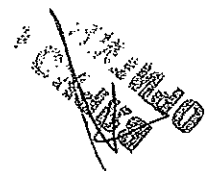
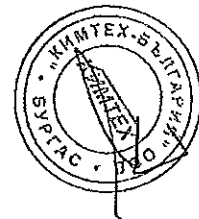


IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.7.4	Temperature-rise verification			P
	Fuse-link details (fuse-combination units only):			
	- manufacturer's name, trademark or identification mark	Jean Müller		
	- manufacturer's model or type reference	M2gG400/69		
	- rated voltage (V)	690		
	- rated current (A)	400		
	- power loss (W)	45 max.		
	- rated breaking capacity (kA)	100		
	Fuse link(s) aged during the overload test are replaced by new fuse-link(s).....	Yes		P
	Conductor cross-section (mm ²)	1 x 240		
	Test current I _e (A)	400		
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 62	75	P
	Manual operating means: non-metallic	5	35	P
	Parts intended to be touched but not hand-held: non-metallic	32	50	P
	Parts which need not be touched during normal operation: non-metallic	38	60	P

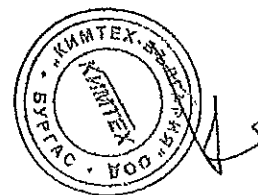


IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.7.1	Overload test		P
	Type SL2-3x3/3A		
	ambient temperature 10-40 °C	22	
	test enclosure W x H x D (mm x mm x mm)	-	
	material of enclosure	-	
	test current 1,6 x Ithe or 1,6 x Ith (A)	640	
	cable/busbar cross-section (mm ²)/(mm x mm)	1 x 240 / 30 x 10	
	cable/busbar length (mm)/(mm).....	2000 / 600	
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark	Jean Müller	
	- manufacturer's model or type reference	M2gG400/69	
	- rated voltage (V)	690	
	- rated current (A)	400	
	- power loss (W)	45 max.	
	- rated breaking capacity (kA)	100	
	Time duration of the overload test (s)	802	
	Within 3 to 5 min after the fuse(s) has(have) operated (or 1 h), the equipment has been operated once, i.e. opened and closed	Opened and closed	P
	Required opening force not greater than the test force of 8.2.5.2 and table 8		P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage 2 Ue with a minimum of 1000V~ (V) ...	1380	
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage 1,1 Ue (V)	760	
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA/pole	-	N/A
	Leakage current (other utilization categories) ≤ 2 mA/pole (mA)	< 1	P

БРПО С
 ОПТМАТНА



IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.7.4	Temperature-rise verification			P
	Fuse-link details (fuse-combination units only):			
	- manufacturer's name, trademark or identification mark	Jean Müller		
	- manufacturer's model or type reference	M2gG400/69		
	- rated voltage (V)	690		
	- rated current (A)	400		
	- power loss (W)	45 max.		
	- rated breaking capacity (kA)	100		
	Fuse link(s) aged during the overload test are replaced by new fuse-link(s).....	Yes		P
	Conductor cross-section (mm ²)	1 x 240		
	Test current I _e (A)	400		
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 62	75	P
	Manual operating means: non-metallic	5	35	P
	Parts intended to be touched but not hand-held: non-metallic	32	50	P
	Parts which need not be touched during normal operation: non-metallic	38	60	P



ВПРОС
ОПРАШАНА

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.4	ELECTROMAGNETIC COMPATIBILITY TESTS		P
8.4.1	Immunity		P
8.4.1.1	Equipment not incorporating electronic circuits: no tests necessary		P
8.4.1.2	Equipment incorporating electronic circuits:		N/A
	Equipment utilizing circuits in which all components are passive are not required to be tested		N/A
	All other equipment, requirements according to 7.3.3.2 and limits according table 6 apply		N/A
	Performed tests	-	N/A
	No unintentional separation or closing of contacts has occurred during these tests	-	N/A
8.4.2	Emission		P
8.4.2.1	Equipment not incorporating electronic circuits: no tests necessary		P
8.4.2.2	Equipment incorporating electronic circuits:		N/A
	Equipment utilizing circuits in which all components are passive are not required to be tested		N/A
	All other equipment, requirements according to 7.3.3.2 and limits according table 7 apply		N/A
	Performed tests	-	N/A



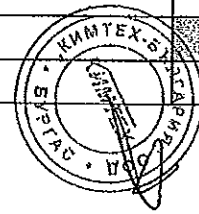
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IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
Annex A (normative)			N/A
A	Equipment for direct switching of a single motor		N/A
A.1	Additional rated duties	-	N/A
A.1.1	- Intermittent periodic duty		N/A
	- intermittent duty		N/A
A.1.1.1	Classes of Intermittent duty	-	N/A
	-class 1: up to 1 operating cycle per hour		N/A
	-class 3: up to 3 operating cycle per hour		N/A
	-class 12: up to 12 operating cycles per hour		N/A
	-class 30: up to 30 operating cycles per hour		N/A
	-class 120: up to 120 operating cycles per hour		N/A
A.1.2	Temporary duty	-	N/A
A.5	Mechanical durability:		N/A
	Equipment mounted according to manufacturer's instruction		N/A
	Preferred number of no-load operating cycles expressed in millions.....	-	N/A
	0,001 – 0,003 – 0,01 – 0,03 – 0,1 – 0,3 - 1		N/A
	If no mechanical endurance is stated by the manufacturer, a minimum mechanical endurance according to the class of intermittent duty shall be tested.		N/A
	Number of no-load operating cycles performed.....	-	N/A
A.6	Electrical durability:		N/A
	- test according to manufacturer's instruction		N/A
A.7	Verification of making and breaking capacities:		N/A
	- utilization category	-	
	- rated operational voltage U_e (V)	-	
	- rated operational current I_e (A)	-	
	Conditions for make/break operations or make operations:		
	- test voltage, $U = 1,05 U_e$(V):	L1: - L2: - L3: -	
	- test current, $I =$ $\times I_e$ (A):	L1: - L2: - L3: -	
	- power factor	L1: - L2: - L3: -	



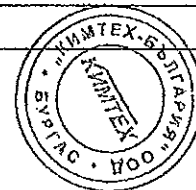
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IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Conditions for make/break operations:		N/A
	- test voltage, $U = 1,05 U_e$ .....(V):	L1: - L2: - L3: -	
	- test current, $I =$ $\times I_e$ (A):	L1: - L2: - L3: -	
	- power factor / time constant	L1: - L2: - L3: -	
	Number of make/break or make and break operations	-	N/A
	- recovery voltage duration ≥ 50 ms (ms)		N/A
	- current duration (ms)	-	
	- time interval between operations (s)	-	N/A
	Characteristic of transient recovery voltage if necessary:		N/A
	- oscillatory frequency (kHz)	-	
	- measured oscillatory frequency (kHz)	L1: - L2: - L3: -	N/A
	- factor γ	L1: - L2: - L3: -	N/A
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		N/A
	Test performed without:		
	- endanger to the operator		N/A
	- cause damage to adjacent equipment		N/A
	No permanent arcing		N/A
	No flash over between poles and poles and frame		N/A
	No melting of the fuse in the detection circuit		N/A
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		N/A
	Immediately after the test equipment must work satisfactorily		N/A
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N/A
	- equipment is able to carry its rated current after normal closing operation		N/A
8.3.3.4	Dielectric verification		N/A
	test voltage $2 U_e$ with a minimum of 1000V~ (V) ...:	-	
	No flashover or breakdown		N/A



BIPAD 2
 OPIHNIK

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.5	Leakage current		N/A
	test voltage 1,1 Ue (V)	-	
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B): ≤ 0,5 mA/pole	-	N/A
	Leakage current (other utilization categories): ≤ 2 mA/pole (mA)	-	N/A
8.3.3.6	Temperature-rise verification		N/A
	- conductor cross-section (mm²)	-	
	- test current Ie (A)	-	
	Measured temperature-rise	-	N/A
A.8	Operational performance test:		N/A
	- utilization category	-	
	- rated operational voltage (V)	-	
	- rated operational current (A)	-	
	Test conditions for electrical operation cycles:		N/A
	- test voltage (V)	L1: - L2: - L3: -	
	- test current (A)	L1: - L2: - L3: -	
	- power factor / time constant	L1: - L2: - L3: -	
	Number of cycles with current	-	N/A
	Number of cycles without current	-	N/A
	First test sequence (with/without current)	-	
	Second test sequence (with/without current)	-	
	- time interval between first and second test sequence	-	
	- recovery voltage duration at operations with current ≥ 50 ms (ms).....	-	N/A
	- current duration (ms)	-	
	- time interval between operations (s)	-	N/A
8.3.4.1.5	Behaviour of the equipment during the operational performance test		N/A
	Test performed without:		
	- endanger to the operator		N/A
	-cause damage to adjacent equipment		N/A
	No permanent arcing		N/A



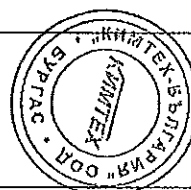
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IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	No flash over between poles and poles and frame		N/A
	No melting of the fuse in the detection circuit		N/A
8.3.4.1.6	Condition of the equipment after making and breaking capacity tests		N/A
	Immediately after the test equipment must work satisfactorily		N/A
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N/A
	- equipment is able to carry its rated current after normal closing operation		N/A
8.3.4.2	Dielectric verification		N/A
	test voltage $2 U_e$ with a minimum of 1000V~ (V): -		
	No breakdown or flashover		N/A
8.3.4.3	Leakage current		N/A
	test voltage $1,1 U_e$ (V): -		
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) $\leq 0,5$ mA/pole: -		N/A
	Leakage current (other utilization categories) ≤ 2 mA/pole (mA): -		N/A
8.3.4.4	Temperature-rise verification		N/A
	- conductor cross-section (mm ²): -		
	- test current I_e (A): -		
	Measured temperature-rise: -		N/A
A.9	Special tests:	-	N/A



ВЕРНО
ОПРАВДАНО

IEC 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
Annex C (normative)			P
C	Single pole operated three pole switches		P
C.1	Three pole operated switches of fundamentally the same design, already successfully tested are deemed to satisfy the requirements of individually operated three pole devices.		P
C.2	Additional-tests to be performed on single pole operated three pole switches		P
	Test "8.3.3.3 Making and breaking capacities" according to test sequence I with following modifications		P
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle.....:	see pages 16 to 19 see pages 24 to 27 see pages 32 to 35	P
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle.....:	see pages 16 to 19 see pages 24 to 27 see pages 32 to 35	P
	Test performed in a three phase circuit		P
	Test "8.3.4.1 Operational performance" according to test sequence II with following modifications		P
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle.....:	see pages 40 to 41 see pages 44 to 45 see pages 48 to 49	P
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle.....:	see pages 40 to 41 see pages 44 to 45 see pages 48 to 49	P
	Test performed in a three phase circuit		P
	Test "8.3.6.2 Fuse protected short circuit test" according to test sequence IV with following modifications		P
	For the making test L1 shall be open and L2 closed, L3 is subjected to the required make operation cycle	see pages 58 to 60 see pages 64 to 66	P
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle.....:	-	N/A
	Test performed in a three phase circuit		P
C.5	Instruction for use		P
	The product literature includes following statement.....:		P
	These devices are intended for power distribution systems where switching and/or isolating of an individual phase may be necessary and shall not be used for the switching of the primary circuit of three-phase equipment.		P



ՏՎՈՒՄ 2
ՕՐԻՆՏԱԿ

IEC 60947-3				
Clause	Requirement + Test		Result - Remark	Verdict
8.3.3.1	TABLE 1: Temperature-rise at SL2-3x/3A with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	42	65
		L2	42	
		L3	43	
	Outgoing (tin plated copper)	L1	47	65
		L2	48	
		L3	58	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			27	40
Parts which need not be touched during normal operation: non-metallic			35	50
Supplementary information:				
Ambient temperature: 22°C				

IEC 60947-3				
Clause	Requirement + Test		Result - Remark	Verdict
8.3.3.1	TABLE 2: Temperature-rise at SL2-3x3/3A with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	40	65
		L2	42	
		L3	43	
	Outgoing (tin plated copper)	L1	48	65
		L2	48	
		L3	60	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			27	40
Parts which need not be touched during normal operation: non-metallic			34	50
Supplementary information:				
Ambient temperature: 22°C				



КЭМТЕК
БРИГАДИ

IEC 60947-3				
Clause	Requirement + Test	Result - Remark	Verdict	
8.3.3.1	TABLE 3: Temperature-rise at SL2-3x/3A with solid-links 630A		P	
Temperature rise dT of part:		dT (K) measured	dT (K) required	
Terminals	Incoming (tin plated copper)	L1	45	65
		L2	45	
		L3	46	
	Outgoing (tin plated copper)	L1	54	65
		L2	55	
		L3	64	
Manual operating means: non-metallic		4	25	
Parts intended to be touched but not hand-held: non-metallic		23	40	
Parts which need not be touched during normal operation: non-metallic		31	50	
Supplementary Information: Ambient temperature: 22°C				

8.3.3.1	TABLE 4: Temperature-rise at SL2-3x3/3A with solid-links 630A		P	
Temperature rise dT of part:		dT (K) measured	dT (K) required	
Terminals	Incoming (tin plated copper)	L1	45	65
		L2	46	
		L3	45	
	Outgoing (tin plated copper)	L1	56	65
		L2	55	
		L3	63	
Manual operating means: non-metallic		4	25	
Parts intended to be touched but not hand-held: non-metallic		24	40	
Parts which need not be touched during normal operation: non-metallic		30	50	
Supplementary Information: Ambient temperature: 22°C				



ВЕРНО
ОПРАВКА

IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.3.1	TABLE 5: Temperature-rise at SL2-3x/KM2G-F with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	40	65
		L2	42	
		L3	41	
	Outgoing (tin plated copper)	L1	48	65
		L2	48	
		L3	57	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			25	40
Parts which need not be touched during normal operation: non-metallic			34	50
Supplementary information: Ambient temperature: 22°C				

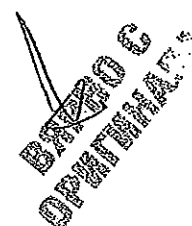
IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.3.1	TABLE 6: Temperature-rise at SL2-3x3/KM2G-F with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	40	65
		L2	43	
		L3	42	
	Outgoing (tin plated copper)	L1	48	65
		L2	50	
		L3	56	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			26	40
Parts which need not be touched during normal operation: non-metallic			35	50
Supplementary information: Ambient temperature: 22°C				



ВЕРИТЬСЯ
ОРИГИНАЛУ

IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.3.1	TABLE 7: Temperature-rise at SL2-3x/KM2G with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	41	65
		L2	43	
		L3	41	
	Outgoing (tin plated copper)	L1	49	65
		L2	51	
		L3	57	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			25	40
Parts which need not be touched during normal operation: non-metallic			36	50
Supplementary information:				
Ambient temperature: 22°C				

IEC 60947-3				
Clause	Requirement + Test	Result - Remark		Verdict
8.3.3.1	TABLE 8: Temperature-rise at SL2-3x3/KM2G with fuse-links 400A			P
Temperature rise dT of part:			dT (K) measured	dT (K) required
Terminals	Incoming (tin plated copper)	L1	42	65
		L2	43	
		L3	41	
	Outgoing (tin plated copper)	L1	50	65
		L2	52	
		L3	58	
Manual operating means: non-metallic			6	25
Parts intended to be touched but not hand-held: non-metallic			25	40
Parts which need not be touched during normal operation: non-metallic			37	50
Supplementary information:				
Ambient temperature: 22°C				



List of test equipment used:

Measured quantity	Device	Manufacturer	Code
Voltage (tests up to 15kA)	Voltage divider 1:2000 Difference amplifier AM 502 Signal memory recorder TRA 800	AIT Tektronix W&W	- AM 502/1...3 TRA800
Current (tests up to 15kA)	Lin. current transformer LGSSO Burden 1Ω Signal memory recorder TRA 800	Ritz AIT W&W	WLIN5000/1...3 - TRA800
Voltage (tests above 15kA)	3-channel insulating measuring amplifier Signal memory recorder Nicolet	Rohrer W&W	Arcus 930-1 2580-P
Current (tests above 15kA)	Lin. current transformer LGSSO Burden 0,7mΩ Signal memory recorder Nicolet	Ritz AIT W&W	WLIN6000.HVF/1...3 - 2580-P
Current (tests at reduced voltage)	Current transformer GE 4461 Current transformer AET110 True-RMS amperemeter KI. 0,5 Digital multimeter Fluke 185	Goerz Siemens Norma Fluke	WI600/1...3 WI4000/1...3 A0,5/1 /4 FLUKE185/2
Transient recovery voltage	Adjustment equipment for TRV Oscilloscope G 801.1	AIT Tektronix	- G801.1
Dielectric properties	High-voltage test equipment 90-1F with measuring equipment Impulse tester 35 Impulse voltmeter SV642 Oscilloscope 9430	Elabo Haefely Haefely Le Croy	HSG5KV G304 G503 G805
Leakage current	High-voltage test equipment 90-1F Digital multimeter Fluke 187 Digital multimeter Fluke 185	Elabo Fluke Fluke	HSG5KV G922 FLUKE185/2
Time	Signal memory recorders TA 800 Stopwatch	W&W Quantum	TRA800 938-3
Temperature	Data Acquisition/Data Logger Switch Unit 34970A Temperature meter TESTO 901	Agilent Testoterm	942 TESTO
Abnormal heat and fire	Glow-wire test device with measuring equipment	Friborg	Glow
Mechanical strength of terminals	Test equipment	AIT	MSD
Insertability of unprepared conductors	Gauges	AIT	Gauge 1...16
Strength of actuator mechanism	Test equipment	Sauter GmbH	FH1K
Degree of protection	Test probe	PTL	PTL 1...3
Clearances, creepage distances	Digital slide gauge CD-20D	Mitutoyo	SCHUB



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Accredited by BMWA, No. BMWA-92.714/0532-V12/2006 as test- and inspection body
and according to BGBl. II, No. 244/2005 as certification body for personnel

arsenal research
Ein Unternehmen der Austrian Research Centers

Test Report

Project Designation

TYPE TEST
AT A LOW-VOLTAGE
FUSE-SWITCH-DISCONNECTOR
TYPE
SL2G-3x and SL2G-3x3

Client

Jean Müller GmbH
H.J.-Müller Straße 7
D-65343 Eltville, Germany

Order form / No.

01/2009 / ---

Project Number

2.03.00954.1.0 /SL2G

Test Engineer

Ing.J.Ainetter

Date of Issue	08.04.2009
Total number of Issues / No.	1 / 1
Number of pages	5
Annex	CB/CCA - Test Report No. 2.03.00954.1.0 /SL2G/CB/CCA (45 pages)

The results relate exclusively to the terms tested.

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ING. J. AINETTER
VERIFIED
08.04.2009

Test item

Identification:

Low-voltage fuse-switch-disconnector type SL2G-3x and SL2G-3x3

Manufacturer:	Jean Müller GmbH
Trademark:	Jean Müller
Number of poles:	3-pole
Rated operational voltage(s):	AC 400V, AC 500V, AC 690V
Rated operational current(s):	400A
Rated frequency:	50Hz

Technical data and description:

See page 4

Testing location, Period of testing

Testing location:

Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.
Business Unit Electric Energy Systems
Power Service Center
Gleifinggasse 2
1210 Vienna
AUSTRIA

Period of testing:

01 ...03/2009

Test(s)

Test(s) performed:

Type test

Test standard(s):

IEC 60947-1:2007 (5th Edition) and IEC 60947-3:2008 (3rd Edition)
EN 60947-1:2004 and EN 60947-3:1999+A1:2001+A2:2005

Test procedure(s):

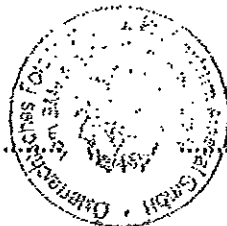
CB Scheme and CCA Scheme

Result

The low-voltage fuse-switch-disconnectors type SL2G-3x and SL2G-3x3 have passed the type test successfully.

Test Engineer

Ing. J. Ainetter

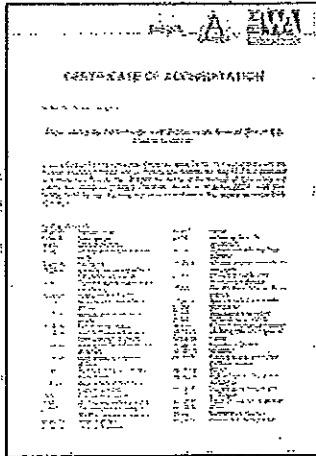


Project Engineer,
technical responsibility

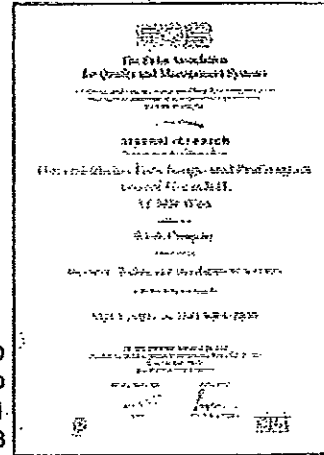
Ing. K. Fathofer



Testing laboratory



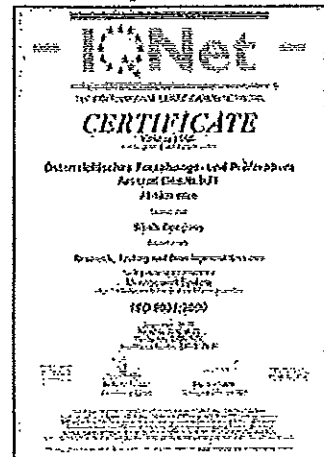
ACCREDITED according to EN ISO/IEC 17025 No. BMWA-02.714/0532-V12/2008



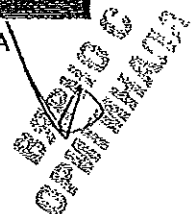
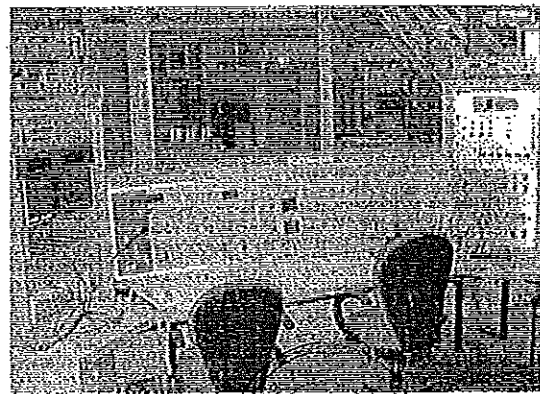
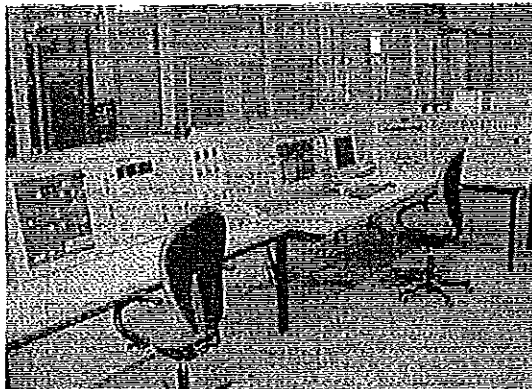
CERTIFICATED according to ISO 9001 Reg. No. 12769-03



RECOGNIZED CB TESTING LABORATORY under the responsibility of OVE as the National Certification Body



POWER SERVICE CENTER:



Technical data and description

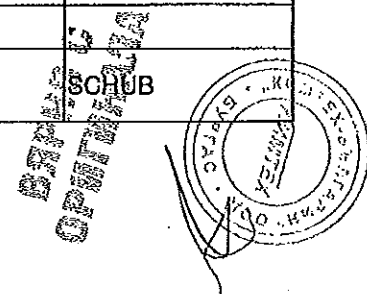
Test Item	Low-voltage fuse-switch-disconnector
Trademark	Jean Müller
Model/Type reference	SL2G-3x and SL2G-3x3
Manufacturer	Jean Müller GmbH
Place of manufacture	H.J.-Müller Straße7, D-65343 Eltville, Germany
Method of operation	Dependent manual operation
Switching positions	ON / OFF
Number of poles	3-pole
Nature of supply	AC
Utilization category	AC-22B
Rated operational voltage	400V, 500V, 690V
Rated operational current	400A
Rated frequency	50Hz
conventional free air thermal current I _{th}	400A
Rated Insulation voltage	1000V
Rated impulse withstand voltage	12kV
Rated conditional short-circuit current	80kA
Degree of protection	IP30
Kind of protective device	Fuse-link NH2



BRUNO C. SPINALETTI

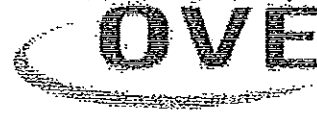
Measuring equipment

Measured quantity	Device	Manufacturer	Code
Voltage (tests up to 15kA)	Voltage divider 1:2000 Difference amplifier AM 502 Signal memory recorder TRA 800	ÖFPZ Arsenal Tektronix W&W	- AM 502/1...3 TRA800
Current (tests up to 15kA)	Lin. current transformer LGSSO Burden 1Ω Signal memory recorder TRA 800	Ritz ÖFPZ Arsenal W&W	WLIN6000/1...3 - TRA800
Voltage (tests above 15kA)	3-channel Insulating measuring amplifier Signal memory recorder SMR II	Rohrer W&W	T908D SMRII64/1
Current (tests above 15kA)	Lin. current transformer LGSSO Burden 0,7mΩ Signal memory recorder SMR II	Ritz ÖFPZ Arsenal W&W	WLIN6000,HVF/1...3 - SMRII64/1
Current (tests at reduced voltage)	Current transformer GE 4461 Current transformer AET110 True-RMS amperemeter KI. 0,5 Digital multimeter Fluke 185	Goerz Siemens Norma Fluke	WI600/1...3 WI4000/1...3 A0,5/1...3 FLUKE185/1, 2
Transient recovery voltage	Adjustment equipment for TRV Oscilloscope G 801.1	ÖFPZ Arsenal Tektronix	- G801.1
Dielectric properties	High-voltage test equipment 90-1F with measuring equipment Impulse tester 35 Impulse voltmeter 64M Oscilloscope 9410	Elabo Haefely Haefely Le Croy	HSG5KV G304 G502 G803
Leakage current	High-voltage test equipment 90-1F Digital multimeter Fluke 185 Digital multimeter Fluke 185	Elabo Fluke Fluke	HSG5KV FLUKE185/1 FLUKE185/2
Time	Signal memory recorder TRA 800 Stopwatch	W&W Junghans	TRA800, SMRII64/1 938-2
Temperature	24-channel recorder Polycomp SK30 Temperature meter TESTO 901	H & B Testoterm	SK 30 TESTO
Abnormal heat and fire	Glow-wire test device with measuring equipment	Friborg	-
Mechanical strength of terminals	Test equipment	ÖFPZ Arsenal	-
Insertability of unprepared conductors	Gauges	ÖFPZ Arsenal	-
Strength of actuator mechanism	Test equipment	Schatz	-
Degree of protection	Test probe	PTL	-
Clearances, creepage distances	Digital slide gauge CD-20D	Mitutoyo	-



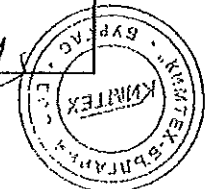


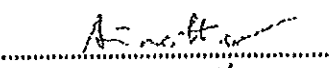
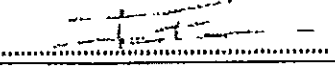

Test Report issued under the responsibility of



TEST REPORT IEC / EN 60947-3 Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units	
Report Reference No.	2.03.00954.1.0 /SL2G/CB/CCA
Date of Issue.....	08.04.2009
Total number of pages.....	45
CB / CCA Testing Laboratory.....	ÖFPZ Arsenal Ges.m.b.H.
Address	A-1210 Wien, Gleifinggasse 2
Applicant's name.....	Jean Müller GmbH
Address	H.J.-Müller Strasse 7, D-65343 Eitville, Germany
Test specification:	
Standard	<input checked="" type="checkbox"/> IEC 60947-3:1999 (Second Edition) + A1:2001 + A2:2005 In conjunction with IEC 60947-1:2004 (Fourth Edition)
	<input checked="" type="checkbox"/> EN 60947-3:1999 + A1:2001 + A2:2005 In conjunction with EN 60947-1:2004
Test procedure	CB / CCA
Non-standard test method.....	N/A
Test Report Form No.....	IECEN60947_3B
Test Report Form(s) Originator.....	OVE
Master TRF.....	Dated 2008-08
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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
This report is not valid as a CCA Test Report unless signed by an approved CCA Testing Laboratory and appended to a CCA Test Certificate issued by an NCB in accordance with CCA.	
Test item description	Fuse-switch-disconnector
Trade Mark	JEAN MÜLLER
Manufacturer	Jean Müller GmbH H.J.-Müller Strasse 7, D-65343 Eitville, Germany
Model/Type reference.....	SL2G-3x and SL2G-3x3
Ratings.....	AC-22B; 690V; 400A; 3-pole



APPROVED



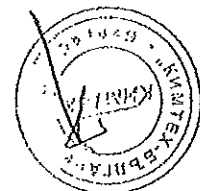
Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB / CCA Testing Laboratory:	ÖFPZ Arsenal Ges.m.b.H.
Testing location/ address	A-1210 Wien, Gleifinggasse 2
<input type="checkbox"/> Associated CB Laboratory:	---
Testing location/ address	---
Tested by (name + signature).....	Ing.J.Ainetter 
Approved by (name + signature).....	Ing.K.Farhofer 
	
<input type="checkbox"/> Testing procedure: TMP	
Tested by (name + signature).....	-----
Approved by (name + signature).....	-----
Testing location/ address	---
<input type="checkbox"/> Testing procedure: WMT	
Tested by (name + signature).....	-----
Witnessed by (name + signature)....	-----
Approved by (name + signature).....	-----
Testing location/ address	---
<input type="checkbox"/> Testing procedure: SMT	
Tested by (name + signature).....	-----
Approved by (name + signature).....	-----
Supervised by (name + signature) ..	-----
Testing location/ address	---
<input type="checkbox"/> Testing procedure: RMT	
Tested by (name + signature).....	-----
Approved by (name + signature).....	-----
Supervised by (name + signature) ..	-----
Testing location/ address	---

ÖFPZ ARSENAL
Gleifinggasse 2
1210 Wien



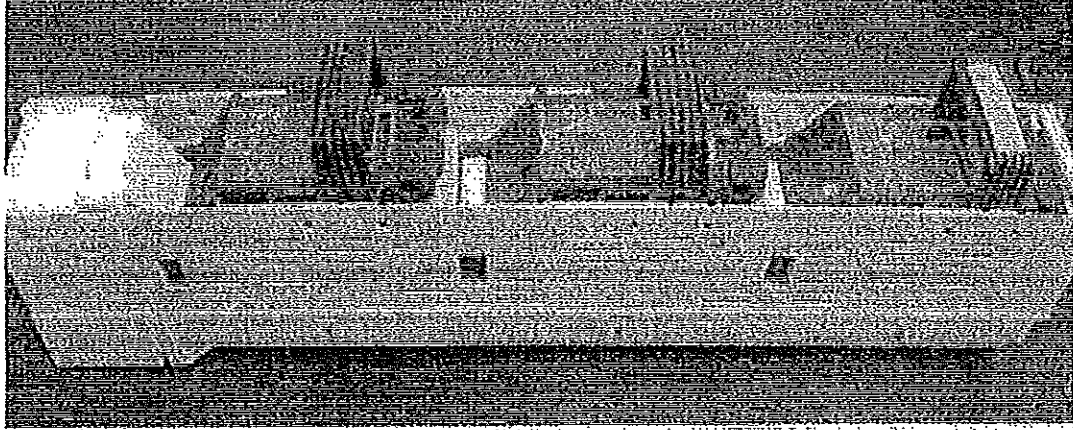
Summary of testing:	
Tests performed (name of test and test clause): A type test was performed according to <ul style="list-style-type: none"> ▪ IEC 60947-1:2007 (5th Edition) ▪ IEC 60947-3:2008 (3rd Edition) and <ul style="list-style-type: none"> ▪ EN 60947-1:2004 ▪ EN 60947-3:1999+A1:2001+A2:2005. The fuse-switch-disconnectors type <ul style="list-style-type: none"> ▪ SL2G-3x and SL2G-3x3 have passed the type test successfully.	Testing location: ÖFPZ Arsenal Ges.m.b.H. Business Unit Electric Energy Systems Power Service Center Gleifinggasse 2 1210 Wien AUSTRIA The ÖFPZ Arsenal Ges.m.b.H. is a recognized CB Testing Laboratory under the responsibility of OVE as the National Certification Body.
Summary of compliance with National Differences: ---	
Copy of marking plate:	
SL2G-3x:	
<p style="text-align: center;"> JEAN MULLER  CE (IEC/EN 60947-3: 50Hz (12.10.2008) (300)) (300V: 400A: AC: 22B (0330)) KEUR KEUR max. 400A 45W SL2G-3X L293100100 NH2-400A TM2-400A </p>	
SL2G-3x3:	
<p style="text-align: center;"> JEAN MULLER  CE (IEC/EN 60947-3: 50Hz (12.10.2008) (300)) (300V: 400A: AC: 22B (0330)) KEUR KEUR max. 400A 45W SL2G-3X3 L203100100 NH2-400A TM2-400A </p>	

ÖFPZ ARSENAL
 BUSINESS UNIT
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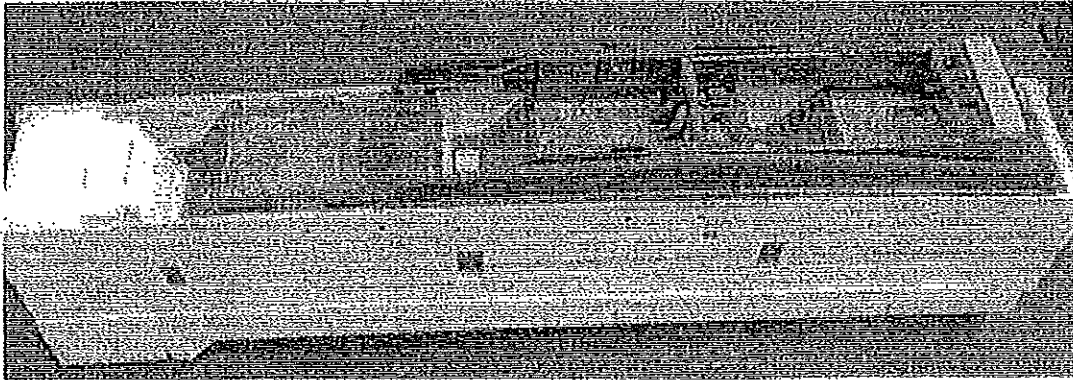


Picture(s) of the test item:

SL2G-3x: Fuse-switch-disconnector, 3-poles, independent switching pole after pole



SL2G-3x3: Fuse-switch-disconnector, 3-poles, switching 3-poles together, with locking device in close and open position



ВІСНОВОК
ОПРАЦЬОВАНО

A circular stamp with the text "KAMTEX S.V.F.A.C." around the perimeter. A signature is written across the stamp.

Test item particulars:	
- method of mounting.....	: Dependent manual operation
- switching positions	: I / O
- number of poles.....	: 3
- kind of current.....	: AC
- number of positions of the main contacts	: 2
Rated and limiting values, main circuit:	
- rated operational voltage U_e (V)	: 400, 500, 690
- rated insulation voltage U_i (V)	: 1000
- rated impulse withstand voltage U_{imp} (kV).....	: 12
- rated operational current I_e with solid-links (A).....	: 400
- conventional free air thermal current I_{th} with fuse-links (A):	400
- rated uninterrupted current I_u with fuse-links (A).....	: 400
- rated frequency (Hz)	: 50 to 60
- utilization category.....	: AC-22B
Short-circuit characteristic:	
- rated short-time withstand current I_{sc} (A)	: -
- rated short-time making capacity I_{cm} (A)	: -
- rated conditional short-circuit current (kA)	: 80
Rated and limiting values, auxiliary circuit(s):	
- rated operational voltage (V).....	: -
- rated frequency (Hz)	: -
- number of circuits	: -
- number and kind of contact elements	: -
Co-ordination of short-circuit protective devices:	
- kind of protective device.....	: NH-fuse 400A gG (size 02)
Possible test case verdicts:	
- test case does not apply to the test object.....	: N (Not applicable)
- test object does meet the requirement.....	: P (Pass)
- test object does not meet the requirement.....	: F (Fail)
Testing:	
Date of receipt of test item.....	: 01/2009
Date (s) of performance of tests.....	: 01 ... 3/2009



**BRIG C
DITMATA**

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the issuing testing laboratory.

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

Note: EN Group Differences together with National Differences and Special National Conditions, if any, are stated in the Appendix to the main body of this TRF.

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

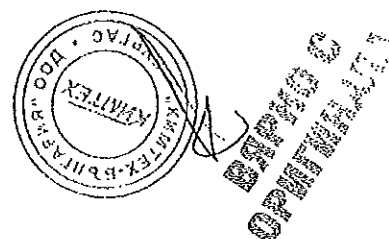
The making and breaking and the short-circuit tests are carried out with a metallic screen placed at:

- right side 130mm
- left side 120mm
- upper side 160mm

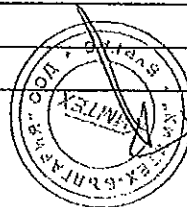
General product information:

Low-voltage fuse-switch-disconnector
size 2
for use with NH fuse-links

type
SL2G-3x and SL2G-3x3

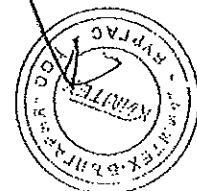


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
5.2	MARKING		P
	Marking on equipment itself or on nameplate or nameplates attached to the equipment and legible from the front after mounting		P
	- Indication of the open and closed position	Visible open and closed position	P
	- suitability for isolation	Yes	P
	- disconnectors AC-20 and DC-20 only: marked "Do not operate under load"		N
	Marking on equipment not needed to be visible after mounting:		P
	- manufacturer's name or trademark	JEAN MÜLLER	P
	- type designation or serial number	SL2G-3x SL2G-3x3	P
	- rated operational current	400A	P
	- rated operational voltage	400V, 500V, 690V	P
	- utilization category	AC-22B	P
	- rated frequency	50-60Hz	P
	- manufacturer's claim for compliance with IEC/EN 60947-3	EN 60947-3	P
	- degree of protection	IP30	P
	Marking on fuse-combination units:		P
	- fuse type	NH fuse-link size 2	P
	- maximum rated current	400A	P
	- power loss of the fuse-link	45W	P
	Identification of terminals:		P
	- line terminals		P
	- load terminals		P
	- neutral pole terminal		N
	- protective earth terminal		N
	Data in the manufacturer's published information:		P
	- rated insulation voltage	1000V	P
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	12kV	P
	- pollution degree, if different from 3	3	P
	- rated duty	Uninterrupted duty	P
	- rated short-time withstand current and duration	-	N
	- rated short-circuit making capacity	-	N
	- rated conditional short-circuit current	80kA	P

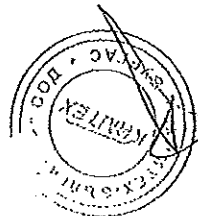


BUREAU VERITAS
CERTIFICATION CENTER

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1	CONSTRUCTION		P
7.1.1	Materials		P
7.1.1.1	Resistance to abnormal heat and fire		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11		P
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 960 °C		P
	No visible flame and no sustained glowing.....:	No visible flame	P
	Flames and glowing extinguish within 30 s	-	N
	No ignition of the tissue paper		P
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C		P
	No visible flame and no sustained glowing.....:	No visible flame	P
	Flames and glowing extinguish within 30 s	-	N
	No ignition of the tissue paper		P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances		P
	Rated impulse withstand voltage (kV)	8	—
	Minimum clearances (mm)	8	—
	Measured clearances (mm)	> 8	P
	Creepage distances		P
	Pollution degree	3	—
	Comparative tracking index (V)	600	—
	Material group	I	—
	Rated insulation voltage U_i (V)	1000	—
	Minimum creepage distances (mm).....	14	—
	Measured creepage distances (mm)	> 14	P
7.1.4	Actuator		—
7.1.4.1	Insulation		—
	Actuator insulated from live parts for		—
	- rated insulation voltage	$U_i = 1000V$	P
	- rated impulse withstand voltage	$U_{imp} = 12kV$	P
	Actuator made of metal	No	—
	- connected to a protective conductor or provided with an additional insulation		N

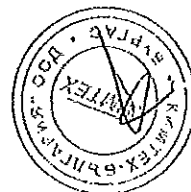


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Actuator made of or covered by insulating material:	Thermoplastic material	—
	- Internal metal parts, which might become accessible in the event of an insulation failure, are also insulated from live parts for the rated insulation voltage		P
7.1.4.2	Direction of movement		P
	The direction of operation for actuators shall where applicable conform to IEC 60447		P
	There is no doubt of the "I" and "O" position and the direction of operation		P
7.1.5 of Part 1	Indication of contact position		P
7.1.5.1	Indicating means		P
7.1.5.2	Indication by the actuator	Yes	P
7.1.6	Additional safety requirements for equipment suitable for isolation		P
7.1.6.1	Additional constructional requirements for equipment suitable for isolation ($U_a > 50$ V):		P
	- marking according to 5.2.1b		P
	- Indication of the position of the contacts		P
	- construction of the actuating mechanism		P
	- minimum clearances across open contacts (see Table 13, Part 1) (mm)	14	—
	- measured clearances (mm).....	> 14	P
	- test U_{imp} across gap (kV)	18,6	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N
	Auxiliary switch is rated according to IEC 60947-5-1 (unless the equipment is rated AC-23)		N
	Time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles: ≥ 20 ms.....	-	—
	Measured time interval (ms).....	-	N
	During the closing operation the contacts of the auxiliary switch closes after or simultaneously with the contacts of the main poles		N



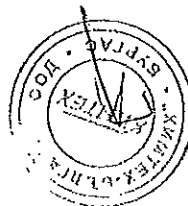
EMPHASIS
OF THE RESULTS

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N
	The locking means is so designed that it cannot be removed with the appropriate padlock(s) installed		N
	Test force F applied to the actuator in an attempt to operate to the closed position (N).....: -		—
	Rated impulse withstand voltage (kV): -		—
	Test Ulmp on open main contacts at test force (kV).....: -		N
7.1.7 of Part 1	Terminals		P
7.1.7.1	All parts of terminals which maintain contact and carry current are of metal having adequate mechanical strength	See 8.2.4 below	P
	Terminal connections are such that necessary contact pressure is maintained	See 8.2.4 below	P
	Terminals are so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	See 8.2.4 below	P
	Terminals do not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operation of equipment and the insulation voltage is not reduced below the rated value	See 8.2.4 below	P
8.2.4	Mechanical properties of terminals		P
	Mechanical strength of terminals		P
	Maximum cross-sectional area of conductor: 240mm ²		—
	Diameter of thread (mm).....: M12		—
	Torque (Nm).....: 40Nm x 11% = 44Nm		—
	5 lines on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		N
	Type of terminals tested.....: -		—
	Conductor of the smallest cross-sectional area (mm ²).....: -		—
	Number of conductors of the smallest cross section.....: -		—
	Diameter of bushing hole (mm): -		—



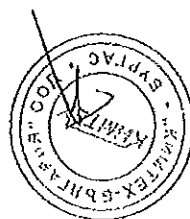
REPHO C
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Height between equipment and platen (mm).....:	-	—
	Mass at the conductor(s) (kg).....:	-	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		—
	Pull-out test		N
	Force (N), applied for 1 min.....:	-	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		—
	Conductor of the largest cross-sectional area (mm ²).....:	-	—
	Number of conductors of the largest cross section.....:	-	—
	Diameter of bushing hole (mm).....:	-	—
	Height between equipment and platen (mm).....:	-	—
	Mass at the conductor(s) (kg).....:	-	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		—
	Pull-out test		N
	Force (N), applied for 1 min.....:	-	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		N
	Conductor of the largest and smallest cross-sectional area (mm ²).....:	-	—
	Number of conductor of the smallest cross section, number of conductor of the largest cross section ..:	-	—
	Diameter of bushing hole (mm).....:	-	—
	Height between equipment and platen (mm).....:	-	—
	Mass at the conductor(s) (kg).....:	-	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		N
	Pull-out test		N
	Force (N), applied for 1 min.....:	-	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		N



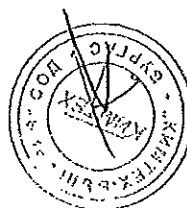
BRNO
OPR. M. S. I.

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.7.2	Connection capacity		P
	Type of conductors	Cable lugs for busbars	—
	Minimum cross-sectional area of conductor		—
	Maximum cross-sectional area of conductor		—
	Number of conductors simultaneously connectable to the terminal.....		—
7.1.7.3	Connection		P
	Terminals for connection to external conductors are readily accessible during installation		P
	Clamping screws and nuts do not serve to fix any other component		P
7.1.7.4	Terminal identification and marking		P
	Terminal intended exclusively for the neutral conductor		N
	Protective earth terminal		N
	Other terminals		P
7.1.8	Additional requirements for equipment provided with a neutral pole		N
	Equipment provided with a pole intended for the connection of neutral, this pole shall be clearly marked by the letter "N"		N
	The switched neutral pole does not break before and does not make after the other poles except		N
	- a pole having the appropriate short-circuit breaking and making capacity is used as neutral pole, all poles may operate together		N
	Conventional thermal current of neutral pole		N
7.1.9	Provisions for protective earthing		N
7.1.9.1	The exposed conductive parts are electrically interconnected and connected to a protective earth terminal		N
7.1.9.2	Protective earth terminal is readily accessible		N
	Protective earth terminal is suitably protected against corrosion		N
	Electrical continuity between exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	Protective earth terminal has no other functions		N
7.1.9.3	Protective earth terminal marking and identification		N



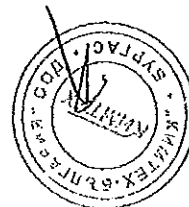
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.10	Enclosure for equipment		N
7.1.10.1	Design		N
	When the enclosure is opened, all parts requiring access for installation and maintenance are readily accessible		N
	Sufficient space is provided inside the enclosure		N
	The fixed parts of a metal enclosure are electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N
	Under no circumstances a removable metal part of the enclosure is insulated from the part carrying the earth terminal when the removable part is in place		N
	The removable parts of the enclosure are firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N
	If the enclosure is used for mounting push-buttons, it is not possible to remove the buttons from the outside of the enclosure		N
7.1.10.2	Insulation		N
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining is securely fixed to the enclosure		N
7.1.11	Degree of protection of enclosed equipment		P
	Degree of protection: IP30		P



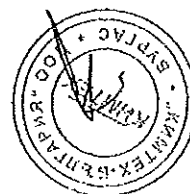
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		P
8.3.3.1	Temperature-rise		P
	ambient temperature 10-40°C	25	—
	test enclosure W x H x D (mm x mm x mm)	-	—
	material of enclosure.....	-	—
	Main circuits, test conditions:		P
	- conventional thermal current I _{th} (A)	400A	—
	- conventional enclosed thermal current I _{the} (A) ..	-	—
	- cable/busbar cross-section (mm ²)/(mmxmm)	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	Fuse-link details (fuse-combination units only):		P
	- manufacturer's name, trademark or identification mark.....	Dummy	—
	- manufacturer's model or type reference.....	-	—
	- rated voltage (V)	-	—
	- rated current (A).....	400A	—
	- power loss (W).....	45W	—
	- rated breaking capacity (kA).....	-	—
	Temperature-rise of phase poles	See appended table 1	P
	Temperature-rise of neutral pole (if applicable)		N
	Temperature-rise of accessible parts	See appended table 1	P
	Auxiliary circuits, test conditions:		N
	- rated operation current (A)	-	—
	- cable cross-section (mm ²)	-	—
	Temperature-rise of terminals		N
	Temperature-rise of accessible parts		N



BRNO
OPRIMAT

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.2	Test of dielectric properties		P
	Rated impulse withstand voltage (kV)	12	—
	- test U _{imp} main circuits (kV)	14,8	P
	- test U _{imp} auxiliary circuits (kV)	-	N
	- test U _{imp} on open main contacts (equipment suitable for isolation) (kV)	18,5	P
	Power-frequency withstand voltage (V)	1000	—
	- main circuits, test voltage for 5 sec. (V)	2200	P
	- control and auxiliary circuits, test voltage for 5 sec. (V)	-	N
	Devices, which have been disconnected for the power-frequency withstand voltage test	-	N
	Equipment suitable for isolation, leakage current not exceed 0,5 mA		—
	Test voltage 1,1 U _e (V)	760	P
	Measured leakage current (mA)	< 0,2	P



**BRNO C
OPRAVA**

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	SL2G-3x3		
	- utilization category	AC-22B	---
	- rated operational voltage U_e (V).....	690	—
	- rated operational current I_e (A) or power (kW)....	400	—
	Conditions for make operations, AC-23A and AC-23B only:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor	L1: - L2: - L3: -	—
	Conditions for break operations, AC-23A and AC-23B only:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor	L1: - L2: - L3: -	---
	Conditions for make/break operations, other than AC-23A and AC-23B:		P
	- test voltage, $U = 1,05 U_e$ (V)	L1: 742 L2: 746 L3: 742	—
	- test current, $I = 3 \times I_e$ (A)	L1: 1231 L2: 1221 L3: 1225	—
	- power factor/time constant	L1: 0,65 L2: 0,65 L3: 0,65	—
	Number of make/break or make and break operations	5	P
	- recovery voltage duration (≥ 50 ms)	Permanent	P
	- current duration (ms)	500	—
	- time interval between operations (s).....	30	P



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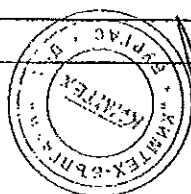
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Clause	Requirement - Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:		P
	- oscillatory frequency (kHz)	44,2	—
	- measured oscillatory frequency (kHz)	L1: 48,1 L2: 48,1 L3: 47,9	P
	- factor γ	L1: 1,1 L2: 1,1 L3: 1,1	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.3.4	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V) ...	1380	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage (1,1 U_e) (V)	759 (tested with 800V)	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm)	Supply: copper bar 30x10mm Load: 240mm ³ , 2m length	—
	- test current I_e (A)	400A	
	Temperature rise of main circuit terminals ≤ 80 K (K)	60	

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.7	Strength of actuator mechanism		P
8.2.5	Verification of the strength of actuator mechanism and position indicating device		P
	- actuator type (fig.).....	One-hand operated (1e)	—
8.2.5.2.1	Dependent and independent manual operation		P
	- actuating force for opening (N).....	154	—
	- test force with blocked main contacts (N).....	400	—
	- used method to keep the contact closed.....	Welding	—
	During and after the test, open position not indicated.....	No open position	P
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N
8.2.5.2.2	Dependent power operation		N
	- main contacts fixed together in the closed position.....	-	N
	- used method to keep the contact closed.....	-	N
	- 110% of the rated supply voltage applied to the equipment (3 times).....	-	N
	During and after the test, open position not indicated.....	-	N
	Equipment show no damage impairing its normal operation.....	-	N
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N
8.2.5.2.3	Independent power operation		N
	- main contacts fixed together in the closed position.....	-	N
	- used method to keep the contact closed.....	-	N
	- stored energy of the power operator released (3 times).....	-	N
	During and after the test, open position not indicated.....	-	N
	Equipment show no damage impairing its normal operation.....	-	N
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N



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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	SL2G-3x		
	- utilization category	AC-22B	—
	- rated operational voltage U_e (V).....	690	—
	- rated operational current I_e (A) or power (kW)....	400	—
	Conditions for make operations, AC-23A and AC-23B only:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor	L1: - L2: - L3: -	—
	Conditions for break operations, AC-23A and AC-23B only:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor	L1: - L2: - L3: -	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		P
	- test voltage, $U = 1,05 U_e$ (V)	L1: 741 L2: 747 L3: 742	—
	- test current, $I = 3 \times I_e$ (A)	L1: 1235 L2: 1228 L3: 1219	—
	- power factor/time constant	L1: 0,66 L2: 0,65 L3: 0,65	—
	Number of make/break or make and break operations	5 operations (L1 closed, L2 closed, L3 operated) 5 operations (L1 operated, L2 closed, L3 open)	P
	- recovery voltage duration (≥ 50 ms)	Permanent	CR
	- current duration (ms)	500	CR
	- time interval between operations (s).....	30	CR



IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:		P
	- oscillatory frequency (kHz)	44,2	—
	- measured oscillatory frequency (kHz)	L1: 48,1 L2: 48,1 L3: 48,1	P
	- factor γ	L1: 1,1 L2: 1,1 L3: 1,1	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.3.4	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V)...	1380	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage (1,1 U_e) (V)	769 (tested with 800V)	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm)	Supply: copper bar 30x10mm Load: 240mm ² -2m length	—
	- test current I_e (A)	400A	
	Temperature rise of main circuit terminals ≤ 80 K (K)	58	



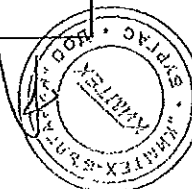
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.7	Strength of actuator mechanism		P
8.2.5	Verification of the strength of actuator mechanism and position indicating device		P
	- actuator type (fig.).....	One-hand operated (1e)	—
8.2.5.2.1	Dependent and independent manual operation		P
	- actuating force for opening (N).....	130	—
	- test force with blocked main contacts (N).....	390	—
	- used method to keep the contact closed.....	Welding	—
	During and after the test, open position not indicated.....	No open position	P
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N
8.2.5.2.2	Dependent power operation		N
	- main contacts fixed together in the closed position.....	-	N
	- used method to keep the contact closed.....	-	N
	- 110% of the rated supply voltage applied to the equipment (3 times).....	-	N
	During and after the test, open position not indicated.....	-	N
	Equipment show no damage impairing its normal operation.....	-	N
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N
8.2.5.2.3	Independent power operation		N
	- main contacts fixed together in the closed position.....	-	N
	- used method to keep the contact closed.....	-	N
	- stored energy of the power operator released (3 times).....	-	N
	During and after the test, open position not indicated.....	-	N
	Equipment show no damage impairing its normal operation.....	-	N
	Equipment with locking mean, no locking in the open position while test force is applied.....	-	N



BRUNO G
GRUBBIA

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY Type SL2G-3x3		P
8.3.4.1	Operational performance test		P
	- utilization category	AC-22B	—
	- rated operational voltage U_e (V).....	690	—
	- rated operational current I_e (A) or power (kW)....	400	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....	L1: 701 L2: 698 L3: 695	—
	- test current (A).....	L1: 402 L2: 403 L3: 401	—
	- power factor/time constant	L1: 0,79 L2: 0,78 L3: 0,79	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current).....	With	—
	Second test sequence (with/without current).....	Without	—
	- time interval between first and second test sequence	No time interval	—
	- recovery voltage duration (≥ 60 ms).....	Permanent	P
	- current duration (ms)	320	—
	- time interval between operations (s).....	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P



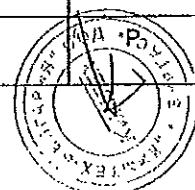
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Clause	Requirement - Test	Result - Remark	Verdict
8.3.4.2	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V)...	1380	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1,1 U_e) (V).....	759	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm).....	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	- test current I_e (A).....	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....	< 57	P

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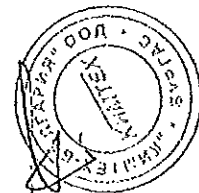
IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY Type SL2G-3x		P
8.3.4.1	Operational performance test		P
	- utilization category	AC-22B	—
	- rated operational voltage U_n (V).....	690	—
	- rated operational current I_n (A) or power (kW)....	400	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....	L1: 702 L2: 699 L3: 695	—
	- test current (A).....	L1: 401 L2: 402 L3: 401	—
	- power factor/time constant	L1: 0,79 L2: 0,78 L3: 0,79	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current).....	With	—
	Second test sequence (with/without current).....	Without	—
	- time interval between first and second test sequence	No time interval	—
	- recovery voltage duration (≥ 50 ms).....	Permanent	P
	- current duration (ms)	320	—
	- time interval between operations (s).....	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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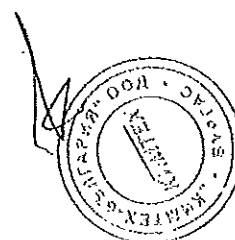
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Clause	Requirement - Test	Result - Remark	Verdict
8.3.4.2	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V)...	1380	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1,1 U_e) (V).....	769	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm).....	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	- test current I_e (A).....	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....	< 57	P

БУДОВА
 ОПИШКА

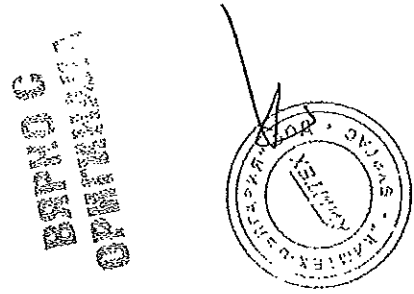


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Clause	Requirement - Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III; SHORT-CIRCUIT PERFORMANCE CAPABILITY		N
8.3.5.1	Short-time withstand current test		N
	Rated short-time withstand current I_{cw} (A)	-	N
	test voltage (V).....	L1: - L2: - L3: -	—
	r.m.s. test current (A)	L1: - L2: - L3: -	—
	peak test current (A)	L1: - L2: - L3: -	—
	power factor/time constant.....	L1: - L2: - L3: -	—
	factor n	-	N
	test duration (ms).....	-	N
8.3.5.1.5	Behaviour of the equipment during the test		N
	Test performed without:		—
	- endanger to the operator		N
	- cause damage to adjacent equipment		N
	No permanent arcing		N
	No flash over between poles or poles and frame		N
	No melting of the fuse in the detection circuit		N
8.3.5.1.6	Conditions of the equipment after the test		N
	Immediately after the test equipment must work satisfactorily		N
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N
	- equipment is able to carry its rated current after normal closing operation		N

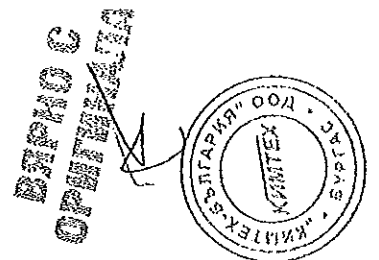
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.5.2	Short-circuit making capacity		N
	Rated short-circuit making capacity I _{cm} (A).....:	-	N
	test voltage (1,05 U _e) (V).....:	L1: - L2: - L3: -	—
	r.m.s. test current (A).....:	L1: - L2: - L3: -	—
	peak test current (A).....:	L1: - L2: - L3: -	—
	power factor/time constant.....:	L1: - L2: - L3: -	N
	factor <i>n</i>:	-	N
	current duration (ms).....:	-	N
	Time interval between the cycles (min).....:	-	N
	Number of making cycles.....:	-	N
8.3.5.2.5	Behaviour of the equipment during the test		N
	Test performed without:		—
	- endanger to the operator		N
	- cause damage to adjacent equipment		N
	No permanent arcing		N
	No flash over between poles or poles and frame		N
	No melting of the fuse in the detection circuit		N
8.3.5.2.6	Conditions of the equipment after the test		N
	Immediately after the test equipment must work satisfactorily		N
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N
	- equipment is able to carry its rated current after normal closing operation		N

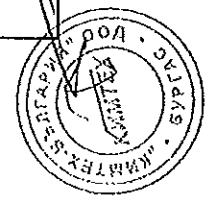


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.5.3	Dielectric verification		N
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V).....: -		—
	No flashover or breakdown		N
8.3.5.4	Leakage current		N
	test voltage (1,1 U_e) (V).....: -		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA): -		N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA): -		N
8.3.5.5	Temperature-rise verification		N
	- conductor cross-section (mm ²) / (mmxmm).....: -		—
	- test current I_e (A).....: -		—
	Temperature rise of main circuit terminals ≤ 80 K (K).....: -		N



IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT Type SL2G-3x3, tested at 690V/80k		P
	Conditional short-circuit current test		P
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....: Jean Müller		—
	- manufacturer's model or type reference.....: M2gL400/69		—
	- rated voltage (V).....: 690		—
	- rated current (A).....: 400		—
	- rated breaking capacity (kA).....: 80		—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 U _e) (V).....: L1: 729 L2: 732 L3: 733		—
	test current (A).....: L1: 81390 L2: 81500 L3: 81900		—
	rated frequency (Hz).....: 50		—
	power factor.....: 0,20		P
	time constant (ms).....: -		N
	factor <i>n</i>: 2,24		P
a)	Fuse protected short-circuit withstand:		P
	- max. let-through current (A).....: L1: 11000 L2: 33800 L3: 32200		—
	- Joule Integral I ² dt (A ² s).....: L1: 151000 L2: 1080000 L3: 724000		—
b)	Fuse protected short-circuit withstand:		P
	- mean velocity of 15 manually under no-load conditions operations (m/s).....: 0,97		—
	- point at which the measurement is made.....: Maximum distance of actuator		—
	- test speed during short-circuit making (m/s).....: 1,0		—
	- max. let-through current (A).....: L1: 32100 L2: 11000 L3: 29000		—
	- Joule Integral I ² dt (A ² s).....: L1: 1100000 L2: 830000 L3: 810000		—

OPTIMA
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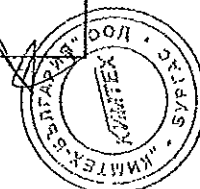
IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.6.2.5	Behaviour of the equipment during the test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.6.2.6	Condition of the equipment after the test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.6.3	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V)...	1380	—
	No flashover or breakdown		P
8.3.6.4	Leakage current		P
	test voltage (1,1 U_e) (V).....	759 (tested with 800V)	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.6.5	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm).....	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	- test current I_e (A).....	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....	61K	P

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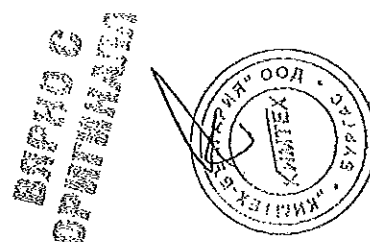


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT Type SL2G-3x, tested at 690V/80k		P
	Conditional short-circuit current test		P
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....: Jean Müller		—
	- manufacturer's model or type reference.....: M2gL400/69		—
	- rated voltage (V).....: 690		—
	- rated current (A).....: 400		—
	- rated breaking capacity (kA).....: 100		—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 U _e) (V).....: L1: 727 L2: 730 L3: 730		—
	test current (A).....: L1: 82000 L2: 82200 L3: 83400		—
	rated frequency (Hz).....: 50		—
	power factor.....: 0,20		P
	time constant (ms).....: -		N
	factor n.....: 2,24		P
a)	Fuse protected short-circuit withstand:		P
	- max. let-through current (A).....: L1: 20200 L2: 42200 L3: 43400		—
	- Joule Integral I ² dt (A ² s).....: L1: 55600 L2: 1000000 L3: 769000		—
b)	Fuse protected short-circuit withstand:		P
	- mean velocity of 15 manually under no-load conditions operations (m/s).....: 0,97		—
	- point at which the measurement is made.....: Maximum distance of actuator		—
	- test speed during short-circuit making (m/s).....: 1,0		—
	- max. let-through current (A).....: L1: - L2: 37000 L3: 37000		—
	- Joule Integral I ² dt (A ² s).....: L1: - L2: 890000 L3: 890000		—

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.6.2.5	Behaviour of the equipment during the test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.6.2.6	Condition of the equipment after the test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.6.3	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ (V)... :	1380	—
	No flashover or breakdown		P
8.3.6.4	Leakage current		P
	test voltage (1,1 U_e) (V).....:	750 (tested with 800V)	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA)	-	N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA)	< 2	P
8.3.6.5	Temperature-rise verification		P
	- conductor cross-section (mm ²) / (mmxmm).....:	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	- test current I_e (A).....:	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....:	80K	P



IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY Type SL2G-3x3, tested with 400A fuse-links		P
8.3.7.1	Overload test		P
	ambient temperature 10-40 °C	25	—
	test enclosure W x H x D (mm x mm x mm)	-	—
	material of enclosure.....	-	—
	test current 1,6 x I _{th} e or 1,6 x I _{th} (A)	640	—
	- cable/busbar cross-section (mm ²)/(mmxmm)	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark.....	Jean Müller	—
	- manufacturer's model or type reference.....	M02gG400/69	—
	- rated voltage (V)	690	—
	- rated current (A).....	400	—
	- power loss (W).....	34	—
	- rated breaking capacity (kA).....	100	—
	- time duration of the overload test (s)	2290	P
	Within 3 to 5 min after the fuse(s) has(have) operated (or 1 h), the equipment has been operated once, i.e. opened and closed	Opening and closing operation	P
	Required opening force not greater than the test force of 8.2.5.2 and table 8		P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage: 2 ^u U _e with a minimum of 1000V~ (V)...	1380	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage (1,1 U _e) (V).....	759	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA)	-	N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA)	< 2	P
8.3.7.4	Temperature-rise verification		P
	Fuse links aged during the overload test are replaced by new fuse-links		P

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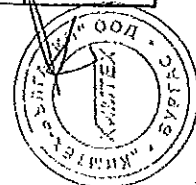
IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	- conductor cross-section (mm ²) / (mm×mm).....:	Supply: copper bar 30×10mm Load: 240mm ² , 2m length	—
	- test current I _e (A).....:	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....:	87K	P

ВЕРИЛИ
ОПРАВИЛИ

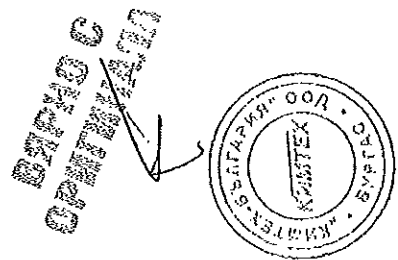


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY Type SL2G-3x		P
8.3.7.1	Overload test		P
	ambient temperature 10-40 °C	25	—
	test enclosure W x H x D (mm x mm x mm)	-	—
	material of enclosure	-	—
	test current 1,8 x Ithe or 1,6 x Ith (A)	640	—
	- cable/busbar cross-section (mm ²)/(mmxmm)	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark	Jean Müller	—
	- manufacturer's model or type reference	M02gG400/69	—
	- rated voltage (V)	690	—
	- rated current (A)	400	—
	- power loss (W)	34	—
	- rated breaking capacity (kA)	100	—
	- time duration of the overload test (s)	2300	P
	Within 3 to 5 min after the fuse(s) has(have) operated (or 1 h), the equipment has been operated once, i.e. opened and closed	Opening and closing operation	P
	Required opening force not greater than the test force of 8.2.5.2 and table 8		P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage: 2*Ue with a minimum of 1000V~ (V)	1380	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage (1,1 Ue) (V)	759	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA)	-	N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA)	< 2	P
8.3.7.4	Temperature-rise verification		P
	Fuse links aged during the overload test are replaced by new fuse-links		P

ВЕРИЖЕ
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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	- conductor cross-section (mm ²) / (mmxmm).....:	Supply: copper bar 30x10mm Load: 240mm ² , 2m length	—
	- test current I _e (A).....:	400A	—
	Temperature rise of main circuit terminals ≤ 80 K (K).....:	67K	P

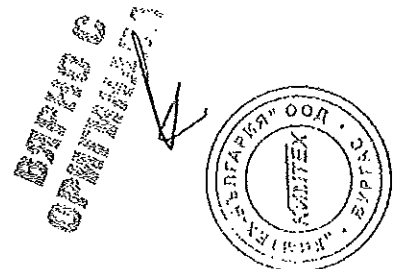


IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.4	ELECTROMAGNETIC COMPATIBILITY TESTS		
8.4.1	Immunity		N
8.4.1.1	Equipment not incorporating electronic circuits: no tests necessary		N
8.4.1.2	Equipment incorporating electronic circuits:		N
	Equipment utilizing circuits in which all components are passive are not required to be tested		N
	All other equipment, requirements according to 7.3.2.2 and limits according table 6 apply		N
	Performed tests.....: -		N
	No unintentional separation or closing of contacts has occurred during these tests.....: -		N
8.4.2	Emission		N
8.4.2.1	Equipment not incorporating electronic circuits: no tests necessary		N
8.4.2.2	Equipment incorporating electronic circuits:		N
	Equipment utilizing circuits in which all components are passive are not required to be tested		N
	All other equipment, requirements according to 7.3.3.2 and limits according table 7 apply		N
	Performed tests.....: -		N
	No unintentional separation or closing of contacts has occurred during these tests.....: -		N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
Annex A (normative)			N
A	Equipment for direct switching of a single motor		N
A.1	Additional rated duties:		-
A.1.1	Intermittent periodic duty.....: -		N
	Intermittent duty: -		N
A.1.1.1	Classes of intermittent duty: -		N
	- class 1: up to 1 operating cycle per hour		N
	- class 3: up to 3 operating cycles per hour		N
	- class 12: up to 12 operating cycles per hour		N
	- class 30: up to 30 operating cycles per hour		N
	- class 120: up to 120 operating cycles per hour		N
A.1.2	Temporary duty.....: -		N
A.5	Mechanical durability:		N
	Equipment mounted according to manufacturer's instruction		N
	Preferred number of no-load operating cycles expressed in millions (0,001 – 0,003 – 0,01 – 0,03 – 0,1 – 0,3 – 1).....: -		N
	Number of no-load operating cycles performed: -		N
	If no mechanical endurance is stated by the manufacturer, a minimum mechanical endurance according to the class of Intermittent duty shall be tested (corresponding to 8000 h of operation).		N
A.6	Electrical durability:		N
	Test according to manufacturer's instruction		N
	Number of operating cycles performed: -		N



IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
A.7	Verification of making and breaking capacities:		N
	- utilization category	-	—
	- rated operational voltage U_e (V).....	-	—
	- rated operational current I_e (A) or power (kW)....	-	—
	Conditions for make/break operations or make operations:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor	L1: - L2: - L3: -	—
	Conditions for make/break operations:		N
	- test voltage, $U = 1,05 U_e$ (V)	L1: - L2: - L3: -	—
	- test current, $I = \dots \times I_e$ (A)	L1: - L2: - L3: -	—
	- power factor/ time constant	L1: - L2: - L3: -	—
	Number of make/break or make and break operations	-	N
	- recovery voltage duration (≥ 50 ms)		N
	- current duration (ms)	-	—
	- time interval between operations (s).....	-	N
	Characteristic of transient recovery voltage if necessary:		N
	- oscillatory frequency (kHz)	-	—
	- measured oscillatory frequency (kHz)	L1: - L2: - L3: -	N
	- factor γ	L1: - L2: - L3: -	N



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БАНКО
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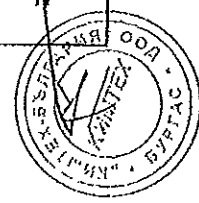
IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		N
	Test performed without:		—
	- endanger to the operator		N
	- cause damage to adjacent equipment		N
	No permanent arcing		N
	No flash over between poles or poles and frame		N
	No melting of the fuse in the detection circuit		N
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		N
	Immediately after the test equipment must work satisfactorily		N
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N
	- equipment is able to carry its rated current after normal closing operation		N
8.3.3.4	Dielectric verification		N
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~.....: -		—
	No flashover or breakdown		N
8.3.3.6	Leakage current		N
	test voltage (1,1 U_e) (V).....: -		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA).....: -		N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA).....: -		N
8.3.3.6	Temperature-rise verification		N
	- conductor cross-section (mm^2) / ($\text{mm} \times \text{mm}$).....: -		—
	- test current I_e (A).....: -		—
	Temperature rise of main circuit terminals ≤ 80 K (K).....: -		N
	Supplementary information:		N



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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
A.8	Operational performance test:		N
	- utilization category	-	—
	- rated operational voltage U_e (V).....	-	—
	- rated operational current I_e (A) or power (kW)....	-	—
	Test conditions for electrical operation cycles:		N
	- test voltage (V).....	L1: - L2: - L3: -	—
	- test current (A).....	L1: - L2: - L3: -	—
	- power factor/time constant	L1: - L2: - L3: -	—
	Number of cycles with current	-	N
	Number of cycles without current	-	N
	First test sequence (with/without current).....	-	—
	Second test sequence (with/without current).....	-	—
	- time interval between first and second test sequence	-	—
	- recovery voltage duration (≥ 50 ms)		N
	- current duration (ms)	-	—
	- time interval between operations (s).....	-	N
8.3.4.1.5	Behaviour of the equipment during the operational performance test		N
	Test performed without:		—
	- endanger to the operator		N
	- cause damage to adjacent equipment		N
	No permanent arcing		N
	No flash over between poles or poles and frame		N
	No melting of the fuse in the detection circuit		N
8.3.4.1.6	Condition of the equipment after the operational performance test		N
	Immediately after the test equipment must work satisfactorily		N
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N
	- equipment is able to carry its rated current after normal closing operation		N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.4.2	Dielectric verification		N
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~.....: -		—
	No breakdown or flashover		N
8.3.4.3	Leakage current		N
	test voltage (1,1 U_e) (V).....: -		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): $\leq 0,5$ mA / pole (mA): -		N
	Leakage current (other utilization categories): $\leq 2,0$ mA / pole (mA): -		N
8.3.4.4	Temperature-rise verification		N
	- conductor cross-section (mm^2) / ($\text{mm} \times \text{mm}$).....: -		—
	- test current I_e (A).....: -		—
	Temperature rise of main circuit terminals ≤ 80 K (K).....: -		N
	Supplementary information:		N
A.9	Special tests:		N
	- performed tests.....: -		N

ВНЕШНЯЯ
ОПЕРАЦИЯ



IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
Annex C (normative)			N
C	Single pole operated three pole switches		N
C.1	Three pole operated switches of fundamentally the same design, already successfully tested are deemed to satisfy the requirements of individually operated three pole devices.		N
C.2	Additional-tests to be performed on single pole operated three pole switches		N
	Test "8.3.3.3 Making and breaking capacities" according to test sequence I with following modifications		N
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle		N
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle		N
	Test performed in a three phase circuit		N
	Test "8.3.4.1 Operational performance" according to test sequence II with following modifications		N
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle		N
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle		N
	Test performed in a three phase circuit		N
	Test "8.3.6.2 Fuse protected short circuit test" according to test sequence IV with following modifications		N
	For the making test L1 shall be open and L2 closed, L3 is subjected to the required make operation cycle.....		N
	Test performed in a three phase circuit		N
C.5	Instructions for use		N
	The product literature includes following statement:		N
	These devices are intended for power distribution systems where switching and/or isolating of an individual phase may be necessary and shall not be used for the switching of the primary circuit of three-phase equipment.		N

ВЕРНО
ОТВЕЧЕНО



Table 1:

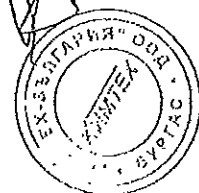
Temperature rise measurements (with dummy 45 W)			
Sequence F, type SL2G-3x, new			
Temperature rise dT of part:	Phase	Measured dT (K)	Required dT (K)
Cable terminals	L1	50,7	≤ 70
	L2	50,7	
	L3	50,7	
Busbar terminals	L1	50,7	
	L2	50,7	
	L3	50,7	
Actuator	—	5	≤25
Parts intended to be touched but not hand-held:			
Metallic	—	—	≤ 30
Non-metallic	—	25	≤ 40
Parts which need not be touched during normal operation:			
Metallic	—	—	≤ 40
Non-metallic	—	34	≤ 50

ВЕРИ
ОПЕРАТОРА



Remarks

ВНУТРЕННЯЯ
ОПРЕДЕЛЕНИЕ





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

официален дистрибутор на
тцсо Electronics
кабели, трансформатори,
електрооборудване

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

Списък на проведените изпитвания на Вертикален предпазител-разединител НН 400 А, с триполюсно управление

1. Изпитване устойчивост на стареене;
2. Краткотрайно изпитване на ток;
3. Изпитване ток на късо съединение;
4. Изпитване претоварване;
5. Изпитване електромагнитна съвместимост;

13.01.2016г.

Подпис



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

RWE Eurotest

ул. Унтерще-Вилмс № 52, 44143 Дортмунд

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

съоръжения и уреди за високо напрежение, компактни разпределителни уредби ниско напрежение, кабели, кабелна арматура за силнотокowi кабели, пресови и винтови съединители, изолационни продукти, електромагнитна съвместимост, заземителни съоръжения

Свидетелството за акредитация важи във връзка с решение от 18.10.2011 с акредитационен № D-PL-15207-01 и е валидно до 17.10.2016г. Състои се от този лист и приложения общо 6 страници.

Регистрационен номер на свидетелството: D-PL-15207-01-01

Франкфурт на Майн, 18.10.2011

дипл. инж. Ралф Егнер



**ВАЖНО С
ОРИГИНАЛ**

Deutsche Akkreditierungsstelle GmbH

Bellehene 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

RWE Eurotest GmbH
Unterste-Wilms-Str. 52, 44143 Dortmund

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

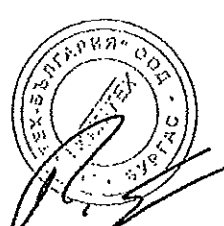
Hochspannungsgeräte und -anlagen, Niederspannungs-Schaltgeräte-Kombinationen,
Kabel, Starkstromkabel-Garnituren, Press- und Schraubverbinder,
Isolierstoffe (Isolieröle), EMV, Erdungsanlagen,
sowie von PSA bei Lichtbogeneinwirkung

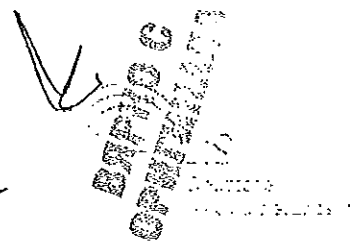
Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 18.10.2011 mit der Akkreditierungsnummer D-PL-15207-01 und ist gültig bis 17.10.2016. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 6 Seiten.

Registrierungsnummer der Urkunde: D-PL-15207-01-01

Frankfurt am Main, 18.10.2011

Siehe Hinweise auf der Rückseite


Dipl.-Ing. (FH) Rolf Egner
Leiter Abteilung 2





TRANSLATION AGENCY

Превод от английски език

50 Hristo Smirnenski Blvd.
1164, Sofia, Bulgaria

T +359 2 9804090
F +359 2 9817160
office@greg-bg.com
www.greg-bg.com

Фирмена бланка на Akkreditierung Austria

Националният акредитиращ орган

Akkreditierung Austria

потвърждава акредитацията на

Лаборатория за изпитване

AIT Austrian Institute of Technology GmbH
ул. Донау-Сити 1, А-1220 Вiena
Идентификационен номер: 0001

Акредитацията е въз основа на:
ÖVE/ÖNORM EN ISO/IEC 17025:2007
Начална дата на акредитация: 01.12.1993 г.

Информация относно обхвата на акредитацията и Akkreditierung Austria
<http://www.bmvfw.gv.at/akkreditierung>

Тази акредитация е предоставена със сертификат, който потвърждава че Органът за оценка за съответствието - включително обектите, посочени в сертификата – отговаря на изискванията на ÖVE/ÖNORM EN ISO/IEC 17025:2007. Това потвърждение за акредитация може да бъде възпроизведено само в пълна форма.

12.08.2014 г.
Дата

(подпис не се чете)
Допл. инж. д-р. Норман Брунер
Ръководител на Акредитация Австрия

Кръгъл фирмен печат

Долуподписаният, Жасмин Кръстев Кръстев, удостоверявам верността на извършения от мен превод от английски език на български език на приложения документ: Удостоверение за акредитация с дата 12.08.2014 г. Преводът се състои от 1 стр.

Подпис:
Жасмин Кръстев Кръстев





Die Nationale Akkreditierungsstelle / *The National Accreditation Body*

AKKREDITIERUNG AUSTRIA

bestätigt die Akkreditierung der / *confirms the accreditation of*

Prüfstelle / *Testing Laboratory*

AIT Austrian Institute of Technology GmbH

Donau-City-Straße 1, A-1220 Wien

Identifikationsnummer / *ID-number* **0001**

Akkreditierungsgrundlage / *Accreditation basis*:

ÖVE/ÖNORM EN ISO/IEC 17025:2007

Datum der Erstakkreditierung / *Initial date of accreditation*: **01.12.1993**

Informationen zum Akkreditierungsumfang und zu Akkreditierung Austria /
Information about the accreditation scope and Akkreditierung Austria

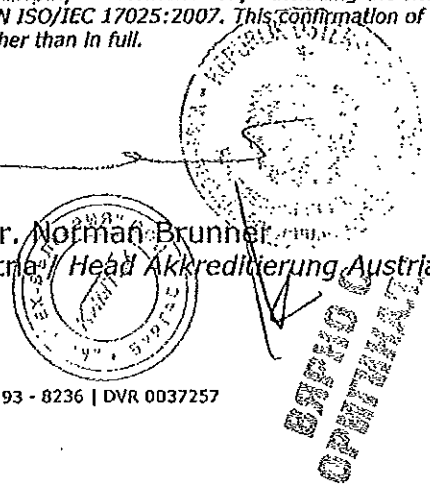
<http://www.bmwfw.gv.at/akkreditierung>

Die Akkreditierung wurde mittels Bescheid erteilt und damit bestätigt, dass die Konformitätsbewertungsstelle - einschließlich der im Bescheid genannten Standorte - die Anforderungen der ÖVE/ÖNORM EN ISO/IEC 17025:2007 erfüllt. Diese Bestätigung der Akkreditierung darf nur unverändert weiterverbreitet werden.

The accreditation was granted by a decree which confirms that the Conformity Assessment Body - including the sites mentioned in the decree - fulfills the requirements of ÖVE/ÖNORM EN ISO/IEC 17025:2007. This confirmation of accreditation may not be reproduced other than in full.

12.08.2014
Datum / *Date*

Dipl.-Ing. Dr. Norman Brunner
Leiter Akkreditierung Austria / *Head Akkreditierung Austria*





TRANSLATION AGENCY

Превод от английски език

50 Hristo Smirnenki Blvd.
1164, Sofia, Bulgaria

T +359 2 9804090
F +359 2 9817160
office@greg-bg.com
www.greg-bg.com

Декларация за съответствие

Ние: **ЕТИ Електроелемент АД**
Ул. Обрезни 5
1411 Излаке
СЛОВЕНИЯ

декларираме на наша отговорност, че стоката(ите)

Модел/Тип

NV **лептов тип товарови прекъсвачи разединители със стопяеми предназначители SL**

за които се отнася тази декларация, са в съответствие с разпоредбите на следната директива(и) на ЕС:

2006/95/ЕС Директива за ниско напрежение
2004/108/ЕС Директива за ЕМС

и отговарят на следния стандарт(и):

EN 60947-3

Комutationsни апарати за ниско напрежение - Част 3: Товарови прекъсвачи, разединители, товарови прекъсвач-разединители и апарати, комбинирани със стопяеми предназначители

Година на СЕ маркировка

2000

Място и дата:

Излаке, 01.11.2008 г.

Подпис на представителя на производителя (*не се чете*)

Стане Верлич, Продуктов мениджър

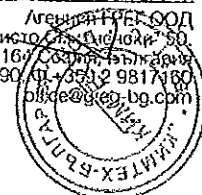
Печат: Електроелемент АД

Долуподписаният, **Жасмин Кръстев Кръстев**, удостоверявам верността на извършения от мен превод от английски език на български език на приложения документ: Декларация за съответствие с дата 01.11.2008 г. Преводът се състои от 1 стр.

Подпис: 
Жасмин Кръстев Кръстев



ВАЖНО С
СРЪБИЯ





DECLARATION OF CONFORMITY

We: **ETI Elektroelement d.d.**
Obrezija 5
1411 Izlake
SLOVENIA

declare under our sole responsibility that the product(s)

Model/Type:

NV Strip type fuse-switch disconnectors SL ...

to which this declaration relates are in conformity with the provisions of the following EC Directive(s)

2006/95/EC Low Voltage Directive
2004/108/EC EMC Directive

and comply with the following standard(s):

EN 60947-3
Low-voltage switchgear and controlgear -- Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

Year of CE marking:

2000

Place and date:

Izlake, 1.11.2008

Manufacturer representative signature:

Stane Verlič, Product manager

Stane Verlič
ELEKTROELEMENT d.d.
IZLAKA
46 ETI



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA EKONOMIKO IN TRAJNO RAZVOJNO SODRANJE

KEMA



CERTIFICATE

KEMA No. 2075805.02

Issued to:
Applicant:
Jean Müller GmbH
H.J. Müller Straße 7
65343, ELTVILLE, Germany

Manufacturer/Licensee:
Jean Müller GmbH
H.J. Müller Straße 7
65343, ELTVILLE, Germany

Product: fuse-switch disconnectors

Trade names: JEAN MÜLLER
Types/models: SI 2G-3x; SI 2G-3x3

The product and any acceptable variation thereof 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 60947-3:1999
- an inspection of the production location according to CENELEC Operational Document OIG 021
- a certification agreement with the number 900446

KEMA hereby grants the right to use the KEMA-KEUR certification mark.



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: December 12, 2005

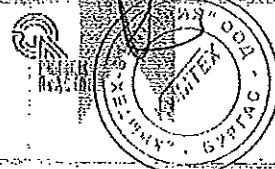

M.H.M. Versteegen
Certification Manager

© Integral publication of this certificate is allowed.

KEMA Quality B.V.
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 5445, 6802 ED Arnhem, The Netherlands
Telephone +31 26 3 66 20 00, Telefax +31 26 3 62 5
Website: www.kema.com

ACCREDITED BY
THE DUTCH COUNCIL
FOR ACCREDITATION

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SPECIFICATION OF THE CERTIFIED PRODUCT

Product data

- Product : fuse-switch-disconnectors
- trade name : JEAN MÜLLER
- types : SL2G-3x, SL2G-3x3
- rated insulation voltage : 1000 V
- conventional free air thermal current : fuse-links: 400 A (power loss 45 W)
- rating/utilization : fuse-links
AC-22B 400 A 400 V
- category (Ue-Ie) : AC-22B 400 A 500 V
AC-22B 400 A 690 V
- rated conditional short-circuit current : 80 kA at 690 V when provided with fuse-links limiting the cut-off current to a maximum 36,7 kA and the Joule Integral to a maximum of 1040 kA²s.
Fuse-links during tests: make Jean Müller type M2gG400/69, 400 A, 690 V, 100 kA
- rated impulse withstand voltage : 12 kV
- operational performance without current : category B
1400 operating cycles
- with current : 200 operating cycles
- degree of protection : operational front side, open position: IP10
operational front side, closed position: IP20
- connection design : busbars or cable lugs
type SL2G-3x: fuse-switch-disconnector, 3-poles, switching pole after pole
type SL2G-3x3, fuse-switch-disconnector, 3-poles, switching 3-poles together, with locking device in close and open position

TESTS

Test requirements

EN 60947-3:1999 A1:2001

Test result

The test results are laid down in KEMA test file 2075805.02.

Remarks

This certificate replaces certificate 2075005.02 dated October 28, 2005.

Conclusion

The examination proved that all test requirements were met.

Tested by : H.L. Schendstok 

Checked by : H.H.M. Versteegen 



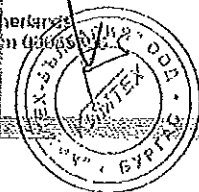
KEMA KEUR
CERTIFICATE



ANNEX TO KEMA-KEUR CERTIFICATE 2076805.02

page 2 of 2

Factory-Locations
Jean Müller GmbH,
H.J. Müller Straße 7, 65343, ELTVILLE, Germany



2076805.02
01/2005

Customer : ETI Elektroelement d.d.
Obrezija 5, SL-1411 Izlake / Slovenia

Manufacturer : Jean Müller GmbH
H.J.-Müller-Straße 7, D-65343 Eltville am Rhein

Product : LV HRC strip fuseways
LV HRC strip type fuse switch-disconnectors

Type : L....
SL....

We herewith confirm, that the following mentioned type designations by

Jean Müller GmbH, Eltville/Germany and ETI Elektroelement d.d., Izlake/Slovenia
L00-3/... up to L3-3/... L00-3/... up to L3-3/...
SL00-3X/... up to SL3-3X/... SL00-3X/... up to SL3-3X/...
SL00-3X3/... up to SL3-3X3/... SL00-3X3/... up to SL3-3X3/...

designate identical products.

The above mentioned product(s) fulfils the requirements of the following standards/specifications.

EC-Standards :


IEC-Standards :

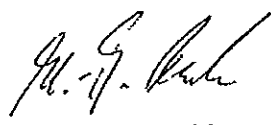
VDE-Specifications :

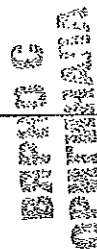
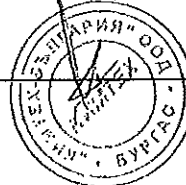
Issuer : PM/QM

Place, Date : Eltville, 19.03.2003

Signatures :


i.V. W. Ringel


i.V. H.-J. Birk



**Herstellerbestätigung
Manufacturer's Confirmation**

Blatt : 1 von 1
Datum : 14.03.08
Zeichen : QSVA

Kunde : ETI Elektroelement d.d
Customer : Obreziža 5, SL-1411 Izlake, Slovenia
Hersteller : Jean Müller GmbH Elektrotechnische Fabrik
Manufacturer : H.-J.-Müller-Str. 7, D-65343 Eltville
Produktbezeichnung : LV HRC fuseways and LV HRC switch disconnectors
Product designation
Typ : Jean Müller- L/SL and ETI-VL/SL
Type

We herewith confirm, that the abovementioned products with below mentioned type designations of Jean Müller GmbH, Eltville, Germany and ETI Elektroelement d.d , Izlake, Slovenia are identical.

Designation of Jean Müller, Germany	Designation of ETI, Slovenia
L00-3/..., L1-3/..., L2-3/..., L3-3/...	VL00-3/..., VL1-3/..., VL2-3/..., VL3-3/...
SL00-3X/..., SL1-3X/..., SL2-3X/..., SL3-3X/...	SL00-1P/..., SL1-1P/..., SL2-1P/..., SL3-1P/...
SL00-3X3/..., SL1-3X3/..., SL2-3X3/..., SL3-3X3/...	SL00-3P/..., SL1-3P/..., SL2-3P/..., SL3-3P/...
L1G-3/..., L2G-3/...	VL1G-3/..., VL2G-3/...
SL1G-3X/..., SL2G-3X/...	SL1G-1P/..., SL2G-1P/...
SL1G-3X3/..., SL2G-3X3/...	SL1G-3P/..., SL2G-3P/...

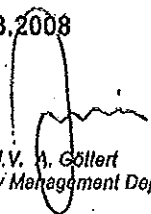
Das oben genannte Produkt erfüllt die Bau- und Prüfvorschriften der nachfolgend aufgeführten Normen und Vorschriften.

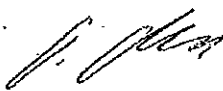
The above mentioned product(s) fulfils the requirements of the following standards / specifications.

Europäische Normen / EC Standards : EN 60947-3
IEC-Standards / IEC-Standards : IEC 60947-3
VDE-Vorschriften / VDE-Specifications : VDE 0660-107
ISO-Vorschriften / ISO-Standards :

Aussteller / Issuer : QS
Ort, Datum / Place, Date : Eltville, 14.03.2008

Unterschriften/Signatures :


I.V. W. Göllert
Quality Management Dept.


I.A. A. Maul
Area Sales Manager





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:

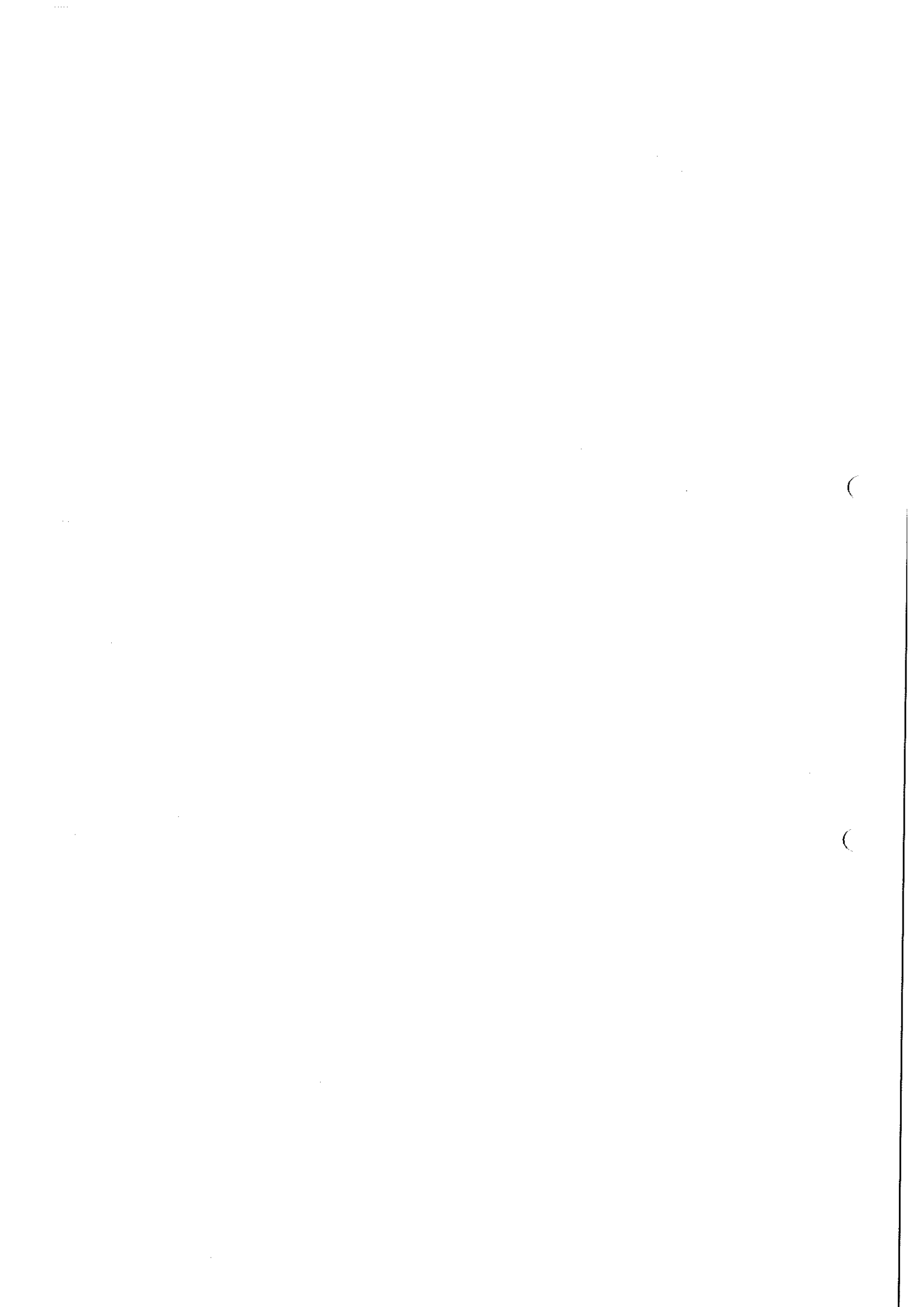
1/ Вертикален предпазител – разединител НН 400А, с триполусно управление

отговаря на изискванията на техническата спецификация и на стандарта EN 60947.

13.01.2016г.
гр. Бургас

Подпис и печат:

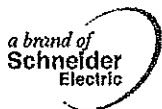
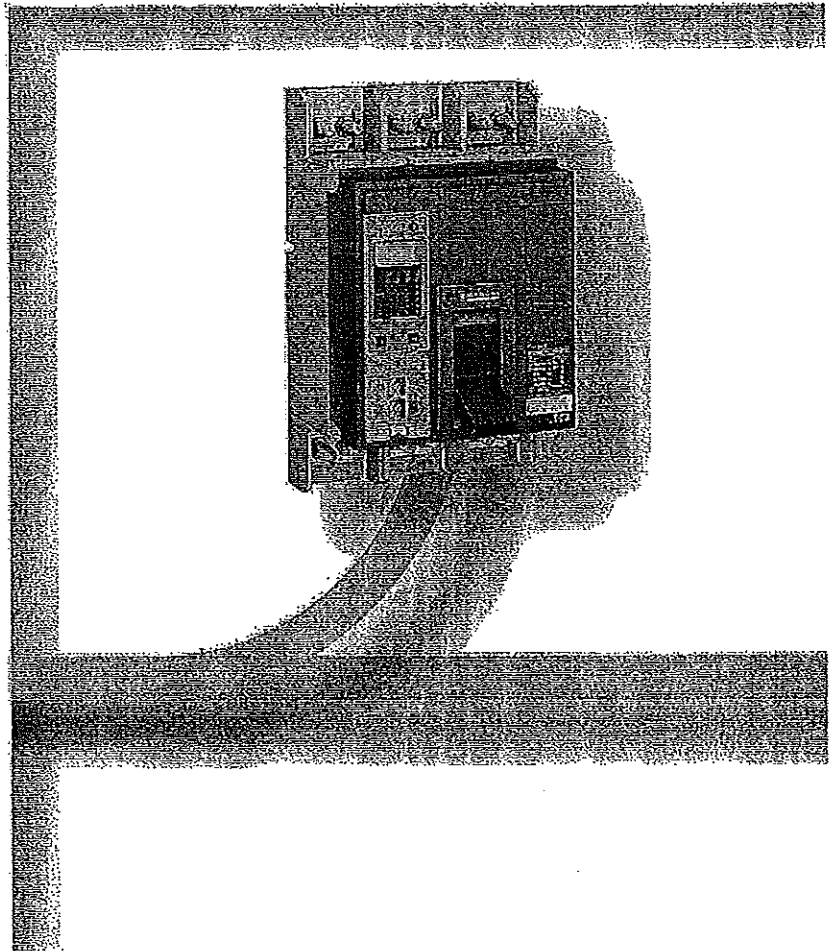




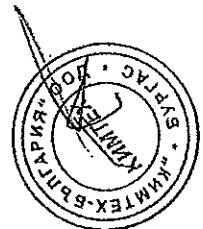
Low Voltage Products

COMPACT NS630b to 1600 A

User manual



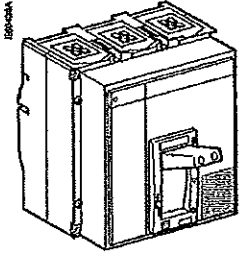
**OPERTORRATA
BRPHO C**



User manual for circuit breakers
COMPACT NS630b to 1600 A

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Discovering Compact



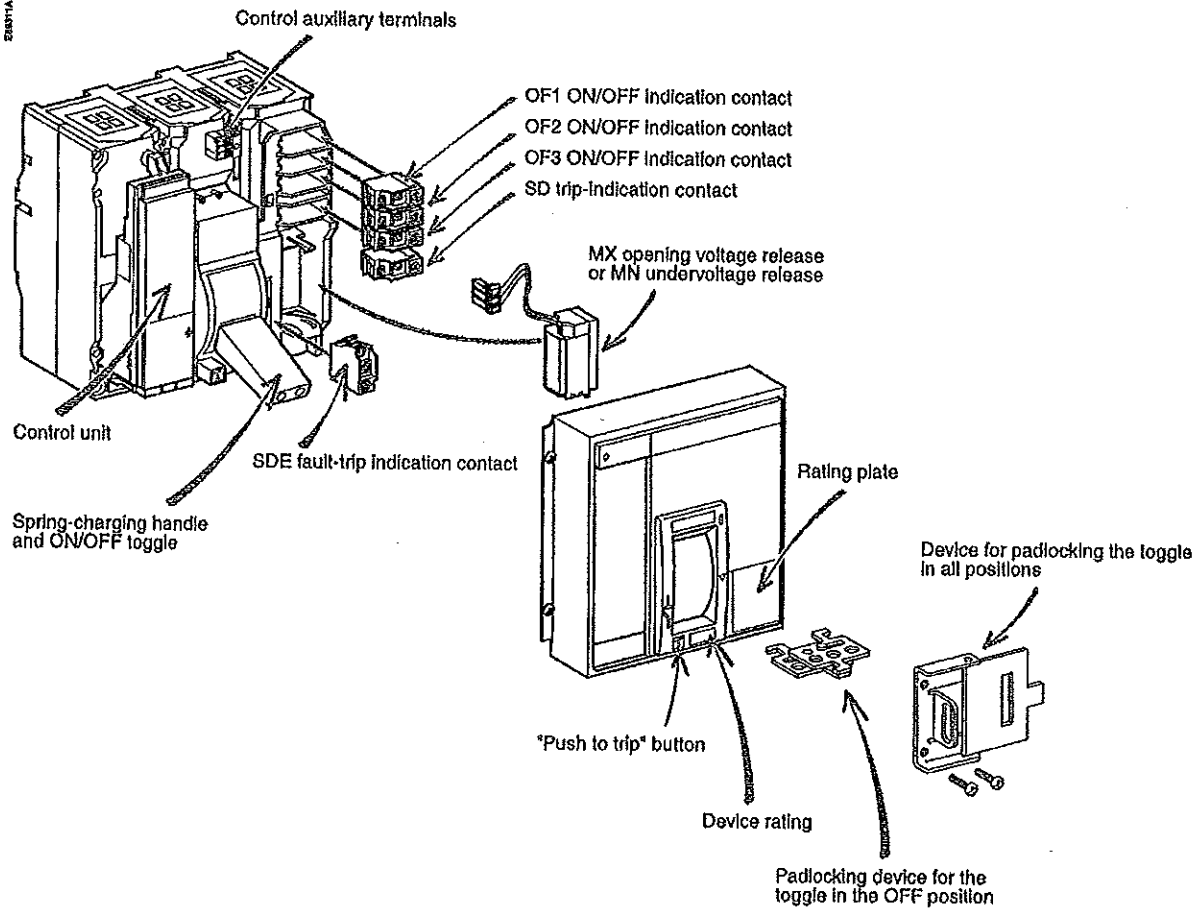
Rating plate

Compact NS6306 NS
 UI 750 V Uimp 8 kV
 Ue 220/240 ~ Icu 50
 (V) 380/415 (kA) 50
 440 ~ 30
 500/525 ~ 40
 660/690 ~ 30
 Ics = 75% Icu
 Icw 25kA / 0.5s cat B
 IEC 60947-2
 AS M.E. C2 ES
 DTE VDE TCU/A

- Rated current (x 100 A)
- Performance level
- Suitability for isolation
- Type of device: circuit breaker or switch-disconnector
- Ui - rated insulation level
- Uimp - Impulse withstand voltage
- Icu - ultimate breaking capacity
- Ue - rated operational voltage
- Ics - rated service breaking capacity
- Icw - rated short-time withstand current
- Standards

Manually operated
Compact with a toggle

Components



BRP10 C
09/11/1980

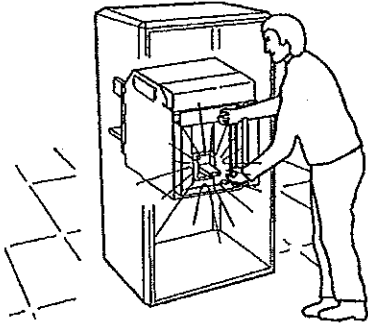


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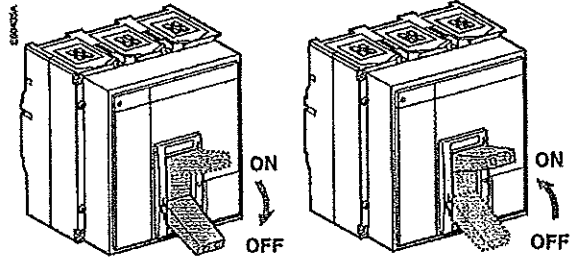
Opening, closing, reset

5E0405A

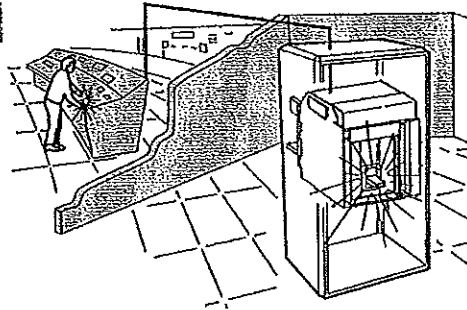


Local opening and closing

■ OFF: breaker open, ON: breaker closed.



5E0405A



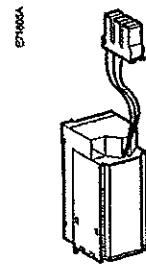
Remote opening

Use either:

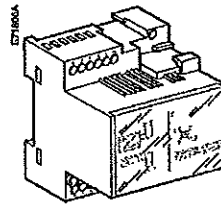
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release.

When connected to the control panel, these releases may be used to remotely open the device.

MX, MN

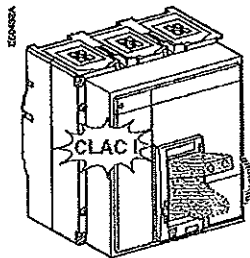


Delay unit

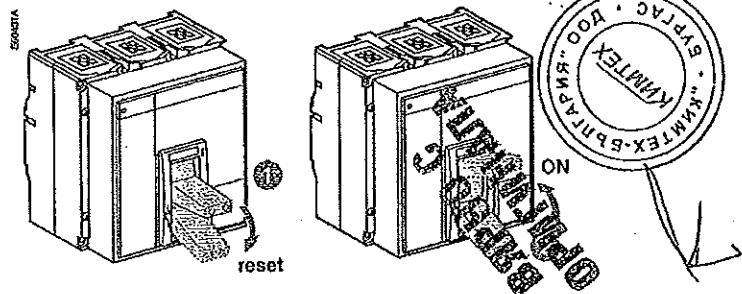


Resetting the device following a trip

■ the device trips.

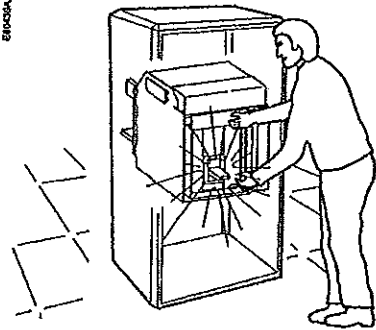


■ reset the device, then close it again.

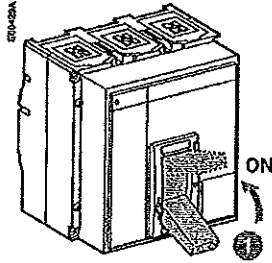


Manually operated
Compact with a toggle

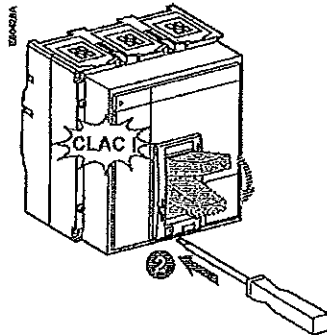
Testing the device



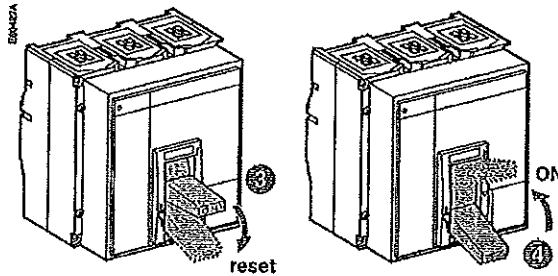
■ close the device.



■ press the "Press to trip" button.



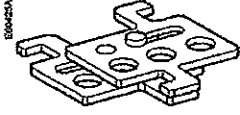
■ push the toggle down to reset the device, then back up close it again.



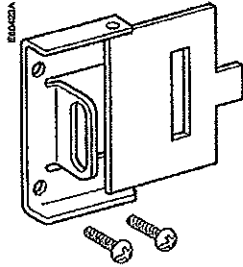
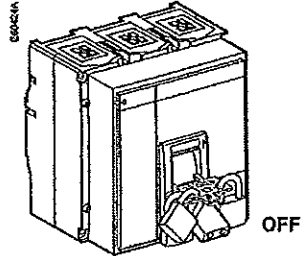
BRP10 C
BRP10A12A



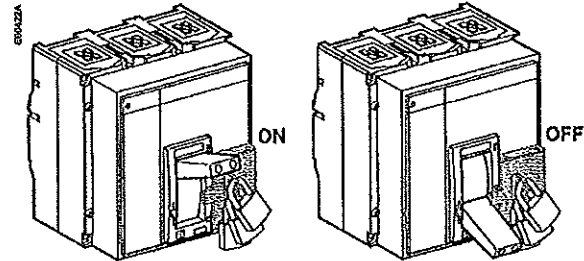
Locking the toggle



Locking the toggle in the OFF position using one to three padlocks (shackle diameter 5 to 8 mm)



Locking the toggle in the ON or OFF position using one to three padlocks (shackle diameter 5 to 8 mm)



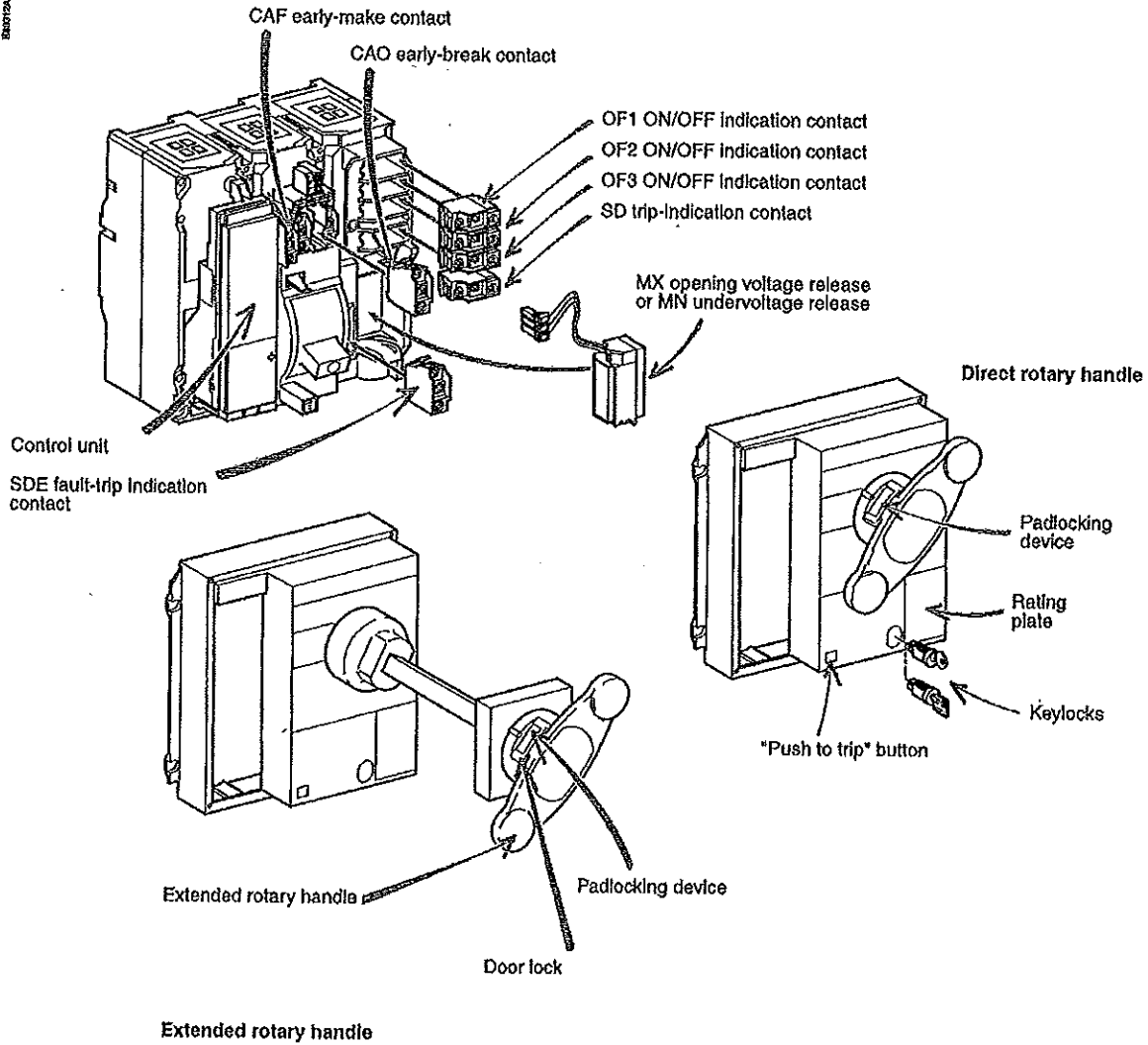
BRAND C
OPPTIMIZED



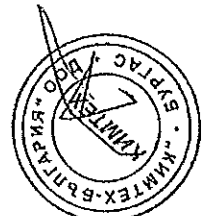
Manually operated
Compact with a rotary
handle

Components

280702A

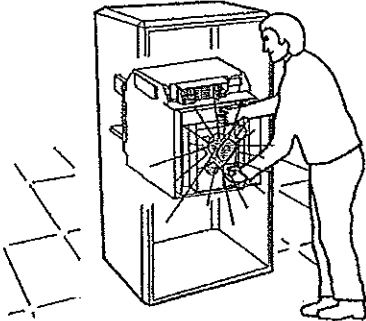


OPRIETWAARDIG
 BRNO G ORDES



Opening, closing, reset

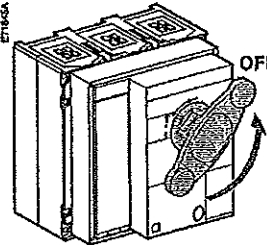
ET1844



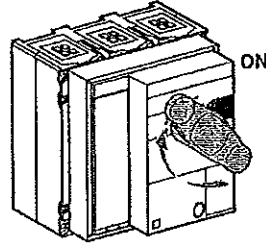
Local opening and closing

■ OFF: breaker open, ON: breaker closed.

ET1854

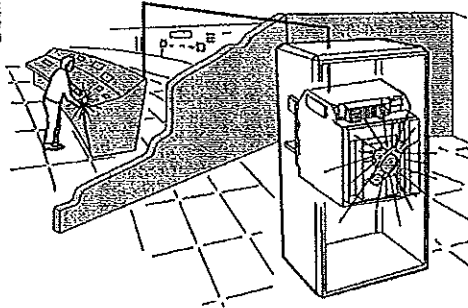


OFF



ON

ET1857



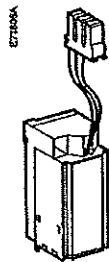
Remote opening

Use either:

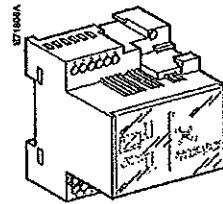
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release.

When connected to the control panel, these releases may be used to remotely open the device.

MX, MN



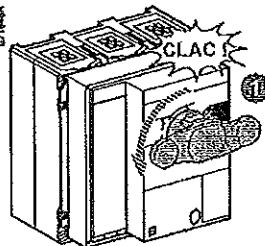
Delay unit



Resetting the device following a trip

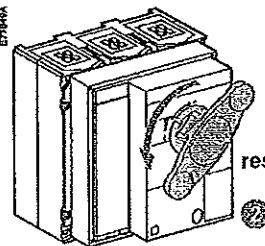
■ the device trips.

ET1844

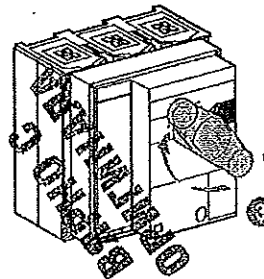


■ reset the device, then close it again.

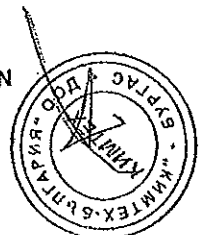
ET1844



reset

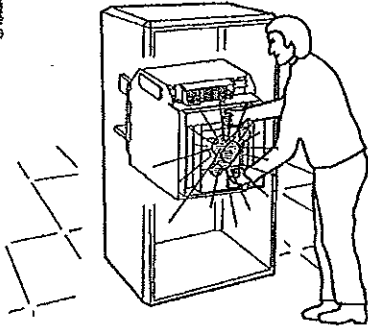


ON

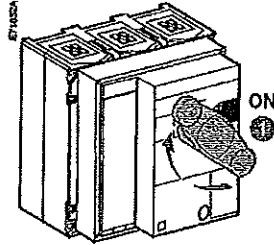


Manually operated
Compact with a rotary
handle

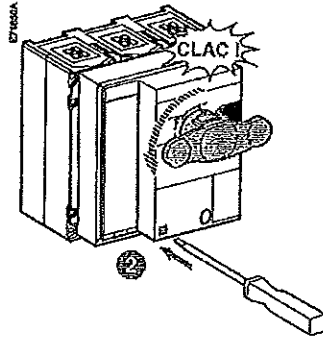
Testing the device



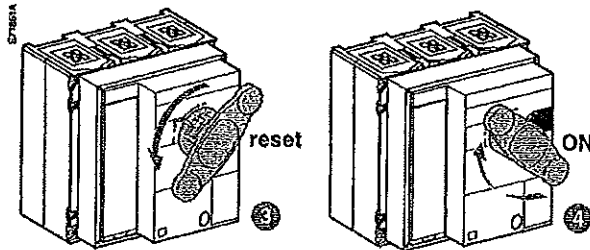
■ close the device.



■ press the "Press to trip" button.



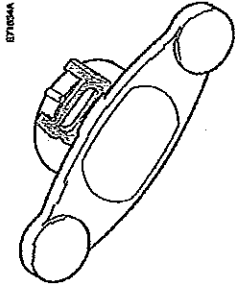
■ turn the handle to reset the device, then back to close it again.



BRP10 3
OPM111A11A

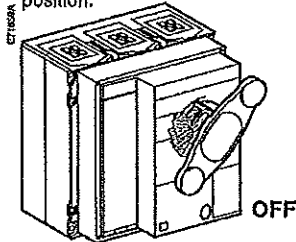


Locking the rotary handle

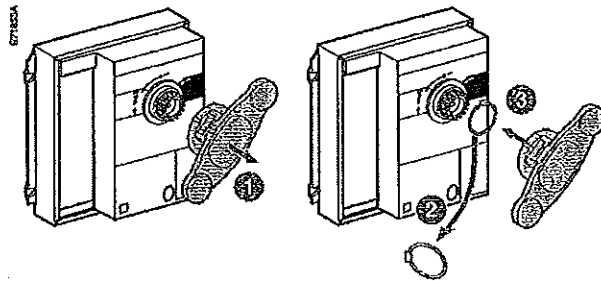


Locking the direct or extended rotary handle in all positions using one to three padlocks (shackle diameter 5 to 8 mm)

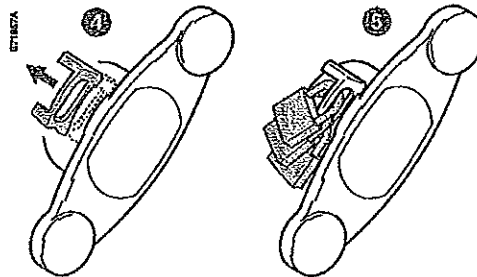
■ In the standard configuration, the device may be locked in the OFF position.



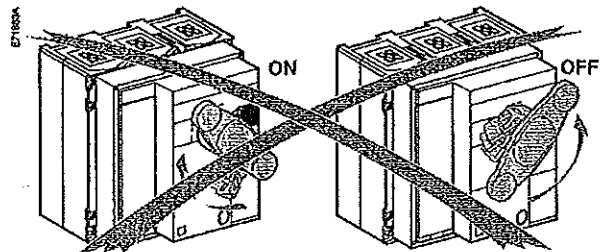
■ remove the ring as indicated below to enable locking in both the ON and OFF positions.



■ lock the handle.

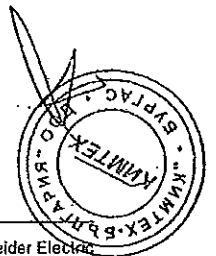


■ the controls are locked.



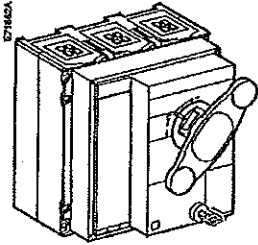
Note:
the rotary handle can be equipped for locking by both padlocks and keylocks.

BRAND C
OPERATIONAL



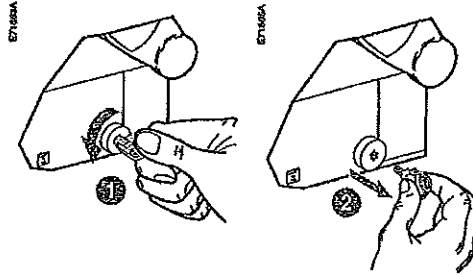
Manually operated
Compact with a rotary
handle

Locking the rotary handle

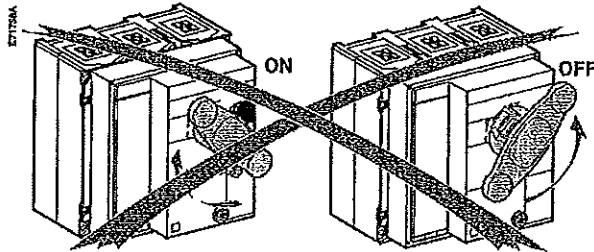


Locking the direct rotary handle in all positions using a keylock

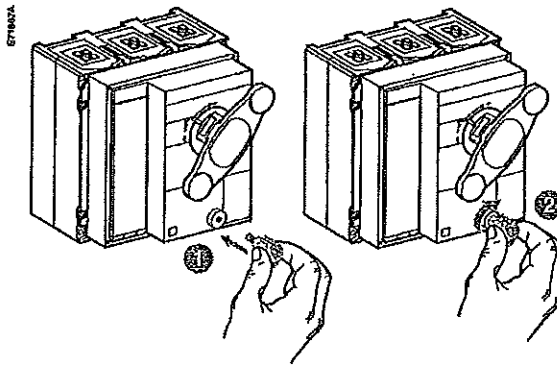
■ lock.



■ the controls are locked.

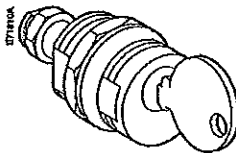


■ unlock.

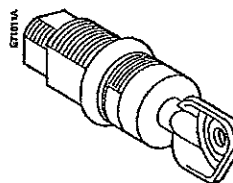


Two types of keylocks are available

RONIS



PROFALUX

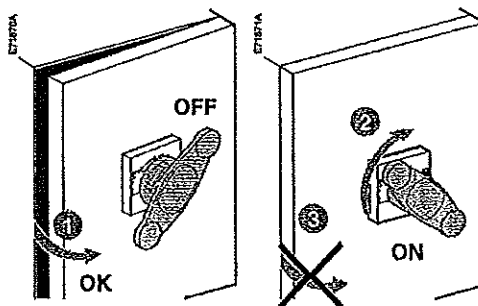


BRUNNEN
OPMONTWERK
BRIJDE C

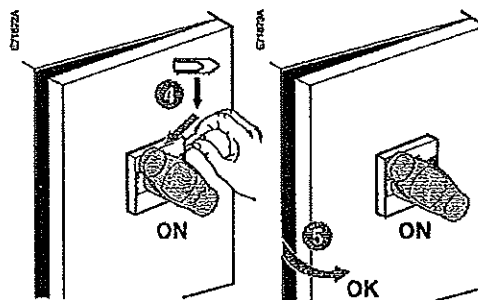


Door locking when the device is in the ON position, using the extended rotary handle

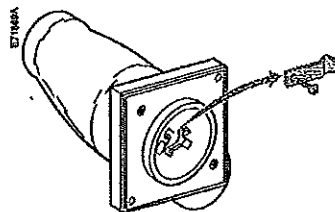
■ In the standard configuration, the door cannot be opened when the rotary handle is set to the ON position.



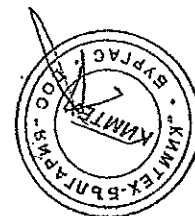
■ It is possible, however, to defeat the door lock.



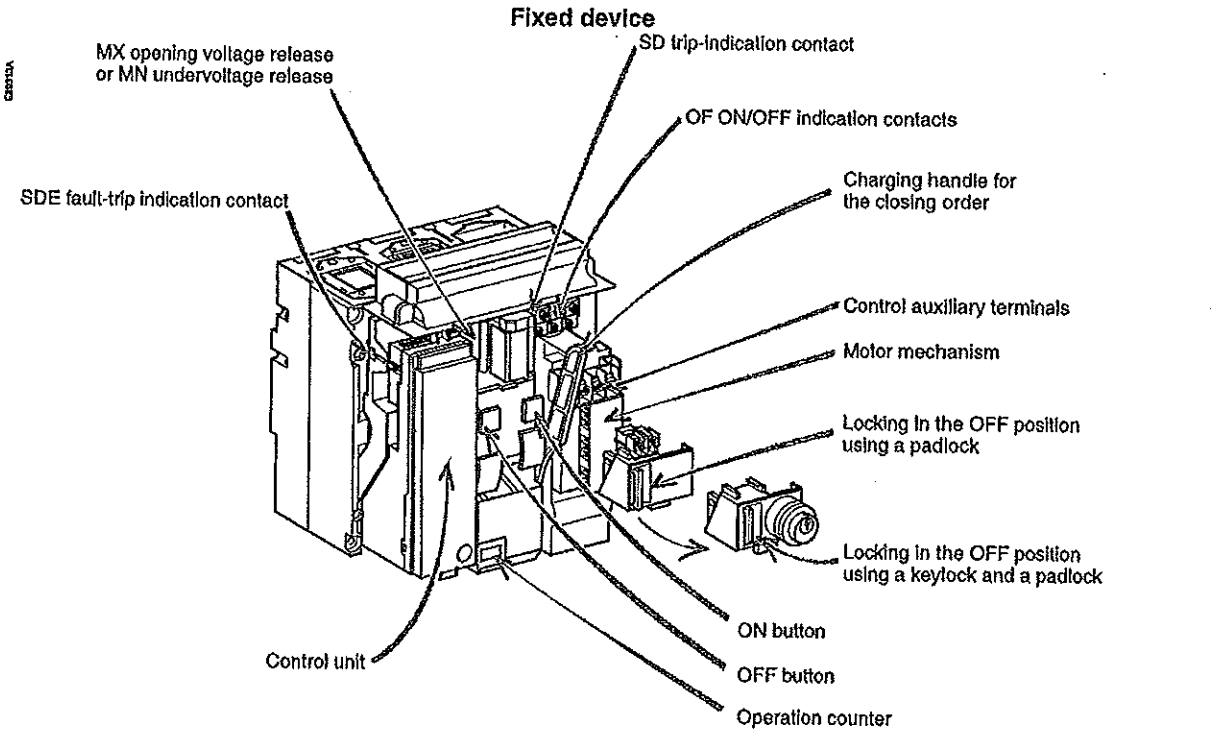
■ The door-lock function may be permanently disabled by removing the lock.



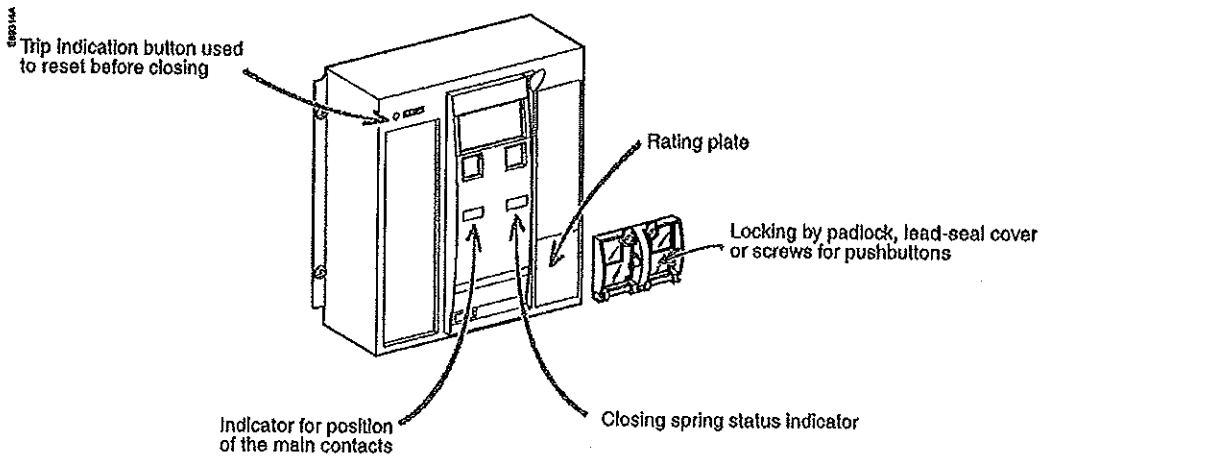
BRNO G
OPRIMMAMA



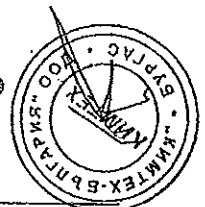
Remote operated Compact Components



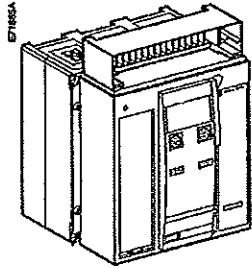
Front



BRAND
CHIEF

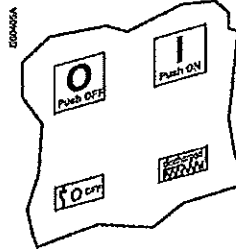


Opening, closing, reset

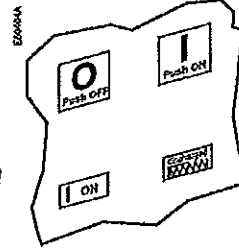


Local opening and closing

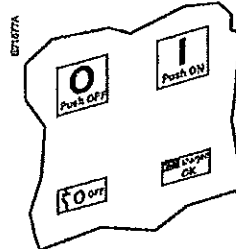
Device open (OFF),
discharged



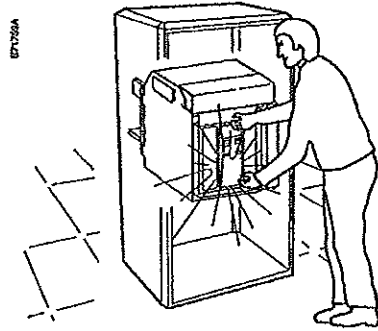
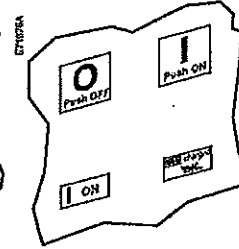
Device closed (ON),
discharged



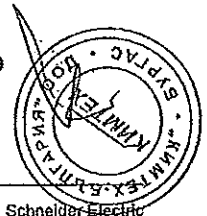
Device open (OFF),
charged



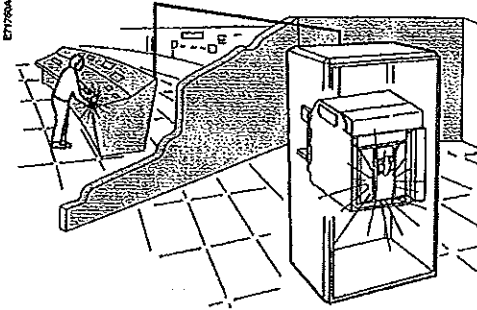
Device closed (ON),
charged



BRUNNEN
OPENTHATTA



Remote operated Compact Opening, closing, reset



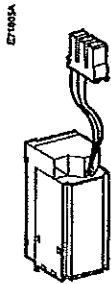
Remote opening

Use either:

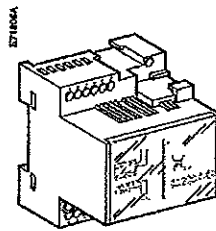
- an MX opening release
- an MN undervoltage release
- a delayed MN undervoltage release
- a motor mechanism.

When connected to the control panel, these releases may be used to remotely open the device.

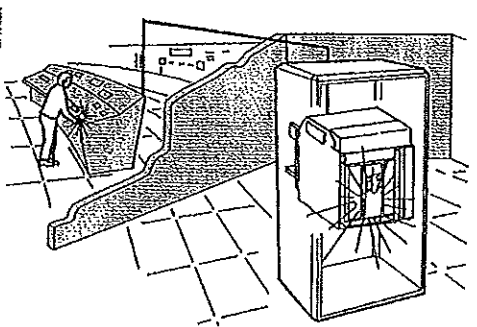
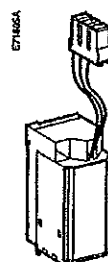
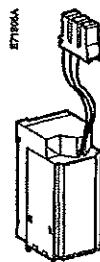
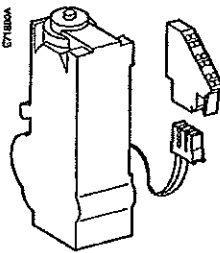
MX, MN



Delay unit

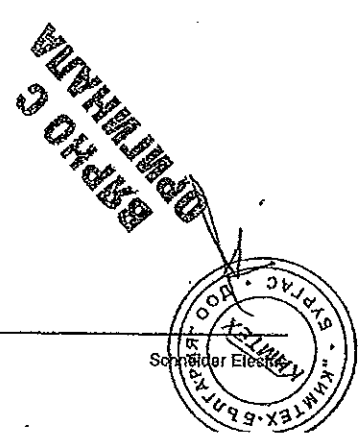
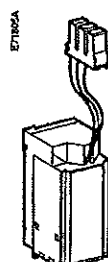
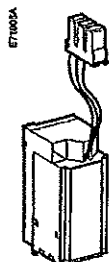
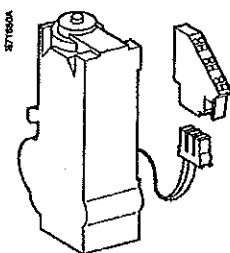


Motor mechanism

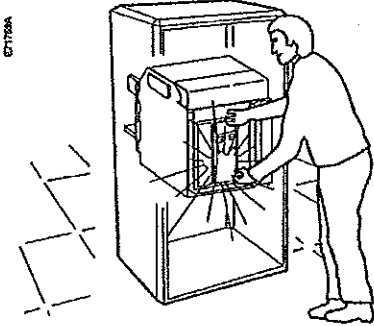


Remotely close

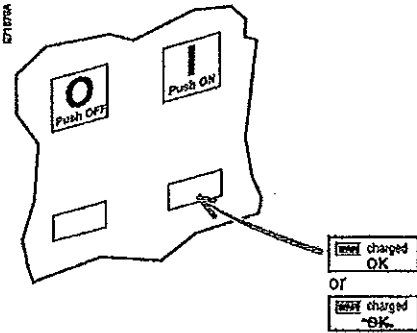
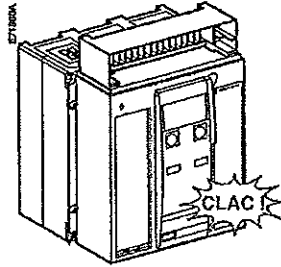
Motor mechanism



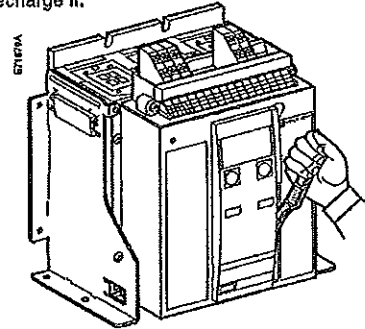
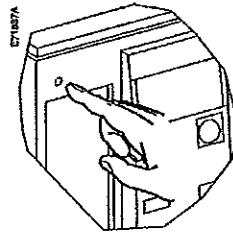
Manually recharge the device following a trip



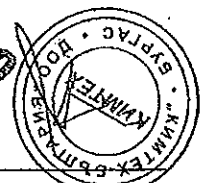
■ the device trips.



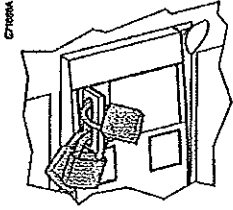
■ reset the device, then recharge it.



BRPAC C
OPMIMKATM



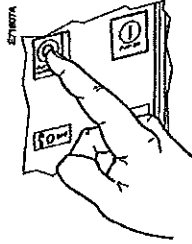
Remote operated Compact **Locking the controls** Disabling local or remote closing



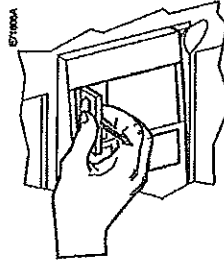
Locking the device using one to three padlocks (shackle diameter 5 to 8 mm)

■ lock.

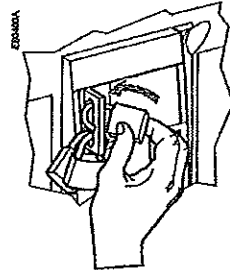
Open the device.



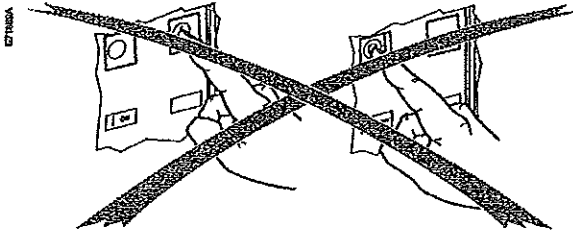
Pull out the tab.



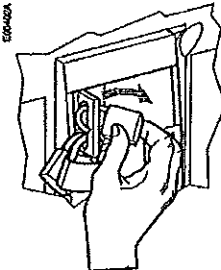
Install the padlock(s).



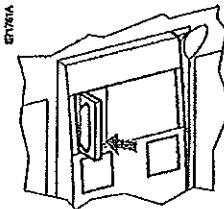
■ the controls are locked.



■ unlock.

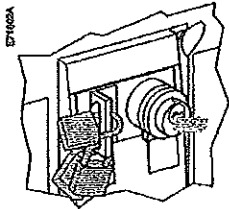


■ push in the tab.



Note:
Padlocks and keylocks may be used together.

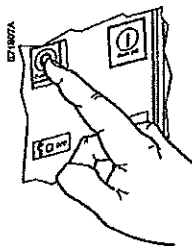




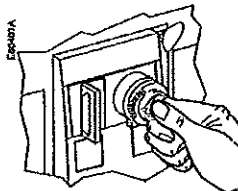
Padlocks and keylocks may be used together.
 Locking using padlocks is identical to the system on the previous page.

Locking the device using a keylock and/or one to three padlocks (shackle diameter 5 to 8 mm)

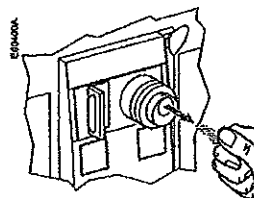
■ keylocking.
 Open the device.



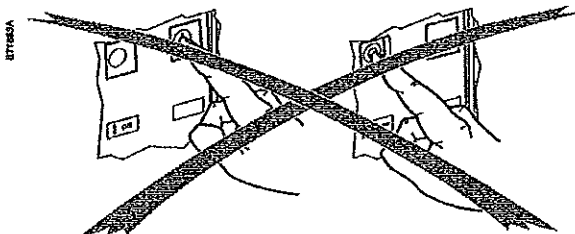
Turn the key.



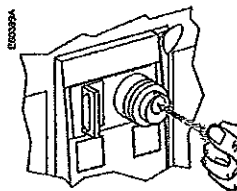
Remove the key.



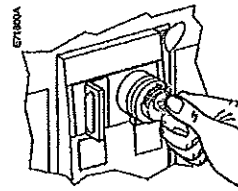
■ the controls are locked.



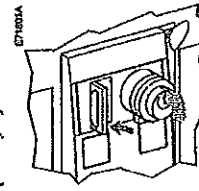
■ unlock.
 Insert the key.



Turn the key.

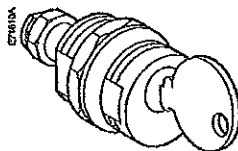


Push in the tab.

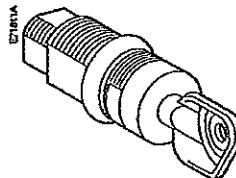


Two types of keylocks are available

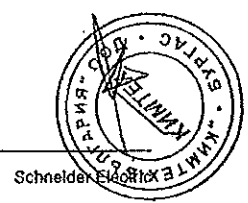
RONIS

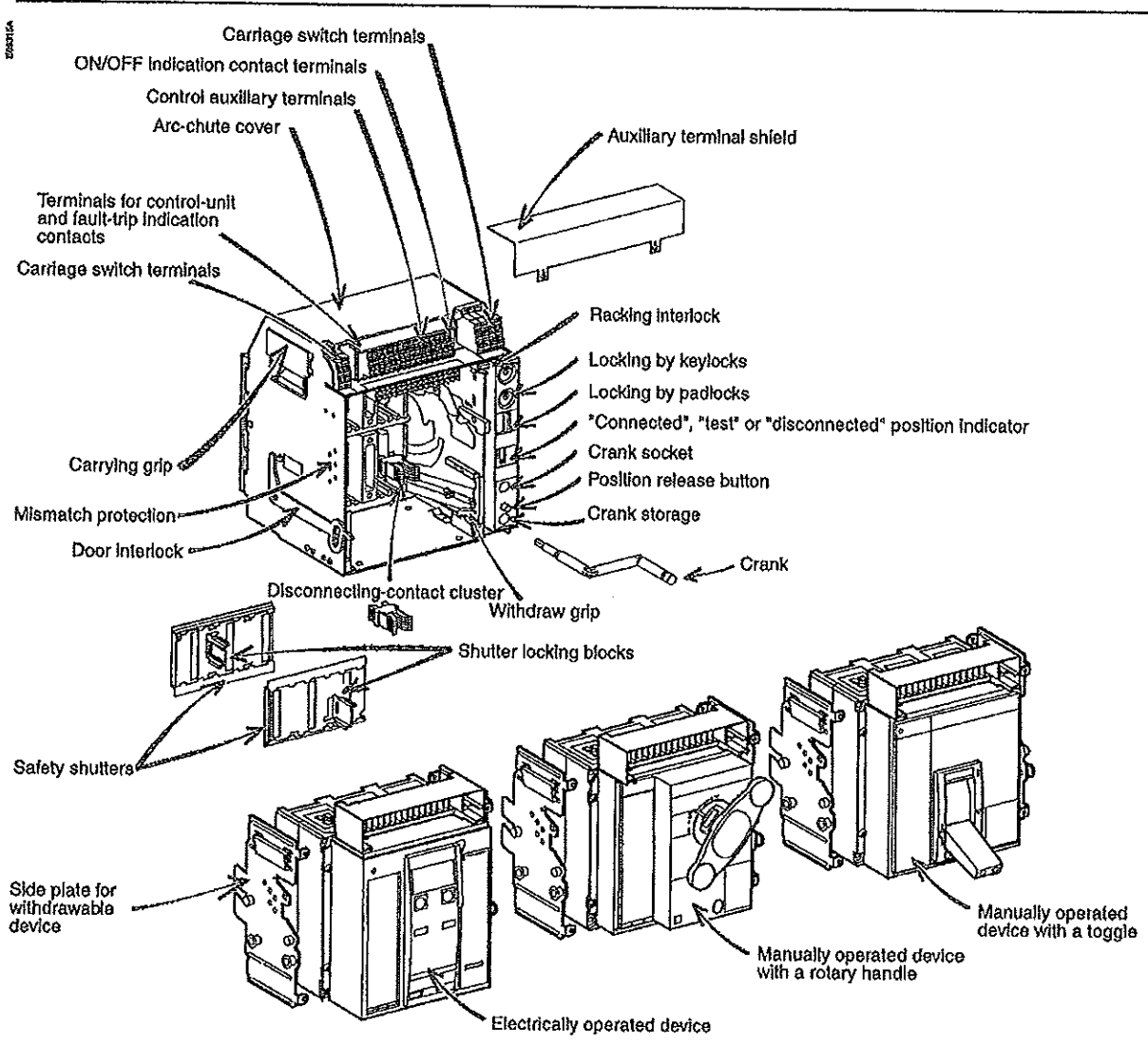


PROFALUX

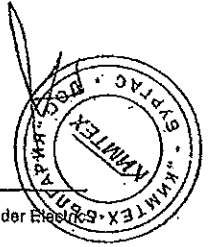


BRPFD C
 OPMTMATA





BRP/HD C
 @P/MT/HA/TA/IA

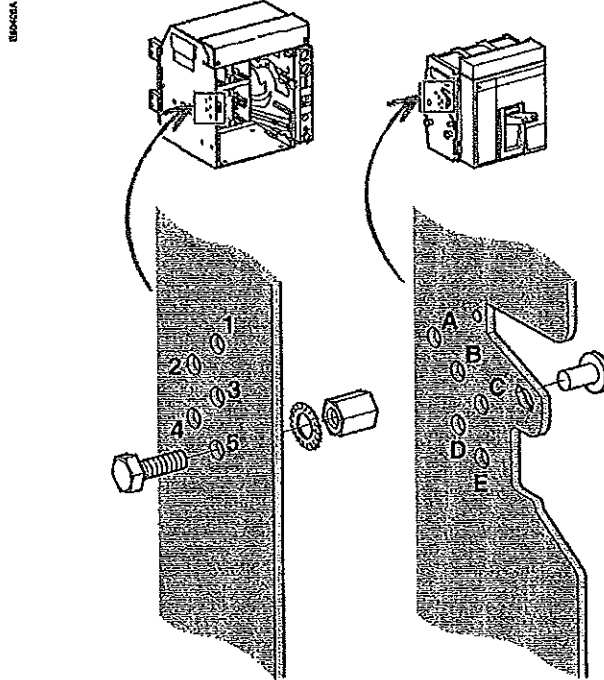






Matching a device with its chassis

To set up a mismatch-prevention combination for the device and the chassis, see the mismatch-prevention installation manual.

The mismatch protection ensures that a device is installed only in a chassis with compatible characteristics.

The possible combinations are listed below.



			
ABC	45	BCD	15
ABD	35	BCE	14
ABE	34	BC	145
AB	345	BDE	13
ACD	25	BD	135
ACE	24	BE	134
AC	245	CDE	12
ADE	23	CD	125
AD	235	CE	124
AE	234	DE	123



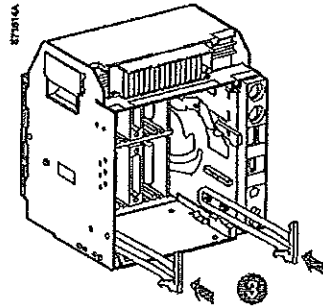
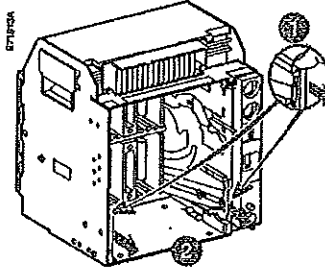
For complete information on Compact handling and mounting, see the installation manual(s).

Before mounting Compact NS, make sure it matches the chassis.

Removing the rails

Press the release tabs and pull the rails out.

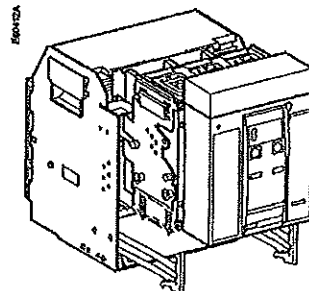
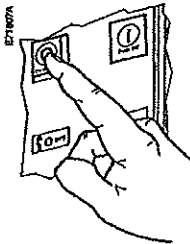
To put the rails back in, press the release tabs and push the rails in.



Inserting the device

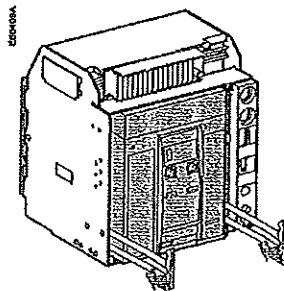
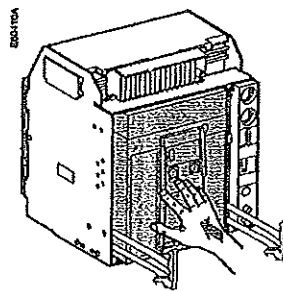
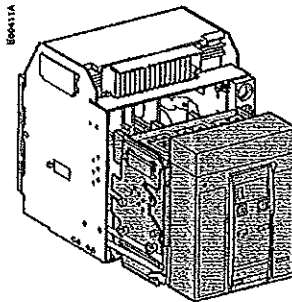
Open the circuit breaker (in any case, it opens automatically during connection).

Position the circuit breaker on the rails. Check that it rests on all four supports.

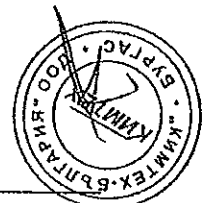


If you cannot insert the device in the chassis, check that the mismatch protection on the chassis corresponds to that on the device.

Push the device into the chassis, taking care not to push on the control unit.



ВРНО С
ОПРЕДЕЛЕНАТА

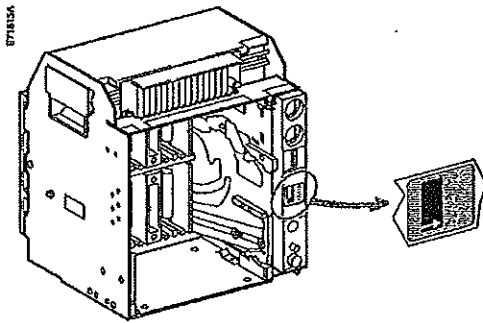


Racking

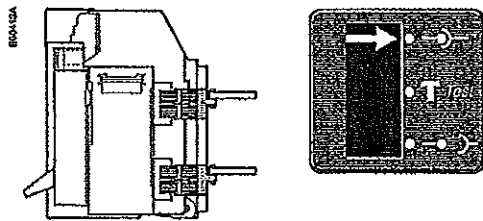
Prerequisites

To connect and disconnect the device, the crank must be used. The locking systems, padlocks and the racking interlock all inhibit use of the crank.

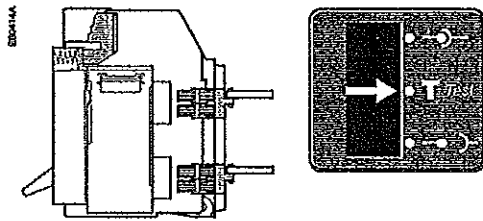
The indicator on the front signals the position of the circuit breaker in the chassis.



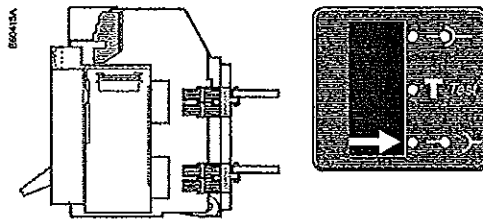
"connected" position



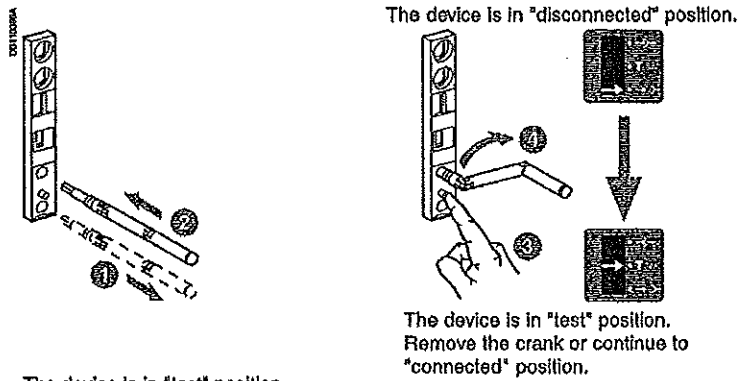
"test" position



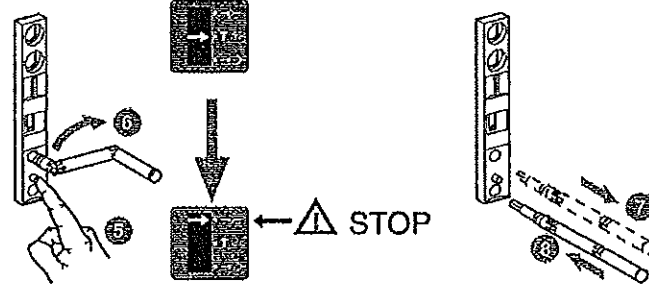
"disconnected" position



Racking the circuit breaker from the "disconnected" to "test" position, then to "connected" position

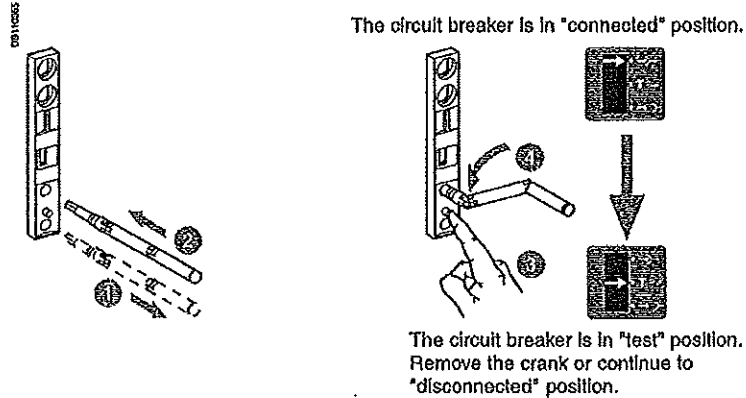


The device is in "test" position.

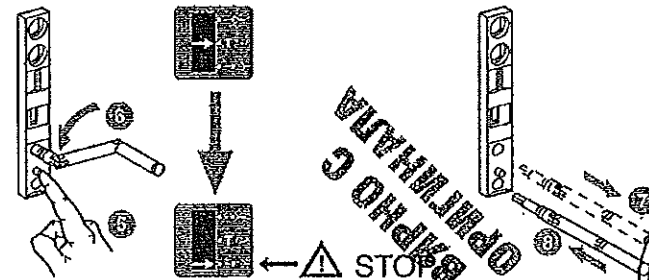


The device is in "connected" position.

Withdrawing the circuit breaker from the "connected" to "test" position, then to "disconnected" position

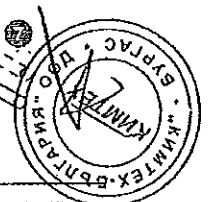


The circuit breaker is in "test" position.



The circuit breaker is in "disconnected" position.

Note: These operations require that all chassis-locking functions be disabled (see page 24).



Locking in the "disconnected" position

Using one to three padlocks

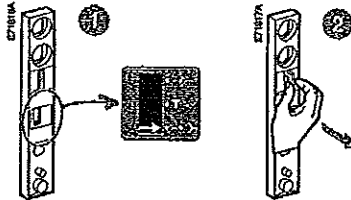
Combination of locking systems.
It is possible to lock the device on the chassis in the "disconnected" position using:

- one to three padlocks
- one or two keylocks
- a combination of both.

Locking

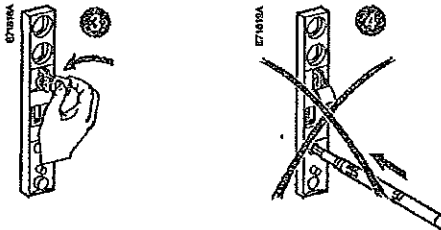
Use padlocks with a maximum shackle diameter of 5 to 8 millimetres.

Device in "disconnected" position. Pull out the tab.



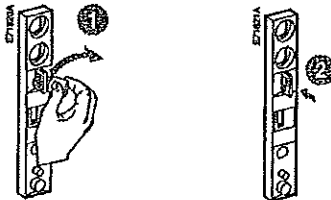
Insert the shackle (max. diameter 5 to 8 mm) of the padlock(s).

The crank cannot be inserted.

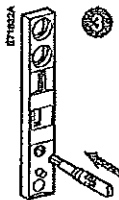


Unlocking

Remove the padlock(s). Release the tab.



The crank can be inserted.



Note:
Padlocks and keylocks may be used together.
If specified when ordering the chassis, this locking function may be adapted to operate in all positions ("connected", "test" and "disconnected"), instead of in "disconnected" position alone.

BRAND C OPHTELMO

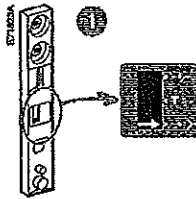


Using one or two keylocks

Locking

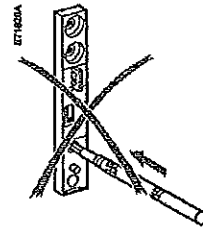
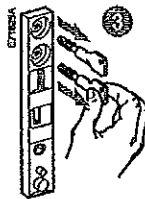
Device in "disconnected" position.

Turn the key(s).



Remove the key(s).

The crank cannot be inserted.

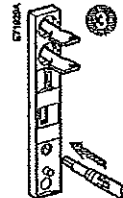
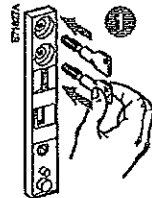


Unlocking

Insert the key(s).

Turn the key(s).

The crank can be inserted.

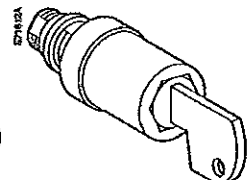
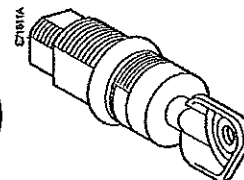
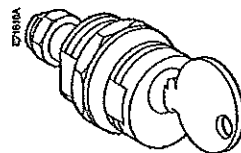


Three types of keylocks are available.

RONIS

PROFALUX

CASTELL

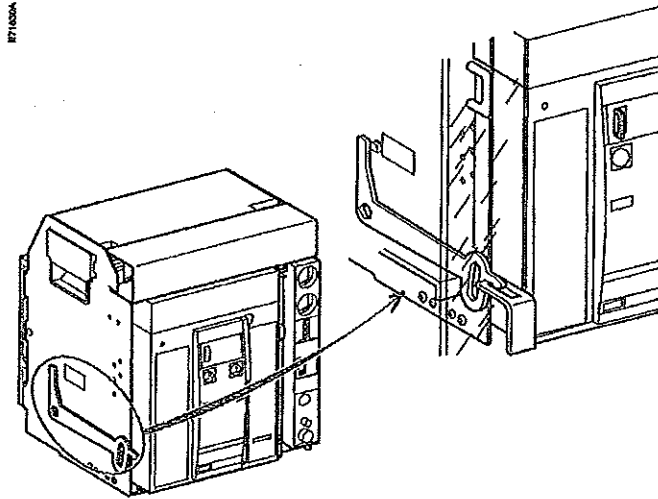


OPTIMAT
 BOARD C



Locking the switchboard door

The locking device is installed on the left or right-hand side of the chassis.
 ■ when the device is in "connected" or "test" position, the latch is lowered and the door is locked.
 ■ when the device is in "disconnected" position, the latch is raised and the door is unlocked.

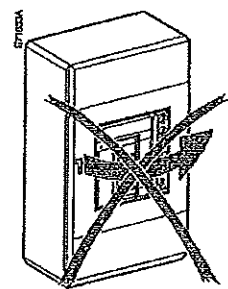
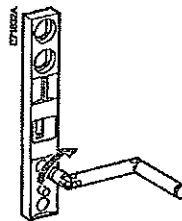
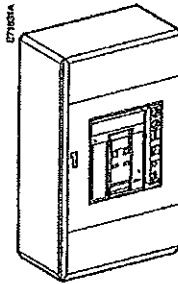


Disabling door opening

Close the door.

Turn the crank until the device is in "test" or "connected" position.

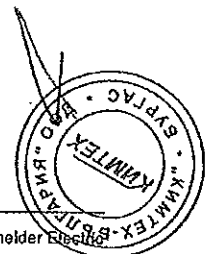
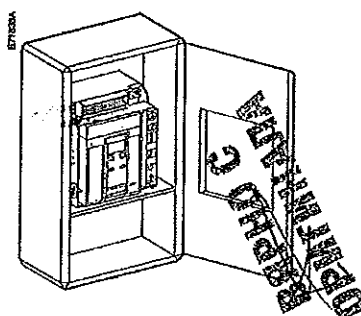
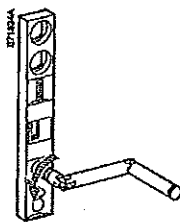
The door is locked.



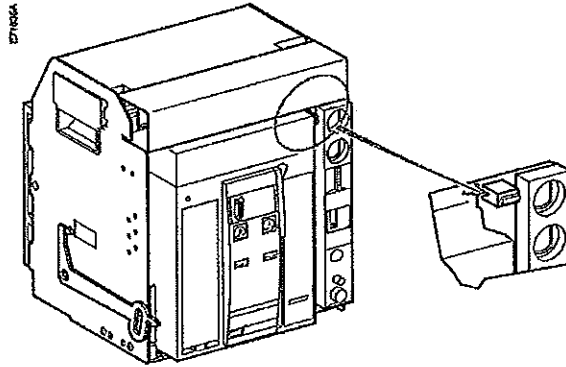
Enabling door opening

Turn the crank until the device is in "disconnected" position.

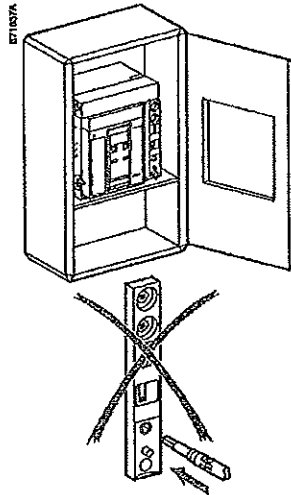
The door is unlocked.



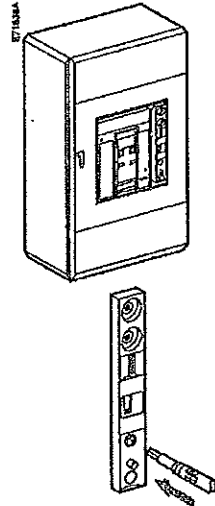
Locking the device when the door is open



When the door is open, the crank cannot be inserted.



When the door is closed, the crank can be inserted.



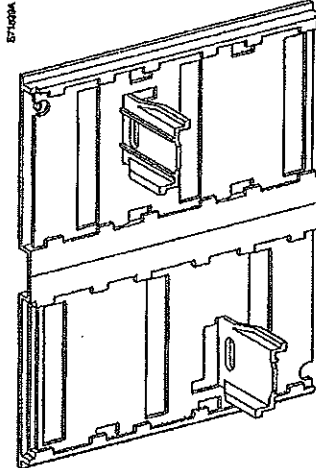
BRAND C
OPENTHATM



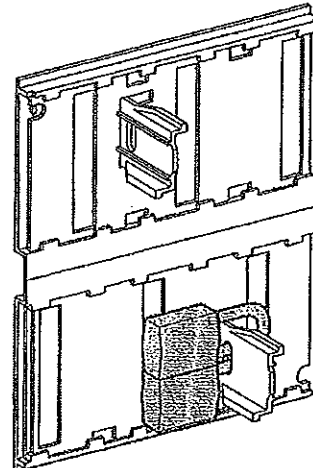
Locking the safety shutters

Four locking possibilities inside the chassis using one or two padlocks (maximum shackle diameter 5 to 8 mm) for each shutter

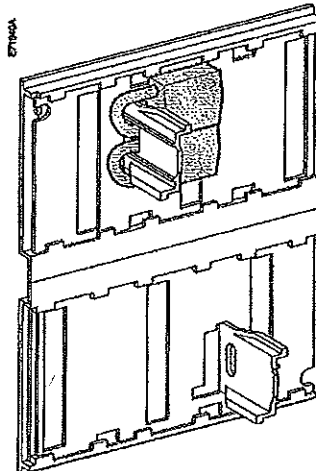
Top and bottom shutters not locked.



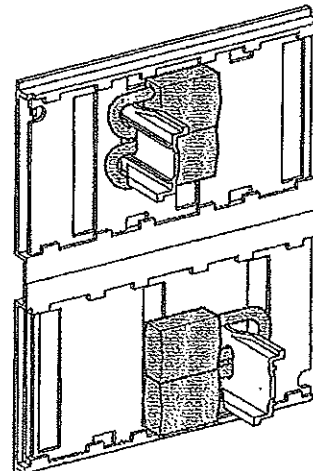
Top shutter not locked.
Bottom shutter locked.



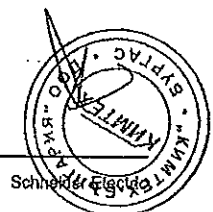
Top shutter locked.
Bottom shutter not locked.



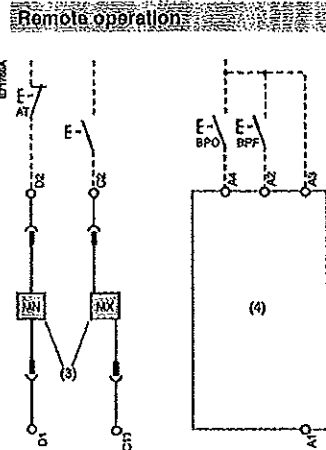
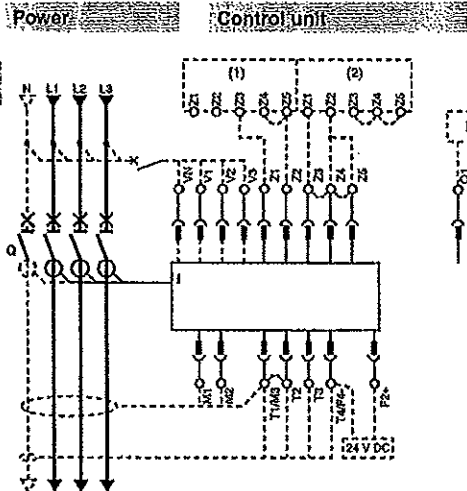
Top and bottom shutters locked.



OPREDELJENJE
BRNO 2



The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.



Control unit		UC1		UC2		UC3		M6C	
Com	E5 E8	Z5	M1	M2	M3	F2+		O3	
	E6 E4	Z3	Z4	T3	T4	VN		O2	
	E1 E2	Z1	Z2	T1	T2	F1-		O1	

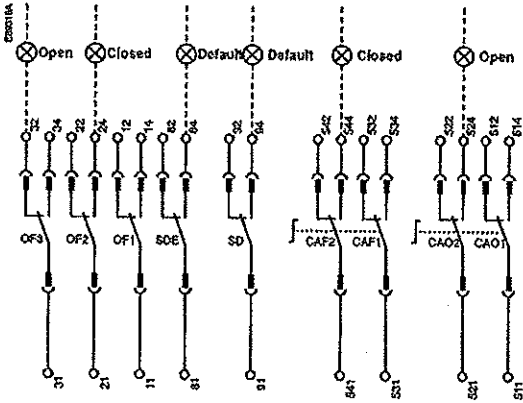
Remote operation		CAF2 / CAF1		SD	
	D2 / C12	A4	A2		
	D1 / C11		B4		
			A1		

A	P	Control unit	Remote operation
		Com: E1-E6 communication	SDE: Fault-trip indication contact (supplied as standard)
		UC1: Z1-Z5 zone selective interlocking; Z1 = ZSI = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (ground fault) M1 = Vigi module input (Micrologic 7)	SD: Trip-indication contact (supplied as standard)
		UC2: T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)	MN: Undervoltage release or MX: Shunt release (standard or communicating)
		UC3: F2+, F1- external 24 V DC power supply VN external voltage connector (must be connected to neutral with circuit breaker 3P)	
		M6C: 8 programmable contacts (must be connected to external relay M6C) ext. 24 V DC power supply required	

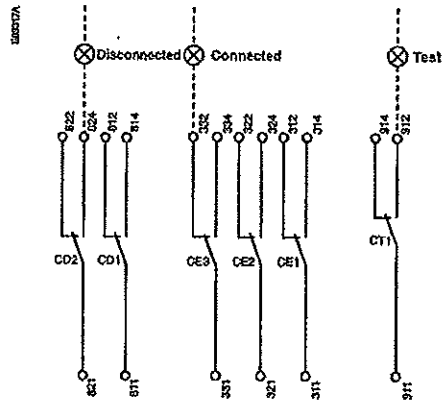
A: Digital ammeter
P: A + power meter + programmable protection



Indication contacts



Chassis contacts



Indication contacts

CAF1/CAF2	SDE	SD	CAO2	CAO1	OF3	OF2	OF1
544 534	84	94	544 514	514 34	24	14	
542 532	82	92	522 512	512 32	22	12	
542 531	81	91	521 511	511 31	21	11	

Chassis contacts




CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

OF3 / OF2 / OF1: ON/OFF indication contacts

Chassis contacts

CD2: Disconnected- CD1 position contacts
 CE3: Connected- CE2 position contacts
 CE1: Connected- CE1 contacts
 CT1: Test-position contacts

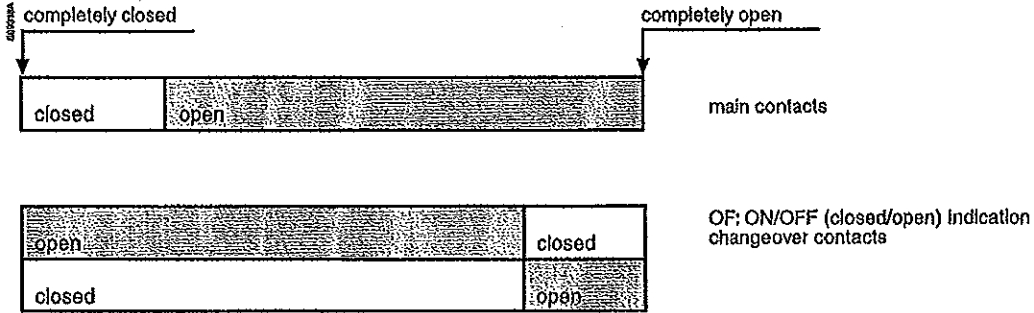
- Key:**
-  Withdrawable device only
 -  SDE1, OF1, OF2, OF3, OF4 supplied as standard
 -  Interconnected connections (only one wire per connection point)

BERNARDINI
 OPERATIONAL



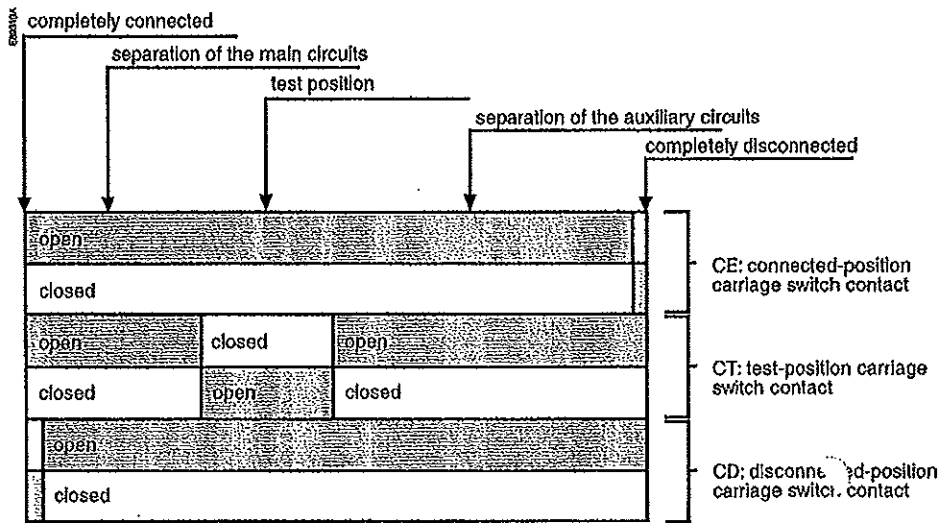
The ON/OFF indication contacts signal the status of the device main contacts.

Device



The carriage switches indicate the "connected", "test" and "disconnected" positions.

Chassis



Electrical characteristics of contacts and control auxiliaries

Device indication contacts								
designation	type	standard	minimum current 100 mA 24 V low level minimum current 2 mA 15 V		standard	minimum current 100 mA 24 V low level minimum current 2 mA 15 V		
OF ON/OFF contact	3 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
SD fault indication	1 changeover contact breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
SDE fault-trip indication for device with motor mechanism	1 changeover contact breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
CAO early-break switch for device with rotary handle	2 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
CAF early-make switch for device with rotary handle	2 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	
		V AC	240/380	6 A (rms)	V AC	24/48	5 A (rms)	
			480	6 A (rms)		240	5 A (rms)	
		V DC	24/48	2.5 A	V DC	24/48	5 / 2.5 A	
			125	0.5 A		125	0.5 A	

Device control auxiliaries				
designation	power supply	threshold	consumption	response time
MX opening release	V AC: 50/60 Hz: 24/48 - 100/130 - 200/250 - 277 - 380/480 V DC: 12 - 24/30 - 48/60 - 100/130 - 200/250	0.7 to 1.1 Un	pick-up: 200 VA or W (80 ms) hold: 4.5 VA or W	device at Un: 50 ms ± 10
MN undervoltage release	V AC: 50/60 Hz: 24/48 - 100/130 - 200/250 - 380/480 V DC: 24/30 - 48/60 - 100/130 - 200/250	open: 0.35 to 0.7 Un close: 0.85 Un	pick-up: 200 VA or W (80 ms) hold: 4.5 VA or W	device at Un: 40 ms ± 10
Delay unit for undervoltage release	V AC: 50/60 Hz V DC not adjustable: 100/130 - 200/250 V DC adjustable: 48/60 - 100/130 - 200/250 - 380/480	open: 0.35 to 0.7 Un close: 0.85 Un	200 VA	device at Un: not adjustable: 0.25 s adjustable: 0.5 - 0.9 - 1.5 - 3 s

Motor mechanism				
designation	power supply	threshold	consumption and motor overcurrent	recharge time and operating rate
Motor mechanism	V AC: 50/60 Hz: 48/60 - 100/130 - 200/240 - 277 - 400/440 - 480 V DC: 24/30 - 48/60 - 100/125 - 200/250	0.85 to 1.1 Un	consumption: 180 VA or W overcurrent: 2 to 3 In for 0.1 s	3 seconds max. 3 cycles per minute

"Connected", "test" and "disconnected" position carriage switches								
designation	type	standard	minimum current 100 mA 24 V low level minimum current 2 mA 15 V		standard	minimum current 100 mA 24 V low level minimum current 2 mA 15 V		
CE, CT, CD	3 changeover contacts breaking capacity (AC 12 / DC 12 as per 947-5-1)	V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	
		V AC	240	8 A (rms)	V AC	24/48	5 A (rms)	
			380	8 A (rms)		240	5 A (rms)	
		V DC	480	8 A (rms)	V DC	380	5 A (rms)	
			690	6 A (rms)		24/48	2.5 A	

ЗАПРЕЩА СЕ КОПИРА
 И РАСПРОСТРАНЯВА
 БЕЗ ПОЗВОЛЕНИЯ
 НА АВТОРИТЕТА



Electrical characteristics of contacts and control auxiliaries

Wiring of control auxiliaries

Under pick-up conditions, the level of consumption is approximately 150 to 200 VA. Consequently, for low supply voltages (12, 24, 48 V), cables must not exceed a maximum length determined by the supply voltage and the cross-section of the cables.

Indicative values for maximum cable lengths (In meters)

		12 V		24 V		48 V	
		2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²
MN	100% source voltage	—	—	58	36	280	165
	85% source voltage	—	—	16	10	76	45
MX-XF	100% source voltage	21	12	115	70	650	330
	85% source voltage	10	6	75	44	350	210

Note:

The indicated length is that for each of the two supply wires.

ОБЩЕСТВО С ОГРАНИЧЕННОЙ ОТВЕТСТВЕННОСТЬЮ
 «КМНБХ»



Start-up operations Procedure

These operations must be carried out before using a device for the first time.

A general check of the device takes only a few minutes and avoids any risk of mistakes due to errors or negligence.

A general check must be carried out:

- prior to initial use
- following an extended period during which the device is not used.

A check must be carried out with the entire switchboard de-energised. In switchboards with compartments, only those compartments that may be accessed by the operators must be de-energised.

Electrical tests

Insulation and dielectric-withstand tests must be carried out immediately after delivery of the switchboard. These tests are precisely defined by international standards and must be directed and carried out by a qualified expert.

Prior to running the tests, it is absolutely necessary to:

- disconnect all the electrical auxiliaries of the device (MCH, MX, MN)
 - remove the long-time rating plug on the 7.0 A control units.
- Removal of the rating plug disconnects the voltage measurement input.

Switchboard inspection

Check that the devices are installed in a clean environment, free of any installation scrap or items (tools, electrical wires, broken parts or shreds, metal objects, etc.).

Conformity with the installation diagram

Check that the devices conform with the installation diagram:

- breaking capacities indicated on the rating plates
- identification of the control unit (type, rating)
- presence of any optional functions (motor mechanism)
- protection settings (long time, short time, instantaneous, ground fault)
- identification of the protected circuit marked on the front of each device.

Condition of connections and auxiliaries

Check device mounting in the switchboard and the tightness of power connections. Check that all auxiliaries and accessories are correctly installed:

- electrical auxiliaries
- terminal blocks
- connections of auxiliary circuits.

Operation

Check the mechanical operation of the devices:

- opening of contacts
- closing of contacts.

Check on the control unit

Check the control unit of each circuit breaker using the respective user manuals.



БСРНО С
ОПРЕДЕЛЕНА

What to do when the circuit breaker trips?

Note the fault

Faults are signalled locally and remotely by the indicators and auxiliary contacts installed on devices (depending on each configuration). See page 32 in this manual and the user manual of the control unit for information on the fault indications available with your circuit breaker.

Identify the cause of tripping

A circuit must never be reclosed (locally or remotely) before the cause of the fault has been identified and cleared.

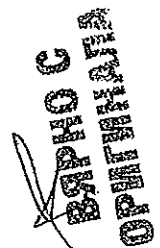
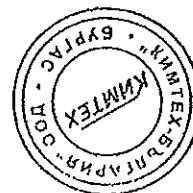
Depending on the type of fault and the criticality of the loads, a number of precautionary measures must be taken, in particular the insulation and dielectric tests on a part of or the entire installation. These checks and test must be directed and carried out by qualified personnel.

Inspect the circuit breaker following a short-circuit

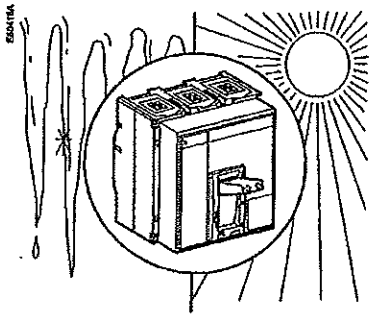
- check the tightness of connections (see the device installation manual)
- check the disconnecting-contact clusters.

Reset the circuit breaker

The circuit breaker can be reset locally or remotely. See pages 5, 9 and 15 in this manual for information on how the device can be reset.

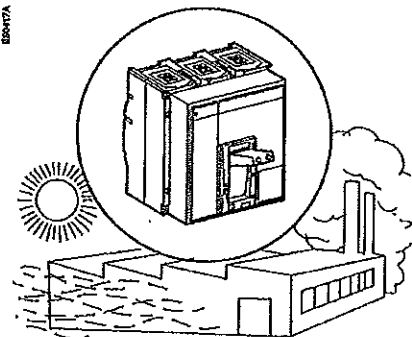


Compact operating conditions



Ambient temperature

- Compact devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5°C to $+70^{\circ}\text{C}$
 - circuit-breaker closing is guaranteed down to -35°C
 - Compact (without the control unit) can be stored in an ambient temperature of -40°C to $+85^{\circ}\text{C}$
 - the control unit can be stored in an ambient temperature of -25°C to $+85^{\circ}\text{C}$.



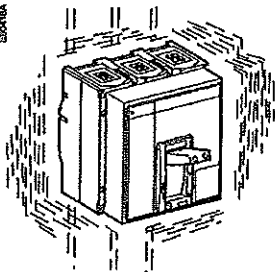
Extreme atmospheric conditions

Compact devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:

- IEC 68-2-1: dry cold at -55°C
- IEC 68-2-2: dry heat at $+85^{\circ}\text{C}$
- IEC 68-2-30: damp heat (temperature $+55^{\circ}\text{C}$, relative humidity 95%)
- IEC 68-2-52 level 2: salt mist.

Compact devices can operate in the industrial environments defined by standard IEC 947 (pollution degree up to 3).

It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.



Vibrations

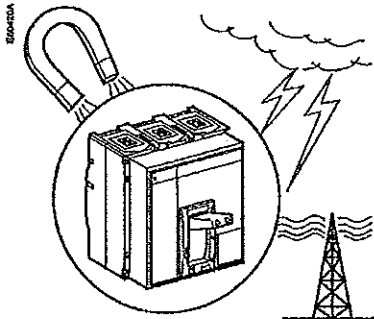
Compact devices resist electromagnetic or mechanical vibrations. Tests are carried out in compliance with standard IEC 68-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):

- 2 to 13.2 Hz: amplitude $\pm 1\text{ mm}$
- 13.2 to 100 Hz: constant acceleration 0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.

БРПНО С
ОПРЕДЕЛЕНА





Electromagnetic disturbances

Compact devices are protected against:

- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbance or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced by users.

Compact devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

- IEC 947-2, appendix F
- IEC 947-2, appendix B (trip units with earth-leakage function).

The above tests guarantee that:

- no nuisance tripping occurs
- tripping times are respected.

Cleaning

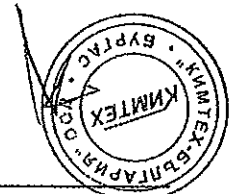
non-metallic parts:

never use solvent, soap or any other cleaning product. Clean with a dry cloth only

metal parts:

clean with a dry cloth whenever possible. If solvent, soap or any other cleaning product must be used, make sure that it does not come into contact with non-metallic parts.

ВРНО С
ОПШНО
КМТЕХ



**General Specification for Molded Case
Circuit Breakers from 630 to 1600 A**

Protective device for low voltage electrical installation

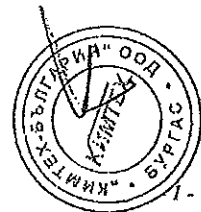


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1 General

The present specification applies to molded case circuit breakers (MCCB) from 630A to 1600A for AC (50/60Hz) low voltage electrical installation from 220V to 690V.

- MCCB shall be equipped with a trip unit that offers the appropriate level of protection performance to fit to the application. All trip units could be proposed with versions that provide measurement, and communication functions.
- MCCB shall be available in fixed or withdrawable versions as well as in 3-pole and 4-pole versions. For withdrawable versions, a safety trip shall provide advanced opening to prevent connection and disconnection of a closed circuit breaker
- Fixed and manual MCCBs shall be designed for both vertical, horizontal or flat mounting, without any adverse effect on electrical performance.
- For a MCCB rating frame given, MCCBs dimensions shall be the same whatever the ultimate breaking capacity.
- MCCB shall have a rated operational voltage (U_e) of 690 V, a rated insulation voltage (U_i) of 800V (AC 50/60 Hz) and a rated impulse voltage (U_{imp}) of 8kV.

2 Compliance with Standards

Reference	Title	Scope
EN /IEC 60947-1 & 2	Low-voltage Switchgear and controlgear Part 2 : Circuit Breaker	Characteristics of circuit-breakers; - operation and behaviour in normal service; - operation and behaviour in case of overload and operation and behaviour in case of short-circuit, including co-ordination in service (discrimination and back-up protection); - dielectric properties;
IEC 60947-2, annex B	Circuit Breaker incorporating residual current protection	
IEC 60947-2, annex F	Additional tests for circuit-breakers with electronic over-current protection	Electronic trip unit (rms current measurement, EMC)
IEC 60664-1	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	Category IV for a rated insulation voltage up to 690 V, class II insulation between the front and internal power circuits
IEC 61000-4-1	Electromagnetic compatibility (EMC) Testing and measurement techniques	EMC Immunity
IEC 61557-12	Combined performance measuring and monitoring devices for electrical parameters	Accuracy class
IEC 60068-2	Environmental testing	Climatic withstand

Versions complying with UL 489 shall also be available.

3 Circuit breaker design

3.1 Safety

For maximum safety,

- The power contacts shall be insulated in an enclosure made of a thermosetting material from other functions such as the operating mechanism, the case, the trip unit and auxiliaries
- The molded case circuit breakers shall provide double insulation of the front face to allow on-site installation of auxiliaries without de-energising the installation. All electrical auxiliaries and accessories such as voltage releases, (shunt or undervoltage type) and auxiliary contacts shall be designed for easy on-site installation.
- The operating mechanism of the molded case circuit breakers shall be of the fast make and fast break type. Tripping on a fault shall be mechanically independent of the operating handle. The operating mechanism shall be designed to operate all poles of the circuit breaker simultaneously for making, breaking and tripping.
- If required, the circuit breaker shall be equipped with a rotary handle.
- The operating mechanism shall be designed in such a way that the position of the operating handle of the circuit breaker indicates the real position of the main contacts, even if the circuit breaker is equipped with a rotary handle.
- In order to ensure suitability for isolation complying with IEC 60947-2 § 7-27: The operating mechanism shall be designed such that the handle can only be in OFF position (O) if the power contacts are all actually separated, in OFF position, the handle shall indicate the isolation position.
- MCCBs shall be able to receive a device for locking in the "isolated" position, with up to 3 padlocks, Ø8 maximum or keylock (for rotary handle).
- MCCBs shall be designed to prevent access to live parts when the cover is removed
- MCCBs shall be equipped with a "push to trip" button in front to test operation and the opening of the poles.
- MCCB rating, "push to trip" button, performances and contact position indication must be clearly visible and accessible from the front, through the front panel or the door of the switchboard.
- In electronic trip units, protection functions shall be electronically managed independently of measurement and communication function by a dedicated ASIC.

3.2 Breaking capacity, Current limitation, discrimination, durability

- The molded case circuit breakers (except for current-limiting circuit breakers) shall belong to category B as defined in IEC60947-1. Certificates attesting to compliance with these rules shall be established taking into account the following performance levels for the test sequences: service breaking capacity (Ics) equal to at least 50% of the rated ultimate breaking capacity (Icu) and a rated short-time withstand current (Icw) of 25 kA / 0.5 s (except for current-limiting circuit breakers)
- If required current limiting circuit breakers shall be available.
- The rated ultimate breaking capacity (Icu) of each molded case circuit breaker shall be equal to at least the value of the short-circuit current (Isc) at the point of installation on the electric circuit, unless the upstream circuit breaker makes it possible to ensure coordination (as defined in Appendix A of IEC 60947-2); in this case, the coordination between the two circuit breakers shall be confirmed by manufacturer.
- MCCB's manufacturer shall provide selectivity and coordination tables with other devices such as other MCCBs, ACB, switches and contactors.

3.3 Auxiliaries and accessories

- The operating mechanism shall be of the stored-energy type only
- The addition of a motor mechanism or a rotary handle shall in no way affect circuit breaker characteristics:
 - o Only three stable tripping mechanism positions (ON, OFF and TRIPPED) shall be possible with the motor mechanism,
 - o Suitability for isolation shall be provided by positive contact indication (ON and OFF) in front of the motor mechanism module
- MCCBs shall be designed to enable safe on-site installation of auxiliaries such as voltage releases (shunt and undervoltage releases) and indication switches as follows:
 - o same field installable auxiliary contacts for signalling different functions, as: open/ closed position, fault signal, electrical fault (including electrical leakage) signal, all auxiliaries shall be common for the entire range,
 - o they shall be separated from power circuits,
 - o all electrical auxiliaries shall be of the snap-in type and fitted with terminal blocks,
 - o Auxiliary function and terminals shall be permanently engraved on the case of the circuit breaker and the auxiliary itself,
- The trip units shall not increase overall circuit breaker dimensions

3.3.1 Remote operation

- Coils:
 - o Manually operated circuit breaker could be equipped with one shunt opening release or one undervoltage opening release.
 - o Electrically operated circuit breaker could be equipped with one shunt opening release or one undervoltage opening release in addition to opening and closing order.
 - o Coils shall be designed for continuous-duty.
 - o Voltage release auxiliary power supply:
 - AC: 24 48 100/130 200/250 277 380/480 VAC
 - DC 12 24/30 48/60 100/130 200/250 VDC
 - o Opening time with shunt opening release 50ms +/- 10ms
 - o Electrical closing time 60ms +/- 10ms
- Electric motor for spring charge
 - o Motor auxiliary power supply:
 - AC: 24 48 100/130 200/250 277 380/415 VAC
 - DC 12 24/30 48/60 100/130 200/250 VDC
 - o Charging time: <=4sec
 - o Operating frequency <=3 cycle / min.
- Electrically operated MCCB shall be equipped with anti pumping function: If opening and closing orders occur simultaneously, the circuit breaker shall remain in the open position.

4 Protections requirements

4.1 General

- The high-current molded case circuit breakers shall be available in 3-pole or 4-pole (neutral protection) versions. On 4-pole circuit breakers, a 3-position switch shall be provided to set neutral protection to any of the following levels: unprotected neutral (4P3D), half-protected neutral (4P3D+N/2) or fully protected neutral (4P4D).
- The trip units shall not augment overall circuit breaker dimensions
- Trip unit shall be easily interchangeable and easily secured to the MCCB without removing the breaker from the panel
- All electronic components shall withstand temperatures up to 105 °C.
- Electronic and thermal-magnetic trip units shall be adjustable and it shall be possible to fit lead seals to prevent unauthorised access to the settings
- Protection settings shall apply to all circuit breaker poles
- It shall be possible to adjust protections with a knob without any power supply or when the main is off
- Electronic trip unit shall be fitted with thermal memory
- It shall be possible to equip MCCBs with an auxiliary contact signaling an electrical fault operated by the trip unit.
- The following monitoring functions shall be integral parts of electronic trip units:
 - o 1 LED for load indication lighted above 105 % of Ir
 - o a test connector shall be installed for checks on electronic and tripping mechanism operation using an external device.

4.2 Trip unit protection functions

4.2.1 Basic protection (LI) with or without energy measurement

These trip units shall offer

- Long time protection
 - Adjustable Ir threshold settings from 40% to 100 % of the trip unit rating
 - Adjustable tr time delay
- Instantaneous protection
 - Adjustable Isd threshold settings from 1.5xIr to 10xIr

4.2.2 Selective protection (LSI) with or without energy measurement

These trip units shall offer

- Long time protection
 - Adjustable Ir threshold settings from 40% to 100 % of the trip unit rating
 - Adjustable tr time delay
- Short time protection

- Adjustable I_{sd} threshold settings from $1.5xI_r$ to $10xI_r$
- Adjustable t_{sd} time delay
- Instantaneous protection
 - Adjustable I_i threshold settings from $2xI_n$ to $15xI_n$ with an OFF position

4.2.3 Selective protection & Ground fault or Earth leakage protection (LSIG) with or without energy measurement

These trip units shall offer

- Long time protection
 - Adjustable I_r threshold settings from 40% to 100 % of the trip unit rating
 - Adjustable t_r time delay
- Short time protection
 - Adjustable I_{sd} threshold settings from $1.5xI_r$ to $10xI_r$
 - Adjustable t_{sd} time delay
- Instantaneous protection
 - Adjustable I_i threshold settings from $2xI_n$ to $15xI_n$ with an OFF position
- Ground fault protection (GF) Or Earth leakage protection (Vigi)
 - Adjustable I_g threshold settings Adjustable I_{en} threshold settings
 - Adjustable t_g time delay Adjustable t_{en} time delay

4.2.4 Advanced protection trip unit

In addition to the previous protection functions trip units with Under/Over Voltage, Under/Over Frequency and Reverse Power protection could be proposed.

4.3 Trip unit measurement function

If required by the application, the trip unit shall offer measurement (including energy) without additional module whatever the protection type (LI, LSI, LSIG). Available measurements shall be:

- Currents
- Demand Current, Maxim Demand Current
- Voltage, active power, reactive power, power factor,
- Demand Power, Maxim Demand Power
- Energy
- Accuracies of the entire measurement system, including the sensors: shall be
 - Current: 1,5%
 - Voltage: 0.5 %
 - Power and energy: 2%
- Rogowski current transformers shall be used to ensure accurate measurements from low current up to high currents
- For safety reason, protection functions shall be electronically managed independently of measurement function by a dedicated ASIC.
- The measurements shall be displayed on the breaker itself and on a remote system via Modbus communication. In addition to these solutions it shall be possible to connect a remote display.

5 Operating & Maintenance

5.1 Operating assistance function

- Electronic trip units with measurement and communication capability shall offer operating assistance function:
 - o trips history (Fault type, date and time)
 - o Pre-alarm
 - o Trip and pre-alarm could activate relay output(s)
- Theses functions and indicators shall be available on the display, by communication or setting PC tool.

5.2 Maintenance indicators

Electronic trip units with measurement and communication capability shall offer maintenance indicators:

- Operation and trip counters,
- Operating hours counter,
- Load profile
- Theses functions and indicators shall be available by communication or setting PC tool.

5.3 Commissioning and operating tool

- A test connector shall be installed for checks on electronic and tripping mechanism operation using an external dedicated tool
- A software tool available for all electronic trip unit shall be provided:
 - To visualize and configure trip unit parameters
 - To create and save setting files
 - To display tripping curve
 - To set time and date
 - To display tripping and alarms histories

5.4 Alarms (Advanced protection trip units)

- User shall be able to activate alarms based on measurement (I, U, F, Q, Idemand, Pdemand.)
- Alarms shall be time stamped
- Alarms could activate up to 6 relay output(s)
- These functions and indicators shall be available by display and/or communication and/or setting PC tool.

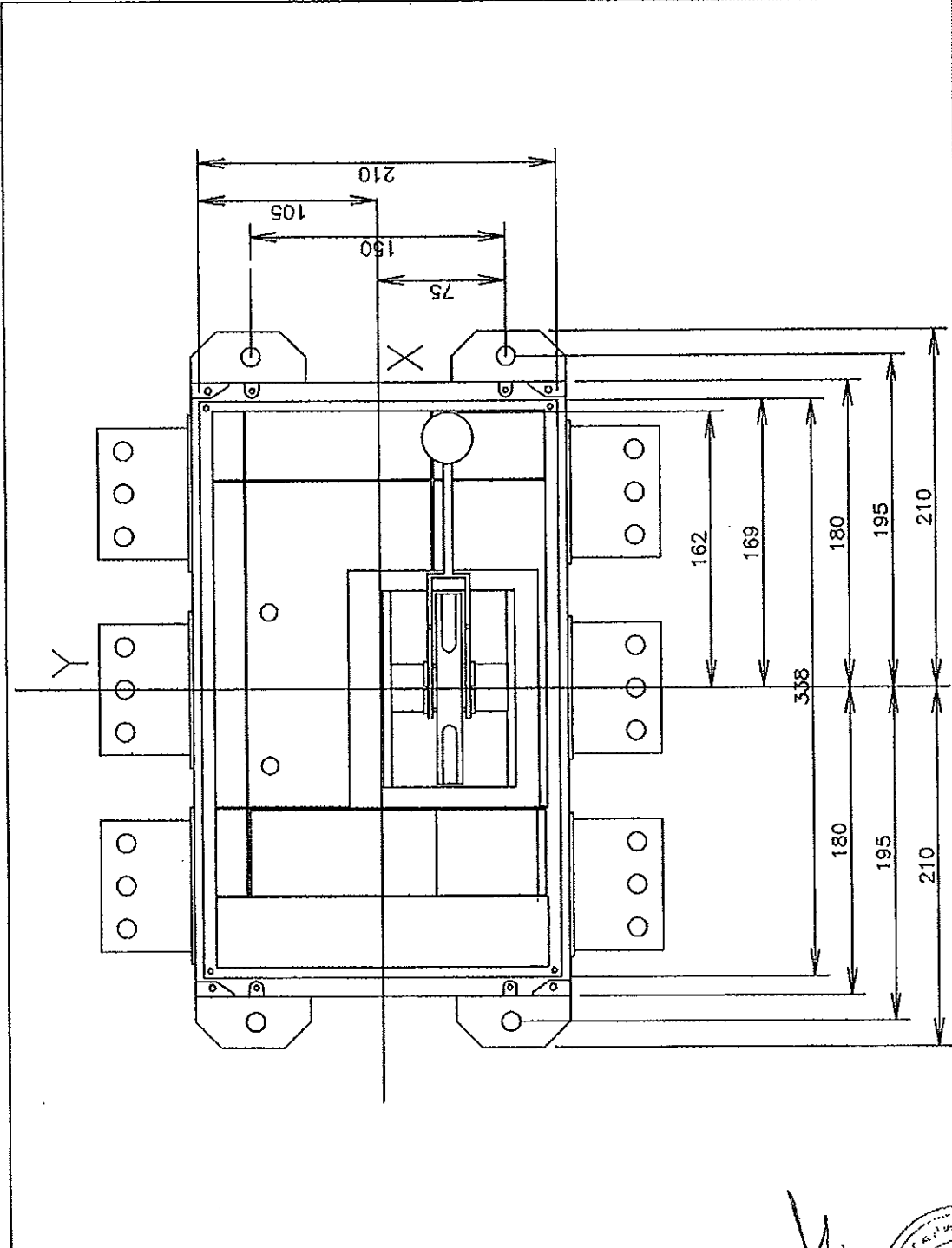
6 Communication

ACB shall be equipped easily with MODBUS communication.

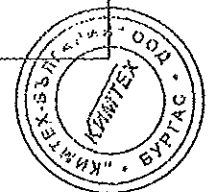
- Whatever the trip unit is:
 - the following information shall be accessible:
 - Open / Close position / fault-trip indication (SDE) / Ready to close/ Position in the Chassis (Withdrawable version).
 - the following commands shall be possible
 - open / close.
- When trip units with measurement functions are used the following information shall be accessible:
 - instantaneous and demand values, maximeters/minimeters, energy, Current demand and power demand.
 - timestamp trip and alarm histories and event table.
 - Maintenance indicators.

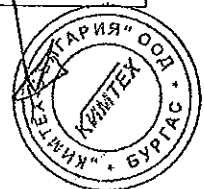
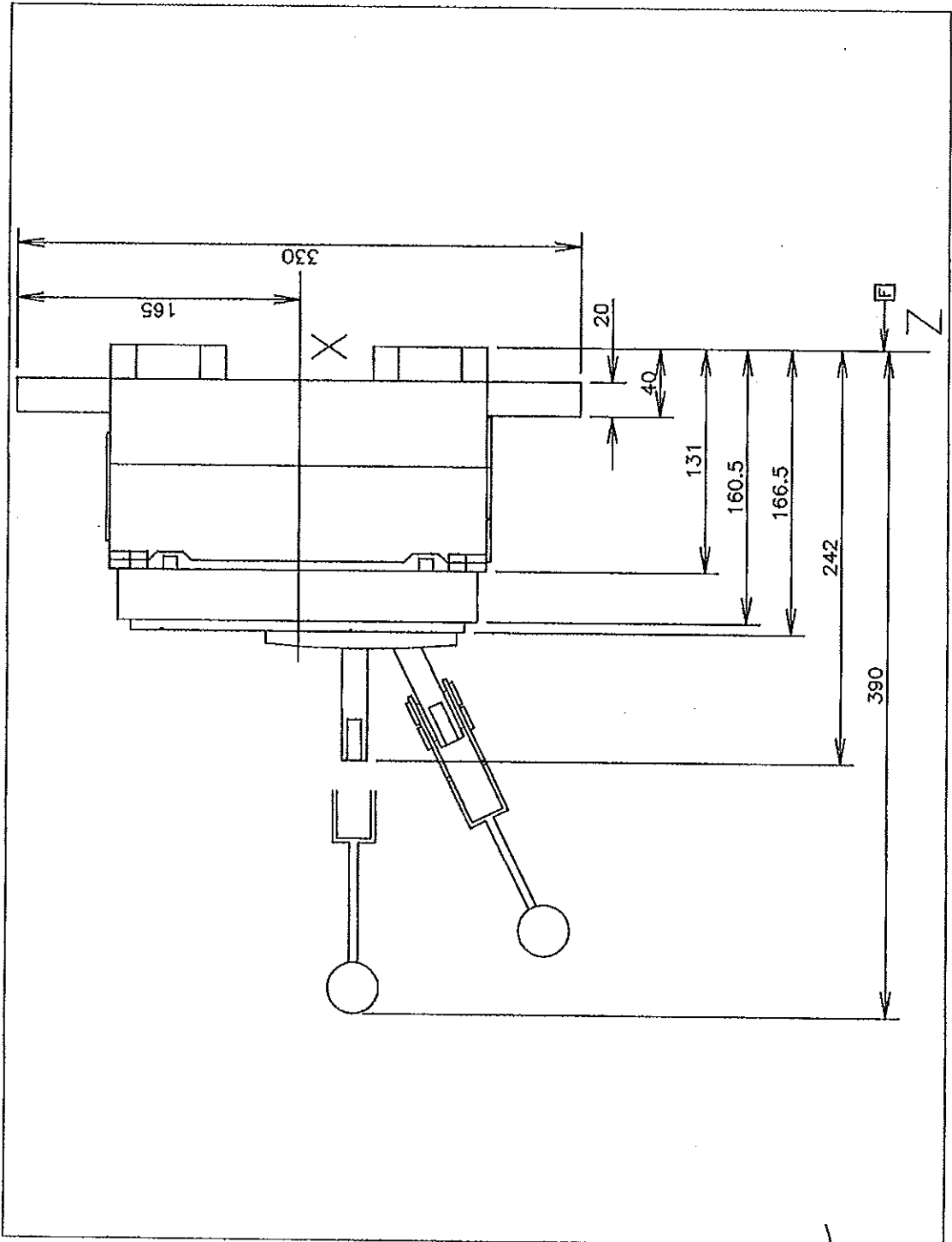
7 Environment

- Production site organisation shall be non polluting and certified to comply with ISO 9002 and ISO 14001 standards.
- MCCBs shall be designed according to Eco-design complying with ISO 14062 Especially MCCB's materials shall be of halogen free type
- MCCB shall be designed for easy disassembly and recycling at end of life, and complies with environmental directives RoHS and WEEE.
- The manufacturer shall provide product environmental profile of the MCCB
- The manufacturer shall provide instructions on the removal, dismantling and processing of circuit-breaker materials at the end of service life.



Handwritten signature or mark.







TRANSLATION AGENCY

50 Hristo Smirnenki Blvd.
1164, Sofia, Bulgaria

T +359 2 9804090
F +359 2 9817160
office@greg-bg.com
www.greg-bg.com

Превод от английски език

Фирмена бланка на ASEFA

Сертификат за съответствие № 147-05BT

Издаден на: ШНАЙДЕР ЕЛЕКТРИК ИНДЪСТРИС САС
бул. „Франклин Рузвелт“ № 89
92500 РУЕЛ МАЛМЕЗОН
ФРАНЦИЯ

за апарата: неподвижен триполюсен или четириполюсен прекъсвач за ниско напрежение
референция: Comrast NS 630b H, 800 H, 1000 H, 1250 H, 1600 H, с електронен
изключвател, (MICROLOGIC 2.0, 5.0, 6.0, 7.0, типове A, P и H)

производител: ШНАЙДЕР ЕЛЕКТРИК СА
търговска марка: МЕРЛИН ГЕРИН

съгласно стандарт(и):
IEC 60947-2 (2003-04) ed. 3, раздел II, ал. 8.3.4 и раздел III, ал. 8.3.5

Номинални характеристики:

Работен ток (I_e) : 630 A до 1600 A
Работно напрежение (U_e) : 220 V променлив ток до 690 V пром. ток
Честота : 50 Hz - 60 Hz
Напрежение по изолацията (U_i) : 800 V
Издържано от изолацията импулсно напрежение (U_{imp}): 8 kV

Експлоатационни и пределни мощности при изключване на прекъсвача:

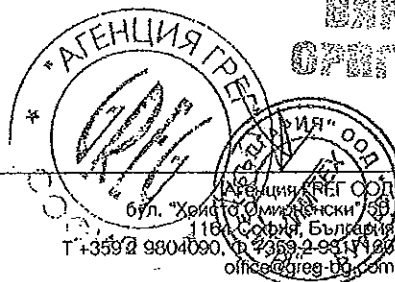
U_e (V)	I_{cu} (kA)	$I_{cs75\%}$ (kA) за $I_n=630$ a / 1250 A	$I_{cs50\%}$ (kA) за $I_n = 1600$ A
220/240, 380/415	70	52.5	35
440	65	48.75	32.5
500/525	50	37.5	25
660/690	42	31.5	21

Категория на използване : B
Еталонна температура : 40° C
Приспособление за изолация : да
Експлоатация : непрекъсната

Свързан документ(и):
Протокол(и) от изпитване: F01.04.19, F01.04.20

GREG Agency Ltd.
50 "Hristo Smirnenki" Blvd.
1164 Sofia, Bulgaria
T +359 2 9804090, F +359 2 9817160
office@greg-bg.com

www.greg-bg.com





Certificat de conformité / certificate of conformity n° 147-058T

délivré à / issued to : SCHNEIDER ELECTRIC INDUSTRIES SAS
89 boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / for the apparatus : Disjoncteur basse tension tripolaire ou tétrapolaire,
fixe / Low-voltage fixed three- or four-pole circuit-breaker

référence / reference : Compact NS 630b H, 800 H, 1000 H, 1250 H, 1600 H, avec déclencheur électronique/
with electronic trip unit, (MICROLOGIC 2.0, 5.0, 6.0, 7.0, types A, P et/and H)

constructeur / manufacturer : SCHNEIDER ELECTRIC SA
marque commerciale / trademark : MERLIN GERIN

selon le(s) référentiel(s) / according to standard(s) :
CEI/IEC 60947-2 (2003-04) ed.3, sequence II, § 8.3.4 et/and sequence III, § 8.3.5

caractéristiques assignées / rated characteristics :

Courant d'emploi / Operational current, (I_e) : 630 A à/up to 1600 A
Tension d'emploi / Operational voltage, (U_e) : 220 Vac à/up to 690 Vac
Fréquence / Frequency : 50 Hz - 60 Hz
Tension d'isolement / Insulation voltage, (U_i) : 800 V
Tension de tenue aux chocs / Impulse withstand voltage, (U_{imp}) : 8 kV

Pouvoirs de coupure de service et ultime en court-circuit / Service and ultimate short-circuit breaking capacities.

U _e (V)	I _{cu} (kA)	I _{cs} (kA) pour / for I _n =320 à / 1250 A	I _{cs} (kA) pour / for I _n =1600 A
220/240, 380/415	70	52,5	35
440	65	48,75	32,5
500/525	50	37,5	25
660/690	42	31,5	21

Catégorie d'utilisation / Utilization category : B
Température de référence / Reference temperature : 40°C
Appareil apte au sectionnement / Device suitable for isolation : oui / yes
Service / Duty : ininterrompu / uninterrupted

document(s) pris en compte(s) / relevant document(s) :

Rapport (s) d'essai / Test report (s) : F01.04.19, F01.04.20

Ce certificat ne s'applique qu'à l'échantillon soumis à l'essai de type / This certificate applies only to the sample submitted to the type test.

Fontenay-aux-Roses,
Le / on : 2005-12-22

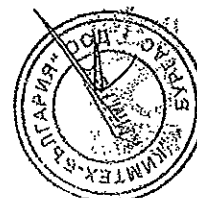
Le Président de l'ASEFA / The chairman of ASEFA,

M. BRENON

La reproduction de ce certificat de conformité n'est autorisée que sous la forme de fac-similé photographique fidèle / The certificate of conformity shall only be reproduced in the form of a complete photographic fac-simile
Certificat de conformité CEI version C / Certificate of conformity CEI version C

13, av du général Leclerc
72000 Fontenay-aux-Roses - FRANCE
tél 01 40 95 03 34
fax 01 40 95 03 16
e-mail : asefa@eclie.fr

DAFNB C
OPTEKALIA



reproduction
n° 5-0017
entée
communiquée
sur demande

Test platform accredited
Under the Nr F01 by :



File nr : 31042

RECORD OF PROVING TEST n° : F01.04.20

Issued to : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
F-92500 RUEIL-MALMAISON FRANCE

Apparatus tested : Low-voltage circuit-breaker

reference : Compact NS-630b-H , 1600-H
with trip unit MICROLOGIC 5.0A

manufacturer : SCHNEIDER ELECTRIC SA
Trademark : MERLIN GERIN

Purpose of the test : Test at the rated ultimate (Icu) short-circuit breaking capacity
according to the IEC 60947-2 ed.3 (04/2003) seq.III §8.3.5

Rated characteristics :

Operational Voltage	220V to 690V
Rated current	630A to 1600A
Rated ultimate short circuit breaking capacity	220-240V / 70kA 380-415V / 70kA 440V / 65kA 500-525V / 50kA 660-690V / 42kA

Date or period of test : November 18th 2004 to January 14th 2005

This record of proving test comprises : 68 page(s) + 30 appendice(s)

The results obtained during tests entered in this record of proving test justify the rated characteristics assigned by the Manufacturer as stated above.

Date of issue : August 19th 2005

The technical responsible ,

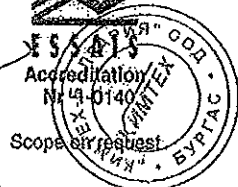
Name : E. FERNANDEZ

Signature

*This document results from tests carried out on a sample. It does not prejudice the compliance of the whole manufactured products with the tested specimen.
This record of proving test shall only be reproduced in the complete form.
COFRAC accreditation is an attestation of the laboratory technical competence within the field of test covered by the accreditation.*

Test performed by ; VOLTA LABORATORY - SCHNEIDER ELECTRIC
2 rue Volta 38050 GRENOBLE Cedex 09

COFRAC
Accreditation
N° 4-0140
Scope on request



Description and characterization of the test object

Characteristics

Type of circuit-breaker:	Compact NS 630bH , 1600 H
Number of poles	4
Kind of current	a.c.
Number of phases	3
Rated frequency	50/60 Hz
Utilization category	B
Reference temperature	40 °C
Suitability for isolation	yes

Rated and limiting values: (according to test volume)

Main circuit:

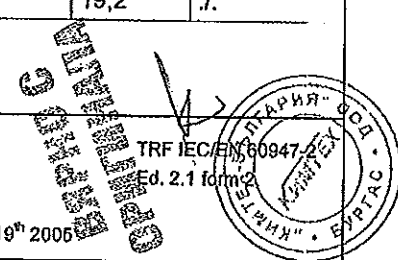
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	800 V
Conventional thermal current I_{th} / I_{the}	630A to 1600A
Rated current I_n	630A to 1600A
Rated current in the neutral pole	630A to 1600A

Short-circuit characteristics:

U_e/V	I_{cm}/kA	I_{cu}/kA	$I_{cs75\%}/kA$ For $I_n=630$ to $1250A$	$I_{cs50\%}/kA$ For $I_n=1600A$	I_{cw}/kA	I_{IT}/kA
220/240	154	70	52.5	35	19,2	/.
380/415	154	70	52.5	35	19,2	/.
440	143	65	48.75	32,5	19,2	/.
500/525	105	50	37.5	25	19,2	/.
660/690	88.2	42	31.5	21	19,2	/.

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Date August 19th 2006



Control circuits:

Electrical control circuits:

Kind of current	a.c. or d.c.
Rated frequency	50/60Hz
Rated control circuit voltage U_c	MN:24 to 480Vac , 24 to 250Vdc MX:24 to 480Vac , 12 to 250Vdc
Rated control supply voltage U_s	./. V
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	690 V

Air-supply control circuits:

Rated supply pressure	./. kPa
Limits of pressure	./. kPa
Required volume for each closing operation	./. m ³
Required volume for each opening operation	./. m ³

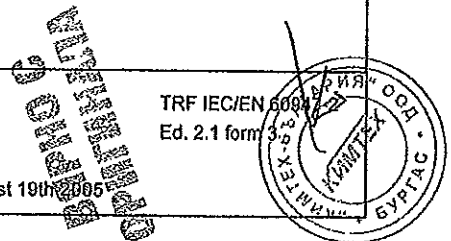
Auxillary circuits:

Rated operational voltage U_e	240 to 690Vac and 24 to 250Vdc
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	690 V
Rated frequency	50/60 Hz
Rated operational current I_e	according models
Number of circuits	according models
Number and kind of contact elements	OF/SDE/SD/MN/MX/

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Ed. 2.1 form 3



Releases:

- Shunt release:

- Rated control circuit voltage U_c MX:24 to 480Vac , 12 to 250Vdc
- Kind of current a.c. or d.c.
- Rated frequency if a.c. 50/60 Hz

- Undervoltage or no-voltage release

- Rated control circuit voltage U_c MN:24 to 480Vac, 24 to 250Vdc
- Kind of current a.c. or d.c.
- Rated frequency if a.c. 50/60 Hz

- Over-current release:

- Short-circuit release

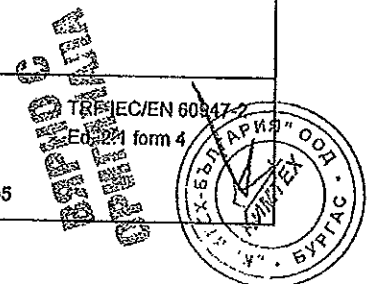
- instantaneous release yes
- definite time-delay release yes

- Rated current I_n 630 to 1600 A
- Kind of current a.c.
- Rated frequency if a.c. 50/60 Hz
- Current setting (or range of settings) Isd:1.5 to 10 I_n
Ii=2 to 15 I_n
- Time setting (or range of settings) Tsd : 0.1 to 0.4s, on, off

- Overload release (IEC 60947-1; 2.4.30):

- instantaneous release No
- definite time-delay release No
- inverse time-delay release No
- dependent on ambient air temperature No
- independent of ambient air temperature Yes

- Reference temperature 40°C
- Rated current I_n 630 to 1600A
- Kind of current a.c.
- Rated frequency if a.c. 50/60 Hz
- Current setting (or range of settings) 0.4 to 1 I_n
- Time setting (or range of settings) tr: 0.5 to 24 s



ASEFA	Test report No.: F01.04.20 Page 5 / 68
Type test according to: IEC 60947-2 Test sequence III	Type: NS 630bH to 1600H

TEST SEQUENCE III

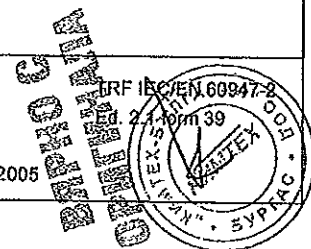
Rated ultimate short-circuit breaking capacity

Test sequence III comprises the following tests:

		Page(s)
Sample 31042.05		
8.3.5.1	Verification of overload releases	8
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	9-11
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	12 13
8.3.5.4	Verification of overload releases	14
Sample 31042.06		
8.3.5.1	Verification of overload releases	15
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	16-18
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	19 20
8.3.5.4	Verification of overload releases	21
Sample 31042.07		
8.3.5.1	Verification of overload releases	22
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	23-25
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	26 27
8.3.5.4	Verification of overload releases	28
Sample 31042.08		
8.3.5.1	Verification of overload releases	29
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	30-32
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	33 34
8.3.5.4	Verification of overload releases	35

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ASEFA	Test report No.: F01.04.20 Page 6 / 68
Type test according to: IEC 60947-2 Test sequence III	Type: NT 06-12 H2

Test sequence III comprises the following tests:

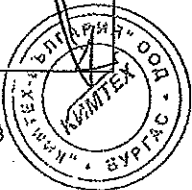
		Page(s)
Sample 31042.09		
8.3.5.1	Verification of overload releases	36
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	37-39
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	40 41
8.3.5.4	Verification of overload releases	42
Sample 31042.10		
8.3.5.1	Verification of overload releases	43
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	44-46
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	47 48
8.3.5.4	Verification of overload releases	49
Sample 31042.11		
8.3.5.1	Verification of overload releases	50
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	51-53
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	54 55
8.3.5.4	Verification of overload releases	56
Sample 31042.12		
8.3.5.1	Verification of overload releases	57
8.3.5.2	Rated ultimate short-circuit breaking capacity Additional sequence of short-circuit operations on four-pole circuit-breakers (if applicable)	58-60
8.3.5.3	Verification of dielectric withstand Verification of leakage current (if applicable)	61 62
8.3.5.4	Verification of overload releases	63

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Date August 19th 2005

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ASEFATest report No.: F01.04.20
Page 7 / 68Type test according to: IEC 60947-2
Test sequence III

Type: NS630bH to 1600H

Sample Nb	Type	Test	Ir	Ics Tested	Supply	pages
31042.05	NS1600H	Single Ph.	1600A	42kA/240V	Upper	8-14
31042.06	NS630bH	Single Ph.	630Ax0,4	42kA/240V	Upper	15-21
31042.07	NS1600H	Single Ph.	1600A	39kA/254V	Upper	22-28
31042.08	NS1600H	Single Ph.	1600A	25,2kA/398V	Lower	29-35
31042.09	NS1600H	3 Ph.	1600A	70kA/415V	Upper	36-42
31042.10	NS630bH	3 Ph.	630Ax0,4	70kA/415V	Upper	43-49
31042.11	NS1600H	3 Ph.	1600A	65kA/440V	Upper	50-56
31042.12	NS1600H	3 Ph.	1600A	42kA/690V	Lower	57-63

The MICROLOGIC tripping unit being independent of the temperature, the connections used for testing tripping characteristics differ from those given in the tables of standard (refer to IEC 60947-2 note 2 of 8.3.5.1)

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ASEFA recognised PLATFORMTRF IEC/EN 60947-2
Ed. 2.1 form 39

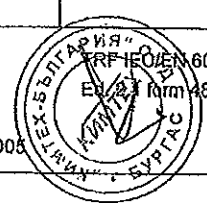
Date August 19th 2005

СЕРТИФИКАТ
КОМПЕТЕНТНОСТИ
№ 001/05

ASEFA		Test report No.: F01.04.20 Page 9 / 68
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.05
Standard and clause	Kind of tests and requirements	Test values Results
8.3.5.2 8.3.6.4 8.3.7.6	ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS Test made on the same sample as for the three-pole short-circuit or on a new sample Rated operational voltage U_e Test voltage Recovery voltage Rated ultimate short-circuit breaking capacity I_{cu} Rated short-time withstand current I_{cw} Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)	same/new 415 V $U_e/\sqrt{3}$ 240 V $1.05 \times U_e/\sqrt{3}$ 252 V 42 kA 19.2 kA 42 kA
Table 11	Power factor Frequency	0,25 50/60 Hz 0,25(+0;-0,05) 50 Hz
8.3.2.1 7.2.1.1.3	Control supply voltage Maximum value of the closing time Sequence of operation Circuit diagram Calibration of the test circuit Safety area Installation of the material tested Energization direction	$0.85 \times U_e$./. V /. ms O - t - CO Page 66 Next page Pageform Pageform Top/Bottom Page 65 Page 64 Top
60947-1 Table 9, 10 and 11	Cabling characteristics Cable Bar Number Length Tightening torque	/. mm ² /. x /. mm 100 x 10 mm 1 500 mm 0 mm 50 Nm

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Date August 19th 2005

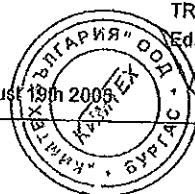


ВНИМАНИЕ
 ОПРЕДЕЛЕНИЕ
 ПОСЛЕДСТВИЙ

ASEFA		Test report No.: F01.04.20 Page 10 / 68	
Type test according to: IEC 60947-2		Type: NS630bH to 1600H Sample 31042.05	
Standard and clause	Kind of tests and requirements	Test values Results	
60947-1 8.3.4.1.5	CALIBRATION OF THE TEST CIRCUIT		
	Oscillogram	20040283-0102 20040283-0103	
	Applied voltage	260 V	
	Frequency	50 Hz	
	RMS current value at 20 ms	I_1	43,7 kA
		I_2	./. kA
		I_3	./. kA
	Average RMS. Value	43,7 kA	
Peak current maximum value	87,53 kA		
Power factor	0,23		

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Date August 19th 2009



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2009.08.19
 09:14:23
 09/19/09

ASEFA		Test report No.: F01.04.20 Page 11 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.05	
Standard and clause	Kind of tests and requirements	Test values Results	
7.2.1.1.3	OPERATION "O"		
	Oscillogram	20040283.0104	
	Peak current value I_t	75,33 kA	
	Total duration	16,15 ms	
	Recovery voltage (phase to neutral) $U_{R(1-N)}$	260 V	
	Ratio between U_r and U_e U_r/U_e	1,08	
	Joule Integral Ph_1	33,15 (kA) ² s	
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	10 min
	OPERATION "CO"		
	Oscillogram	20040283.0105	
	Applied voltage	257 V	
	Peak current value I_t	63,41 kA	
	Total duration	22,7 ms	
	Recovery voltage (phase to neutral) $U_{R(1-N)}$	256 V	
	Ratio between U_r and U_e U_r/U_e	1,06	
	Joule Integral Ph_1	25,28 A ² s	
Closing operation time		./ ms	
Melting of the fusible element	Yes/No	No	
Cracks observed	Yes/No	No	
if Yes		Page ./.	

Test laboratory: F01- GRENOBLE
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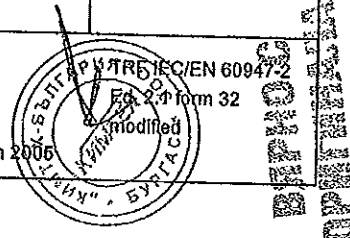
Date August 19th 2005

КОМПАНЬЯ
 КРАТКОВЕЩАТЕЛЬНАЯ

ASEFA		Test report No.: F01.04.20 Page 12 / 68
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.05
Standard and clause	Kind of tests and requirements	Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND	
	Test voltage	
	2 x U _o , min. 1000 V	1000 V
8.3.3.5	Test sequence I	1000 V
8.3.4.3	Test sequence II	
8.3.5.3	Test sequence III	
8.3.6.5	Test sequence IV	
8.3.7.3	Test sequence V, stage 1	
8.3.7.7	Test sequence V, stage 2	
8.3.8.5	Combined test sequence	
B.10.3.1	Test sequence B.II	
A.5	Verification of discrimination	
A.6.3	Verification of back-up protection	
C.3	Individual pole short-circuit test sequence	
H.3	Test sequence for circuit-breakers for IT-systems	
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)	
	Test duration	5 s
		5 s

Test laboratory: F01- GRENOBLE
ASEFA recognised PLATFORM

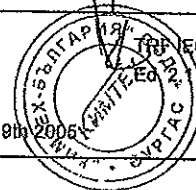
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ASEFA		Test report No.: F01.04.20
Type test according to: IEC 60947-2 Test sequence III		Page 13 / 68
Standard and clause		Test values Results
VERIFICATION OF LEAKAGE CURRENT		
For circuit-breakers suitable for isolation having an operational voltage U_o greater than 50 V.		
8.3.3.2	- Main circuit of the circuit-breaker - Isolating contacts of a withdrawable unit (if applicable)	
	Test voltage	$1.1 \times U_o = 457 \text{ V}$ 457 V
60947-1 7.2.7	Application of the test voltage	
Leakage current		
8.3.3.2	Test sequence I (In new condition)	$\leq 0.5 \text{ mA}$ / . mA
8.3.3.5	Test sequence I (after overload performance)	$\leq 2 \text{ mA}$ / . mA
8.3.4.3	Test sequence II	$\leq 2 \text{ mA}$ / . mA
8.3.5.3	Test sequence III	$\leq 6 \text{ mA}$ <1 mA
8.3.6.6	Test sequence IV	$\leq 2 \text{ mA}$ / . mA
8.3.7.3	Test sequence V, stage 1	$\leq 2 \text{ mA}$ / . mA
8.3.7.7	Test sequence V, stage 2	$\leq 6 \text{ mA}$ / . mA
8.3.8.5	Combined test sequence	$\leq 2 \text{ mA}$ / . mA
C.3	Individual pole short-circuit test sequence I_{su}	$\leq 6 \text{ mA}$ / . mA
H.3	Individual pole short-circuit test sequence I_{IT}	$\leq 6 \text{ mA}$ / . mA

Test laboratory: F01- GRENOBLE
ASEFA recognised PLATFORM

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ASEFA		Test report No.: F01.04.20	
Type test according to: IEC 60947-2 Test sequence III		Page 14 / 68	
Standard and clause		Test values Results	
VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm ²	./. mm ²
	Bar	100 x 5 mm	100 x 5 mm
	Number	2	2
	Length	./. mm	500 mm
	Tightening torque		50 Nm
	Reference temperature	40 °C ± 2 °C	
	Ambient temperature		22,5 °C
	Correction factor (k = 1 for releases independent of ambient temperature) k		1
	Current setting value	I_n	1600 A
	Test current		
	either $k \times 2.0 \times I_n$	./. A	./. A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1	
8.3.5.1	Test sequence III	before 8.3.5.2	
8.3.6.1	Test sequence IV	before 8.3.6.2	
8.3.6.6	Test sequence IV	after 8.3.6.5	
8.3.7.4	Test sequence V	before 8.3.7.5	
8.3.8.1	Combined test sequence	before 8.3.8.2	
A.5	Verification of discrimination	before 8.3.5.2	
A.6.3	Verification of back-up protection	before 8.3.5.2	
	or $k \times 2.5 \times I_n$	4000 A	4000 A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5	
8.3.5.4	Test sequence III	after 8.3.5.3	
8.3.7.8	Test sequence V	after 8.3.7.7	
8.3.8.7	Combined test sequence	after 8.3.8.6	
A.5	Verification of discrimination	after 8.3.5.3	
A.6.3	Verification of back-up protection	after 8.3.5.3	
C.4	Individual pole short-circuit test sequence		
H.4	Test sequence for circuit-breakers for IT-systems		
	Tripping time (for twice the value of current setting on single pole)		
	Neutral	≤ 270 s	133 s
	Ph ₁	≤ 270 s	126 s
	Ph ₂	≤ ./. s	./. s
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM			
Date August 19th 2005			

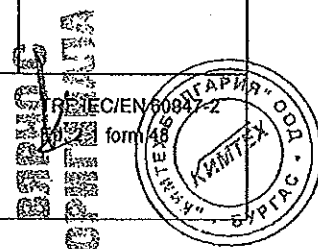


ASEFA		Test report No.: F01.04.20 Page 15 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.06	
Standard and clause	Kind of tests and requirements	Test values Results	
60947-1 Table 9, 10 and 11	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY		
	Cabling characteristics Cable 185 mm ² 185 mm ² Bar <i>.l. x .l. mm</i> <i>.l. x .l. mm</i> Number 1 1 Length <i>.l. mm</i> 2000 mm Tightening torque 50 Nm Reference temperature 40 °C ± 2 °C Ambient temperature 22 °C Correction factor (<i>k = 1</i> for releases independent of ambient temperature) <i>k</i> 1 Current setting value <i>I_n</i> Test current either <i>k x 2.0 x I_n</i> 504 A 504 A 8.3.5.1 Test sequence II (<i>I_{cs} = I_{cu}</i>) before 8.3.4.1 8.3.5.1 Test sequence III before 8.3.5.2 8.3.6.1 Test sequence IV before 8.3.6.2 8.3.6.6 Test sequence IV after 8.3.6.5 8.3.7.4 Test sequence V before 8.3.7.5 8.3.8.1 Combined test sequence before 8.3.8.2 A.5 Verification of discrimination before 8.3.5.2 A.6.3 Verification of back-up protection before 8.3.5.2 or <i>k x 2.5 x I_n</i> <i>.l. A</i> <i>.l. A</i> 8.3.5.4 Test sequence II (<i>I_{cs} = I_{cu}</i>) after 8.3.4.5 8.3.5.4 Test sequence III after 8.3.5.3 8.3.7.8 Test sequence V after 8.3.7.7 8.3.8.7 Combined test sequence after 8.3.8.6 A.5 Verification of discrimination after 8.3.5.3 A.6.3 Verification of back-up protection after 8.3.5.3 C.4 Individual pole short-circuit test sequence H.4 Test sequence for circuit-breakers for IT-systems Tripping time (for twice the value of current setting on single pole) Neutral ≤ 270 s 213 s Ph ₁ ≤ 270 s 235 s Ph ₂ ≤ 270 s 217 s Ph ₃ ≤ 270 s 217 s		
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		TRF IEC/EN 60947-2 Ed. 2.1 form 46 	
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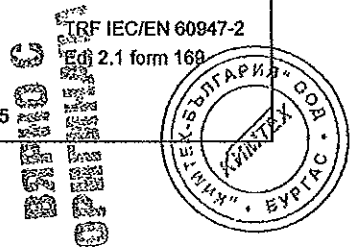
ASEFA		Test report No.: F01.04.20
Type test according to: IEC 60947-2 Test sequence III		Page 16 / 68
Type: NS630bH to 1600H Sample 31042.06		
Standard and clause	Kind of tests and requirements	Test values Results
8.3.5.2 8.3.6.4 8.3.7.6	ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS Test made on the same sample as for the three-pole short-circuit or on a new sample	same/new New
	Rated operational voltage U_e	415 V
	Test voltage	$U_e/\sqrt{3}$ 240 V
	Recovery voltage	$1.05 \times U_e/\sqrt{3}$ 252 V
	Rated ultimate short-circuit breaking capacity I_{cu}	42 kA
	Rated short-time withstand current I_{cw}	./. kA
	Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)	./ kA
Table 11	Power factor	0.20-0.25
	Frequency	50 Hz
8.3.2.1	Control supply voltage	$0.85 \times U_e$./ V
7.2.1.1.3	Maximum value of the closing time	./ ms
	Sequence of operation	O - t - CO
	Circuit diagram	Page 66
	Calibration of the test circuit	Pageform 169
	Safety area	Pageform
	Installation of the material tested	Pageform
	Energization direction	Top/Bottom
60947-1	Cabling characteristics	
Table 9, 10 and 11	Cable	./ mm ² ./ mm ²
	Bar	./ x ./ mm 100 x 10 mm
	Number	./ 1
	Length	supply side ./ mm 500 mm
		load side ./ mm 0 mm
	Tightening torque	50 Nm

Test laboratory: F01- GRENOBLE
ASEFA recognised PLATFORM

Date August 19th 2005



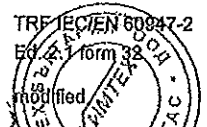
ASEFA		Test report No.: F01.04.20 Page 17 / 68
Type test according to: IEC 60947-2		Type: NS630bH to 1600H Sample 31042.06
Standard and clause	Kind of tests and requirements	Test values Results
60947-1 8.3.4.1.5	CALIBRATION OF THE TEST CIRCUIT	
	Oscillogram	20040283-0103 20040283-0102
	Applied voltage	260 V
	Frequency	50 Hz
	RMS current value at 20 ms	I_1 43.7 kA I_2 ./. kA I_3 ./. kA
	Average RMS. Value	43.7 kA
	Peak current maximum value	87.53 kA
	Power factor	0,23
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		TRF IEC/EN 60947-2 Ed. 2.1 form 169 Date August 19th 2005




ASEFA		Test report No.: F01.04.20
Type test according to: IEC 60947-2 Test sequence III		Page 18 / 68
Standard and clause		Test values Results
7.2.1.1.3	OPERATION "O" Oscillogram Peak current value I_1 Total duration Recovery voltage (phase to neutral) $U_{r(1-N)}$ Ratio between U_r and U_0 U_r/U_0 Joule Integral Ph_1 Melting of the fusible element Yes/No Holes in the PE-sheet (if applicable) Yes/No Cracks observed Yes/No if Yes Time interval between operations 3 min	20040283-0106 75.35 kA 16.4 ms 257 V 1.07 33.55 (kA) ² s No No No Page ./. 4 min
	OPERATION "CO" Oscillogram Applied voltage Peak current value I_1 Total duration Recovery voltage (phase to neutral) $U_{r(1-N)}$ Ratio between U_r and U_0 U_r/U_0 Joule Integral Ph_1 Closing operation time Melting of the fusible element Yes/No Cracks observed Yes/No if Yes	20040283-0107 257 V 61.6 kA 24.6 ms 257 V 1.07 27.2 (kA) ² s ./ ms No No Page ./
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		TRF IEC/EN 60947-2 Ed. 2.1 form 49 Date August 19th 2005

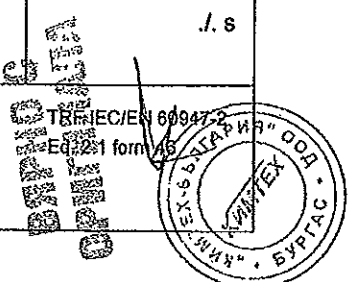
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 ЦЕНТЪР



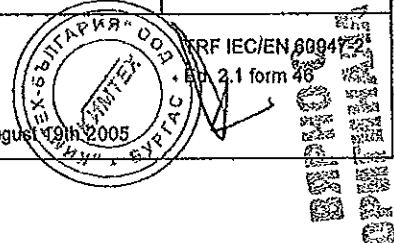
ASEFA		Test report No.: F01.04.20 Page 19 / 68
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.06
Standard and clause	Kind of tests and requirements	Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND	
	Test voltage	
	2 x U_n , min. 1000 V	1000 V
8.3.3.5	Test sequence I	1000 V
8.3.4.3	Test sequence II	
8.3.5.3	Test sequence III	
8.3.6.5	Test sequence IV	
8.3.7.3	Test sequence V, stage 1	
8.3.7.7	Test sequence V, stage 2	
8.3.8.5	Combined test sequence	
B.10.3.1	Test sequence B.II	
A.5	Verification of discrimination	
A.6.3	Verification of back-up protection	
C.3	Individual pole short-circuit test sequence	
H.3	Test sequence for circuit-breakers for IT-systems	
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)	
	Test duration	5 s 5 s
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		
		 Date August 19th, 2006

ASEFA		Test report No.: F01.04.20 Page 20 / 68
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.06
Standard and clause	Kind of tests and requirements	Test values Results
	VERIFICATION OF LEAKAGE CURRENT For circuit-breakers suitable for Isolation having an operational voltage U_o greater than 50 V.	
8.3.3.2	- Main circuit of the circuit-breaker - Isolating contacts of a withdrawable unit (if applicable)	
	Test voltage	$1.1 \times U_o = 457 \text{ V}$ 457 V
60947-1 7.2.7	Application of the test voltage	
	Leakage current	
8.3.3.2	Test sequence I (In new condition)	$\leq 0.5 \text{ mA}$./ mA
8.3.3.5	Test sequence I (after overload performance)	$\leq 2 \text{ mA}$./ mA
8.3.4.3	Test sequence II	$\leq 2 \text{ mA}$./ mA
8.3.5.3	Test sequence III	$\leq 6 \text{ mA}$ 5 mA
8.3.6.5	Test sequence IV	$\leq 2 \text{ mA}$./ mA
8.3.7.3	Test sequence V, stage 1	$\leq 2 \text{ mA}$./ mA
8.3.7.7	Test sequence V, stage 2	$\leq 6 \text{ mA}$./ mA
8.3.8.5	Combined test sequence	$\leq 2 \text{ mA}$./ mA
C.3	Individual pole short-circuit test sequence I_{SU}	$\leq 6 \text{ mA}$./ mA
H.3	Individual pole short-circuit test sequence I_{IT}	$\leq 6 \text{ mA}$./ mA
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		TRF IEC/EN 60947-2 Ed. 2.1 form/25
Date August 18th 2005		

ASEFA		Test report No.: F01.04.20
		Page 21 / 68
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.06
Standard and clause	Kind of tests and requirements	Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY	
60947-1 Table 9, 10 and 11	Cabling characteristics	
	Cable 185 mm ²	185 mm ²
	Bar ./. x ./. mm	./. x ./. mm
	Number 1	1
	Length ./. mm	2000 mm
	Tightening torque	50 Nm
	Reference temperature 40 °C ± 2 °C	
	Ambient temperature	21,6 °C
	Correction factor (k = 1 for releases independent of ambient temperature) k	1
	Current setting value I _n	252 A
	Test current	
	either k x 2.0 x I _n ./. A	./. A
8.3.5.1	Test sequence II (I _{cs} = I _{cu}) before 8.3.4.1	
8.3.5.1	Test sequence III before 8.3.5.2	
8.3.6.1	Test sequence IV before 8.3.6.2	
8.3.6.6	Test sequence IV after 8.3.6.5	
8.3.7.4	Test sequence V before 8.3.7.5	
8.3.8.1	Combined test sequence before 8.3.8.2	
A.5	Verification of discrimination before 8.3.5.2	
A.6.3	Verification of back-up protection before 8.3.5.2	
	or k x 2.5 x I _n 630 A	630 A
8.3.5.4	Test sequence II (I _{cs} = I _{cu}) after 8.3.4.5	
8.3.5.4	Test sequence III after 8.3.5.3	
8.3.7.8	Test sequence V after 8.3.7.7	
8.3.8.7	Combined test sequence after 8.3.8.6	
A.5	Verification of discrimination after 8.3.5.3	
A.6.3	Verification of back-up protection after 8.3.5.3	
C.4	Individual pole short-circuit test sequence	
H.4	Test sequence for circuit-breakers for IT-systems	
	Tripping time (for twice the value of current setting on single pole)	
	NETRAL ≤ 270 s	129 s
	Ph ₁ ≤ 270 s	135 s
	Ph ₂ ≤ ./. s	./. s
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		
Date August 19th 2005		



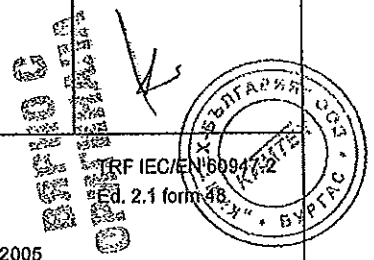
ASEFA		Test report No.: F01.04.20 Page 22 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY		
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm ²	./. mm ²
	Bar	100 x 5 mm	100 x 5 mm
	Number	2	2
	Length	500 mm	500 mm
	Tightening torque		50 Nm
	Reference temperature	40 °C ± 2 °C	
	Ambient temperature		22,6 °C
	Correction factor (k = 1 for releases independent of ambient temperature) k		1
	Current setting value	I_n	1600 A
	Test current		
	either $k \times 2,0 \times I_n$	3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1	
8.3.5.1	Test sequence III	before 8.3.5.2	
8.3.6.1	Test sequence IV	before 8.3.6.2	
8.3.6.6	Test sequence IV	after 8.3.6.5	
8.3.7.4	Test sequence V	before 8.3.7.5	
8.3.8.1	Combined test sequence	before 8.3.8.2	
A.5	Verification of discrimination	before 8.3.5.2	
A.6.3	Verification of back-up protection	before 8.3.5.2	
	or $k \times 2,5 \times I_n$	./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5	
8.3.5.4	Test sequence III	after 8.3.5.3	
8.3.7.8	Test sequence V	after 8.3.7.7	
8.3.8.7	Combined test sequence	after 8.3.8.6	
A.5	Verification of discrimination	after 8.3.5.3	
A.6.3	Verification of back-up protection	after 8.3.5.3	
C.4	Individual pole short-circuit test sequence		
H.4	Test sequence for circuit-breakers for IT-systems		
	Tripping time (for twice the value of current setting on single pole)		
	Neutral	≤ 270 s	238 s
	Ph ₁	≤ 270 s	239 s
	Ph ₂	≤ 270 s	237 s
	Ph ₃	≤ 270 s	231 s
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM			
Date August 19th 2005			

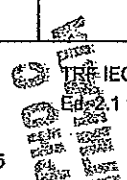
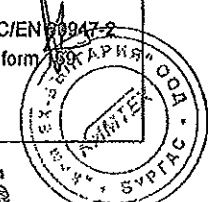


ASEFA		Test report No.: F01.04.20 Page 23 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
8.3.5.2 8.3.6.4 8.3.7.6	ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS Test made on the same sample as for the three-pole short-circuit or on a new sample	same/new	New
	Rated operational voltage U_e	440 V	
	Test voltage	$U_e/\sqrt{3}$	254 V
	Recovery voltage	$1.05 \times U_e/\sqrt{3}$	267 V
	Rated ultimate short-circuit breaking capacity I_{cu}	39 kA	
	Rated short-time withstand current I_{cw}	19.2 kA	
	Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)		39 kA
Table 11	Power factor	0.20-0.25	0.22
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	$0.85 \times U_s$./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 66
	Calibration of the test circuit	Pageform 169	Next page
	Safety area	Pageform	Page 65
	Installation of the material tested	Pageform	Page 64
	Energization direction	Top/Bottom	Top
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm ²	./. mm ²
	Bar	./. x ./. mm	100 x 10 mm
	Number	./.	1
	Length	supply side ./. mm	500 mm
		load side ./. mm	500 mm
	Tightening torque		50 Nm

Test laboratory: F01- GRENOBLE
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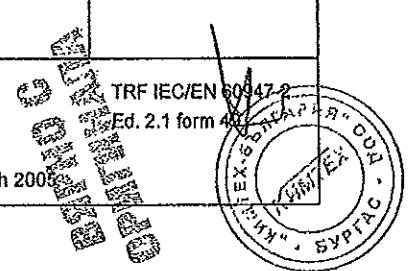


ASEFA		Test report No.: F01.04.20 Page 24 / 68	
Type test according to: IEC 60947-2		Type: NS830bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
60947-1 8.3.4.1.5	CALIBRATION OF THE TEST CIRCUIT		
	Oscillogram	20040283-0108 20040283-0113	
	Applied voltage	277 V	
	Frequency	50 Hz	
	RMS current value at 20 ms	I_1	39.52 kA
		I_2	.1. kA
		I_3	.1. kA
	Average RMS. Value	39.52 kA	
Peak current maximum value	83.05 kA		
Power factor	0,22		
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM		 	
		Date August 19th 2005	


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Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
7.2.1.1.3	OPERATION "O"		
	Oscillogram	20040283-0116	
	Peak current value I_t	73 kA	
	Total duration	16.9 ms	
	Recovery voltage (phase to neutral) $U_{r(1-N)}$	277 V	
	Ratio between U_r and U_0 U_r/U_0	1.09	
	Joule integral Ph_1	31.42 (kA) ² s	
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	3 min
	OPERATION "CO"		
	Oscillogram	20040283-0117	
	Applied voltage	280 V	
	Peak current value I_t	60.5 kA	
	Total duration	17.9 ms	
	Recovery voltage (phase to neutral) $U_{r(1-N)}$	276.7 V	
	Ratio between U_r and U_0 U_r/U_0	1.08	
	Joule integral Ph_1	22.63 (kA) ² s	
Closing operation time		./ ms	
Melting of the fusible element	Yes/No	No	
Cracks observed	Yes/No	No	
if Yes		Page ./.	

Test laboratory: F01- GRENOBLE
ASEFA recognised PLATFORM

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ASEFA		Test report No.: F01.04.20 Page 27 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	- Main circuit of the circuit-breaker - Isolating contacts of a withdrawable unit (if applicable)		
	Test voltage	$1.1 \times U_e = 484 \text{ V}$	484 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	$\leq 0.5 \text{ mA}$	./. mA
8.3.3.5	Test sequence I (after overload performance)	$\leq 2 \text{ mA}$	./. mA
8.3.4.3	Test sequence II	$\leq 2 \text{ mA}$	./. mA
8.3.5.3	Test sequence III	$\leq 6 \text{ mA}$	0.5 mA
8.3.6.5	Test sequence IV	$\leq 2 \text{ mA}$	./. mA
8.3.7.3	Test sequence V, stage 1	$\leq 2 \text{ mA}$	./. mA
8.3.7.7	Test sequence V, stage 2	$\leq 6 \text{ mA}$	./. mA
8.3.8.5	Combined test sequence	$\leq 2 \text{ mA}$	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	$\leq 6 \text{ mA}$./. mA
H.3	Individual pole short-circuit test sequence I_T	$\leq 6 \text{ mA}$./. mA
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Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.07	
Standard and clause	Kind of tests and requirements	Test values Results	
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY		
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm ²	./. mm ²
	Bar	100 x 5 mm	100 x 5 mm
	Number	2	2
	Length	./. mm	500 mm
	Tightening torque		50 Nm
	Reference temperature	40 °C ± 2 °C	
	Ambient temperature		21.3 °C
	Correction factor (k = 1 for releases independent of ambient temperature) k		1
	Current setting value	I _n	1600 A
	Test current		
	either k x 2.0 x I _n	./. A	./. A
8.3.5.1	Test sequence II (I _{cs} = I _{cu})	before 8.3.4.1	
8.3.5.1	Test sequence III	before 8.3.5.2	
8.3.6.1	Test sequence IV	before 8.3.6.2	
8.3.6.6	Test sequence IV	after 8.3.6.5	
8.3.7.4	Test sequence V	before 8.3.7.5	
8.3.8.1	Combined test sequence	before 8.3.8.2	
A.5	Verification of discrimination	before 8.3.5.2	
A.6.3	Verification of back-up protection	before 8.3.5.2	
	or k x 2.5 x I _n	4000 A	4000 A
8.3.5.4	Test sequence II (I _{cs} = I _{cu})	after 8.3.4.5	
8.3.5.4	Test sequence III	after 8.3.5.3	
8.3.7.8	Test sequence V	after 8.3.7.7	
8.3.8.7	Combined test sequence	after 8.3.8.6	
A.5	Verification of discrimination	after 8.3.5.3	
A.6.3	Verification of back-up protection	after 8.3.5.3	
C.4	Individual pole short-circuit test sequence		
H.4	Test sequence for circuit-breakers for IT-systems		
	Tripping time (for twice the value of current setting on single pole)		
	Neutral	≤ 270 s	132 s
	Ph ₁	≤ 270 s	129 s
	Ph ₂	≤ ./. s	./. s
	Ph ₃	≤ ./. s	./. s
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		Date August 19th 2005	

ASEFA		Test report No.: F01.04.20 Page 29 / 68	
Type test according to: IEC 60947-2 Test sequence III		Type: NS630bH to 1600H Sample 31042.08	
Standard and clause	Kind of tests and requirements	Test values Results	
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY		
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm ²	./. mm ²
	Bar	100 x 5 mm	100 x 5 mm
	Number	2	2
	Length	./. mm	500 mm
	Tightening torque		50 Nm
	Reference temperature	40 °C ± 2 °C	
	Ambient temperature		22.6 °C
	Correction factor (k = 1 for releases independent of ambient temperature) k		1
	Current setting value	I _n	1600 A
	Test current		
	either k x 2.0 x I _n	3200 A	3200 A
8.3.5.1	Test sequence II (I _{cs} = I _{cu})	before 8.3.4.1	
8.3.5.1	Test sequence III	before 8.3.5.2	
8.3.6.1	Test sequence IV	before 8.3.6.2	
8.3.6.6	Test sequence IV	after 8.3.6.5	
8.3.7.4	Test sequence V	before 8.3.7.5	
8.3.8.1	Combined test sequence	before 8.3.8.2	
A.5	Verification of discrimination	before 8.3.5.2	
A.6.3	Verification of back-up protection	before 8.3.5.2	
	or k x 2.5 x I _n	./. A	./. A
8.3.5.4	Test sequence II (I _{cs} = I _{cu})	after 8.3.4.5	
8.3.5.4	Test sequence III	after 8.3.5.3	
8.3.7.8	Test sequence V	after 8.3.7.7	
8.3.8.7	Combined test sequence	after 8.3.8.6	
A.5	Verification of discrimination	after 8.3.5.3	
A.6.3	Verification of back-up protection	after 8.3.5.3	
C.4	Individual pole short-circuit test sequence		
H.4	Test sequence for circuit-breakers for IT-systems		
	Tripping time (for twice the value of current setting on single pole)		
	Neutral	≤ 270 s	235 s
	Ph ₁	≤ 270 s	219 s
	Ph ₂	≤ 270 s	223 s
	Ph ₃	≤ 270 s	223 s
Test laboratory: F01- GRENOBLE ASEFA recognised PLATFORM			
Date August 19th 2006			

