successfully.

5.3.4 Operating Force Test

This test was carried out as described in 4.

Test date: 11.12. - 12.12.2206


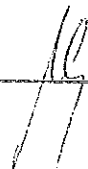
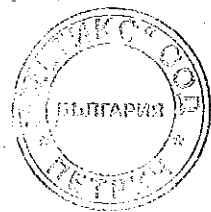
Temperature: - 20°C

Duration: 24h

Force: < 900 N

Requirement: $F < 900 \text{ N}$

The test was passed successfully.



6 Conclusion

The separable connector type CELLPLUX-CTS 630 A 24 kV passed all tests described in clause 2 successfully. The test object fulfilled the requirements according CENELEC HD 629.1 / S1 06/2002, table 7, test sequences D1 and D2 and additional tests table 7, pos.19-22.

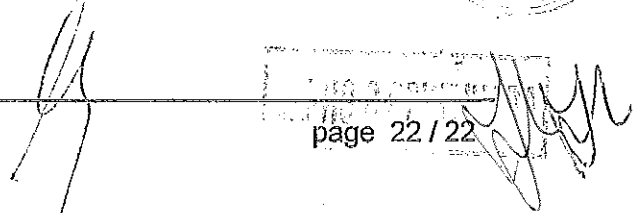
Karlsruhe, 08.01.2007



Dr.-Ing. R. Badent
Bereichsleiter HPT

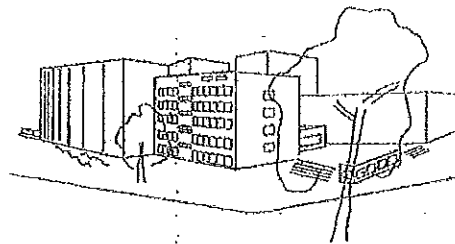


Dr.-Ing. B. Hoferer
stellv. Bereichsleiter HPT



Bereich Hochspannungsprüftechnik

Institut für Elektroenergiesysteme und Hochspannungstechnik



Universität Fridericiana (TH) Karlsruhe
76128 Karlsruhe - Kaiserstraße 12

Telefon (0721) 608 2520 Telefax (0721) 69 62 24

Test Report No 2010-77

Type Test of

Separable Connectors

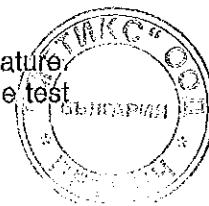
Type CELLPLUX-CTKS 630A 24 kV

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Customer: Cellpack GmbH
Carl-Zeiss-Str. 20
79761 Waldshut-Tiengen

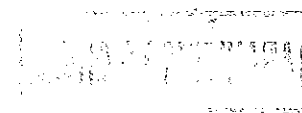
Reporter: Dr.-Ing. R. Badent
Dr.-Ing. B. Hoferer

This report includes 24 numbered pages and is only valid with the original signature.
Copying of extracts is subject to the written authorization of the test laboratory. The test results concern exclusively to the tested objects.

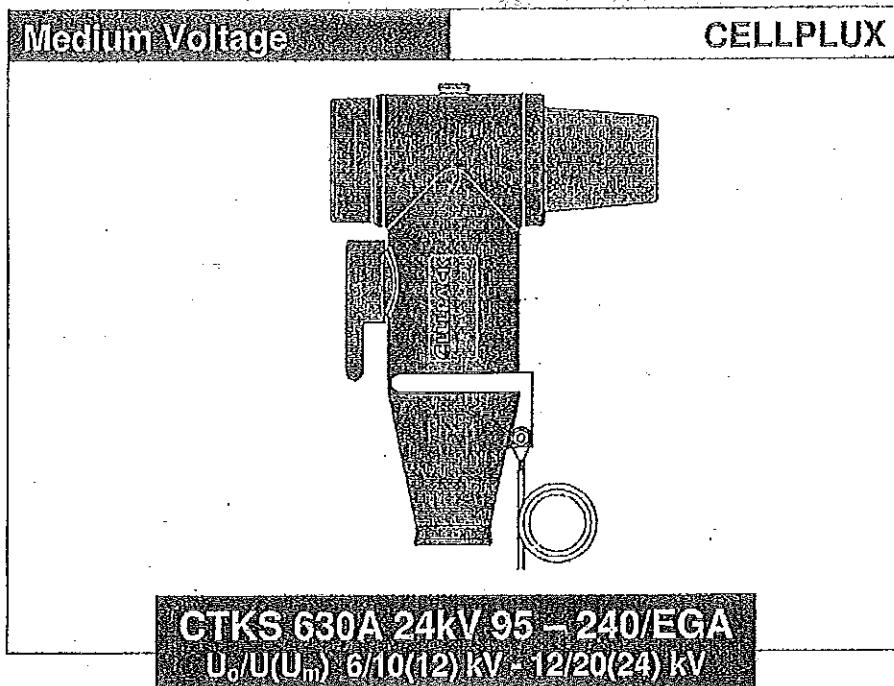


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A handwritten signature, possibly 'B. Hoferer', located at the bottom center of the page.



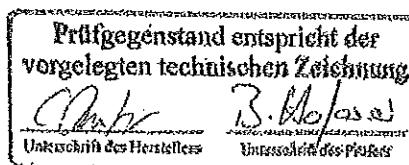
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Working Instruction

Separable T Coupling Connector for
single-core polymeric cables
up to 24 kV

257258/0910/3/9



CELLPACK GmbH
Electrical Products
D-79761 Waldshut-Tiengen
Tel. +49(0)7741/60 07 11
Fax +49(0)7741/60 07 83
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e-mail: electrical.products@cellpack.com

CELLPACK AG
Electrical Products
CH-5612 Villmorgen
Tel. +41(0)56/618 12 34
Fax +41(0)56/618 12 45

CELLPACK
Electrical Products

257258 CTKS 630A 24kV 95-240/EGA

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Figure 2.1: Installation Instruction.



General remarks:

- Check if the range and size of the accessories is appropriate to the cable.
- Check the content of the kit as per packing list.
- Thoroughly read the working instruction.

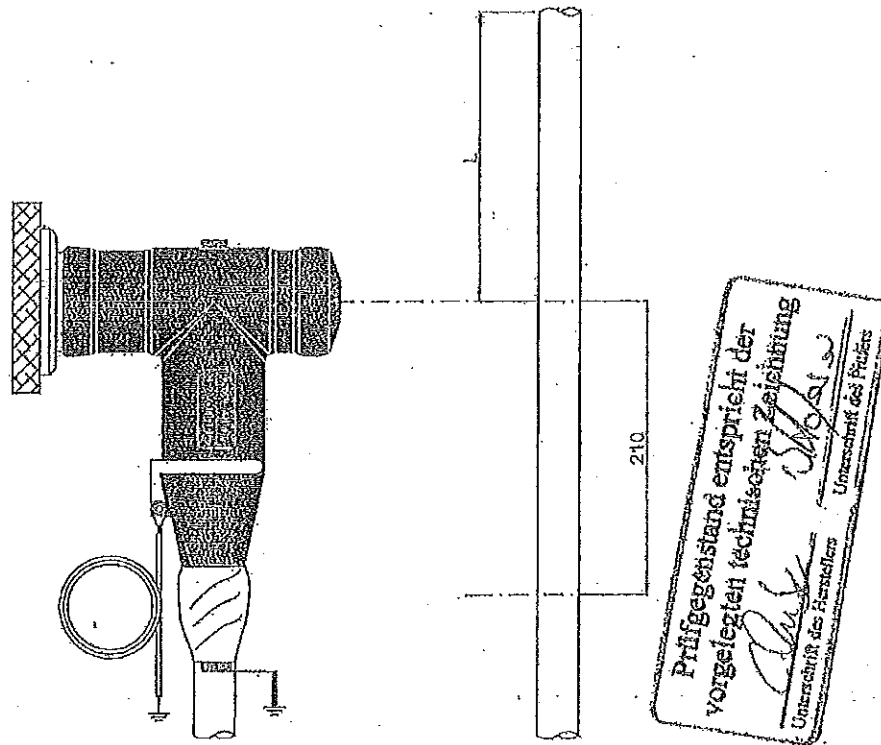
Installation must be executed by competent personnel only.
The manufacturer accepts no liability for breakdowns or damages resulting from an incorrect installation.

Separable T Coupling Connector CELLPLUX CTKS 630A 24kV 95-240/EGA:

Cross-Section Application

Voltage U ₀ /U _m kV	Cable Cross-Section (*) mm ²
6/10(12) kV	150 – 240 *)
8,7/15(17,5) kV	120 – 240 *)
12/20(24) kV	95 – 240 *)

(*) Minimal diameter over cable insulation of 22 mm

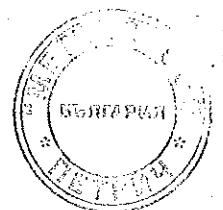


- Clean thoroughly the cable ends up to 1 m.
- Adjust the cable overhanging in the middle of the bushing by $L = 200 - 500$ mm. Cut-off the excess of cable
- Make a mark 210 mm from the centre of the bushing onto the cable sheath.

257258 CTKS 630A 24kV 95-240/EGA

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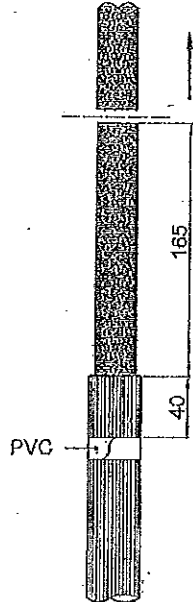
Figure 2.2: Installation Instruction



Preparation of the cable

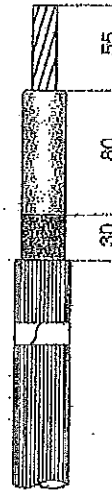
Cable with wire screen:

1a)



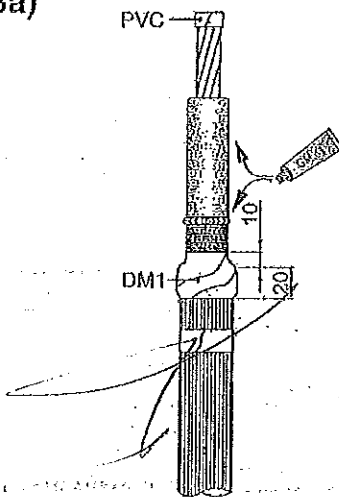
- Remove the cable sheath up to the mark.
- Band back the screen wires of the cable and fix them on the cable sheath with PVC tape (Fig. 1a).
- Cut off the conductor at the length of 165 mm.

2a)



- Remove carefully the outer conductive layer up to 30 mm (mind a clean cut back edge).
- Cut back the cable insulation by 55 mm.
- Clean thoroughly insulation and the outer conductive layer of the cable.

3a)



257258 CTKS 630A 24kV 95-240/EGA

Prüfgegenstand entspricht der vorgelegten technischen Zeichnung
 Unterschrift des Herstellers: *[Signature]*
 Unterschrift des Prüfers: *[Signature]*

- Wrap the tip end of the conductor with PVC tape.
- Wrap 2/3 of the length of DM1 mastic 10 mm on to the conductive layer and 20 mm on to the wire screen (stretch 50%).
- Apply at and around the cut edge of the conductive layer lubricant and filling agent GM1 (forming a ring).
- Moisten the insulation with lubricant and filling agent GM1.

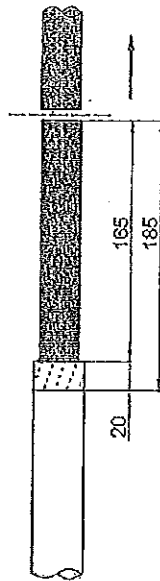
3/9

Figure 2.3: Installation Instruction

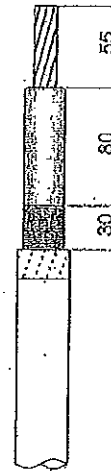


Cable with tape screen:

1b)



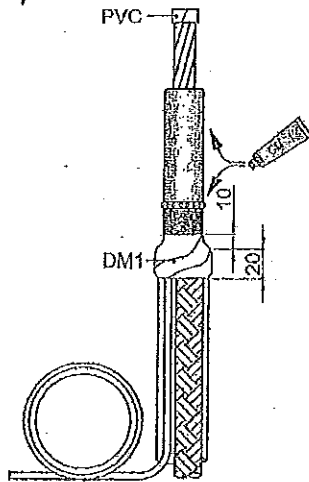
2b)



- Remove the cable sheath up to the mark + 20mm.
- Cut the cable according to the drawing.
- Remove carefully the tape screen up to 20 mm.

- Remove carefully the outer conductive layer up to 30 mm (mind a clean cut back edge).
- Cut back the cable insulation by 55 mm.
- Clean thoroughly the insulation and the conductive layer.

3b)



257258 CTKS 630A 24kV 95-240/EGA

- Wrap the tip end of the conductor with PVC tape.
- Fix the flat Cu-braid and earthing cable with the pressure spring RF on to the tape screen (order the earthing kit separately).
- Wrap 2/3 of the length of mastic tape DM1 10 mm on to the conductive layer and 20 mm on to the copper tape screen (Fig. 3b).
- Apply at and around the cut edge of the conductive layer lubricant and filler agent GM1 (forming a ring).
- Moisten the insulation with lubricant and filling agent GM1.

Prüfgegenstand entspricht der vorgelegten technischen Zeichnung

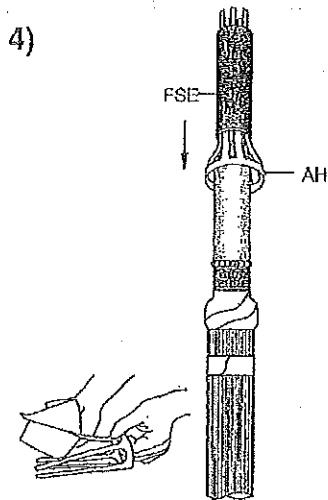
C. Dörfler *R. Hofler*

Unterschrift des Herstellers Unterschrift des Prüfers

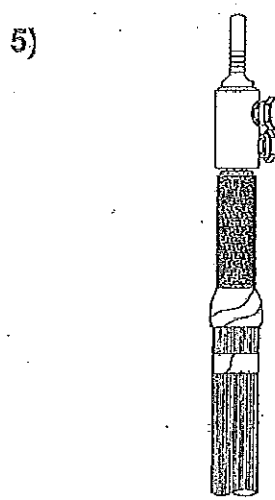
4/9

Figure 2.4: Installation Instruction

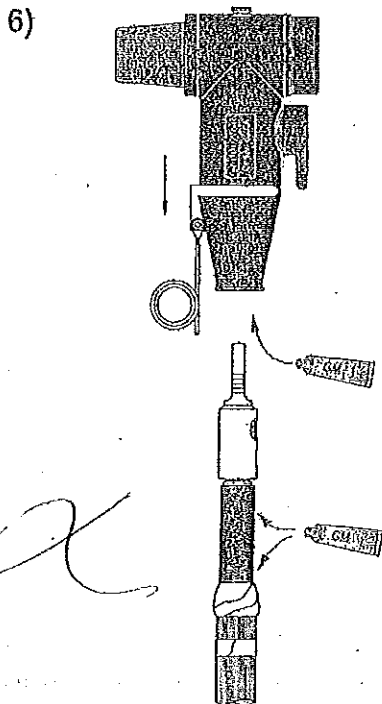




- Moisten the tongues of the applicator AH with the silicon towel.
- Insert the applicator AH in to the stress control element FSE and slip it on to the cable up to the sealing wrap.
- Remove the applicator AH by pulling out the tongues one by one.
- Adjust the position of the stress control element FSE by turning it slightly (Fig. 5).



- Remove the protection wrap from the tip end of the conductor.
- Install the shear-head screw cable lug according to the separate instruction. Please note that the tapped hole of the cable lug is in line with the bushing axle.
- Clean thoroughly the surface of the stress control element FSE.



- Moisten the connector body and the surface of the stress control elements FSE with lubricant and filling agent GM1.
Attention: The cable lug must not be moistured.
- Slip the connector body on to the conductor until the tapped hole of the cable lug is centred inside the connector body.

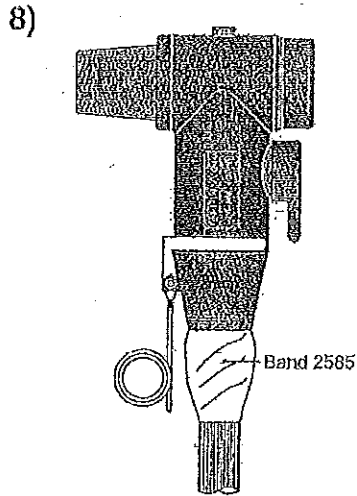
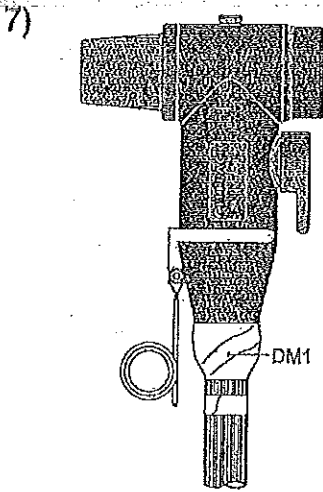
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257258 GTKS 630A 24kV 95-240/EGA

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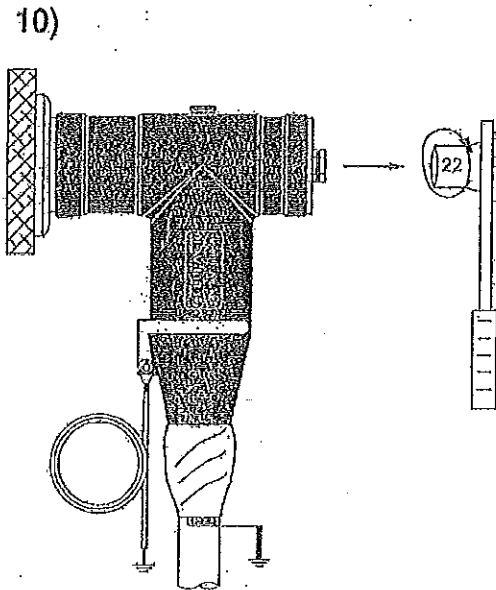
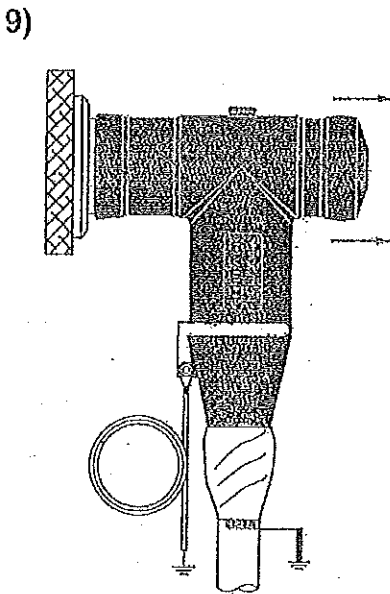
Figure 2.5: Installation Instruction





- Wrap the remaining 1/3 of mastic tape DM1 between the end of the connector body and the sealing area.

- Wrap the tape Nr. 2585 adhesive side inwards approx. 20 mm over the end of the connector body up to the end of the sealing area (stretch 20%).



- Take off the conductive protection cup of the T - connector body.

- Unscrew the insulating plug. Use appropriate tool.

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257258.CTKS 630A 24kV 95-240/EGA

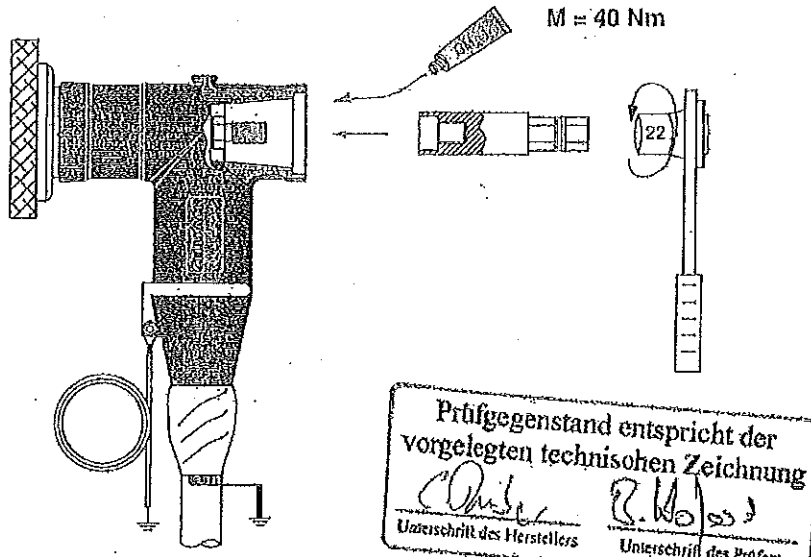
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Figure 2.6: Installation Instruction



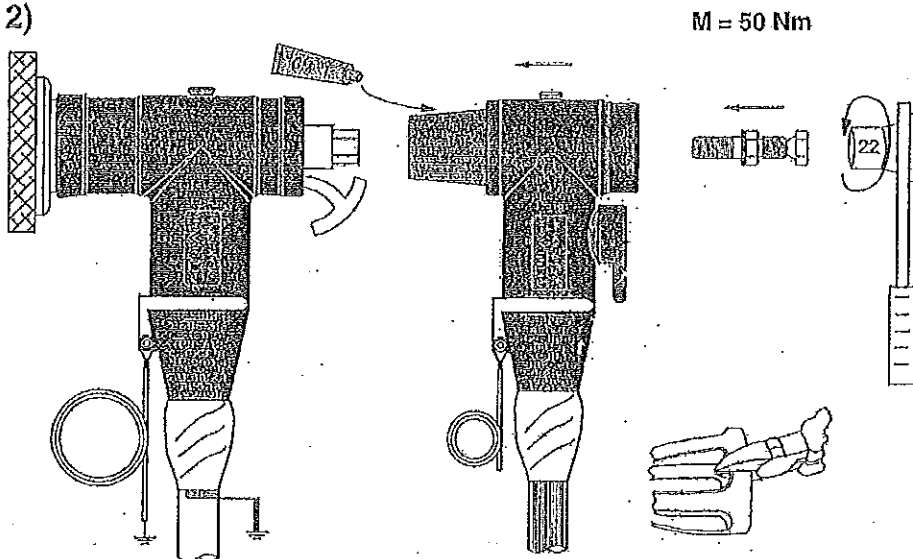
[Handwritten signatures and marks]

11)



- Clean thoroughly inside of the T-connector body and moisten again with lubricant and filling agent GM1.
- Insert the adaptor plug into the T-connector body and screw the adaptor plug manually. Tighten the adaptor plug with an appropriate tool till the shear head breaks.
Attention:
To rouse the adaptor plug it must be tighten with a shear moment „M“ of 40 Nm

12)



- Moisten outside of the CTKS-connector body with lubricant and filling agent GM1.
- Cut out a tongue from the applicator AH (air decompression device). Insert the decompression device into the T-connector body.
- Attach the CTKS-connector straight on to the adaptor plug and screw the contact screw manually.
- Tighten the contact screw with an appropriate tool till the shear head breaks.
Attention:
To rouse the contact screw it must be tighten with a shear moment „M“ of 50 Nm

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Figure 2.7: Installation Instruction

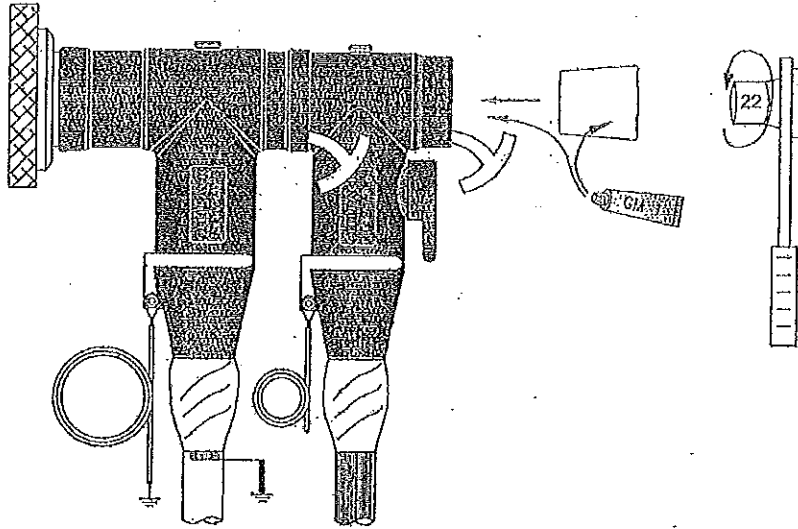


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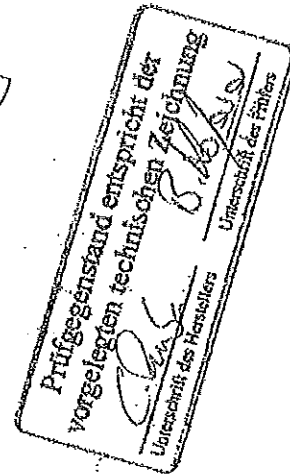
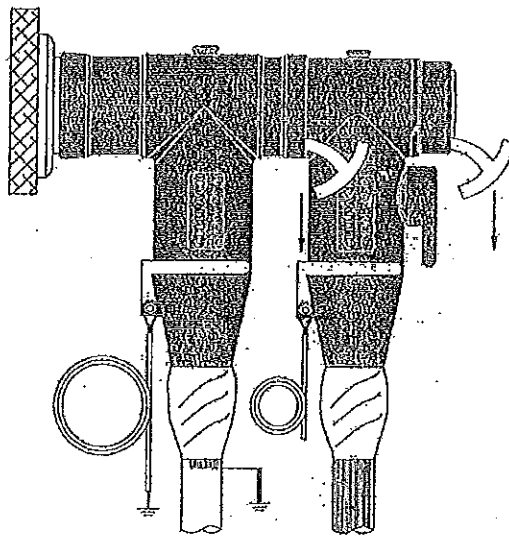
13)

M ≈ 40 Nm



- Moisten inside of the CTKS-connector body and the new insulating plug with lubricant and filling agent GM1.
- Cut out a second tongue from the applicator and insert it into the connector body.
- Insert the new insulating plug into the connector body. Tighten the insulating plug with an appropriate tool. Do not apply a shear moment „M“ bigger than 40 Nm.

14)



- Pull out gently the decompression devices and remove remaining of lubricant and filling agent GM1.

257258 CTKS 630A 24kV 95-240/EGA

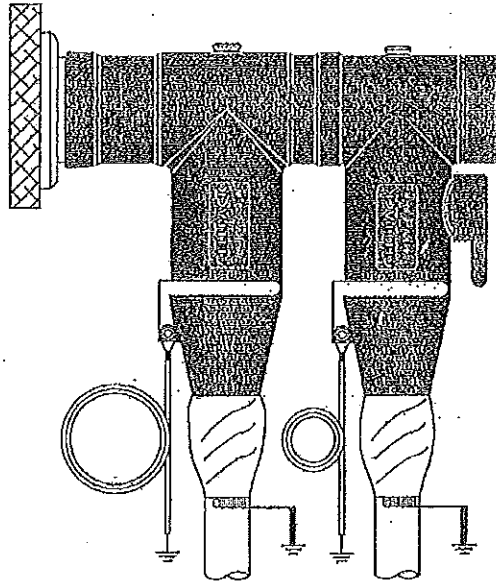
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Figure 2.8: Installation Instruction



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15)



- Insert the conductive protection cup over the connector body and ground the CTKS-connector body.
- Further earthing measurements have to be carried out according to local regulations.

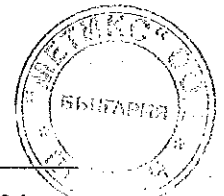


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257258 CTKS 630A 24kV 95-240/EGA

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Figure 2.9: Installation Instruction



Several handwritten signatures and marks in black ink, including a large signature on the left and a smaller one on the right.

Packliste	256 839	Lista de carga	CELLPACK Electrical Products
Packing list			
Liste d'emballage			

MEDIUM VOLTAGE	CELLPLUX
-----------------------	-----------------

T-Koppelsteckanschluss	Typ	CTKS 630A 24kV 95-240/EGA	
T Coupling Connector	$U_o/U(U_m)$	0/10(12)kV	150 - 240 mm ²
Connecteur de couplage en T		8,7/15(17,5)kV	120 - 240 mm ²
Terminal de acople en T		12/20(24)kV	95 - 240 mm ²
		Isolation min. Ø: 22 mm	
Version: 03			

Pos		St. Cont.	Dimension			
1		3	CTKS 630A 24 kV	Steckanschluss Plug-in connector		Connecteur Séparable Cuerpo Terminal
2		3	CTKS 630A 24 kV	Isol. Anschluss-Stopfen Insulated plug		Connecteur isolé Enchufe aislado
3		3	FSE 20	Feldsteuerelement Field control element		Contrôleur de champ Elemento de control de campo
4		4	GM1	Gleit- und Füllmittel Lubrificant and filler		Lubrifiant Lubrificante
5		3	AH 3	Aufschlebehilfe Applicator		Dispositif d'endigo Aplicador
6		3	CTKS(A) 630A	Verbindungsstück Adaptor plug		Raccordement Pieza de conexión
7		3	CTKS 630A 95-240	Schraubkabelschuh + Anschlussbolzen Screw cable lug with connecting bolt		Cintre de fixation Terminal con
8		3	DM 1 25x200 mm	Dichtband grau Sealing tape grey		Ruban d'étanchéité gris Cinta de estanqueidad gris
9		3	2585 50x350 mm	Polsterband Rubber mastik tape		Ruban mastique Cinta Mastik
10		1	N° 028 5 m	Isolierband PVC tape		Ruban isolant Cinta aislante
11		3	Paar	Handschuhe Gloves		Gants Guantes
12		3	ST	Tuch mit Silikonöl Tissue with silicon oil		Tissue siliconé Toalla siliconada
13		9	RT	Reinigungstuch Cleaning tissue		Tissue de nettoyage Toalla de limpieza
14		4	MA de, en, fr, es	Montageanleitung Working instructions		Instrucciones de montaje Instrucciones de montaje

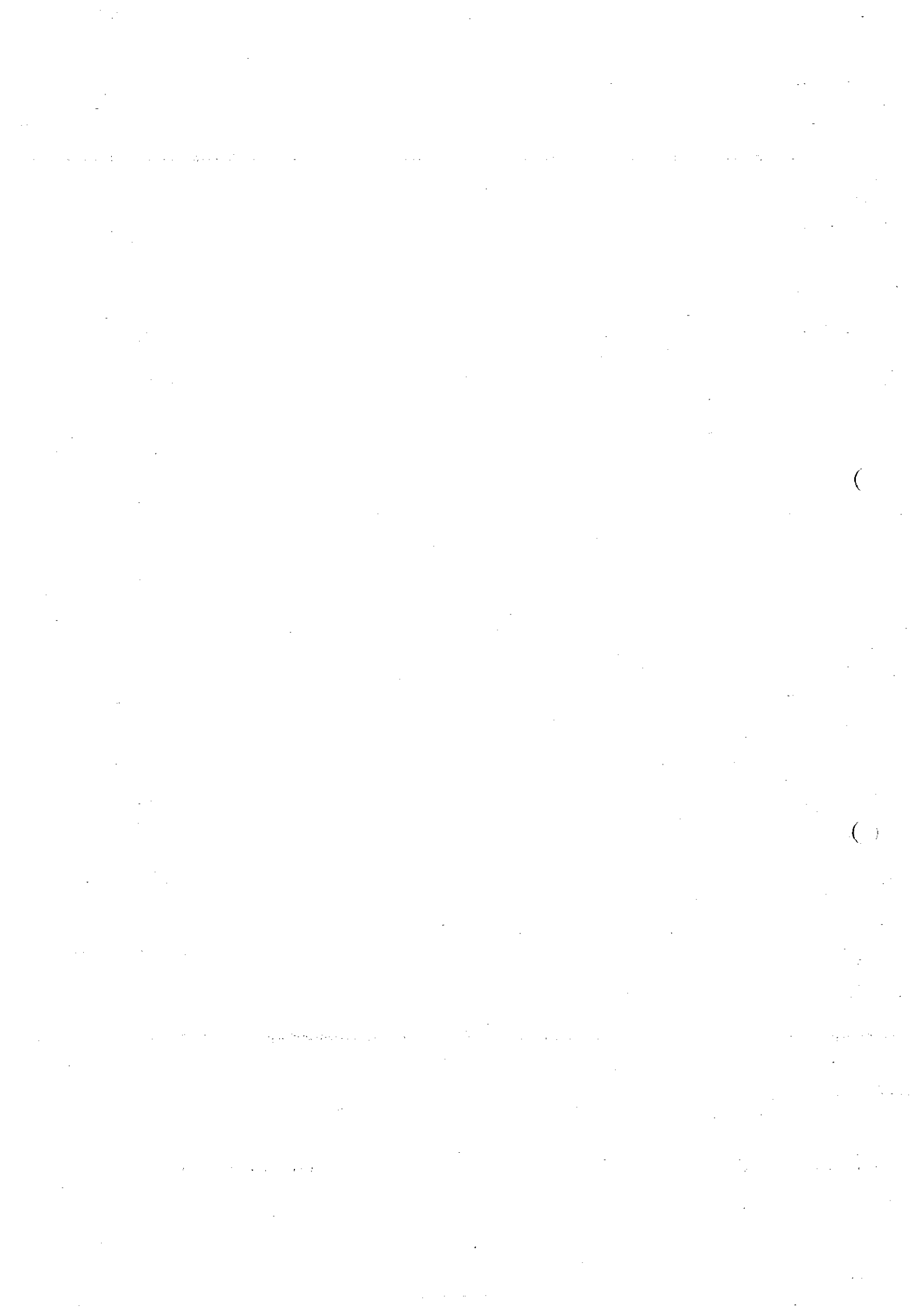
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Figure 2.10: Packing list





Anhang A
 (informativ)

Dokumentation der Prüfkabel (siehe 5.1.1 und 8.2)

Nennspannung U_N (V_m) 12/20(24)kV

Kabelaufbau: 1-Leiter 3-Leiter einzeln geschlirmt
 gemeinsam geschlirmt

Leiteraufbau: Al Cu
 mehrdrähtig massiv
 Rundleiter Sektorleiter
 120 mm² 150 mm² 185 mm²
 anderer Querschnitt: mm²

Kabelisolation: VPE
 EPR HEPR

Äußere Leitschicht: fest extrudiert abziehbar

Metallischer Schirm: Drähte Bündel extrudiert

Armlerung: Draht Band

Außenmantel: PVC PE (Typ ist anzugeben)

Wassersperre, wenn vorhanden: im Leiter unter Außenmantel

Durchmesser:

- Leiter 16,2 mm
- Isolierung 28,3 mm
- äußere Leitschicht 28,7 mm
- Außenmantel 36,5 mm

Kabelbezeichnung: TF Kabel 5
N2XSY 1x185 RM125 20kV

Figure 2.9: Cable data sheet



[Handwritten signatures and scribbles]

Tests: Test volume, chronological order and requirements conform to DIN VDE 0278-629-1:2009-07 test sequence D1, table 7 and additional test pos. 21.
The PD-test was performed at $2 V_0$. The tests were carried out in accordance with the test methods described in DIN EN 61442 01/2006.

Test sequence D1:

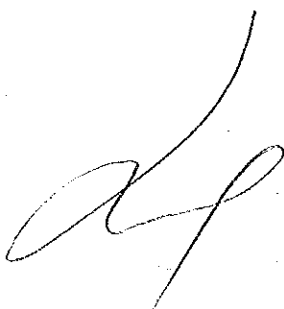
- Pos. 1. DC voltage withstand test*
 $V = 6 V_0 = -76 \text{ kV}$; $t = 15 \text{ min}$
- Pos. 2. AC voltage withstand test*
 $\hat{V} / \sqrt{2} = 4,5 V_0 = 57 \text{ kV}$; $t = 5 \text{ min}$
- Pos. 3. Partial discharge test*
 $\hat{V} / \sqrt{2} = 2,0 V_0 = 25 \text{ kV}$; $PD \leq 10 \text{ pC}$
- Pos. 4. Impulse voltage withstand test at elevated temperature*
Impulse voltage
 $\hat{V} = 125 \text{ kV}$; positive and negative polarity each 10 impulses
- Pos. 5. Electrical heat cycling in air*
each loading cycle had a 5 hour heating period and a 3 hour no-load cooling period;
test voltage: $\hat{V} / \sqrt{2} = 32 \text{ kV}$, number of cycles: 63
- Pos. 6. Electrical heat cycling in water*
each loading cycle had a 5 hour heating period and a 3 hour no-load cooling period;
test voltage: $\hat{V} / \sqrt{2} = 32 \text{ kV}$, number of cycles: 63
- Pos. 10. Disconnection / Connection*
5 complete operations,
no visible damage to contact
- Pos. 11. Partial discharge test at ambient temperature and elevated temperature*
 $\hat{V} / \sqrt{2} = 2,0 V_0 = 25 \text{ kV}$; $PD \leq 10 \text{ pC}$
- Pos. 12. Impulse voltage withstand test, lightning impulse voltage*
 $\hat{V} = 125 \text{ kV}$; positive and negative polarity each 10 impulses
- Pos. 13. AC voltage withstand test*
 $\hat{V} / \sqrt{2} = 2,5 V_0 = 32 \text{ kV}$; $t = 15 \text{ min}$
- Additional Test:
- Pos. 21. Capacitive test point performance*
 $C_{tc} > 1,0 \text{ pF}$
 $C_{te} / C_{tc} \leq 12$



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3 Mounting

Final assembling of the separable connector was executed in the high-voltage laboratory of the IEH.



4 Test Setups

4.1 DC Voltage Withstand Test

The DC-voltage was generated according to Figure 4.1. The voltage measurement was carried out with an ohmic-capacitive divider (ratio 2000:1). The measurement uncertainty was 3%.

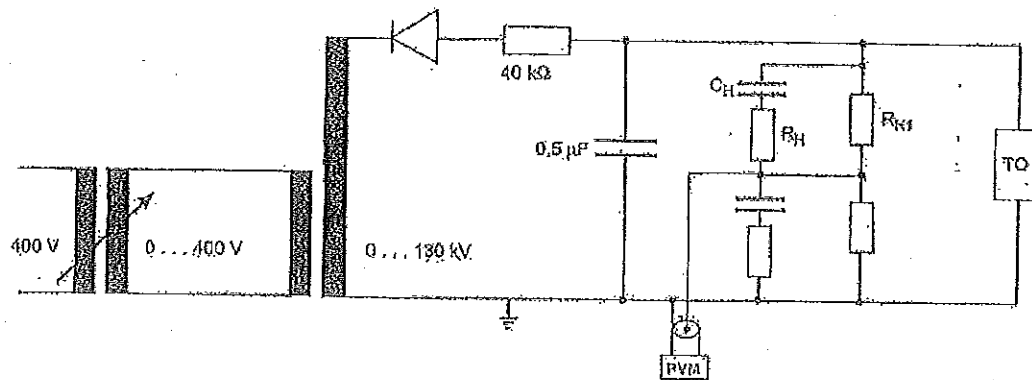


Figure 4.1: Scheme of DC voltage test circuit.

$R_H = 3,6 \text{ k}\Omega$, $R_{H1} = 360 \text{ M}\Omega$, $C_H = 180 \text{ pF}$, ratio 2.000:1, PVM: Peak Voltmeter, TO: Test object, measurement uncertainty 3%

4.2 AC Voltage Withstand Test

The test voltage was generated by an 60-kVA transformer. The voltage measurement was carried out with a capacitive divider ($C_H = 180 \text{ pF}$; ratio = 2.000) and a peak voltmeter calibration $\diamond / \sqrt{2}$.

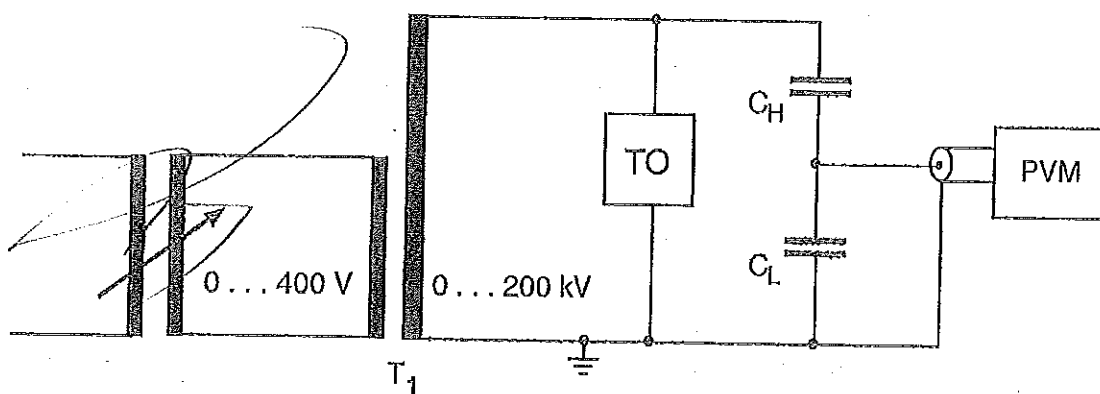
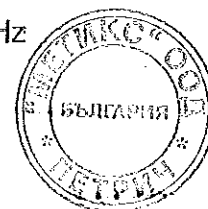


Figure 4.2: Scheme of AC test circuit

T_1 : transformer 400V / 200000V ; 60 kVA ; $v_K = 3,5 \%$; 50 Hz
 C_H : 180 pF ; ratio 2000:1 ; PVM : Peak-Voltmeter
 TO: Test object; measurement uncertainty 3 %



4.3 Partial-Discharge Test

The PD-measurement was performed with an analog bridge according to *Kreuger*, Figure 4.3. External PDs producing common mode signals at the detector are rejected by the differential amplifier. Internal PDs represent differential mode signals and are amplified. The background noise level at 25 kV_{rms} was 1,0 pC.

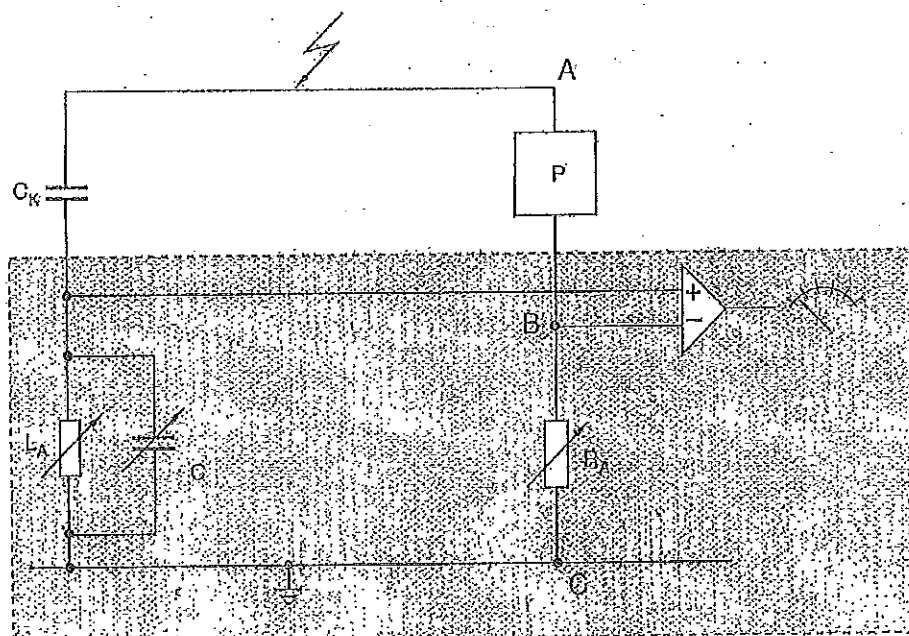


Figure 4.3: Scheme of PD test circuit

TO1: Test object 1

TO2: Test object 2

For balancing the bridge a calibrating impulse with $q_A = 10.000 \text{ pC}$ is applied between the terminals A (high-voltage) and C (ground) and the amplifier output is minimized. A pulse between the terminals A and C corresponds to an external PD. For the calibration a PD pulse, $q_A = 10 \text{ pC}$, is applied between A and B. Subsequently, the amplifier output of the PD measuring unit is adapted to the applied pulse.

Starting from zero the AC-voltage was steadily raised up to 28,1 kV and kept constant for 60 s, then slowly reduced to 25 kV including pd-reading.



4.4 Lightning Impulse Voltage Withstand Test

For impulse testing was used a two-stage Marx generator (Haefely) with a maximum cumulative charging voltage of $V = 400$ kV and a maximum impulse energy of $E_{max} = 20$ kWs. At this test, the capacity of the energy storage capacitor was $C_S = 0.25$ μ F. The crest value of the impulse voltage was measured by a damped capacitive divider and a subsequent impulse peak voltmeter (Haefely). The front time and the time to half value were evaluated from the oscillographs.

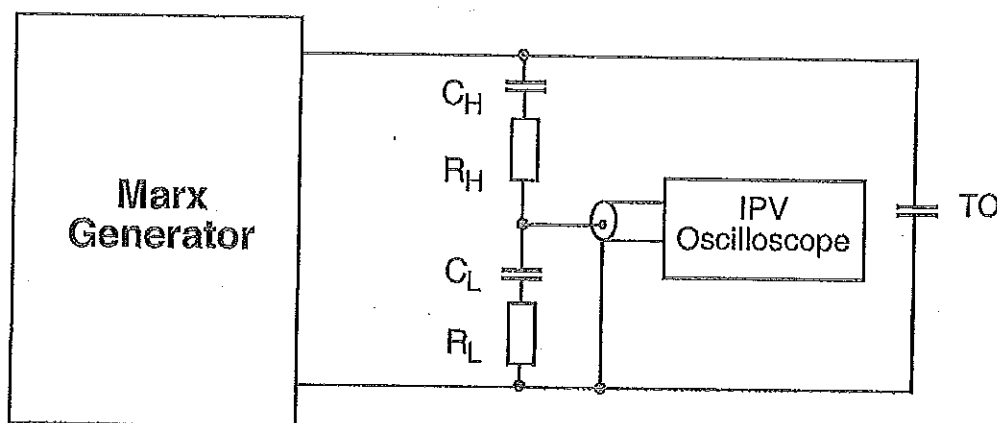


Figure 4.4: Scheme of impulse voltage test circuit

C_H : 1200 pF ; $R_H = 70 \Omega$; ratio: 3215;

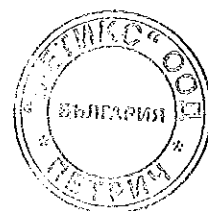
IPV: impulse-peak-voltmeter (Haefely) – measurement uncertainty 3%

Oscilloscope: Tektronix TDS 3044B – measurement uncertainty 2%

The waveform parameters were determined at reduced charging voltage.

Positive impulse: $T_1 = 3.07 \mu s$ $T_2 = 49.6 \mu s$

Negative impulse: $T_1 = 2.87 \mu s$ $T_2 = 49.4 \mu s$



4.5 Electrical Heat Cycling in Air

The test objects must be heated by a current which provides the permitted service temperature of the tested cable plus 5 K - 10 K, that means 95°C - 100°C, for XLPE-cable. The heating current I was determined with a dummy cable. The same cable as used for the test, with a length of 3 m, was drilled with a diameter of 0.8 mm up to the conductor. The temperature was measured with a thermo couple NiCr-Ni. The measurement uncertainty was ± 2 K.

The maximum heating current for this test was 760 A. Current inception was accomplished by a transformer ($V_1 = 400$ V; $V_2 = 8$ V) which used the cable as secondary winding. The current was regulated by a control unit and measured by a current transformer, 1500/5, and a digital multimeter. The measurement uncertainty was 1%.

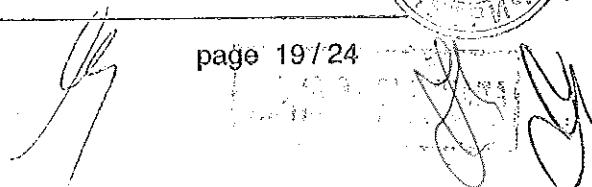
4.6 Electrical Heat Cycling in Water

The test object were placed in a tank and filled with water. The height of the water was 1000 mm above the test object. The conductivity of the water at 20°C was 63 mS/m.

At a distance of 100 mm from each side of the accessory, the cable oversheath was removed for a distance of 50 mm.

4.7 Capacitive test point performance

The test was performed with a different bridge. For this test the capacity of test point to the cable conductor C_{tc} and the capacity of test point to earth C_{te} were measured at ambient temperature.



5 Results

5.1 Test Sequence D1

5.1.1 DC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 24.09.2010

Test voltage: $V = - 76 \text{ kV} ; t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the DC voltage withstand test.

The test was passed successfully.

5.1.2 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 24.09.2010

Test voltage: $\diamond / \sqrt{2} = 57 \text{ kV} , t = 5 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.

5.1.3 Partial Discharge Test

This test was carried out as described in 4.

Test date: 24.09.2010

Voltage: $\diamond / \sqrt{2} = 28.1 \text{ kV} , t = 60 \text{ s thereafter}$
 $\diamond / \sqrt{2} = 25 \text{ kV with pd reading}$

PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.



5.1.4 Impulse Voltage Withstand Test at elevated Temperature

This test was carried out as described in 4

Test date: 24.09.2010
Test voltage: $\hat{U} = 125 \text{ kV}$
Maximum heating current: $I = 760 \text{ A}$; $t = 5 \text{ h}$
Number of tests: 10 positive polarity, 10 negative polarity

Neither flashover nor breakdown occurred at the test objects during all lightning impulse voltage withstand tests.

The test was passed successfully.



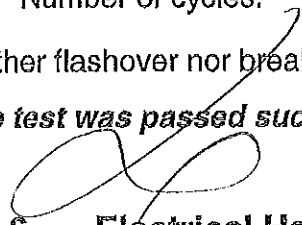
5.1.5 Electrical Heat Cycling in Air

This test was carried out as described in 4.

Test date: 30.09. - 21.10.2010
Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$
Maximum heating current: $I = 760 \text{ A}$
Cycle: 5 h heating; 3 h cooling
Number of cycles: 63

Neither flashover nor breakdown occurred.

The test was passed successfully.



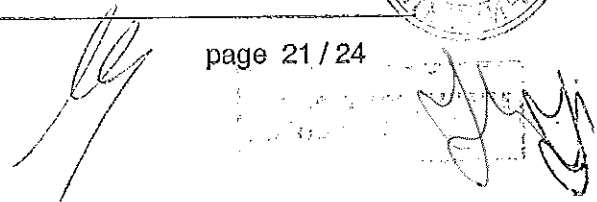
5.1.6 Electrical Heat Cycling in Water

This test was carried out as described in 4.

Test date: 28.10. - 18.11.2010
Conductivity: 63 mS/m
Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$
Maximum heating current: $I = 760 \text{ A}$
Cycle: 5 h heating; 3 h cooling
Number of cycles: 63
Heat of water: 1000mm

Neither flashover nor breakdown occurred.

The test was passed successfully.



5.1.7 Disconnection / Connection

Test date: 30.11.2010
Number: 5 complete operations

With each test object there was no visible damage to contact.

The test was passed successfully.

5.1.8 Partial Discharge Test

5.1.8.1 Partial Discharge Test at ambient temperature

This test was carried out as described in 4.

Test date: 09.12.2010
Voltage: $\diamond/\sqrt{2} = 28.1 \text{ kV}$, $t = 60 \text{ s}$ thereafter
 $\diamond/\sqrt{2} = 25 \text{ kV}$ with pd reading
PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.

5.1.8.2 Partial Discharge Test at elevated temperature

This test was carried out as described in 4

Test date: 10.12.2010
Maximum heating current: $I = 760 \text{ A}$, $t = 5 \text{ h}$
Voltage: $\diamond/\sqrt{2} = 28.1 \text{ kV}$, $t = 60 \text{ s}$ thereafter
 $\diamond/\sqrt{2} = 25 \text{ kV}$ with pd reading
PD magnitude (25 kV): $< 10 \text{ pC}$

The test was passed successfully.

5.1.9 Impulse Voltage Withstand Test

This test was carried out as described in 4.

Test date: 10.12.2010

Test voltage: $\hat{U} = 125 \text{ kV}$

Number of tests: 10 positive polarity, 10 negative polarity

Neither flashover nor breakdown occurred at the test objects during all lightning impulse voltage withstand tests.

The test was passed successfully.

5.1.10 AC Voltage Withstand Test

This test was carried out as described in 4.

Test date: 10.12.2010

Test voltage: $\hat{U}/\sqrt{2} = 32 \text{ kV}$, $t = 15 \text{ min}$

With each test object neither flashover nor breakdown occurred at the test objects during the AC voltage withstand test.

The test was passed successfully.

5.2 Additional Tests

Capacitive test point performance

This test was carried out as described in 4.

Test date: 22.12.2010

Capacitance of test point to cable conductor $C_{tc} > 1,0 \text{ pF}$

Requirement: $C_{tc} > 1,0 \text{ pF}$

Ratio of capacitance of test point to earth C_{te} and capacitance of test point to cable conductor: $C_{tc} : C_{te} / C_{tc} < 12$

Requirement: $C_{tc} : C_{te} / C_{tc} \leq 12$



6 Conclusion

The separable connector type CELLPLUX CTKS 630A 24 kV passed all tests described in clause 2 successfully. The test object fulfilled the requirements according DIN VDE 0278-629-1:2009-07, table 7, test sequence D1 and additional test table 7, pos.21.

Karlsruhe, 15.01.2011



Dr.-Ing. R. Badent
Bereichsleiter HPT



Dr.-Ing./B. Hoferer
stellv. Bereichsleiter HPT





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ПРИЛОЖЕНИЕ 9.10.4



Сертификат/акредитация на независимата изпитвателна лаборатория, провела типите изпитвания

Настоящото приложение се прилага във връзка с участието ми в:
 търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Deutsche Akkreditierungsstelle GmbH

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation




The Deutsche Akkreditierungsstelle GmbH attests that the testing laboratory

Karlsruher Institut für Technologie (KIT)
Institut für Elektroenergiesysteme und Hochspannungstechnik (IEH)
Engesserstraße 11, 76128 Karlsruhe

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:


Electromagnetic Compatibility (EMC), High Voltage, Power Cable



The accreditation certificate shall only apply in connection with the notice of accreditation of 10.07.2014 with the accreditation number D-PL-11068-09 and is valid until 09.07.2019. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 21 pages.

Registration number of the certificate: D-PL-11068-09-00

Frankfurt am Main, 10.07.2014



Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter




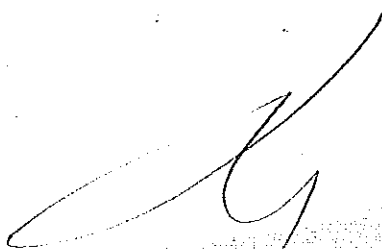
This document is a translation. The definitive version is the original German accreditation certificate.

Deutsche Akkreditierungsstelle GmbH

Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

Office Braunschweig
Bundesallee 100
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The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAKKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAKKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAKKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu



Deutsche Akkreditierungsstelle GmbH

Annex to the Accreditation Certificate D-PL-11068-09-00 according to DIN EN ISO/IEC 17025:2005

Period of validity: 10.07.2014 to 09.07.2019

Date of issue: 10.07.2014



Holder of certificate:

Karlsruher Institut für Technologie (KIT)
Institut für Elektroenergiesysteme und Hochspannungstechnik (IEH)
Engesserstraße 11, 76128 Karlsruhe

Tests in the fields:

Electromagnetic Compatibility (EMC), High Voltage, Power Cable

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60034-15:2009 DIN EN 60034- 15:2010 VDE 0530-15:2010	Rotating electrical machines - Part 15: Impulse voltage withstand levels of form- wound stator coils for rotating a.c. machines	
High Voltage	IEC 60044-3:2002 DIN EN 60044-3:2003 VDE 0414-44-3:2003	Instrument transformers - Part 3: Combined transformers	
High Voltage	IEC 60044-7:1999 DIN EN 60044-7:2000 VDE 0414-44-7:2000	Instrument transformers - Part 7: Electronic voltage transformers	
High Voltage	IEC 60044-8:2002 DIN EN 60044-8:2003 VDE 0414-44-8:2003	Instrument transformers - Part 8: Electronic current transformers	
High Voltage	IEC 60060-1:2010 DIN EN 60060-1:2011 VDE 0432-1:2011	High-voltage test techniques - Part 1: General definitions and test requirements	



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Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60060-2:2010 DIN EN 60060-2:2011 VDE 0432-2:2011	High-voltage test techniques – Part 2 Measuring systems	
High Voltage	IEC 60068-2-1:2007 DIN EN 60068-2-1:2008	Environmental testing - Part 2-1: Tests - Test A: Cold	
High Voltage	IEC 60068-2-11:1981 DIN EN 60068-2-11 IEC 60068-2-14:2009 DIN EN 60068-2-14:2010 VDE 0468-2-14:2010	Environmental testing - Part 2: Tests. Test Ka: Salt mist Environmental testing - Part 2-14: Tests - Test N: Change of temperature	
High Voltage	IEC 60068-2-17:1994 DIN EN 60068-2-17:1995	Basic environmental testing procedures - Part 2: Tests - Test Q: Sealing	
High Voltage	IEC 60068-2-2:2007 DIN EN 60068-2-2:2008 VDE 0468-2-2:2008	Environmental testing - Part 2-2: Tests - Test B: Dry heat	
High Voltage	IEC 60068-2-21:2006 DIN EN 60068-2-21:2007	Environmental testing - Part 2-21: Tests - Test U: Robustness of terminations and integral mounting devices	
High Voltage	IEC 60068-2-38:2009 DIN EN 60068-2-38:2010 VDE 0468-2-38:2010	Environmental testing - Part 2-38: Tests - Test Z/AD: Composite temperature/humidity cyclic test	
High Voltage	IEC 60076-1:2011 DIN EN 60076-1:2012 VDE 0532-76-1:2012	Power transformers - Part 1: General	
High Voltage	IEC 60076-11:2004 DIN EN 60076-11:2005 VDE 0532-76-11:2005	Power transformers - Part 11: Dry-type transformers	
High Voltage	IEC 60076-16:2011 DIN EN 60076-16:2012 VDE 0532-76-16:2012	Power transformers - Part 16: Transformers for wind turbine applications	

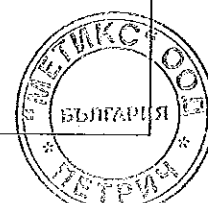


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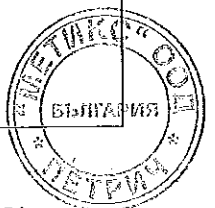
Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60076-3:2013 DIN EN 60076-3:2012 VDE 0532-76-3:2012	Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air	
High Voltage	IEC 60076-4:2002 DIN EN 60076-4:2003 VDE 0532-76-4:2003	Power transformers - Part 4: Guide to the lightning impulse and switching impulse testing - Power transformers and reactors	
High Voltage	IEC 60076-6:2007 DIN EN 60076-6:2008 VDE 0532-76-6:2009	Power transformers - Part 6: Reactors	
High Voltage	IEC 60099-4:2009 DIN EN 60099-4:2010 VDE 0675-4:2010	Surge arresters - Part 4: Metal-oxide surge arresters without gaps for a.c. systems	
High Voltage	IEC 60137:2008 DIN EN 60137:2009 VDE 0674-5:2009	Insulated bushings for alternating voltages above 1 000 V	
High Voltage	IEC 60143-1:2004 DIN EN 60143-1:2004 VDE 0560-42:2004	Series capacitors for power systems - Part 1: General	
High Voltage	IEC 60156:1995 DIN EN 60156:1996 VDE 0370-5:1996	Insulating liquids - Determination of the breakdown voltage at power frequency - Test method	
High Voltage	IEC 60168:2001 DIN EN 60168:2001 VDE 0674-1:2001	Tests on indoor and outdoor post insulators of ceramic material or glass for systems with nominal voltages greater than 1000 V	
High Voltage	IEC 60214-1:2003 DIN EN 60214-1:2003 VDE 0532-214-1:2003	Tap-changers - Part 1: Performance requirements and test methods	
High Voltage	IEC 60243-1:2013 DIN EN 60243-1:1999 VDE 0303-21:1999	Electric strength of insulating materials - Test methods - Part 1: Tests at power frequencies	
High Voltage	IEC 60243-2:2001 DIN EN 60243-2:2001 VDE 0303-22:2001	Electric strength of insulating materials - Test methods - Part 2: Additional requirements for tests using direct voltage	



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Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60243-3:2001 DIN EN 60243-3:2002 VDE 0303-23:2002	Electric strength of insulating materials - Test methods - Part 3: Additional requirements for 1,2/50 μ s impulse tests	
High Voltage	IEC 60252-1:2013 DIN EN 60252-1:2011 VDE 0560-8:2011	AC motor capacitors - Part 1: General - Performance, testing and rating - Safety requirements - Guidance for installation and operation	
High Voltage	IEC 60270:2000 DIN EN 60270:2001 VDE 0434:2001	High-voltage test techniques - Partial discharge measurements	
High Voltage	IEC 60273:1990 DIN IEC 60273:1993 VDE 0674-4:1993	Characteristic of indoor and outdoor post insulators for systems with nominal voltages greater than 1000 V	
High Voltage	IEC 60282-1:2009 DIN EN 60282-1:2010 VDE 0670-4:2010	High-voltage fuses - Part 1: Current-limiting fuses	
High Voltage	IEC 60358-1:2013 DIN EN 60358-1:2013 VDE 0560-2:2013	Corrigendum 1 - Coupling capacitors and capacitor dividers - Part 1: General rules	
High Voltage	IEC 60383-1:1993 DIN EN 60383-1:2001 VDE 0446-1:2001	Insulators for overhead lines with a nominal voltage above 1000 V - Part 1: Ceramic or glass insulator units for a.c. systems - Definitions, test methods and acceptance criteria	
High Voltage	IEC 60383-2:1993 DIN EN 60383-2:1995 VDE 0446-4:1995	Insulators for overhead lines with a nominal voltage above 1000 V - Part 2: Insulator strings and insulator sets for a.c. systems - Definitions, test methods and acceptance criteria	
High Voltage	IEC 60433:1998 DIN EN 60433:1999 VDE 0446-7:1999	Insulators for overhead lines with a nominal voltage above 1 000 V - Ceramic insulators for a.c. systems - Characteristics of insulator units of the long rod type	



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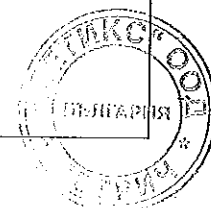
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Department	Standard / In house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60437:1997 DIN EN 60437:1998 VDE 0674-6:1998	Radio interference test on high-voltage insulators	
High Voltage	IEC 60507:1991 DIN EN 60507:1994 VDE 0448-1:1994	Artificial pollution tests on high-voltage insulators to be used on a.c. systems	
High Voltage	IEC 60618:1978 EN 60618:1999	Inductive voltage dividers	
High Voltage	IEC 60644:2009 DIN EN 60644:2010 VDE 0670-401:2010	Specification for high-voltage fuse-links for motor circuit applications	
High Voltage	IEC 60660:1999 DIN EN 60660:2000 VDE 0441-3:2000	Insulators - Tests on indoor post insulators of organic material for systems with nominal voltages greater than 1 000 V up to but not including 300 kV	
High Voltage	IEC 60700-1:2008 DIN EN 60700-1:2009 VDE 0553-1:2009	Thyristor valves for high voltage direct current (HVDC) power transmission - Part 1: Electrical testing	
High Voltage	IEC 60832-1:2010 DIN EN 60832-1:2010 VDE 0682-211:2010	Live working - Insulating sticks and attachable devices - Part 1: Insulating sticks	
High Voltage	IEC 60832-2:2010 DIN EN 60832-2:2010 VDE 0682-212:2010	Live working - Insulating sticks and attachable devices - Part 2: Part 2: Attachables devices	
High Voltage	IEC 60871-1:2005 DIN EN 60871-1:2006 VDE 0560-410:2006	Shunt capacitors for a.c. power systems having a rated voltage above 1000 V - Part 1: General	
High Voltage	IEC 60871-4:1996 DIN EN 60871-4:1997 VDE 0560-440:1997	Shunt capacitors for AC power systems having a rated voltage above 1000 V - Part 4: Internal fuses	
High Voltage	IEC 60895:2003 DIN EN 60895:2004 VDE 682-304:2004	Live working - Conductive clothing for use at nominal voltage up to 800 kV a.c. and +/- 600 kV d.c.	

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Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 60900:2012 DIN EN 60900:2013 VDE 0682-201:2013	Live working - Hand tools for use up to 1 000 V a.c. and 1 500 V d.c.	
High Voltage	IEC 60903:2005 DIN EN 60903:1:2005 VDE 0682-311:1:2005	Live working - Gloves of insulating material	
High Voltage	IEC 60947-3:2012 DIN EN 60947-3:2012 VDE 0660-107:2012	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	
High Voltage	IEC 60984:2005 DIN EN 60984:2003 VDE 0682-312:2003	Sleeves of insulating material for live working	
High Voltage	IEC 61071:2007 DIN EN 61071:2008 VDE 0560-120:2008	Capacitors for power electronics	
High Voltage	IEC 61071:2007 DIN EN 61071:2008 VDE 0560-120:2008	Capacitors for power electronics	
High Voltage	IEC 61219:2000 DIN EN 61219:1995 VDE 0683-200:1995	Corrigendum 1 - Live working - Earthing or earthing and short-circuiting equipment using lances as a short-circuiting device - Lance earthing	
High Voltage	IEC 61229:2002 DIN EN 61229/A2:2003 VDE 0682-551/A2:2003	Rigid protective covers for live working on a.c. installations	
High Voltage	IEC 61230:2008 DIN EN 61230:2009 VDE 0683-100:2009	Live working - Portable equipment for earthing or earthing and short-circuiting	
High Voltage	IEC 61236:2010 DIN EN 61236:2011 VDE 0682-651:2011	Live working - Saddles, stick clamps and their accessories	
High Voltage	IEC 61243-1:2009 DIN EN 61243-1:2010 VDE 0682-411:2010	Live working - Voltage detectors - Part 1: Capacitive type to be used for voltages exceeding 1 kV a.c.	

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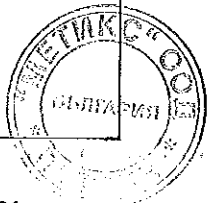
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Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / In house procedure / Version	Title of standard or in house procedure (deviations./ modifications of standard)	Test area/ reductions
High Voltage	IEC 61243-2:2002 DIN EN 61243-2/A2:2003 VDE 0682-412/A1:2003	Live working - Voltage detectors - Part 2: Resistive type to be used for voltages of 1 kV to 36 kV a.c.	
High Voltage	IEC 61243-3:2009 DIN EN 61243-3:2011 VDE 0682-401:2011	Live working - Voltage detectors - Part 3: Two-pole low-voltage type	
High Voltage	IEC 61243-5:1997 DIN EN 61243-5:2002 VDE 0682-415:2002	Live working - Voltage detectors - Part 5: Voltage detecting systems (VDS)	
High Voltage	IEC 61284:1997 DIN EN 61284:1998 VDE 0212-1:1998	Overhead lines - Requirements and tests for fittings	
High Voltage	IEC 61325:1995 DIN EN 61325:1996 VDE 0446-5:1996	Insulators for overhead lines with a nominal voltage above 1000 V - Ceramic or glass insulator units for d.c. systems - Definitions, test methods and acceptance criteria	
High Voltage	IEC 61378-1:2012 DIN EN 61378-1:2012 VDE 0532-41:2012	Converter transformers - Part 1: Transformers for industrial applications	
High Voltage	IEC 61378-2:2001 DIN EN 61378-2:2001 VDE 0532-42:2001	Converter transformers - Part 2: Transformers for HVDC applications	
High Voltage	IEC 61462:2007 DIN EN 61462:2008 VDE 0441-102:2008	Composite hollow insulators - Pressurized and unpressurized insulators for use in electrical equipment with rated voltage greater than 1000 V - Definitions, test methods, acceptance criteria and design recommendations	
High Voltage	IEC 61466-1:2007 DIN EN 61466-1:2010 VDE 0441-4:2010	Composite string insulator units for overhead lines with a nominal voltage greater than 1000 V - Part 1: Standard strength classes and end fittings	
High Voltage	IEC 61466-2:2002 DIN EN 61466-2:2002 VDE 0441-5:2002	Composite string insulator units for overhead lines with a nominal voltage greater than 1000 V - Part 2: Dimensional and electrical characteristics	



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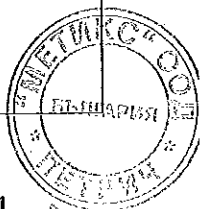
Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 61854:1998 DIN EN 61854:1999 VDE 0212-2:1999	Overhead lines - Requirements and tests for spacers	
High Voltage	IEC 61869-1:2007 DIN EN 61869-1:2010 VDE 0414-9-1:2010	Instrument transformers - Part 1: General requirements	
High Voltage	IEC 61869-2:2012 DIN EN 61869-2:2013 VDE 0414-9-2:2013	Instrument transformers - Part 2: Additional requirements for current transformers	
High Voltage	IEC 61869-3:2011 DIN EN 61869-3:2012 VDE 0414-9-3:2012	Instrument transformers - Part 3: Additional requirements for inductive voltage transformers	
High Voltage	IEC 61869-4:2013 VDE 0414-9-4:2008	Instrument transformers - Part 4: Additional requirements for combined customers	
High Voltage	IEC 61869-5:2011 DIN EN 61869-5:2012 VDE 0414-9-5:2012	Instrument transformers - Part 5: Additional requirements for capacitor voltage transformers	
High Voltage	IEC 61921:2003 DIN EN 61921:2004 VDE 0560-700:2004	Power capacitors - Low-voltage power factor correction banks	
High Voltage	IEC 61952:2008 DIN EN 61952:2009 VDE 0441-200:2009	Insulators for overhead lines - Composite line post insulators for A.C. systems with a nominal voltage greater than 1000 V - Definitions, test methods and acceptance criteria	
High Voltage	IEC 61954:2013 DIN EN 61954:2012 VDE 0553-100:2012	Static var compensators (SVC) - Testing of thyristor valves	
High Voltage	IEC 62146-1:2013	Grading capacitors for high-voltage alternating current circuit breakers	
High Voltage	IEC 62155:2003 DIN 62155:2004 VDE 0674-200:2004	Hollow pressurized and unpressurized ceramic and glass insulators for use in electrical equipment with rated voltages greater than 1000 V	

Period of validity: 10.07.2014 to 09.07.2019
Date of issue: 10.07.2014

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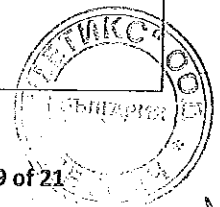
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Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 62217:2012 DIN EN 62217:2013 VDE 0441-1000:2013	Polymeric HV insulators for indoor and outdoor use - General definitions, test methods and acceptance criteria	
High Voltage	IEC 62271-1:2011 DIN EN 62271-1:2012 VDE 0671-1:2012	High-voltage switchgear and controlgear - Part 1: Common specifications	
High Voltage	IEC 62271-100:2012 DIN EN 62271-100:2013 VDE 0671-100:2013	High-voltage switchgear and controlgear - Part 100: Alternating current circuit-breakers	
High Voltage	IEC 62271-102:2001 DIN EN 62271-102:2012 VDE 0671-102:2012	High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches	
High Voltage	IEC 62271-102:2013 DIN EN 62271-102:2012 VDE 0671-102:2012	Amendment 2 - High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches	
High Voltage	IEC 62271-104:2009 DIN EN 62271-104:2010 VDE 0671-104:2010	High-voltage switchgear and controlgear - Part 104: Alternating current switches for rated voltages of 52 kV and above	
High Voltage	IEC 62271-105:2012 DIN EN 62271-105:2013 VDE 0671-105:2013	High-voltage switchgear and controlgear - Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV	
High Voltage	IEC 62271-107:2012 DIN EN 62271-107:2013 VDE 0671-107:2013	High-voltage switchgear and controlgear - Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV	
High Voltage	IEC 62271-108:2005 DIN EN 62271-108:2006 VDE 0671-108:2006	High-voltage switchgear and controlgear - Part 108: High-voltage alternating current disconnecting circuit-breakers for rated voltages of 72,5 kV and above	



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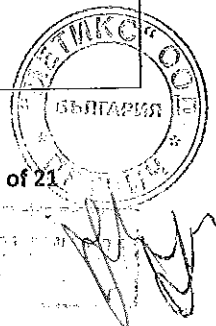
Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	IEC 62271-200:2011 DIN EN 62271- 200:2012 VDE 0671-200:2012	High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	
High Voltage	IEC 62271-201:2006 DIN EN 62271- 201:2007 VDE 0671-201:2007	High-voltage switchgear and controlgear - Part 201: AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	
High Voltage	IEC 62271-203:2013 DIN EN 62271- 203:2012 VDE 0671-203:2012	Corrigendum 1 - High-voltage switchgear and controlgear - Part 203: Gas-insulated metal- enclosed switchgear for rated voltages above 52 kV	
High Voltage	IEC 62271-206:2011 DIN EN 62271- 206:2011 VDE 0671-206:2011	High-voltage switchgear and controlgear - Part 206: Voltage presence indicating systems for rated voltages above 1 kV and up to and including 52 kV	
High Voltage	IEC/PAS 60099-7:2004 DIN EN 60099-1:2000 VDE 0675-1:2000	Surge arresters - Part 7: Glossary of terms and definitions from IEC publications 60099-1, 60099-4, 60099-6, 61643-1, 61643-12, 61643- 21, 61643-311, 61643-321, 61643-331 and 61643-341	
High Voltage	IEC/TR 61294:1993 DIN VDE 0380-5:1995	Insulating liquids - Determination of the partial discharge inception voltage (PDIV) - Test procedure	
High Voltage	IEC/TR 62271- 305:2009	High-voltage switchgear and controlgear - Part 305: Capacitive current switching capability of air-insulated disconnectors for rated voltages above 52 kV	
High Voltage	IEC/TS 61639:1996	Direct connection between power transformers and gas-insulated metal- enclosed switchgear for rated voltages of 72,5 kV and above	
High Voltage	DIN-EN 137000:1998 VDE 0560-800:1998	Generic specification - Fixed aluminium electrolytic a.c. capacitors with non-solid electrolyte for use with motors	

Period of validity; 10.07.2014 to 09.07.2019
Date of issue: 10.07.2014

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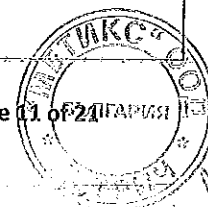
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Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	DIN EN 50089:1994 VDE 0670-806:1994	Cast resin partitions for metal enclosed gas-filled high voltage switchgear and controlgear	
High Voltage	DIN EN 50482:2008 VDE 0414-6:2008	Instrument transformers - Three-phase inductive voltage transformers having Um up to 52 kV	
High Voltage	DIN IEC 60871-2:1993 VDE 0560-420:1993 IEC/TS 60871-2:1996	Shunt capacitors for AC power systems having a rated voltage above 1000 V - Part 1: General	
High Voltage	DIN VDE 0212 Teil 55:1998 VDE 0212-55:1998	Fittings for overhead lines and switchgear; dynamic-mechanical behaviour of antivibration fittings	
High Voltage	DIN VDE 0303 Teil 4:1969 VDE 0303-4:1969	Specification for electrical tests of insulating materials; Determination of the dielectric properties	
High Voltage	DIN VDE 0441-1:1985	Tests on insulators of organic material for systems with nominal alternating voltages greater than 1000 V; tests on materials	
High Voltage	DIN VDE 0532- 21:1982 VDE 0532-21:1982 DIN 57532-21:1982	Transformers and reactors; starting transformers and starting reactors [VDE Specification]	
High Voltage	DIN VDE 0560-1:1969 VDE 0560-1:1969 DIN VDE 0560- 11:1970	Rules for capacitors; part 11: Rules for capacitors of more than 600 V for the equalizing of pulsating direct voltages	
High Voltage	DIN VDE 0560-3:1968	Regeln für Kondensatoren; Teil 3: Regeln für Kondensatoren für Kopplung, Spannungsmessung und Überspannungsschutz 0560-3	
High Voltage	DIN VDE 0660- 112:1987	Switchgear and controlgear; additional specification for d.c. air-break switches, air-break disconnectors and air-break switch-disconnectors exceeds 1200 V but not exceeds 3000 V	
High Voltage	DIN VDE 0681-1:1986	Operating, testing and safe-guarding devices for work on electrically energized systems with rated voltages exceeding 1 kV; part 1: general requirements for the parts 2 to 4	

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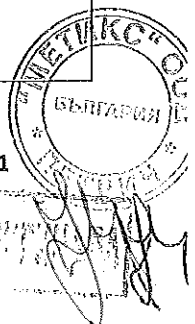
Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
High Voltage	DIN VDE 0681-2:2013	Live working - Devices for operating, testing and safe-guarding with rated voltages exceeding 1 kV - Part 2: Switching sticks	
High Voltage	DIN VDE 0681-3:2013	Live working - Devices for operating, testing and safe-guarding with rated voltages exceeding 1 kV - Part 3: Fuse tongs	
High Voltage	DIN VDE 0681-6:1985	Operating and testing devices for work and safe guarding on electrically energized systems with rated voltages exceeding 1 kV; voltage detectors to be used for overhead contact systems	
High Voltage	DIN VDE 0682-421:2008	Live working - Voltage detectors - Capacitive type to be used for a.c. systems of 15 kV and 110 kV with a frequency of 16,7 Hz	
High Voltage	DIN VDE 0682-552:2003	Live working - Insulating protective barriers above 1 kV	
High Voltage	DIN VDE 0682-621:2004	Arbeiten unter Spannung - Vorrichtung zum Reinigen durch Absaugen von unter Spannung stehenden Teilen mit emessungsspannungen über 1 kV bis 36 kV	
Power cable	IEC 60141-1:1998	Tests on oil-filled and gas-pressure cables and their accessories - Part 1: Oil-filled, paper or polypropylene paper laminate insulated, metal-sheathed cables and accessories for alternating voltages up to and including 500 kV	
Power cable	IEC 60141-2:1967	Tests on oil-filled and gas-pressure cables and their accessories. Part 2: Internal gas-pressure cables and accessories for alternating voltages up to 275 kV	
Power cable	IEC 60141-3:1967	Tests on oil-filled and gas-pressure cables and their accessories. Part 3: External gas-pressure (gas compression) cables and accessories for alternating voltages up to 275 kV	

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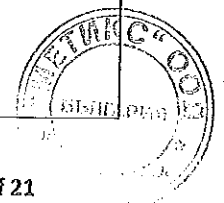
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Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
Power cable	IEC 60141-4:1990	Tests on oil-filled and gas-pressure cables and their accessories. Part 4: Oil-impregnated paper-insulated high pressure oil-filled pipe-type cables and accessories for alternating voltages up to and including 400 kV	
Power cable	IEC 60230:1966 DIN EN 60230:2003 VDE 0481-230:2003	Impulse tests on cables and their accessories	
Power cable	IEC 60502-1:2009	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um = 3,6 kV)	
Power cable	IEC 60502-2:2005	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 2: Cables for rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
Power cable	IEC 60502-4:2010	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
Power cable	IEC 60840:2011	Power cables with extruded insulation and their accessories for rated voltages above 30 kV (Um = 36 kV) up to 150 kV (Um = 170 kV) - Test methods and requirements	
Power cable	IEC 60885-2:1987 DIN 60885-2:2004 VDE 0481-885-2:2004	Electrical test methods for electric cables. Part 2: Partial discharge tests	
Power cable	IEC 60885-3:1988 DIN EN 60885-3:2004 VDE 0481-885-3:2004	Electrical test methods for electric cables. Part 3: Test methods for partial discharge measurements on lengths of extruded power cables	



Period of validity: 10.07.2014 to 09.07.2019
Date of issue: 10.07.2014

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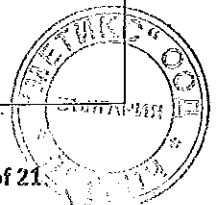
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Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
Power cable	IEC 61238-1:2003 DIN EN 61238-1:2004 VDE 0220-100:2004 IEC/TRF 61238-1:2011	Compression and mechanical connectors for power cables for rated voltages up to 30 kV (Um = 36 kV) - Part 1: Test methods and requirements	
Power cable	IEC 61284:1998 DIN EN 61284:1998 VDE 0212-1:1998	Corrigendum 1 - Overhead lines - Requirements and tests for fittings	
Power cable	IEC 61442:2005 DIN EN 61442:2006 VDE 0278-442:2006	Test methods for accessories for power cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)	
Power cable	IEC 61854:1998 DIN EN 61854:1999 VDE 0212-2:1999	Overhead lines - Requirements and tests for spacers	
Power cable	IEC 62067:2011 DIN IEC 62067:2013 VDE 0276-2067:2013	Power cables with extruded insulation and their accessories for rated voltages above 150 kV (Um = 170 kV) up to 500 kV (Um = 550 kV) - Test methods and requirements	
Power cable	DIN EN 50393:2006 VDE 0278-393:2006	Test methods and requirements for accessories for use on distribution cables of rated voltage 0,6/1,0 (1,2) kV	
Power cable	HD 620 S2:2010 DIN VDE 0276-620:2010	Power cables - Distribution cables with extruded insulation for rated voltages from 3,6/6 (7,2) kV up to and including 20,8/36 (42) kV; German version HD 620 S2:2010, parts 0, 1 and 10-C	
Power cable	HD 621 S1:1996 DIN VDE 0276-621:1997	Power cables - Part 621: Medium voltage impregnated paper insulated distribution cables; German version HD 621 S1:1996 Parts 1, 2, 3C and 4C	
Power cable	HD 626 S1:1996 DIN VDE 0276-626/A1:1998	Power cables Part 626- Overhead distribution cables of rated voltage U ₀ /U(U _m):0,6/1 (1,2) kV; German version HD 626 S1 Parts 1, 2 and 4 F-1:1996	
Power cable	HD 629.1 S2:2006 DIN VDE 0278-629-1:2009	Test requirements on accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 1: Cables with extruded insulation	

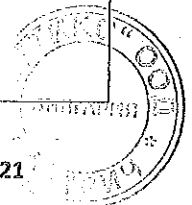


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Annex to the Accreditation Certificate D-PL-11068-09-00

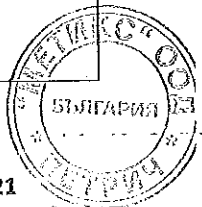
Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
Power cable	HD 629.2 S2:2006 DIN VDE 0278-629- 2:2009	Test requirements on accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 2: Cables with impregnated paper insulation	
Power cable	HD 632 S3:2012 DIN VDE 0276-632- 3:2013 VDE 0276-632-3:2013	Power cables with extruded insulation and their accessories for rated voltages above 36 kV ($U_m = 42$ kV) up to 150 kV ($U_m = 170$ kV); German version HD 632 S1 Parts 1, 3D, 4D and 5D:1998	
Power cable	HD 633 S1:1997 DIN VDE 0276- 633:1999 VDE 0276-633:1999	Prüfungen an Ölkabeln mit einer Isolierung aus Papier oder polypropylenbeschichtetem Papier und Metallmantel und Garnituren für Wechselspannungen bis einschließlich 400 kV ($U_m=420$ kV)	
Power cable	HD 634 S1:1997 DIN VDE 0276- 634:1999 VDE 0276-634:1999	Tests on internal gas-pressure cables and accessories for alternating voltages up to and including 275 kV ($U_m=300$ kV); German version HD 634 S1 Parts 1 and 3C:1997	
Power cable	HD 635 S1:1997 DIN VDE 0276- 635:1999 VDE 0276-635:1999	Tests on external gas-pressure (gas compression) cables and accessories for alternating voltages up to and including 275 kV ($U_m=300$ kV); German version HD 635 S1 Parts 1 and 3C:1997	
Power cable	DIN VDE 0212 Teil 55:1998 VDE 0212-55:1998	Fittings for overhead lines and switchgear; insulation behaviour of fittings for insulated overhead lines	
Power cable	DIN VDE 0220-1:1971	Specifications for single- and multiple cable clamps with insulating parts in electrical power cable installations up to 1000 V	
Power cable	DIN VDE 0220-2:1971	Bestimmungen für Preßverbinder in Starkstromkabelanlagen bis 1000 V	
Power cable	DIN 57220-3:1977 DIN VDE 0220-3:1977 VDE 0220-3:1997	Specifications for single- and multiple cable clamps with insulating parts in electrical power cable installations up to 1000 V	
Power cable	DIN VDE 0271:2008 VDE 0271:2008	Power cables - Specifications for power cables 0,6/1 kV and above for special applications	



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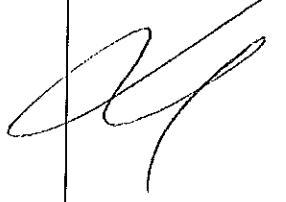
Department	Standard / In house procedure / Version	Title of standard or In house procedure (deviations / modifications of standard)	Test area / reductions
Power cable	DIN VDE 0276-632:1999 VDE 0276-632:1999	Power cables with extruded insulation and their accessories for rated voltages above 36 kV ($U_m = 42$ kV) up to 150 kV ($U_m = 170$ kV); German version HD 632 S1 Parts 1, 3D, 4D and 5D:1998	
Power cable	DIN VDE 0276-634:1999 VDE 0276-634:1999	Tests on internal gas-pressure cables and accessories for alternating voltages up to and including 275 kV ($U_m = 300$ kV); German version HD 634 S1 Parts 1 and 3C:1997	
Power cable	DIN VDE 0472-505:1983 DIN 57472-505:1983 VDE 0472-505:1983	Testing of cables, wires and flexible cords; loss factor, dielectric loss coefficient and leakance [VDE Specification]	
Power cable	DIN VDE 0472-512:1985	Testing of cables, wires and flexible cords; resistance between protective conductor and semi-conductive layer	
Power cable	DIN VDE 0472-603:1989 VDE 0472-603:1989	Prüfung an Kabeln und isolierten Leitungen; Biegeverhalten	
Power cable	IEEE 404:2012	IEEE Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2.5 kV to 500 kV	
Power cable	IEEE 48:2009	Standard for test procedures and requirements for alternating-current cable terminations used on shielded cables having laminated insulation rated 2.5 kV through 765 kV or extruded insulation rated 2.5 kV through 500 kV	
Power cable	CIGRE 415:2010	Test Procedures for HV Transition Joints for Rated Voltages 30 kV up to 500 kV	



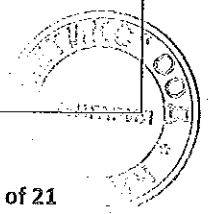
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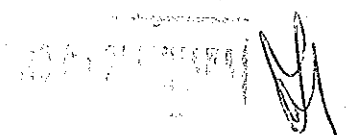
Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
Generic Standards			
EMC	DIN EN 61000-6-1; VDE 0839-6-1:2007	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards -Immunity for residential, commercial and light-industrial environments	Only immunity according to DIN EN 61000-4-3
EMC	EN 61000-6-1:2007	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards -Immunity for residential, commercial and light-industrial environments	Only immunity according to DIN EN 61000-4-3
EMC	IEC 61000-6-1:2005	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards -Immunity for residential, commercial and light-industrial environments	Only immunity according to DIN EN 61000-4-3
EMC	DIN EN 61000-6-2; VDE 0839-6-2:2011	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards -Immunity for residential, commercial and light-industrial environments	Only immunity according to DIN EN 61000-4-3
EMC	EN 61000-6-2:2005 	Electromagnetic compatibility (EMC) - Part 6-1: Generic standards -Immunity for residential, commercial and light-industrial environments	Only immunity according to DIN EN 61000-4-3









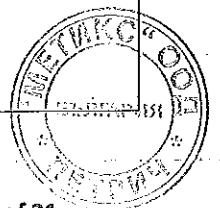
Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
EMC	IEC 61000-6-2:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments	Only immunity according to DIN EN 61000-4-3
EMC	DIN EN 61000-6-3; VDE 0839-6-3:2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	Only conducted emission
EMC	EN 61000-6-3:2007 + A1:2011 + A2:2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	Only conducted emission
EMC	IEC 61000-6-3:2006 + A1:2010	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	Only conducted emission
EMC	DIN EN 61000-6-4; VDE 0839-6-4:2011	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments	Only conducted emission
EMC	EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	Only conducted emission

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Department	Standard / In house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
EMC	IEC 61000-6-4:2006 + A1:2010	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	Only conducted emission
Basic Standards			
EMC	DIN EN 61000-4-3; VDE 0847-4-3:2011	Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:2006 + A1:2007 + A2:2010); German version EN 61000-4-3:2006 + A1:2008 + A2:2010	
EMC	EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	
EMC	IEC 61000-6-4:2006 + A1:2010	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	
EMC	DIN EN 61000-4-8; VDE 0847-4-8:2010	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test (IEC 61000-4-8:2009); German version EN 61000-4-8:2010	
EMC	EN 61000-4-8:2010	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	
EMC	IEC 61000-4-8:2009	Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	

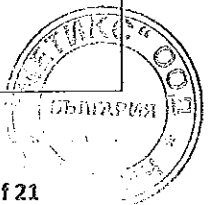


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Annex to the Accreditation Certificate D-PL-11068-09-00

Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
EMC	DIN EN 61000-4-13; VDE 0847-4-13:2010 IEC 61000-4-13:2002 + A1:2009 EN 61000-4-13:2002 + A1:2009	Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests (IEC 61000-4-13:2002 + A1:2009); German version EN 61000-4-13:2002 + A1:2009	Only single phase
EMC	EN 61000-4-13:2002 + A1:2009	Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests	Only single phase
EMC	IEC 61000-4-13:2002 + A1:2009	Electromagnetic compatibility (EMC) - Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signaling at a.c. power port, low frequency immunity tests	Only single phase
EMC	DIN EN 55014-1; VDE 0875-14-1:2012 CISPR 14-1:2005 + A1:2008 + Cor. :2009 + A2:2011	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission (CISPR 14-1:2005 + A1:2008 + Cor. :2009 + A2:2011); German version EN 55014-1:2006 + A1:2009 + A2:2011	No radiated emission, no toys
EMC	EN 55014-1:2006 + A1:2009 + A2:2011	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	No radiated emission, no toys
EMC	CISPR 14-1:2005 + A1:2008 + Cor. :2009 + A2:2011	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	No radiated emission, no toys



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Department	Standard / in house procedure / Version	Title of standard or in house procedure (deviations / modifications of standard)	Test area / reductions
EMC	DIN EN 55014-2; VDE 0875-14-2:2009	Electromagnetic compatibility - Requirements for household appliances , electric tools and similar apparatus - Part 2: Immunity - Product family standard (IEC/CISPR 14-2:1997 + A1:2001 + A2:2008); German version EN 55014-2:1997 + Corrigendum 1997 + A1:2001 + A2:2008	Only immunity according to DIN EN 61000-4-3
EMC	EN 55014-2:1997 + Corrigendum 1997 + A1:2001 + A2:2008	Electromagnetic compatibility - Requirements for household appliances , electric tools and similar apparatus - Part 2: Immunity - Product family standard	Only immunity according to DIN EN 61000-4-3
EMC	IEC/CISPR 14-2:1997 + A1:2001 + A2:2008	Electromagnetic compatibility - Requirements for household appliances , electric tools and similar apparatus - Part 2: Immunity - Product family standard	Only immunity according to DIN EN 61000-4-3
EMC	IEEE 299:2006	IEEE Standard Method for Measuring the Effectiveness of Electromagnetic Shielding Enclosures	
EMC	VG 95373-15:2004	Elektromagnetische Verträglichkeit - Elektromagnetische Verträglichkeit von Geräten - Teil 15: Messverfahren für Kopplungen und Schirmungen	

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Deutsche Akkreditierungsstelle GmbH

Befehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multifateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

Institut "Prüffeld für elektrische Hochleistungstechnik" GmbH
Landsberger Allee 378A, 12681 Berlin

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

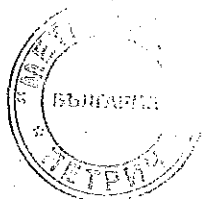
Hochspannungsgeräte, -anlagen und deren Komponenten
Kabel und Leitungen
Industrielle Niederspannungsgeräte

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.01.2012 mit der Akkreditierungsnummer D-PL-12107-01 und ist gültig bis 24.01.2017. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 29 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12107-01-01**

Frankfurt am Main, 25.01.2012

Im Auftrag Dipl.-Ing. (FH) Ralf Egnér
Abteilungsleiter





Deutsche Akkreditierungsstelle GmbH German Accreditation Body

Entrusted according to Section 8 subsection 1 AkkStelleG in connection with Section 1 subsection 1 AkkStelleGBV

Signatory to the Multilateral Agreements of EA, ILAC and IAF for Mutual Recognition

Accreditation



The Deutsche Akkreditierungsstelle GmbH (German Accreditation Body) attests that the testing laboratory

FGH Engineering & Test GmbH
Hallenweg 40, 68219 Mannheim

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out tests in the following fields:

High voltage devices and systems and their components
Power cable and power cable sets

The accreditation certificate shall only apply in connection with the notice of accreditation of 11.01.2012 with the accreditation number D-PL-12110-01 and is valid until 10.01.2017. It comprises the cover sheet, the reverse side of the cover sheet and the following annex with a total of 22 pages.

Registration number of the certificate: D-PL-12110-01

Frankfurt am Main, 11.01.2012

On behalf of Dipl.-Ing. (FH) Ralf Egner
Head of Division 2

This document is a translation. The definitive version is the original German accreditation certificate.

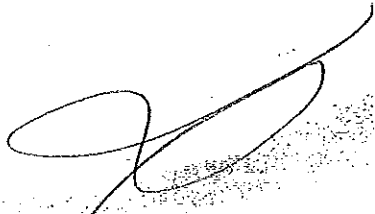


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Office Berlin
Spittelmarkt 10
10117 Berlin

Office Frankfurt am Main
Gartenstraße 6
60594 Frankfurt am Main

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Bundesallee 100
38116 Braunschweig



The publication of extracts of the accreditation certificate is subject to the prior written approval by Deutsche Akkreditierungsstelle GmbH (DAKKS). Exempted is the unchanged form of separate disseminations of the cover sheet by the conformity assessment body mentioned overleaf.

No impression shall be made that the accreditation also extends to fields beyond the scope of accreditation attested by DAKKS.

The accreditation was granted pursuant to the Act on the Accreditation Body (AkkStelleG) of 31 July 2009 (Federal Law Gazette I p. 2625) and the Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products (Official Journal of the European Union L 218 of 9 July 2008, p. 30). DAKKS is a signatory to the Multilateral Agreements for Mutual Recognition of the European co-operation for Accreditation (EA), International Accreditation Forum (IAF) and International Laboratory Accreditation Cooperation (ILAC). The signatories to these agreements recognise each other's accreditations.

The up-to-date state of membership can be retrieved from the following websites:

EA: www.european-accreditation.org

ILAC: www.ilac.org

IAF: www.iaf.nu



Deutsche Akkreditierungsstelle GmbH

Befähigte gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung



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Institut "Prüffeld für elektrische Hochleistungstechnik" GmbH
Landsberger Allee 378A, 12681 Berlin

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Hochspannungsgeräte, -anlagen und deren Komponenten
Kabel und Leitungen
Industrielle Niederspannungsgeräte

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.01.2012 mit der Akkreditierungsnummer D-PL-12107-01 und ist gültig bis 24.01.2017. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 295 Seiten.

Registrierungsnummer der Urkunde: D-PL-12107-01-01



ИЗДАНИЕ 01

ТОВ РНЕИНЛАНД БЪЛГАРИЯ
ТОВ РНЕИНЛАНД БЪЛГАРИЯ
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ТОВ РНЕИНЛАНД БЪЛГАРИЯ
ТОВ РНЕИНЛАНД БЪЛГАРИЯ



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ISO 9001:2009
OHSAS 18001:2007
www.tuv.com
ID 9105026355



Management System
ISO 14001:2004
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ID 9105026355

ПРИЛОЖЕНИЕ 9.10.5

Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение със стандартизационните документи“

С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

Настоящото приложение се прилага във връзка с участието ми в:
търга с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от „ЧЕЗ Разпределение България“ АД

Independent, accredited testing station · Member laboratory of STL and LOVAG

TEST CONFIRMATION

on the given range of performed tests

Cooper Power Systems
2300 Badger Drive
Waukesha, WI 53188

CLIENT

Cooper Electric Technology (Shanghai) Co.
Pudong, Shanghai 201201
P.R. China

MANUFACTURER

Screened separable connector for single-core plastic-insulated cables

TEST OBJECT

DE250

TYPE

10 test samples

MANUFACTURING NO.

Rated power frequency voltage	U_0/U	12.7/22 kV	RATED CHARACTERISTICS GIVEN BY THE CLIENT
Maximum value of the highest system voltage			
Rated current	U_m	24 kV	
		250 A	
Rated cross-section range		70 mm ²	

CENELEC Harmonization Document HD 629.1 S2: 2006-02
IEC 60502-4: 2005-02
DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06
EN 61442: 2005-04
DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

NORMATIVE DOCUMENT

Test series D1, D2, D3 and additional tests No. 17, 18, 19 and 21

RANGE OF TESTS PERFORMED

25 June 2007 to 7 December 2007

DATE OF TEST

The type test of test series D1, D2, D3 and additional tests No. 17, 18, 19 and 21 have been PASSED. The test results are documented in IPH Type Test Report No. 2829.0907.7.666.

TEST RESULT



H. GLABSCH
Head of test laboratories



D. JEGUST
Test engineer in charge

Berlin, 19 December 2007



This documentation shall not be reproduced in extracts without written approval by IPH GmbH. The test results relate only to the object tested.

Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DAkT) e.V. in the fields of hv apparatus and switchgear, power cables and power cable accessories, hv apparatus and switchgear, installation equipment and switching and control equipment.



DAT-P-019/92

Всичко за енергетиката от една ръка



6000 Стара Загора; ул. Индустриална, ПК 177; тел. (042) 551-73 факс: (042) 600-129, e-mail: office@contragent.com
1233 София; ж.к. Банишора, ул. Опълченска, бл.42А, вх. Ж, пом. 1, тел. (02) 931-0473, факс: (02) 931-4184, sofia@contragent.com
9000 Варна; ул. Юри Венелин 6, ет. 1, ап.1; тел. (052) 637 111, факс: (052) 637 111, varna@contragent.com
Web site: www.contragent.com

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Станчо Пантов

Декларирам на собствена отговорност, че предлаганите от „КОНТРАГЕНТ 35“ ЕООД гр. Стара Загора, щепселни кабелни глави тип CTS и CGS производство на Cellpack, за който се отнася тази декларация, са в съответствие с Cenelec HD 629 S1, HD 629 S2, IEC 60502-4, DIN VDE 0278 технологичната документация и в съответствие с Наредбата за съществените изисквания и оценяване съответствието на строителните продукти, съществените изисквания за безопасност на други наредби за оценяване на съответствието.

Декларирам, че ми е известна отговорността, която нося съгласно член 313 от НК.

гр.Стара Загора
28.02.2014 г.

УПРАВИТЕЛ

/Станчо Пантов/



Handwritten signatures and initials at the bottom of the page.

ТОВ "Енергетик" АД
ул. "Славейков" № 1
1000 София, България
Тел: 00359 2 819 0400; факс: 00359 2 185 6331
www.enertic.com



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OHSAS 18001:2007
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www.tuv.com
ID 915026355

ПРИЛОЖЕНИЕ 9.10.6

Инструкция за монтиране

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

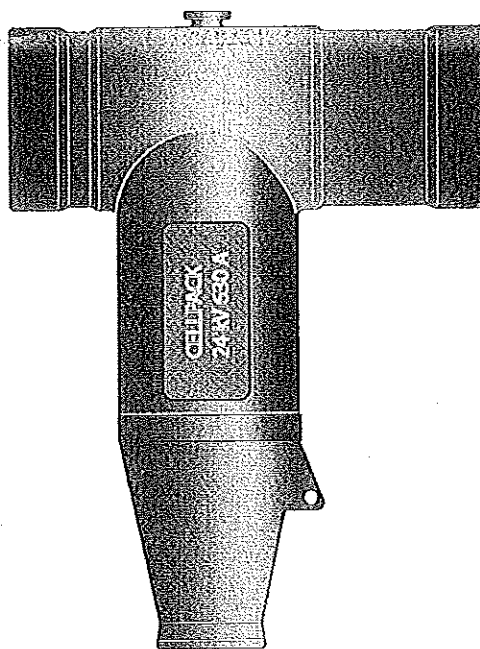
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "МЕЗ Разпределение България" АД

Средно напрежение

CELLPLUX



CTS 630A 24kV 95 - 240
 $U_0/U(U_m)$ 8,7/15(17,5) kV – 12,7/22(24) kV

Инструкция за монтаж

Кабелна глава щепселна, Т-образна за едножилни кабели с полимерна изолация за напрежения до 24 kV

206742/0908/4/7

CELLPACK GmbH
Electrical Products
D-79761 Waldshut-Tiengen
Tel. +49(0)7741/60 07 11
Fax +49(0)7741/60 07 83
www.cellpack.com
e-mail: electrical.products@cellpack.com

CELLPACK AG
Electrical Products
CH-5612 Villmergen
Tel. +41(0)56/618 12 34
Fax +41(0)56/618 12 45

CELLPACK
Electrical Products

Общи указания:

- Проверете дали обхватът на кабелните аксесоари е подходящи за размера на кабела.
- Проверете съдържанието на комплекта съгласно опаковъчния лист.
- Старателно прочетете инструкциите за монтаж.

Монтажът трябва да се извършва само от компетентен персонал.

Производителят не носи отговорност за повреди, причинени от неправилен монтаж.

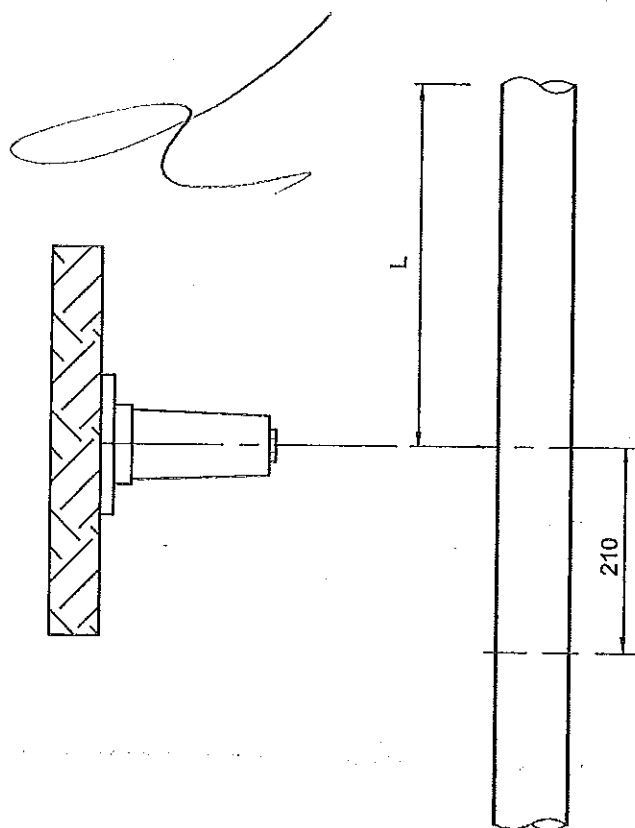
Кабелна глава щепселна, Т-образна тип CELLPLUX CTS 630A 24kV 95-240 :

Сечения:

Напрежение $U_0/U(U_m)$ kV	Сечение на кабела (*) mm ²
8,7/15(17,5) kV	120 – 240 *)
12/20(24) kV	95 – 240 *)

(*) Минимален диаметър над кабелната изолация от 22 мм

Нагласяне

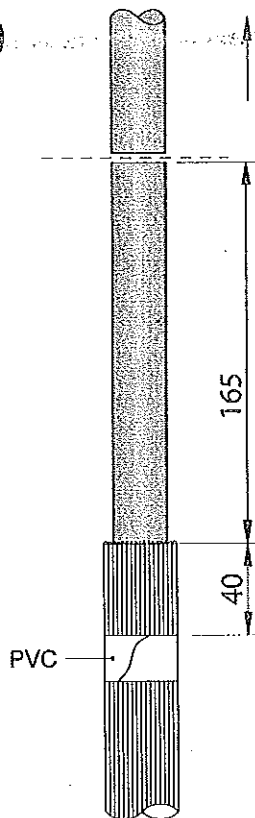


- Почистете грижливо краищата на кабела до 1м.
- Нагласете кабела спрямо оста на клемата за присъединяване, оставяйки свободна дължина $L = 200-500$ мм. Изрежете излишното.
- Маркирайте кабела на 210 мм от центъра на клемата.

Подготовка на кабела

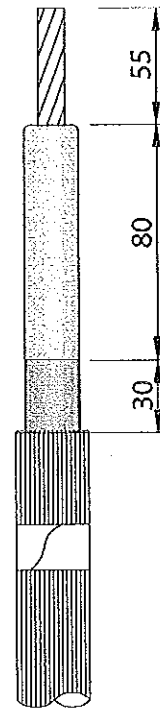
Кабел с екран от медни жички:

1a)



- Отстранете външната изолация на кабела до маркировката.
- Подгънете назад медните жици на екрана и ги фиксирайте към външната изолация на кабела с PVC лента (Fig. 1a).
- Отрежете кабела на дължина 165 mm.
- Внимателно отстранете външния полупроводим слой, така че да

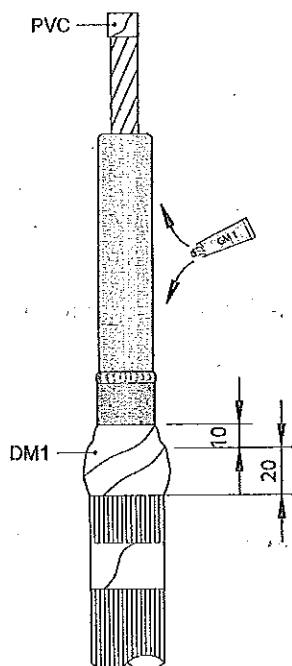
2a)



остане слой с дължина 30 mm. Уверете се, че ръбът на слоя е гладък.

- Отстранете XLPE изолацията на кабела на размер 55 mm.
- Почистете старателно XLPE изолацията и външния полупроводим слой на кабела.

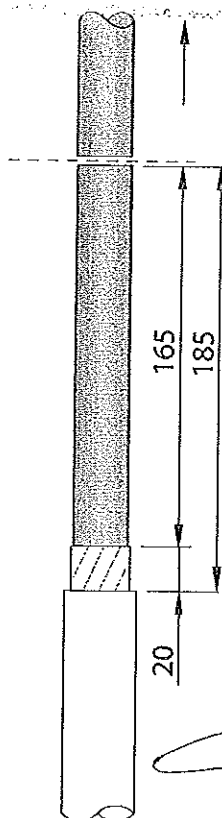
3a)



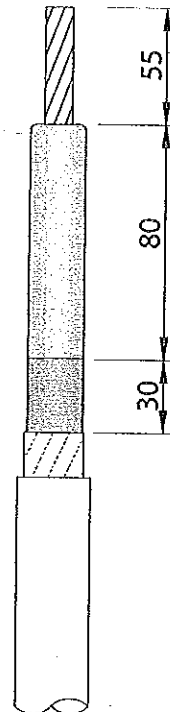
- Защитете края на жилото с PVC-лента.
- Навийте 2/3 от дължината на уплътняващата лента DM1 върху 20 mm от екрана и върху 10 mm от полупроводящия слой (с разтягане 50%)
- Нанесете на и около ръбът на полупроводящия слой смазка и пълнеж GM1 (оформете пръстен).
- Навлажнете изолацията със смазка и пълнеж GM1.

Кабел с лентов екран:

1b)



2b)

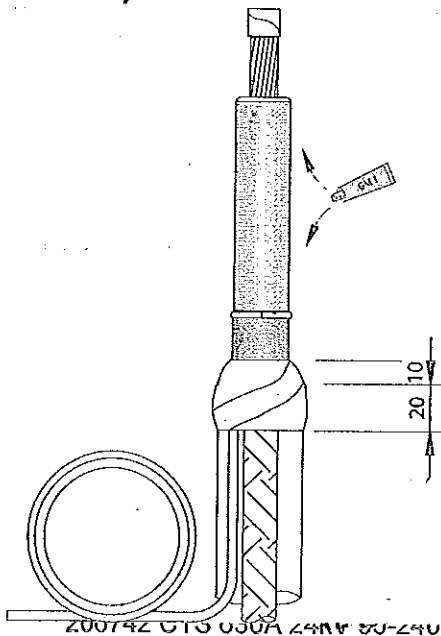


- Отстранете външната изолация на кабела до маркировката + 20mm.
- Отрежете кабела както е показано на фигурата.
- Отрежете лентовия екран, така че върху кабела да остане 20 мм от него.
- Внимателно отстранете **външния** полупроводим слой, така че да остане слой с дължина 30 мм.

Уверете се, че ръбът на слоя е гладък.

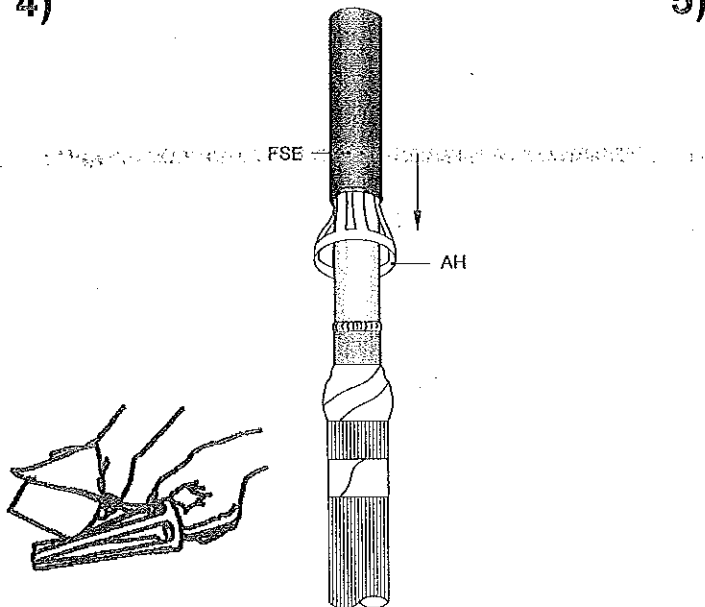
- Отстранете XLPE изолацията на кабела на размер **55 mm**.
- Почистете старателно изолацията и външния полупроводим слой на кабела.

3b)



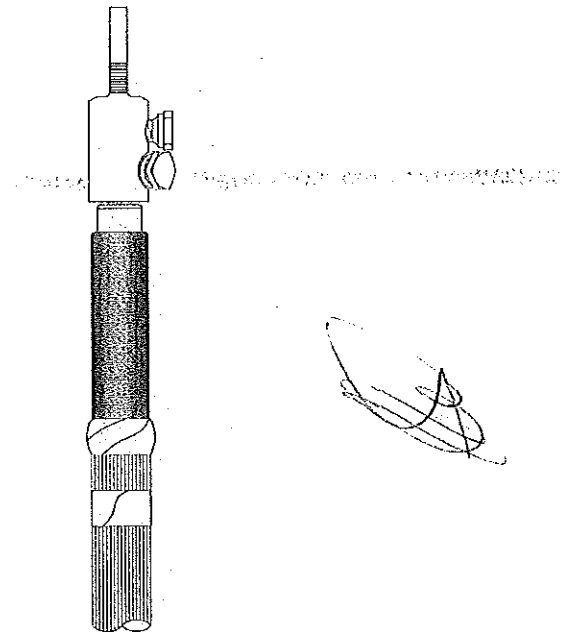
- Защитете края на жилото с PVC-лента.
- Фиксирайте заземителната оплетка и заземителния проводник чрез ролкова пружина към лентовия екран (заземителния комплект се поръчва отделно).
- Навийте 2/3 от дължината на уплътняващата лента DM1 върху **20 mm** от екрана и върху **10 mm** от полупроводящия слой (фиг. 3b).
- Нанесете на и около ръбът на полупроводящия слой смазка и пълнеж GM1 (оформете пръстен).
- Навлажнете изолацията със смазка и пълнеж GM1.

4)



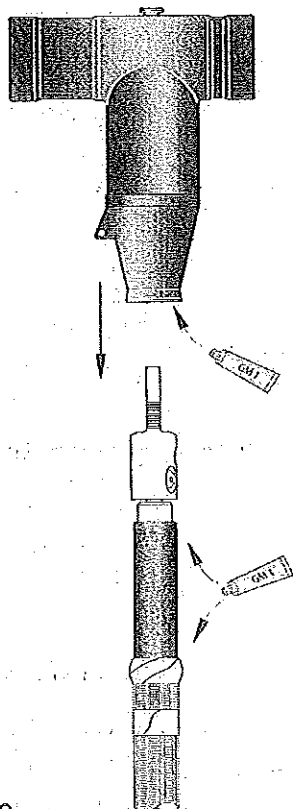
- Навлажнете лентите на апликатора АН със силиконовата кърпичка.
- Вмъкнете апликатора АН в елемента за контрол на полето FSE и ги нахлузете върху кабела до достигане на уплътняващата обвивка.
- Отстранете апликатора, издърпвайки лентите му една по една.
- Позиционирайте елемента за контрол на полето като леко го завъртате (фиг. 5).
- Отстранете PVC лентата от края на жилото на кабела.

5)



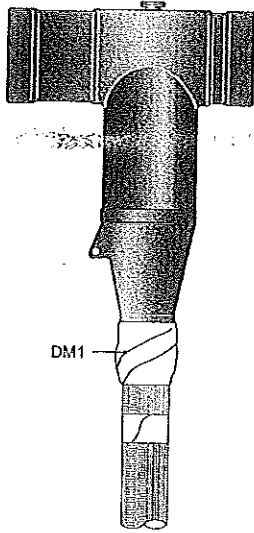
- Монтирайте кабелна обувка с болтове с откъсващи се глави, съгласно отделна инструкция. Моля, обърнете под внимание, че отвора на кабелната обувка трябва да бъде съосен оста на клемата за присъединяване.
- Почистете старателно повърхността на елемента за контрол на полето FSE.

6)



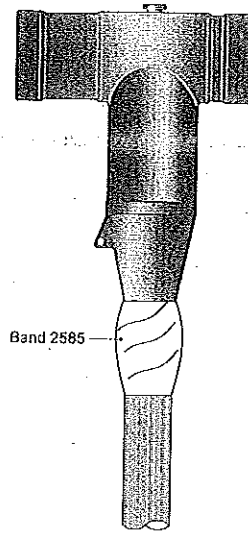
- Навлажнете тялото на Т-образната щепселна глава и повърхността на елемента за контрол на полето FSE със смазка и пълнеж GM1. **Внимание: Кабелната обувка да не се навлажнява.**
- Нахлузете тялото на Т-образна щепселна глава върху кабела докато отвора на кабелната обувка се центрира в него

7)



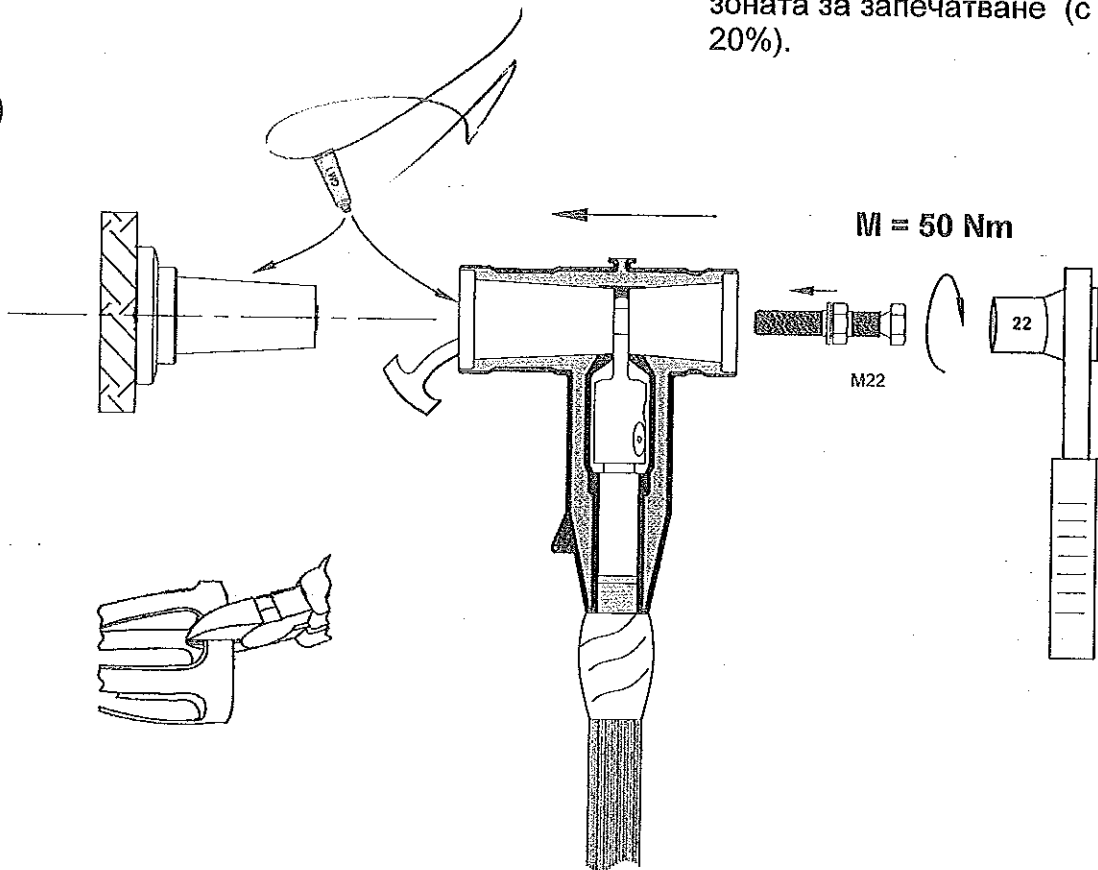
- Навийте останалата **1/3** от лентата DM1 между края на Т-образното тяло и зоната за запечатване.

8)



- Навийте лента № 2585 приблизително **20 мм** върху края на Т-образното тяло до края на зоната за запечатване (с разтягане 20%).

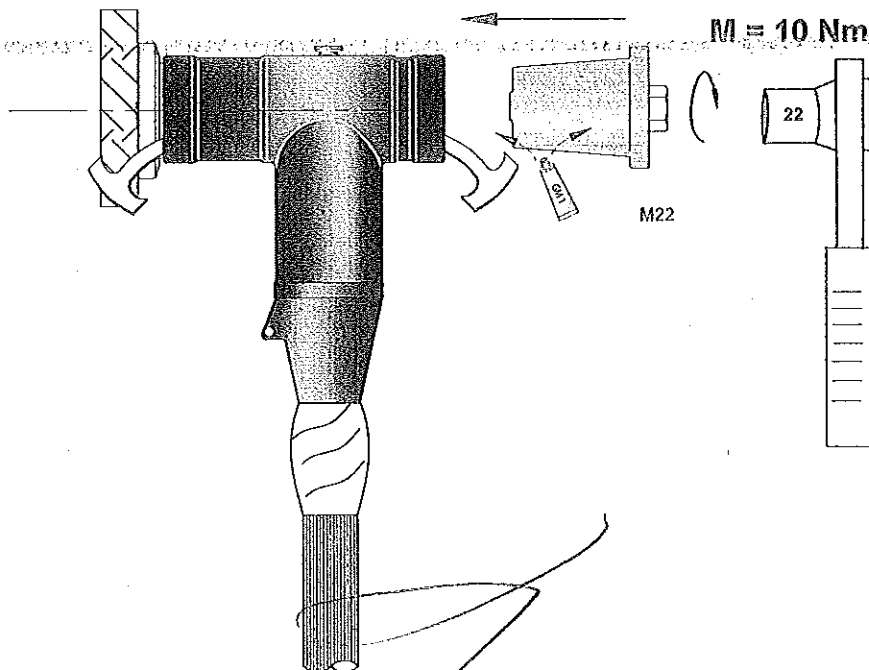
9)



- Навлажнете повърхността на клемата за присъединяване и вътрешността на Т-образното тяло със смазката и пълнежа GM1.
- Отрежете лента от апликатора АН (приспособление за изтегляне на въздуха).
- Вмъкнете приспособлението за изтегляне на въздуха в Т-образното тяло.
- Закрепете Т-образното тяло право върху клемата за присъединяване и завийте контактния болт ръчно.
- Затегнете контактния болт с подходящ инструмент до скъсване на главата му.

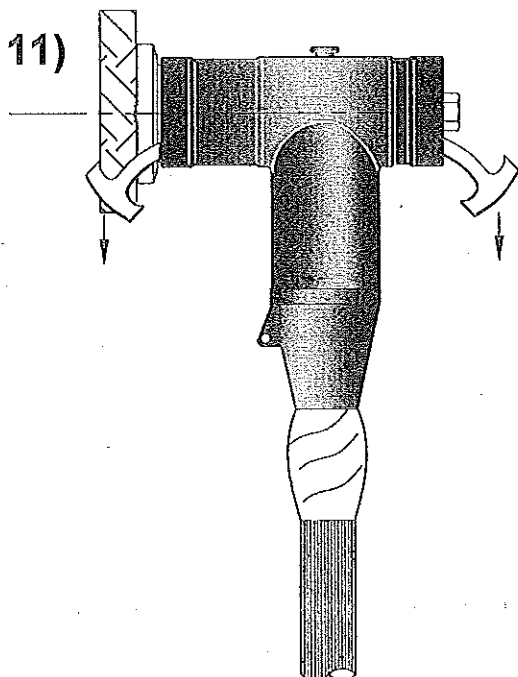
Внимание:
За повторно използване на контактния болт, при затягане на последния, трябва да бъде приложен срязващ момент от 50 Nm.

10)

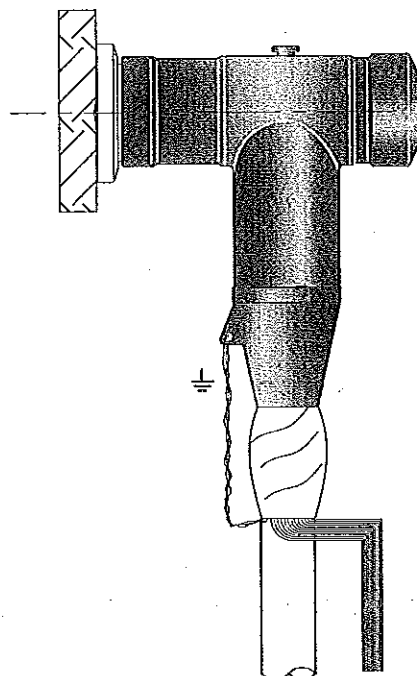


- Навлажнете Т-образното тяло и екранирания изолационен конус със смазката и пълнежа GM1.
- Отрежете втора лента от апликатора АН и го поставете в Т-образното тяло.
- Вкарайте екранирания изолационен конус в Т-образното тяло. Затегнете го с подходящ инструмент. Не прилагайте срязващ момент по-голям от 10 Nm.

11)



12a)



- Издърпайте внимателно приспособлението за изтегляне на въздуха и отстранете остатъците от смазката и пълнежа GM1.

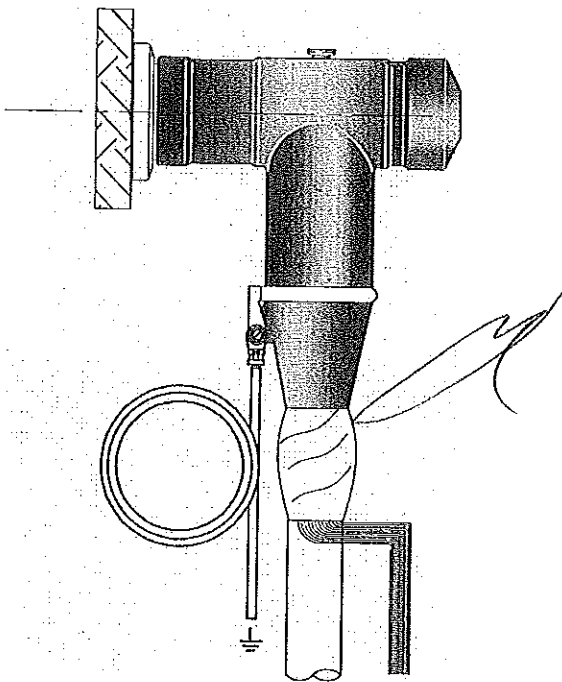
- Поставете полупроводящата защитна капачка върху Т-образното тяло.

Версия без заземителен комплект

- Усучете 3 жички от екрана и ги фиксирайте към отвора на Т-образното тяло.

Версия със заземителен комплект – версия EGA

12b)



- Инсталирайте заземителния комплект към Т-образното тяло и го заземете (съгласно фиг. 12b).
- Допълнителните мерки за заземяване да бъдат съобразени със местните законови разпоредби.

DE250 Deadbreak

Инструкция за монтаж

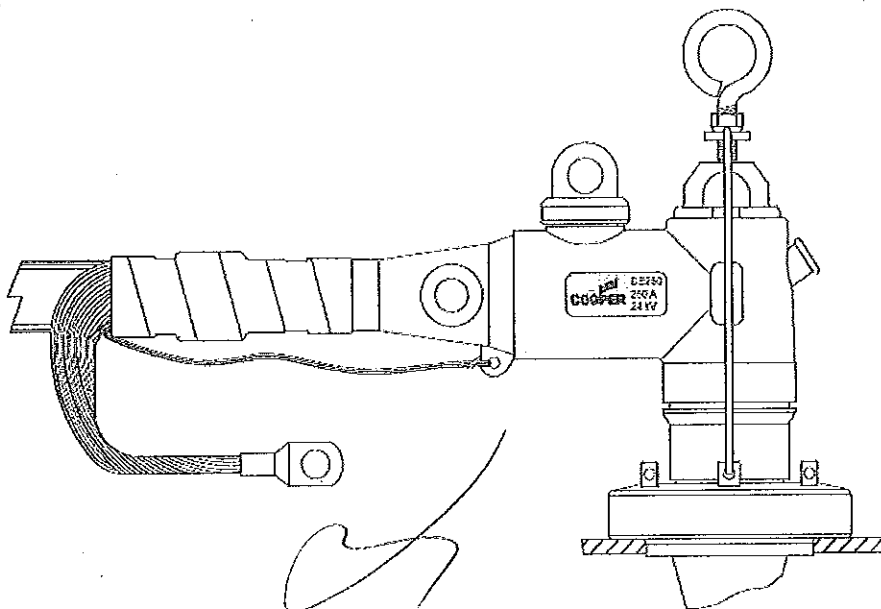
COOPER Power Systems

ЩЕПСЕЛНА Г-ОБРАЗНА ГЛАВА

ЗА ВЪНШЕН КОНУС С КОНТАКТ 250 А
ЗА КАБЕЛИ СРН С ЕКСТРУДИРАНА ИЗОЛАЦИЯ И РАДИАЛНО ПОЛЕ

Предварителна подготовка

- V Прочетете внимателно инструкциите преди монтажа.
- V Проверете дали всички необходими компоненти са включени в комплекта.

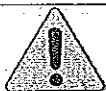


Електрически данни:

Номинално напрежение (U_0/U):	12/20 kV
Макс. напрежение на системата (U_{max}):	24 kV
Продължителен ток:	250 A

СЪДЪРЖАНИЕ НА КОМПЛЕКТА:

- 1 тяло
- 1 контактен проводник (обувка)
- 1 контактен щифт
- 1 шестограмен ключ
- 1 монтажнен винт
- силиконова смазка
- уплътняваща мастик лента
- изолационна PVC лента
- хартиена кърпа
- шкурка

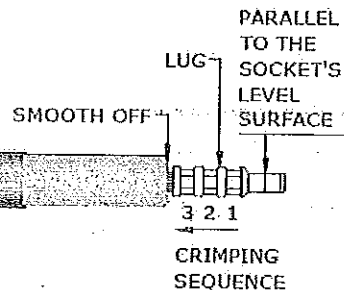
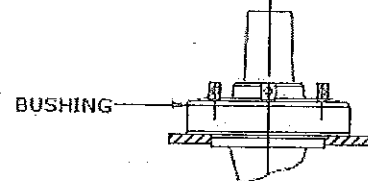
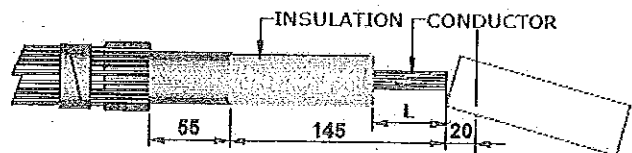
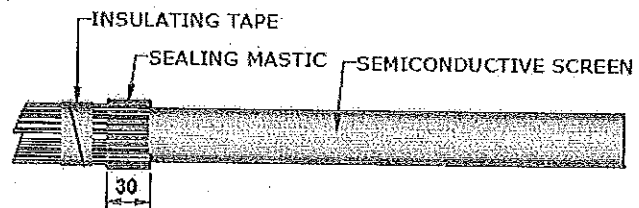
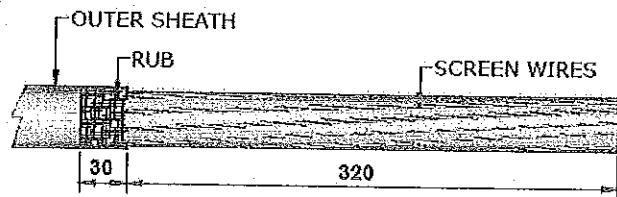
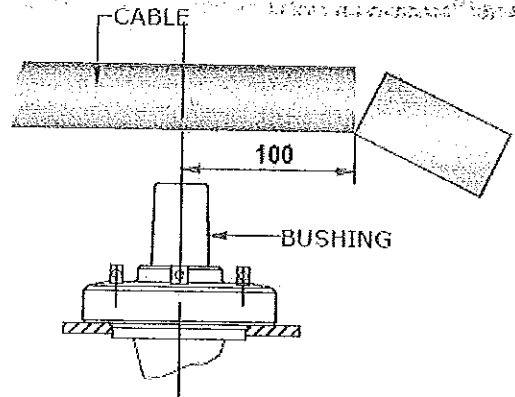


ВНИМАНИЕ: Тази щепселна глава е проектирана да работи в съответствие с нормалните безопасни оперативни процедури. Тези указания не заместват или заменят съществуващите правила за безопасност и процедури на работа. Щепселната глава трябва да се инсталира и обслужва само от персонал, запознат с добрите практики по безопасност за работа с високо напрежение и електрически съоръжения. Всички прилежащи съоръжения не трябва да бъдат под напрежение по време на монтаж и/или поддръжка.

1
[Handwritten signatures]

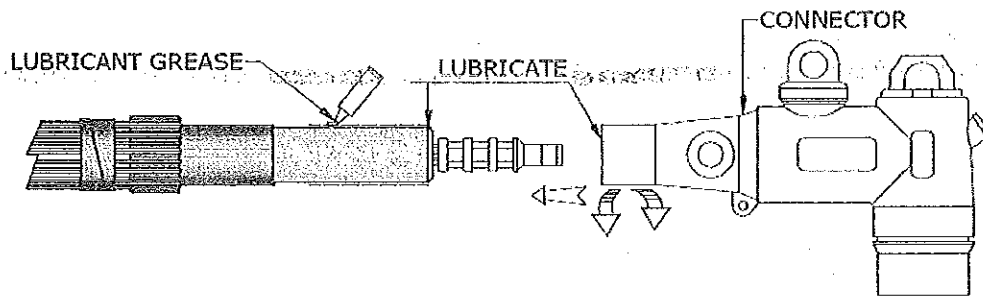
ПОДГОТОВКА НА КАБЕЛА (екран от проводници)

- 1 Позиционирайте кабела близо до изолатора, както е показано на чертежа.
- 2 Уверете се, че дължината на кабела е достатъчна, за да достигне спокойно изолатора.
- 3 Разделете мислено със симетрична линия изолатора, както е показано и отстранете 100 mm от външната изолация на кабела и почистете края му с подходящ инструмент.
- 4 Това е временна дължина, която да улесни възстановяването на екрана от проводници. Кабелът ще бъде отрязан до крайната си дължина по-късно.
- 5 Отстранете 320 mm от външната изолация. Почистете приблизително 30 mm от изолацията със шкурка.
- 6 Нанесете слой от уплътняваща мастик лента на 30 mm от края на външната изолация.
- 7 Обърнете назад екрана от проводници, опънете ги равномерно и ги притиснете с уплътняващата лента.
- 8 Бандажирайте екрана с PVC изолационна лента на няколко сантиметра от запълващата лента.
- 9 Поставете кабела във финална позиция.
- 10 Отрежете кабела на 20 mm от центъра на изолатора и отстранете излишъка.
- 11 Внимателно отстранете последните 145 mm от полупроводящия слой.
- 12 Отстранете основната изолация на разстояние L:
 40 mm за медни кабелни обувки (Cu),
 50 mm за биметални кабелни обувки (Al/Cu).



МОНТАЖ НА ЩЕПСЕЛНАТА ГЛАВА

- 13 Поставете кабелната обувка: плоската част на обувката трябва да бъде паралелна на повърхността на изолатора.
- 14 Кербовайте, както е показано на фигурата.
- 15 Завъртете на 90° и кербовайте. Повторете.
- 16 Почистете излишната грес.
- 17 Почистете края на изолацията, за да улесните вкарването на конектора.
- 18 Почистете изолацията със шкурка до отстраняване на всякакви следи от полупроводящия слой. Уверете се, че няма наранявания или драскотини върху основната изолация.



19 Почистете основната изолация и нанесете тънък пласт силиконова паста. Разпределете равномерно.

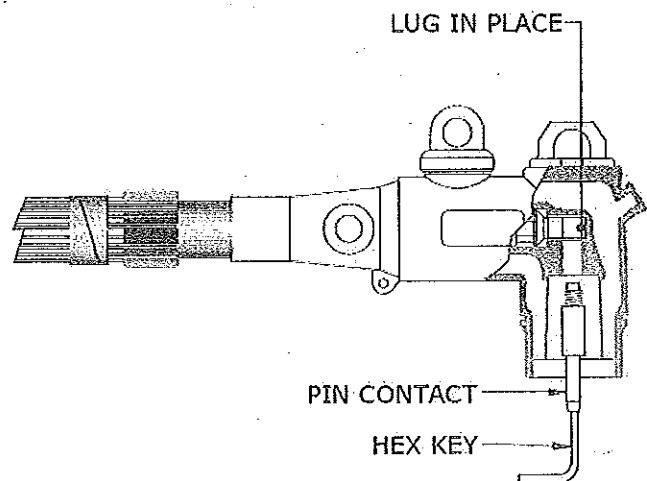
20 Нанесете паста и във входа на тялото на конектора.

21 Проверете дали тялото на конектора е ориентирано под правилен ъгъл спрямо обувката и го приплъзнете с леки въртеливи движения върху кабела до крайно възможно положение на обувката.

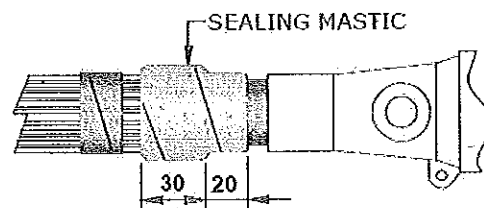
22 Проверете дали входа на обувката е поставен правилно в тялото на конектора.

23 Отстранете излишната грес от главата.

24 Вкарайте резбования край на контактният щифт във входа на обувката. Уверете се, че резбите не се пресичат. Стегнете с шестограм на най-малко на 90 градуса.

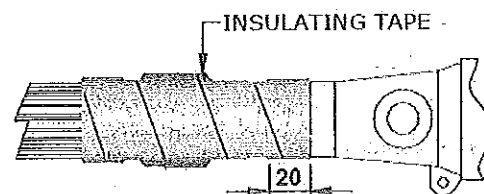


25 Нанесете слой от уплътняващата мастик лента за да покриете приблизително 30 mm от предишния мастик слой като започнете на разстояние 20 mm от края на полупроводящия слой, както е показано на чертежа.



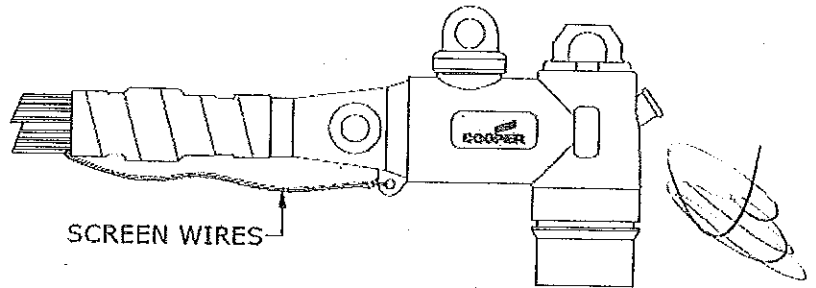
26 Нанесете два слоя самовулканизираща се лента, така че да покрие уплътняващата лента. Лентата се нанася с 50 % припокриване и опън, при който тя да намали ширината си почти наполовина.

27 Лентовото покритие трябва да обхваща около 40 mm от екрана и да покрие тялото на конектора с около 20 mm.



28 Свържете един или два проводника от екрана към ухото на конектора.

29 Почистете вътрешността на конектора и повърхността на изолятора, след това смажете с тънък слой силиконова паста, за да улесните свързването.



30 Вкарайте конектора върху изолятора до максимално крайно положение.

31 Стегнете конектора към изолятора със скобите.

32 Скобите се пристягат към ушите на изолятора.

33 Фиксирайте конектора като завинтите без да използвате сила, както е показано на чертежа.

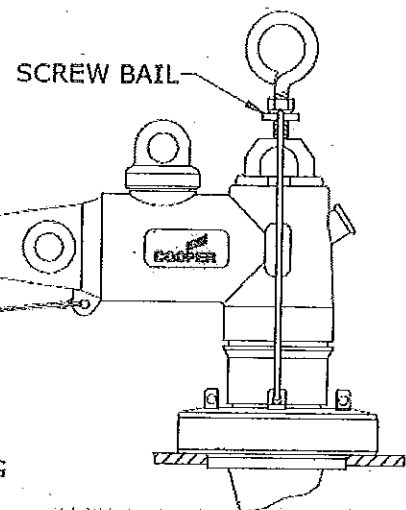
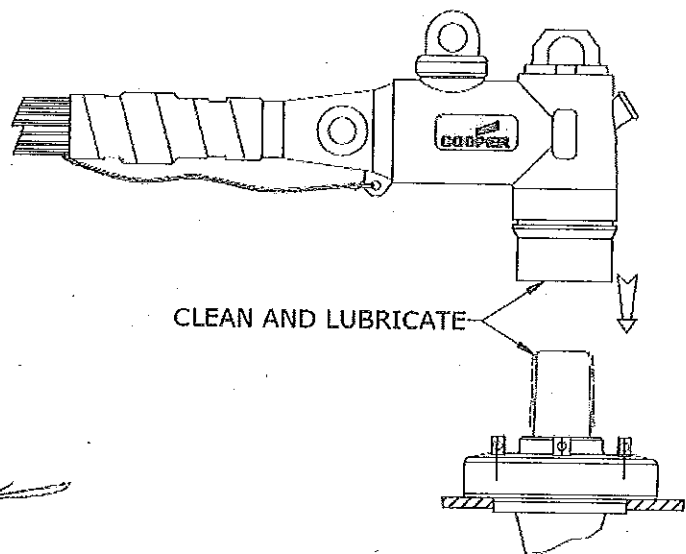
34 Фиксирайте устройството използвайки гайката под ухото.

35 Съберете екрана от проводници и поставете кабелната обувка за ниско напрежение.

36 Свържете кабелната обувка за ниско напрежение към заземителната система.

37 Стегнете кабела близо до конектора.

38 Г-образната глава е готова за употреба.



ВНИМАНИЕ: Всички прилежащи съоръжения не трябва да бъдат под напрежение по време на монтаж и/или поддръжка

Наименование на материала: Комплект измервателен клемен блок с клеми за медни проводници от проходен тип и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители

Съкратено наименование на материала: Клемен блок с Цилиндрични П-л П-ч Р-ли

Област: G - Инсталации

Категория: 14 - Инсталационни тръби, кутии, клемни кутии, клеми, планки

Мерна единица: Брой

Аварийни запаси: Да



Характеристика на материала:

Клемен блок комплектуван с делими измервателни клеми от проходен тип, за монтаж на DIN шина, с резбови контактни съединения за медни токопроводими жила с класове 1,2 и 5 съгласно БДС EN 60228:2006 или еквивалент със сечения от от 2,5 mm² до min 6 mm² (max 16 mm²) и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители. Клеморедът е защитен от неправомерен достъп посредством прозрачен устойчив на деформации капак с възможност за пломбиране.

Използване:

Клемният блок, комплектуван с делими измервателни клеми и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители е предназначен за присъединяване на медни токопроводими жила при опроводяване на системи за измерване на използваните от потребителите количества електрическа енергия, еталонна апаратура за проверка и аналогични инсталации.

Съответствие на предложеното изпълнение със стандартизационните документи:

Клемният блок, комплектуван с делими измервателни клеми за медни проводници от проходен тип и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители, трябва да бъдат в съответствие с изискванията на посочените стандарти или еквиваленти, включително на техните валидни изменения и поправки:

- БДС EN 60947-7-1:2009 "Комутационни апарати за ниско напрежение. Част 7-1: Спомагателни принадлежности. Клемни блокове за медни проводници (IEC 60947-7-1:2009)";
- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“; и
- БДС EN 60947-3:2009 „Комутационни апарати за ниско напрежение. Част 3: Товарни прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазител (IEC 60947-3:2008)“ и

да бъдат оценени положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	Приложение № 9.11.1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение № 9.11.2
3.	ЕО декларация за съответствие	Приложение № 9.11.3
4.	Протоколи от типови изпитвания на английски или български език съответно за 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители и клемните блокове, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение № 9.11.4
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение № 9.11.5

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. Каталогите и протоколите от проверките и изпитванията могат да бъдат и само на английски език.

Технически данни

1. Характеристики на работната среда

№ по ред	Характеристика	Стойност
1.1	Околна среда, в която работи	На закрито
1.2	Максимална околна температура	+ 40°C
1.3	Минимална околна температура	Минус 5°C
1.4	Относителна влажност (при 20 °C)	До 90 %
1.5	Степен на замърсяване	III
1.6	Надморска височина	До 1000 m

2. Параметри на електроразпределителната мрежа

№ по	Параметър	Стойност

ред		
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално работно напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Брой на фазите	3
2.5	Заземяване на звездния център	Директно заземен

3. Технически характеристики

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.1	Клемен блок	-	-
3.1.1	Конструкция	а) Клемният блок трябва да бъде комплектуван с делими измервателни клеми от проходен тип с резбови контактни съединения, за монтаж на DIN шина	Да, Клемният блок е комплектуван с делими измервателни клеми от проходен тип с резбови контактни съединения, за монтаж на DIN шина
б) Клемите за началата и краищата на отделните токови вериги трябва да бъдат монтирани една до друга.		Да, Клемите за началата и краищата на отделните токови вериги са монтирани една до друга.	
в) Клемният блок трябва да осигурява възможност за независимо шунтиране и разкъсване на токовите вериги на всяка от фазите		Да, Клемният блок осигурява възможност за независимо шунтиране и разкъсване на токовите вериги на всяка от фазите	

№ по ред	Характеристика	Изискване	Гарантирано предложение
		г) Клемният блок трябва да бъде комплектуван с разделителни стени между нееднородните фази и клемата за неутралния проводник	Да, Клемният блок е комплектуван с разделителни стени между нееднородните фази и клемата за неутралния проводник
		д) Клемният блок ведно със стопяемите цилиндрични предпазител-прекъсвач-разединители трябва да бъдат защитени срещу неправомерен достъп с прозрачен монолитен капак с възможност за пломбиране	Да, Клемният блок ведно със стопяемите цилиндрични предпазител-прекъсвач-разединители са защитени срещу неправомерен достъп с прозрачен монолитен капак с възможност за пломбиране
		е) Защитният монолитен капак трябва бъде изработен от поликарбонат или еквивалентен прозрачен материал с дебелина на стените min 2 mm и да осигурява клас на защита на клемния блок IP 4X съгласно БДС EN 60529+A1:2004 до ниво монтажна плоча от всички страни или еквивалент.	Да, Защитният монолитен капак е изработен от поликарбонат с дебелина на стените min 2 mm и да осигурява клас на защита на клемния блок IP 4X съгласно БДС EN 60529+A1:2004 до ниво монтажна плоча от всички страни
3.1.2	Размери		

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.1.2a	Височина	max 140 mm	140 mm
3.1.2b	Широчина	max 170 mm	170 mm
3.1.2c	Дълбочина	80 mm (препоръчително)	80 mm
3.2	Проходни делими клеми	-	-
3.2.1	Конструкция	а) Клемите с резбови контактни съединения трябва да позволяват присъединяване на медни токопроводими жила с класове 1,2 и 5 съгласно БДС EN 60228 или еквивалент със сечения от от 2,5 mm ² до min 6 mm ² (max 16 mm ²)	Клемите с резбови контактни съединения позволяват присъединяване на медни токопроводими жила с класове 1,2 и 5 съгласно БДС EN 60228
		б) Клемите трябва да бъдат окомплектовани със съответните аксесоари, позволяващи свързване на измервателна апаратура	Клемите са окомплектовани със съответните аксесоари, позволяващи свързване на измервателна апаратура
3.2.2	Съответствие със стандарти	БДС EN 60947-7-1 или еквивалент	БДС EN 60947-7-1
3.2.3	Обявено работно напрежение AC, U _e	min 500 V	690 V
3.2.4	Обявен продължителен ток, I _n	min 10 A	32 A
3.2.5	Сравнителен показател за устойчивост срещу пропълзяващи токове - STI	min 600	600
3.2.6	Минимален работен температурен диапазон	От минус 30°C до + 90°C	От минус 50°C до + 120°C
3.2.7	Категория на горимост	min V-0	UL 94 V0
3.2.8	Закрепване	Към шина с DIN – профил с размери 35x7.5 mm	профил с размери 35x7.5x2000


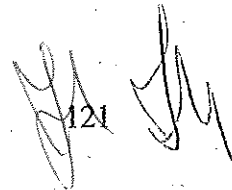


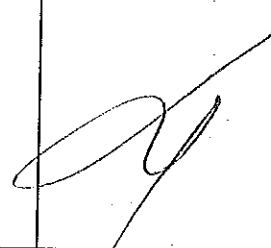

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.2.9	Клеми за токовите вериги	6 бр. токови клеми; позволяващи: <ul style="list-style-type: none"> ○ независимо свързване на късо (шунтиране) на токовите вериги на електромера на всяка фаза посредством мостова връзка; ○ видимо разкъсване на токовите вериги. 	6 бр. токови клеми, позволяващи: <ul style="list-style-type: none"> ○ независимо свързване на късо (шунтиране) на токовите вериги на електромера на всяка фаза посредством мостова връзка; ○ видимо разкъсване на токовите вериги.
3.2.10	Клема за неутралния проводник	1 бр. с възможност за видимо разкъсване на веригите. (Не се изисква при използване на 3P+N цилиндрични предпазител-прекъсвач-разединители)	1 бр. с възможност за видимо разкъсване на веригите.
3.2.11	Разделителна стена между нееднородните фази и неутралния проводник	Клемният блок трябва да бъде комплектуван с разделителни стени за предотвратяване на неволно шунтиране или късо съединение	Клемният блок е комплектуван с разделителни стени за предотвратяване на неволно шунтиране или късо съединение
3.2.12	Крайна капачка	1 бр. или 2 бр. (в зависимост от конструкцията)	1 бр
3.2.13	Краен притискач с винтове	2 бр.	Да, 2 броя

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.2.14	Маркировка на клемите	а) Токовите клемите трябва да бъдат маркирани с буквено-цифрени означения за фаза и начало и край на съответните фази	Токовите клемите са маркирани с буквено-цифрени означения за фаза и начало и край на съответните фази
		б) Цветова маркировка – препоръчително	Цветова маркировка
3.3	Спецификация 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители		-
3.3.1		а) 3 броя еднополюсни (1P) или 1 брой триполюсни (3P или 3P+N) стопяемите цилиндрични предпазител-прекъсвач-разединители	1 брой триполюсни
		б) Еднополюсни (1P) или триполюсни (3P) стопяемите цилиндрични предпазител-прекъсвач-разединители са съгласно стандарт 20 16 6zzz в Приложение 1 с предпазители 10x38 mm от категория на приложение gG с обявен ток на стопяемата вложка 4 А	Еднополюсни (1P) или триполюсни (3P) стопяемите цилиндрични предпазител-прекъсвач-разединители са съгласно стандарт 20 16 6zzz в Приложение 1 с предпазители 10x38 mm от категория на приложение gG с обявен ток на стопяемата вложка 4 А

№ по ред	Характеристика	Изискване	Гарантирано предложение
		в) Съответствието на 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители с изискванията на стандартизационните документи се доказва с последно издание на каталога на производителя и със заверени копия на протоколи от типови изпитвания, проведени от независима акредитирана лаборатория.	Съответствието на 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители с изискванията на стандартизационните документи се доказва с последно издание на каталога на производителя и със заверени копия на протоколи от типови изпитвания, проведени от независима акредитирана лаборатория.
3.3.2	Технически изисквания за 3P+N триполюсен стопяем цилиндричен предпазител-прекъсвач-разединител, размер 10x38 mm		
3.3.2.1	Брой на полюсите	3+N	3+N
3.3.2.2	Широчина	max 54 mm	54 mm
3.3.2.3	Обявено работно напрежение AC, Ue	min 500 V	500 V
3.3.2.4	Обявена честота	50 Hz	50 Hz
3.3.2.5	Обявено напрежение на изолацията Ui AC	min 750 V	800 V
3.3.2.6	Категория по пренапрежение при 400 V AC	III	III
3.3.2.7	Обявено издържано импулсно напрежение, Uimp	4 kV	4 kV
3.3.2.8	Категория на приложение (при 400V AC)	AC 21 B	AC 21 B

№ по ред	Характеристика	Изискване	Гарантирано предложение
3.3.2.9	Термичен ток със стопяема вложка, I_{th}	32 A	32 A
3.3.2.10	Условен ток на късо съединение (ефективна стойност) при 400 V AC	min 50 kA	50 kA
3.3.2.11	Размер на цилиндричната стопяема вложка	10 x 38 mm	10 x 38 mm
3.3.2.12	Максимална стойност на обявения ток на стопяемата вложка I_n	32 A	32 A
3.3.2.13	Ток на приложената стопяема вложка	4 A	4 A
3.3.2.14	Максимална мощност на разсейване на стопяемата вложка	3,5 W	3,5 W
3.3.2.15	Механична износоустойчивост (комутационни цикли)	min 1 700	1 700
3.3.2.16	Електрическа износоустойчивост (комутационни цикли)	min 300	300
3.3.2.17	Степен на защита	min IP20	IP20
3.3.2.18	Диапазон на сеченията на присъединяваните проводници	От 2,5 до 10 mm ² за Cu проводници	От 2,5 до 10 mm ² за Cu проводници
3.3.2.19	Тегло, g	Да се посочи	8
3.4	DIN-шина	а) Шината с DIN – профил за закрепване на клеморедата трябва да бъде с размери 35x7,5 mm и да съответства на изискванията на DIN 46277 P3 или еквивалент.	Шината с DIN – профил за закрепване на клеморедата е с размери 35x7,5 mm и да съответства на изискванията на DIN 46277 P3

№ по ред	Характеристика	Изискване	Гарантирано предложение
		б) DIN шината трябва да бъде изработена от стомана и да бъде защитена от корозия чрез поцинковане или друго еквивалентно антикорозионно покритие.	DIN шината е изработена от стомана и да бъде защитена от корозия чрез поцинковане
		в) DIN шината не трябва да се показва извън капака, покриващ целия клемен блок	DIN шината не се показва извън капака, покриващ целия клемен блок

4. Свързани документи

В техническата спецификация на стандарта за „Комплект измервателен клемен блок с клеми за медни проводници от проходен тип и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители“ е направено позоваване на следните технически спецификации на стандарти за материали с йерархична съподчиненост, които са неразделна част от документа, както следва:

№ по ред	Номер на техническа спецификация на стандарт	Наименование на материала
4.1	20 16 6zzz	Триполюсни и еднополюсни стопяем цилиндричен предпазител-прекъсвач-разединители, размер 10x38 mm

Наименование на материала: Триполюсни и еднополюсни стопяем цилиндричен предпазител-прекъсвач-разединители, размер 10x38 mm

Съкратено наименование на материала: 3P и 1P Цилиндр. П-л П-ч Р-ли, 10x38 mm

Област: Н – Електрически уредби СрН/НН

Категория: 16 - Предпазители, основи за предпазители

J - Уредби за търговско измерване

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Триполюсните и еднополюсните стопяем цилиндричен предпазител-прекъсвач-разединители са предназначени за цилиндрични патрони размер 10x38 mm и могат да бъдат plombирани във включено положение. Закрепването на апаратите към разпределителните табла се извършва посредством шина с DIN-профил с размери 35x7,5 mm.

Използване:

Триполюсните и еднополюсните стопяем цилиндричен предпазител-прекъсвач-разединители са предназначени за защита на напрежените вериги на електромерите и други подобни електрически съоръжения в главните разпределителни табла в трансформаторни постове и в електромерните табла за индиректно измерване на електрическата енергия.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Триполюсните и еднополюсните стопяем цилиндричен предпазител-прекъсвач-разединители трябва да отговарят най-малко на посочените по-долу стандарти или еквиваленти.

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)“;
 - БДС EN 60947-1:2007/A1:2011 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007/A1:2010)“; и
 - БДС EN 60947-3:2009 „Комутационни апарати за ниско напрежение. Част 3: Товарни прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазители (IEC 60947-3:2008)“
- и

да бъдат оценени положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	OPV10S-3 OEZ s.r.o. Czech Republic, Приложение 9.9.1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.9.2
3.	ЕО декларация за съответствие	Приложение 9.9.3

№ по ред	Документ	Приложение № или текст
4.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.9.4
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провели типовите изпитвания по т. 4 – заверено копие	Приложение 9.9.5

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. (Каталозите и протоколите от изпитванията могат да бъдат и само на английски език.)

Технически данни

1. Характеристики на работната среда:

№ по ред	Характеристика	Стойност
1.1	Околна среда, в която работи	На закрито
1.2	Максимална околна температура	+ 40°C
1.3	Минимална околна температура	Минус 5°C
1.4	Относителна влажност (при 20 °C)	До 90 %
1.5	Степен на замърсяване	III
1.6	Надморска височина	До 1000 m

2. Параметри на електроразпределителната мрежа НН:

№ по ред	Параметър	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Брой проводници в разпределителната мрежа	4 проводна мрежа (L1, L2, L3, PEN)
2.5	Вид схема на разпределителната мрежа	TN-C

3. Общи технически параметри

№ по ред	Параметър	Изискване	Гарантирано предложение
3.1	Обявено работно напрежение AC, U_0	min 500 V	690V
3.2	Обявена честота	50 Hz	50HZ

№ по ред	Параметър	Изискване	Гарантирано предложение
3.3	Обявено напрежение на изолацията U_i AC	min 750 V	800VAC
3.4	Категория по пренапрежение при 400 V AC	III	III
3.5	Обявено издържано импулсно напрежение, U_{imp}	4 kV	6kV
3.6	Диапазон на температурата на околната среда	min (от минус 5°C до + 40°C)	-25 до +55°C
3.7	Категория на приложение (при 400V AC)	AC 21 В или по висока	AC 22 В
3.8	Термичен ток със стопяема вложка, I_{th}	32 A	32A
3.9	Условен ток на късо съединение (ефективна стойност) при 400 V AC	min 50 kA	50 kA
3.10	Размер на цилиндричната стопяема вложка	10 x 38 mm	10 x 38 mm
3.11	Максимална стойност на обявения ток на стопяемата вложка I_n	32 A	32A
3.12	Максимална мощност на разсейване на стопяемата вложка	3,5 W	3.5W
3.13	Механична износоустойчивост (комутационни цикли)	min 1 700	2000
3.14	Електрическа износоустойчивост (комутационни цикли)	min 300	300
3.15	Степен на защита	min IP20	IP20
3.16	Диапазон на сеченията на присъединяваните проводници	min (0,5 до 25 mm ²) за Cu/Al проводници	0.75-25mm ²

4. Триполюсни и еднополюсни стопяем цилиндричен предпазител-прекъсвач-разединители, размер 10x38 mm

4.1 Триполюсен стопяем цилиндричен предпазител-прекъсвач-разединител, размер 10x38 mm

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 16 6001		OPV10S-3	
Наименование на материала		Триполюсен стопяем цилиндричен предпазител-прекъсвач-разединител, размер 10x38 mm	
Съкратено наименование на материала		3P Цилиндр. П-л П-ч Р-л 10x38 mm	
№ по ред	Наименование	Изисквана стойност	Гарантирано предложение
4.1.1	Брой на полюсите	3	3
4.1.2	Ширина	max 54 mm	52,5

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 16 6001		OPV10S-3	
Наименование на материала		Триполюсен стояем цилиндричен предпазител-прекъсвач- разединител, размер 10x38 mm	
Съкратено наименование на материала		3P Цилиндр. П-л П-ч Р-л 10x38 mm	
№ по ред	Наименование	Изисквана стойност	Гарантирано предложение
4.1.3	Тегло, g	Да се посочи	280гр.

4.2 Еднополюсен стояем цилиндричен предпазител-прекъсвач-разединител, размер 10x38 mm

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 16 6101		OPV10	
Наименование на материала		Еднополюсен стояем цилиндричен предпазител- прекъсвач-разединител, размер 10x38 mm	
Съкратено наименование на материала		1P Цилиндр. П-л П-ч Р-л 10x38 mm	
№ по ред	Наименование	Изисквана стойност	Гарантирано предложение
4.2.1	Брой на полюсите	1	1
4.2.2	Ширина	max 18 mm	17,5
4.2.3	Тегло, g	Да се посочи	100гр.

Сибенмакс

булевард 2780, Бургас 8100
телефон 042 55 143; факс 042 55 4772
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Management System
ISO 9001:2008
OHSAS 18001:2007
www.tuv.com
ID 910522555



Management System
ISO 14001:2004
www.tuv.com
ID 910522555

ПРИЛОЖЕНИЕ 9.11.1

Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

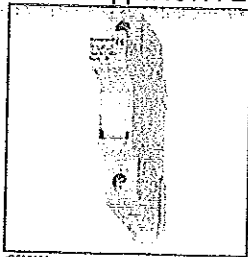
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

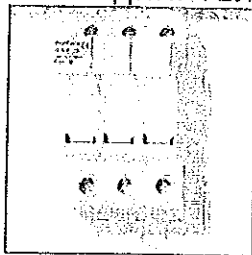
организиран от "ЧЕЗ Разпределение България" АД

ПРЕДПАЗИТЕЛНИ РАЗЕДИНИТЕЛИ ЗА ЦИЛИНДРИЧНИ ПРЕДПАЗИТЕЛНИ ВЛОЖКИ

ПРЕДПАЗИТЕЛНИ РАЗЕДИНИТЕЛИ 10X38 ДО 32А



IS506101



IS506103

ИНФОРМАЦИЯ НА SCHRACK

- Номинално напрежение: 690 V AC
- Номинален ток: 32 А
- Категория на употреба: AC -22В
- Пружинни клеми (макс. mm²): 25 mm²
- Съгласно EN 60947-3

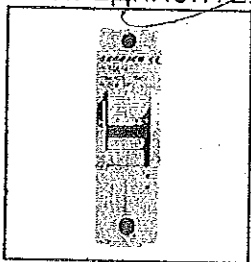


ОПИСАНИЕ	ЗА ПРЕДПАЗИТЕЛИ	РАЗМ. (ШxВxД) ММ	КАТАЛОЖЕН НОМЕР
Носач на предпазител 1P	10x38	17,5x81x64,5	IS506101
Носач на предпазител 3P	10x38	52,5x81x64,5	IS506103

ЦИЛИНДРИЧНИ СТОПЯЕМИ ВЛОЖКИ 10X38 ММ

ОПИСАНИЕ	ЗА ПРЕДПАЗИТЕЛИ	ТОК	КАТАЛОЖЕН НОМЕР
Стопяема вложка	10x38	0,5А	ISZ100005
Стопяема вложка	10x38	1А	ISZ100001
Стопяема вложка	10x38	2А	ISZ100002
Стопяема вложка	10x38	4А	ISZ100004
Стопяема вложка	10x38	6А	ISZ100006
Стопяема вложка	10x38	8А	ISZ100008
Стопяема вложка	10x38	10А	ISZ100010
Стопяема вложка	10x38	12А	ISZ100012
Стопяема вложка	10x38	16А	ISZ100016
Стопяема вложка	10x38	20А	ISZ100020
Стопяема вложка	10x38	25А	ISZ100025
Стопяема вложка	10x38	32А	ISZ100032

ПРЕДПАЗИТЕЛНИ РАЗЕДИНИТЕЛИ 14X51 ДО 50А



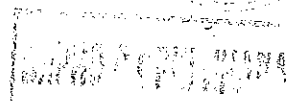
IS506141

ИНФОРМАЦИЯ НА SCHRACK

- Номинално напрежение: 690 V AC
- Номинален ток: 50 А
- Категория на употреба: AC -22В
- Пружинни клеми (макс. mm²): 35 mm²
- Съгласно EN 60947-3

ОПИСАНИЕ	ЗА ПРЕДПАЗИТЕЛИ	РАЗМ. (ШxВxД) ММ	КАТАЛОЖЕН НОМЕР
Носач на предпазител 1P	14x51	27x90x76,8	IS506141
Носач на предпазител 3P	14x51	81x90x76,8	IS506143

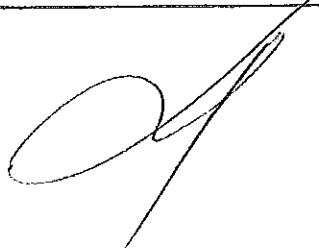
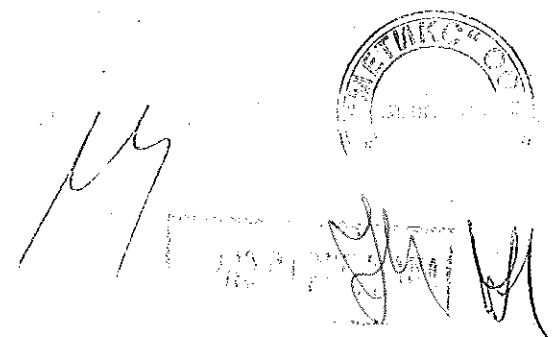
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Handwritten initials.

Означение на типа, производителя и страната на производство (произход)

№	ТИП	КАТ. №	ПРОИЗВОДИТЕЛ	СТРАНА - ПРОИЗХОД
1	WTL 6/1 Клема измервателна, делима	1016700000	Вайдмюлер	Чехия
2	WAP WTL 6/1 Крайна плочка	1068300000	Вайдмюлер	Румъния
3	WTW WTL 6/1 Разделителна стена	1068400000	Вайдмюлер	Румъния
4	QVS 2 Двуполюсен мост подвижен	0307300000	Вайдмюлер	Германия
5	VH 19 Втулка	0318000000	Вайдмюлер	Германия
6	STB35 Гнездо за сонда жълто	0389000000	Вайдмюлер	Германия
7	STB35 Гнездо за сонда зелено	0388900000	Вайдмюлер	Германия
8	STB35 Гнездо за сонда червено	0388800000	Вайдмюлер	Германия
9	BS 25 Винт за мост	0334700000	Вайдмюлер	Германия
10	Stb 25 SW Гнездо за сонда черно	0271500000	Вайдмюлер	Германия
11	Stb 14 Гнездо за сонда	0169900000	Вайдмюлер	Чехия
12	DEK 5 GW K Маркировка за клема	0522761031	Вайдмюлер	Германия
13	DEK 5 GW N Маркировка за клема	0522761034	Вайдмюлер	Германия
14	DEK 5/5 MC-10 NEUT. WS Маркировка за клема, бяла, надписана	1609801044	Вайдмюлер	Германия
15	TS36 Шина симетрична, перфорирана 35/7,5/2000	0514500000	Вайдмюлер	Италия
16	Основа за предпазител 10x38 3P 32A 690V	IS506103	Шрак Техник ГмбХ	Австрия
17	Предпазител вложка gG10x38 4A 500V	60120004	Сокомек	Франция
18	Краен притискач с винтове	P60228	Вайд-Бул	България
19	Защитен монолитен капак IP4x	K1008000	Вайд-Бул	България

Технически проект

ТОВ "ЧЕЗ Разпределение България"
ул. "Трифон Търновски" № 45
1000 СФ. С. С. 1000, БГ
Тел: 003591 116 05113; факс: 00359 116 05102
e-mail: info@cez.bg
www.cez.bg



ПРИЛОЖЕНИЕ 9.11.2

Техническо описание и чертежи с нанесени на тях размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

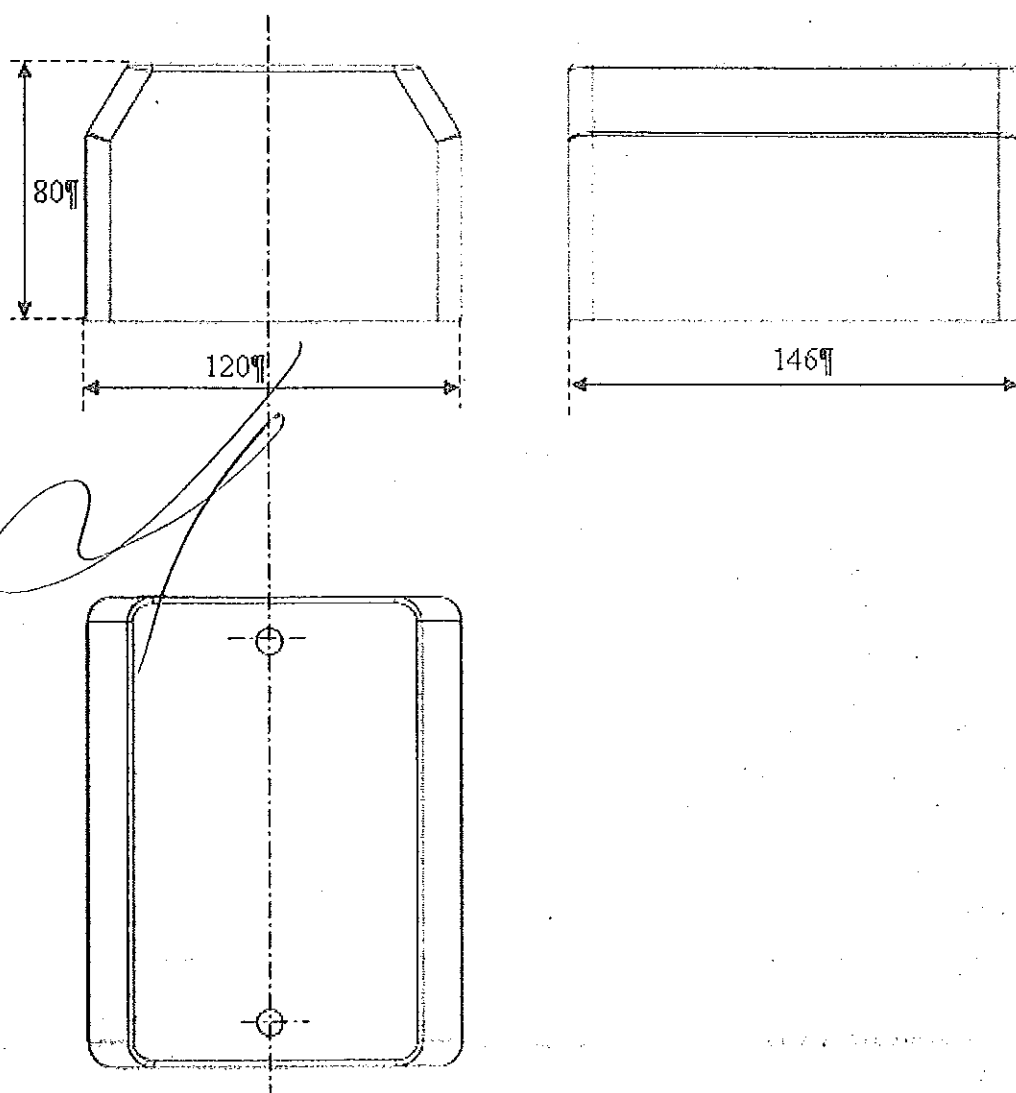
„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065


организиран от "ЧЕЗ Разпределение България" АД

ЧЕРТЕЖ С НАНЕСЕНИ РАЗМЕРИ

Комплект измервателен клемен блок с клеми за медни проводници от проходен тип и 1P, 3P или 3P+N стопяеми цилиндрични предпазител-прекъсвач-разединители



ТЕХНИЧЕСКО ОПИСАНИЕ

№	Наименование, описание и технически характеристики	Кат. №
	<p>Общи данни за клеми Неотслабваща сила на притискане на проводника при вибрации и стареене Отговаря на EN 60947-7-1 (виж Приложение 20) С винтова връзка за свързване на проводника С висока устойчивост на чупене Изолационен материал на клемите WEMID Устойчивост на токове на утечка \geq CTI 600 Работна температура - $-50^{\circ}\text{C} \dots +120^{\circ}\text{C}$ Клас на горимост по UL 94 V0, самозагасящ материал, Без вредни съставки (виж Приложение 18) Устойчивост срещу електролитна корозия</p>	
1	<p>WTL 6/1 Измервателна делима клема с възможност за разкъсване на веригата в клемата и монтиране на по едно стандартно гнездо от двете страни на клемата, за присъединяване на външна измервателна апаратура с размер на отвора Φ 4 mm; възможност за мостова връзка между клемите; с монтирани гнезда за сонди. Номинални данни по IEC 60947-7-1 / VDE 0100-537: напрежение - 800 V; ток - 41 A; импулсно напрежение - 6000 V; максимален ток - 57 A; максимално сечение на проводника - 10 mm²</p>	1016700000
2	<p>WAP WTL 6/1 Крайна капачка за клема WTL 6/1 дебелина 1,5 mm, материал - WEMID</p>	1068300000
3	<p>WTW WTL 6/1 Разделителна стена за клема WTL 6/1 дебелина 1,5 mm, материал - WEMID</p>	1068400000
4	<p>QVS 2 мост, двуполюсен, подвижен</p>	0307300000
5	<p>VH 19 Втулка</p>	0318000000
6	<p>STB35 Гнездо за сонда жълто</p>	0389000000
7	<p>STB35 Гнездо за сонда зелено</p>	0388900000
8	<p>STB35 Гнездо за сонда червено</p>	0388800000
9	<p>BS 25 Винт за мост</p>	0334700000
10	<p>Stb 25 SW Гнездо за сонда черно</p>	0271500000
11	<p>Stb 14 Гнездо безцветно</p>	0169900000
12	<p>DEK 5 GW K Маркировка за клема</p>	0522761031
13	<p>DEK 5 GW N Маркировка за клема</p>	0522761034
14	<p>DEK 5/5 MC-10 NEUT. WS Маркировка за клема, бяла, надписана</p>	1609801044
15	<p>TS 35 Шина за клеморед, стоманена с антикорозионно покритие пасивиран цинк, перфорирана, с размери 35x7,5x2000</p>	0514500000
16	<p>Основа за предпазител 10x38 3P 32A 690V</p>	IS506103
17	<p>Предпазител вложка gG10x38 4A 500V</p>	60120004
18	<p>Краен притискач с винтове</p>	P60228
19	<p>Защитен монолитен капак IP4x</p>	K1008000

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булевард "Св. Кирил и Методий" № 10
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Тел: +359 02 945 88743; Е-пошта: info@tuv.com
www.tuv.com
ТОВ "ТЮВ РХАЙНЛАНД БЪЛГАРИЯ"
булевард "Св. Кирил и Методий" № 10
1113 София, България
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ПРИЛОЖЕНИЕ 9.11.3

ЕО декларация за съответствие

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Аз (Ние)

„ВАЙД БУЛ“ ЕООД
(наименование на доставчика)

гр. София 1756 бул. „Свети Климент Охридски“ № 13
(адрес)

декларирам(е) на собствена отговорност, че продуктът

Измервателни токови и напреженови клеми тип WTL и аксесоари към тях
(наименование, тип или модел, номер на партидата, извадката)

Производство на: Weidmüller Interface GmbH & Co. KG- Германия
(пробата) или серията, евентуално произход и брой на екземплярите)

за който се отнася тази декларация, е в съответствие със следния(те)
стандарт(и)

IEC60947-7-1, EN 60079-7, VDE 0100-537

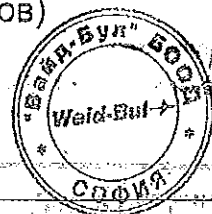
или друг(и) нормативен(ни) документ(и):

ISO 9001:2008

(наименование и/или номер и дата на издаване на стандарта(тите)
или друг(и) нормативен(ни) документ(и))

03.09.2015 г., гр. Пловдив
(място и дата на издаване)

(инж. Божидар Здравков)



ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Аз (Ние)

„ВАЙД БУЛ“ ЕООД
(наименование на доставчика)

гр. София 1756 бул. „Свети Климент Охридски“ № 13
(адрес)

декларирам(е) на собствена отговорност, че продуктът

Прекъсвач-предпазител със стопяеми цилиндрични вложки
Тип: IS506103

(наименование, тип или модел, номер на партидата, извадката)

Производство на: Schrack Technik - Австрия
(пробата) или серията, евентуално произход и брой на екземплярите)

за който се отнася тази декларация, е в съответствие със следния(те)
стандарт(и):

БДС EN 60947-1

БДС EN 60947-3

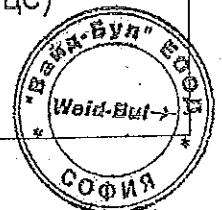
или друг(и) нормативен(ни) документ(и):

ISO 9001:2008

(наименование и/или номер и дата на издаване на стандарта(тите)
или друг(и) нормативен(ни) документ(и))

04.09.2015 г, гр. Пловдив
(място и дата на издаване)

инж. Божидар Здравков
(фамилия и подпис на
упълномощено лице)



ТОВ "ЕЛЕКТРОТЕХНИКА"

ТОВ "ЕЛЕКТРОТЕХНИКА"
булевард "Св. Кирил и Методий" № 10
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тел: 00359 2 828 8463, факс: 00359 2 828 8464
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ПРИЛОЖЕНИЕ 9.11.4

Протоколи от типови изпитвания на английски или български език съответно за 1P, 3P или 3P+N стъпаями цилиндрични предпазител-прекъсвач-разединители и клемните блокове, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

*Настоящото приложение се прилага във връзка с участието ми в:
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РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



Julia Co. Consular Agency Ltd.®

Джулия Ко. ЕООД
Office: 3 Stefan Verkovich Street, fl.1, office 3,
P.O. Box 1003 - BG 4000 Plovdiv
Administrative address: Dr. Valkovich Street, 6,
P.O. Box 1003 - PLZ /ZIP 4000 Plovdiv / Bulgaria

Official representative of the UNHOLLAND - University Amsterdam
Tel.: + 359 / 32 / 633-906
Tel/Fax: + 359 / 32 / 633-902
E-Mail: julia.ans@gmail.com

Превод от английски език на български език

Лабораторен отчет

рег. №: DAT – P – 008/91-13
Германски акредитационен съвет

WEIDMÜLLER

LAB 14224
Страница 1 (24)
Дата 31.08.2006

Задача: WTL 6/1 EN STB Типово изпитание съгласно
DIN EN 60947-7-1 и ръкопис SC17B/MT14
секция D.7.2.2 / септември 2005

Образец за изпитание: Снимка

WTL 6/1 EN STB Кат. № 19348200000

Материал:

Корпус на клемата: Вемид бежов
Тоководеща шина: Електролитна Cu галв. покритие Sn
Стягаща скоба: M 3,5 стомана галв. покритие ZnC
Винтове на клемата: M 3,5 x 8,8 стомана галв. покритие ZnC
Водеща планка на
плъзгача: Стомана галванично покритие ZnC
Контактен елемент на
плъзгача: E-CU57 галв. покритие Sn
Изолац. елемент плъзгач: PA 66 оранжев
Винт на плъзгача: M3 x 9,3 стомана галв. покритие ZnC
Цокъл: STB 14, CuZn галв. покритие Sn

Производител: Weidmüller Interface GmbH & Co. KG
Klingenbergstr. 16
32758 Detmold

Дата на производство: 20-та седмица на 2006 г. и 35-та седмица на 2006 г.

**Дата на получаване на
образца за изпитания:** 18.05.2006 и 31.08.2006

Период на изпитания: 29-та- 35-та седмица на 2006 г.

Заключение: Типовите изпитания са издържани.

W 420.00

J. Morgott
(изпитващ)

F. Maris
(одобрил)

Този резултат от изпитанията се отнася само за изпитаните мостри. Размножаването на извадки от този отчет за изпитания е разрешено само с писмено позволение. Немската версия е обвързваща.
Акредитацията се отнася само до специалните стандарти на продукти- свързки, терминални блокове, безопасни мерки за електронните уреди relais и EMC.

Representative office Varna
10 Angel Georgiev Str.
Tel.: 359 888 / 638 887; 359 / 52 / 618 826
E-Mail: rosiraleva@hotmail.com, julia.ans@hotmail.com

Representative office Sofia
Stoycho Stoev Tel.: 359 / 887 / 273077
E-Mail: julia.ans@abv.bg
www.julia-co.eu

Вайдмюлер Интерфейс GmbH & Co. KG, Телефон (05231) 14-0, Компаниятно дружество
Stoppelkamp 17, Седалище: Детмолд
D-32 758 Детмолд, Факс (05231) 14- 1689, Регистрационен съд:
Lemgo HRA 2790

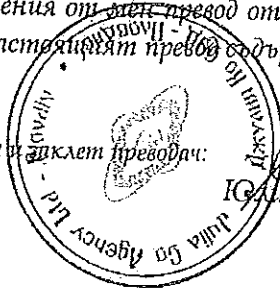
Член: Вайдмюлер Интерфейс
Регистрационен съд: Lemgo HRA 2790
Ръководител: Томас Х. Хаген, Вернер
Дили, Ралф Хопс, д-р Йоаким Бели

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*Забележка: Превод/НЕ-ВГ Договор с Консулски отдел на МВнР № 664/95-00-150 / 2001, актуализиран на 14.05.2003
<http://www.mfa.bg/en/pages/mvnr/75>, Всички имена са изписани съгласно стандарт II. ISO9: 1995(E) и стандарт ISO9: 1995(E).
Преводчикът и преводческата къща не носят наказателна отговорност за истинността на приложения към преводни документи.
Фирмата е подписала декларация за поверителност на личните данни съгласно Българското законодателство и директивата на
ЕС за защита на личните данни.

Аз, долу подписаната, **Юлия Иванова Тодорова**, в качеството си на официален преводач
удостоверявам истинността на извършения от мен превод от английски на български език
на лабораторен отчет от 31.08.2006г. Настоящият превод съдържа 2(две) страници.
4000 Пловдив, 12.01.2012

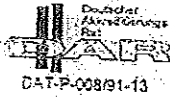
Оторизиран и заклет преводач:



12.01.2012

Laboratory Report

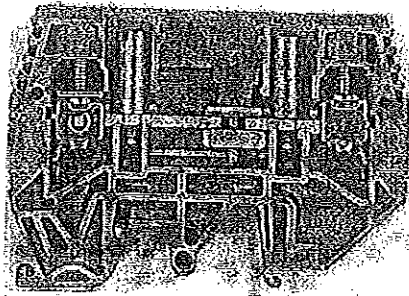
Weidmüller 



LAB 14224
Page 1 (24)
Date 2006-08-31

Task: WTL 6/1 EN STB - Type test taken pattern from DIN EN 60947-7-1 and manuscript SC17B/MT14 section D.7.2.2 / sept. 2005

Test objects:



WTL 6/1 EN STB

Cat.-no. 19348200000

Materials:

- housing: Wemid beige
- current bar: Cu-ETP gal. Sn
- clamping yoke: M3,5 steel gal. ZnC
- clamping screw: M3,5x8,8 steel gal. ZnC
- leading plate of discon.: steel gal. ZnC
- contact element of discon.: E-CU57 gal. Sn
- insulation of disconnector: PA 66 orange
- screw of disconnector: M3x9,3 steel gal. ZnC
- socket: STB 14, CuZn gal. Sn

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FCM
Kette
EMSA
Handing
FS
Register
OSP

Manufacturer: Weidmüller Interface GmbH & Co. KG
Klingenbergstr. 16
32 758 Detmold

Date of manufacture: 20th week 2006 and 35th week 2006

Receipt of test objects: 2006-05-18 and 2006-08-31

Period of test performance: 29th – 35th week 2006

Conclusion of result: The type test has been passed.

J.Morgott
(tester)

F. Maris
(approved)

420.00

All test results only apply to the objects tested. Reproduction of this laboratory report by extract with written permission only. The german version is binding. Accreditation only applies to special standards for connectors, terminal blocks, safety requirements for electronic devices, relays and EMC.

Weidmüller Interface GmbH & Co. KG
Stoppelkamp 17
D-32758 Detmold

Telefon (05231) 14-0
Telefax (05231) 14-1659

Rechtsform: Kommanditgesellschaft
Sitz: Detmold
Amtsgericht: Lemgo HRA 2790

Komplementärin:
Sitz: Detmold
Geschäftsführer:

Weidmüller Interface Führungsgesellschaft mbH
Amtsgericht: Lemgo HRB 3924
Thomas H. Hagen, Werner Dilly, Ralf Hoppe,
Dr. Joachim Belz



Handwritten signatures and stamps at the bottom right of the page.



Accredited by BMWA, No. BMWA-92.714/0592-I/12/2008 as test- and inspection body and according to BGBl. II, No. 244/2005 as certification body for personnel

arsenal research

Ein Unternehmen der Austrian Research Centers

Test Report

Project Designation

**TYPE TEST AT
FUSE-SWITCH-DISCONNECTORS
FOR CYLINDRICAL FUSE-LINKS
TYPE VLC 10**

Client

ETI Elektroelement d.d.
1411 Izlake, Obrezlja 5
SLOVENIA

Order from / No.

09/2008 /---

Project Number

2.03.00938.1.0/VLC10

Test Engineer

Ing. J. Ainetter

Date of Issue	26.01.2009
Total number of Issues / No.	1 / 1
Number of pages	5
Annex	CB/CCA - Test Report No. 2.03.00938.1.0/VLC10/CB/CCA (30 pages)

The results relate exclusively to the terms tested.

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Test item

Identification:

Low-voltage fuse-switch-disconnectors for cylindrical fuse-links type VLC 10

Manufacturer: ETI Elektroelement d.d.
Trademark: ETI
Number of poles: 1p, 1p+N, 2p, 3p, 3p+N
Rated operational voltage(s): 400V up to 690V
Rated operational current(s): 10A up to 32A
Rated frequency: 50Hz

Technical data and description:

See page 4

Testing location, Period of testing

Testing location:

Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.
Business Unit Monitoring, Energy and Drive Technologies – Power Service Center
Gleifinggasse 2
1210 Wien
AUSTRIA

Period of testing:

10 ... 12/2008

Test(s)

Test(s) performed:

Type test

Test standard(s):

IEC 60947-1:2007 (5th Edition) and IEC 60947-3:2008 (3rd Edition)
EN 60947-1:2007 and EN 60947-3:1999+A1:2001+A2:2005

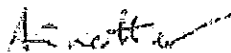
Test procedure(s):

CB Scheme and CCA Scheme

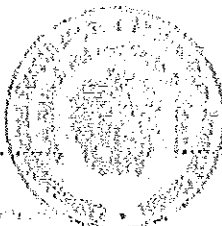
Result

The low-voltage fuse-switch-disconnectors for cylindrical fuse-links type VLC 10 have passed the type test successfully.

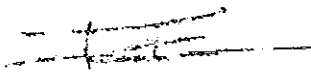
Test Engineer



Ing. J. Ainetter



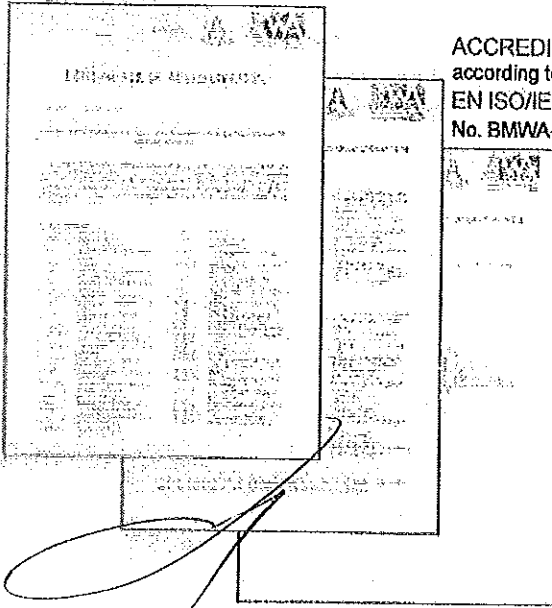
Project Engineer,
technical responsibility



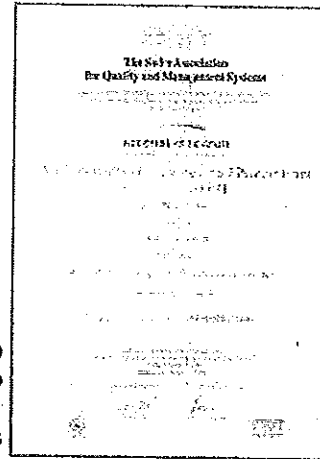
Ing. K. Farthofer



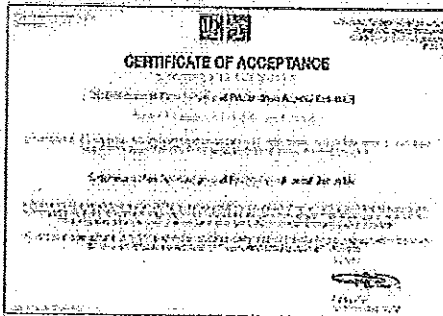
Testing laboratory



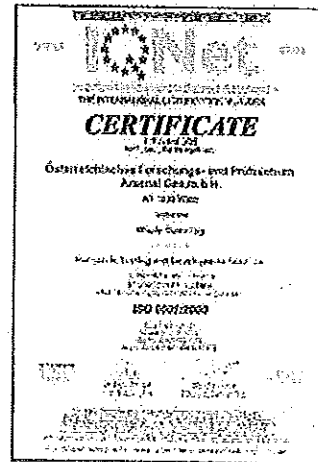
ACCREDITED
according to
EN ISO/IEC 17025
No. BMWA-92.714/0532-V12/2008



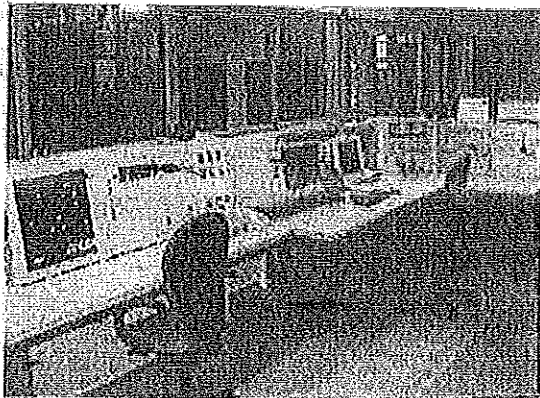
CERTIFICATED
according to
ISO 9001
Reg. No. 12769-03



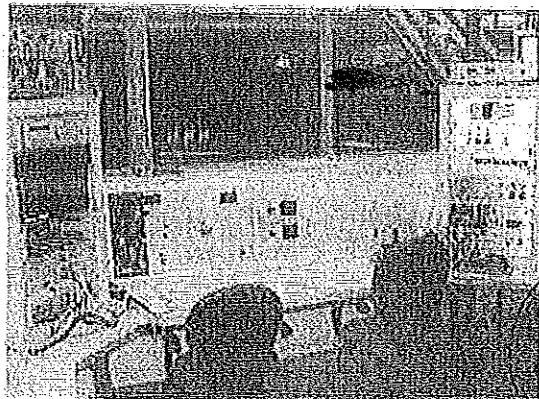
RECOGNIZED
CB TESTING LABORATORY
under the responsibility of OVE
as the National Certification Body



PSC – POWER SERVICE CENTER:



Control station for tests up to 15kA



Control station for tests above 15kA



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Technical data and description

Test item	Low-voltage fuse-switch-disconnectors for use with cylindrical fuse-links
Trademark	ETI
Model/Type reference	VLC 10
Manufacturer	ETI Elektroelement d.d.
Place of manufacture	1411 Izlake, Obrezija 5
Method of operation	Dependent manual operation
Switching positions	ON / OFF
Number of poles	1p, 1p+N, 2p, 3p, 3p+N
Nature of supply	AC
Utilization category	AC-22B at 690V/32A
Rated operational voltage	400V up to 690V
Rated operational current	10A up to 32A
Rated frequency	50Hz
Conventional free air thermal current	10A up to 32A (max. 3W)
Rated insulation voltage	690V
Rated impulse withstand voltage	8kV
Rated short-time withstand current	300A / 1s
Rated conditional short-circuit current	100kA at 400V (with 32A fuse-links)
Kind of protective device	Cylindrical fuse-link CH 10 (10 x 38)
Degree of protection	IP 20





arsenal research

Ein Unternehmen der Austrian Research Centers.

Measuring equipment

Measured quantity	Device	Manufacturer	Code
Voltage (tests up to 15kA)	Voltage divider 1:2000 Difference amplifier AM 502 Signal memory recorder TRA 800	ÖFPZ Arsenal Tektronix W&W	- AM 502/1...3 TRA800
Current (tests up to 15kA)	Lin. current transformer LGSSO Burden 1Ω Signal memory recorder TRA 800	Ritz ÖFPZ Arsenal W&W	WLIN5000/1...3 - TRA800
Current (tests at reduced voltage)	Current transformer GE 4461 Current transformer AETt10 True-RMS amperemeter Kl. 0,5 Digital multimeter Fluke 185	Goerz Siemens Norma Fluke	WI600/1...3 WI4000/1...3 A0,5/1...3 FLUKE185/1, 2
Transient recovery voltage	Adjustment equipment for TRV Oscilloscope G 801.1	ÖFPZ Arsenal Tektronix	- G801.1
Dielectric properties	High-voltage test equipment 90-1F with measuring equipment Impulse tester 35 Impulse voltmeter 64M Oscilloscope 9410	Elabo Haefely Haefely Le Croy	HSG5KV G304 G502 G803
Leakage current	High-voltage test equipment 90-1F Digital multimeter Fluke 185 Digital multimeter Fluke 185	Elabo Fluke Fluke	HSG5KV FLUKE185/1 FLUKE185/2
Time	Signal memory recorder TRA 800 Stopwatch	W&W Junghans	TRA800 938-2
Temperature	24-channel recorder Polycomp SK30 Temperature meter TESTO 901	H & B Testoterm	SK 30 TESTO
Abnormal heat and fire	Glow-wire test device with measuring equipment	ÖFPZ Arsenal	-
Mechanical strength of terminals	Test equipment	ÖFPZ Arsenal	-
Insertability of unprepared conductors	Gauges	ÖFPZ Arsenal	-
Strength of actuator mechanism	Test equipment	Schatz	-
Degree of protection	Test probe	PTL	-
Clearances, creepage distances	Digital slide gauge CD-20D	Mitutoyo	SCHUB



ДЕКЛАРАЦИЯ

Долуподписаният Петър Димитров Копев, в качеството ми на Управител
на Шрак Техник ЕООД

ДЕКЛАРИРАМ

Продуктите на фирма Шрак Техник ЕООД от група Цилиндрични предпазители,
в това число IS506103 - Разединител с предпазители 3P, 32A, 10x38 и ISZ10004 -
Стопяем предпазител 10x38, 4A, 500V AC, се произвеждат в заводите на фирма
ETI d.d.
Obrezija 5
1411 Izlake, Slovenia
и съответстват на типове VLC10 и CH10. За тях са в сила типовите изпитания за
VLC10 и CH10.

Гр. София
18.11.2013 г.

Управител:

инж. П. Копев



ШРАК ТЕХНИК ЕООД
гр. София 1582
бул. проф. Цветан Лазаров 162
тел.: 02/890 79 13
факс: 02/890 79 30

Банка: Райфайзенбанк България
IBAN: BG49RZBB91551088878219
BIC: RZBBBGSF
EИК: 200404379
ИН по НДС: BG200404379



Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung



Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

Weidmüller Interface GmbH & Co. KG
Zentrallabor
Orbker Straße 48, 32758 Detmold

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

**Sicherheit elektrischer Betriebsmittel, Industrielle Niederspannungsgeräte,
Steckverbinder, Umweltprüfungen, Elektromagnetische Verträglichkeit (EMV)**

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 16.07.2015 mit der Akkreditierungsnummer D-PL-12095-01 und ist gültig bis 06.03.2019. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 10 Seiten.

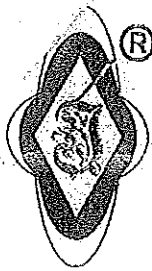
Registrierungsnummer der Urkunde: D-PL-12095-01-00

Frankfurt am Main, 16.07.2015

Siehe Hinweis auf der Rückseite

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Abteilungsleiter





Julia Co. Consultancy Agency Ltd. ©

Джулия Ко. ЕООД
Office: 3 Stefan Verkovich Street, 111, office 3,
P.O. Box 1003 - BG 4000 Plovdiv
Administrative address: Dr. Valkovich Street, 6,
P.O. Box 1003 - PLZ /ZIP 4000 Plovdiv /Bulgaria

Official representative of the IAN HOLLAND - University Amsterdam
Tel.: + 359 /32 /633-908
Tel/Fax: + 359 /32 /633-902
E-Mail: julia.ans@gmail.com

Превод от немски и английски език на български език

DATech Немска акредитираща служба Техника в TGA GmbH
Подписалият по-долу многостранното споразумение от EA и ILAC за взаимно признаване

представен в

Немския акредитационен съвет

герб на Федерална Република Германия

Акредитация

TGA GmbH, представена от DATech, немската акредитираща служба Техника, в TGA GmbH с настоящото потвърждава, че изпитателната лаборатория

Weidmüller Interface GmbH & Co. KG
Лаборатория с адрес: Am Stoppelkamp 17
D-32758 Detmold

е компетентна да извършва изпитания по DIN EN ISO/IEC 17025:2005 в областта на редови клеми, куплунги, безопасност на електронни средства за производство, включително и за електромагнитна съвместимост, както и изпитания на околната среда

съгласно посочените в приложението норми на спецификации.

Акредитацията е валидна до: 2014-08-11

Приложението е съставна част на документа и се състои от 6 страници.

DAR- регистрационен номер: DAT – PL – 008/91-14

Frankfurt/Main, 2009-08-12

Коректността на английски превод е потвърдена: Frankfurt/Main, 2009-09-08

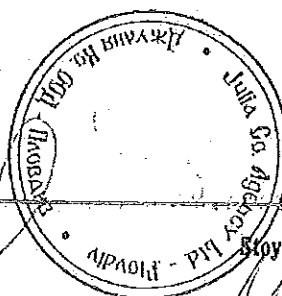
(подпис – на съществуване)

подписан д-р Томас Факлам,
управител на акредитиращата служба

Член на EA, ILAC, IAF

Representative office Varna
10 Angel Georgiev Str.,
Tel.: +359 888 / 038 887; +359 /52 / 018 828
E-Mail: rosira.leva@hotmail.com, julia.ans@hotmail.com

Representative office Sofia
Stoycho Stoev Tel.: +359 /887 / 273077
E-Mail: julia.ans@abv.bg
www.julia-co.eu



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DATech Немската акредитираща служба Техника в
TGA GmbH – Немска Асоциация за Акредитация ООД
Гартенщрасе 6
D- 60594 Франкфурт на Майн

Тази акредитация е получена на базата на оценка и съгласно споразумение сключено с акредитационната организация, предвид акредитацията на проверяващата лаборатория в съгласие с правилата и процедурите на Германската Акредитационна Система и в съответствие на Европейските стандарти DIN EN ISO/IEC 17025:2005 и DIN EN ISO/IEC 17011:2005.

Изискванията от гледище на материали и персонал както са установени в DIN EN ISO/IEC 17025 за специфичните тестове, посочени в акредитационния сертификат, както и процедурите, описани в приложението към акредитационния сертификат, са изпълнени.

Детайли по обхвата на акредитацията (тестови полета, процедури и спецификации) са посочени в приложението към този акредитационен сертификат.

Приема се, че приложението и документите, предоставени във връзка с акредитацията, ще оформят съществената част от нея. Всякакви корекции трябва да бъдат извършени в писмена форма.

Акредитацията е обект на анулиране по всяко време, свързано с фундаментална промяна или невалидност на което и да е от условията, описани в споразумението и в приложението към този акредитационен сертификат.

Акредитационният сертификат и приложението не трябва да се разпространяват в каквато и да е форма, различна от настоящата. Публикацията на извадки е обект на одобрение от страна на акредитационната организация.

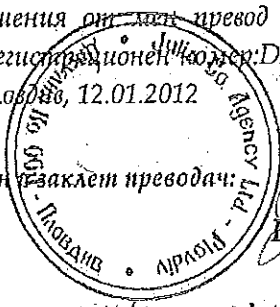
Не трябва да се създава впечатление, че инспектирането на тестващата лаборатория също се простира върху продукти и услуги на притежателя на сертификата, които не са покрити от тази акредитация. Ако такова впечатление се създаде, акредитационната организация има правото да поиска да се направят промени.

**Забележка: Превод/НЕ-БГ/ Договор с Консулски отдел на МВнР № 664/95-00-150 / 2001, актуализиран на 14.05.2003
<http://www.mfa.bg/en/pages/view/75>. Всички имена са изписани съгласно стандарт И. ISO9: 1995(E) и стандарт ISO9: 1995(E).
Преводачът и преводаческата къща не носят наказателна отговорност за истинността на приложения към превода документи.
Фирмата е подписала декларация за поверителност на личните данни съгласно Българското законодателство и директивата на ЕС за защита на личните данни.*

Аз, долуподписаната, Юлия Иванова Тодорова, в качеството си на официален преводач удостоверявам истинността на извършения от мен превод от немски и английски език на български език на акредитация DAR- регистрационен номер: DAT – PL-008/91-14. Настоящият превод съдържа 2 (две) страници. 4000 Пловдив, 12.01.2012

Оторизиран и заклет преводач:

Юлия Иванова Тодорова



DATEch Deutsche Akkreditierungsstelle Technik in der TGA GmbH
Signatory of the Multilateral Agreement of EA and ILAC for the mutual recognition

represented in the

Deutschen AkkreditierungsRat



Akkreditierung

The TGA GmbH, represented by the DATEch Deutsche Akkreditierungsstelle Technik in der TGA GmbH, confirms that the Testing Laboratory

Weidmüller Interface GmbH & Co. KG

Labor

Am Stoppelkamp 17

D-32758 Detmold

is competent under the terms of DIN EN ISO/IEC 17025:2005 to carry out testing in the fields of

**Line-up Terminals, Plug Connector,
Safety of Electrical Appliances including
Electromagnetic Compatibility (EMC) and Environmental Tests**

according to the annexed list of standards and specifications.

The accreditation is valid until: **2014-08-11**

The annex is deemed part of this certificate and comprises 6 pages.

DAR-Registration No.: **DAT-PL-008/91-14**

Frankfurt/Main, 2009-08-12

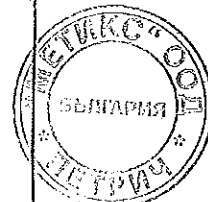
Correctness of the english translation confirmed: Frankfurt/Main, 2009-09-08


Dr. Thomas Facklam
Managing Director

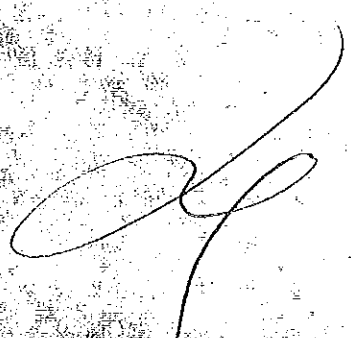
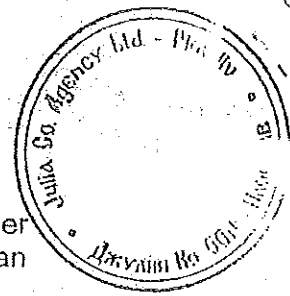
Member in EA, ILAC, IAF

Translation for information purposes only. The German Accreditation Certificate is authoritative.

See notes overleaf



DATEch Deutsche Akkreditierungsstelle Technik in der
TGA – Trägergemeinschaft für Akkreditierung German
Association for Accreditation GmbH
Gartenstrasse 6
D-60594 Frankfurt am Main



This accreditation has been awarded on the basis of an assessment and pursuant to the agreement concluded with the accreditation bodies with respect to the accreditation of a testing laboratory in accordance with the rules and procedures of the German Accreditation System, in conformity with the European standards DIN EN ISO/IEC 17025:2005 and DIN EN ISO/IEC 17011:2005.

The requirements in terms of materials and personnel as specified in DIN EN ISO/IEC 17025 for the specific tests indicated in the accreditation certificate, as well as for the procedures described in the annex to the accreditation certificate, have been met.

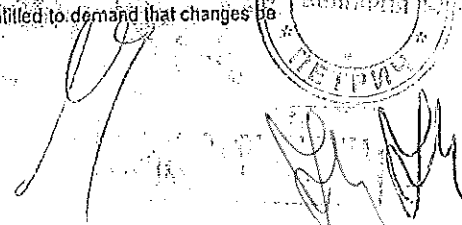
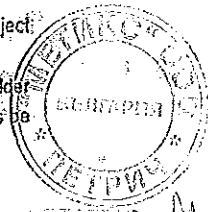
Details on the scope of the accreditation (test fields, procedures and specifications) are given in the annex to this accreditation certificate.

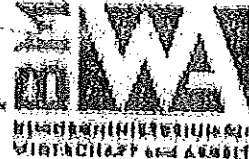
The annex and the documents submitted in connection with the accreditation are deemed to form an integral part of it. Any amendments are to be made in writing.

The accreditation is awarded subject to revocation at any time on the fundamental change or lapse of any conditions defined in the agreement and in the annex to this accreditation certificate.

Accreditation certificate and annex are not to be disseminated in any form other than the present one. The publication of extracts is subject to approval from the accreditation bodies.

The impression shall not be given that the inspection of the testing laboratory also extends to products and services of the certificate holder which are not covered by this accreditation. If such an impression is given, the accreditation bodies are entitled to demand that changes be made.





CERTIFICATE OF ACCREDITATION



Einwählung ist konfirmiert durch

Österreichische Forschungs- und Prüflaboratorium Arsenal G.m.b.H
arsenal research

is accredited as Testing Laboratory/Inspection Body (B No. 1) in accordance with the Austrian Accreditation Law (AkkG), Federal Law Gazette No. 450/1992 in the version published in Federal Law Gazette I No. 116/2002, by decree of the Minister of Economics and Labour No. 92714/237-IV/2000, issued at October 24, 2000, valid from October 01, 2000, last amendment by decree No. BMWA-02.714/6379-IV/2004, issued at January 21, 2005, valid from June 24, 2004, for test methods/inspection procedures in the quoted technical fields (ICB-No.).

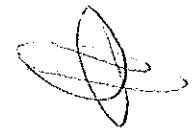
Testing Laboratory:

03.280.10	Transport by rail	21.020	Characteristics and design of machines, automatic equipment
12.110	Safety of machinery		Valves in general
13.100	Alloys with respect to human beings	23.040.01	Pressure regulators
13.280.10	Fire-fighting	23.050.40	Pumps
13.280.40	Ignitability and burning behaviour of materials and products	23.120	Ventilators, Fans, Air-conditioners
13.200	Protection against electric shock	23.140	Compressors and pistons
13.040.20	Heat-conductive equipment		measuring
17.020	Metrology and measurement in general	25.040.40	Industrial process measurement and control
17.040.20	Properties of surfaces	27.010	Energy and heat transfer engineering in general
17.040.01	Measurement of fuel flow in general	27.010	Gas and steam turbines, Steam engines
17.120.10	Flow in closed conduits	27.050.30	Deaerators and heat exchangers
17.140.01	Access measurements and radio equipment in general	27.050	Heat pumps
17.140.01	Noise emitted by machines and equipment	27.100	Water energy engineering
17.140.20	Noise emitted by means of transport	27.200	Integrating technology
17.100	Machines, shock and vibration measurement	28.020	Electrical engineering in general
17.800.01	Large-scale measuring systems	28.025.01	Insulating materials in general
17.220.20	Measurement of electrical and magnetic quantities	29.050.01	Electrical wires and cables in general
10.040	Environmental testing	29.050.30	Cables
10.010	Mechanical and electronic testing	29.050.10	Insulators
		28.100.29	Other components for equipment
		29.120.10	Power and other special products devices



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Österreichische Forschungs- und Prüfzentrum Arsenal Gen.m.b.H
arsenal research



29.120.70	Hydro	35.240.30	IT applications in transport and trade
29.130.10	High voltage technology and equipment	45.030	Factory engineering in general
29.130.20	Low voltage technology and equipment	45.050.01	Factory wiring work in general
29.100.01	Flowing machinery in general	45.030	Fuel and energy conversion
29.100.30	Motors	55.130.40	Complete fixed transport packages
29.100	Transformers, Reactors	95.120.20	Accessories in buildings, Sound insulation
29.240.01	Power transmission and distribution networks in general	95.120.25	Isolation and vibration protection
29.205	Electric traction equipment	95.140.10	Central heating systems
33.100.01	Electromagnetic compatibility (EMC) systems	95.140.30	Ventilation and air conditioning systems
33.100.20	Immunity	95.140.55	Waste heating equipment
33.240	Applications of information technology	95.000.50	Fixed installations in general
33.240.15	Identification cards and related devices	95.000.50	Fixed equipment and installations
		95.100	Complexities of systems
Inspection Body:			
29.200	Pumps	01.020.50	Crane and winches
29.100.20	Low voltage technology and equipment	01.120.01	Protection of work in buildings in general
45.100	Crane and equipment	01.140.50	Crane systems

Detailed information of the scope of accreditation is given in the attachment to this above mentioned document (340 total number, 62 inspection procedures).
The requirements of **ÖVE/NORM EN ISO/IEC 17025** resp. **ÖVE/NORM EN ISO/IEC 17050 Type A** are fulfilled.

G.P. Fiser
Head of Division 112



Dr. W. Dittlerberger
Deputy Head of Testplan Division



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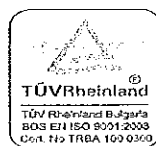
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ТОВ "ЧЕЗ Разпределение България"

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1000 Бургас, БГ
телефон: +359 80 1411 (факс): +359 80 1412
e-mail: info@cez.bg
ул. Чичо 1050, Трънско Разпределение АД
1700 Трън, БГ, e-mail: info@trzn.ceb.com
www.ceb.com



Management System
ISO 9001:2008
OHSAS 18001:2007
www.tuv.com
ID: 315526555



Management System
ISO 14001:2004
www.tuv.com
ID: 315526555

ПРИЛОЖЕНИЕ 9.9.1

Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

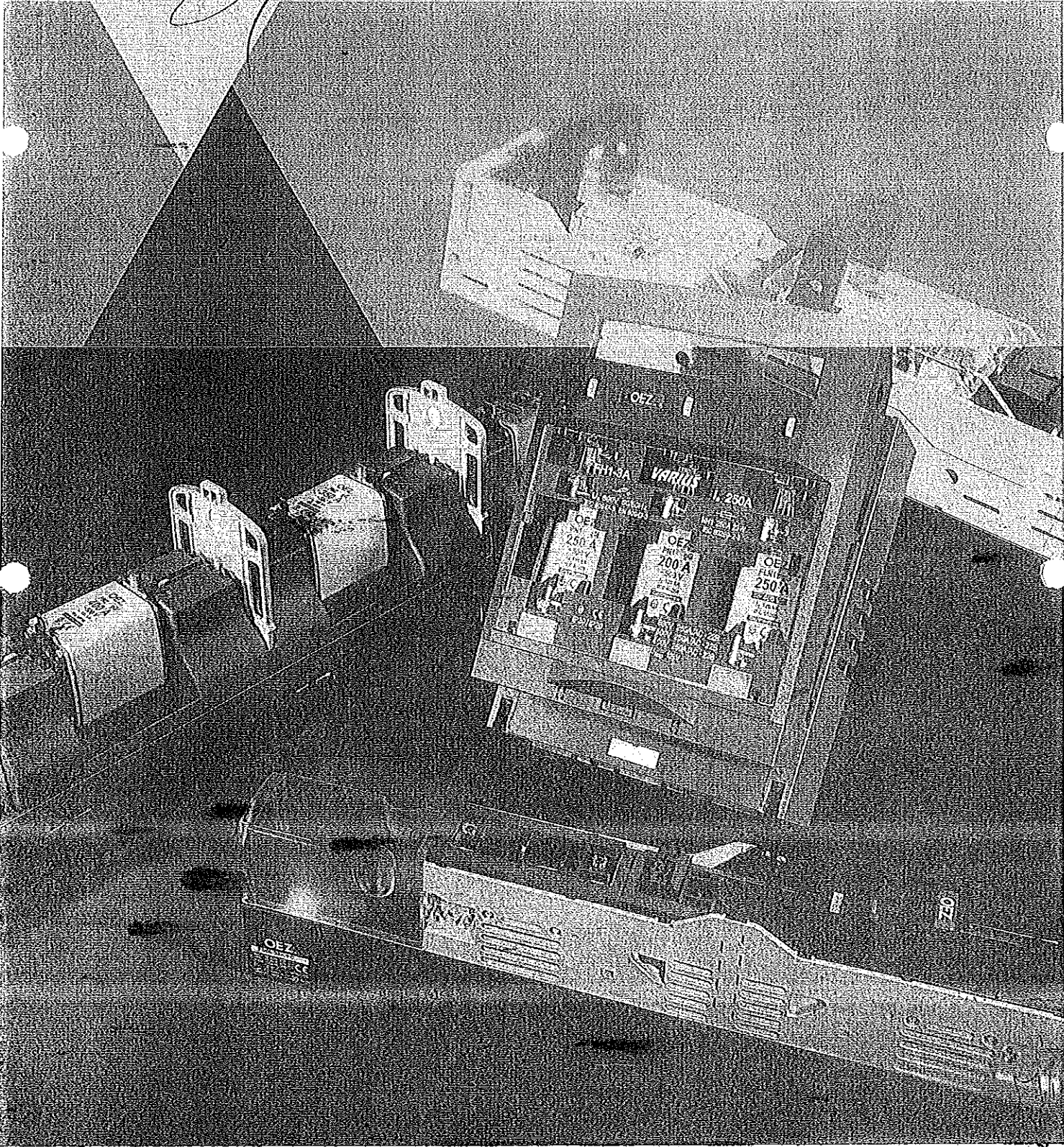
РЕФ. № PPD 15-065

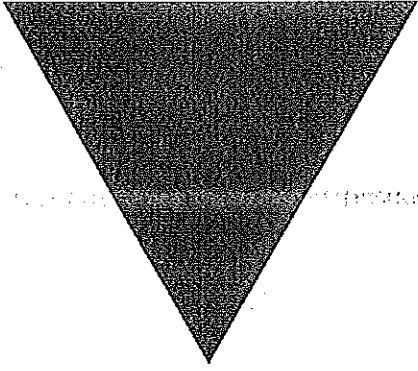
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OEZ

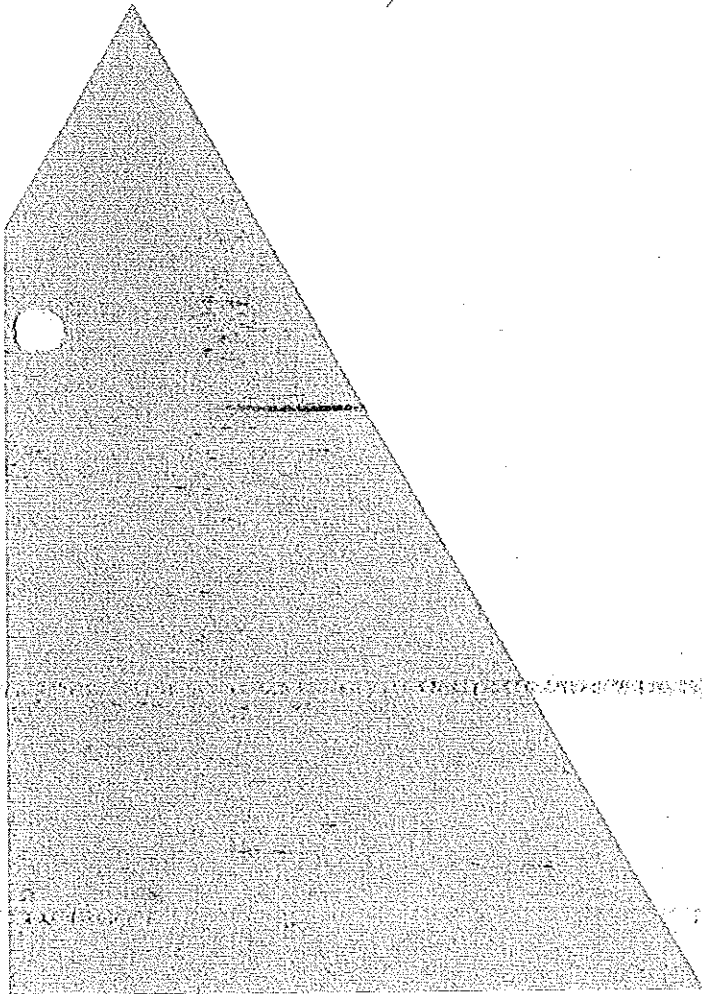
VARIUS

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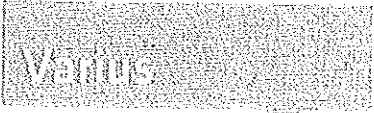








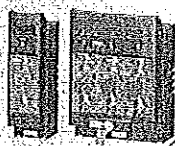
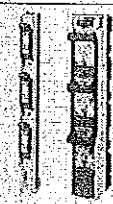
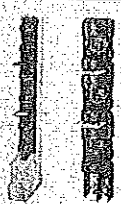
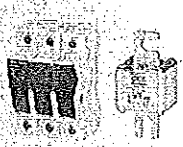



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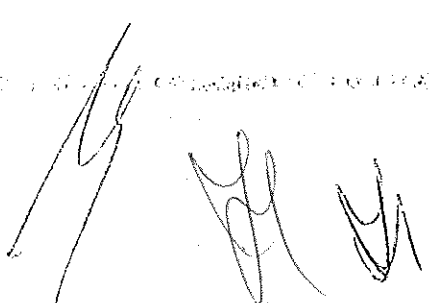
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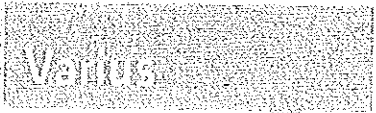
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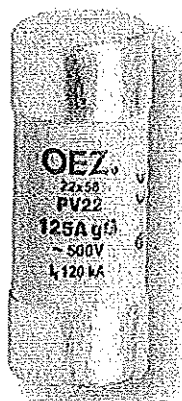
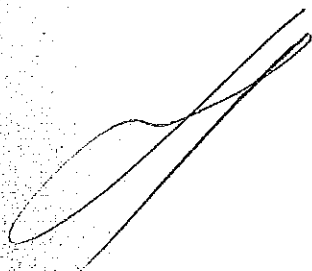




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CYLINDRICAL FUSESB

- Fuse-links PVA, PV B2
- Zkratové propojky B8



FUSE-LINKS PVA, PV

- Small dimensions.
- High limiting and breaking capacity.
- Low power losses.
- The fuse-links do not contain harmful substances according to the RoHS Regulation (cadmium, lead and other).
- Utilization category gG for protection of lines, cables and other equipment against overload and short-circuit.
- Utilization category aM for protection of motors, overcurrent relays, contactors and similar devices only against short-circuit.

Fuse-links PVA, PV

I [A]	Utilization category gG				Utilization category aM				Weight [kg]	Package [pcs]
	Type	U [V]	Product code	Power losses [W]	Type	U [V]	Product code	Power losses [W]		
0.25	-	-	-	-	PVA10 0.25A aM	500	40758	0.08	0.008	10
0.5	-	-	-	-	PVA10 0.5A aM	500	40759	0.07	0.008	10
1	-	-	-	-	PVA10 1A aM	500	40760	0.10	0.008	10
2	PVA10 2A gG	500	40748	0.50	PVA10 2A aM	500	40761	0.14	0.008	10
4	PVA10 4A gG	500	40749	0.85	PVA10 4A aM	500	40762	0.28	0.008	10
6	PVA10 6A gG	500	40750	0.95	PVA10 6A aM	500	40763	0.38	0.008	10
8	PVA10 8A gG	500	40751	1.15	PVA10 8A aM	500	40764	0.60	0.008	10
10	PVA10 10A gG	500	40752	1.30	PVA10 10A aM	500	40765	0.62	0.008	10
12	PVA10 12A gG	500	40753	1.40	PVA10 12A aM	500	40766	0.82	0.008	10
16	PVA10 16A gG	500	40754	1.90	PVA10 16A aM	500	40767	0.87	0.008	10
20	PVA10 20A gG	500	40755	2.40	PVA10 20A aM	500	40768	1.05	0.008	10
25	PVA10 25A gG	500	40756	2.70	PVA10 25A aM	400	40769	1.20	0.008	10
32	PVA10 32A gG	500	06709	2.54	PVA10 32A aM	400	40770	1.80	0.011/0.008	10
0.25	-	-	-	-	PV14 0.25A aM	690	06711	0.11	0.020	10
0.5	-	-	-	-	PV14 0.5A aM	690	06712	0.14	0.020	10
1	-	-	-	-	PV14 1A aM	690	06713	0.23	0.020	10
2	PV14 2A gG	690	06714	0.95	PV14 2A aM	690	06715	1.20	0.020	10
4	PV14 4A gG	690	06716	1.57	PV14 4A aM	690	06717	0.35	0.020	10
6	PV14 6A gG	690	06718	1.24	PV14 6A aM	690	06719	0.58	0.020	10
8	PV14 8A gG	690	06720	2.20	PV14 8A aM	690	06721	0.55	0.020	10
10	PV14 10A gG	690	06722	1.58	PV14 10A aM	690	06723	0.57	0.020	10
12	PV14 12A gG	690	06724	1.49	PV14 12A aM	690	06725	0.62	0.020	10
16	PV14 16A gG	690	06726	2.00	PV14 16A aM	500	06727	0.97	0.020	10
20	PV14 20A gG	690	06728	2.24	PV14 20A aM	500	06729	1.10	0.020	10
25	PV14 25A gG	690	06730	2.70	PV14 25A aM	500	06731	1.32	0.020	10
32	PV14 32A gG	690	06732	3.33	PV14 32A aM	500	06733	2.05	0.020	10
40	PV14 40A gG	500	06734	3.86	PV14 40A aM	500	06735	2.32	0.020	10
50	PV14 50A gG	500	06736	4.10	PV14 50A aM	400	06737	3.25	0.020	10
63	PV14 63A gG*	500	06738	5.35	PV14 63A aM*	400	06739	3.65	0.020	10
16	PV22 16A gG	690	06740	2.23	PV22 16A aM	690	06741	1.10	0.060	10
20	PV22 20A gG	690	06742	2.24	PV22 20A aM	690	06743	1.21	0.060	10
25	PV22 25A gG	690	06744	2.90	PV22 25A aM	690	06745	1.55	0.060	10
32	PV22 32A gG	690	06746	4.10	PV22 32A aM	690	06747	3.09	0.060	10
40	PV22 40A gG	690	06748	4.52	PV22 40A aM	690	06749	3.52	0.060	10
50	PV22 50A gG	690	06750	6.45	PV22 50A aM	690	06751	3.95	0.060	10
63	PV22 63A gG	500	06752	5.82	PV22 63A aM	500	06753	4.98	0.060	10
80	PV22 80A gG	500	06754	6.82	PV22 80A aM	500	06755	5.28	0.060	10
100	PV22 100A gG	500	06756	7.81	PV22 100A aM	500	06757	6.20	0.060	10
125	PV22 125A gG**	500	18271	10.50	PV22 125A aM**	400	06758	7.55	0.060	10

* The fuse-link can be used only in the OPVP14 switch-disconnectors of cylindrical fuse-links see page H12.

** The fuse-link can be used only in the OPVP22 switch-disconnectors of cylindrical fuse-links see page H14.



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FUSE-LINKS PVA, PV

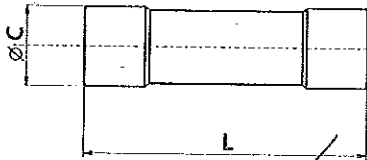
Specifications

Rated voltage	U_n	400 - 690 V a.c. 250 V d.c.
Rated breaking capacity (RMS)	I_b	120 kA/400 - 690 V a.c. (100 kA/PV10 32 A gG, 80 kA/PV14 63 A gG) 50 kA/250 V d.c. (10 kA/PVA10)
Utilization category		gG gM
Discrimination		1:1.6
Standards		IEC 60269 EN 60269

Approval marks



Dimensions

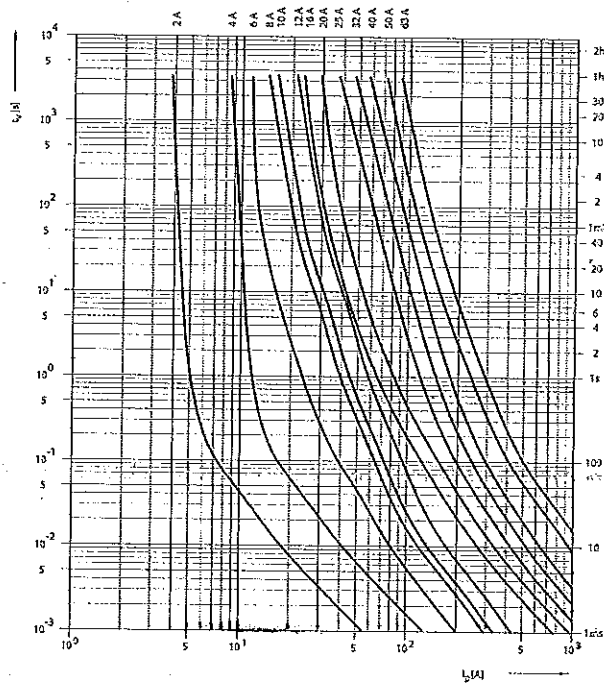
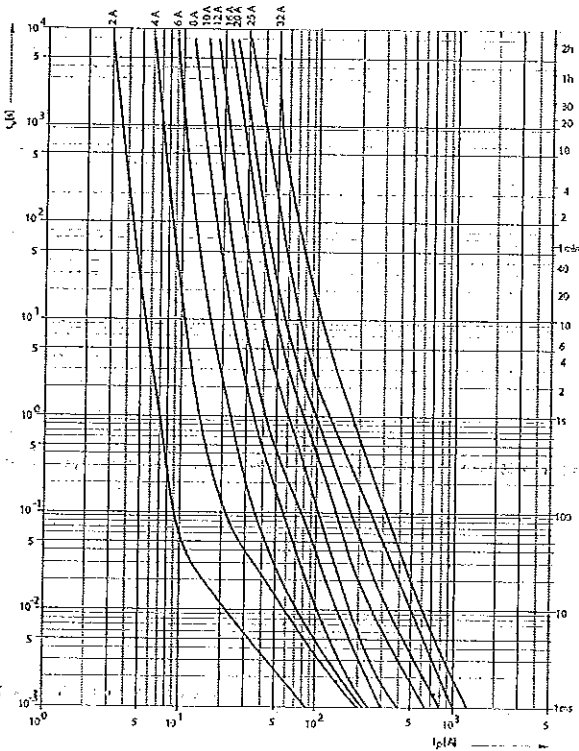


Type	$\varnothing C$	L
PVA10, PV10	10.3 ± 0.1	38 ± 0.6
PV14	14.3 ± 0.1	$51^{+0.6}_{-1.1}$
PV22	22.2 ± 1	$58^{+0.1}_{-2}$

Characteristics

Prearcing time/current characteristic
PVA10, PV10 gG

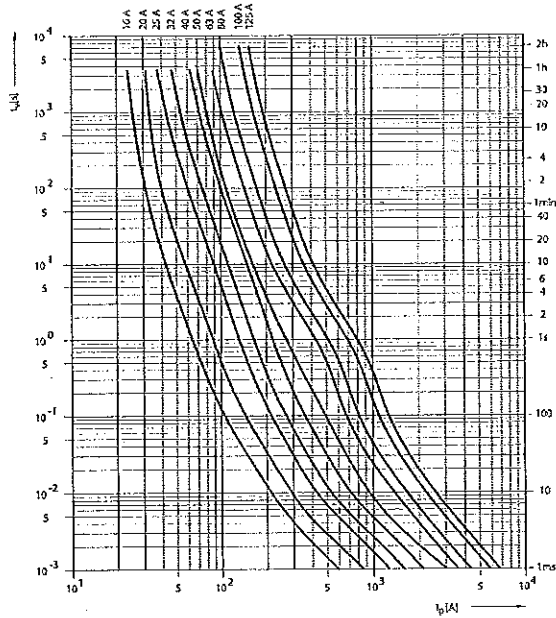
Prearcing time/current characteristic
PV14 gG



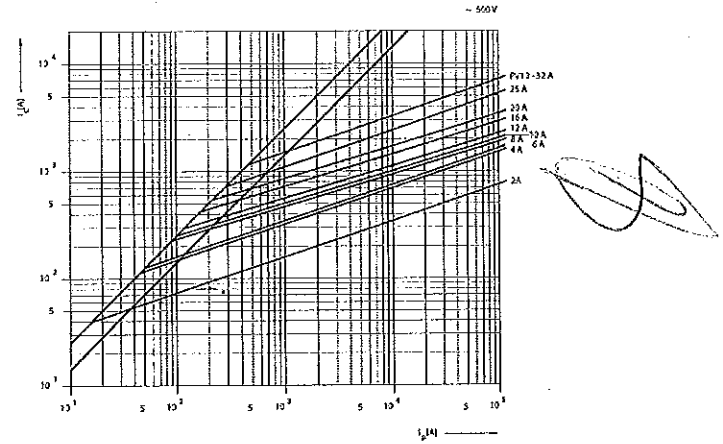
FUSE-LINKS PVA, PV

Characteristics

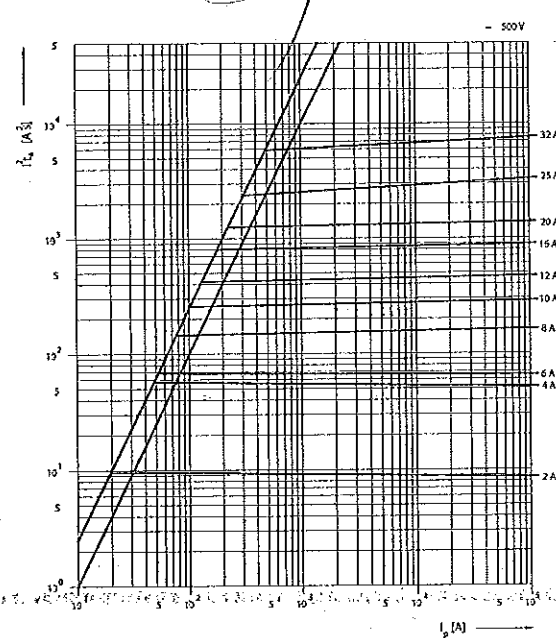
Prearing time/current characteristic
PV22 gG



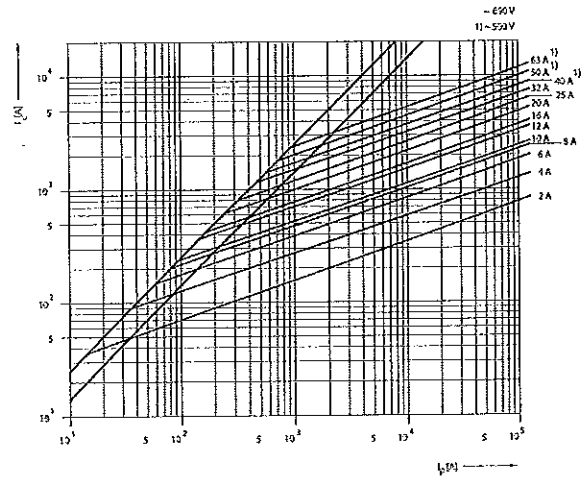
Cut-off characteristic
PVA10, PV10 gG



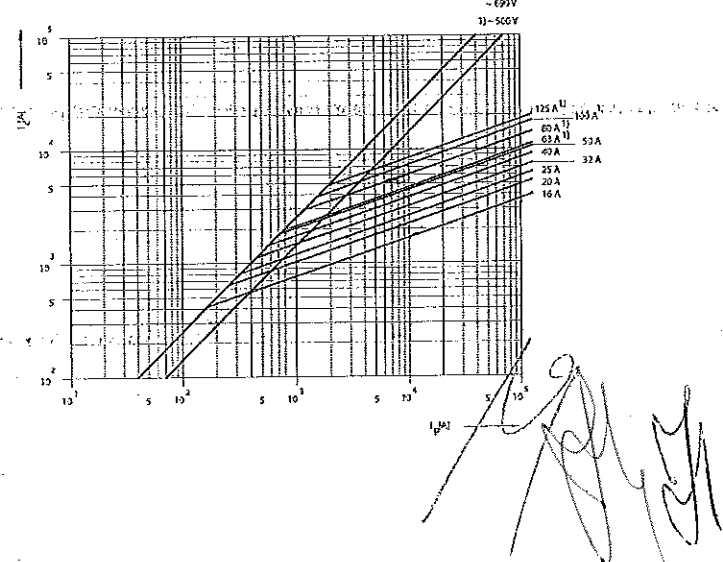
$I_{t_0}^2$ characteristic
PVA10, PV10 gG

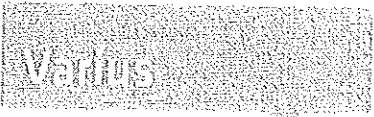


Cut-off characteristic
PV14 gG



Cut-off characteristic
PV22 gG

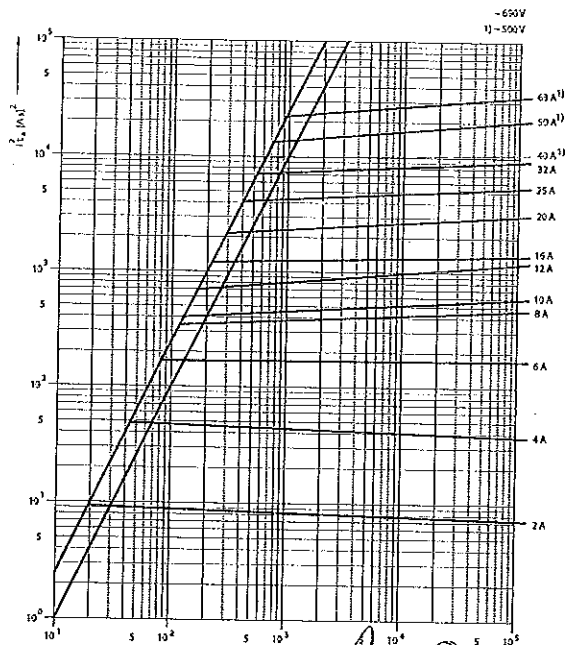




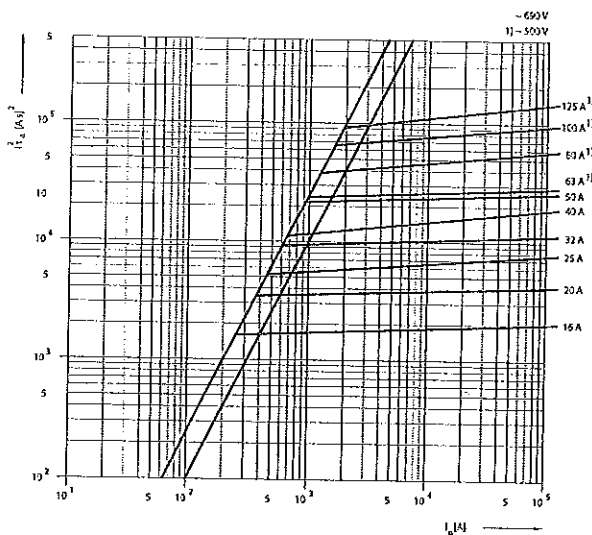
FUSE-LINKS PVA, PV

Characteristics

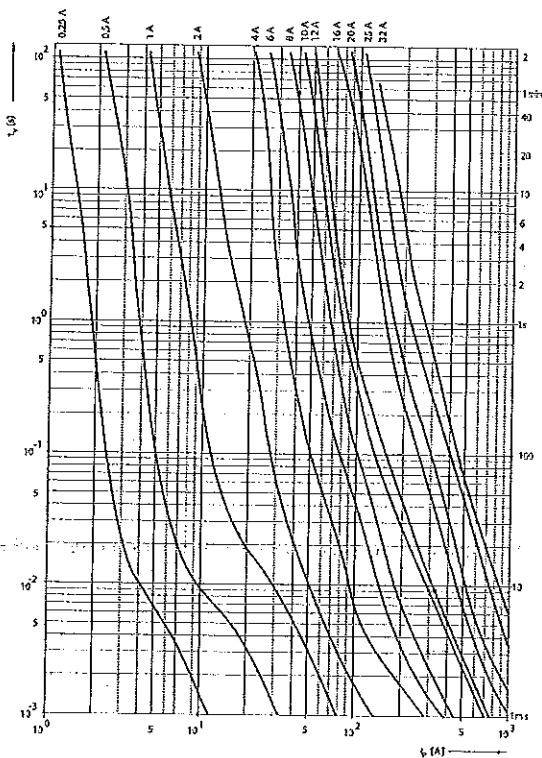
Pt characteristic
PV14 gG



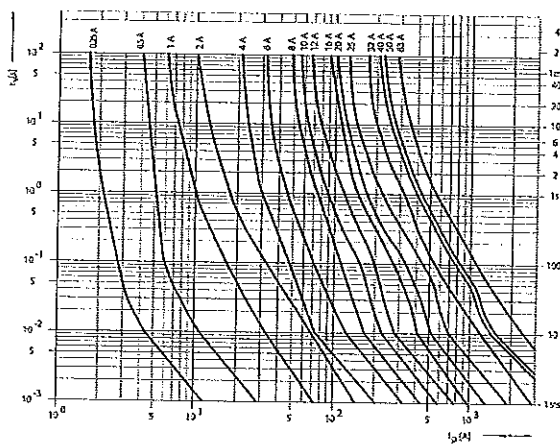
Pt characteristic
PV22 gG



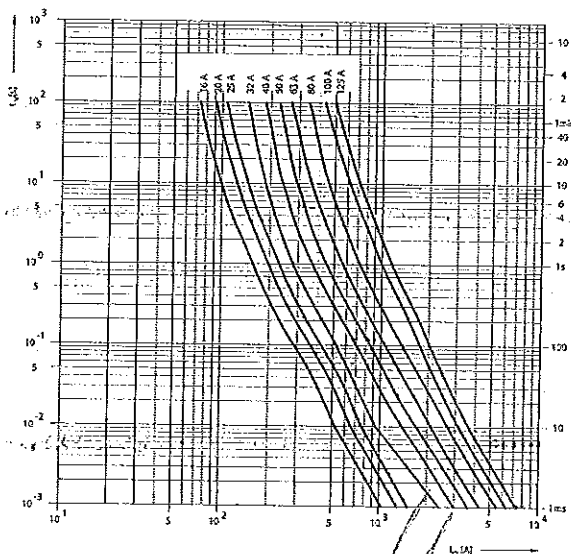
Pre-arcing time/current characteristic
PVA10 aM



Pre-arcing time/current characteristic
PV14 aM



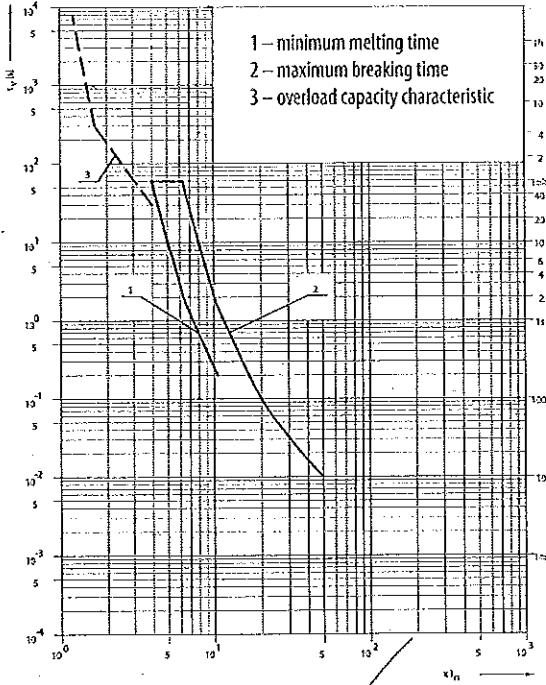
Pre-arcing time/current characteristic
PV22 aM



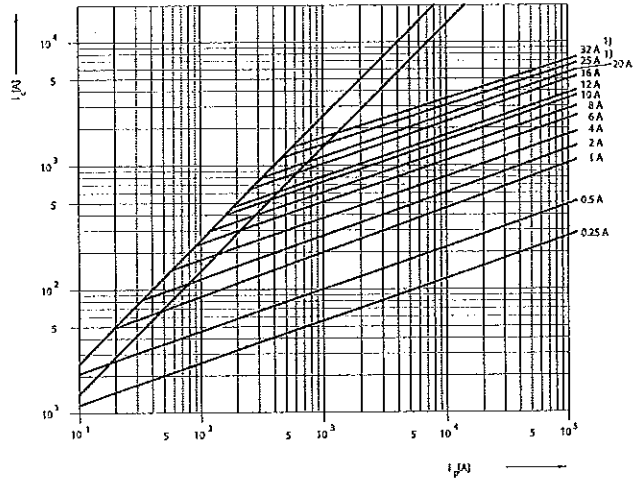
FUSE-LINKS PVA, PV

Characteristics

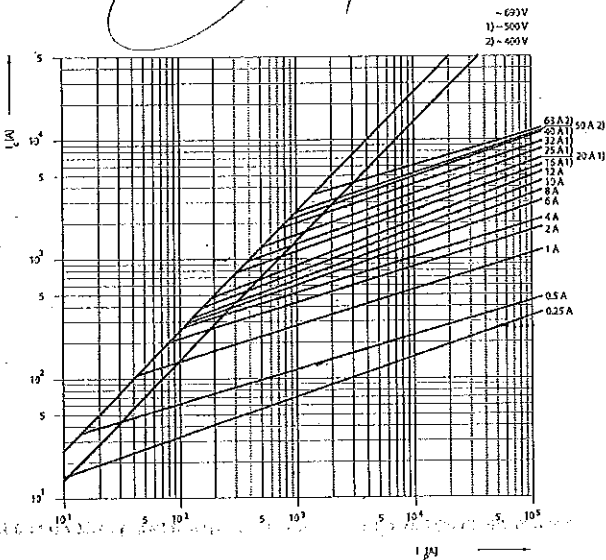
Time/current ranges
PVA10, 14, 22 aH



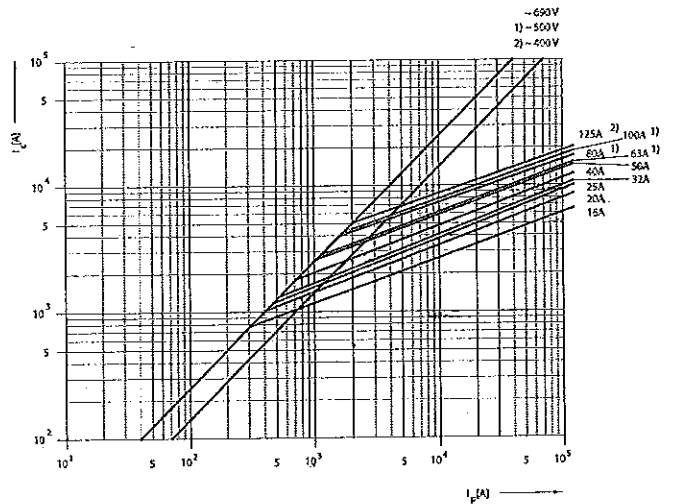
Cut-off characteristic
PVA10 aH



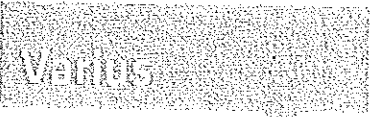
Cut-off characteristic
PV14 aH



Cut-off characteristic
PV22 aH

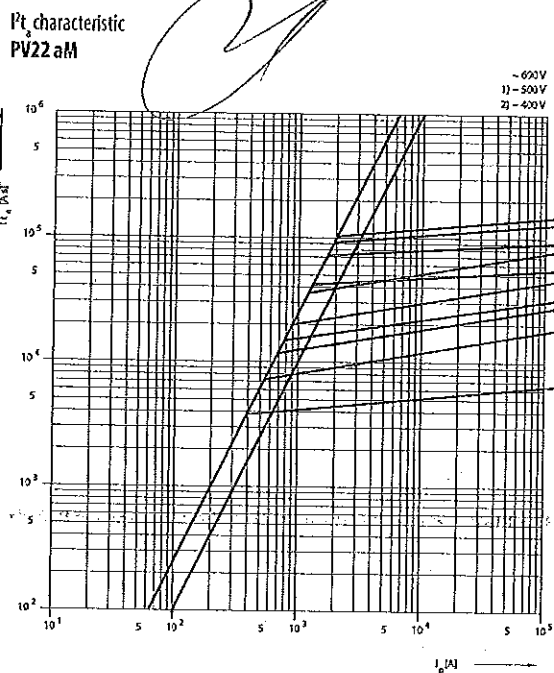
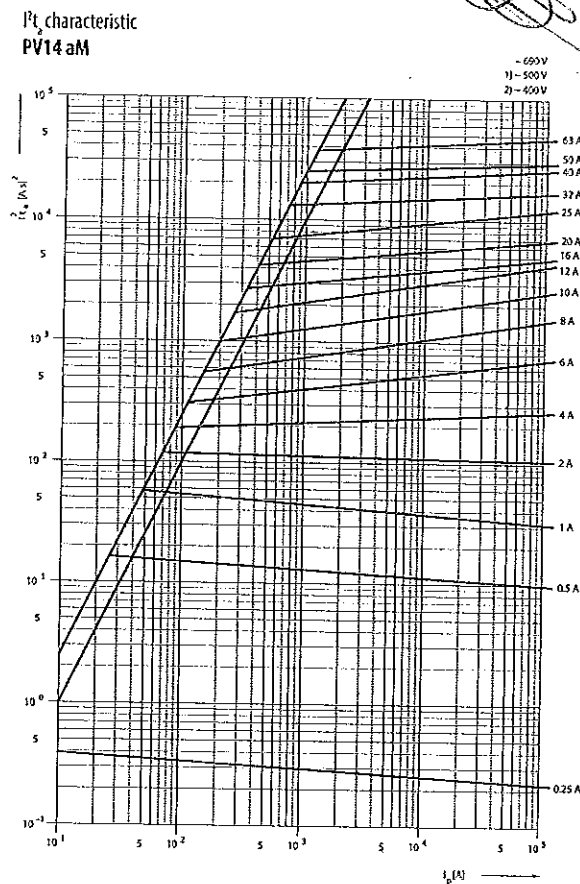
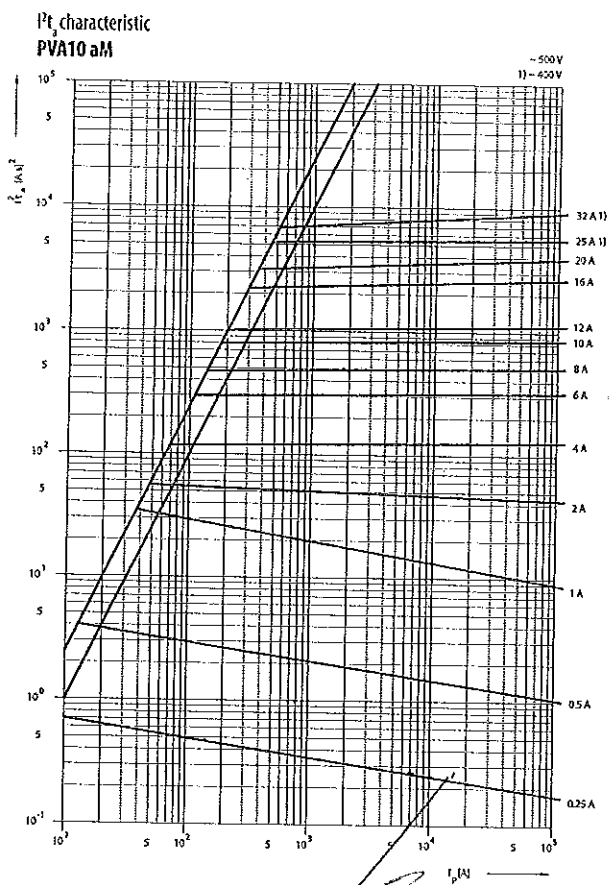


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FUSE-LINKS PVA, PV

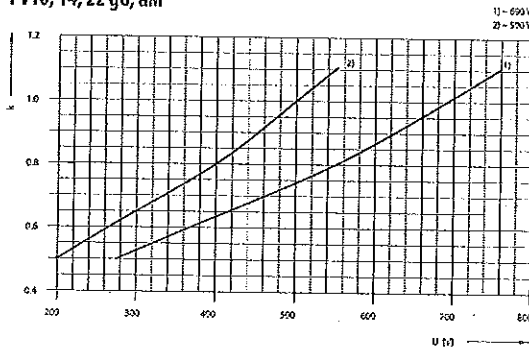
Characteristics



Correction factor, k^u of I^2t dependence on operating voltage U

$$(I^2t)_{(U)} = k^u I^2t$$

PV10, 14, 22 gM, aM



DISCONNECTING LINKS

Disconnecting links are used anywhere, where it is necessary either to create an easy-to-disconnect connection or for various reasons to replace a fuse-link (in measurement etc.).

They are used in fuse switch-disconnectors for cylindrical fuse-links. Replacement tongs KV are used for handling in fuse-bases.

Disconnecting links

Description	Type	Product code	Weight (kg)	Package (pcs)
Disconnecting link	ZPV10	13197	0.008	10

Disconnecting link	ZPV14	13198	0.017	10
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Disconnecting link	ZPV22	13199	0.047	10
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Disconnecting link	ZPT22	08609	0.098	10
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Accessories

Description	Type	Product code	Weight (kg)	Package (pcs)
Replacement tongs	KV	06687	0.020	1

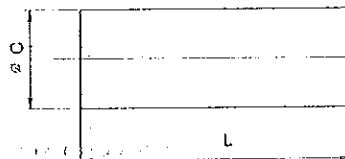
Specifications

Type	I _n (A)	Size	Use for
ZPV10	32	10x38	OPVA10, OPVP10
ZPV14	63	14x51	OPVA14, OPVP14
ZPV22	125	22x58	OPVA22, OPVP22
ZPT22	63	22x127	OPT22

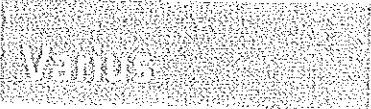
Approval marks



Dimensions



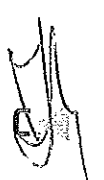
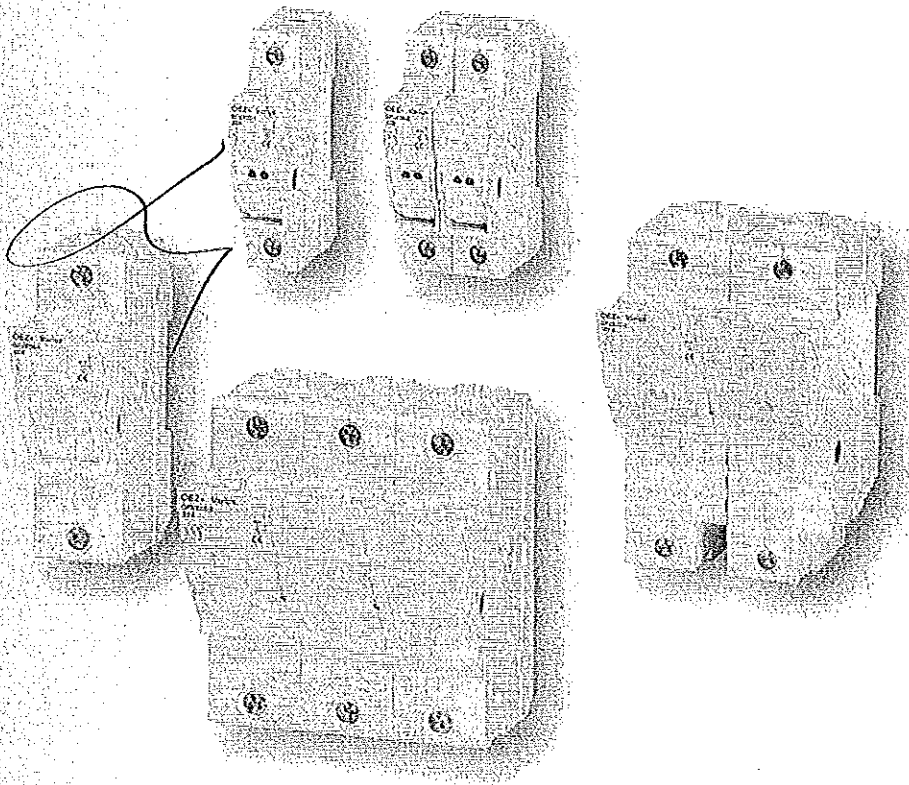
Type	ø C	L
ZPV10	10.3	38
ZPV14	14.3	51
ZPV22	22.8	58
ZPT22	22.8	127



CONTENTS

FUSE SWITCH-DISCONNECTORS FOR CYLINDRICAL FUSE-LINKSC

- Fuse switch-disconnectors OPVA10 up to 32 AC2
- Fuse switch-disconnectors OPVA14 up to 50 A C4
- Fuse switch-disconnectors OPVA22 up to 100 A C6
- Fuse switch-disconnectors OPVP14 up to 63 A H12
- Fuse switch-disconnectors OPVP22 up to 125 A H14



FUSE SWITCH-DISCONNECTORS OPVA10 UP TO 32 A

Fuse switch-disconnectors OPVA10 are intended for cylindrical fuse-links PV10, PV10 size 10x38. They enable safe disconnection of rated current and overcurrent. Devices meet the requirements for safe disconnection. Inverse connection is permissible and it affects neither the technical parameters nor the safety of the operator.

- Fuse switch-disconnectors OPVA10 can be sealed in the closed state.
- The devices are designed as modular for 45 mm cutout in the switchboard.
- Mounted on „U“ rail of type TH35 according to EN 60715 or on the panel (steel rail recommended).
- Fuse-link state can be indicated by means of electronic signalling see page D17.

Fuse switch-disconnectors

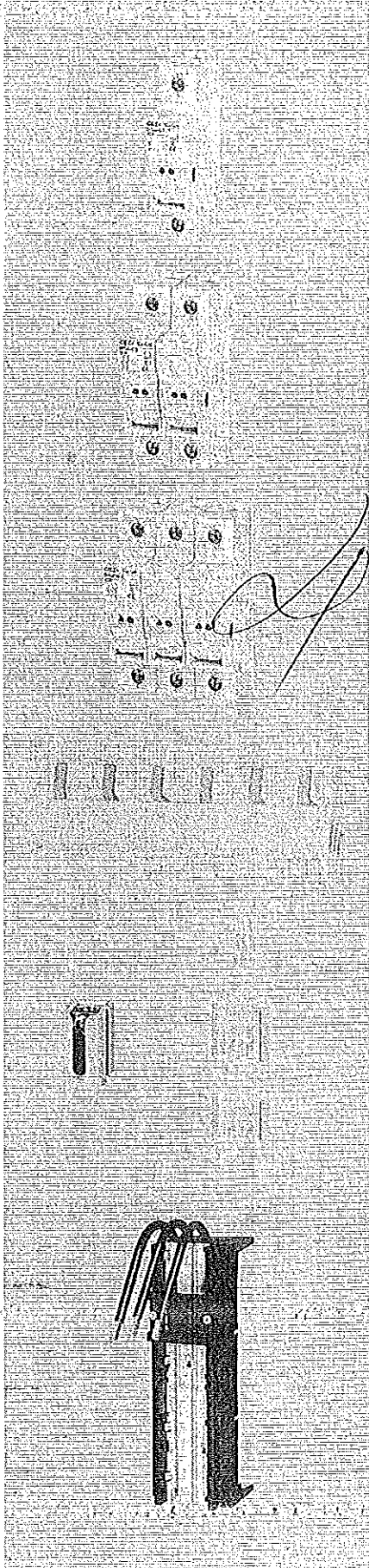
Type	Product code	I_n [A]	Number of poles	Weight [kg]	Package [pcs]
OPVA10-1	41005		1	0.063	12
OPVA10-1-S	41006		1	0.068	12
OPVA10-1N	41007		1+N	0.133	6
OPVA10-2	41008	32	2	0.128	6
OPVA10-2-S	41009		2	0.137	6
OPVA10-3	41010		3	0.193	4
OPVA10-3-S	41011		3	0.193	4
OPVA10-3N	41012		3+N	0.271	3

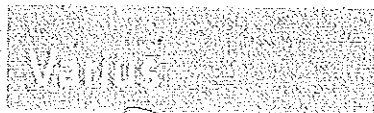
Accessories

Description	Type	Product code	Weight [kg]	Package [pcs]
1-pole interconnecting busbar, cross-section 10 mm ² , max. current 63 A rated operating voltage 690 V a.c./1000 V d.c., length 210 mm	S1L-210-10	38475	0.047	50
1-pole interconnecting busbar, cross-section 16 mm ² , max. current 80 A rated operating voltage 690 V a.c./1000 V d.c., length 1 m	S1L-1000-16	37375	0.302	50
2-pole interconnecting busbar, cross-section 10 mm ² , max. current 63 A rated operating voltage 415 V a.c., length 210 mm	S2L-210-10	38476	0.110	20
2-pole interconnecting busbar, cross-section 16 mm ² , max. current 80 A rated operating voltage 415 V a.c., length 1 m	S2L-1000-16	37378	0.447	20
3-pole interconnecting busbar, cross-section 10 mm ² , max. current 63 A rated operating voltage 415 V a.c., length 210 mm	S3L-210-10	38482	0.110	25
3-pole interconnecting busbar, cross-section 16 mm ² , max. current 80 A rated operating voltage 415 V a.c., length 1 m	S3L-1000-16	37379	0.737	20
End cap, for 1-pole busbars of cross-section 10, 16 mm ²	EKC-1	37383	0.0005	10
End cap, for 2-pole and 3-pole rails of cross-section 16 mm ²	EKC-2+3	37384	0.001	10
End cap, for 3-pole rails of cross-section 10 mm ²	EKC-3	37385	0.001	10
Connection block, enables power supply of interconnecting busbars by conductors of cross-section up to 35 mm ² , the use of the block extends the mounting with by additional N-poles	ES-35-GS	00175	0.03	10
Adapter for busbar system with spacing 60 mm, busbar thickness 5 or 10 mm, busbar width 12 - 30 mm, cable outlet bottom, max. current 63 A	GA-60/63/54-1x7,5	11883	0.56	1

Specifications

Rated operating current	I_n	32 A
Rated operating voltage	U_n	690 V a.c./440 V d.c.
LED signalling voltage range		110 - 690 V a.c./d.c.
Utilization category		400 V a.c. AC-22B 690 V a.c. AC-20B
Rated thermal current with fuse-link	I_{th}	32 A
Rated frequency	f_n	50 + 60 Hz
Rated insulation voltage	U_i	800 V a.c.
Rated conditional short-circuit current with fuse-links PV (RMS)	I_{cc}	400 V a.c. 100 kA 690 V a.c. 50 kA
Rated impulse withstand voltage	U_{ov}	6 kV
Fuse-link size	diameter x length	10x38
Max. power losses of the fuse-link	P_{max}	3 W
Rated short-time withstand current	I_{sc} 1s	1.6 kA
Rated short-circuit making capacity at 440 V d.c.	I_{sc}	3.5 kA





FUSE SWITCH-DISCONNECTORS OPVA10 UP TO 32 A

Specifications

Electrical endurance	operating cycles	300
Mechanical endurance	operating cycles	2000
Degree of protection from front side, built-in device, cover closed		IP20
Connection cross-section		Cu/0.75 ÷ 25 mm ² (2 x 6 ÷ 16 stranded in the same size)
Torque		2 ÷ 2.5 Nm
Operating ambient temperature	t	-5 ÷ +35 °C
Max. sea level		2000 m
Seismic resistance according to VE ŠKODA		3 g/8 ÷ 50 Hz
Overvoltage category/Rated voltage		I(II*)/690 V a.c.; II(III*)/500 V a.c.; III/400 V a.c.
Standards		IEC 60947-1, -3
Approval marks		

* For underground cable distribution systems with overvoltage protection or for exposure to a low thunderstorm electricity (table H2 EN 60947-1, IEC 60947-1).

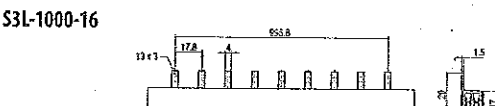
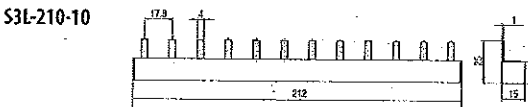
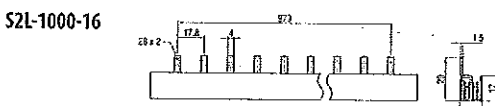
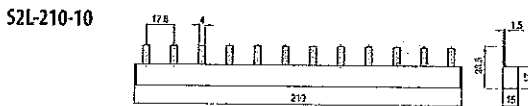
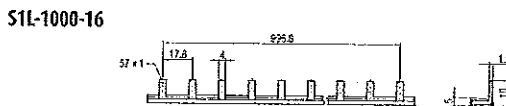
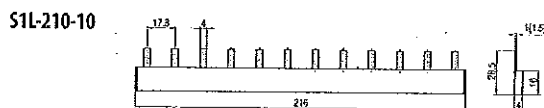
EN 60947-3 ed. 2/A2, p. C.5 Instructions for the use of 1-pole controlled devices states:

These devices are intended for distribution systems, with possible necessity of switching and/or safe disconnection of individual phases, and must not be used for switching a primary circuit of a three-phase equipment.

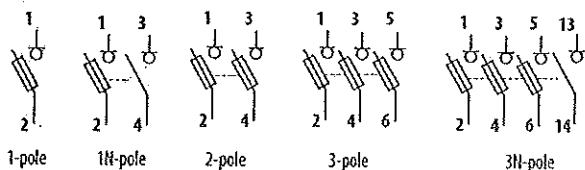
Fuse switch-disconnector with disconnecting link

Rated operating current	I_n	32 A
Thermal current with disconnecting link ZPV10	I_{th}	100 / 25 mm ²
Utilization category		AC-20B
Rated short-time withstand current	I_{cs} 1 s	1.6 kA
Rated short-circuit making capacity at 690 V a.c.	I_{cs} [kA]	3.5 kA
Rated short-circuit making capacity at 440 V d.c.	I_{cs} [kA]	4 kA
Power losses with disconnecting link at I_n	P [W]	4.5 W
Connection cross-section		0.75 ÷ 25 mm ²

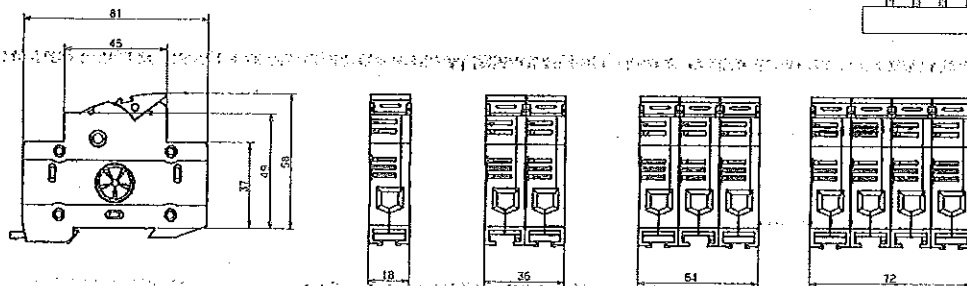
Interconnecting busbars



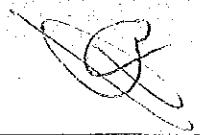
Diagram



Dimensions



[Handwritten signatures and initials]



FUSE SWITCH-DISCONNECTORS OPVA14 UP TO 50 A

Fuse switch-disconnectors OPVA14 are intended for cylindrical fuse-links PV14 up to 50 A size 14x51. They enable safe disconnection of rated current and overcurrent. Devices meet the requirements for safe disconnection. Inverse connection is permissible and it affects neither the technical parameters nor the safety of the operator.

- Fuse switch-disconnectors OPVA14 can be sealed in the closed state.
- The devices are designed as modular for 45 mm cutout in the switchboard.
- Mounted on „U“ rail of type TH35 according to EN 60715 or on the panel (steel rail recommended).
- Fuse-link state can be indicated by means of electronic signalling see page D17.

Fuse switch-disconnectors

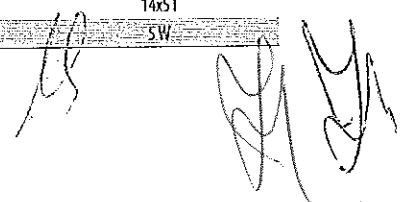
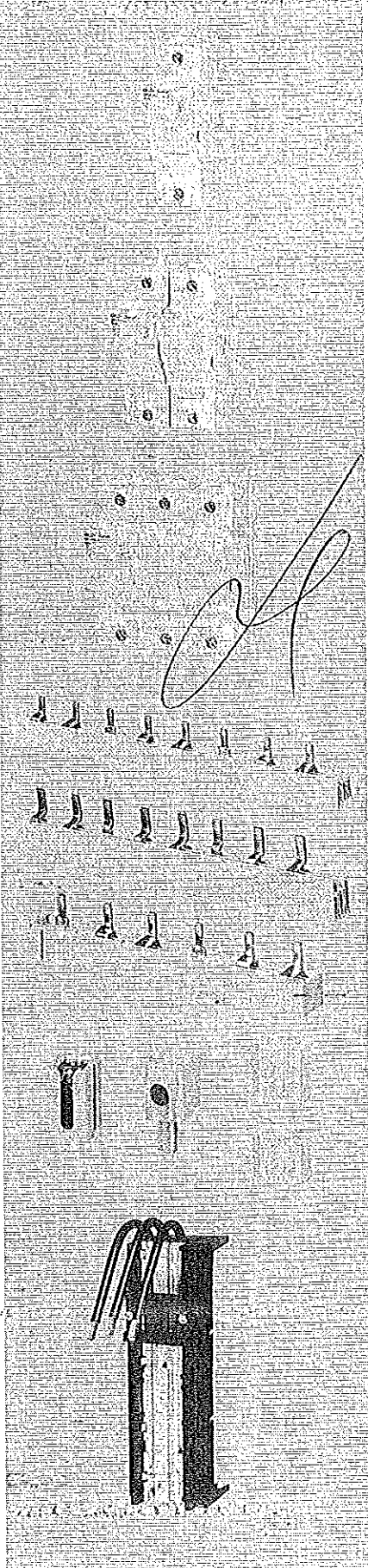
Type	Product code	I [A]	Number of poles	Weight [kg]	Package [pcs]
OPVA14-1	41016	50	1	0.097	6
OPVA14-1-S	41017		1	0.098	6
OPVA14-1N	41018		1+N	0.218	3
OPVA14-2	41019		2	0.202	3
OPVA14-2-S	41020		2	0.203	3
OPVA14-3	41021		3	0.304	2
OPVA14-3-S	41022	3	0.305	2	
OPVA14-3N	41023	3+N	0.427	1	

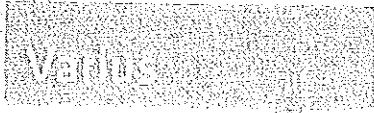
Accessories

Description	Type	Product code	Weight [kg]	Package [pcs]
3-pole interconnecting busbar, cross-section 16 mm ² , rated operating voltage 415 V a.c., max. current at power supply of one's end 80 A, max. current at power supply of middle 130 A, length 1 m, it is possible to use maximum 4 pieces of 3-pole devices (12 poles)		S3L-27-1000-16	37380	0.240 1
3-pole interconnecting busbar, cross-section 25 mm ² , rated operating voltage 415 V a.c., max. current at power supply of one's end 100 A, max. current at power supply of middle 180 A, length 1 m, it is possible to use maximum 5 pieces of 3-pole devices (15 poles)		S3L-27-1000-25	37381	0.240 1
3-pole interconnecting busbar, cross-section 16 mm ² , rated operating voltage 415 V a.c., max. current at power supply of one's end 65 A, max. current at power supply of middle 130 A, length 156 mm (6 poles)		S-3L-27-156/16SN	11892	0.065 1
End cap, for 3-pole rails of cross-section 16 mm ²	EKC-2-3	37384	0.001	10
End cap, for 3-pole rails of cross-section 25 mm ²	EKC-3-36	37386	0.002	10
Terminal extension, for connection of Cu/Al conductor of cross-section 2.5 - 50 mm ² , if the adapter is used, it is not possible to use the interconnecting busbar	AS-50-S-AL01	38749	0.02	1
Connection block, enables power supply of interconnecting busbars by conductors of cross-section up to 35 mm ² , the use of the block extends the mounting with by additional 12-poles	ES-35-GS	00175	0.03	10
Adapter for busbar system with spacing 60 mm, busbar thickness 5 or 10 mm, busbar width T2 = 30 mm	GA-60/63/54-1x7,5	11883	0.56	1

Specifications

Rated operating current	I _n	50 A
Rated operating voltage	U _e	690 V a.c./440 V d.c.
LED signalling voltage range		110 - 690 V a.c./d.c.
Utilization category	400 V a.c.	AC-22B
	690 V a.c.	AC-20B
Rated thermal current with fuse-link	I _{th}	50 A
Rated frequency	f _n	50 ÷ 60 Hz
Rated insulation voltage	U _i	800 V a.c.
Rated conditional short-circuit current with fuse-links PV (RMS)	400 V a.c.	100 kA
	690 V a.c.	80 kA
Rated impulse withstand voltage	U _{imp}	6 kV
Fuse-link size	diameter x length	14x51
Max. power losses of the fuse-link	P _{max}	5 W





FUSE SWITCH-DISCONNECTORS OPVA14 UP TO 50 A

Specifications

Rated short-time withstand current	I_{st}	1.6 kA
Rated short-circuit making capacity at 440 V d.c.	I_{cs}	6.9 kA
Electrical endurance	operating cycles	300
Mechanical endurance	operating cycles	2000
Degree of protection from front side, built-in device, cover closed		IP20
Connection cross-section		Cu/1.5 + 35 mm ²
Torque		2.5 + 3 Nm
Operating ambient temperature	t	-5 + +35 °C
Max. sea level		2000 m
Seismic resistance according to VE ŠKODA		3 g/8 + 50 Hz
Overvoltage category/Rated voltage		I(II*)/690 V a.c.; III(III*)/500 V a.c.; III/400 V a.c.
Standards		IEC 60947-1, -3
Approval marks		

* For underground cable distribution systems with overvoltage protection or for exposure to a low thunderstorm electricity (table H2 EN 60947-1, IEC 60947-1).

EH 60947-3 ed. 2/A2, p. C.5 Instructions for the use of 1-pole controlled devices states:

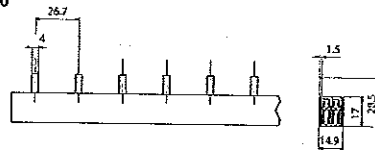
These devices are intended for distribution systems, with possible necessity of switching and/or safe disconnection of individual phases, and must not be used for switching a primary circuit of a three-phase equipment.

Fuse switch-disconnector with disconnecting link

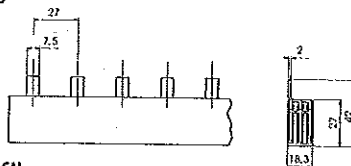
Rated operating current	I_n	50 A
Thermal current with disconnecting link ZPV14	I_{th}	110 / 35 mm ²
Utilization category		AC-20B
Rated short-time withstand current	I_{st}	1.6 kA
Rated short-circuit making capacity at 690 V a.c.	I_{cs}	6.9 kA
Rated short-circuit making capacity at 440 V d.c.	I_{cs}	5 kA
Power losses with disconnecting link at I _n	P _l	5 W
Connection cross-section		1.5 + 35 mm ²

Interconnecting busbars

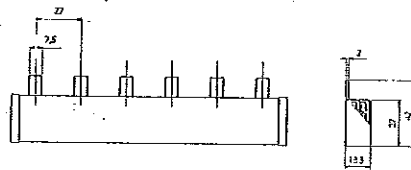
S3L-27-1000-16



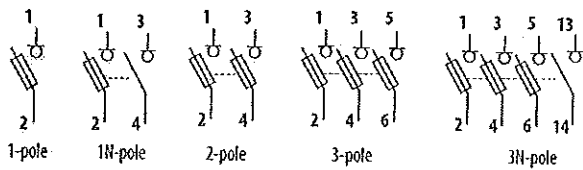
S3L-27-1000-25



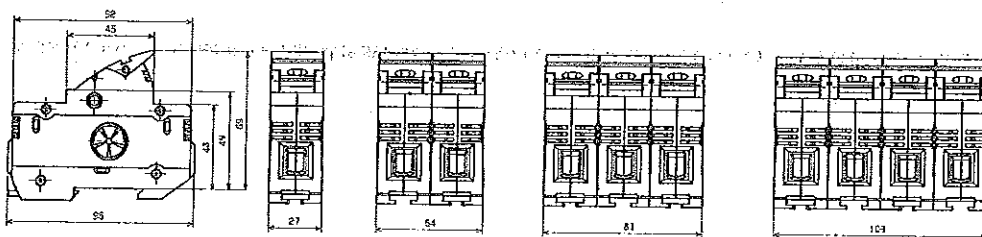
S-3L-27-156/165N



Diagram



Dimensions



M

C5

FUSE SWITCH-DISCONNECTORS OPVA22 UP TO 100 A

Fuse switch-disconnectors OPVA22 are intended for cylindrical fuse-links PV22 up to 100 A size 22x58. They enable safe disconnection of rated current and overcurrent. Devices meet the requirements for safe disconnection. Inverse connection is permissible and it affects neither the technical parameters nor the safety of the operator.

- Fuse switch-disconnectors OPVA22 can be sealed in the closed state.
- The devices are designed as modular for 45 mm cutout in the switchboard.
- Mounted on „U“ rail of type TH35 according to EN 60715 or on the panel (steel rail recommended).
- Fuse-link state can be indicated by means of electronic signalling see page D17.

Fuse switch-disconnectors

Type	Product code	I _n [A]	Number of poles	Weight [kg]	Package [pcs]
OPVA22-1	41027		1	0.158	6
OPVA22-1-S	41028		1	0.159	6
OPVA22-1H	41029		1+H	0.358	3
OPVA22-2	41030	100	2	0.322	3
OPVA22-2-S	41031		2	0.323	3
OPVA22-3	41032		3	0.486	2
OPVA22-3-S	41033		3	0.487	2
OPVA22-3H	41034		3+H	0.675	1

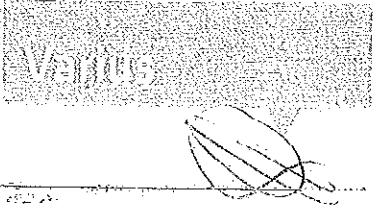
Accessories

Description	Type	Product code	Weight [kg]	Package [pcs]
Terminal extension - set of 3 pcs, for connection of Cu/Al conductors of cross-section 35 ÷ 95 mm ² to switch-disconnector OPVP22-3, possibility of connection of two stranded conductors 25 mm ²	CS-FH000-3HP95	13740	0.184	1
Terminal extension with long terminal - set of 3 pcs, for connection of Cu/Al conductors of cross-section 35 ÷ 95 mm ² to switch-disconnector OPVP22-3, use for a set with interconnecting busbars CS-OPV-3L., possibility of connection of two stranded conductors 25 mm ² , advantage is mounting from the front side of the switch-disconnector	CS-FH000-3ND95	15589	0.184	1

Description	Type	Number of connected switch-disconnectors	Product code	Weight [kg]	Package [pcs]
Interconnecting busbars, for 3-pole switch-disconnectors, cross-section 35 mm ² , rated operating voltage 415 V a.c., max. operating voltage 690 V, 200 A at power supply of middle, 125 A at power supply of one's end, in one terminal it is possible to connect a busbar and one solid Cu conductor of cross-section 1.5 ÷ 35 mm ² , or terminal extension with long terminal	CS-OPV22-3L2	2	35954	0.184	5
	CS-OPV22-3L3	3	35955	0.320	5
	CS-OPV22-3L4	4	35956	0.452	5
	CS-OPV22-3L5	5	35957	0.590	5

Specifications

Rated operating current	I _n	100 A
Rated operating voltage	U _n	690 V a.c./440 V d.c.
LED signalling voltage range		110 ÷ 690 V a.c./d.c.
Utilization category		230 V a.c./OPVA22-1.. AC-21B 400 V a.c. AC-21B 690 V a.c. AC-20B
Rated thermal current with fuse-link	I _t	100 A
Rated frequency	f _n	50 ÷ 60 Hz
Rated insulation voltage	U _i	800 V a.c.
Rated conditional short-circuit current with fuse-links PV (RMS)	I _{cc}	500 V a.c. 100 kA 690 V a.c. 80 kA
Rated impulse withstand voltage	U _{imp}	6 kV
Fuse-link size	diameter x length	22x58
Max. power losses of the fuse-link	P _v	9.5 W
Rated short-time withstand current	I _{ts}	2.5 kA
Rated short-circuit making capacity at 440 V d.c.	I _{sc}	12.4 kA
Electrical endurance	operating cycles	200
Mechanical endurance	operating cycles	1600



FUSE SWITCH-DISCONNECTORS OPVA22 UP TO 100 A

Specifications

Degree of protection from front side, built-in device, cover closed	IP20
Connection cross-section	Cu/4 ÷ 50 mm ²
Torque	3.5 ÷ 4 Nm
Operating ambient temperature	-5 ÷ +35 °C
Max. sea level	2000 m
Seismic resistance according to VE ŠKODA	3 g/8 ÷ 50 Hz
Overvoltage category/Rated voltage	II(III [*])/690 V a.c., III(IV [*])/500 V a.c.
Standards	IEC 60947-1, -3
Approval marks	

* For underground cable distribution systems with overvoltage protection or for exposure to a low thunderstorm electricity (table H2 EN 60947-1, IEC 60947-1).

EN 60947-3 ed. 2/A2, p. C.5 Instructions for the use of 1-pole controlled devices states:

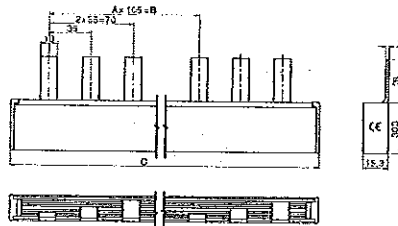
These devices are intended for distribution systems, with possible necessity of switching and/or safe disconnection of individual phases, and must not be used for switching a primary circuit of a three-phase equipment.

Fuse switch-disconnector with disconnecting link

Rated operating current	I_n	100 A
Thermal current with disconnecting link ZPV22	I_{ts}	150/50 mm ²
Utilization category		AC-20B
Rated short-time withstand current	$I_{cs} 1s$	2.5 kA
Rated short-circuit making capacity at 690 V a.c.	I_{cm}	12.4 kA
Rated short-circuit making capacity at 440 V d.c.	I_{cm}	7 kA
Power losses with disconnecting link at 1	P_{1v}	7 W
Connection cross-section		4 ÷ 50 mm ²

Interconnecting busbars

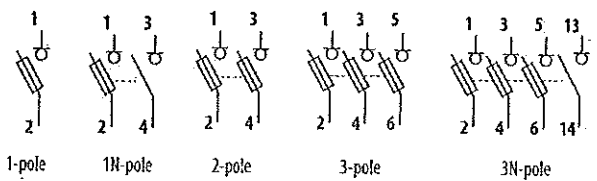
Interconnecting busbars CS-OPV22-...
for connection of 2, 3, 4 or 5 pieces of 3-pole switch-disconnectors OPVA22



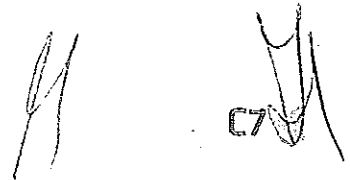
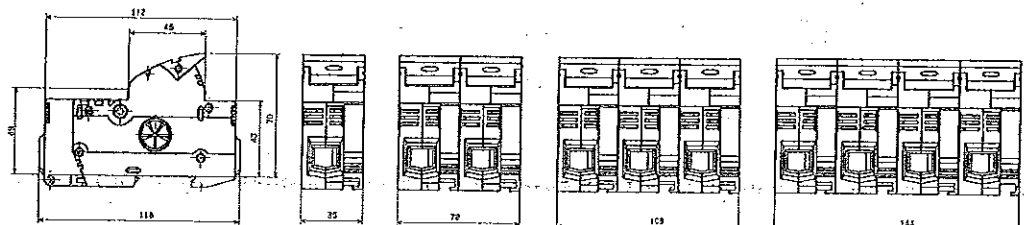
A [number]	Dimensions		Type
	B [mm]	C [mm]	
1	105	178	CS-OPV22-312
2	210	267	CS-OPV22-313
3	315	356	CS-OPV22-314
4	420	445	CS-OPV22-315

Cross-section of busbar 35 mm².
Max. busbar current 200 A.
Max. individual current taking 125 A/phase.
* Recommended value of max current can not be exceeded in no place of interconnecting busbar.

Diagram



Dimensions



NOTES

ОБЩИНСКО ЗАЕМНО СЪЮЗНО
ЕЛЕКТРОЕНЕРГЕТИЧЕСКО
ПРЕДПРИЯТИЕ "ЕЛЕКТРО
БЪЛГАРИЯ" АД
ул. Св. Кирил и Методий, гр. София 1000
Тел.: 02/97 54 90 01-5; 02/97 54 90 02-5
Факс: 02/97 54 90 03-5
www.elektrobulgaria.com



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OHSAS 18001:2007
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ISO 14001:2004
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ID: 915628835

ПРИЛОЖЕНИЕ 9.9.2

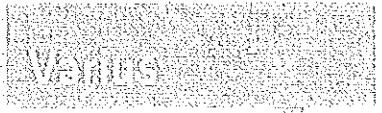
Техническо описание и чертежи с нанесени на тях размери

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД



FUSE SWITCH-DISCONNECTORS OPVA10 UP TO 32 A

Specifications

Electrical endurance	operating cycles	300
Mechanical endurance	operating cycles	2000
Degree of protection from front side, built-in device, cover closed		IP20
Connection cross-section		Cu/0.75 + 25 mm ² (2 x 6 + 16 stranded in the same size)
Torque		2 ± 2.5 Nm
Operating ambient temperature		t
Max. sea level		2000 m
Seismic resistance according to VE ŠKODA		3 g/8 + 50 Hz
Overvoltage category/Rated voltage		I (II*)/690 V a.c., II (III*)/500 V a.c., III/400 V a.c.
Standards		IEC 60947-1, -3
Approval marks		

* For underground cable distribution systems with overvoltage protection or for exposure to a low thunderstorm electricity (table H2 EN 60947-1, IEC 60947-1).

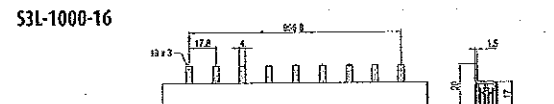
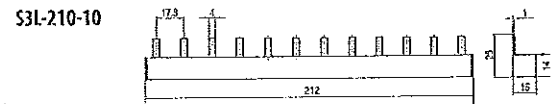
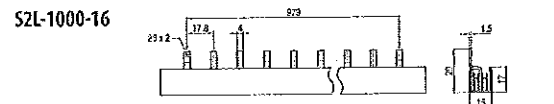
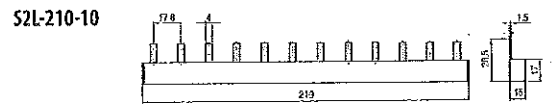
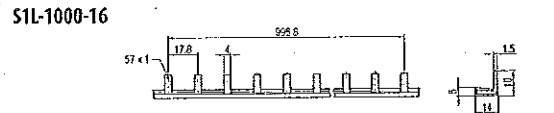
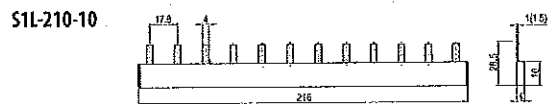
EN 60947-3 ed. 2/A2, p. C.5 Instructions for the use of 1-pole controlled devices states:

These devices are intended for distribution systems, with possible necessity of switching and/or safe disconnection of individual phases, and must not be used for switching a primary circuit of a three-phase equipment.

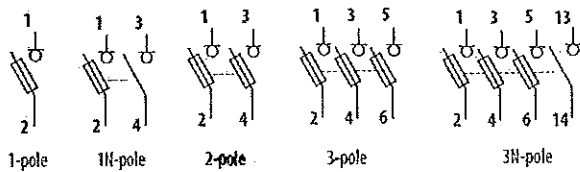
Fuse switch-disconnector with disconnecting link

Rated operating current	I_n	32 A
Thermal current with disconnecting link ZPV10	I_b	100/25 mm ²
Utilization category		AC-20B
Rated short-time withstand current	$I_{cr} 1s$	1.6 kA
Rated short-circuit making capacity at 690 V a.c.	$I_{cm} [kA]$	3.5 kA
Rated short-circuit making capacity at 440 V d.c.	$I_{cm} [kA]$	4 kA
Power losses with disconnecting link at I_n	$P [W]$	4.5 W
Connection cross-section		0.75 + 25 mm ²

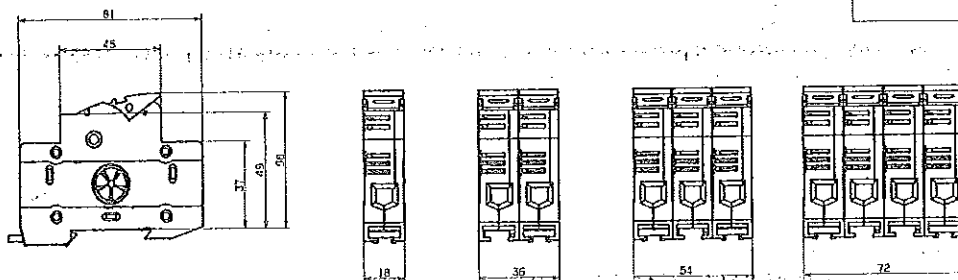
Interconnecting busbars



Diagram



Dimensions



[Handwritten signatures and marks]

ТОВ "ЕЛЕКТРОТЕХНИКА"

булевард 2653, гр. София
тел: 02 49 125 1014; факс: 02 49 125 1012
www.electrotech.bg
ул. Слънце 4053, гр. София
тел: 02 49 2 343 0493; факс: 02 49 2 343 0494
www.electrotech.bg



ПРИЛОЖЕНИЕ 9.9.3

ЕО декларация за съответствие

Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

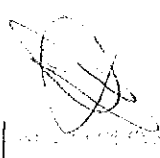
CONFORMITY DECLARATION



List of issued Conformity Declarations for products made by OEZ s.r.o. according to Law No.22/97 LD and consecutive statutory ruleles



Conformity No.	Type	Product
Modular devices Minia		
504600/1203	SVBC	Combined lightning current and surge voltage arresters - type 1 + type 2
480100/1002	SVF	Surge voltage arresters - type 2
475800/0908	SVBC	Combined lightning current and surge voltage arresters - type 1 + type 2
474602/0909	LPN-UC	Miniature circuit breakers up to 63 A (10 kA)
474500/0903	LPN-DG	Miniature circuit breakers up to 63 A (10 kA)
462701/0909	SVD	Surge voltage arresters - type 3
462602/1002	SJB	Lightning current arresters - type 1
456101/1210	OLI	Residual current circuit breakers with overcurrent protection (10 kA)
456001/1210	OLE	Residual current circuit breakers with overcurrent protection (6 kA)
455404/1210	SVC	Surge voltage arresters - type 2
455202/0909	SJBC	Combined lightning current and surge voltage arresters - type 1 + type 2
446402/0807	SVM	Surge voltage arresters - type 2
443400/0805	CS-L, CS-N, CS-PE	Terminal board
437407/1201	UTZ, UNZ, UNZR	Power supplies
437103/1210	UMZ, UMB	Electric bells and buzzers
436901/0803	MKA	Signal lights
436701/0803	MTX	Control push-buttons
436600/0805	MST	Push-button switches
436504/0901	MSK	Rocker-type switches and change-over switches
436401/0803	MSP	Tumbler switches
436108/1210	APN, AST, AVN	Tumbler power switches
435703/1201	MAP, MAR	Timers
435601/1210	MQA, MQB, MQC	Stair switches
435408/1210	MIR	Impulse (memory) relays
435304/1210	MTR	Timing relays
435201/0810	MCR	Multiple-function time relays
435104/1112	RLP	Priority current relays
434512/1201	RSI	Installation contactors
434403/1211	RPR	Installation relays
434301/0807	SVD	Surge voltage arresters - stage 3 - type 3
434101/0807	SJB	Lightning current arresters - stage 1 - type 1
433902/0805	OLFE	Residual current circuit breakers with overcurrent protection (6 kA)
433803/0805	OLFI	Residual current circuit breakers with overcurrent protection (10 kA)
433701/0805	OFE	Residual current circuit breakers (6 kA)
433600/0805	OFI	Residual current circuit breakers (10 kA)
430701/1102	LST	Miniature circuit breakers up to 125 A (10 kA)
332902/1210	LPE	Miniature circuit breakers up to 63 A (6 kA)
328609/1210	LPN	Miniature circuit breakers up to 63 A (10 kA)
Moulded case circuit breakers Modelon		
503800/1109	MODI-ZA	Automatic standby units
486504/1007	3VT5..	Moulded case circuit breakers
486403/1007	3VT4..	Moulded case circuit breakers
486302/1007	3VT3..	Moulded case circuit breakers
486203/1007	3VT2..	Moulded case circuit breakers
486104/1007	3VT1..	Moulded case circuit breakers
456600/1003	MODI ZA-10-....	Automatic standby units
456600/1002	MODI ZA-0-....	Automatic standby units
221100/0910	BC160NT405-V	Switch-disconnectors
21934476_04/1004	RCD-BC-....	Moulded case circuit breakers
21932211_04/1005	BC160NT405-V	Moulded case circuit breakers
21932210_10/1005	BC160NT305-V	Moulded case circuit breakers
219305/1210	BC160	Moulded case circuit breakers
21444752_06/1005	BL1000SE305-1000-V	Moulded case circuit breakers
214404/1103	BL1000S	Moulded case circuit breakers
21184750_07/1005	BH630NE...-630-V	Moulded case circuit breakers
21182231_00/1004	BH100	Moulded case circuit breakers
211805/1103	BH630	Moulded case circuit breakers
20974753_07/1005	BL1600SE305-1600-V	Moulded case circuit breakers
209704/1206	BL1600S	Moulded case circuit breakers
20564751_07/1005	BD250NE...-250-V	Moulded case circuit breakers
205607/1201	BD250	Moulded case circuit breakers
Air circuit breakers Arion		
219905/1103	ARION WL13	Air circuit breakers and switch-disconnectors
219705/1103	ARION WL12	Air circuit breakers and switch-disconnectors
219604/1103	ARION WL11	Air circuit breakers and switch-disconnectors
Fuse systems Varius		



505700/1301	PC10	Fuse-links for protection of photovoltaic systems
503400/1301	OPVP22	Fuse switch-disconnectors for cylindrical fuse-links size 22x58
503200/1301	OPVP14	Fuse switch-disconnectors for cylindrical fuse-links size 14x51
503000/1301	OPVP10	Fuse switch-disconnectors for cylindrical fuse-links size 10x38
502800/1301	OPVF10	Fuse holders
502700/1210	OPVA22	Fuse switch-disconnectors for cylindrical fuse-links size 22x58
502500/1210	OPVA14	Fuse switch-disconnectors for cylindrical fuse-links size 14x51
502300/1210	OPVA10	Fuse switch-disconnectors for cylindrical fuse-links size 10x38
493200/1210	PVA	Fuse-links
491700/1204	PHNA	Fuse-links
491600/1204	PLNA (gG)	Fuse-links
491502/1204	PNA	Fuse-links
461701/1104	OPF10	Fuse disconnectors for cylindrical fuse-links size 10x38
46074608_02/0907	PF10...	Fuse-links for semiconductor protection for voltage up to 900 V a.c. (cylindrical)
460701/1210	PF	Fuse-links for semiconductor protection for voltage up to 900 V a.c. (cylindrical)
428303/1201	FR00	Fuse-rails size 00 up to 160 A
428106/1201	FD00	Fuse switch-disconnectors - vertical design size 00 up to 160 A
141300/1301	P51V06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (blade contacts)
136803/1201	OPT20	Fuse disconnectors for traction cylindrical fuses size 20x127
136003/1201	P50U10	Fuse-links for semiconductor protection for voltage up to 1000 V a.c. (with screw connections)
135803/1103	P40U10	Fuse-links for semiconductor protection for voltage up to 1000 V a.c. (with screw connections)
135603/1201	P51U06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (blade contacts)
135403/1201	P51R06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (blade contacts)
135204/1201	P52U06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
135003/1201	P50U06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
134803/1201	P51T06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
134603/1201	P50T06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
134403/1201	P50R06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
134203/1201	P50N06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
134003/1201	P51K06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
133804/1201	P50K06	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (with screw connections)
133604/1210	PV522	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (cylindrical)
133403/1103	PV514	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (cylindrical)
133202/1103	PV510	Fuse-links for semiconductor protection for voltage up to 690 V a.c. (cylindrical)
132705/1201	PN	Fuse-links
132502/1201	ZPV, ZPT	Disconnecting links
132404/1104	SPV	Fuse-bases
132306/1201	PV10, PV14, PV22	Fuse-links
132203/1103	PT	Fuse-links for traction applications
131704/1104	SP	Fuse holders
131503/1201	S4..., VL41F, S-P50U06, 586...	Remote signalings of fuse state
130801/1301	P50V16	Fuse-links for semiconductor protection for voltage up to 1800 V a.c. (with screw connections)
130207/1205	FR3	Fuse-rails size 3 up to 630 A
130106/1205	FR2	Fuse-rails size 2 up to 400 A
130006/1205	FR1	Fuse-rails size 1 up to 250 A
129904/1201	OPT22	Fuse disconnectors for traction cylindrical fuses size 22x127
129804/1210	OPV22	Fuse switch-disconnectors for cylindrical fuse-links size 22x58
129704/1210	OPV14	Fuse switch-disconnectors for cylindrical fuse-links size 14x51
129605/1210	OPV10	Fuse switch-disconnectors for cylindrical fuse-links size 10x38
129503/1201	LTL4a	Fuse switch-disconnectors size 4a up to 1600 A
129402/1004	FH3	Fuse switch-disconnectors Varius for fuse-links with blade contacts size 3 up to 630 A
129302/1004	FH2	Fuse switch-disconnectors Varius size 2 up to 400 A
129203/1004	FH1	Fuse switch-disconnectors Varius size 1 up to 250 A
129104/1210	FH000	Fuse switch-disconnectors Varius size 000 up to 160 A
129003/0909	FH00	Fuse switch-disconnectors Varius size 00 up to 160 A
128904/1210	ZP, TM4a	Disconnecting links
128804/1210	VL...	Signal contacts
128102/1201	SPF	Single-pole steel fuse-bases
128005/1107	SPB	Single-pole plastic fuse-bases
127903/1103	SNB, SNF	Neutral terminal bridges
127802/1201	SHF3C	Single-pole steel fuse-bases
127704/1201	S3PB	Three-pole plastic fuse-bases
127405/1210	PLN (gTr)	Fuse-links for protection of transformers
127303/1201	PLN (gG)	Fuse-links
127203/1201	PHN	Fuse-links



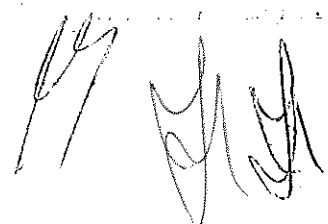
127003/1103 126603/1003 126402/1201 126204/1205 126103/1205 126004/1205 125906/1302 122400/1211	D1PH, DP, DPM 48..., 58... SL3 FD3 FD2 FD1 MA P50V16...	Replacement handles V-shaped clamps and their covers Fuse switch-disconnectors - vertical design size Fuse switch-disconnectors - vertical design size 3 up to 630 A Fuse switch-disconnectors - vertical design size 2 up to 400 A Fuse switch-disconnectors - vertical design size 1 up to 250 A Measuring adapter for vertical switch-disconnectors and fuse-rails Fuse-links for semiconductor protection
Distribution boards and switchboard cabinets Distri		
494603/1210 483500/1008 483401/1210 483202/1008 483102/1008 417804/1210 416604/1003 410702/0803 327603/1210 325902/0901 325702/0901 325602/0901 325502/1001 131801/0803	RNG, RZG, RZV, ECO RNB.. RZB.. DZ... DN... QA NP KB... RZA ECO COMBI ORO ERA D100/185	Plastic distribution boards Distribution boards (IP30) Distribution boards (IP30) Flush-mounted distribution boards (IP43) Wall-mounted distribution boards (IP43) Side-by-side switchboard cabinets Wall-mounted switchboard cabinets Individual switchboard cabinets Steel-plastic distribution boards (IP30) Plastic distribution boards Wall-mounted distribution boards (IP40) Flush-mounted distribution boards (IP40) Flush-mounted distribution boards (IP30) Busbar systems holders with spacing 100 and 185 mm
Devices for switching and control Conteo		
488800/1201 488700/1201 481200/1001 470001/1201 469903/1005 469800/0901 469701/0910	SM, 3RV ST, 3RT, 3RH SM1E SR ST12..., ST25..., ST50... ST100.. SM12..., SM25..., SM50... SM100.. SM1	Industrial motor starters Contactors Economical motor starters Thermal overload relays Contactors Industrial motor starters Economical motor starters
Other devices		

Place of issue: **Letohrad** Manufacturer's representative **Ing. Roman Schiffer**
and signature:

Date of issue: **18.02.2013** Position: **general director**



OEZ
OEZ s.r.o.
Sečnická 339, Letohrad 561 51
Česká republika
IČO: 42610146, DIČ: CZ42610146



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ПРИЛОЖЕНИЕ 9.9.4

Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език

*Настоящото приложение се прилага във връзка с участието ми в:
търг с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от **“ЧЕЗ Разпределение България” АД**

Příloha č.: 3 ze dne: 15.6.2010

je nedílnou součástí

osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

List 1 z 19

Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lásem 129, 171 02 Praha 8

Kalibrační listy podepisuje:

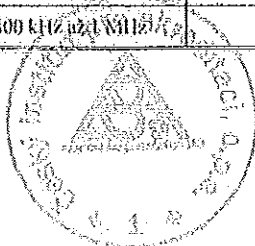
Ing. František Nekola vedoucí kalibrační laboratoře
Ing. Jan Černý technický vedoucí kalibrační laboratoře
Ing. Ladislav Hrubý zástupce technického vedoucího kalibrační laboratoře

Obor měřené veličiny: elektrické veličiny

Kalibrace:

Nominální teplota pro kalibraci: (23 ± 2) °C

Pořadové číslo	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace ± ^{2), 3)}	Identifikace metody a poznámky
1	Napětí stejnosměrné	0 až 200 mV		0,00086 % + 0,3 μV	MK4, MK8, MK9
		0,2 V až 0,5 V		0,00095 %	
		0,5 V až 20 V		0,00075 %	
		20 V až 1100 V		0,0012 %	
		1 kV až 6 kV		40 V	MK10
		6 kV až 15 kV		120 V	
		15 kV až 30 kV		240 V	
		30 kV až 50 kV		400 V	
50 kV až 100 kV		800 V			
2	Napětí střídavé	0,1 mV až 200 mV	10 Hz až 30 Hz	0,031 % + 4 μV	MK4, MK8, MK9
			40 Hz až 10 kHz	0,028 % + 4 μV	
			10 kHz až 30 kHz	0,041 % + 8 μV	
			30 kHz až 100 kHz	0,078 % + 22 μV	
			100 kHz až 330 kHz	0,21 % + 60 μV	
		300 kHz až 1 MHz	0,61 % + 0,4 mV		
		0,2 V až 0,5 V	10 Hz až 40 Hz	0,028 %	MK4, MK8, MK9
			40 Hz až 10 kHz	0,025 %	
			10 kHz až 30 kHz	0,043 %	
			30 kHz až 100 kHz	0,058 %	
			100 kHz až 330 kHz	0,23 %	
			300 kHz až 1 MHz	1,4 %	
		0,5 V až 1 V	10 Hz až 40 Hz	0,023 %	
			40 Hz až 10 kHz	0,019 %	
			10 kHz až 30 kHz	0,033 %	
			30 kHz až 100 kHz	0,046 %	
			100 kHz až 330 kHz	0,18 %	
			300 kHz až 1 MHz	1,2 %	



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Příloha č.: 3 ze dne: 15.6.2010

je nedílnou součástí

osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

List 2 z 19

Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Pořadové číslo ^D	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{K,3)}	Identifikace metody a poznámky
2	Napětí střídavé	1 V až 2 V	10 Hz až 40 Hz	0,021 %	MK4, MK8, MK9
			40 Hz až 10 kHz	0,017 %	
			10 kHz až 30 kHz	0,026 %	
			30 kHz až 100 kHz	0,038 %	
		1 V až 2 V	100 kHz až 330 kHz	0,14 %	
			300 kHz až 1 MHz	0,90 %	
		2 V až 5 V	10 Hz až 40 Hz	0,028 %	
			40 Hz až 10 kHz	0,025 %	
			10 kHz až 30 kHz	0,043 %	
			30 kHz až 100 kHz	0,058 %	
			100 kHz až 330 kHz	0,23 %	
			300 kHz až 1 MHz	1,4 %	
		5 V až 10 V	10 Hz až 40 Hz	0,023 %	
			40 Hz až 10 kHz	0,019 %	
			10 kHz až 30 kHz	0,033 %	
			30 kHz až 100 kHz	0,046 %	
			100 kHz až 330 kHz	0,18 %	
			300 kHz až 1 MHz	1,2 %	
		10 V až 20 V	10 Hz až 40 Hz	0,021 %	
			40 Hz až 10 kHz	0,017 %	
			10 kHz až 30 kHz	0,026 %	
			30 kHz až 100 kHz	0,038 %	
			100 kHz až 330 kHz	0,14 %	
			300 kHz až 1 MHz	0,90 %	
		20 V až 50 V	10 Hz až 40 Hz	0,028 %	
			40 Hz až 10 kHz	0,025 %	
			10 kHz až 30 kHz	0,043 %	
			30 kHz až 100 kHz	0,060 %	
		50 V až 100 V	10 Hz až 40 Hz	0,023 %	
			40 Hz až 10 kHz	0,019 %	
			10 kHz až 30 kHz	0,033 %	
			30 kHz až 100 kHz	0,048 %	
100 V až 200 V	10 Hz až 40 Hz	0,021 %	MK4, MK8, MK9, MK11		
	40 Hz až 10 kHz	0,017 %			
	10 kHz až 30 kHz	0,026 %			
	30 kHz až 100 kHz	0,040 %			



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Příloha č.: 3 ze dne: 15.6.2010

je nedílnou součástí

osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

List 3 z 19

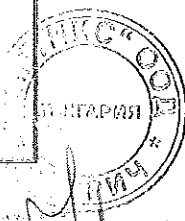
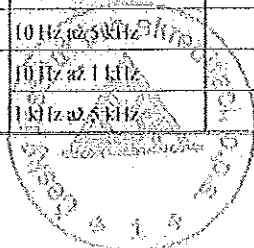
Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisím 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky	
2	Napětí střídavé	200 V až 300 V	45 Hz až 10 kHz	0,026 %		
			10 kHz až 30 kHz	0,047 %		
		300 V až 500 V	45 Hz až 10 kHz	0,032 %		
			10 kHz až 30 kHz	0,050 %		
		500 V až 1100 V	45 Hz až 330 Hz	0,046 %		
			300 Hz až 10 kHz	0,038 %		
			10 kHz až 33 kHz	0,046 %		
		1 kV až 6 kV	40 Hz až 60 Hz	40 V		MK10
		6 kV až 15 kV	40 Hz až 60 Hz	120 V		
		15 kV až 30 kV	40 Hz až 60 Hz	240 V		
		30 kV až 50 kV	40 Hz až 60 Hz	400 V		
		50 kV až 100 kV	40 Hz až 60 Hz	800 V		
		3	Proud stejnosměrný	0 až 20 nA		
20 nA až 1 µA				0,25 %		
1 µA až 200 µA				0,01 % + 2 nA		
200 µA až 20 mA				0,011 %		
20 mA až 50 mA				0,015 %		
50 mA až 200 mA				0,012 %		
200 mA až 500 mA				0,031 %		
0,5 A až 2 A				0,024 %		
2 A až 100 A				0,050 %		
1 A až 100 A				0,50 %	MK4, MK8, klešťové multimetry	
100 A až 1000 A				1,5 %		
4	Proud střídavý	1 µA až 10 µA	10 Hz až 5 kHz	0,042 % + 20 nA	MK9, měřeni	
		10 µA až 200 µA	10 Hz až 5 kHz	0,042 % + 20 nA		MK4, MK8, MK9
		200 µA až 500 µA	10 Hz až 5 kHz	0,10 %		
		0,5 mA až 1 mA	10 Hz až 5 kHz	0,073 %		
		1 mA až 2 mA	10 Hz až 5 kHz	0,054 %		
		2 mA až 5 mA	10 Hz až 5 kHz	0,10 %		
		5 mA až 10 mA	10 Hz až 5 kHz	0,073 %		
		10 mA až 20 mA	10 Hz až 5 kHz	0,054 %		
		20 mA až 50 mA	10 Hz až 5 kHz	0,10 %		
		50 mA až 100 mA	10 Hz až 5 kHz	0,073 %		
		100 mA až 200 mA	10 Hz až 5 kHz	0,054 %		
		200 mA až 500 mA	10 Hz až 1 kHz	0,12 %		
				1 kHz až 5 kHz		



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Příloha č.: 3 ze dne: 15.6.2010

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osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

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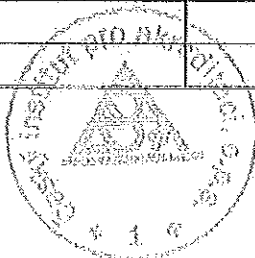
Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřitel schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky	
4	Proud střídavý	0,5 A až 1 A	10 Hz až 1 kHz	0,070 %		
		0,5 A až 1 A	1 kHz až 5 kHz	0,13 %		
		1 A až 2 A	10 Hz až 5 kHz	0,10 %		
		2 A až 11 A	40 Hz až 1 kHz	0,050 %		
		11 A až 105 A	40 Hz až 60 Hz	0,10 %		
		1 A až 105 A	40 Hz až 60 Hz	0,25 %		MK4, MK8, kleškové multimetry
		100 A až 1050 A	40 Hz až 60 Hz	1,5 %		
5	Odpor stejnosměrný	0 Ω až 20 Ω		0,0019 % + 30 μΩ	MK11, MK12, MK13	
		20 Ω až 200 Ω		0,0015 %	MK4, MK8, MK11, MK12, MK13	
		200 Ω až 20 kΩ		0,0012 %		
		20 kΩ až 200 kΩ		0,0015 %		
		200 kΩ až 500 kΩ		0,0028 %		MK4, MK8, MK11, MK13, MK14
		500 kΩ až 2 MΩ		0,0025 %		
		2 MΩ až 5 MΩ		0,0078 %		
		5 MΩ až 20 MΩ		0,0058 %		
		20 MΩ až 50 MΩ		0,078 %		
		50 MΩ až 200 MΩ		0,050 %		
		200 MΩ až 1,1 GΩ		0,50 %		
		1 GΩ až 11 GΩ	100 V až 1000 V	1,0 %		
		1 GΩ až 11 GΩ	1000 V až 2500 V	1,6 %	MK13	
		1 GΩ až 11 GΩ	2500 V až 5000 V	0,84 %		
		0,1 mΩ		0,05 %		MK11, MK12, MK13, etalony
		1 mΩ		0,0035 %		odchylka jmenovité hodnoty do 10 %
		10 mΩ		0,0018 %		
		100 mΩ		0,0022 %		
		1 Ω		0,0018 %		
		10 Ω		0,0022 %		
		100 Ω		0,0022 %		MK4, MK8, MK12, MK13, etalony
		1 kΩ		0,0024 %		odchylka jmenovité hodnoty do 10 %
		10 kΩ		0,0024 %		
100 kΩ		0,0030 %				
1 MΩ		0,0060 %				
10 MΩ		0,012 %				
100 MΩ		0,047 %				



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Příloha č.: 3 ze dne: 15.6.2010

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Příloha náhrazuje přílohu č.: 2 ze dne: 15.4.2010

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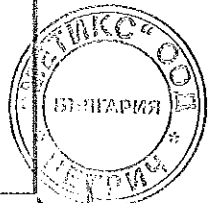
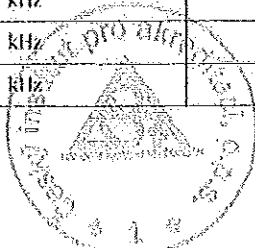
Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsuh měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2), 3)}	Identifikace metody a poznámky
5.	Odpor stejnosměrný	1 GΩ	100 V až 1000 V	0,030 %	MK13, MK14, etalony
		10 GΩ	100 V až 1000 V	0,20 %	odchylka jmenovité hodnoty do 10 %
		100 GΩ	100 V až 1000 V	0,40 %	
		1 TΩ	100 V až 1000 V	0,50 %	
		10 TΩ	100 V až 1000 V	1,5 %	MK14, etalony
		100 TΩ	100 V až 1000 V	3,0 %	odchylka jmenovité hodnoty do 20 %
6	Odpor střídavý	0,1 Ω	1 kHz	0,50 %	MK15, etalony
		1 Ω	1 kHz	0,10 %	odchylka jmenovité hodnoty do 10 %
		10 Ω	1 kHz	0,10 %	
		100 Ω	1 kHz	0,050 %	
		1 kΩ	1 kHz	0,050 %	MK15, etalony
		10 kΩ	1 kHz	0,050 %	odchylka jmenovité hodnoty do 10 %
		100 kΩ	1 kHz	0,050 %	
		100 Ω	1 kHz až 1 MHz	0,060 %	
		1 kΩ	1 kHz až 1 MHz	0,060 %	
		10 kΩ	1 kHz až 1 MHz	0,10 %	
		100 kΩ	1 kHz až 100 kHz	0,25 %	
		0,1 Ω až 1 Ω	1 kHz	0,50 %	MK15, měření
		1 Ω až 10 Ω	1 kHz	0,30 %	
		10 Ω až 10 kΩ	1 kHz	0,10 %	
		10 kΩ až 100 kΩ	1 kHz	0,20 %	
		100 Ω až 1 kΩ	1 kHz až 100 kHz	0,13 %	
			100 kHz až 1 MHz	0,23 %	
		1 kΩ až 100 kΩ	1 kHz až 100 kHz	0,40 %	
		1 kΩ až 10 kΩ	100 kHz až 1 MHz	0,50 %	
		7	Modul impedance	0,5 Ω až 20 kΩ	50 Hz
1 mΩ	50 Hz			0,10 %	MK11, etalony
10 mΩ	50 Hz			0,10 %	
100 mΩ	50 Hz, 1 kHz			0,10 %	MK11, MK13, etalony
1 Ω	1 kHz			0,10 %	MK15, etalony
10 Ω	1 kHz			0,10 %	
100 Ω	1 kHz			0,050 %	
1 kΩ	1 kHz			0,050 %	
10 kΩ	1 kHz			0,050 %	
100 kΩ	1 kHz			0,050 %	



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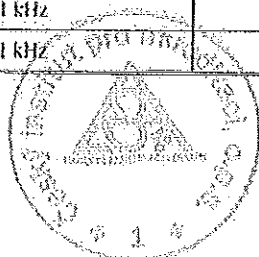
Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Přídavné číslo	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] %	Identifikace metody a poznámky	
7	Modul impedance	1 Ω až 10 Ω	1 kHz	0,30 %	MK15, měření	
		10 Ω až 10 kΩ	1 kHz	0,10 %		
		10 kΩ až 100 kΩ	1 kHz	0,20 %		
8	Kapacita	1 pF	1 kHz	0,060 %	MK15, etalony odchylka jmenovité hodnoty do 10 %	
		10 pF	1 kHz	0,025 %		
		100 pF	1 kHz	0,015 %		
		1 nF	1 kHz	0,015 %		
		10 nF	1 kHz	0,015 %		
		100 nF	1 kHz	0,015 %		
		1 μF	1 kHz	0,015 %		
		10 μF až 100 μF	1 kHz	0,25 %		
		1 pF	1 kHz až 1 MHz	0,10 %		
		10 pF	1 kHz až 1 MHz	0,10 %		
		100 pF	1 kHz až 1 MHz	0,10 %		MK15, etalony odchylka jmenovité hodnoty do 10 %
		1 nF	1 kHz až 1 MHz	0,15 %		
		10 pF až 100 pF	1 kHz	0,30 %		MK15
		100 pF až 1 nF	1 kHz	0,20 %		
		1 nF až 1 μF	1 kHz	0,10 %		
		1 μF až 100 μF	1 kHz	0,30 %		
		9	Induktivnost	1 pF až 10 pF		10 kHz až 1 MHz
10 pF až 1 nF	1 kHz až 1 MHz			0,20 %		
2 mH	1 kHz			0,10 %	MK15, etalony, odchylka jmenovité hodnoty do 10 %	
5 mH	1 kHz			0,10 %		
10 mH	1 kHz			0,050 %		
20 mH	1 kHz			0,10 %		
50 mH	1 kHz			0,10 %		
100 mH	1 kHz			0,050 %		
200 mH	1 kHz			0,050 %		
500 mH	1 kHz			0,050 %		
1 H	1 kHz	0,050 %				
2 H	1 kHz	0,10 %				
5 H	1 kHz	0,10 %				
10 H	1 kHz	0,10 %				



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osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lísem 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace $\pm 1^{2) 3)}$	Identifikace metody a poznámky
9	Indukčnost	100 pH	10 kHz až 1 MHz	0,20 %	MK 15, syntetické indukivity
		100 mH	1 kHz až 100 kHz	0,20 %	odehybka jmenovité hodnoty do 10 %
		1 mH až 10 mH	1 kHz	0,20 %	MK 15, měření
		10 mH až 500 mH	1 kHz	0,10 %	
		500 mH až 5 H	1 kHz	0,20 %	
		5 H až 10 H	1 kHz	0,50 %	
10	Ztrátový činitel D	0 až 0,01	1 kHz	2,0 % + 0,0010	MK 15, pro kapacity 1 pF až 100 pF
		0 až 0,01	10 kHz až 1 MHz	0,53 % + 0,0013	MK 15, pro kapacity 1 pF
		0 až 1,6	1 kHz	1,0 % + 0,0010	MK 15, pro kapacity 1 nF
		0 až 1,6	1 kHz	0,50 % + 0,00050	MK 15, pro kapacity 10 nF až 1 pF
		0 až 1,6	10 kHz až 1 MHz	0,32 % + 0,00052	MK 15, pro kapacity 10 pF až 1 nF
11*	NE-výkon	0,03 A až 0,3 A	6 V až 60 V	7,4 mW	MK 7, 45 Hz až 65 Hz, účinník 0 až 1
		0,3 A až 0,6 A		15 mW	
		0,6 A až 1,3 A		30 mW	
		1,3 A až 2,6 A		61 mW	
		2,6 A až 5,2 A		0,12 W	
		5,2 A až 10 A		0,24 W	
		10 A až 20,5 A		0,49 W	
		0,03 A až 0,3 A	60 V až 130 V	15 mW	
		0,3 A až 0,6 A		30 mW	
		0,6 A až 1,3 A		63 mW	
		1,3 A až 2,6 A		0,13 W	
		2,6 A až 5,2 A		0,25 W	
		5,2 A až 10 A		0,50 W	
		10 A až 20,5 A		1,0 W	
		0,03 A až 0,3 A		130 V až 270 V	31 mW
		0,3 A až 0,6 A			62 mW
		0,6 A až 1,3 A	0,13 W		
		1,3 A až 2,6 A	0,26 W		
		2,6 A až 5,2 A	0,51 W		
		5,2 A až 10 A	1,0 W		
		10 A až 20,5 A	2,1 W		



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Příloha č.: 3 ze dne: 15.6.2010

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Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

Akreditovaný subjekt:

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Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Poradové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřitel schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky
11*	NF výkon	0,03 A až 0,3 A	270 V až 560 V	63 mW	
		0,3 A až 0,6 A		0,13 W	
		0,6 A až 1,3 A		0,26 W	
		1,3 A až 2,6 A		0,52 W	
		2,6 A až 5,2 A		1,0 W	
		5,2 A až 10 A		2,0 W	
		10 A až 20,5 A		4,2 W	
		0,03 A až 0,3 A	560 V až 720 V	0,11 W	
		0,3 A až 0,6 A	0,21 W		
		0,6 A až 1,3 A	0,44 W		
		1,3 A až 2,6 A	0,88 W		
		2,6 A až 5,2 A	1,8 W		
		5,2 A až 10 A	3,5 W		
		10 A až 20,5 A	7,1 W		
12*	VF výkon	200 pW až 200 mW	9 kHz až 100 MHz	1,8 % + 100 pW	MK 16, MK17, měřič
			100 MHz až 1 GHz	2,2 % + 100 pW	
			1 GHz až 4 GHz	2,5 % + 100 pW	
			4 GHz až 6 GHz	2,8 % + 100 pW	
		20 pW až 20 mW	9 kHz až 100 MHz	1,8 % + 10 pW	MK 16, MK17, generování
			100 MHz až 1 GHz	2,2 % + 10 pW	
			1 GHz až 3 GHz	2,6 % + 10 pW	
13*	VF napětí	2,5 mV _{pp} až 2,8 V _{pp}	50 kHz až 3 GHz	2,0 % + 50 pV	MK 16, generování
14*	VF proud	50 μA _{pp} až 90 mA _{pp}	50 kHz až 3 GHz	2,0 % + 1 μA	
15*	Modul činitele odřazu r	0 až 1	300 kHz až 1 MHz	0,011 + 0,03r ²	MK 16, 50 Ω
			1 MHz až 2 GHz	0,009 + 0,03r ²	
			2 GHz až 3 GHz	0,009 + 0,06r ²	



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Akreditovaný subjekt:

Elektrotechnický zkušební ústav s. p.
Kalibrační laboratoř
Pod Lísem 129, 171 02 Praha 8

Obor měřené veličiny: elektrické veličiny

Kalibrace:

Nominální teplota pro kalibraci: $(23 \pm 5) ^\circ\text{C}$

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky
16*	Napětí stejnosměrné	0 až 330 mV		0,0020 % + 1 μV	MK4, MK8, MK9
		0,33 V až 1 V		0,0017 %	
		1 V až 3,3 V		0,0013 %	
		3,3 V až 10 V		0,0018 %	
		10 V až 33 V		0,0014 %	
		33 V až 1020 V		0,0023 %	
		1 kV až 6 kV		40 V	MK10, měření
		6 kV až 15 kV		120 V	
		15 kV až 30 kV		240 V	
		30 kV až 50 kV		400 V	
50 kV až 100 kV		800 V			
17*	Napětí střídavé	1 mV až 33 mV	10 Hz až 45 Hz	0,080 % + 6 μV	MK4, MK8, MK9
			45 Hz až 10 kHz	0,015 % + 6 μV	
			10 kHz až 20 kHz	0,020 % + 6 μV	
			20 kHz až 50 kHz	0,10 % + 6 μV	
			50 kHz až 100 kHz	0,35 % + 12 μV	
			100 kHz až 500 kHz	0,80 % + 50 μV	
		33 mV až 100 mV	10 Hz až 45 Hz	0,054 %	
			45 Hz až 20 kHz	0,040 %	
			20 kHz až 50 kHz	0,059 %	
			50 kHz až 100 kHz	0,18 %	
			100 kHz až 500 kHz	0,41 %	
		100 mV až 330 mV	10 Hz až 45 Hz	0,038 %	
			45 Hz až 20 kHz	0,024 %	
			20 kHz až 50 kHz	0,043 %	
			50 kHz až 100 kHz	0,11 %	
			100 kHz až 500 kHz	0,27 %	
		0,33 V až 1 V	10 Hz až 45 Hz	0,045 %	
			45 Hz až 10 kHz	0,033 %	
			10 kHz až 20 kHz	0,037 %	
			20 kHz až 50 kHz	0,045 %	
50 kHz až 100 kHz	0,11 %				
100 kHz až 500 kHz	0,43 %				



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Příloha č.: 3 ze dne: 15.6.2010

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Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

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Akreditovaný subjekt:

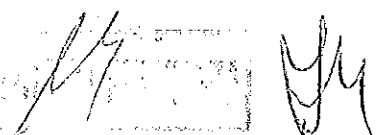
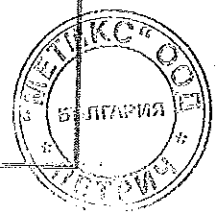
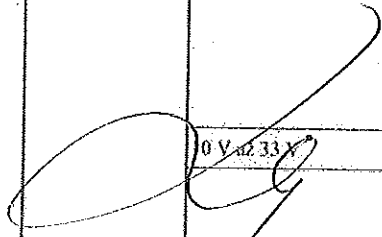
Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8



Pofadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] % ^{2),3)}	Identifikace metody a poznámky
17*	Napětí střídavé	1 V až 3,3 V	10 Hz až 45 Hz	0,035 %	MK4, MK8, MK9
			45 Hz až 10 kHz	0,021 %	
			10 kHz až 20 kHz	0,025 %	
			20 kHz až 50 kHz	0,035 %	
			50 kHz až 100 kHz	0,083 %	
		1 V až 3,3 V	100 kHz až 500 kHz	0,30 %	
		3,3 V až 10 V	10 Hz až 45 Hz	0,050 %	
			45 Hz až 10 kHz	0,033 %	
			10 kHz až 20 kHz	0,042 %	
			20 kHz až 50 kHz	0,053 %	
			50 kHz až 100 kHz	0,14 %	
		10 V až 33 V	10 Hz až 45 Hz	0,037 %	
			45 Hz až 10 kHz	0,021 %	
			10 kHz až 20 kHz	0,030 %	
			20 kHz až 50 kHz	0,041 %	
			50 kHz až 100 kHz	0,11 %	
		33 V až 100 V	45 Hz až 1 kHz	0,025 %	
			1 kHz až 10 kHz	0,038 %	
			10 kHz až 20 kHz	0,043 %	
			20 kHz až 50 kHz	0,048 %	
			50 kHz až 100 kHz	0,35 %	
		100 V až 330 V	45 Hz až 1 kHz	0,021 %	
			1 kHz až 10 kHz	0,026 %	
			10 kHz až 20 kHz	0,031 %	
			20 kHz až 50 kHz	0,036 %	
			50 kHz až 100 kHz	0,25 %	
		330 V až 1020 V	45 Hz až 1 kHz	0,033 %	
			1 kHz až 5 kHz	0,028 %	
5 kHz až 10 kHz	0,033 %				
1 kV až 6 kV	40 Hz až 60 Hz	40 V	MK10, měření		
6 kV až 15 kV	40 Hz až 60 Hz	120 V			
15 kV až 30 kV	40 Hz až 60 Hz	240 V			
30 kV až 50 kV	40 Hz až 60 Hz	400 V			
50 kV až 100 kV	40 Hz až 60 Hz	800 V			



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osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lísem 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky	
18*	Proud stejnosměrný	0 až 0,33 mA		0,015 % + 20 nA	MK4, MK8, MK9	
		0,33 mA až 3,3 mA		0,025 %		
		3,3 mA až 10 mA		0,018 %		
		10 mA až 33 mA		0,013 %		
		33 mA až 100 mA		0,018 %		
		100 mA až 330 mA		0,013 %		
		330 mA až 1,1 A		0,032 %		
		1,1 A až 3,0 A		0,042 %		
		3,0 A až 11 A		0,065 %		
		11 A až 100 A		0,10 %		
		1 A až 100 A		0,50 %		MK4, MK8, klesčové multimetry
		100 A až 1000 A		1,5 %		
		100 A až 1000 A		1,5 %		
19*	Proud střídavý	0,03 mA až 0,33 mA	10 Hz až 20 Hz	0,20 % + 0,10 μA	MK4, MK8, MK9	
			20 Hz až 45 Hz	0,15 % + 0,10 μA		
			45 Hz až 1 kHz	0,13 % + 0,10 μA		
			1 kHz až 5 kHz	0,30 % + 0,15 μA		
			5 kHz až 10 kHz	0,8 % + 0,20 μA		
			10 kHz až 30 kHz	1,6 % + 0,40 μA		
		0,33 mA až 1 mA	10 Hz až 20 Hz	0,25 %		
			20 Hz až 45 Hz	0,17 %		
			45 Hz až 1 kHz	0,15 %		
			1 kHz až 5 kHz	0,26 %		
			5 kHz až 10 kHz	0,59 %		
			10 kHz až 30 kHz	1,2 %		
		1 mA až 3,3 mA	10 Hz až 20 Hz	0,22 %		
			20 Hz až 45 Hz	0,14 %		
			45 Hz až 1 kHz	0,12 %		
			1 kHz až 5 kHz	0,22 %		
			5 kHz až 10 kHz	0,53 %		
			10 kHz až 30 kHz	1,1 %		



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Příloha č.: 3 ze dne: 15.6.2010

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osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lisem 129, 171 02 Praha 8

Pořadové číslo ^D	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřitel schopnost kalibrace [±] ^{2) 3)}	Identifikace metody a poznámky	
19 ^E	Proud střídavý	3,3 mA až 10 mA	10 Hz až 20 Hz	0,24 %		
			20 Hz až 45 Hz	0,15 %		
			45 Hz až 1 kHz	0,10 %		
			1 kHz až 5 kHz	0,14 %		
			5 kHz až 10 kHz	0,29 %		
			10 kHz až 30 kHz	0,52 %		
		10 mA až 33 mA	10 Hz až 20 Hz	0,20 %		
			20 Hz až 45 Hz	0,11 %		
			45 Hz až 1 kHz	0,060 %		
			1 kHz až 5 kHz	0,10 %		
			5 kHz až 10 kHz	0,23 %		
			10 kHz až 30 kHz	0,44 %		
		33 mA až 100 mA	10 Hz až 20 Hz	0,24 %		
			20 Hz až 45 Hz	0,15 %		
			45 Hz až 1 kHz	0,10 %		
			1 kHz až 5 kHz	0,25 %		
			5 kHz až 10 kHz	0,50 %		
			10 kHz až 30 kHz	1,0 %		
		100 mA až 330 mA	10 Hz až 20 Hz	0,20 %		MK4, MK8, MK9
			20 Hz až 45 Hz	0,11 %		
			45 Hz až 1 kHz	0,060 %		
			1 kHz až 5 kHz	0,15 %		
			5 kHz až 10 kHz	0,30 %		
			10 kHz až 30 kHz	0,60 %		
		330 mA až 1,1 A	10 Hz až 45 Hz	0,21 %		
			45 Hz až 1 kHz	0,070 %		
			1 kHz až 5 kHz	0,90 %		
			5 kHz až 10 kHz	4,0 %		
1,1 A až 3 A	10 Hz až 45 Hz	0,19 %				
	45 Hz až 1 kHz	0,069 %				
	1 kHz až 5 kHz	0,69 %				
	5 kHz až 10 kHz	3,0 %				



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osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

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List 13 z 19

Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lisem 129, 171 02 Praha 8

Popisové číslo ^{b)}	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace $[\pm]^{23,3)}$	Identifikace metody a poznámky	
19*	Proud střídavý	3 A až 11 A	45 Hz až 65 Hz	0,070 %		
			65 Hz až 100 Hz	0,13 %		
			100 Hz až 1 kHz	0,17 %		
			1 kHz až 5 kHz	3,0 %		
		11 A až 20,5 A	45 Hz až 65 Hz	0,070 %		
			65 Hz až 100 Hz	0,14 %		
			100 Hz až 1 kHz	0,20 %		
			1 kHz až 5 kHz	3,0 %		
		20 A až 100 A	40 Hz až 60 Hz	0,12 %		
		1 A až 105 A	40 Hz až 60 Hz	0,25 %		MK4, MK8, kleškové multimetry
100 A až 1050 A	40 Hz až 60 Hz	1,5 %				
100 A až 1050 A	40 Hz až 60 Hz	1,5 %	MK9, měření			
20*	Odpor stejnosměrný	0 Ω až 11 Ω		0,0040 % + 0,001 Ω	MK4, MK8, MK13	
		11 Ω až 33 Ω		0,017 %		
		33 Ω až 110 Ω		0,0070 %		
		110 Ω až 330 Ω		0,0046 %		
		330 Ω až 1,1 kΩ		0,0034 %		
		1,1 kΩ až 3,3 kΩ		0,0046 %		
		3,3 kΩ až 11 kΩ		0,0034 %		
		11 kΩ až 33 kΩ		0,0046 %		
		33 kΩ až 110 kΩ		0,0034 %		
		110 kΩ až 330 kΩ		0,0050 %		
		330 kΩ až 1,1 MΩ		0,0038 %		
		1,1 MΩ až 3,3 MΩ		0,0087 %		
		3,3 MΩ až 11 MΩ		0,015 %		MK4, MK8, MK13
		11 MΩ až 33 MΩ		0,048 %		
		33 MΩ až 110 MΩ		0,059 %		
		100 MΩ až 1,1 GΩ		0,50 %		MK14, generování
		1 GΩ až 11 GΩ	100 V až 1000 V	1,0 %		
		1 GΩ až 11 GΩ	1000 V až 5000 V	2,0 %		



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Příloha č.: 3 ze dne: 15.6.2010

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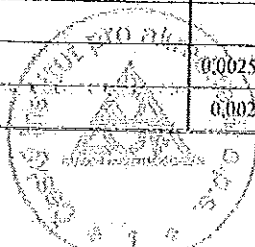
Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky
20*	Odpor stejnosměrný	0,1 mΩ		0,10 %	MK12, etalony, odchylka jmenovité hodnoty do 10 %
		1 mΩ		0,010 %	
		10 mΩ		0,010 %	
		100 mΩ		0,010 %	
		1 Ω		0,010 %	
		10 Ω		0,010 %	
		100 Ω		0,010 %	
		1 kΩ		0,010 %	
		10 kΩ		0,010 %	
21*	NF výkon	3,3 V až 1020 V, 3,3 mA až 20,5 A	45 Hz až 65 Hz	0,12 %	zdánlivého výkonu ⁴⁾ , MK3, MK7, účinník 0,0 až 1,0
		6 V až 720 V, 20,5 A až 120 A	45 Hz až 65 Hz	0,18 %	zdánlivého výkonu ⁴⁾ , MK7, měření účinník 0,0 až 1,0
22*	Účinník ⁴⁾	0,0 až 0,8	45 Hz až 65 Hz	0,0012	MK3, MK7
		0,8 až 1,0	45 Hz až 65 Hz	0,0007	
23*	VF napětí	5 mV _{pp} až 35 V _{pp}	50 kHz až 100 MHz	1,5 % + 0,1 mV	MK16
			100 MHz až 250 MHz	2,0 % + 0,1 mV	
		5 mV _{pp} až 3 V _{pp}	250 MHz až 350 MHz	2,0 % + 0,1 mV	
24*	VF proud	0,1 mA _{pp} až 110 mA _{pp}	50 kHz až 100 MHz	1,5 % + 2 μA	MK16
			100 MHz až 250 MHz	2,0 % + 2 μA	
		0,1 mA _{pp} až 60 mA _{pp}	250 MHz až 350 MHz	2,0 % + 2 μA	
25*	Doba náběhu impulsu	0,7 ns		0,15 ns	MK16, 4,5 mV _{pp} do 1,0 V _{pp} , 50 Ω
		0,85 ns		0,15 ns	MK16, 2,5 V _{pp} , 50 Ω
		≥ 0,7 ns		2,0 % + 0,15 ns	MK16, měření od 5 mV _{pp} do 100 V _{pp}
		≥ 4 ns		3,0 % + 0,15 ns	MK16, měření od 100 V _{pp} do 30 kV _{pp}
		≥ 0,7 ns		4,0 % + 0,15 ns	MK16, měření od 5 mA _{pp} do 36 A _{pp}
		≥ 20 ns		5,0 %	MK16, měření od 36 A _{pp} do 500 A _{pp}
26*	Amplituda impulsu	1,8 mV _{pp} až 2,2 V _{pp}		0,25 % + 0,1 mV	MK16, 50 Ω
		1,8 mV _{pp} až 105 V _{pp}		0,25 % + 0,1 mV	MK16
		100 V _{pp} až 30 kV _{pp}		3,0 %	
		5 mA _{pp} až 36 A _{pp}		3,0 %	
		36 A _{pp} až 500 A _{pp}		3,0 %	
27*	Doba periody a trvání impulsu	2 ns až 2 μs		0,0025 %	MK11, MK16
		2 μs až 50 μs		0,0025 % + 15 mHz	
		50 μs až 5 s		0,0025 % + 1 mHz	



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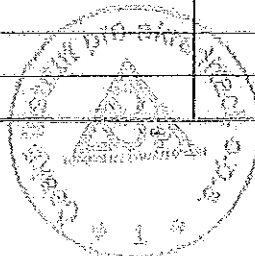
Příloha nahrazuje přílohu č.: 2 ze dne: 15.4.2010

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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lisem 129, 171 02 Praha 8

Přídavné číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace [±] ^{2),3)}	Identifikace metody a poznámky		
28*	Simulace teplotního snímače napětím	-200°C až -100°C		0,33°C	MK8, napětí termoelektrodlánku typu K		
		-100°C až -25°C		0,18°C			
		-25°C až 120°C		0,16°C			
		120°C až 1000°C		0,26°C			
				1000°C až 1372°C		0,40°C	MK8, napětí termoelektrodlánku typu J
				-210°C až -100°C		0,27°C	
				-100°C až -30°C		0,16°C	
				-30°C až 150°C		0,14°C	
				150°C až 760°C		0,17°C	
				760°C až 1200°C		0,23°C	
				-250°C až -150°C		0,63°C	MK8, napětí termoelektrodlánku typu T
				-150°C až 0°C		0,24°C	
				0°C až 120°C		0,16°C	
				120°C až 400°C		0,14°C	
				0°C až 250°C		0,47°C	MK8, napětí termoelektrodlánku typu S
				250°C až 1000°C		0,36°C	
				1000°C až 1400°C		0,37°C	
				1400°C až 1767°C		0,46°C	
		400°C až 800°C		0,44°C	MK8, napětí termoelektrodlánku typu B		
		800°C až 1000°C		0,34°C			
		1000°C až 1550°C		0,30°C			
		1550°C až 1820°C		0,33°C			
28*	Simulace teplotního snímače napětím	-250°C až 100°C		0,50°C	MK8, napětí termoelektrodlánku typu E		
		-100°C až -25°C		0,16°C			
		-25°C až 350°C		0,14°C			
		350°C až 650°C		0,16°C			
		650°C až 1000°C		0,21°C			
29*	Simulace teplotního snímače odporem	-200°C až 0°C		0,05°C	MK8, odpor odporového snímače		
		0°C až 100°C		0,07°C			
		100°C až 300°C		0,09°C			
		300°C až 400°C		0,10°C			
		400°C až 630°C		0,12°C			
		630°C až 800°C		0,14°C			



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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lisem 129, 171 02 Praha 8

Měřené přístroje či zařízení:

(v souladu s výše uvedeným přehledem měřených veličin a jejich rozsahu měření mohou být měřeny následující typy přístrojů či zařízení)

Pořadové číslo	Typ měřeného přístroje či zařízení
1	Číslíkové voltmetry, ampérmetry a multimetry
2	Číslíkové wattmetry, kalibrátory výkonu
3	Analogové voltmetry, ampérmetry a multimetry
4	Analogové wattmetry
5	Zdroje a kalibrátory napětí a proudu
6	Vysokonapěťové zdroje a volimetry
7	Revizní přístroje
8	Měřidla malých odporů
9	Odporů a odporové dekády
10	Měřidla izolačních odporů
11	Měřidla a etalony RLC
12	Analogové a digitální osciloskopy, napěťové a proudové sondy, impulsní a signální generátory, další zařízení kalibrovaná využitím měření VF výkonu a činitele odrazu



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je ucdílnou součástí

osvědčení o akreditaci č.: 119/2009 ze dne: 26.2.2009

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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lisem 129, 171 02 Praha 8

Obor měřené veličiny: frekvence a čas

Kalibrace:

Nominální teplota pro kalibraci: $(23 \pm 5) ^\circ\text{C}$

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Frekvence nebo napětí	Měřicí schopnost kalibrace $[\pm]$ ^{2),3)}	Identifikační metody a poznámky
30	Frekvence	0,1 Hz až 3 GHz		10^{-7}	MK17, pro časový interval 10 s
31	Krátkodobá stabilita frekvence	1 Hz až 10 kHz		$2 \cdot 10^{-10}$	MK17, pro časový interval 1 s
		10 kHz až 3 GHz		$2 \cdot 10^{-11}$	
		0,1 Hz až 100 Hz		$2 \cdot 10^{-11}$	MK17, pro časový interval 10 s
		100 Hz až 3 GHz		10^{-11}	
		0,1 Hz až 50 MHz		10^{-10}	
32	Časový interval	5 ns až 10^5 s		$(0,9 + 100T)$ ns	MK17, MK18, T je v sekundách
33*	Otáčky	30 až 300 min ⁻¹		0,10 %	MK19, pro interval 10 s
		500 až 10000 min ⁻¹		0,050 %	
		6 až 100000 min ⁻¹		0,0020 %	MK19, elektrický vstup

Měřené přístroje či zařízení:

(v souladu s výše uvedeným přehledem měřených veličin a jejich rozsahu měření mohou být měřeny následující typy přístrojů či zařízení)

Pořadové číslo	Typ měřeného přístroje či zařízení
1	Čítače a generátory
2	Elektronické a mechanické stopky, generátory časového intervalu
3	Otáčkoměry s mechanickým snímačem, optickým snímačem nebo elektrickým vstupem



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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.

Kalibrační laboratoř

Pod Lisem 129, 171 02 Praha 8

Obor měřené veličiny: teplota

Kalibrace:

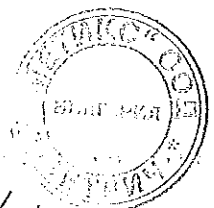
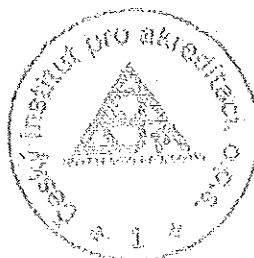
Nominální teplota pro kalibraci: $(23 \pm 5) ^\circ\text{C}$

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Měřicí schopnost kalibrace $[\pm ^2]$	Identifikace metody a poznámky
34*	Teplota	-20°C až 0°C	0,1°C	MK20, elektronické teploměry
		0°C až 90°C	0,05°C	
		90°C až 200°C	0,1°C	
		200°C až 420°C	0,2°C	
		-50°C až 0°C	0,5°C	MK20, teploměry teplotních komor
		0°C až 50°C	0,3°C	
		50°C až 250°C	0,4°C	

Měřené přístroje či zařízení:

(v souladu s výše uvedeným přehledem měřených veličin a jejich rozsahu měření mohou být měřeny následující typy přístrojů či zařízení)

Pořadové číslo	Typ měřeného přístroje či zařízení
1	Elektronické teploměry
2	Teploměry teplotních komor



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Akreditovaný subjekt:

Elektrotechnický zkušební ústav, s. p.
Kalibrační laboratoř
Pod Lísem 129, 171 02 Praha 8

Obor měřené veličiny: světelné veličiny

Kalibrace:

Nominální teplota pro kalibraci: $(23 \pm 2) ^\circ\text{C}$

Pořadové číslo ¹⁾	Měřená veličina	Rozsah měření	Měřicí schopnost kalibrace [\pm] % ^{2),3)}	Identifikace metody a poznámky
35	Svítivost	1 cd až 10000 cd	1,3 %	MK22
36	Světelný tok	50 lm až 10000 lm	1,3 %	MK23
37	Teplota chromatická	2000 K až 2900 K	40 K	MK24
38	Osvětlení	1 lx až 300 lx	1,2 %	MK25
		300 lx až 10000 lx	1,5 %	
		10 klx až 50 klx	2 %	
39	I _{ns}	5 cd/m ² až 500 cd/m ²	2 %	MK26
		500 cd/m ² až 700 cd/m ²	3 %	
		900 cd/m ²	2,5 %	

Měřené přístroje či zařízení:

(v souladu s výše uvedeným přehledem měřených veličin a jejich rozsahu měření mohou být měřeny následující typy přístrojů či zařízení)

Pořadové číslo	Typ měřeného přístroje či zařízení
1	Etalony svítivosti
2	Etalony světelného toku
3	Etalony teploty chromatické
4	Luxmetry
5	Jasoměry

¹⁾ v případě, že laboratoř provádí kalibrace mimo/í mimo své stálé prostory, jsou tyto kalibrace u pořadového čísla označeny hvězdičkou

²⁾ vyjádřena obdobně jako nejistota v souladu s požadavky dokumentu EA 4/02 při $k = 2$

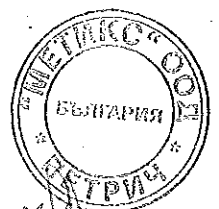
³⁾ hodnoty uvedené relativně v % nebo bezrozměrně, jsou vztaheny k měřené hodnotě, kromě bezrozměrné hodnoty nejistoty u činitele odrazu, kde se jedná o bezrozměrnou hodnotu činitele odrazu

⁴⁾ účinník odpovídá kosínu fázového posuvu mezi napětím a proudem (platí pro kladný i záporný fázový posuv)

⁵⁾ nejlepší schopnost měření je vztahena ke zdánlivému výkonu (součinu napětí a proudu)

MK - metodika kalibrace

V_{pp} , I_{pp} - mezivrcholová hodnota napětí nebo proudu



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Обхват на теста

Измервания	Device	Manufacturer	Code
Напрежение (тестове до 15kA)	Voltage divider 1:2000 Difference amplifier AM 502 Signal memory recorder TA 800	OFZ Arsenal Tektronix W&W	AM 502/1 TRA800
Ток (тестове до 15kA)	Lin. current transformer LGSSO Burden 1 Q Signal memory recorder TA 800	Ritz OFZ Arsenal W&W	WLIN5000/1 TRA800
Напрежение (тестове над 15kA)	3-channel insulating measuring amplifier Signal memory recorder SMR II	Rohrer W&W	T908D SMRII64/1
Ток (тестове над 15kA)	Lin. current transformer LGSSO Burden 0,7m Q Signal memory recorder SMR II	Ritz OFZ Arsenal W&W	WLIN6000/1 SMRII64/1
Ток (тестове с намалено напрежение)	Current transformer GE 4461 Current transformer AETII 0 True-RMS amperemeter Kl. 0,5	Goerz Siemens Norma	WI600/1 WI4000/1 AO.5/1
Пад на напрежение	Digital multimeter Fluke 185	Fluke	FLUKE185/1
Вътрешно съпротивление	Resistance microhm meter 300/0	Stetter	MICROHM
Диелектрични свойства	High-voltage test equipment 90-1 F	Elabo	HSG5KV
Време	Signal memory recorders Stopwatch	W&W Junghans	TRA800, SMRI164/1 938-2
Температура	Temp, recorder Polycomp SK 30 Temperature meter TESTO 901	H & B Testoterm	SK30 TESTO
Нагряване	Heating cabinet UT 6060	Heraeus	-
Механично въздействие якост	Test apparatus	OFZ Arsenal	-
Устойчивост на ръжда	Test chamber C330	Liebich	77
Въртящ момент	Torque meter	Rahsol	-
Отстояния	Digital slide gauge CD-20D	Mitutoyo	SCHUB
Размери	Digital slide gauge CD-20D	Mitutoyo	SCHUB

Тестван продукт: Цилиндрични предпазители OEZ OPV10S/10x38 (500VAC/400VAC gG) от 2A до 32A.

Резултат: №2.03.00938.1.0/ OEZ OPV /500-400/gG/CB/CCA-
Цилиндричните предпазители OEZ OPV10S /10x38 (500VAC/400VAC gG)
преминаха успешно тестовете!



ТОВ "ЕЛЕКТРОМАШИН" - БЪЛГАРИЯ

ТОВ "ЕЛЕКТРОМАШИН" - БЪЛГАРИЯ
УЛ. "СВ. СВЕТОСЛАВ" № 10
1000 СОФИЯ, БЪЛГАРИЯ
ТЕЛЕФОН: 0035 8 02 94 10 10
ТЕЛЕФАКС: 0035 8 02 94 10 11
WWW.ELECTROMASHIN.BG



Management System
ISO 9001:2008
OHSAS 18001:2007
www.tuv.com
ID: 9105026855



Management System
ISO 14001:2004
www.tuv.com
ID: 9105026855

ПРИЛОЖЕНИЕ 9.9.5

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие

С настоящето декларираме съответствието на предлаганото изпълнение с изискванията на техническата спецификация

*Настоящото приложение се прилага във връзка с участието ми в:
търс с предмет:*

„ДОСТАВКА И МОНТАЖ НА КОМПЛЕКТНИ МЕТАЛНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ“

РЕФ. № PPD 15-065

организиран от "ЧЕЗ Разпределение България" АД

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV



ELECTROTECHNICAL TESTING INSTITUTE - CZECH REPUBLIC
ELEKTROTECHNISCHE PRÜFANSTALT - TSCHJECHISCHE REPUBLIK
INSTITUT ÉLECTROTECHNIQUE D'ESSAIS - RÉPUBLIQUE TCHÈQUE
ЕЛЕКТРОТЕХНИЧЕСКИЙ ИСПЫТАТЕЛЬНЫЙ ЦЕНТР - ЧЕХИЯ

Pod Lisem 129, 171 02 Praha 8 - Troja

CERTIFICATE

No.: 1140839

Product: Fuse-disconnector

Type: OPVP10, 14, 22

Rating: 32 A, 50 A, 100 A; 690 V AC, 440 V DC

Ordering firm: OEZ s. r. o
Šedivská 339, 561 51 Letohrad, Czech Republic

Manufacturer: OEZ s. r. o
Šedivská 339, 561 51 Letohrad, Czech Republic

Trade mark:

The test results are stated in the test-report No.: 403929-01/01 of: 30.09.2014

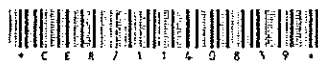
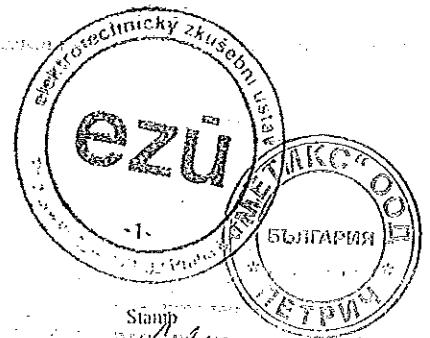
A sample of the product was found to be in conformity with:
ČSN EN 60947-3 ed. 3:10+A1:12, ČSN EN 60947-1 ed.4:08+A1:11

The validity of the certificate is limited to: 31.10.2017

7.10.2014

Prague

Miroslav Sedláček
Head of Certification Body



403929-01