INSTITUT „PRÜFFELD FÜR ELEKTRISCHE HOCHLEISTUNGSTECHNIK" GMBH IPH BERLIN

Independent, accredited testing station · Member laboratory of STL and LOVAG

TEST REPORT

NO. 1213.1607.6.950

Tyco Electronics Raychem GmbH Finsinger Feld 1 85521 Ottobrunn GERMANY	CLIENT
Tyco Electronics Raychem GmbH	MANUFACTURER
Screened separable cable connector for single-core cables with extruded plastic insulation	TEST OBJECT
RSES-52xx-R	TYPE:
12 test samples	SERIAL NO.
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 50 mm²	RATED CHARACTERISTICS GIVEN BY THE CLIENT
CENELEC Harmonization Document HD 629.1 S2: 2006-02 DIN VDE 0278-629.1 (VDE 0278 Teil 629-1): 2002-06 IEC 61442: 2005-04 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
22 May 2007 to 20 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

D. JEGUST
Test engineer in charge

Berlin, 1 April 2008

INSTITUT PRÜFFELD FÜR ELEKTRISCHE HOCHLEISTUNGSTECHNIK IPH BERLIN

Independent test laboratory, accredited by Deutsche Akkreditierungsstelle Technik (DATech) 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

DAT-P-019/98

Contents Sheet

ВЯРНО С ОРИГИНАЛА

"КИМТЕХ-БЪЛГАРИЯ" ООД КИМТЕХ БУРГАС

This test document consists of 66 sheets.

Distribution Copy No. 1

Copy No. 1 in English: Tyco Electronics Raychem GmbH

ВЯРНО С ОРИГИНАЛА

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.	Moritz	IPH test engineer (short- circuit tests and screen fault current initiation test)
Mr.	Schad	Tyco Electronics Raychem GmbH (partially present)

2. Test performed

All tests of the test sequences D1, D2 as well as special tests Nos. 17 to 21 in the following order:

Test sequence	Test	Type of test
D1	1	DC voltage dry withstand test
	2	AC voltage dry withstand test
	3	Partial discharge test at ambient temperature
	4	Impulse voltage test at elevated temperature
	5	Electrical heat cycling test[1)] in air
	6	Electrical heat cycling 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 withstand test

Test sequence	Test	Type of test
D2	1	DC voltage dry withstand test
	2	AC voltage dry withstand test
	3	Thermal short-circuit test of the conductor
	4	Dynamic short-circuit test of the conductor
	5	Disconnection/connection
	6	Impulse voltage test at ambient temperature
	7	AC voltage test

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	Leakage current measurement[2)]
	19	Screen fault current initiation test[3)]
	20	Operating force test
	21	Test of 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 19 and 21 have been carried out on separate test objects.

Note to the tests:
CENELEC Harmonization Document HD 629.1 S2: 2006-02 and IEC 61442: 2005-04 use different terms with regard to the types of test. Below you find the terms of the normative document of the test procedure:

1) Heating cycles voltage test
2) Screen leakage current measurement
3) Screen fault current initiation test
4) Test of capacitive test point performance

ВЯРНО С ОРИГИНАЛА

"КИМТЕХ-БЪЛГАРИЯ" ООД "КИМТЕХ" БУРГАС

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:	RSES-52xx-R		
Manufacturer:	Tyco Electronics Raychem GmbH		
Serial No.:	12 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	50	mm²
Design:	Type of cable connection	Screened separable elbow connector, with capacitive test point	
	Cable	Screened single-core cable with extruded plastic insulation,	
	Cable marking	N2XS(F)2Y 1x50 RM/16 mm² 12/20	kV
	Designation of manufacturer	NEXANS	
	Material of conductor	Cu	
	Material of screen	Cu	

3.2 Identity documents

The manufacturer confirms that the test object has been manufactured in compliance with the drawings given in this document. IPH did not verify this compliance in detail. The identity of the test object is fixed by the following drawings and data submitted by the client:

Name of drawing	Drawing No.	Date of drawing	Author	Notes
Installations Instruction Type RSES	EPP-0472	2/00	Tyco Electronics	Sheets 60 to 65

Entry of test objects at IPH: 28 March 2007

BPRC OPITEMADA

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 61442: 2005-04
DIN VDE 0278-442 (VDE 0278 Teil 442): 2006-01

ВЯРНО С ОРИГИНАЛА

КИНТЕХ-ЕЛЕКТРИЧЕСКА ТЕХНИКА" ООД КИНТЕХ БУРГАС

4.3 Required test parameters

Test No.	Type of test	Required test parameters	
1	DC voltage dry withstand test	Test voltage 6 x U_0: Duration of test: Polarity:	76 kV 15 min Negative
2	AC voltage dry withstand test	Test voltage 4.5 x U_0: Test frequency: Duration of test:	57 kV 50 Hz 5 min
3	Partial discharge test at ambient temperature	Prestress voltage 2.25 x U_0: Measuring voltage 2.00[1] x U_0: Prestress duration: Measuring time:	29 kV 25 kV 1 min 1 min
4	Impulse voltage test at elevated 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. 95 .. 100 °C[2]
5	Electrical heat cycling test in air	• Continuous AC voltage Test voltage 2.5 x U_0: Test frequency: Duration of test: • Thermal cycles Number of cycles: Cycle (8 h): Conductor temperature during the last 2 hours of heating cycle:	 32 kV 50 Hz 21 day 63 5 hours of heating + 3 hours of cooling 95 .. 100 °C[2]
6	Electrical heat cycling 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:	 ϑ_U resp. 95..100 °C[2]
9	Impulse voltage test at ambient temperature	See test No. 4, except Conductor temperature: Duration of test:	 ϑ_U 15 min

ВЯРНО С ОРИГИНАЛА

"ХИМТЕХ-ЗАХАРИЯ" ООД - БУРГАС - ХИМТЕХ

Required test parameters (continued)

Test No.	Type of test	Required test parameters	
10	AC voltage dry withstand test	Test voltage 2.5 x U_0: Test frequency: Duration of test:	32 kV 50 Hz 15 min

Notes to the table of required test parameters:

1) CENELEC Harmonization Document HD 629.1 S2: 2006-2, Table 7, requires the partial discharge to be measured at a measuring voltage of 1.73 x U_0 or 2.00 x U_0 respectively. The measurement was done at 2 x U_0, because the standard of the cable used for the test requires a test voltage > 1.73 x U_0.

2) Acc. to EN 61442: 2005-04, 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.

ХИМТЕХ-БЪЛГАРИЯ" ООД ХИМТЕХ БУРГАС

ВЯРНО С ОРИГИНАЛА

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 DJ250-2 type (manufacturer: Cooper). The test objects were mounted on cable lines of approx. 3 m length and of N2XS(F)2Y-1x50 RM/16 mm²-12/20 kV type. To apply the test voltage, each of the test lines had additionally been equipped with one auxiliary sealing end of EPKT 24C1XI type (manufacturer Tyco Electronics Raychem). 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 test (test 1)

Test arrangement to IEC 61442: 2005-04, Clause 5

4.4.2 AC voltage test (test 2)

Test arrangement to IEC 61442: 2005-04, Clause 4

4.4.3 Partial discharge test at ambient temperature (test 3)

Test arrangement to IEC 61442: 2005-4, 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: 2005-04, 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 Electrical heat cycling test in air (test 5)

Test arrangement to IEC 61442: 2005-04, 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 °C ± 5 K. The thermal cycling was implemented by a test cycle control facility.

КИМТЕХ-БЪЛГАРИЯ" ООД БУРГАС
ВЯРНО С ОРИГИНАЛА

Test arrangement (continued)

4.4.6 Electrical heat cycling 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).

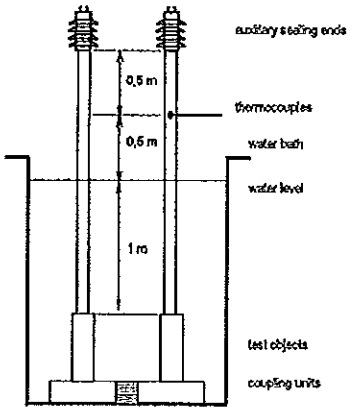


Figure 1: Test of the connectors in water bath

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 test (test 10)

See Sub-clause 4.4.2

КИНТЕХ-БЪЛГАРИЯ ЕООД "КИНТЕХ" • БУРГАС •

BRAND OPTIMAIN

4.5 Test and measuring circuits

4.5.1 DC voltage test (test 1)

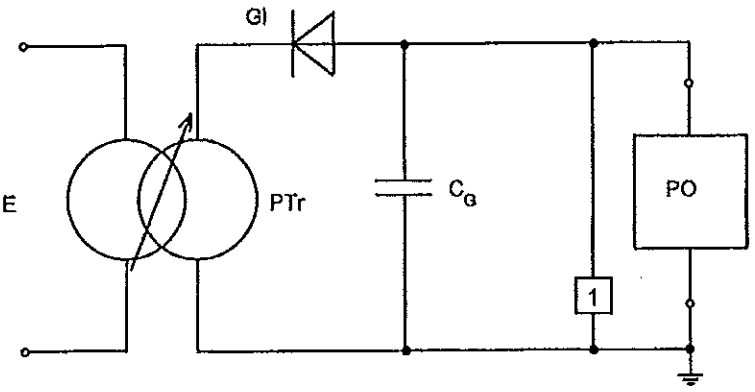
Technical data of test circuit

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
C_G Smoothing capacitor
1 Measuring point
PO Test object

Figure 2: Test and measuring circuit for the DC voltage test

„КИМТЕХ-БЪЛГАРИЯ" ООД КИМТЕХ БУРГАС
ВЯРНО С ОРИГИНАЛА

Test and measuring circuits (continued)

4.5.2 AC voltage test (tests 2 and 10)

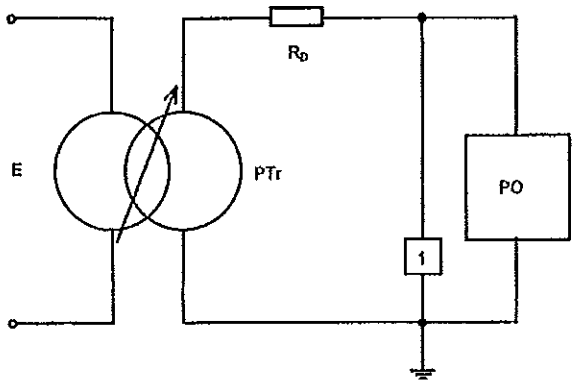
Technical data of test circuit

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 test

ВЯРНО С ОРИГИНАЛА

Test and measuring circuits (continued)

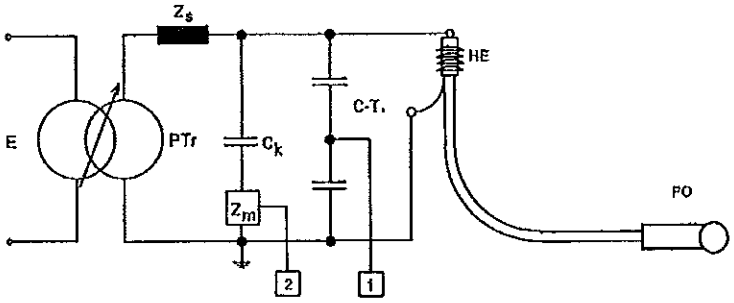
4.5.3 Partial discharge test at elevated and ambient temperatures (tests 3 and 8)

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)	C_k = 1 nF
		- Coupling four pole of COPL542A type	
		- PD measuring station of MPD540 type	Band width = 300 MHz
		- USB Interface 502	Center frequency 400 kHz
		- PD calibrator of CAL542 type (mtronix)	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)

BERICO OPTIMA

Test and measuring circuits (continued)

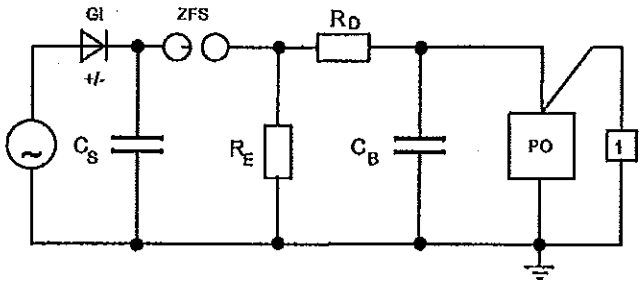
4.5.4 Impulse voltage test at elevated and ambient temperatures (tests 4 and 9)

Technical data of test circuit

Impulse circuit:	Number of stages	n	=	2	
	Impulse capacitance	C_S	=	70	nF
	Loading capacitance	C_B	=	1.5	nF
	Damping resistance	R_D	=	122	Ω
	Discharge resistance	R_E	=	1100	Ω

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)

ВЯРНО С ОРИГИНАЛА
"КИНТЕХ-БЪЛГАРИЯ" ООД КИНТЕХ БУРГАС

Test and measuring circuits (continued)

4.5.5 Electrical heat cycling in air and in water, resp. (tests 5 and 6)

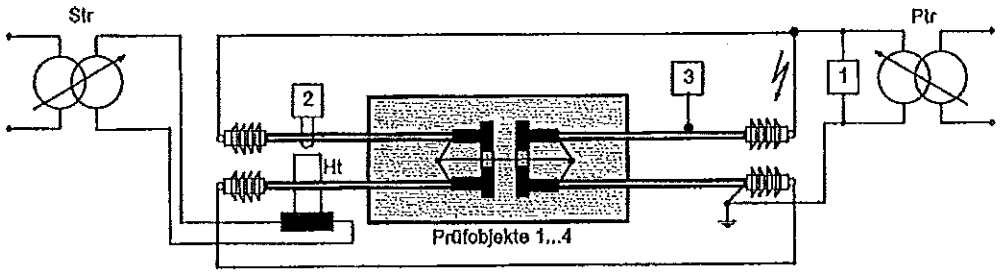
Technical data of test circuit

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 electrical heat cycling tests in air and in water, resp.

4.5.6 Disconnection/connection (test 7)

None

ВЯРНО С ОРИГИНАЛА

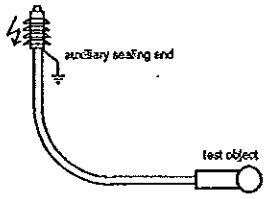
4.6 Test results

4.6.1 DC voltage 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	-76	No disruptive discharge
4	Conductor	Screen		No disruptive discharge

Notes:

Two test lines were tested together, they were connected by a coupling unit.

ВЯРНО С ОРИГИНАЛА

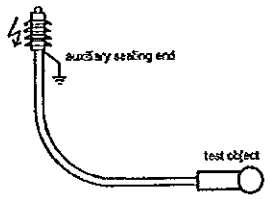
Test results (continued)

4.6.2 AC voltage 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	57	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)

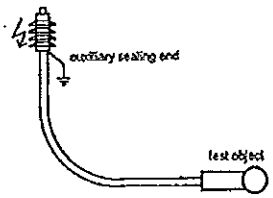
4.6.3 Partial discharge test at ambient temperature (test 3)

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 (1 min)	Measuring voltage (1 min)	Measured PD value
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)

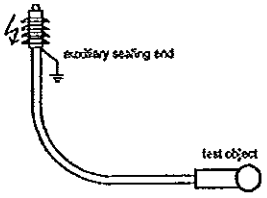
4.6.4 Impulse voltage test at elevated temperature (test 4)

Full wave:

Front time	T_1 = 1.84 µs
Virtual time to half value	T_2 = 50 µs

Test temperature:

Ambient temperature	18 °C
Conductor temperature	95..100 °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] -125 [1]	10/0 [1] 10/0 [1]
3	Conductor	Screen		
4	Conductor	Screen		

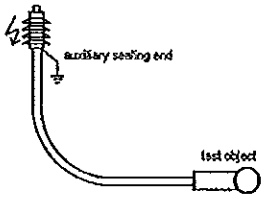
Notes:

[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 Electrical heat cycling 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]	341 [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.

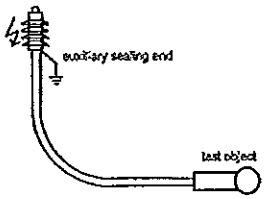
„КЪМТЕХ България" ООД · КЪМТЕХ · БУРГАС

ВЯРНО С ОРИГИНАЛА

Test results (continued)

4.6.6 Electrical heat cycling 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]	350 [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.

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.

ВЯРНО С ОРИГИНАЛА

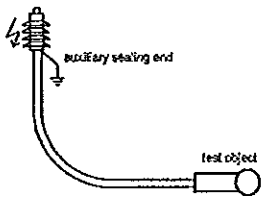
"КИМТЕХ-БЪЛГАРИЯ" ООД • КИМТЕХ • БУРГАС

Test results (continued)

4.6.8 Partial discharge test at elevated and ambient temperatures (test 8)

Test frequency:		50 Hz
Test temperature:	Ambient temperature Conductor temperature	20 °C 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	< 5 [1]
2	Conductor	Screen			
3	Conductor	Screen	29	25	< 2 [1]
4	Conductor	Screen			
Measured PD values at ambient temperature					
1	Conductor	Screen	29	25	< 1.0 [1]
2	Conductor	Screen			
3	Conductor	Screen	29	25	< 1.0 [1, 2, 3]
4	Conductor	Screen	29	25	< 1.0 [1, 2, 3]

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. Providing separate test results for each of the test lines is not possible.

[2] Basic disturbance level at same value

[3] The test lines were separated for the PD measurement.

ВЯРНО С ОРИГИНАЛА

Test results (continued)

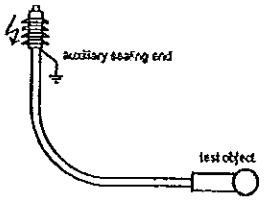
4.6.9 Impulse voltage test at ambient temperature (test 9)

Full wave:

Front time	T_1 = 1.27 µs
Virtual time to half value	T_2 = 53.0 µs

Test temperature:

Ambient temperature	20 °C
Conductor temperature	20 °C

Test arrangement 			Test voltage	Result
No. of test object	Voltage applied to	Earthed	kV	Number of impulses/disruptive discharges
1	Conductor	Screen	+125 -125	10/0 10/0
2	Conductor	Screen		
3	Conductor	Screen		
4	Conductor	Screen		

Notes:

All test lines were tested simultaneously.

ВЯРНО С ОРИГИНАЛА

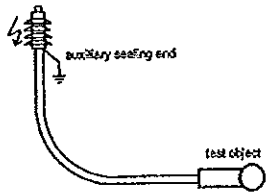
Test results (continued)

4.6.10 AC voltage 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.

ВЯРНО С ОРИГИНАЛА

4.7 Assessment of the results of test sequence D1

• Test 1

In the DC voltage 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 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 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 5 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 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 2006-2.

The tests of 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: 2005-04
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 test	Test voltage 6 x U_0: Duration of test: Polarity:	76 kV 15 min Negative
2	AC voltage test	Test voltage 4.5 x U_0: Test frequency: Duration of test:	57 kV 50 Hz 5 min
3	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 test	Test voltage 2.5 x U_0: Test frequency: Duration of test:	32 kV 50 Hz 15 min

КОМИТЕТ ЗА ЕЛЕКТРОТЕХНИКА" • БУРГАС • БЪЛГАРИЯ

ВЕРНО С ОРИГИНАЛА

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 and of N2XS(F)2Y-1x50 RM/16 mm²-12/20 kV type. To apply the test voltage, each of the test lines had additionally been equipped with one auxiliary sealing end of EPKT type (made by Tyco Electronics Raychem).
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 test (test 1)

Test arrangement to IEC 61442: 2005-04, Clause 5

5.4.2 AC voltage test (test 2)

Test arrangement to IEC 61442: 2005-04, Clause 4

5.4.3 Thermal short-circuit test of the conductor (test 3)

Test arrangement to IEC 61442: 2005-04, Clause 11

The three test objects were arranged on an assembly plate on equal level with phase centres 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.

5.4.4 Disconnection/connection (test 5)

None

5.4.5 Impulse voltage test at ambient temperature (test 6)

Test arrangement to IEC 61442: 2005-04, Clause 6

5.4.6 AC voltage test (test 7)

See Sub-clause 5.4.2

ВЯРНО С ОРИГИНАЛА

„НИМТ-ТЕХ-БЪЛГАРИЯ" ООД • БУРГАС •

5.5 Test and measuring circuits

5.5.1 DC voltage test (test 1)

See Sub-clause 4.5.1

5.5.2 AC voltage test (test 2)

See Sub-clause 4.5.2

5.5.3 Thermal short-circuit test of the conductor (test 3)

See following sheet

5.5.4 Disconnection/connection (test 5)

None

5.5.5 Impulse voltage test at ambient temperature (test 6)

See Sub-clause 4.5.4

5.5.6 AC voltage test (test 7)

See Sub-clause 4.5.2

ВЯРНО С ОРИГИНАЛА

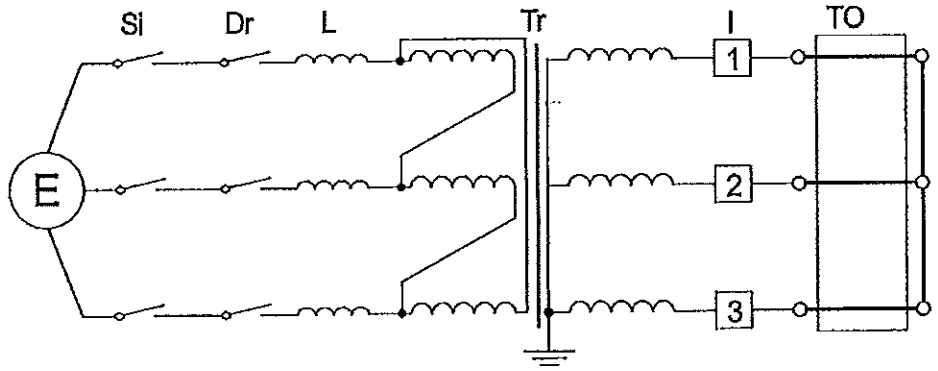
„КИНТЕХ-БЪЛГАРИЯ" ООД КИНТЕХ „КИНТЕХ" • БУРГАС

Test and measuring circuits (continued)

Thermal short-circuit test (test 3)

Technical data of test circuits

Test requirement		Short-circuit tests
Test No.		207 2835 and 207 2837
Number of phases (Test circuit)		3
Number of poles/phases (Test object)		3
Power frequency Hz		50
Power factor cos φ		0.015
Earthing conditions	Generator / grid	Not earthed
	Short-circuit transformer	Earthed
	Short-circuit point	Not earthed



E	Power supply (grid)	TO	Test object
SI	Master breaker	I	Current measurement
Dr	Making switch	U	Voltage measurement
L	Current-limiting reactor	1 - 3	Measuring points
Tr	Short-circuit transformer		

Figure 7: Test and measuring circuit for the thermal short-circuit test of the conductor

Technical data of measuring circuits

Measuring point	Symbol	Measured quantity	Measuring sensor/device
1	I L1	Current of conductor L1	Rogowski measuring device
2	I L2	Current of conductor L2	Rogowski measuring device
3	I L3	Current of conductor L3	Rogowski measuring device
Recording instrument: BE 256 transient recorder system			

ВЯРНО С ОРИГИНАЛА

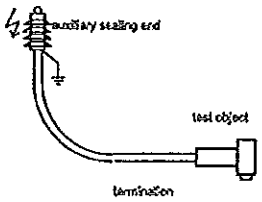
5.6 Test results

5.6.1 DC voltage 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: -

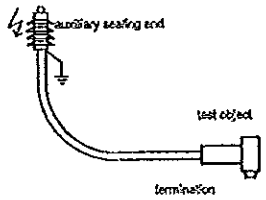
Test results (continued)

5.6.2 AC voltage 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	
5	Conductor	Screen	57	No disruptive discharge
6	Conductor	Screen	57	No disruptive discharge
7	Conductor	Screen	57	No disruptive discharge

Notes: -

КИМТЕХ-БЪЛГАРИЯ" ООД • КИМТЕХ • БУРГАС

ВАЖНО С ОРИГИНАЛА

Test results (continued)

5.6.3 Thermal short-circuit test of the conductor (test 3)

Condition of test object before test:	Prestressed by previous tests
Connection of the test object:	By 50-mm² cable
Short-circuit point:	At the bushings
Ambient temperature:	16 °C

Test parameters:

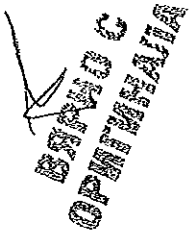
Test No.			207 2835	207 2837
Test voltage	V		455	455
Peak short-circuit current	kA	L1	12.8	13.4
		L2	13.5	14.0
		L3	14.8	15.6
Symmetrical short-circuit current	kA	L1	8.93	9.02
		L2	8.86	8.91
		L3	9.32	9.09
	Average		9.04	9.01
Duration of short-circuit	ms		1011	1011
Joule integral 10^6	A^2s	L1	80.8	82.3
		L2	79.9	80.3
		L3	88.2	84.0
Symmetrical short-circuit current 1 s	kA		9.09	9.06
Notes			-	2_Kt
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.



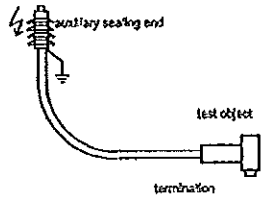
Test results (continued)

5.6.4 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.

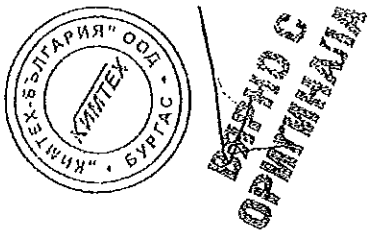
5.6.5 Impulse voltage test at ambient temperature (test 6)

Full wave:	Front time	T_1 = 1.27 µs
	Virtual time to half value	T_2 = 53 µs
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	+125	10/0
6	Conductor	Screen	-125	10/0
7	Conductor	Screen		

Notes:

All test lines were tested simultaneously.



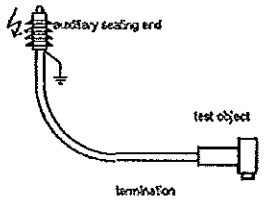
Test results (continued)

5.6.6 AC voltage 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 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 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 conductor with a thermally equivalent current of 9.1 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 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 2006-2.

The tests of test sequence D2 have been PASSED

ВЯРНО С ОРИГИНАЛА

"КИМТЕХ БЪЛГАРИЯ" ООД • КИМТЕХ • БУРГАС

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 61442: 2005-04
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 x U_0: Measuring voltage 2.00[1] x U_0: Prestress duration: Measuring time:	29 kV 25 kV 1 min 1 min

Notes to the table of required test parameters:

1) CENELEC Harmonization Document HD 629.1 S2: 2006-2, Table 7, requires the partial discharge to be measured at a measuring voltage of 1.73 x U_0 or 2.00 x U_0 respectively. The measurement was done at 2 x U_0, because the standard of the cable used for the test requires a test voltage > 1.73 x U_0.

ВЯРНО С ОРИГИНАЛА

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 and of N2XS(F)2Y-1x50 RM/16 mm²-12/20 kV type. To apply the test voltage, each of the test line had additionally been equipped with one auxiliary sealing end of EPKT type (manufacturer Tyco Electronics Raychem). 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: 2005-04, Clause 19

6.4.2 Partial discharge test at ambient temperature

Test arrangement to IEC 61442: 2005-4, 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.

ВЯРНО С ОРИГИНАЛА

"КИНИТЕХ" ООД БЪЛГАРИЯ БУРГАС

6.5 Test and measuring circuits

6.5.1 Operating eye test

None

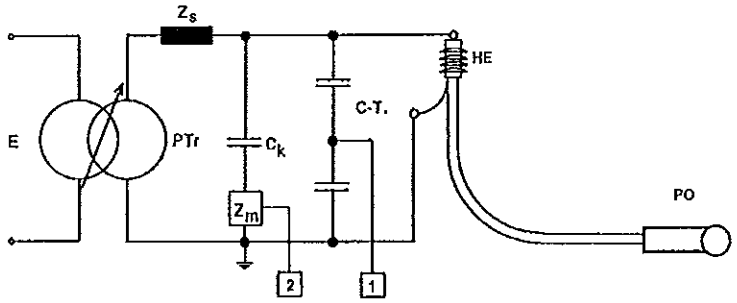
6.5.2 Partial discharge test at ambient temperature

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)	C_k = 1 nF
		- Coupling four pole of COPL542A type	
		- PD measuring station of MPD540 type	Band width = 300 MHz
		- USB interface 502	Center frequency 400 kHz
		- PD calibrator of CAL542 type (mtronix)	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 8: Test and measuring circuit for the partial discharge test

ВЯРНО С ОРИГИНАЛА

6.6 Test results

6.6.1 Operating eye test

The connector releases at an axial force of 23 N, but is capable of tightening again.

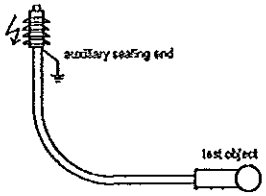
6.6.2 Partial discharge test at ambient temperature

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 (1 min)	Measuring voltage (1 min)	Measured PD value
No. of test object	Voltage applied to	Earthed	kV	kV	pC
1	Conductor	Screen	29	25	<1 [1]

Notes:

[1] Basic disturbance level at same value

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 2006-2.

The tests of the test sequence D3 have been PASSED

ВЯРНО С ОРИГИНАЛА

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 61442: 2005-04
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: Duration of thermal ageing:	(120±2) °C 168 h
18	Leakage current measurement	Test voltage U_m:	24 kV
19	Screen fault current initiation test	• Solidly earthed system Test voltage: Test current: Duration of current flow: Number of tests: • Unearthed or impedance-earthed system Test voltage: Test current: Test procedure:	 12.7 kV[1)] 10 kA 0.2 s 2 12.7 kV[1)] Minimum 10 A Start C-1 s O-2 min C-2 min O-2 min C 1 min O end
20	Operating force test	F < 900 N	
21	Capacitive test point performance	-	-

Note:

1) Test parameter complies with normative document. If lower values are applied the test will become more severe.

7.4 Test arrangement

7.4.1 Screen resistance measurement (test No. 17)

Test arrangement to IEC 61442: 2005-04, 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 Leakage current measurement (test No. 18)

Test arrangement to IEC 61442: 2005-04, 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 cm^2 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: 2005-04, 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: 2005-04, 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: 2005-04, Clause 20

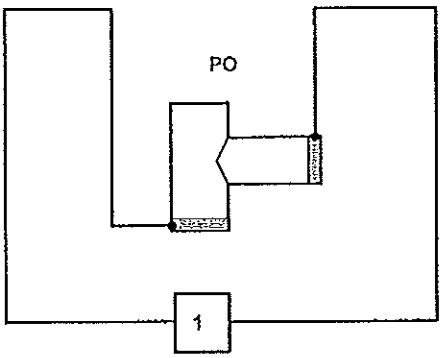
One connector was installed on a short length of cable by the client and the screen was earthed in accordance with the manufacturer's instructions. The test object was equipped with a mating bushing.

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 9: Measuring circuit for resistance measurement on the screen

ВЕРНО С ОРИГИНАЛА
„КЕМТЕХ-БЪЛГАРИЯ" ООД
КЕМТЕХ
БУРГАС

Test and measuring circuits (continued)

7.5.2 Leakage current measurement (test No. 18)

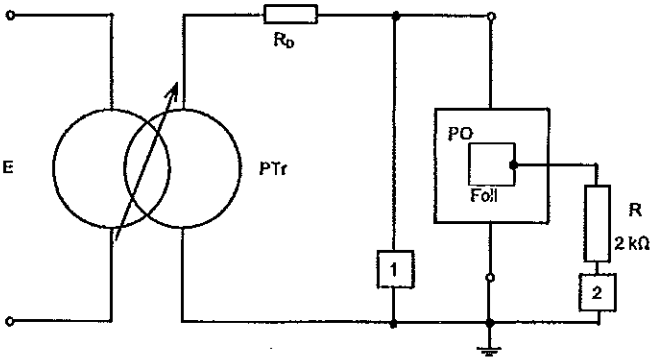
Technical data of test circuit

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 10: Test and measuring circuit for the leakage current measurement

ВЯРНО С ОРИГИНАЛА

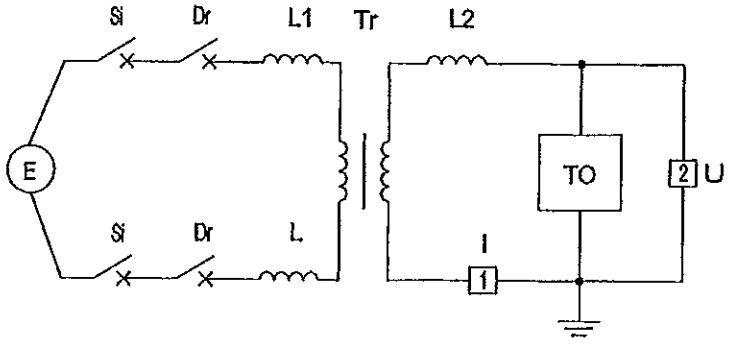
„КИНТЕХ-БЪЛГАРИЯ" ООД КИНТЕХ БУРГАС

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 4008 and 107 6207
Number of phases (Test circuit)		2
Number of poles/phases (Test object)		1
Power frequency Hz		50
Power factor cos φ		< 0.15
Connection of short-circuit transformers		I/I
Short-circuit power		120 MVA
Earthing conditions	Grid	Not earthed
	Short-circuit transformer	Earthed

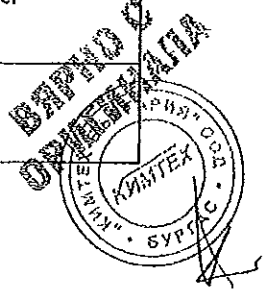


E	Power supply (grid)	1, 2	Measuring points
Si	Master breaker	I	Current measurement
Dr	Making switch	U	Voltage measurement
L1, L2	Current limiting reactors	TO	Test object
Tr	Short-circuit transformer		

Figure 11: 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 4008 and 107 6207	1	I	Short-circuit current	Current transformer
	2	u	Test voltage	RC divider
Recording Instrument: BE 256 transient recorder				



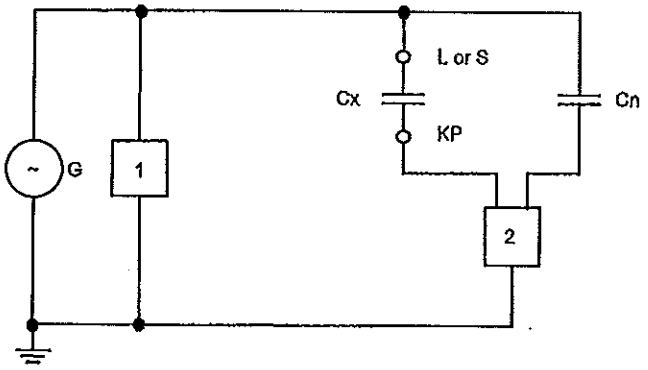
7.5.4 Capacitive test point performance (test No. 21)

Capacitance measurement by differential bridge

The capacitance Cx to be measured was connected to a capacitance measuring bridge together with the well-known capacitance Cn.

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	



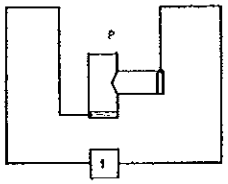
G Sine-wave generator
Cx Capacitance to be determined
L, S Cable conductor or cable screen
KP Capacitive test point
Cn Comparison capacitance
1, 2 Measuring points

Figure 12: Test and measuring circuit for determining the capacitive test point performance

7.6 Test results

7.6.1 Screen resistance measurement (test No. 17)

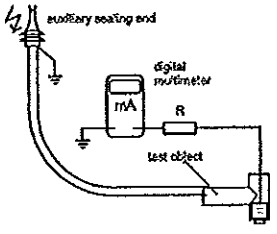
Test temperature: Ambient temperature 20 °C
Temperature during exposure to heat: 120 °C
Time of exposure to heat: 168 h

Test arrangement 		Resistance	Result
No. of test object	Condition of test object	Ω	
8	Before exposure to heat	216	OK
8	After exposure to heat	300	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 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	
9	Conductor	Screen	24		OK

OK: The leakage current was below the maximum permissible value of 0.5 mA.

ВЯРНО С ОРИГИНАЛА

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: RSES-5225-R 250 A

Ambient temperature: 19 °C

Test No.	107 ...	4007	4008		
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	15.5	15.5	15.5
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

Type of test object: RSES-5225-R 250 A

Ambient temperature: 19 °C

Test No.	107	6207
Test object	No.	9
Test voltage	kV	12.8
Test current	kA	10.9
Time of test	s	200
Notes		1)
Evaluation		n. OK

Notes:

1) The connector got loosened from bushing and cable. The bushing got broken.

n. OK: For the case of a disruptive discharge the screen of the connector is able to carry a fault current which is sufficient to trip the protection device, but another operation is no more possible.

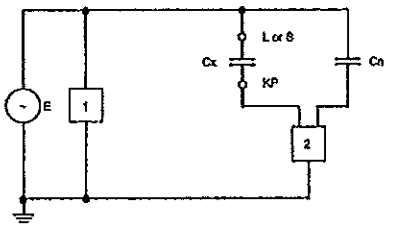
Test results (continued)

7.6.4 Operating force test (test No. 20)

Cold conditioning for 12 h at −20 °C, withdrawal force = 524 N

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	-	9.5	OK
12	S (screen)	Conductor	11.8	-	OK

Notes:

OK: The ratio of C_{te} to C_{tc} was 11.8 pF:9.5 pF ≈ 1.24, and thus ≤ 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 300 and 216 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 5 µA.

• Test 19

- Solidly earthed systems
For the case of a disruptive discharge the screen of the connector is able to carry a fault current which is sufficient to trip the protection device. The fault was reliably initiated within 3 s. The screen is able to discharge an arc to earth. The current is sufficient to operate the circuit protection, but the cable terminal gets completely destroyed so that another making of the short-circuit was no more possible.

- Unearthed or impedance-earthed systems
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. During the making cycle, the arc was ignited resp. re-ignited at 12.1 kV. During the making time, the current flow was present at 12.1 kV. A fault in the insulation is reliably detectable.

• Test 20

The withdrawal force was determined to be 524 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 1.24, 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.

ВЯРНО С ОРИГИНАЛА

8. Photos

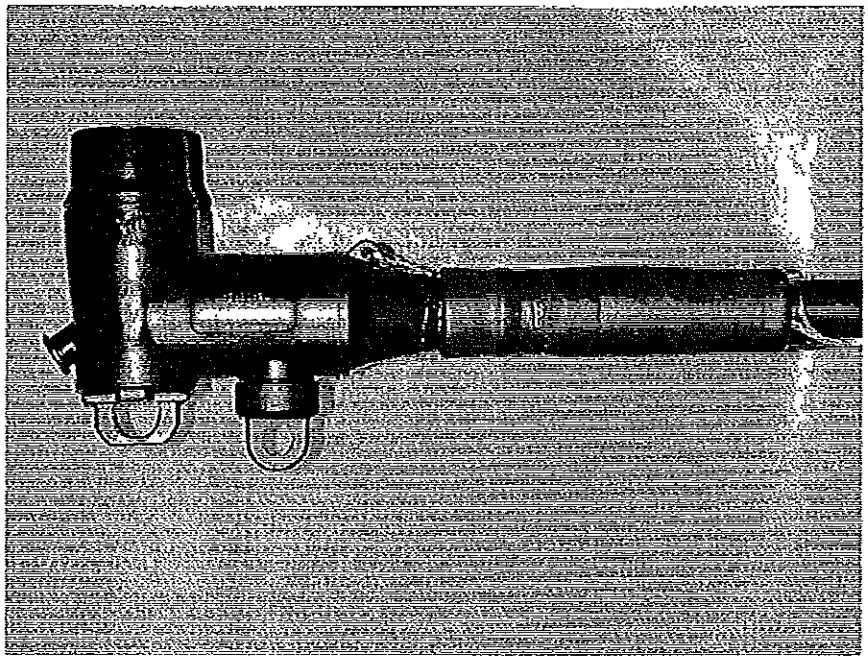


Figure 13: View of one test object

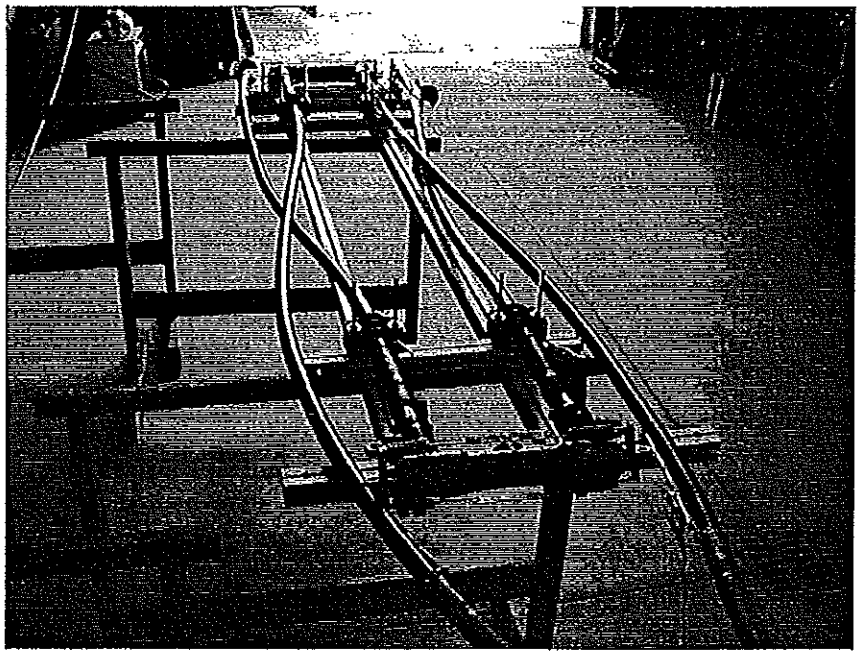


Figure 14: Arrangement for the electrical heat cycling test in air for test sequence D1

ВЯРНО С ОРИГИНАЛА

„КИМТЕХ-БЪЛГАРИЯ" ООД КИМТЕХ БУРГАС

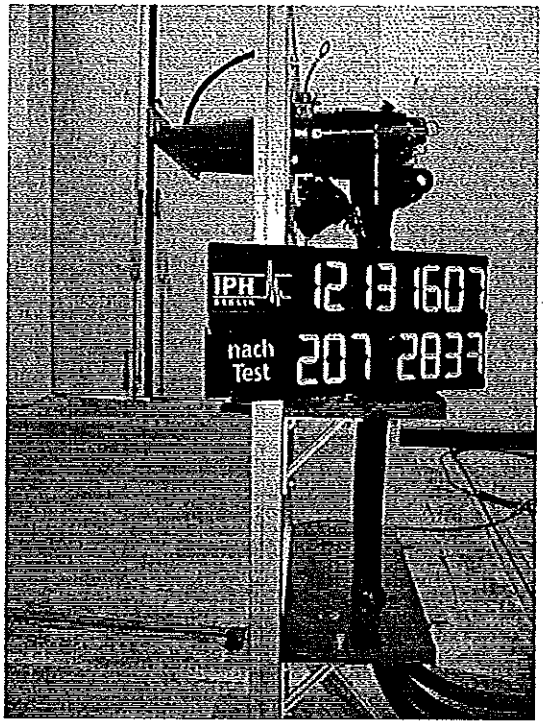


Figure 15: View of the test objects for the test sequence D2 (mounted on bushings)

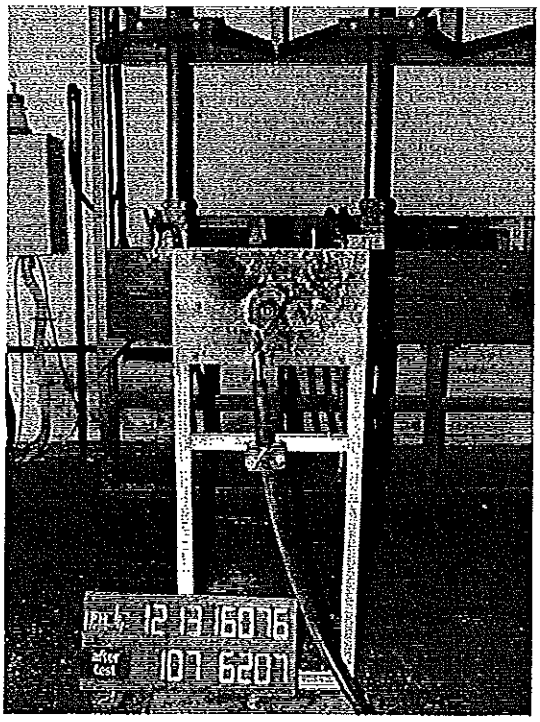


Figure 16: Test object after the screen fault current initiation test (solidly earthed systems)

ВЯРНО С ОРИГИНАЛА
„КИМТЕХ-БЪЛГАРИЯ" ООД
КИМТЕХ
БУРГАС

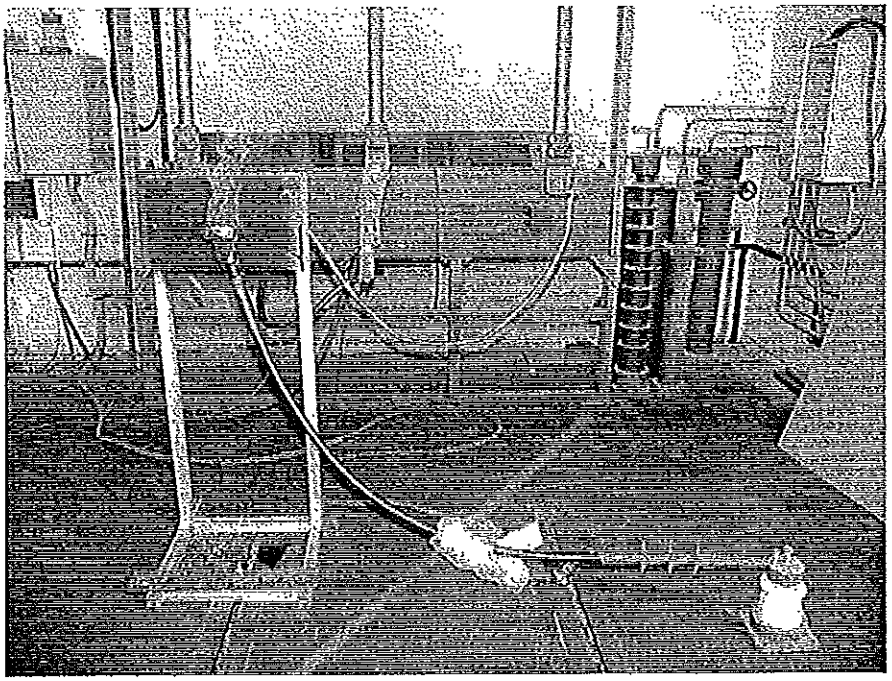
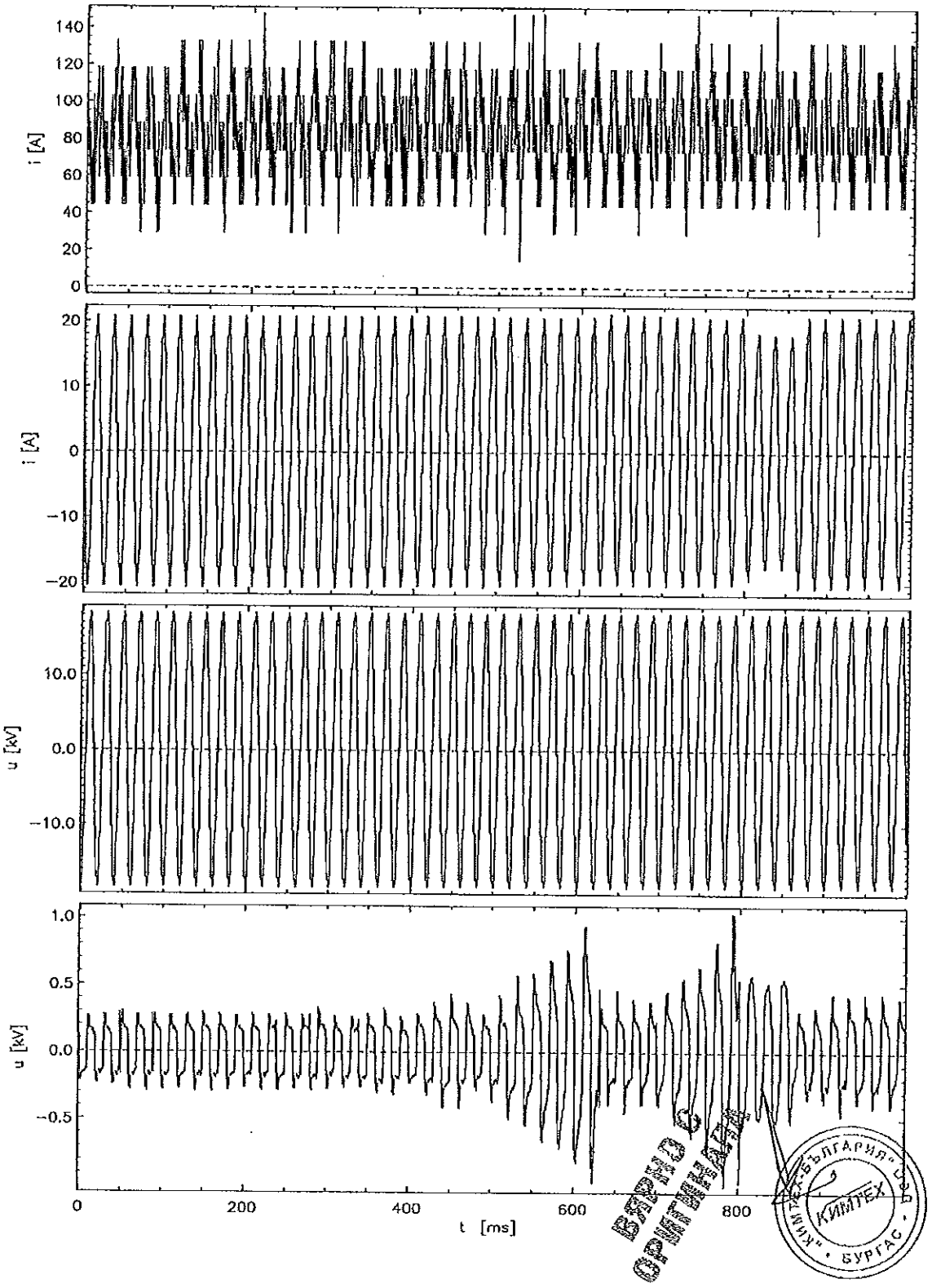


Figure 17: Test object No. 11 after the screen fault current initiation test (unearthed or impedance-earthed systems)

ВЯРНО С ОРИГИНАЛА
КИМТЕХ
КИМТЕХ-БЪЛГАРИЯ ЕООД
БУРГАС

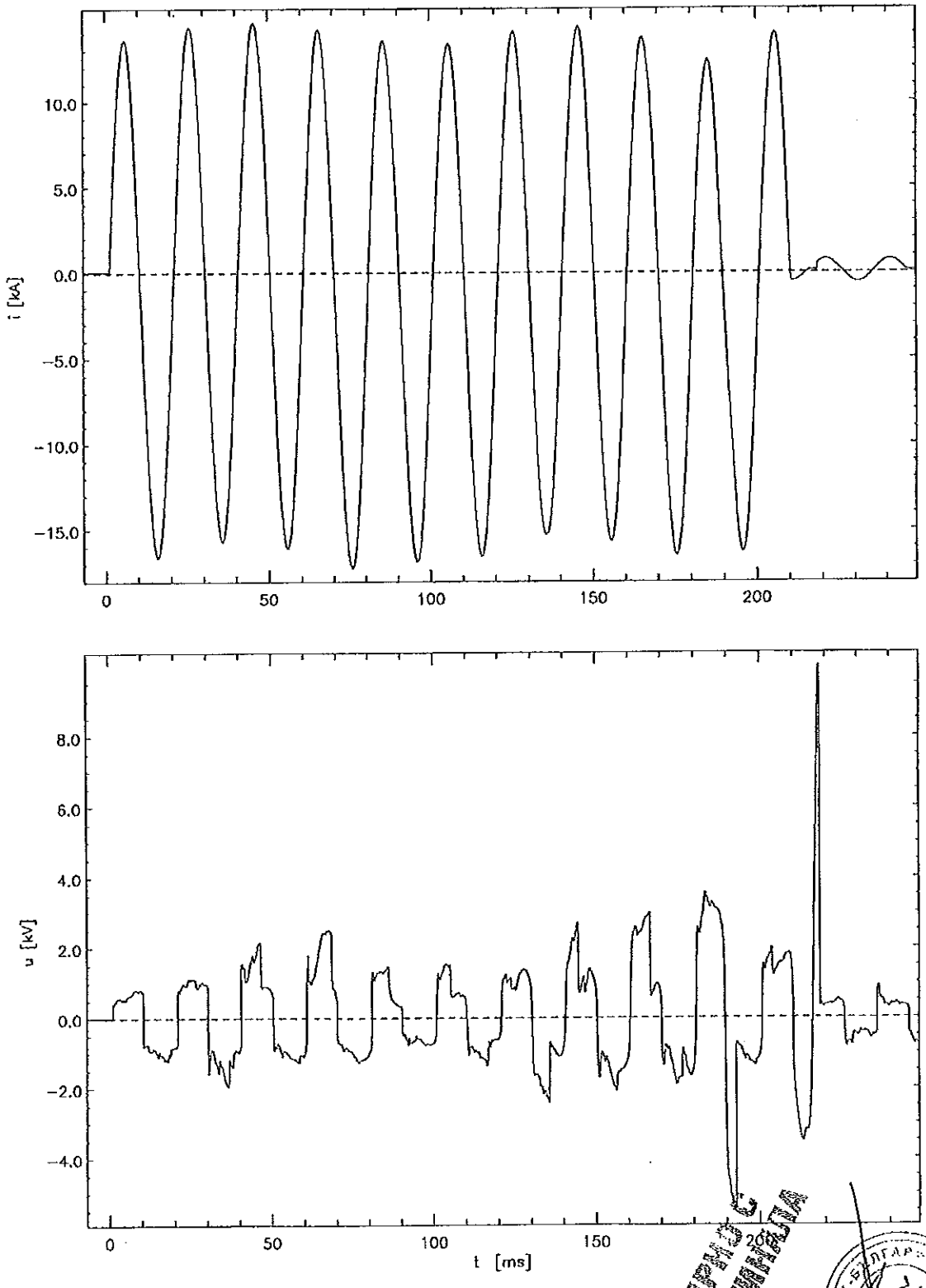
9. Oscillograms

Test-No. 1074008



ВЯРНО С ОРИГИНАЛА
„КИМТЕХ" ЕООД БЪЛГАРИЯ БУРГАС

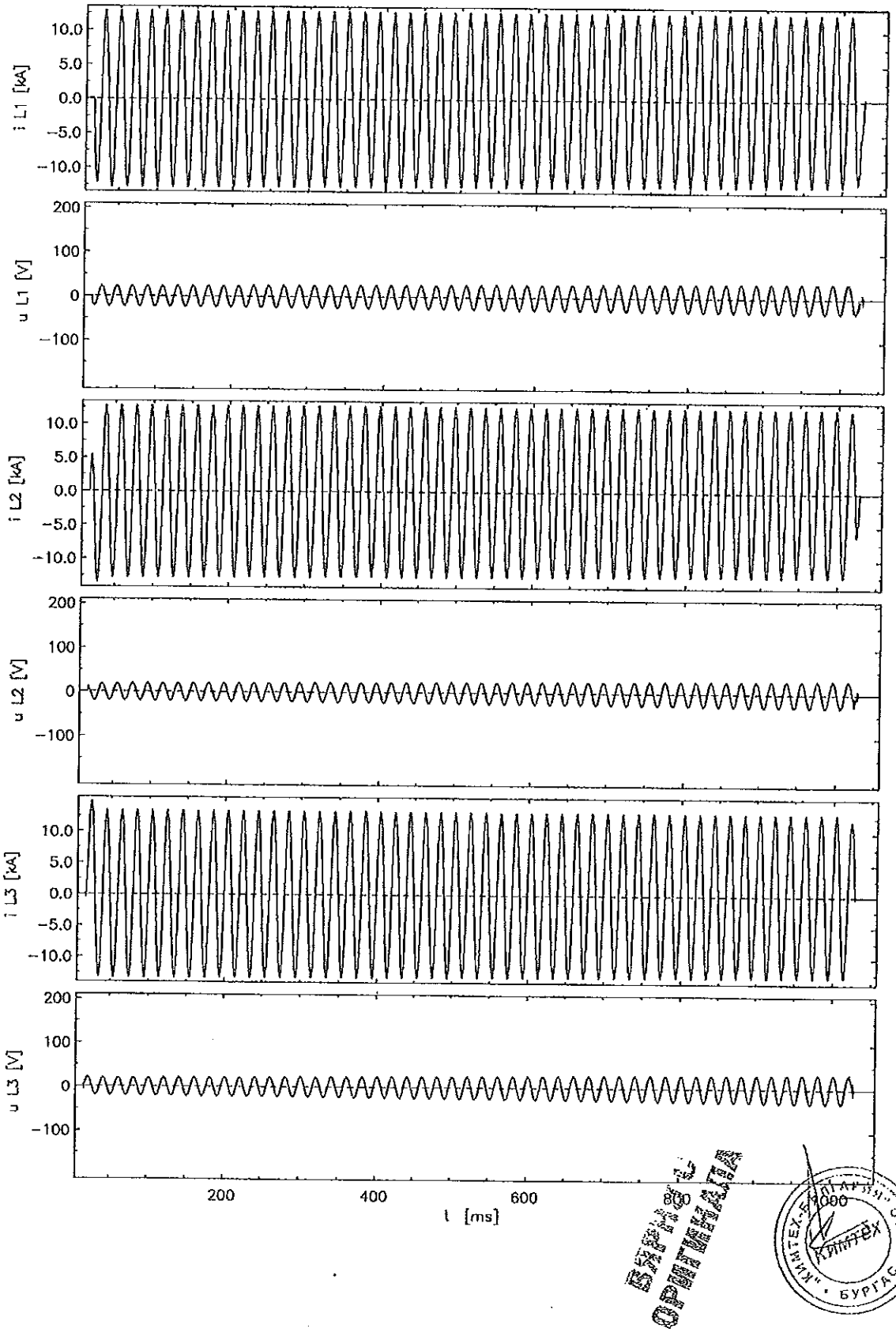
Test--No. 1076207



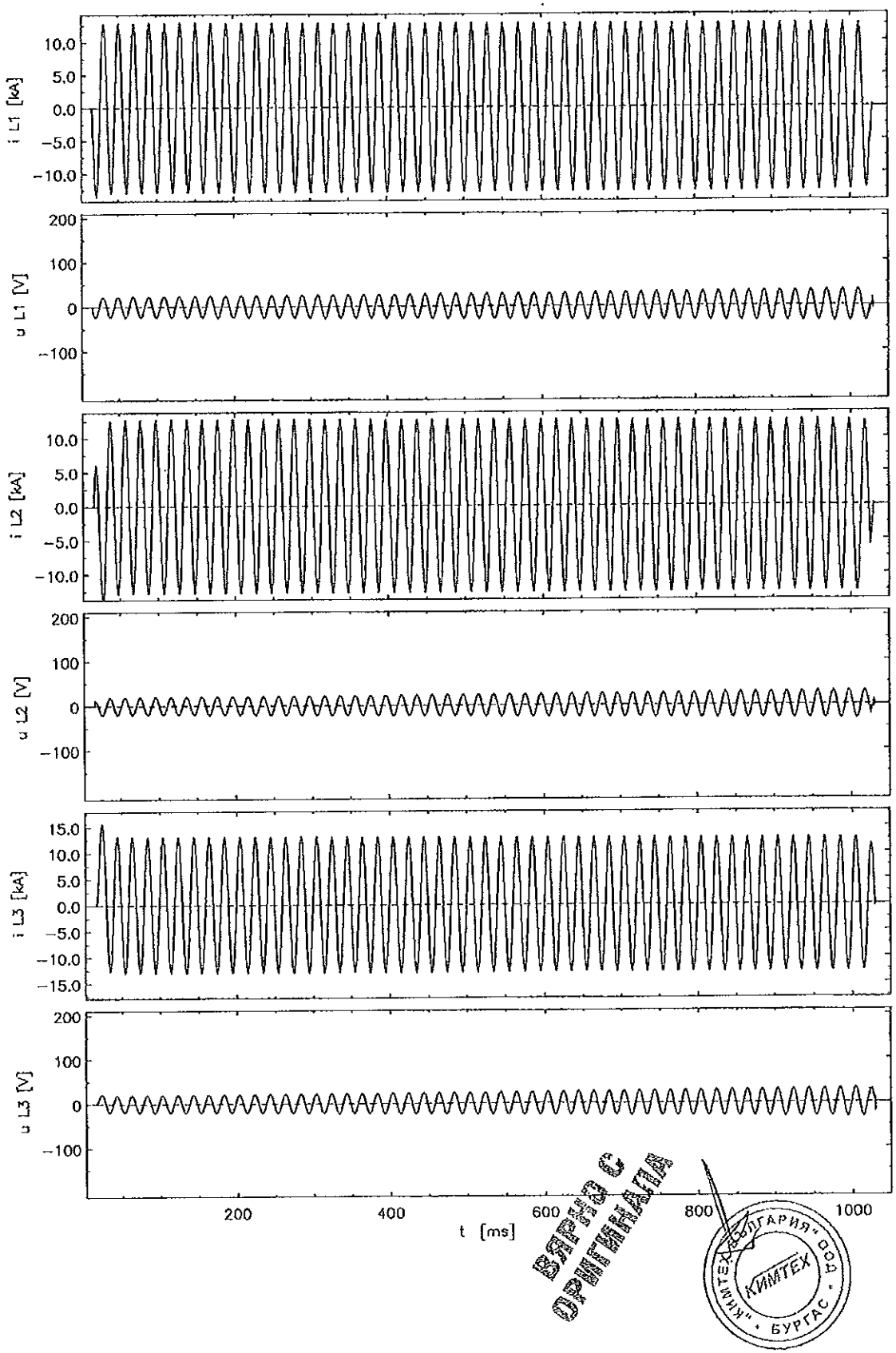
ВЕРНО С ОРИГИНАЛА

КИМТЕХ БЪЛГАРИЯ ООД КИМТЕХ БУРГАС

Test-No. 2072835



Test-No. 2072837



ВЯРНО С ОРИГИНАЛА

"Химтехнология България" ООД
ХИМТЕХ
БУРГАС

Kimtech
Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

Списък на проведените изпитвания на щепселна кабелна глава, Г-образна/адаптор/ тип RSES

1. Изпитване издръжливост с постоянно напрежение;
2. Изпитване издръжливост с променливо напрежение;
3. Изпитване частичен разряд при околна температура;
4. Изпитване импулсно напрежение при околна температура;
5. Изпитване циклично електрическо нагряване във въздух;
6. Изпитване циклично електрическо нагряване във вода;
7. Изпитване комутация/включване/изключване;
8. Изпитване частичен разряд при околна температура;

13.01.2016г.

Подпис и печат:

КИМТЕХ БЪЛГАРИЯ ООД КИМТЕХ БУРГАС

Немска Служба по Акредитация
Предоставено съгласно

с подписано многостранно споразумение на EA, ILAC и IAF за взаимно одобрение

АКРЕДИТАЦИЯ

С настоящото Немска служба за акредитация потвърждава, че лабораторията за изпитване

FGH Инженеринг и Изпитвания
Халенвег 40, 68219 Манхайм

притежава правомощия съгласно ISO/IEC 17025:2005 да провежда изпитвания в областта на

съоръжения и уреди за високо напрежение и техните компоненти,
силови кабели и комплекти за силови кабели

Свидетелството за акредитация важи във връзка с решение от 11.01.2012 с акредитационен № D-PL-12110-01 и е валидно до 10.01.2017г. Състои се от този лист, обратната страна на този лист и приложения общо 22 страници.

Регистрационен номер на свидетелството: D-PL-12110-01

Франкфурт на Майн, 11.01.2012 дипл. инж. Ралф Егнер

"КИМТЕХ-БЪЛГАРИЯ" ООД КИМТЕХ БУРГАС

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH
German Accreditation Body

Entrusted according to Section 8 subsection1 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 Engineeering & 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.

See notes overleaf.

БЯРНО С ОРИГИНАЛА
КИМТЕХ-БЪЛГАРИЯ ООД КИМТЕХ БУРГАС

Немска Служба по Акредитация
Предоставено съгласно

с подписано многостранно споразумение на EA, ILAC и IAF за взаимно одобрение

АКРЕДИТАЦИЯ

С настоящото Немска служба за акредитация потвърждава, че лабораторията за изпитване

Институт „Изпитвания на електрическа високо технологична техника"
Ландсбергер Алее 378А, 12681 Берлин

.притежава правомощия съгласно ISO/IEC 17025:2005 да провежда изпитвания в областта на

съоръжения и уреди за високо напрежение и техните компоненти,
кабели и проводници
индустриално оборудване ниско напрежение

Свидетелството за акредитация важи във връзка с решение от 31.08.2012 с акредитационен № D-PL-12107-01 и е валидно до 24.01.2017г. Състои се от този лист, обратната страна на този лист и приложения общо 30 страници.

Регистрационен номер на свидетелството: D-PL-12107-01-01

Франкфурт на Майн, 31.08.2012 дипл. инж. Ралф Егнер

КИМТЕХ БУРГАС

DAkkS
Deutsche
Akkreditierungsstelle

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

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 31.08.2012 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 30 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12107-01-01**

ВЯРНО С ОРИГИНАЛА

Frankfurt am Main, 31.08.2012

Im Auftrag Dipl.-Ing. (FH) Ralf Egner
Leiter Abteilung 2

Siehe Hinweise auf der Rückseite

Kimtech
Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Иван Вълков Костов, в качеството си на управител на Кимтех България ООД, гр. Бургас, жк. Братя Миладинови, бл. 57, вх. 4А официален дистрибутор на изделията на Tyco Electronics Raychem декларирам, на собствена отговорност, че продуктите:

1/ Щепселна кабелна глава права 20kV, 250A, 50мм2 тип RSSS 5225-P

2/ Щепселна кабелна глава права, 20kV, 250A, 95мм2 тип RSSS 5229-P

произведени в Отобрун, Германия, за които се отнася тази декларация, са произведени в условията на въведената и поддържаната от производителя система за производствен контрол и в съответствие със следните стандарти CENELEC HD 629 (VDE 0278-629), и съотвествието е оценено съгласно Наредбата за съществените изисквания и оценяване на съответствието на строителните продукти. Декларацията се издава въз основа на протоколи от проведени изпитания № PPR 2528, издаден от Лаборатория за изпитвания Берлин.

13.01.2016г.
гр. Бургас

Подпис и печат
/И. Костов-управител/

Kimtech
Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Иван Вълков Костов, в качеството си на управител на Кимтех България ООД, гр. Бургас, жк. Братя Миладинови, бл. 57, вх. 4А официален дистрибутор на изделията на Tyco Electronics Raychem декларирам, на собствена отговорност, че продуктите:

1/ Щепселна кабелна глава Г-образна, 20kV, 250A, 50мм2 тип RSES 5225-P

2/ Щепселна кабелна глава Г-образна, 20kV, 250A, 95мм2 тип RSES 5229-P

произведени в Отобрун, Германия, за които се отнася тази декларация, са произведени в условията на въведената и поддържаната от производителя система за производствен контрол и в съответствие със следните стандарти CENELEC HD 629 (VDE 0278-629), и съответсвието е оценено съгласно Наредбата за съществените изисквания и оценяване на съответствието на строителните продукти. Декларацията се издава въз основа на протоколи от проведени изпитания № PPR 2527, издаден от Лаборатория за изпитвания Берлин.

13.01.2016г.
гр. Бургас

Подпис и печат:
/И. Костов-управител/

„КИМТЕХ БЪЛГАРИЯ" ООД
КИМТЕХ
БУРГАС

Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Иван Вълков Костов, в качеството си на управител на Кимтех България ООД, гр. Бургас, жк. Братя Миладинови, бл. 57, вх. 4А официален дистрибутор на изделията на Tyco Electronics Raychem декларирам, на собствена отговорност, че продуктите:

1/ Щепселна кабелна глава за проходни изводи тип „С" 20kV, 95-185мм2 тип RICS 5133

1/ Щепселна кабелна глава за проходни изводи тип „С" 20kV, 95-185мм2 тип RICS 5137

произведени в Отобрун, Германия, за които се отнася тази декларация, са произведени в условията на въведената и поддържаната от производителя система за производствен контрол и в съответствие със следните стандарти CENELEC HD 629.1 S21 (2006-02), (VDE 0278-629), и съответствието е оценено съгласно Наредбата за съществените изисквания и оценяване на съответствието на строителните продукти. Декларацията се издава въз основа на сертификат от типово одобрение № E-13892 издаден от Дет Норске Веритас съгласно одобрени протоколи от проведени типови изпитания № PPR 866, PPR 1106 издадени от Лаборатория за изпитвания Тайко Електроникс Райхем и Лаборатория за изпитвания Мюнхен.

13.01.2016г.
гр. Бургас

Подпис и печат: /И. Костов/

"КИМТЕХ БЪЛГАРИЯ" ООД КИМТЕХ БУРГАС

Kimtech
Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният Иван Вълков Костов, в качеството си на управител на Кимтех България ООД, гр. Бургас, жк. Братя Миладинови, бл. 57, вх. 4А официален дистрибутор на изделията на Tyco Electronics Raychem декларирам, на собствена отговорност, че продуктите:

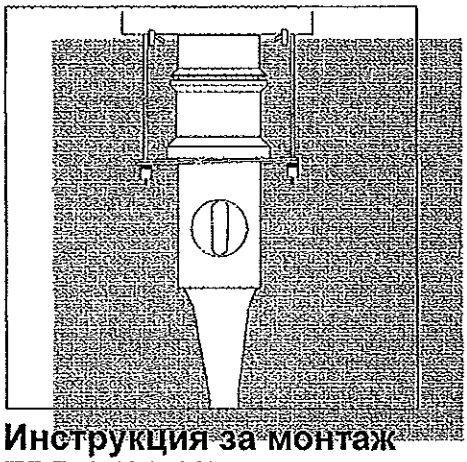
1/ Кабелна глава, 20 kV, закрит монтаж, термосвиваема 70-240mm2 тип POLT 24D/1XI

произведени в Отобрун, Германия, за които се отнася тази декларация, са произведени в условията на въведената и поддържаната от производителя система за производствен контрол и в съответствие със следните стандарти CENELEC HD 629 (VDE 0278-629), IEC 60502-4 и съответствието е оценено съгласно Наредбата за съществените изисквания и оценяване на съответствието на строителните продукти. Декларацията се издава въз основа на протокол от проведени изпитания № PPR 1410, издаден от Лаборатория за изпитвания Манхайм.

13.01.2016г.
гр. Бургас

Подпис и печат:
/И. Костов - Управител/

E L E C T R I C A L
PRODUCTS·DIVISION



Инструкция за монтаж EPP 0580 9/95

Екраниран прав адаптор 250A, за едножилни пластмасови кабели 12 до 24 kV без броня (с тръба за маркиране на фазите)

Тип RSSS

Raychem

ХИМТЕХ БЪЛГАРИЯ ООД БУРГАС
ВЯРНО С ОРИГИНАЛА

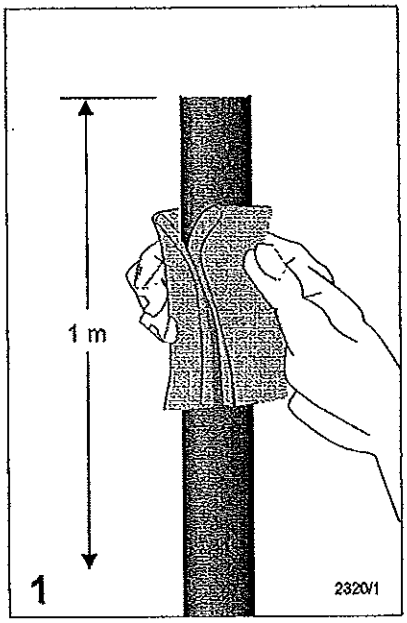
Препоръки за безопасност

Важно е да се спазват съответните правила за безопасност
При работа с оборудване високо напрежение.За точна информация относно безопасността моля свържете се с официалният представител.

Преди монтажа

Проверете, че комплекта е предназначен за кабела.Проверете етикета на комплекта и заглавието на Инструкцията за монтаж. Възможно е, компонентите или стъпки на работа да са променени, в сравнение с тези от предходния път, в който сте монтирали този продукт.Внимателно прочетете и следвайте стъпките в Инструкцията за монтаж.

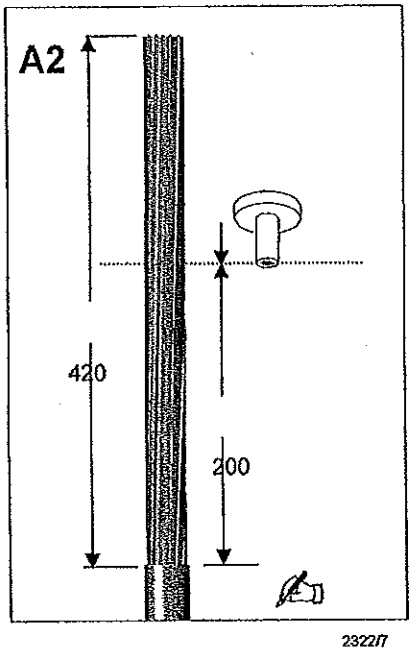
Информацията, съдържаща се в тези инструкции за монтаж е предназначена да опише правилния метод на монтаж на този продукт.Въпреки това,Raychem няма контрол върху полевите условия, които влияят върху монтажа на продукта.Това е отговорност на потребителя,да се определи пригодността на метода на монтаж в полеви условия на потребителя. Задълженията на Raychem са само тези, които са посочени в стандартните условия за продажба на Raychem за този продукт и вникакъв случай Raychem няма да е отговорен за каквито и да било други случайни,непреки или последващи вреди, произтичащи от употребата или злоупотребата с продуктите.



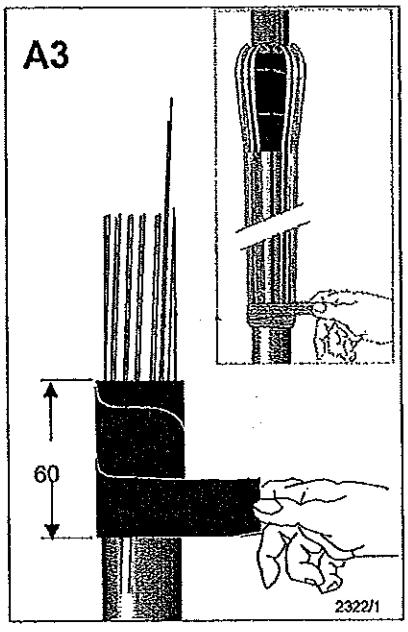
Подготовка на кабела
Почистете и обезмаслете края на външната обвивка на дължина от 1 метър с разтворител.

A. Кабел с екран от телове

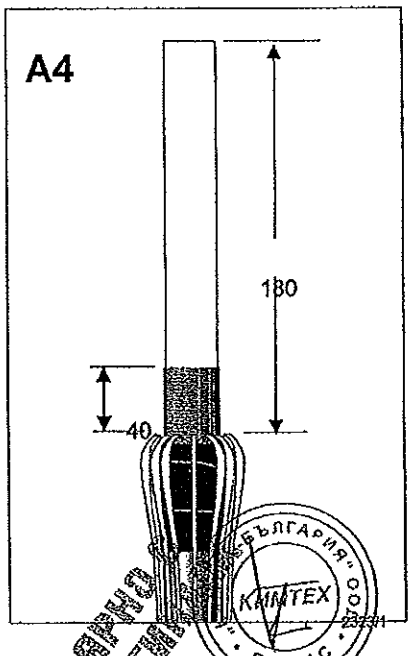
Позициониране на кабела. Маркирайте външната обвивка на 200 mm под края на втулката. Отрежете кабела 420 mm над маркировката и премахнете външната обвивка до този размер



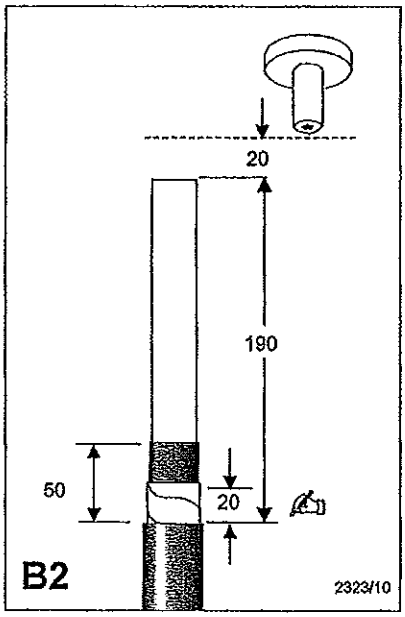
Увийте един слой уплътнителна лента (червена) с малко припокриване и леко разтягане около края на външната обвивка 60 mm.Огънете екрана от телове обратно върху външната обвивка. Избягвайте пресичане на отделните телове. Фиксирайте теловете с лента.

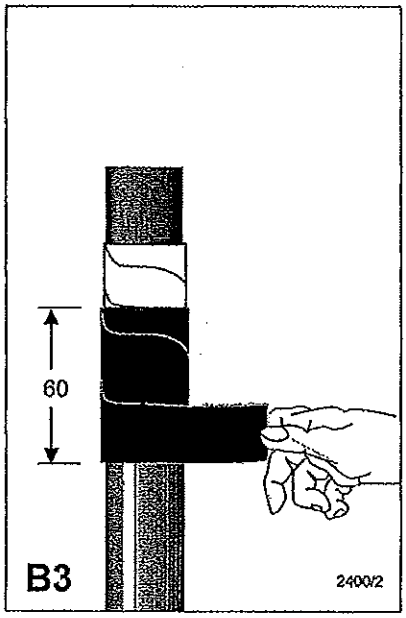


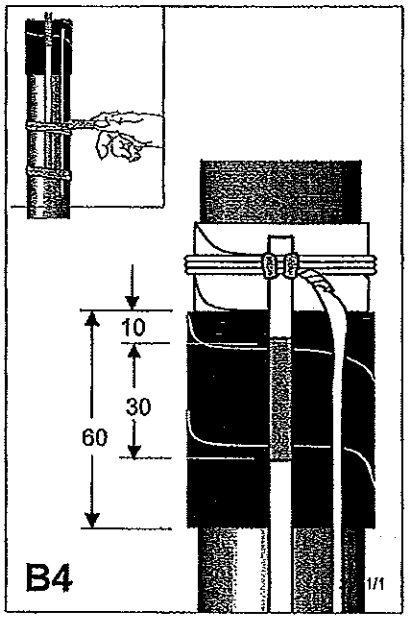
Отрежете жилото в съответсвие с чертежа. Премахнете екрана съгласно чертежа. Повърхността на изолацията не трябва да има следи от полупроводим материал.
Забележка: не наранявайте изолацията, почистете от неравности



ВЕРНО С ОРИГИНАЛА
КИМТЕХ
БЪЛГАРИЯ
БУРГАС







В. Кабел с екран от ленти

Отрежете жилото съгласно чертежа. Премахнете външната обвивка на разстояние от 190 mm. Премахнете екрана от метални ленти до 20 mm от отреза на външната обвивка. Премахнете полупроводимиятекрана на жилото до 50 mm от отреза на външната обвивка. Повърхността на изолацията не трябва да има следи от полупроводим материал. Забележка: не наранявайте изолацията, почистете от неравности

Увийте един слой уплътнителна лента (червена) с малко припокриване и леко разтягане около края на външната обвивка 60 mm.

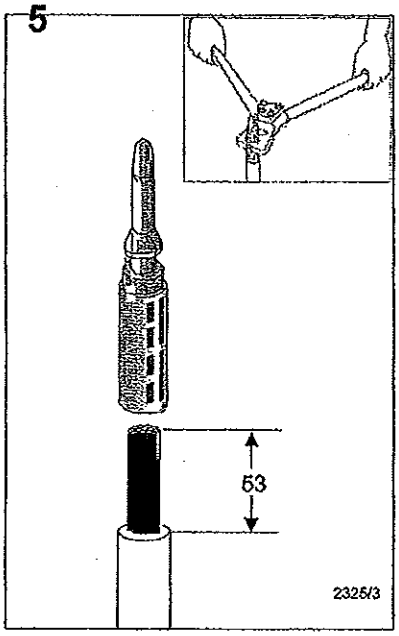
Фиксирайте заземителното въже към метапния екран, така че приблизително 300 mm да остане свободният край. Оформете 30 mm преграда срещу влага като започнете 10 mm под мастик лентата.Фиксирайте заземителното въже с лента.

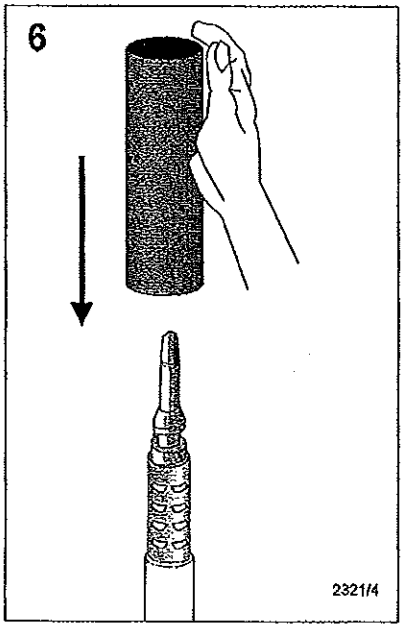
Изпълнение на адаптора

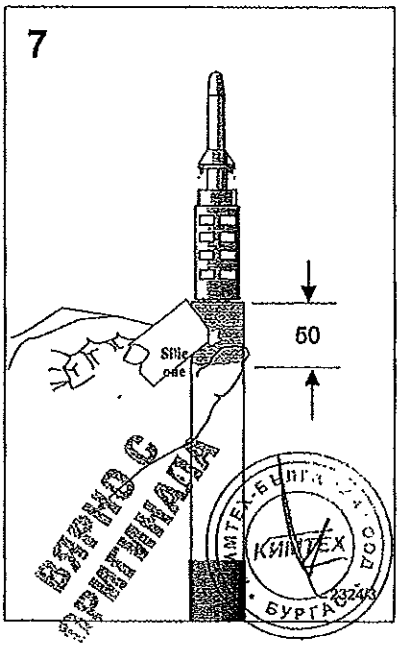
Отрежете изолацията както е показано на чертежа.Монтирайте конектора с инструмент за кербоване за алуминий в съответствие с размера показан на съединителя. Почистете и обезмасл. изол. на жилото и съединителя. Забележка: Използвайте само кербовъчни накрайници с мин. ширина на раб. повърхност7 mm .

Проверете позицията на фазите и поставете съответно маркираната тръба върху кабела.

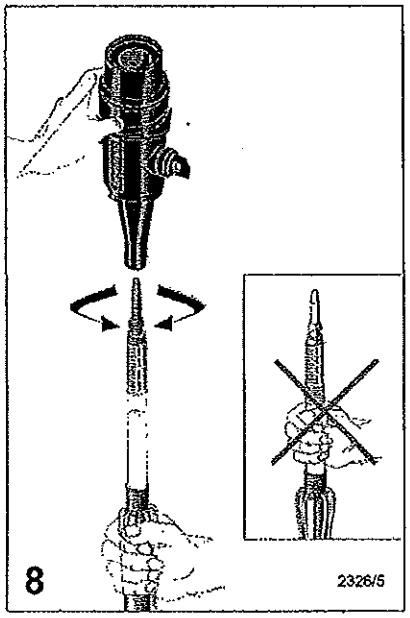
Нанесете силиконова смазка до края на изолацията на разстояние от около 50mm.



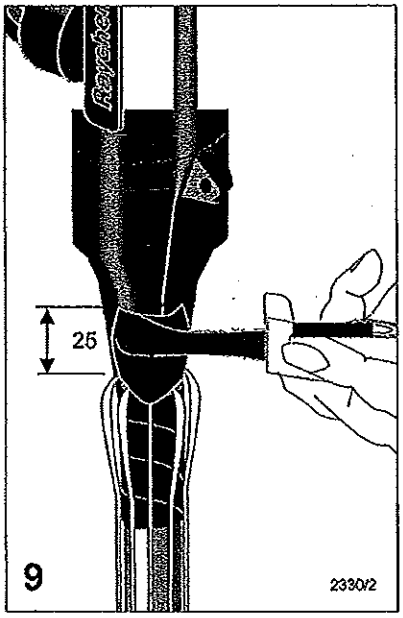




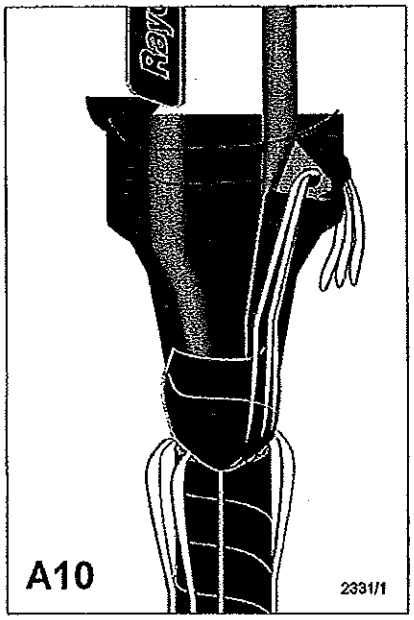
ВЗЕТО С ПРЕВОДА



Напъхайте тялото на адаптора върху подготвеният кабел.Уверете се, че щифта е захванал тялото.Н е трябва да е възможно да се измъкне обратно ако това е направено правилно.Точката за изпитване на адаптора трябва да е достъпна за измерване.
Note: Не пипайте изолацията.

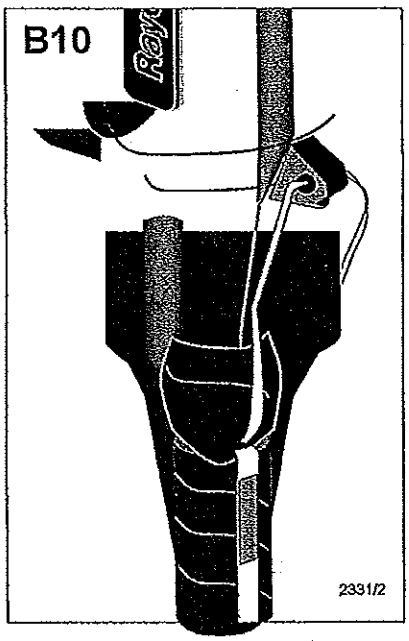


Увийте уплътнителна лента /червена/ между края на външната изолация и адаптора с дължина 25мм.
Сложете достатъчно уплътнителна лента, за да се постигне плавен преход от външната обвивка към адаптора.

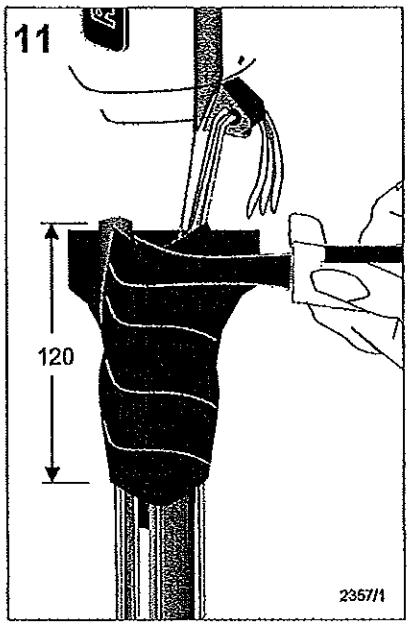


A. Екран от телове
Поставете 3 екраниращи телове и ги промушете през отвора на адаптора. Още не ги увивайте заедно.

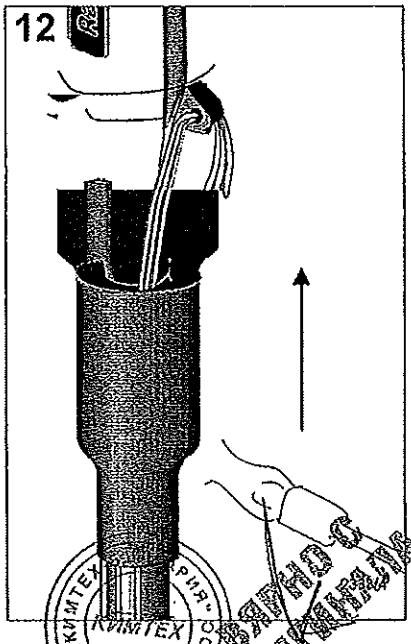
B. Екран от ленти
Вземете края на телта и я промушете през отвора адаптора. Още не я увивайте.



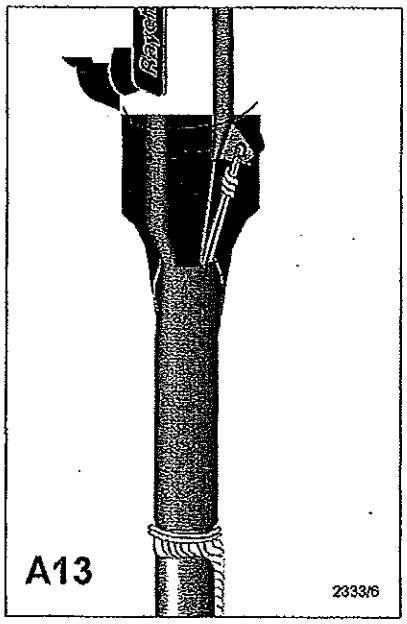
Започнете от долния край на предно положената лента и увивайте на горе уплътнителна лента /червена/ около кабела и адаптора на разстояние 120 mm.



Позиционирайте тръбата така, че частта увита с лента да е напълно покрита и свийте с горелка като започнете от долу нагоре по посока на адаптора.

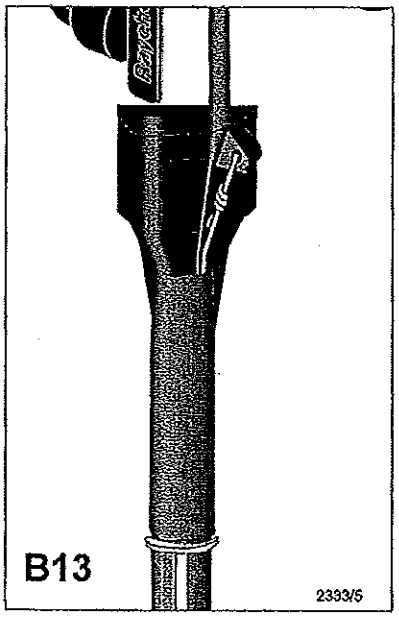


ВЯРНО С ОРИГИНАЛА
„КИМТЕХ" ООД БУРГАС КИМТЕХ



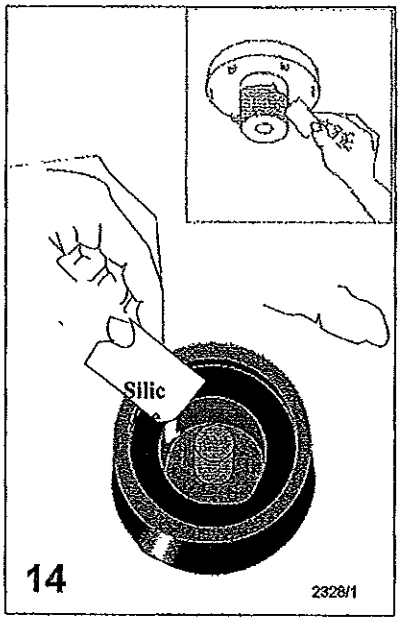
А. Екран от телове

Увийте екраниращите телове заедно около дупката на адаптора. Подсигурете теловете с плетенка към изолацията.Увийте екраниращите телове заедно във формата на заземително въже.



В. Екран от ленти

Увийте теловете заедно около дупката на адаптора. Подсигурете заземителното въже към изолацията с плетенка.

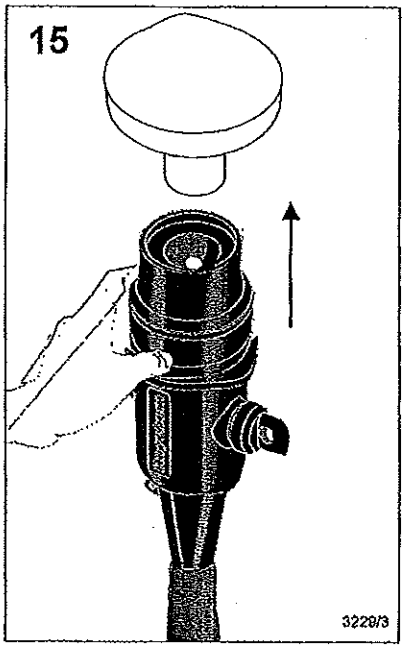


Нанесете силиконова смазка във прохода и във вътрешната повърхност

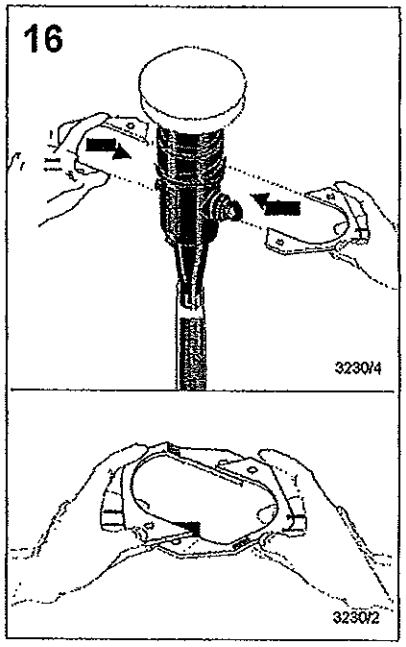
на свързаният адаптор.

Изпълнение на връзката

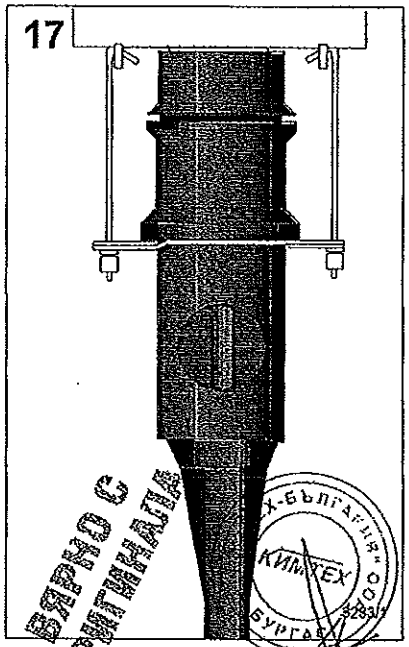
Пъхнете адаптора в прохода.



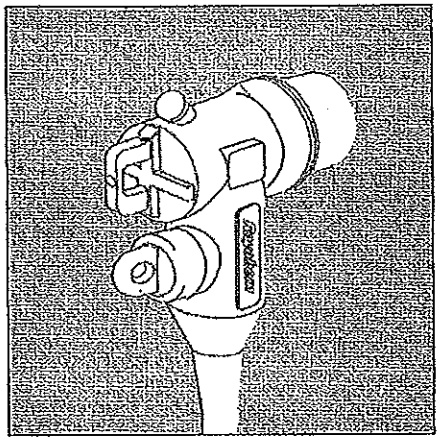
Разположете планките около тялото над точката за излитване. Уверете се, че планките се припокриват, както е показано така, че да се получи равна повърхност.



Пъхнете скобите през дупките на планките и ги закачете към прохода затегнете болтовете здраво на ръка. Монтажът е готов.



ВЯРНО С ОРИГИНАЛА
КИМТЕХ



Инструкция за монтаж EPP-0470-2/00

Екраниран адаптор 250A за едножилен пластмасов кабел 12 до 24 kV без броня (с тръба за маркиране на фазите)

Тип RSES

Tyco Electronics Raychem GmbH
Energy Division
Finsinger Feld 1
85521 Ottobrunn
Munich, Germany
Tel. ++49-89-6089-0
Fax ++49-89-6096345

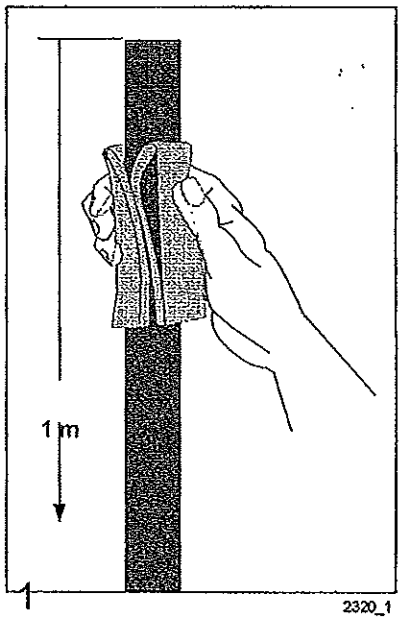
ВЕРНО С ОРИГИНАЛА
„КИМТЕХ-БЪЛГАРИЯ" ООД БУРГАС КИМТЕХ

Препоръки за безопасност

Важно е да се спазват съответните правила за безопасност при работа с оборудване високо напрежение. За точна информация относно безопасността моля свържете се с официалния представител.

Преди монтажа

Проверете, че комплекта е предназначен за кабела. Проверете етикета на комплекта и заглавието на Инструкцията за монтаж. Възможно е компонентите или стъпките на работа да са променени, в сравнение с тези от предходния път, в който сте монтирали този продукт. Внимателно прочетете и следвайте стъпките в Инструкцията за монтаж.



Подготовка на кабела

Почистете и обезмаслете края на външната обвивка на дължина от 1 метър с разтворител.

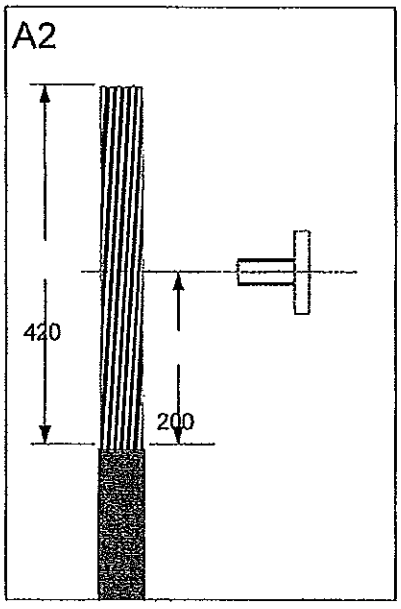
A. Кабел с екран от телове

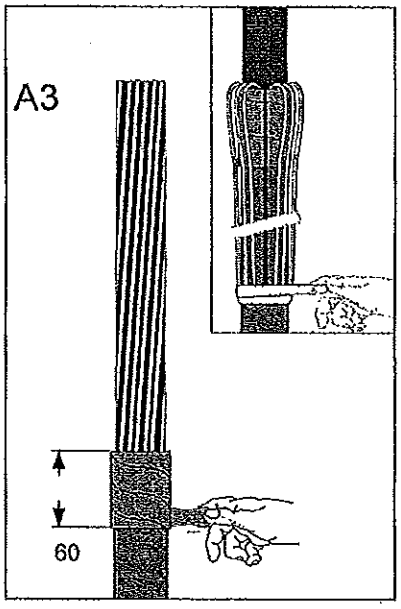
Позициониране на кабела. Маркирайте външната обвивка на 200мм под края на втулката. отрежете кабелна на 420мм над маркировката и премахнете външната обвивка до този размер.

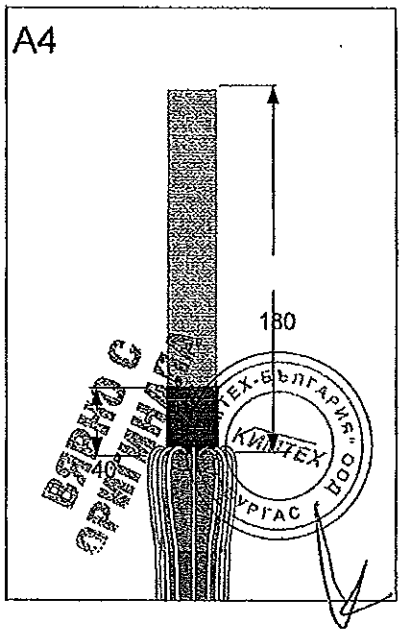
Увийте един слой уплътнителна лента (червена) с малко припокриване и леко разтягане около края на външната обвивка 60 мм. Огънете екрана от телове обратно върху външната обвивка. Избягвайте пресичане на отделните телове. Фиксирайте теловете с лента.

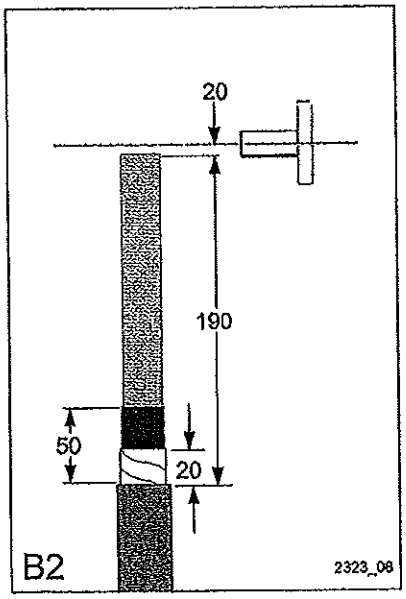
Отрежете жилото в съответствие с чертежа. Премахнете екрана съгласно чертежа. Повърхността на изолацията не трябва да има следи от полупроводим материал.

Забележка: не наранявайте изолацията почистете от неравности.

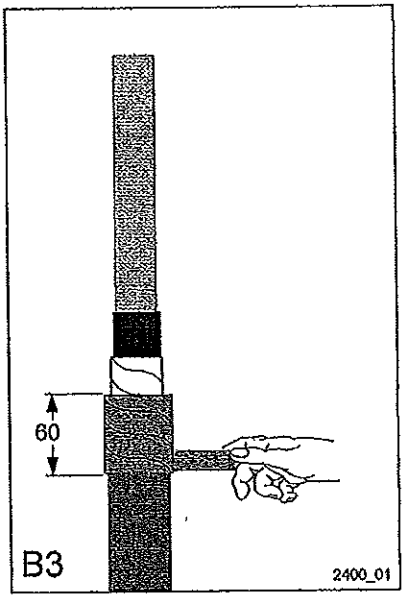




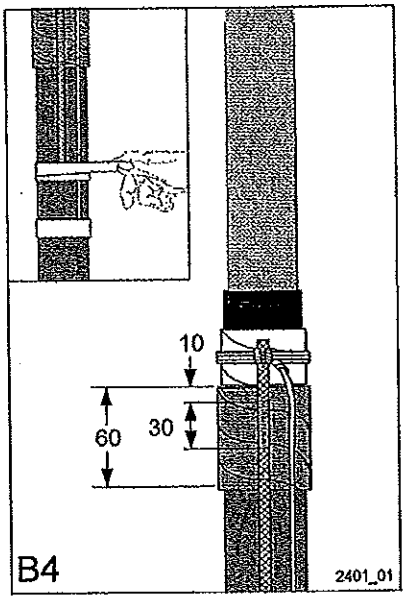




B. Кабел с екран от ленти
Отрежете жилото съгласно чертежа. Премахнете външната обвивка на Разстояние от 190 mm. Премахнете полупроводимия екран на жилото до 50 mm от отреза на външната обвивка. Повърхността на изолацията не трябва да има следи от полупроводим материал.
Забележка: не наранявайте изолацията, почистете от неравности.



Увийте един слой уплътнителна лента /червена/ с малко припокриване и лека разтягане околокрая на на външната обвивка 60мм.

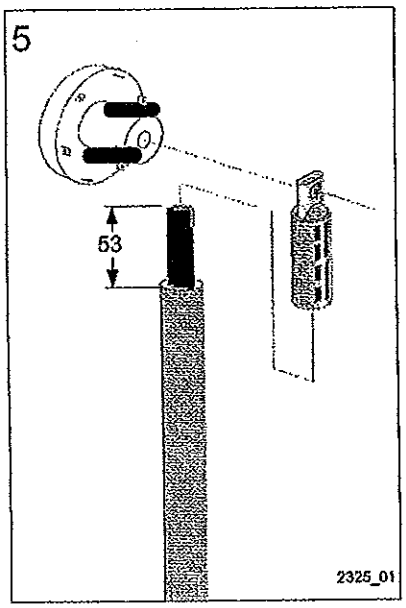


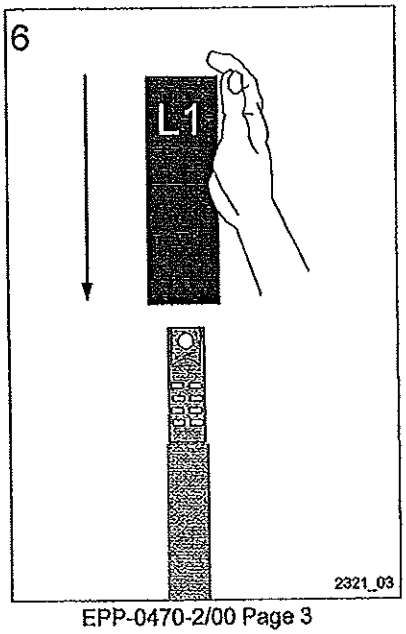
Фиксирайте заземителното въже, така, че приблизително 300мм да остане свободния край. Оформете 30mm преграда срещу влага като започнете 10мм по д мастик лентата. Фиксирайте заземителното въже с лента.

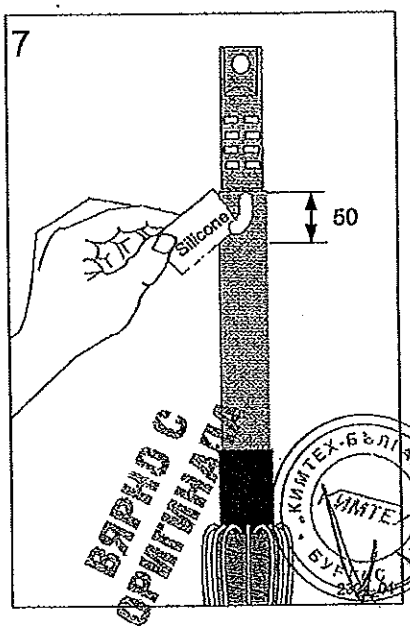
Отрежете изолацията както е показано на чертежа. Монтирайте кабелна обувка на проводника, така че отвора на кабелната обувка и втулката да са на една линия. Монтирайте кабелната обувка с инструмент за кербоване за алуминий в съответствие с размера показан на обувката.
Забележка: използвайте само кербовъчни накрайници с дължина на на раб. повърхност 7 мм.

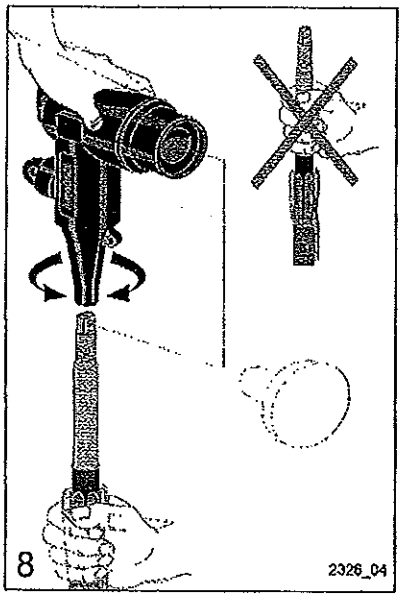
Почистете и обезмаслете изолацията на жилата и обувката. Проверете позицията на фазите и поставете съответно маркираната тръба върху фазите.

Нанесете силиконова смазка до края на изолацията на разстояние от около 50мм.

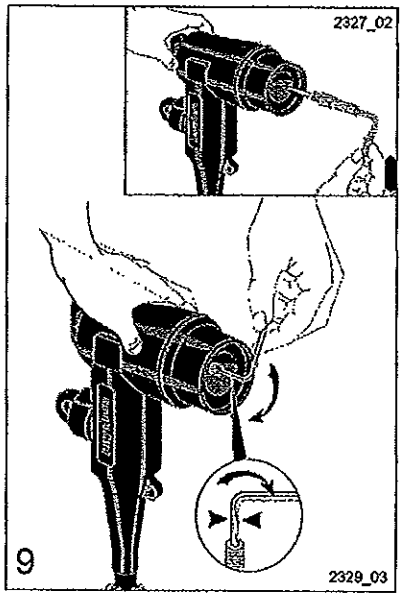




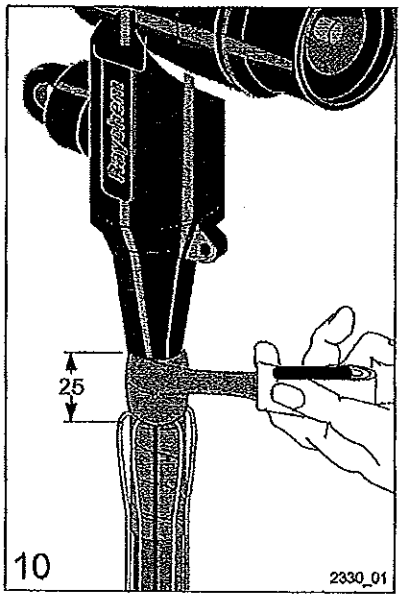




Напъхайте тялото на адаптора върху подготвения кабел.
Предният край на адаптора трябва да сочи към втулката.
Отвора на кабелната обувка и и втулката трябва да са на една линия.
Забележка: не пипайте изолацията .

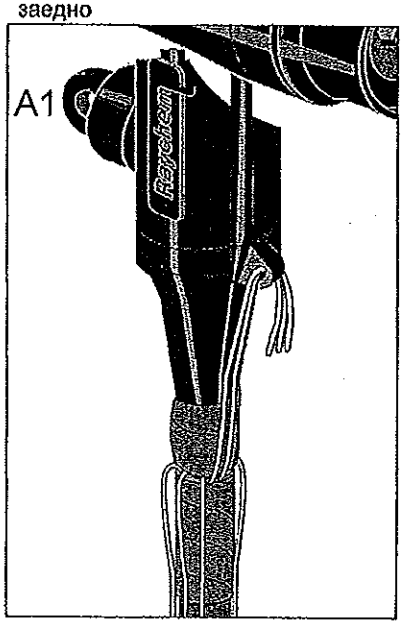


Вкрайте свърващия щифт в адаптора и я закрепете с шестограмен ключ.
Завъртете докато ключът се деформира.

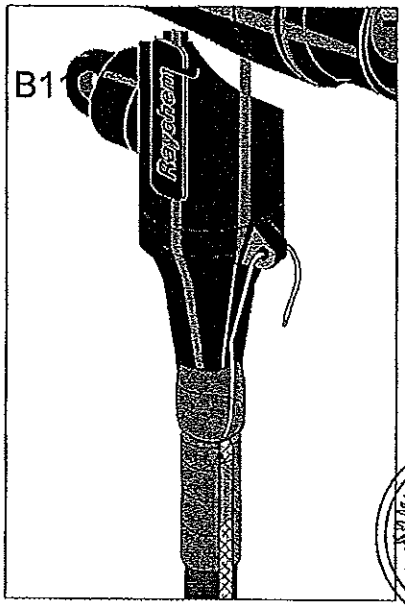


Увийте уплътнителна лента /червена/ между края на външната изолация и адаптора с дължина 25мм.
Сложете достатъчно уплътнителна лента, за да се постигне плавен преход от външната обвивка към адаптора.

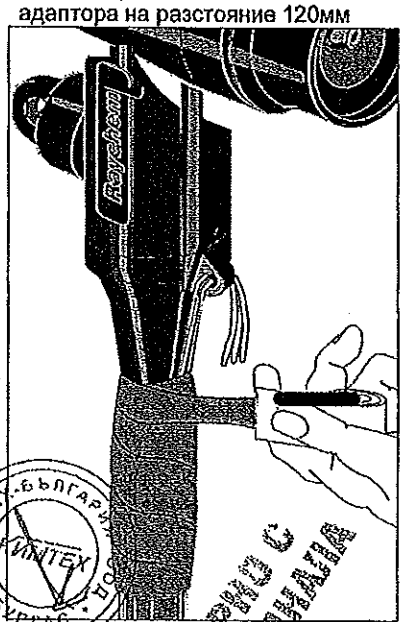
А.Екран от телове
Поставете 3 екраниращи телове и ги промушете през отвора на адаптора. Още не ги увивайте заедно



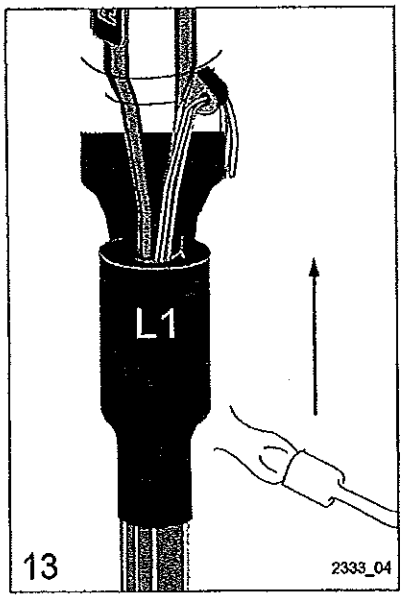
В. Екран от ленти
Вземете края на телта и я промушете през отвора на адаптора. Още не я увивайте.



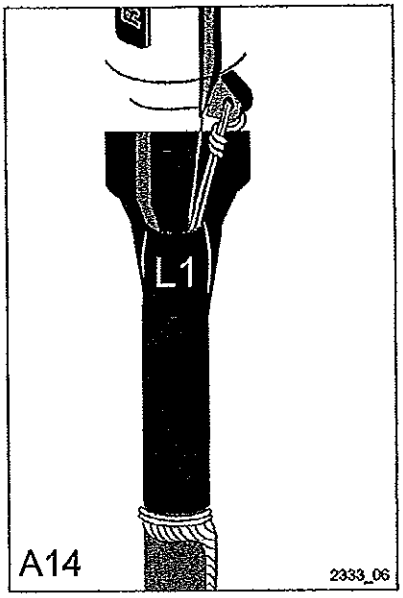
Започнете от долния край на предходно сложената лента и увивайте нагоре уплътнителна лента /червена/ около кабела и адаптора на разстояние 120мм



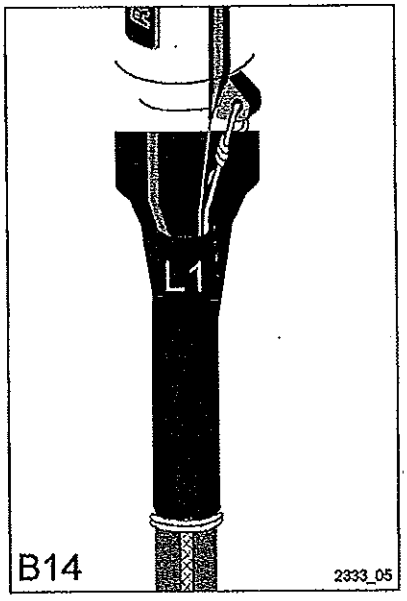
КИМТЕХ БЪЛГАРИЯ
КИМТЕХ
БУРГАС
ВЯРНО С ОРИГИНАЛА



Позиционирайте така тръбата, че часста увита с лента да е напълно покрита и свийте с горелка като започнете от долу на горе по посока на адатора.



А. Екран от телове
Увийте теловете заедно около дупката на адаптора. Подсигурете теловете с плетенка към изолацията. Увийте екранищите телове във формата на заземително въже.

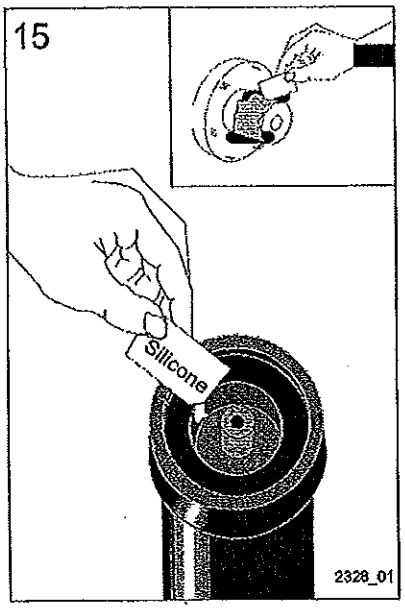


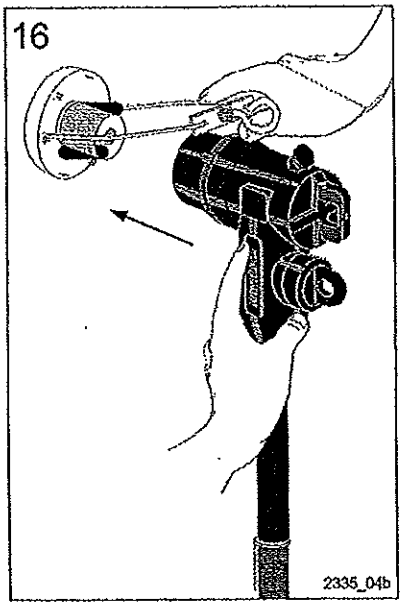
В. Екран от ленти
Увийте теловете заедно около дупката на адаптора. Подсигурете заземителното въже към изолацията с плетенка.

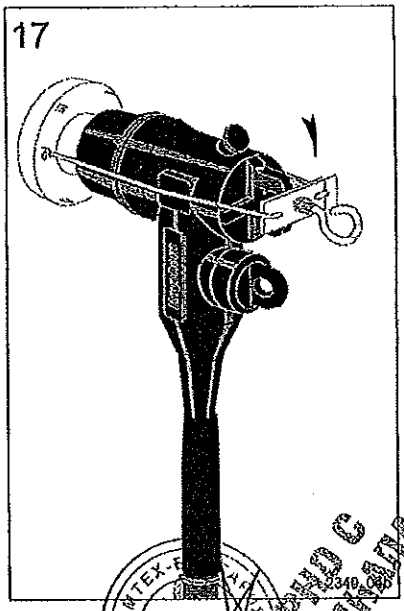
Нанесете силиконова смазка във прохода и във вътрешната повърхност на свързаният адаптор.

Закачете скобите в прохода. Пъхнете адаптора в прохода.

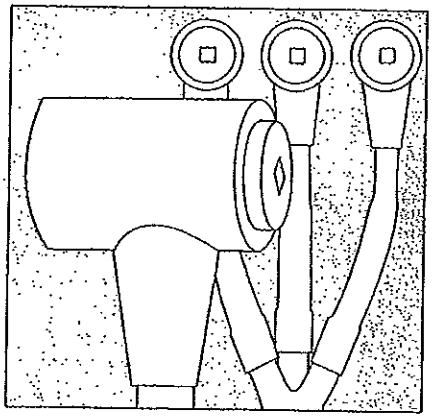
Центрирайте скобата към адаптора и я закрепете. Монтажът е готов.







КИМТЕХ
БУРГАС
ВЕРНО С ОРИГИНАЛА



Инструкция за монтаж
EPP-0271-BG-12/94
Изолирани
Т-адаптори за напрежение до 24 kV и 630 A за втулки с резба по DIN 47636

Тип: RICS

„КИМТЕХ-БЪЛГАРИЯ" ООД
КИМТЕХ
БУРГАС
ВЯРНО С ОРИГИНАЛА

Raychem

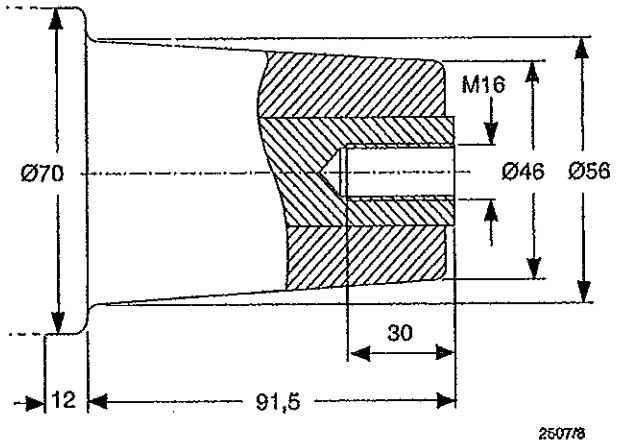
Информацията, съдържаща се в настоящата инструкция е предназначена да опише точния метод за инсталиране на този продукт. Поради това, че Raychem няма възможност да контролира полевите или други условия на монтаж , монтьорът трябва да прилага собствения си опит, когато инсталира този продукт.
Raychem не поема отговорност в случаи на повреди, възникнали в следствие на неправилно използване на продукта.

Внимание! Адапторът и главата не са екранирани!
При подадено напрежение повърхността на изолацията ще бъде също под напрежение, затова не трябва да се докосва!
Спазвайте правилата за работа с високоволтови съоръжения.

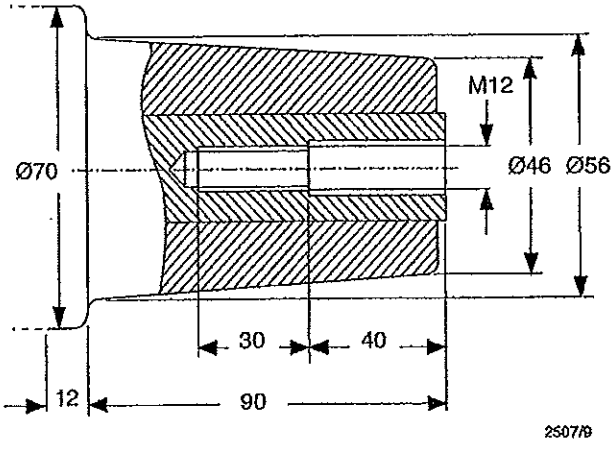
Забележка:
Минимално разстояние между адапторите: 25 mm
между адаптор и земя: 25 mm

Профил на втулката: Описаните адаптори да се използват само при размери на втулките отговарящи на тези от схеми **A1** или **A2**.

A1

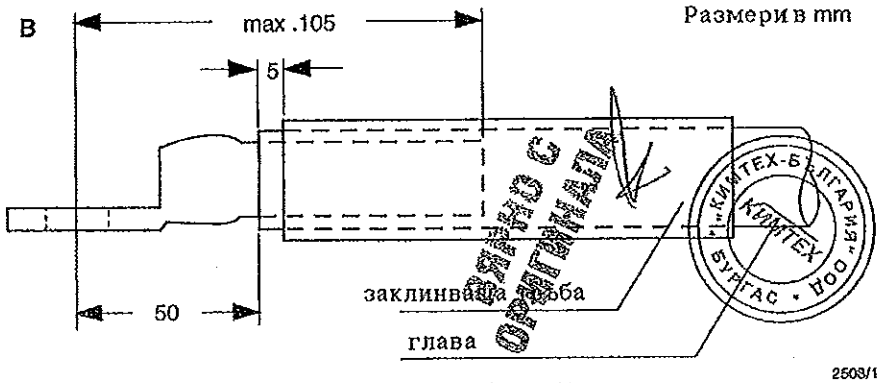


A2



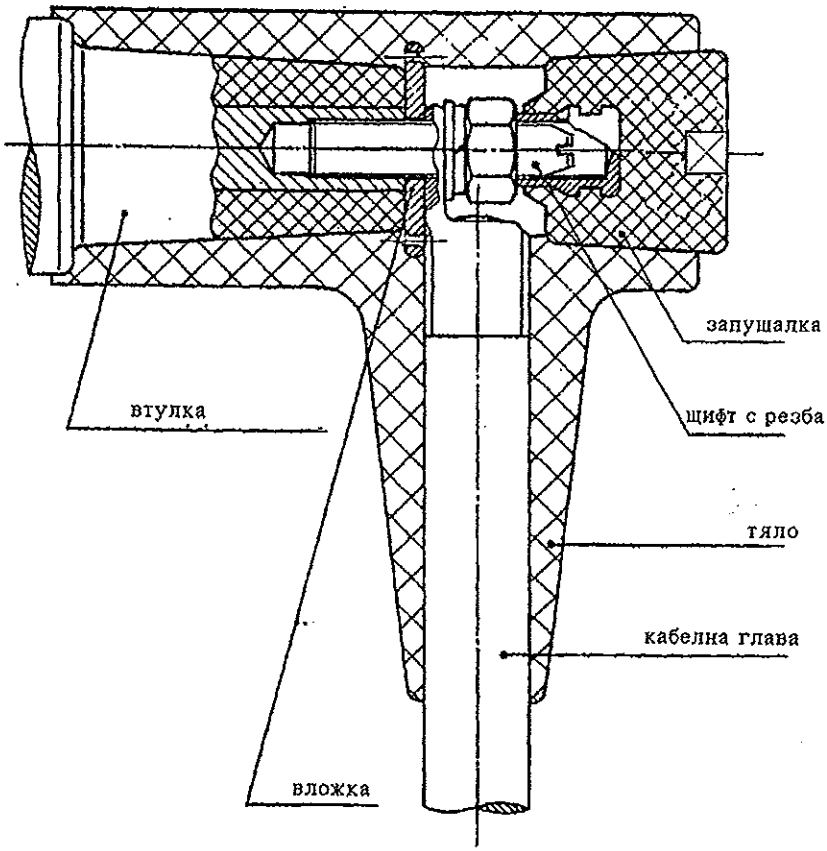
Общи инструкции
Използвайте кабелни обувки с подходящ отвор.
Отстранете окиса от плоската част на обувката.
След пресоване отстранете острите ръбчета.
Използвайте обувки с подходящ химичен състав, ако е нужно - калайдисани или биметални.
Оставете главата да изстине преди да монтирате адаптора.

Монтаж на главата
Монтирайте главата според приложената от Raychem инструкция.
Стрехичките, доставени с главата не са нужни при адаптора RICS.
Главата съдържа херметизиращ лепилен слой върху обувката, който трябва да е на разстояние най-малко 50 mm от центъра на отвора на обувката.
Ако в комплекта на адаптора има заклинваща тръба, свийте я върху главата по размерите от схема B.



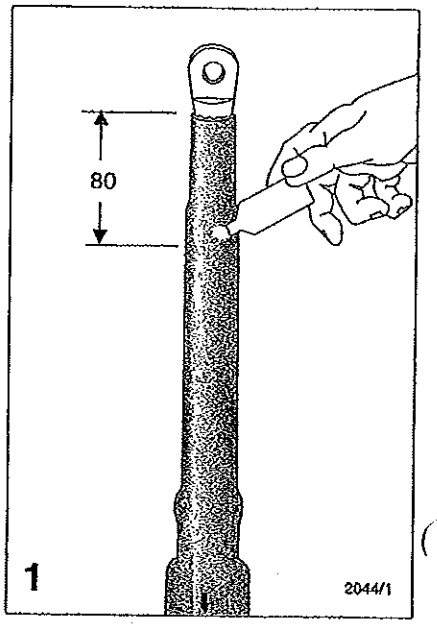
КИМТЕХ-БЪЛГАРИЯ-ООД БУРГАС
КИМТЕХ
Копие с оригинала

C Разположение на детайлите в готов Т-адаптор



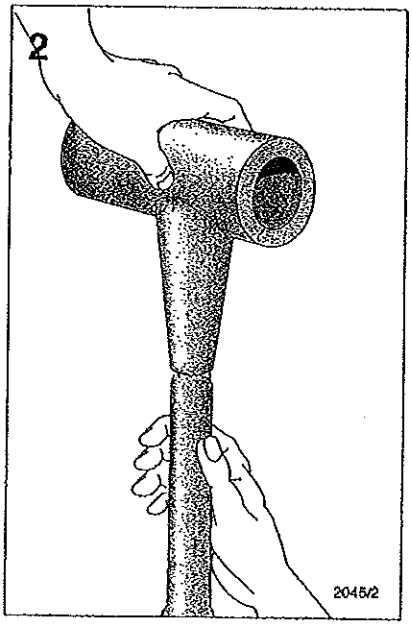
0157

Монтаж на Т-адаптора

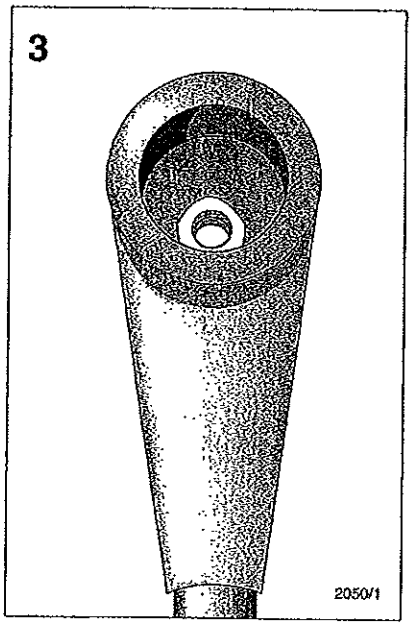


Намажете обилно със силиконова паста края на главата на около 80 mm. Намажете с проводимата паста повърхността на вложката, късия край на адаптора и плоската част на обувката.

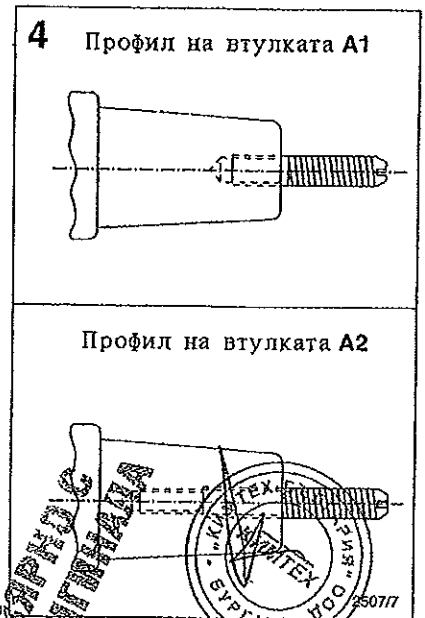
Пъхнете главата в тялото на адаптора. Дългият край на адаптора да сочи втулката.



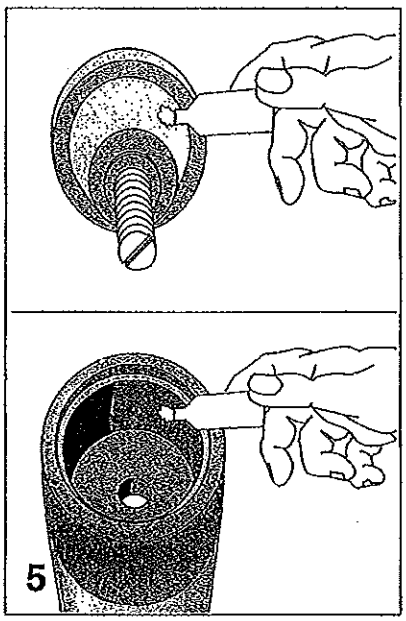
Отворът на кабелната обувка да е на една линия с този на металната вложка на адаптора.



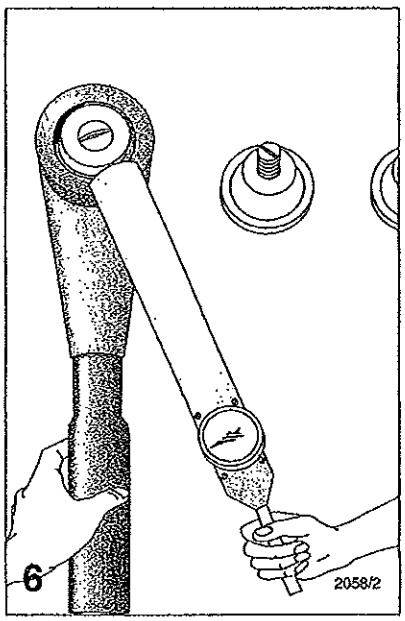
Отстранете щифта, останал във втулката. Завийте щифта на адаптора във втулката и го затегнете добре.



ВЯРНО С ОРИГИНАЛА

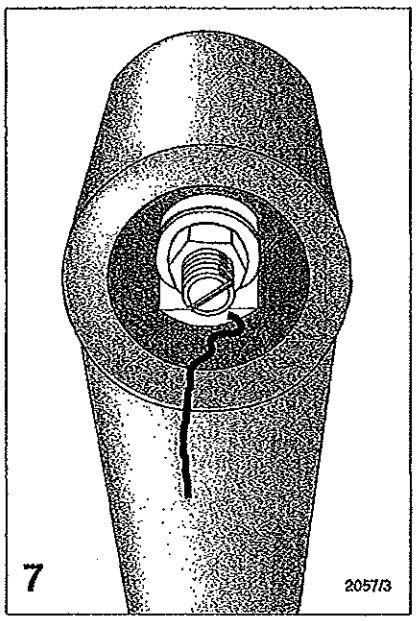


Намажете със силикон втулката и вътрешната повърхност на адаптора.



Напъхайте адаптора върху втулката. Вкарайте шайбата и гайката. Затегнете голямата гайка с усилие, показано долу.

Втулка	Резба	Сила Nm	
		min	max
A1	M16	50	70
A1	M16/M12	35	40
A2	M12	35	40



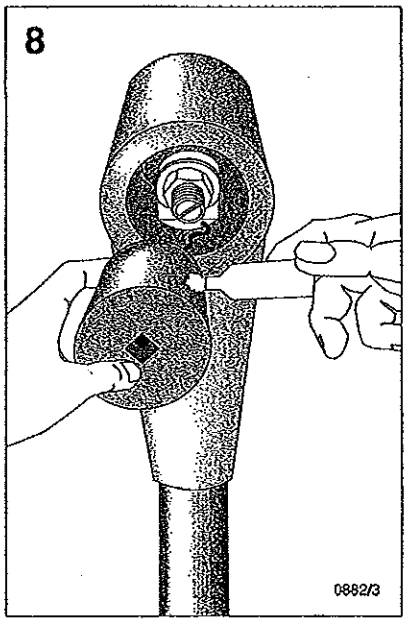
Поставете връвчицата в отвора на адаптора, както е показано на схемата.

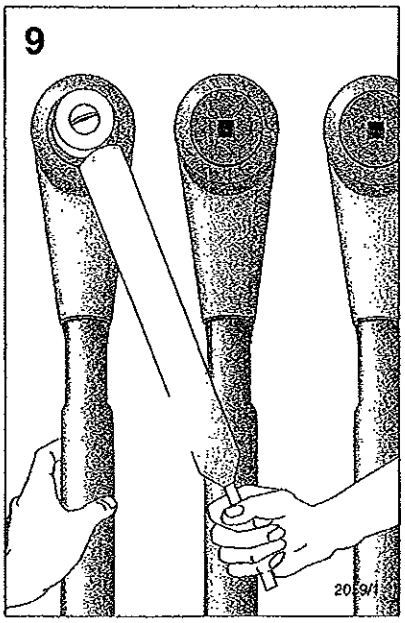
Намажете обилно със силикон коничната повърхност на запушалката на адаптора и вътрешната му повърхност.

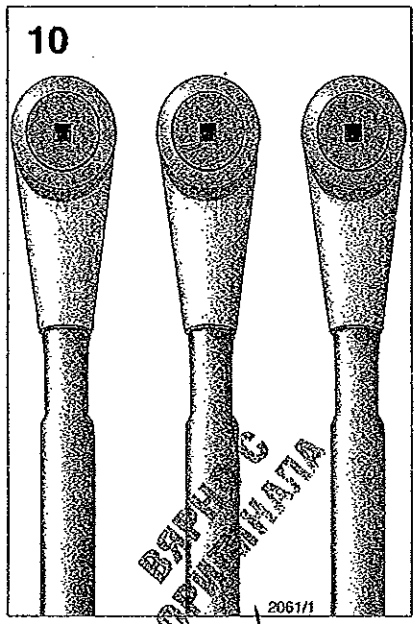
Завийте запушалката в адаптора. Завиването става с голямо усилие. Монтажът е завършен при усещане на голямо съпротивление. Не пренатягайте! Издърпайте връвчицата, за да освободите въздушното налягане в адаптора.

Схемата показва завършения адаптор.

Отстранете всички отпадъци в съответствие със санитарните норми.







© Raychem EPP-0271-BG-12/94

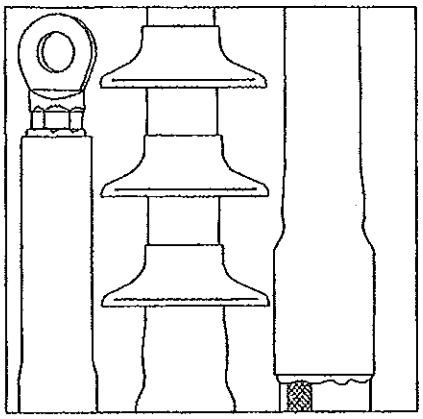
Raychem е запазена марка на Raychem Corporation

Raychem

Raychem България
ЕРЗВЕТ ИИНЖЕНЕРИНГ
Бургас
жк Братя Миладинови
бл.57 вх.4А ап.3
тел.факс 0035 956 37102
тел. 0035 956 34198

ВЪРНЕТЕ С ПРИЛОЖЕНИЯ
„КИМТЕХ-БЪЛГАРИЯ" КИМТЕХ БУРГАС • ВСС

Raychem



Инструкция за монтаж
ESD-3824-BG-4/05

Кабелни глави за кабели с пластмасова изолация без броня, за напрежение до 42 kV

Тип: POLT

Raychem – България
Бургас 8000
ЕРЗЕТ ИНЖЕНЕРИНГ
жк."Братя Миладинови"
Бл.57, вх.4А, ет.1
Тел./факс-0035 956 34198
Тел./факс-0035 956 37102
GSM -0035 988 639903

Tyco Electronics Raychem GmbH
Energietechnik
Finsinger Feld 1
85521 Ottobrunn
Telefon: ++49-89-6089-0
Telefax: ++49-89-6096345

ВЯРНО С ОРИГИНАЛА

„КИМТЕХ-БЪЛГАРИЯ" ООД
КИМТЕХ
БУРГАС

Преди работа

Убедете се, че комплекта, който използвате съответства на кабела.
Сверете етикета на комплекта със заглавието на инструкцията.
Внимателно прочетете инструкцията и следвайте стриктно стъпките на монтажа, защото е възможно да е настъпила промяна в компонентите или последователността на операциите след последния монтаж, който сте извършвали.

Общи положения

Препоръчва се използването на пропан-бутан.

Регулирайти горелката така, че да преобладава меким, жълт пламък.

Избягвайте островърхия, син пламък.

Дръжте горелката наклонена в посоката на свиване така, че да подгрява студените части на тръбата.

Движете пламъка непрекъснато, за да избятвате прегаряне и нагърчване на тръбата.

Почистете с разтворител всички части, които ще контактуват с термотопимото лепило.

Спазвайте инструкциите за работа със съответния разтворител.

При рязане на тръбите използвайте остър нож и избягвайте образуването на ръбчета и неравности.

Свиването на всяка тръба извършвайте, както е посочено в инструкцията.

Убедете се , че тръбата се е свила добре по окръжността на кабела, преди да продължите свиването надлъжно.

Тръбата трябва да се свие гладко, без нагърчвания и профилът на вътрешните елементи да личи добре.

Информацията, съдържаща се в тази инструкция е предназначена да опише точния метод на монтаж на това изделие. Поради това, че Tyco Electronics няма възможност да контролира полевите или други условия на монтаж, монтьорът трябва да прилага собствения си опит, когато инсталира този продукт. Tyco Electronics не носи отговорност в случаи на повреда, възникнала в следствие на неправилен монтаж!
Raychem е запазена марка на Tyco Electronics.

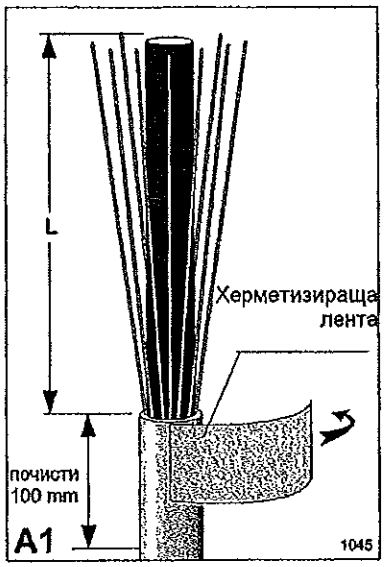
ВЕРНО С ОРИГИНАЛА
„КИМТЕХ" ООД БУРГАС

Подготовка на кабела

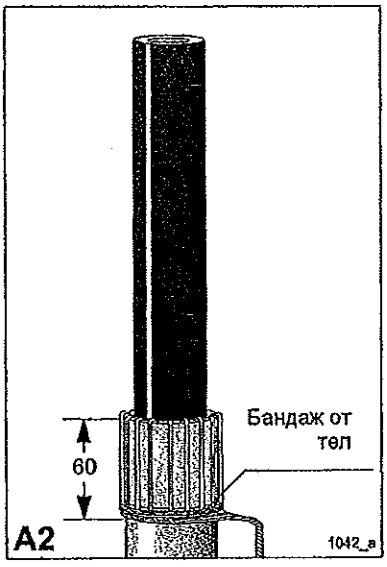
A. Кабел с екран от телове

Таблица 1

Тип POLT-	L закрито [mm]	L открито [mm]
12	240	240
17,5	240	280
24	280	360
36	380	440
42	440	500



Отстранете обвивката по размера L (Таблица 1).
Почистете края на обвивката на 100 mm.
Навийте червената херметизираща лента върху края на обвивката.

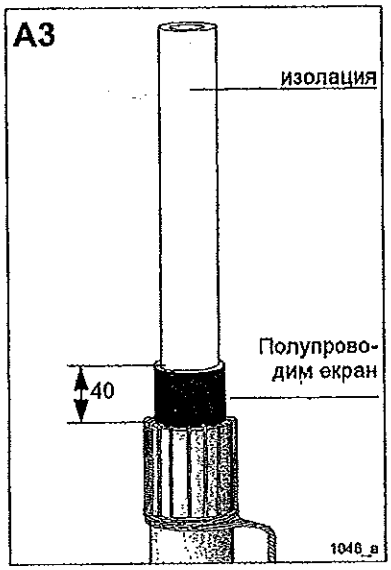


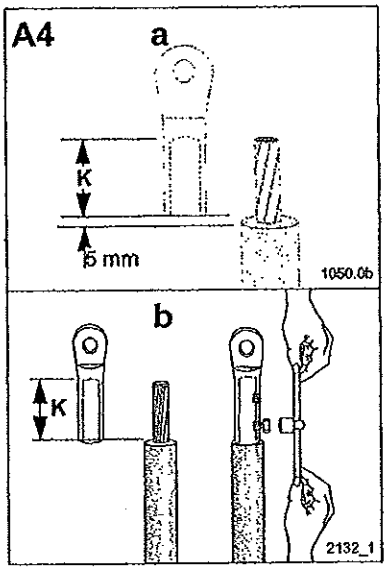
Огънете теловете към обвивката и ги положете без кръстосване върху червената лента.
Превържете ги с бандаж от тел на 60 mm от края на обвивката.
Оплетете теловете в заземително жило.

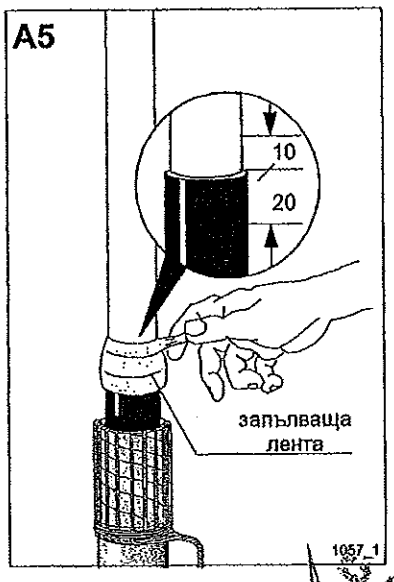
Отстранете полупроводимия екран до 40 mm от обвивката.
Повърхността на изолацията да е абсолютно чиста от проводими частици. Загладете неравностите.
Забележка: Не наранявайте изолацията!

Отрежете изолацията по размера K от схемата.
a. Пресови обувки
Размерът K да не надвишава 110 mm.
Монтирайте обувката.
b. Винтови обувки
Монтирайте обувката. Натягайте двата болта равномерно до откъсване на главите им.

Около края на полупроводимия екран навийте лента така, че да покриете 20 mm от екрана и 10 mm от изолацията.
Разпъвайте лентата до около половината от първоначалната и ширина, като се стремите да получите тънък и фин ръб върху изолацията.







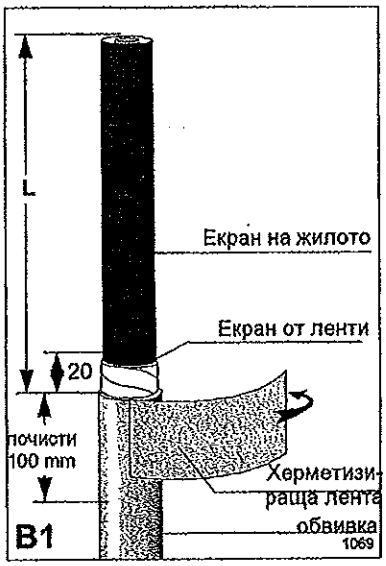
ВЪВ ВЪЗ ОРИГИНАЛА

Подготовка на кабела

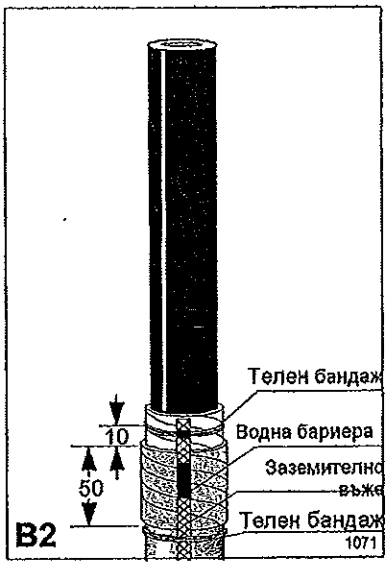
B. Кабел с екран от ленти

Таблица 2

Тип POLT-	L закрито [mm]	L открито [mm]
12	250	250
17.5	250	290
24	290	390
36	390	450
42	450	510



Отстранете обвивката по размера L (Таблица 2).
Отстранете металния екран до 20 mm обвивката.
Почистете обвивката на 100 mm.
Навийте червената херметизираща лента върху края на обвивката.

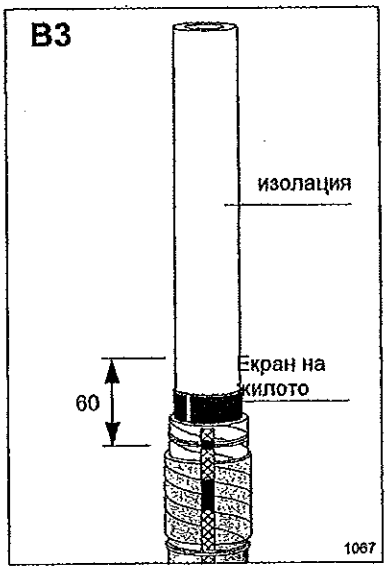


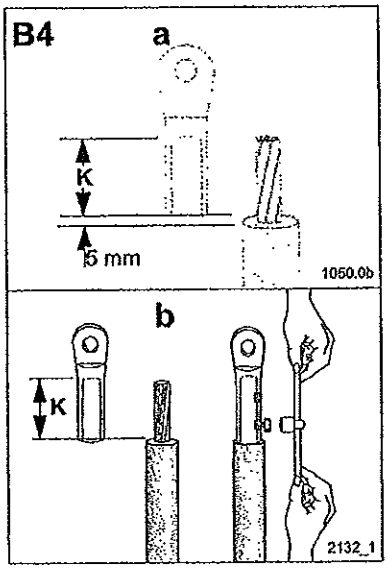
Фиксирайте заземителното въже към металния екран чрез запояване или друг приет метод.
Водната бариера да легне върху червената лента.
С тел фиксирайте заземителното жило към обвивката непосредствено под червената лента.

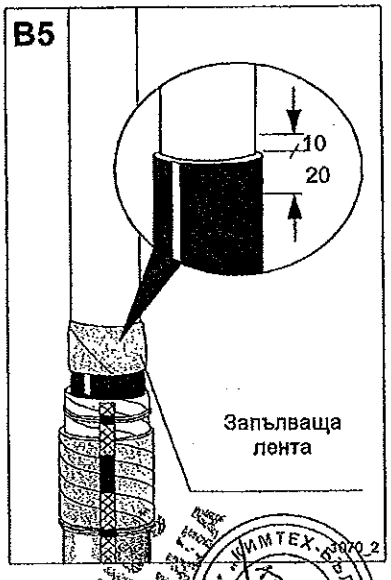
Отстранете полупроводимия екран до 60 mm от обвивката.
Повърхността на изолацията да е абсолютно чиста от проводими частици. Загладете неравностите.
Забележка: Не наранявайте изолацията!

Отрежете изолацията по размера **K** от схемата.
a. Пресови обувки
Размерът K да не надвишава 110 mm.
Монтирайте обувката.
b. Винтови обувки
Монтирайте обувката. Натягайте двата болта равномерно до откъсване на главите им.

Около края на полупроводимия екран навийте лента така, че да покриете 20 mm от екрана и 10 mm от изолацията.
Разпъвайте лентата до около половината от първоначалната и ширина, като се стремите да получите тънък и фин ръб върху изолацията.

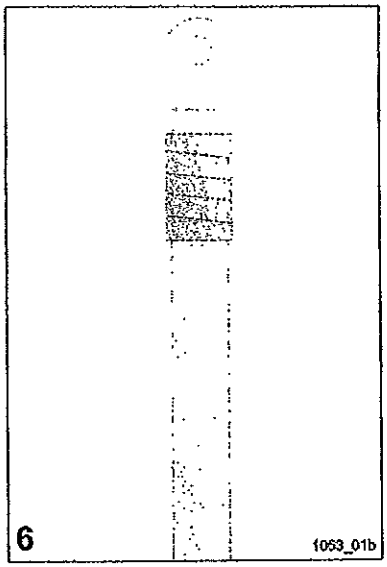






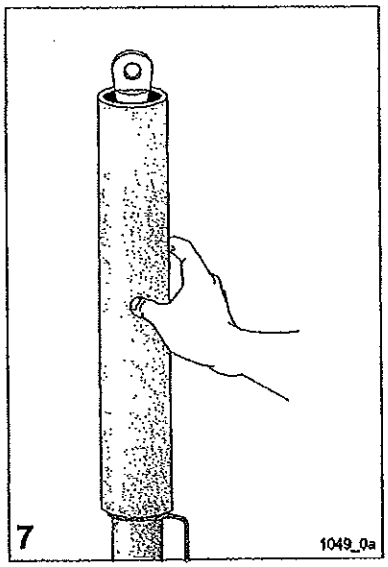
ВЯРНО С ОРИГИНАЛА
КИМТЕХ БЪЛГАРИЯ ООД БУРГАС

Изработване на главата

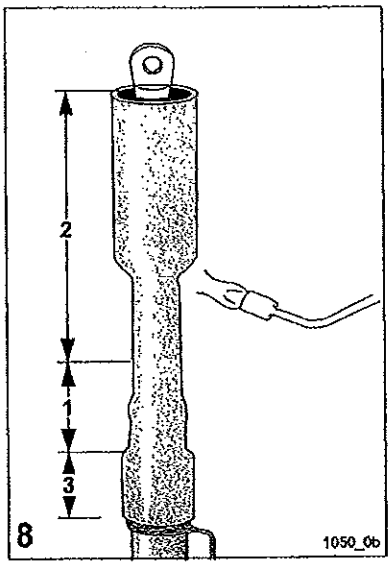


Уплътняване на кабелната обувка:
Използвайте червена лента и херметизирайте допълнително кабелната обувка при следните напрежение/сечение.

12kV: 10 - 25mm^2
17,5kV: 16 - 25mm^2
24 kV: 25 mm^2
36kV: 35 - 50 mm^2
42kV: 35 - 50 mm^2



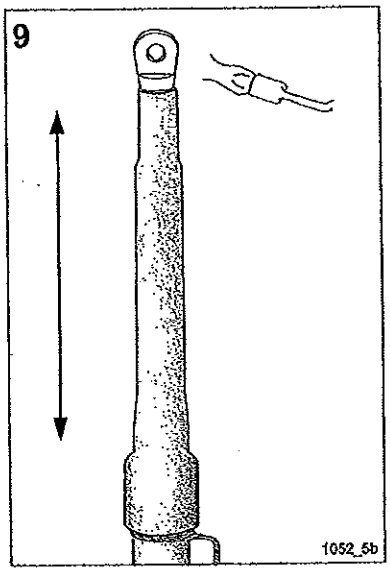
Подгрейте кабелната обувка и напъхайте тръбата до бандажа от тел.



Започнете свиването на тръбата върху края на полупроводимия екран.Продължете свиването към кабелната обувка и накрая - към кабела.
Цифрите на схемата показват последователността на свиване.

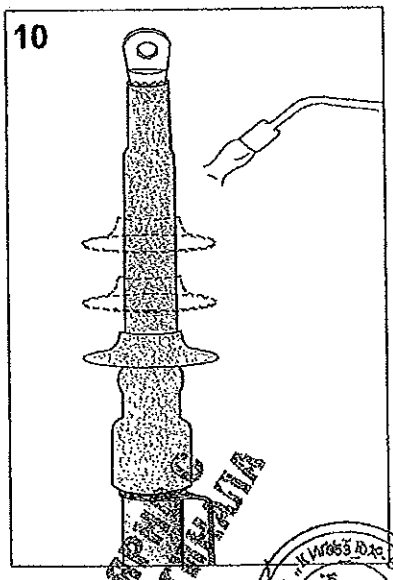
Кабелната глава за монтаж на закрито е готова

Забележка: След монтаж на главата върху шината е желателно главата да се нагрее допълнително до изтичането на зелена маса от вътрешността.
Оставете я да изстине, преди да я подложите на механически стрес.

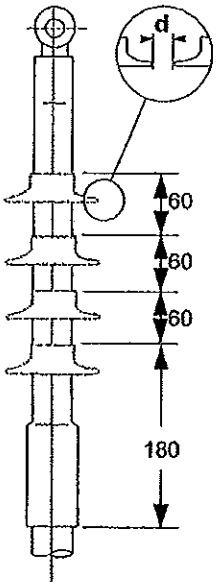


За монтаж на открито:

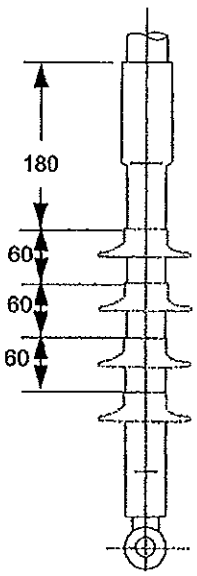
Свийте стрехичките по размерите от таблицата на Стр.6.
Започнете свиването от най-долната стрехичка.



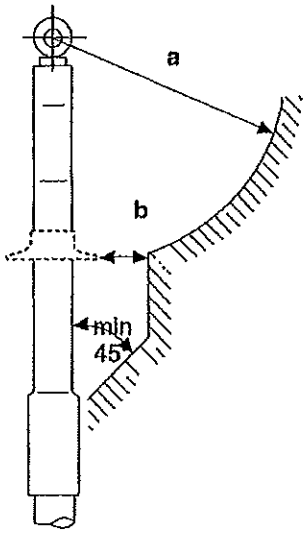
ВЯРНО С ОРИГИНАЛА
КИНЕТЕХ

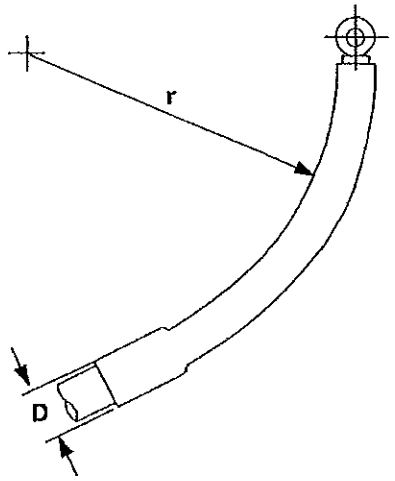


Брой стрехички на жило		
kV	закрито	открито
12	0	1
17,5	0	3
24	0	3
36	0	4
42	0	4



Минимален радиус на огъване и отстояния

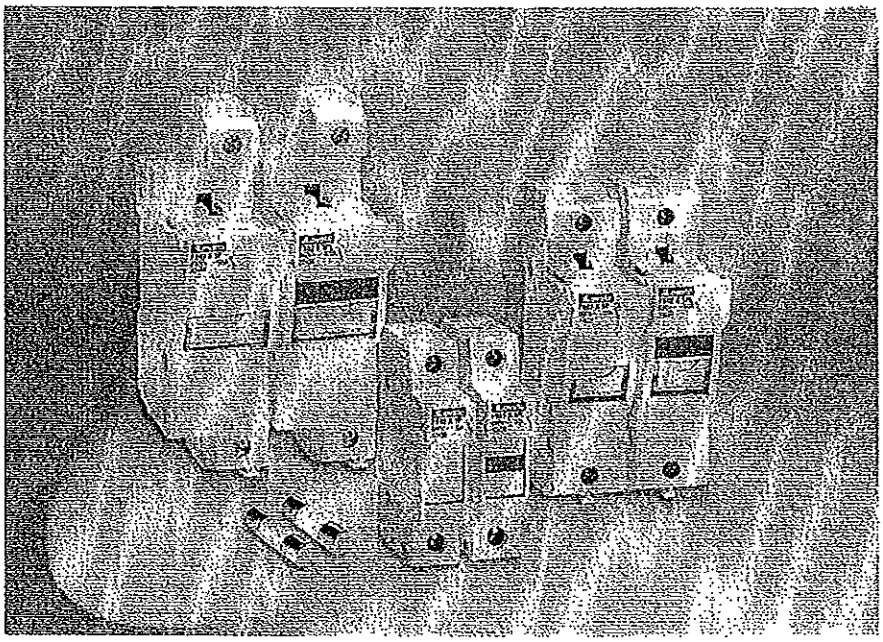




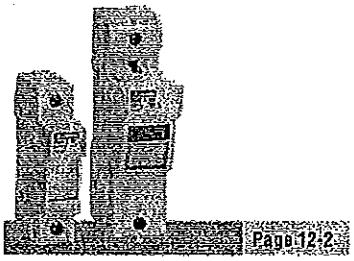
Mln. отстояния	Max. Напрежение в kV				
	12	17,5	24	36	42
a Въздушни	По местните спесификации				
b Ф/Ф и Ф/земя в mm	15	20	25	35	45
d Между стрехичките в mm	10	15	20	25	35
r (min. Радиус на огъване) = 15 x D					

Молим, отстранете всички отпадъци в съответствие с екологичните и санитарни норми

КИМТЕХ-БЪЛГАРИЯ ООД БУРГАС
Вярно с оригинала

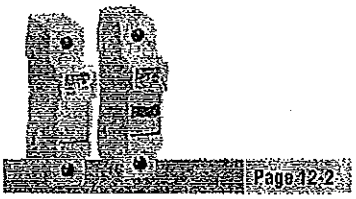


- Modular size for 10x38, 14x51 and 22x58mm fuses
- Finger safe - IP20 IEC degree of protection against accidental contact with live parts and with sealable cover for operators' safety
- Version with status indicator to quickly determine if the fuse is still operative or needs to be replaced
- UL and CSA certified versions.



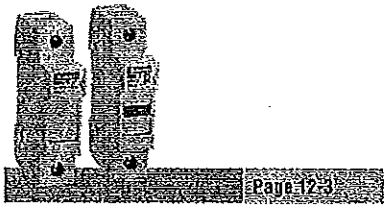
Page 12-2

AC FUSE HOLDERS
- Version without indicator: 1P, 1P+N, 2P, 3P, 3P+N
- Version with indicator: 1P
- For fuses 10x38, 14x51 and 22x58mm IEC class gG or aM.
- Rated current: 32A, 50A, 125A
- Rated voltage: 690VAC.



Page 12-2

AC FUSE HOLDERS CLASS CC FOR NORTH AMERICAN MARKET
- Version without indicator: 1P, 2P, 3P
- Version with indicator: 1P
- For 10x38mm UL/CSA class CC fuses
- Rated current: 30A
- Rated voltage: 600VAC.



Page 12-3

DC FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS
- Version without indicator: 1P, 2P
- Version with indicator: 1P, 2P
- For 10x38mm IEC class gPV fuses
- Rated current: 32A
- Rated voltage: 1000VDC
- IEC utilisation category: DC20B.

Page 12-3

DC FUSES FOR PHOTOVOLTAIC APPLICATIONS
- 10x38mm, IEC class gPV
- Rated current: 20A
- Rated voltage: 1000VDC.

ВЯРНО С ОРИГИНАЛА

Fuse holders UL Recognized and CSA certified

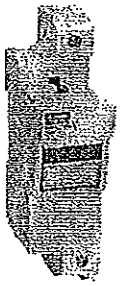

FB01 A...

FB01 A 1PL


FB02 A...


FB02 A 1PL


FB03 A...


FB03 A 1PL

Order code	Pole arrangement	Status indicator	DIN size	Qty. per pkg	Wt.
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 690VAC.					
FB01 A 1P	1P	—	1	12	0.066
FB01 A 1PL	1P	YES	1	12	0.065
FB01 A 1M ❶	1P+N	—	1	12	0.062
FB01 A 1N	1P+N	—	2	6	0.134
FB01 A 2P	2P	—	2	6	0.132
FB01 A 3P	3P	—	3	4	0.188
FB01 A 3N	3P+N	—	4	3	0.260
For 14x51mm fuses. 50A rated current at 690VAC.					
FB02 A 1P	1P	—	1	12	0.113
FB02 A 1PL	1P	YES	1	12	0.114
FB02 A 1N	1P+N	—	2	6	0.237
FB02 A 2P	2P	—	2	6	0.224
FB02 A 3P	3P	—	3	4	0.335
FB02 A 3N	3P+N	—	4	3	0.460
For 22x58mm fuses. 125A rated current at 690VAC.					
FB03 A 1P	1P	—	1	12	0.167
FB03 A 1PL	1P	YES	1	12	0.167
FB03 A 1N	1P+N	—	2	6	0.354
FB03 A 2P	2P	—	2	6	0.334
FB03 A 3P	3P	—	3	4	0.500
FB03 A 3N	3P+N	—	4	3	0.720

❶ Not certified.

Operational characteristics:
- IEC rated voltage Ue:
  - 690VAC (FB01 A 1M excluded)
  - 400VAC (FB01 A 1M only)
- IEC rated current Ie:
  - FB01 A: 32A
  - FB02 A: 50A
  - FB03 A: 125A
- IEC utilisation category:
  - FB01 A: AC22B 500V, AC21B 690V (except FB01 A 1M: AC22B 400V)
  - FB02 A: AC22B 500V, AC21B 690V
  - FB03 A: AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection: IP20

Certifications and compliance:
Certifications obtained:

Type	UL Recognized for USA (File E43395)	CSA certified (File 252040 class 6225)	UL Recognized for USA and Canada (File E43395)
FB01 A 1P, FB01 A 1PL, FB01 A 1N	●	●	
FB02 A			●
FB03 A			●

● Certification obtained

"UL Recognized": Products having this type of marking are intended for use as components of complete workshop-assembled equipment.

Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4

Fuse holders


FB01 B...


FB01 B 1PL

Order code	Pole arrangement	Status indicator	DIN size	Qty. per pkg	Wt.
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 690VAC.					
FB01 B 1P	1P	—	1	12	0.062
FB01 B 1PL	1P	YES	1	12	0.064
FB01 B 1N	1P+N	—	2	6	0.127
FB01 B 2P	2P	—	2	6	0.128
FB01 B 3P	3P	—	3	4	0.185
FB01 B 3N	3P+N	—	4	3	0.247

Operational characteristics:
- IEC rated voltage Ue: 690VAC
- IEC rated current Ie: 32A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection: IP20

Reference standards:
Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-3, IEC/EN 60269-1, IEC/EN 60269-2

Fuse holders UL Listed and CSA certified for class CC fuses for North American market


FB01 C...


FB01 C 1PL

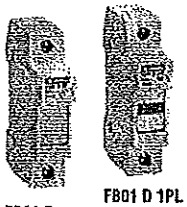
Order code	Pole arrangement	Status indicator	DIN size	Qty. per pkg	Wt.
			n°	n°	[kg]
For 10x38mm fuses. 30A rated current at 600VAC.					
FB01 C 1P	1P	—	1	12	0.070
FB01 C 1PL	1P	YES	1	12	0.072
FB01 C 2P	2P	—	2	6	0.140
FB01 C 3P	3P	—	3	4	0.210

NOTE: UL Listed and CSA certified as "Fuseholders, Cartridge Fuse" for use with Class CC fuses. Interrupting rating 200,000 Amps rms symmetrical. Voltage rating 600V. Current rating 30A.

Operational characteristics:
- IEC rated voltage Ue: 600VAC
- IEC rated current Ie: 30A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for UL/CSA fuse class: CC
- IEC degree of protection: IP20

Certifications and compliance:
Certifications obtained: UL Listed (File E343395) and CSA certified (File 252040 class 6225)
Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4

Fuse holders for photovoltaic applications


FB01 D...

FB01 D 1PL

Order code	Pole arrangement	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 1000VDC.					
FB01 D 1P	1P	—	1	12	0.064
FB01 D 1PL	1P	YES	1	12	0.065
FB01 D 2P	2P	—	2	6	0.127
FB01 D 2PL	2P	YES	2	6	0.130

Operational characteristics
- IEC rated voltage Ue: 1000VDC
- IEC rated current Ie: 32A
- IEC utilisation category: DC20B 1000VDC
- Suitable for IEC fuse class: gPV
- IEC degree of protection: IP20

Reference standards
Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3

Fuses for photovoltaic applications


FE01 D...

Order code	Rated current In	Qty per pkg	Wt
	[A]	n°	[kg]
For 10x38mm fuses. 30kA breaking capacity at 1000VDC.			
FE01 D 00200	2	10	0.008
FE01 D 00400	4	10	0.008
FE01 D 00600	6	10	0.008
FE01 D 00800	8	10	0.008
FE01 D 01000	10	10	0.008
FE01 D 01200	12	10	0.008
FE01 D 01600	16	10	0.008
FE01 D 02000	20	10	0.008

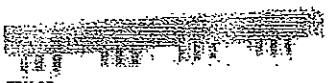
Operational characteristics
- IEC rated voltage Ue: 1000VDC
- IEC rated current Ie: 2-20A
- IEC fuse class: gPV

Reference standards
Compliant with standards: IEC/EN 60269-6

Accessories


FBX 00


FBX 01
FBX 02


FBX 05


FBX 07


FBX 08

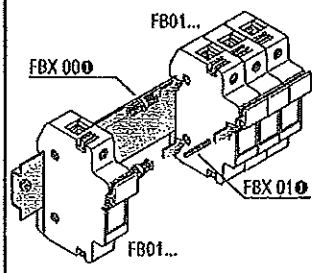

FBX 11

Order code	Description	Qty per pkg	Wt
	[A]	n°	[kg]
FBX 00❶	Coupling clip for 10x38, 14x51 and 22x58mm sizes❶	100	0.003
FBX 01❶	Coupling pin for 10x38mm size❶	100	0.005
FBX 02	Coupling pin for 14x51 and 22x58mm sizes	100	0.008
For FB01 A... and FB01 B... types.			
FBX 05	Three-phase connection busbar, for 57 modules in total, 1m/3.3ft long	10	0.465
FBX 07	One-pole terminal for 25mm² max conductor	25	0.010
FBX 08	One-pole terminal for 50mm² max conductor	25	0.020
FBX 11	End cap for FBX05 busbar	50	0.001

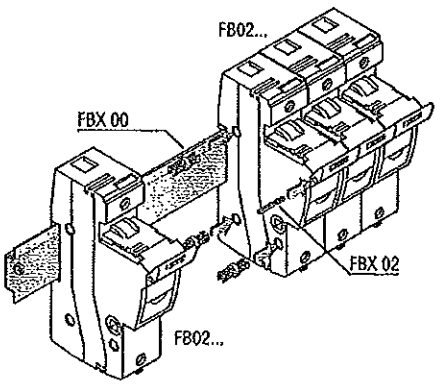
❶ Not suitable for FB01 B1N, FB01 B2P, FB01 B3P and FB01 B3N types.

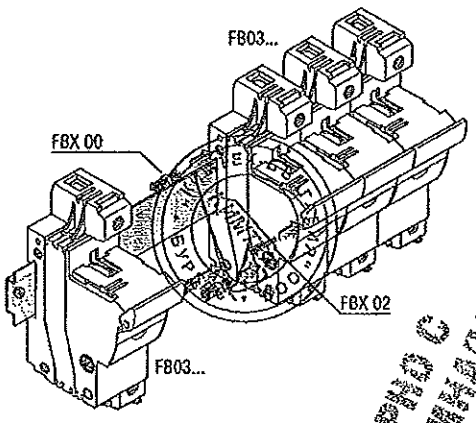
General and operational characteristics
THREE-PHASE BUSBAR
- Central point of power supply: 130A max
- Side point of power supply: 80A max
- Pitch: 18mm/0.7in
- Busbar section: 10mm²
- Number of modules/poles: 57
- For paralleling connection
- Length (standard supplied): 1m/3.3ft which can be cut in shorter sections

Fuse holder assembly in multiple pole configuration



❶ Not suitable for FB01 B1N, FB01 B2P, FB01 B3P and FB01 B3N types.

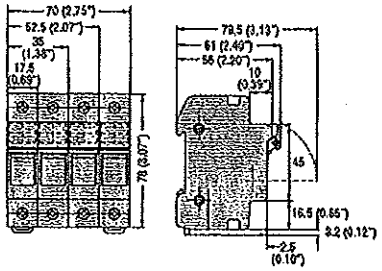




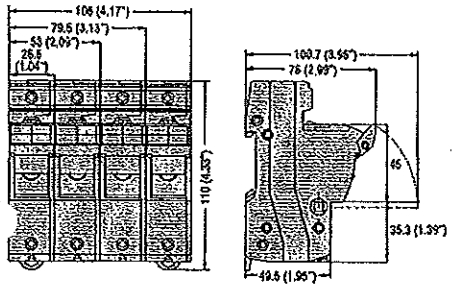
Fuse holders
Dimensions [mm (in)]

FUSE HOLDERS

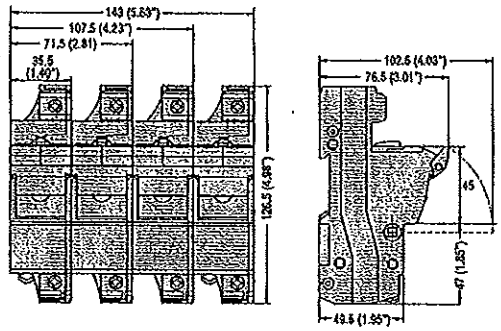
FB01 A... FB01 B... FB01 C... FB01 D...



FB02 A...

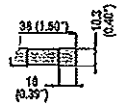


FB03 A...

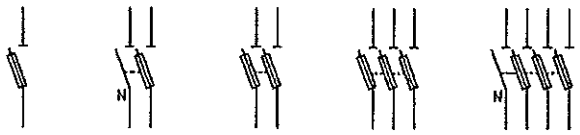


FUSES

FE01 D 0...



Wiring diagrams



1P 1P+N 2P 3P 3P+N

ВЕРНО С ОРИГИНАЛА
„ХИМТЕХ-БЪЛГАРИЯ" ООД
ХИМТЕХ
ВЪЛАС

TYPE		FB01 A...	FB01 B...	FB02 A...	FB03 A...	FB01 C...	FB01 D...
Range		AC				Class CC (AC)	DC
IEC maximum rated current In		32A		50A	125A	30A	32A
IEC maximum rated voltage In		690VAC; 400VAC ❶	690VAC			600VAC	1000VDC
IEC utilisation category		AC22B 500V; AC21B 690V; AC22B 400V ❶			AC21B 690V	AC22B 500V; AC21B 690V	DC20B 1000VDC
Maximum power dissipation		3W		5W	9.5W	3W	4W
Derating factor of current In for different ambient temperatures	20°C	1					
	30°C	0.95					
	40°C	0.9					
	50°C	0.8					
	60°C	0.7					
	70°C	0.5					
Derating factor of current In for side-by-side fuse holders - n° poles	1-4	1					
	5-6	0.8					
	7-9	0.7					
	≥10	0.6					
Voltage for status indicator		120...690VAC		230...690VAC		120...600VAC	350...1000VDC
CONNECTIONS							
Maximum tightening torque		2.5Nm; 2Nm ❶ / 22lbin		3Nm / 26lbin	4Nm / 35lbin	2.5Nm / 22lbin	
Maximum conductor cross section	flexible/stranded	1x16mm²; 1-16mm² ❶ / 8AWG		1x25mm² / 6AWG	1x35mm² / 2AWG	1x16mm² / 8AWG	1x16mm² / 6AWG
	rigid/solid	1x25mm²; 1-10mm² ❶ / 8AWG		1x35mm² / 8AWG	1x50mm² / 1AWG	1x25mm² / 10AWG	1x25mm² / 4AWG
AMBIENT CONDITIONS							
Operating temperature		-20...+70°C					
Storage temperature		-40...+80°C					
Maximum altitude		3,000m					
Operation position		Any					
Fixing		On 35mm DIN rail (IEC/EN 60715)					

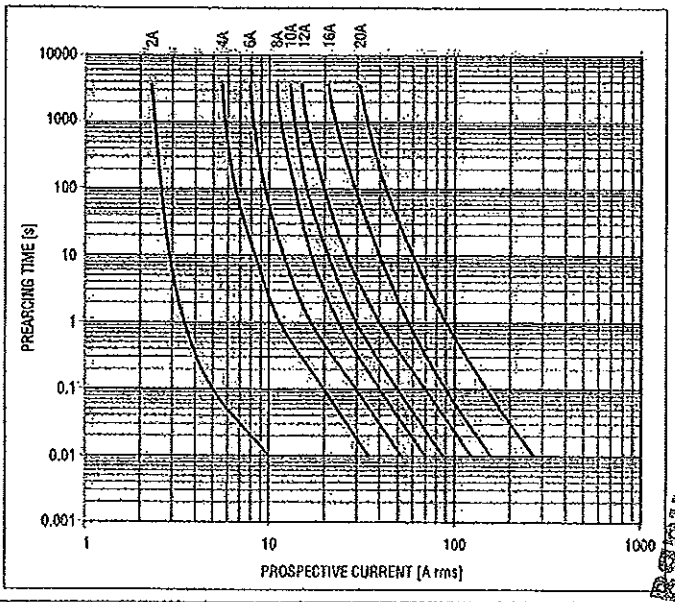
❶ Values valid only for FB01 A 1M type.

12

TECHNICAL CHARACTERISTICS FOR FE01 D... FUSES

TYPE	Rated current [A]	Power consumption at 0.7 In [W]	Power consumption at In [W]	Prearcing I²t [A²s]	Total I²t at 1000VDC [A²s]
FE01 D 00200	2	0.62	1.54	1.78	6.5
FE01 D 00400	4	0.73	1.84	3	11
FE01 D 00600	6	0.96	2.4	8.5	32
FE01 D 00800	8	1.02	2.55	25	93
FE01 D 01000	10	1.03	2.58	11	52
FE01 D 01200	12	1.04	2.6	25	116
FE01 D 01600	16	1.08	2.7	33	152
FE01 D 02000	20	1.16	2.9	85	390

TIME-CURRENT CHARACTERISTICS FOR FE01 D... FUSES



ВЯРНО С ОРИГИНАЛА
ЕЛМТЕХ-БЪЛГАРИЯ
ЕЛМТЕХ
БУРГАС

Kimtech
Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

Описание на типа

за клемен блок с 3 еднополюсни предпазител разединители с цилиндрични стопяеми предпазители

Наименованието на клемния блок е ИК7ТК3Р

Клемния блок е съставен от 7бр. разединяеми клеми тип URTK/S и комплектован с допълнителни аксесоари към тях, 3 броя еднополюсни предпазител разединители тип FB01B и 3 броя цилиндрични стопяеми предпазители 10x38 4A, съгласно изискванията на ЧЕЗ България.

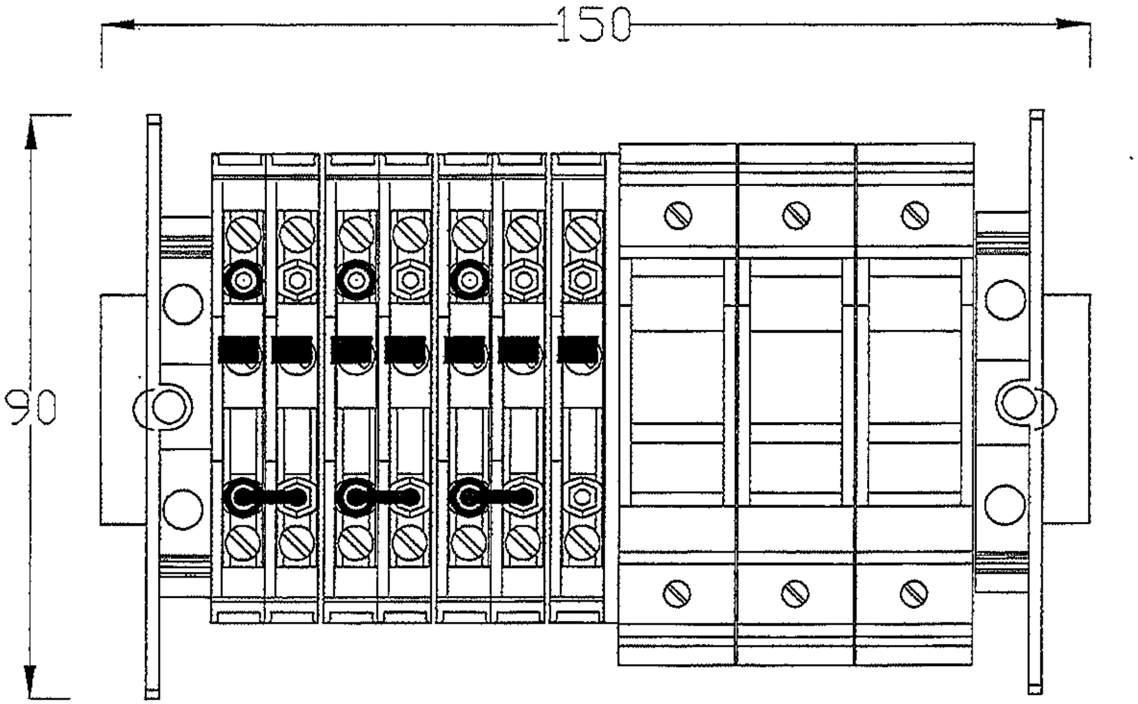
Разединяемите клеми URTK/S и техните аксесоари са произведени от Phoenix Contact GmbH и са със страна на произход Германия.

Предпазител разединителите са произведени от Lovato Electric и са със страна на произход Италия

Клемите, аксеоарите им, предпазител разединителите и стопяемите предпазители се произвеждат в клемен блок съгласно изискванията на ЧЕЗ България.

Подпис и печат:

ВЯРНО С ОРИГИНАЛА



ВиВ Изоматик ООД 1680 София, ул. "Пирин" No40A тел. 02 958 63 40, 958 63 44, 958 31 11, факс 958 22 70			
ОБЕКТ:Измервателен клеморед ЧЕЗ		СЪГЛАСУВАЛИ:	
част:	лист No: 1/ 1		
фаза: РП	мащаб: –	ВЪЗЛОЖИТЕЛ:	
		Чертал:	
		Р-л фирма: инж. Вл. Лазаров	

"КИМТЕХ-БЪЛГАРИЯ" ООД • БУРГАС • КИМТЕХ
ВЯРНО С ОРИГИНАЛА

LOVATO ELECTRIC S.P.A.
Via Don E. Mazza, 12
24020 Gorle (BG) Italy
Tel: +39 035 4282111
Fax (National) +39 0354282200
Fax (International) +39 0354282400
E-mail: info@LovatoElectric.com
VAT ID No. IT 0192130016477

DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

Noi (denominazione del fornitore) **LOVATO ELECTRIC S.p.A.**
We (supplier's name)

(indirizzo) Via Don E. Mazza, 12 - 24020 Gorle - Bergamo - ITALY
(address)

dichiariamo sotto la nostra esclusiva responsabilità che i prodotti
declare under our sole responsibility that the products

Portafusibili **FB..**

Fuseholders

(nome, tipo o modello, lotto o numero di serie, possibilmente l'origine e la quantità)
(name, type or model, batch or serial number, possibility sources and number of items

sono conformi alle seguenti direttive
are in conformity with the following directives

Direttiva Bassa Tensione nr.2006/95/CE
Low Voltage Directive no.2006/95/EC

Direttiva Compatibilità Elettromagnetica nr.2004/108/CE
Electromagnetic Compatibility Directive no.2004/108/EC

Questo è documentato dalla conformità alle norme
This is documented by the conformity with the following standards

EN 60269-1

(Titolo e/o numero e data di pubblicazione della norma o di altri documenti normativi)
(Title and /or number and date of issue of the standard or other normative documents)

Questa dichiarazione è conforme alla Norma Europea EN45014 "Criteri generali del fonitore". Le basi per tali criteri sono documenti internazionali ed in particolare la Guida ISO/IEC 22 "Information on manufacture's declaration of conformity with standards or other technical specifications"

This declaration of conformity is in compliance with the European Standard EN 45014 "General criteria for supplier's declaration of conformity". The basis for the criteria has been found in international documentation, particularly in: ISO/IEC Guide 22 "Information on manufacture's declaration of conformity with standards or other technical specifications"

Revisione:
Revision

Gorle, 04/03/2011
(luogo e data)
(place and data of issue)

Ing. D. Perani Product Manager

(Nome e firma della persona autorizzata)
(Name and signature of authorized person)

LOVATO ELECTRIC S.p.A.

DEVICE UNDER TEST ..... **Fuse holder *FB01B types***

MANUFACTURER ..... Lovato Electric S.p.A.

TYPE OF TEST ..... **Temperature rise test on FB01B fuse holders**

DATE OF DEVICE RECEIPT 27/04/2011

START / END TESTING ..... 29/04/2011 – 13/05/2011

SAMPLES STORING ..... ☒ Eliminated / returned to customer ☐ Storage :

INDEX .....

ISSUE 16/05/2011

COMPILED ..... STAFF LPR

APPROVED ..... RESP. LPR

ВЯРНО С ОРИГИНАЛА

КИМТЕХ България

1. PURPOPSE OF TESTING

Requested test (according to the customer specification):
Temperature rise at 690V – 32A on FB01B fuse holders

Test purpose:
"Verify the good function of FB01B fuse holders ."

Test target:
Pass the test.

2. TEST SAMPLES

N. 1 FB01B1P fuse holder - 32A (10 x 38 mm), batch production number ...[1]
N. 1 FB01B2P fuse holder - 32A (10 x 38 mm), batch production number ...[1]
N. 1 FB01B3P fuse holder - 32A (10 X 38 mm), batch production number ...[1]

3. TEST METHOD

IEC 60947-3 (2008-08) Ed. 3.0 + IEC 60947-1 Ed. 5.1 (2011-03)
Temperature rise (§ 8.3.3.1)

4. TEST PROCEDURES

Temperature rise..... Test instruction LPR 051-1, rev. 4, dated 11/10/2010.

[1] not available
[1] not available
[1] not available

5. TEST RESULTS

5.1 TEMPERATURE RISE

5.1.1 WITH LEGRAND FUSE 32 A gG 400 V

Sample under test.....N. 1 FB01B1P - 32A
N. 1 FB01B2P - 32A
N. 1 FB01B3P - 32A

Test conditions

Ambient temperature.....21 °C
Relative humidity.....46 %
Installation.....In vertical way, on DIN RAIL 35mm

Data sheet fusible used:
- Supplier.....Legrand
- Code .....cod. 133 32

Test parameters

Wiring of the main circuit
- cables section / length.....6,0 mm^2 / 1,0 m
- screws tightening nominal torque .....2,0 ÷ 2,5 N.m
- screws applied tightening torque .....2,0 N·m

Supply of the main circuit
- rated current.....Ith = 25 - 32 A
- test current.....I = 32 A
- supply frequency.....50 Hz

Test results

See next page.

Temperature rise main circuit

	(K)			Standard limit EN60947-1 tab. 2
	One pole fuse holder FB01B1P	2 pole fuse holder FB01B2P	3 pole fuse holder FB01B3P	
Terminal L1	43	54	57	65
Terminal T1	39	51	52	65
Terminal L2	-	55	61	65
Terminal T2	-	49	58	65
Terminal L3	-	-	57	65
Terminal T3	-	-	50	65
Note	Silver plated-brass terminal			

Temperature rise for accessibile parts

	(K)			Standard limit EN60947-1 tab. 3
	One pole fuse holder FB01B1P	2 pole fuse holder FB01B2P	3 pole fuse holder FB01B3P	
Line side	14	24	29	40
Load side	10	19	21	40
Left side	24	30	32	40
Right side	22	30	31	40
On front	18	24	29	40
Lever	9	16	17	40

6. TEST EQUIPMENT AND INSTRUMENTS

6.1. TEST EQUIPMENT

Description	Used for	Full scale	Code
Current supply station	Power supply main circuit	20V – 50A	LPRA 065

6.2. MEASURING INSTRUMENTS

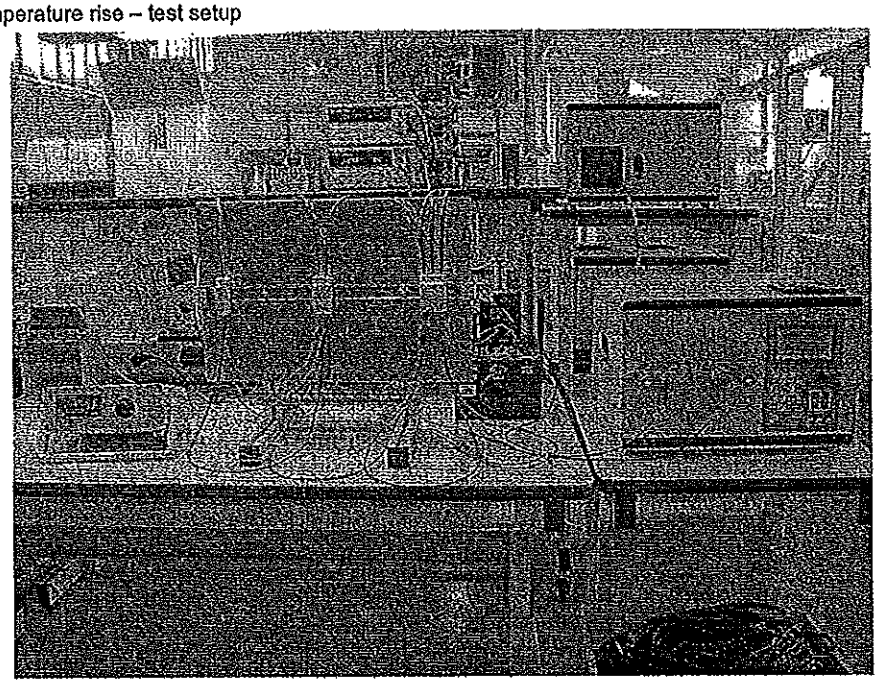
Description	Used to measure	Full scale	Code	Calibration expiration date
Thermohygrometer	Ambient temperature	-5 ÷ 50 °C	LPR 165	27/10/2011
Thermohygrometer	Relative humidity	10 ÷ 90%	LPR 165	27/10/2011
Termometric instrument	Temperature rise	-30 ÷ +200 °C	LPR 201	10/01/2012
Termocouple T type	Temperature rise	-30 ÷ +200 °C	LPR 201	10/01/2012
Termocouple T type	Temperature rise	-30 ÷ +200 °C	LPR 201.13	10/01/2012
Current transformer	Main circuit current	1.004/50 A	LPR 155	11/05/2014
Digital multimeter	Main circuit current	10 A	LPR 55	11/05/2012
Digital multimeter	Drop voltage	mV - Autom.	LPR 125	11/05/2012
Dynamometric screw driver	Main terminal screw tightening	6,0 Nm	LPR 231	07/01/2012

7. REMARKS & ANALYS

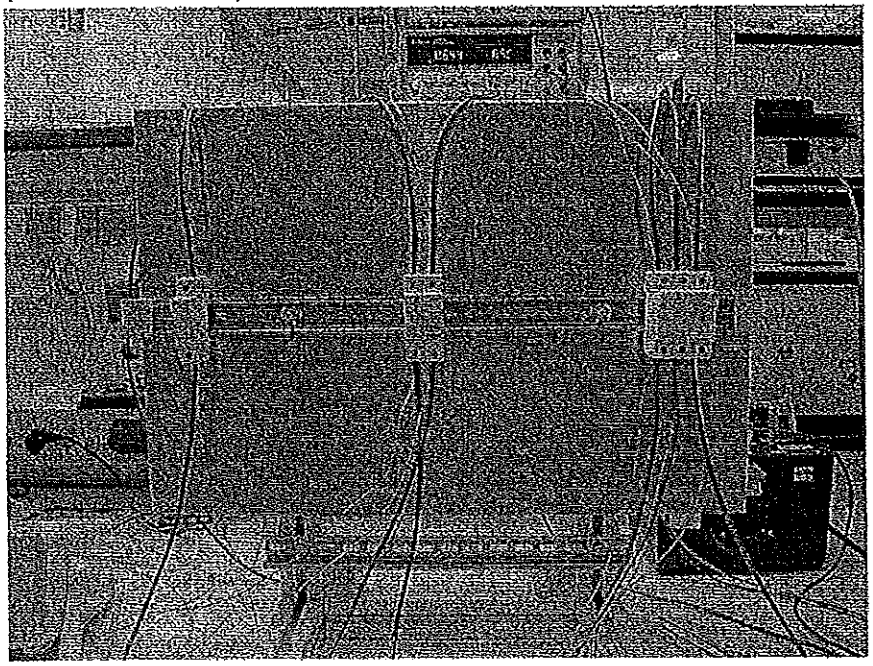
Temperature rise test 690V – 32A: test passed

8. ANNEX

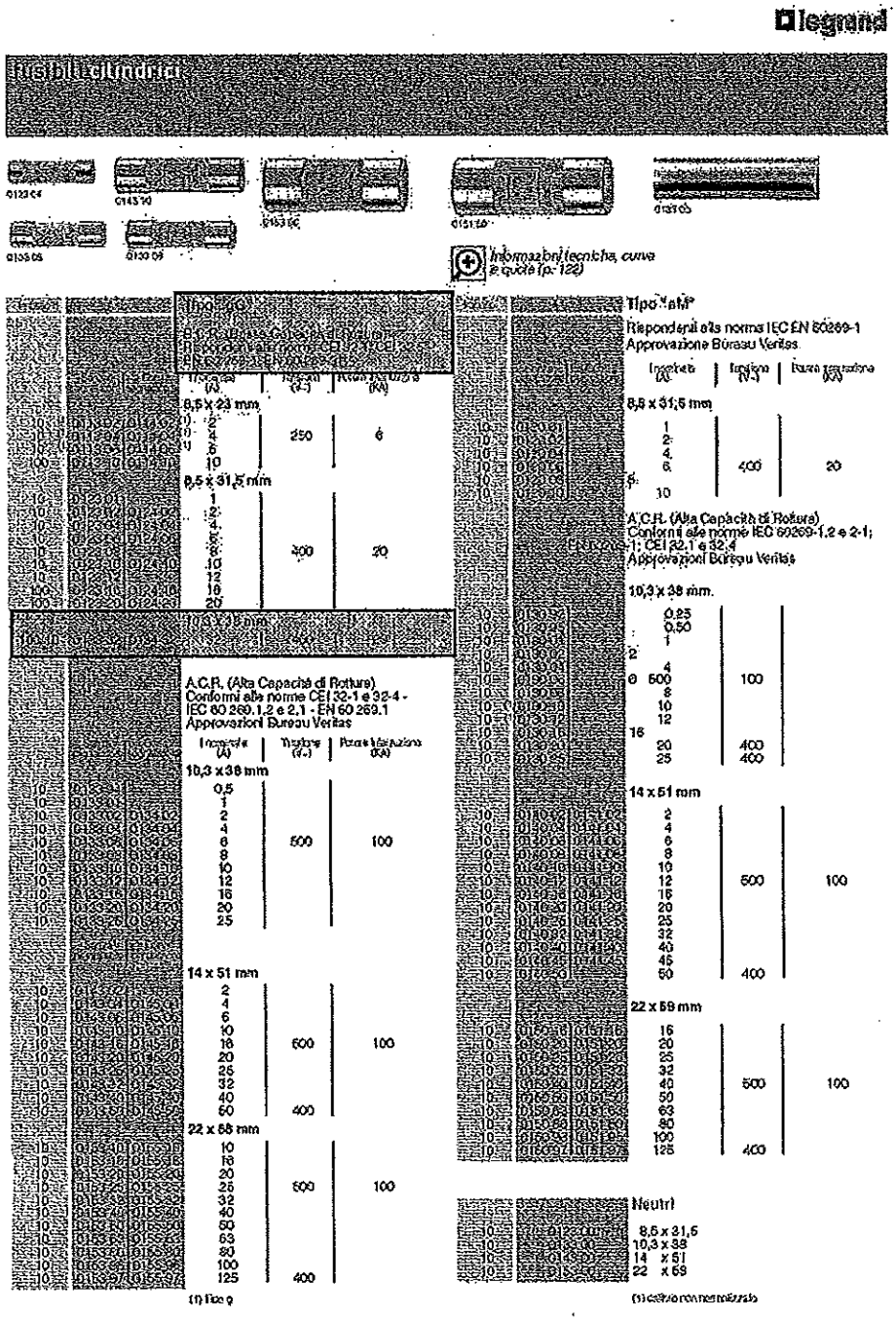
Picture 1: Temperature rise – test setup



Picture 1a: Temperature rise – test setup



Picture 2: Catalogue Legrand fuses



The test results are related only to the exemplary tested and listed under the "test samples".

Кимтех България ООД
1113 гр. София
ул. Акад. Георги Бончев № 20

официален дистрибутор на
tyco Electronics
кабели, трансформатори,
електрооборудване

тел: 02 9733373
факс: 02 9733370
web:www.kimtech.bg
e-mail: office@kimtech.bg

Списък на проведените изпитвания на клемен блок с клеми за медни проводници от проходен тип 1P, 3P и 3P+N

1. Изпитване покачване на температура.

13.01.2016г.

Подпис и печат

KEMA
REGISTERED QUALITY

KEMA KEUR

CERTIFICATE

KEMA No.: 97.4117.13

Issued to:
Applicant:
Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28
BLOMBERG, Germany

Manufacturer/Licensee:
Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28
BLOMBERG, Germany

Product : Terminal blocks

Trade name : PHOENIX CONTACT
Types/models : URTK/S-BEN BU, URTK/S-BEN, URTK/S, URTK/SP, USLKG 10, USLKG 6N

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

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

- a type test according to the standard EN 60947-7-1:1991,EN 60947-7-2:1995
- an inspection of the production location according to CCA Group Operational Document CCA 204
- a certification agreement with the number 900469

KEMA hereby grants the right to use the KEMA certification mark

KEMA KEUR

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

This certificate is issued on August 6, 1999.

C.M. Boschloo
Certification Manager

Integral publication of this certificate is allowed.

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET Arnhem, The Netherlands
Telephone +31 26 3 56 28 60, Telefax +31 26 3 51 49 22

ACCREDITED BY THE DUTCH COUNCIL FOR ACCREDITATION

SPECIFICATION OF THE CERTIFIED PRODUCT

Product data

product	: terminal blocks
trade name	: PHOENIX CONTACT
types	: URTK/S-BEN BU, URTK/S-BEN, URTK/S, URTK/SP, USLKG 10, USLKG 6N
material	: thermoplastic material
mounting	: top hat rail 35 mm (EN 50022) and G-profile rail 32 mm (EN 50035)

Additional information

Markings

Trademark, type designation, rated connection capacity and rated insulation voltage are indented in the insulation material.

Product data – type USLKG 6N

rated connection capacity	: 6 mm²
connectable conductors	: one conductor 0,2 - 10 mm² solid 0,2 - 6 mm² flexible without ferrule 0,25 - 6 mm² flexible with ferrule two conductors 0,2 - 2,5 mm² solid 0,2 - 2,5 mm² flexible without ferrule 0,25 - 1,5 mm² flexible with ferrule
description	: protective conductor terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S

rated voltage	: 400 V
rated connection capacity	: 6 mm²
connectable conductors	: one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	: 6 kV
description	: disconnect terminal block with 2 screw-type clamping units, 1-pole

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562850, Telefax +31 26 3514922

Product data – type USLKG 10

rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 6 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 2,5 mm² flexible without ferrule 0,5 - 2,5 mm² flexible with ferrule
description	:	protective conductor terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S-BEN

rated voltage	:	500 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S-BEN BU

rated voltage	:	500 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562860, Telefax +31 26 3514922

ВИТИНА ОРИГИНАЛА
„КИМТЕХ-БЪЛГАРИЯ" • БУРГАС •

Product data – type URTK/SP

rated voltage	:	600 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 6 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 4 mm² flexible without ferrule 0,5 - 2,5 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

TESTS

Test requirements

EN 60947-7-1:1991 + C:1997-06 + A11:1997
EN 60947-7-2:1995 + C:1996-01

Test results
The test results are laid down in KEMA test file 97.4117.13.

Conclusion
The examination proved that all test requirements were met.

Tested by : H.L. Schendstok

Checked by : L.J.W. van Megen

FACTORY-LOCATION(S)

Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28, BLOMBERG, Germany

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562850, Telefax +31 26 3514922

ВЯРНО С ОРИГИНАЛА

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

Premises: **n.a.**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
LF 0 0	DC/LF Quantities			
LF 1 0	DC Voltage			
	Standard cells		3 µV	
	Up to 1 mV		0,4 µV	
	1 mV to 10 mV		$3 \cdot 10^{-4} \cdot U$	
	10 mV to 100 mV		$3 \cdot 10^{-5} \cdot U$	
	100 mV to 10 V		$5 \cdot 10^{-6} \cdot U$	
	10 V to 100 V		$1 \cdot 10^{-5} \cdot U$	
	100 V to 1100 V		$2 \cdot 10^{-5} \cdot U$	
	Zener Reference Standards			
	1 V and 1,018 V		3 µV	
	10 V		20 µV	
	High Voltage			Measuring
	1 kV to 6 kV		$2 \cdot 10^{-3} \cdot U$	
LF 2 0	DC Current			
	10 µA to 3 A		$2 \cdot 10^{-5} \cdot I$	
	3 A to 10 A		$2{,}5 \cdot 10^{-5} \cdot I$	
	10 A to 20 A		$6 \cdot 10^{-5} \cdot I$	

This annex has been approved by:

J.C. van der Poel
Chief Executive

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	20 A to 100 A		$1 \cdot 10^{-4} \cdot I$	
LF 3 1	AC Voltage			
	60 mV to 1000 V	40 Hz to 20 kHz	$2 \cdot 10^{-4} \cdot U$	
	60 mV to 1000 V	20 kHz to 50 kHz	$3 \cdot 10^{-4} \cdot U$	
	60 mV to 220 V	20 kHz to 50 kHz 50 kHz to 100 kHz	$4 \cdot 10^{-4} \cdot U$	
	220 V to 1000 V	50 kHz to 100 kHz	$4 \cdot 10^{-4} \cdot U$	
	220 V to 1000 V	50 kHz to 100 kHz	$2 \cdot 10^{-3} \cdot U$	
	High Voltage			Measuring
	1 kV tot 6 kV	50 Hz	$2 \cdot 10^{-3} \cdot U$	
LF 3 2	AC Voltage Ratio (instrument transformers)			
	Primary: (10-600)V Secondary: (0,1-240)V	50 Hz and 60 Hz	$3 \cdot 10^{-5} \cdot U_{ult}/U_{in}$ and 90 µrad	
LF 3 3	AC Current			
	0,1 mA to 300 mA	40 Hz to 5 kHz	$3 \cdot 10^{-4} \cdot I$	
	300 mA to 20 A	40 Hz to 1 kHz	$3 \cdot 10^{-4} \cdot I$	
	20 A to 50 A	40 Hz to 1 kHz	$6 \cdot 10^{-4} \cdot I$	
LF 4 2	AC Current Ratio			ambient temp. (23 ± 2) °C
	(instrument transformers)	50 Hz and 60 Hz	$3 \cdot 10^{-5} \cdot I_{ult}/I_{in}$ and 90 µrad	Measuring

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	Primary: 5 A to 6000 A Secondary: 1A or 5A			
LF 4 3	High Current 10 A to 6000 A	50 Hz, 60 Hz	$3 \cdot 10^{-4} \cdot I$	
LF 5 0	Power and Energy			10 mV to 1100 V,
	Power			10 µA to 100 A
	0,1 µW to 1 µW		$1 \cdot 10^{-4} \cdot P$	
	1 µW to 1 kW		$5 \cdot 10^{-5} \cdot P$	
	1 kW tot 10 kW 10 kW tot 110 kW 3 W to 57,6 kW	50 Hz and 60 Hz	$1 \cdot 10^{-4} \cdot P$ $2 \cdot 10^{-4} \cdot P$ $\frac{3 \cdot 10^{-4}}{\cos\varphi} \cdot P$	on site to be performed at ambient temperature; voltage and current as mentioned above
	3 W to 2,9 MW	50 Hz and 60 Hz	$\frac{2 \cdot 10^{-4}}{\cos\varphi} \cdot P$	measuring 20 V to 1100 V 100 mA to 6000A cos φ = 0 to 1
	Reactive Power (P_r) 6 var to 1,8 Mvar	50 Hz and 60 Hz	$\frac{5 \cdot 10^{-4}}{\sin\varphi} \cdot P_r$	60 V to 300 V 100 mA to 6000 A
	Electrical (reactive-) energy			see (reactive-) power and time
LF 5 1	Power Factor cos φ : 0 to 1	40 Hz to 100 Hz	$\frac{2 \cdot 10^{-3}}{\cos\varphi} \cdot PF$	

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
LF 6	Impedance (DC/LF)			
LF 6 2	DC Resistance			Non-decadic values
	20 µΩ to 50 µΩ		$3 \cdot 10^{-4} \cdot R$	
	50 µΩ to 100 µΩ		$1 \cdot 10^{-4} \cdot R$	
	100 µΩ to 20 kΩ		$1{,}2 \cdot 10^{-5} \cdot R$	
	1 mΩ to 10 mΩ		$6\ 5 \cdot 10^{-6} \cdot R$	
	10 mΩ to 1000 mΩ		$7.10^{-6} \cdot R$	
	1 Ω to 10 kΩ		$5 \cdot 10^{-6} \cdot R$	
	10 kΩ to 1 MΩ		$1 \cdot 10^{-5} \cdot R$	
	1 MΩ to 10 MΩ		$1{,}2 \cdot 10^{-5} \cdot R$	
	10 MΩ to 100 MΩ		$3.10^{-5} \cdot R$	
	100 µΩ to 10 kΩ		$6.10^{-6} \cdot R$	Decadic Values
LF 6 4	Capacitance			
	LF Capacitance			accuracy depends on dissipation factor at 1 kHz
	10 pF to 100 pF	100 Hz, 1 kHz, 10 kHz	$1 \cdot 10^{-3} \cdot C$	
	1 µF	50 Hz, 200 Hz, 1 kHz	$1 \cdot 10^{-3} \cdot C$	
LF 6 7	Inductance			
	1 mH to 10 mH	1 kHz, (400-1692)Hz	$1 \cdot 10^{-3} \cdot L$	
	100 mH	100 Hz, 1 kHz 1,592 kHz	$1 \cdot 10^{-3} \cdot L$	
	1 H	100 Hz, 200 Hz, 400 Hz and 1 kHz	$1 \cdot 10^{-3} \cdot L$	
RF 0 0	RF Quantities			
RF 3 0	RF Power			
	- 9 dBm to +30 dBm	0,1 MHz to 4200 MHz	0,5 dB	Measuring:
	+30 dBm to +57 dBm	0,1 MHz to 500 MHz	0,6 dB	50 ohm coaxial VSWR
	-60 dBm to –10 dBm	10 MHz to 10000 MHz	0,5 dB	

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	-80 dBm to –10 dBm	0,1 MHz to 2700 MHz	1,1 dB	source < 2 Generating: (0,09 - 3200) MHz
RF 5 0	Rise time (10% to 90%) 1 ns to 1 ms		$2 \cdot 10^{-2} \cdot \tau$ +200 ps	10 mV/div to 1 kV/div
TF 0 0	TIME and FREQUENCY			
TF2 1	Frequency	1 Hz to 1,2 GHz	$5 \cdot 10^{-10} \cdot f$	
TF 2 2	Time interval	1 µs to ∞	$5 \cdot 10^{-10} \cdot t$ + 100 ns	
TF 3 2	Harmonic Distortion			(1)
	< 0,1 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-4}$	
	0,1 % to 1 %	20 Hz to 2,5 kHz	$1 \cdot 10^{-3}$	
	1 % to 10 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-3}$	
	10 % to 30 %	20 Hz to 2,5 kHz	$1 \cdot 10^{-2}$	
	30 % to 100 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-2}$	

Part II, Mechanical quantities and Temperature

Measured quantity, Instrument, Gauge		Range	Best measurement capabilities (k=2)	Remarks
PV 1 0	Pressure			(2)
	Relative Pressure	(-10 to 10) kPa	$3 \cdot 10^{-4} \cdot p_e$ + 4 Pa	medium: air
		(-98 to 100) kPa	$3 \cdot 10^{-4} \cdot p_e$ + 5 Pa	medium: nitrogen
		100 kPa to 10 MPa	$3 \cdot 10^{-4} \cdot p_e$	medium: nitrogen
		(10 to 70) MPa	$3 \cdot 10^{-4} \cdot p_e$	medium: oil

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	Absolute Pressure	(80 to 110) kPa	$3 \cdot 10^{-4} \cdot p$	medium: air
		(2 to 200) kPa	$3 \cdot 10^{-4} \cdot p$ + 5 Pa	medium: nitrogen
		200 kPa to 10 MPa	$3 \cdot 10^{-4} \cdot p$	medium: nitrogen
		(10 to 70) MPa	$3 \cdot 10^{-4} \cdot p$	medium: oil
TE 0 0	TEMPERATURE, HUMIDITY AND THERMOPHYSICAL PROPERTIES			
TE 1 0	Resistance thermometers	-50 °C to 20 °C	0,02 K	
		20 °C to 50 °C	0,05 K	
		50 °C to 300 °C	0,05 K	
		300 °C to 550 °C	0,16 K	
		550 °C to 650 °C	0,50 K	
TE 3 0	Thermocouples	-50 °C to 20 °C	0,16 K	Including C.J. references
		20 °C to 50 °C	0,16 K	
		50 °C to 300 °C	0,16 K	
		300 °C to 550 °C	0,21 K	
		550 °C to 650 °C	0,6 K	
		650 °C to 1000 °C	1,6 K	
TE 4 0	Liquid-in-glass thermometers	-50 °C to 50 °C	0,02 K	
		20 °C to 50 °C	0,04 K	
		50 °C to 300 °C	0,02 K	
	Differential Temperature	-50 °C to 200 °C	0,05 K	t_{min} = -50 °C t_{max} = 200 °C
TE 4 1	Self indicating thermometers			

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	Dry Block Calibrators	-20 °C to 650 °C	$(8 \cdot 10^{-4} \cdot t_{90} + 0{,}06)$ K	
	Writing thermometers	15 °C to 50 °C	0,5 K	
	Digital thermometers	-50 °C to 20 °C	0,02 K	including C.J. references
		20 °C to 50 °C	0,05 K	
		50 °C to 300 °C	0,05 K	resolution 1 digit
		300 °C to 550 °C	0,16 K	
		550 °C to 630 °C	0,50 K	
		630 °C to 1000 °C	1,5 K	

Remarks:

The ambient temperature during calibration is, unless specified otherwise, for:
LF measurements @ (23 ± 1)°C
TF measurements @ (23 ± 1)°C
Pressure measurements @ (23 ± 2)°C
Temperature measurements @ (23 ± 2)°C

(1) The stated best measurement capabilities are based on the fundamental frequency of the input signal. If desired the distortion can be specified as a rang number of the harmonics.

(2) $p_e = p - p_{amb}$; p_e is the relative pressure, p_{amb} is the local air pressure, p is the absolute pressure.

The best measurement capability is the highest achievable accuracy for a given measuring value or measuring range, expressed as the total positive and negative measurement uncertainty.

The uncertainty is calculated according to EA-4/02 "Expression of the Uncertainty of Measurement in Calibration".

Calibrations are performed inside the laboratory, unless specified otherwise.