



CERTYFIKAT CERTIFICATE

Przyznany organizacji:
Issued for:

APATOR S.A.

**ul. Gdańska nr 4a lok. C4
87-100 Toruń**

Biuro Certyfikacji Systemów Zarządzania Polskiego Rejestru Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, zaświadcza, że Zintegrowany System Zarządzania obejmujący System Zarządzania Jakością, System Zarządzania Środowiskowego oraz System Zarządzania Bezpieczeństwem i Higieną Pracy wyżej wymienionej organizacji został oceniony i stwierdzono jego zgodność z wymaganiami:

Management Systems Certification Bureau of Polski Rejestr Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, certifies that the Integrated Management System including the Quality Management System, Environmental Management System and Occupational Health and Safety Management System of the above organization has been assessed and found to be in accordance with the requirements of:

**ISO 9001:2008
ISO 14001:2004
PN-N-18001:2004**

Zakres certyfikacji:

**PROJEKTOWANIE I PRODUKCJA APARATURY I SYSTEMÓW POMIAROWYCH
I APARATURY ŁĄCZENIOWEJ**

Scope of certification:

**DESIGN AND MANUFACTURING OF METERING EQUIPMENT AND SYSTEMS
AND SWITCHGEAR**

Pierwsze wydanie Certyfikatu: **07.02.1995**
Certificate first issue:

Certyfikat jest ważny do: **18.06.2016**
The Certificate is valid until:

Nr Certyfikatu: **NC-0007**
Certificate No.:

Gdańsk, 19.06.2013



AC 014
QMS, EMS,
BHP

Porozumienie IAF MLA dotyczy QMS i EMS
The Arrangement IAF MLA refers to QMS and EMS

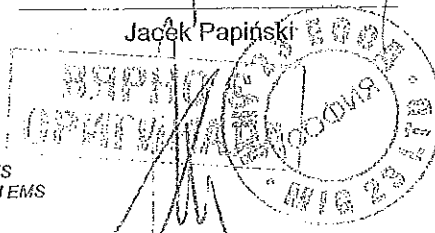


Dariusz Rudziński

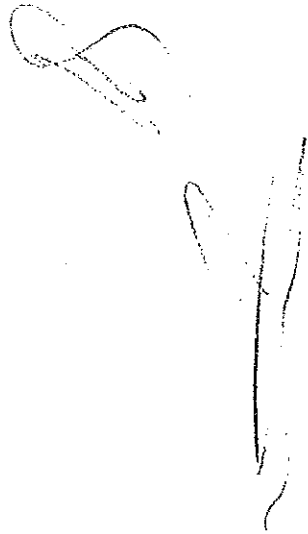
Dariusz Rudziński

Jacek Papiński

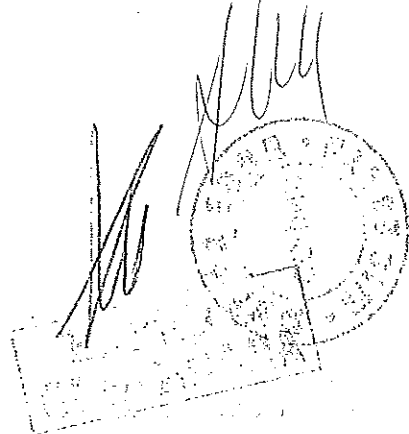
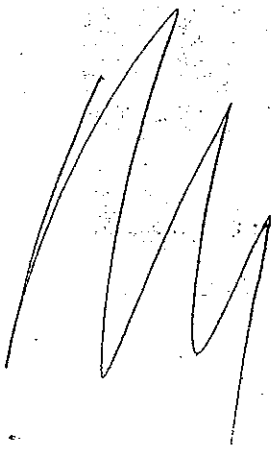
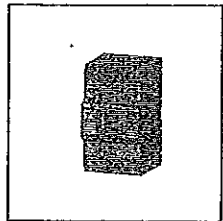
Jacek Papiński



1008



MOULDED CASE CIRCUIT BREAKERS BC160N

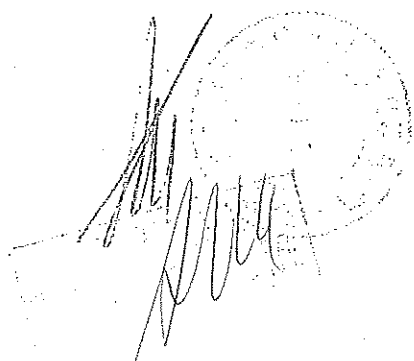


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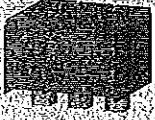
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SUMMARY OF MODELS AND ACCESSORIES

CONNECTING SETS

Double block terminals



CS-BC-B021

Output terminals



CS-BC-B014

Front connection



CS-BC-A011

Rear connection



CS-BC-A021

Potential terminals



CS-BC-PS01

Reduction for BA...*33



CS-BC-A033

HAND DRIVES

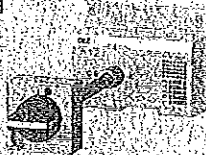
Hand drive unit - front

RP-BC-CK20
RP-BC-CP



Hand drive unit - front

RP-BC-CK21
RP-BC-CH
RP-BC-CH



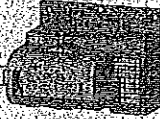
Hand drive unit - right side

RP-BC-CK30



Hand drive unit - left side

RP-BC-CK31



Mechanical parallel switching

RP-BC-CD10



Mechanical interlocking

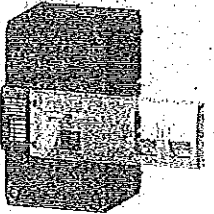
RP-BC-CB10



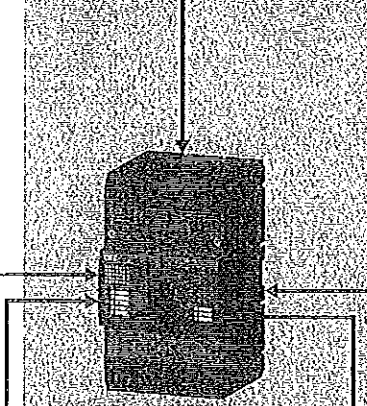
MOTOR DRIVES

Motor drive - side

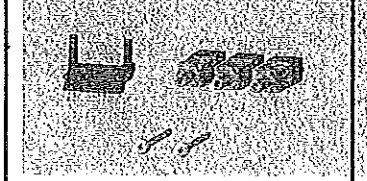
MP-BC-X...B



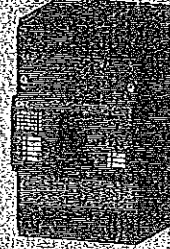
CIRCUIT BREAKERS



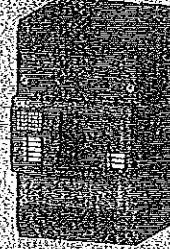
BC160NT305-160-D



BC160NT305-160-I

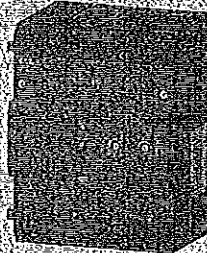


BC160NT305-100-M



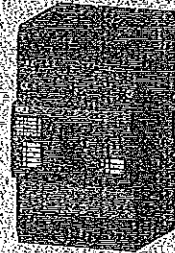
BC160NT305-160-H

RESIDUAL CURRENT DEVICE



RCD-BC4-EA16

SWITCH-DISCONNECTOR



BC160NT305-160-V

AUXILIARY RELEASES

Shunt trip

Undervoltage release



SV-BC-X...



SP-BC-X...

SWITCHES

Signal switch

Auxiliary switch



NS-BC-0010



PS-BC-0010

MOUNTING SETS

Adapter for „U“ rail 35 mm



OD-BC-DIN1

ACCESSORIES

Lever with locking

Terminal cover - IP20

Insulating barriers

Reduction for BA...*33



OD-BC-UP01



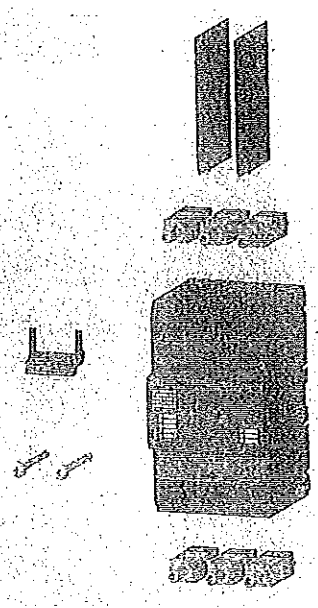
OD-BC-KS03



CS-BC-KS02

OD-BC-MS33

CIRCUIT BREAKERS



- Circuit breaker includes:
 - 2 connecting sets for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the circuit breaker)
 - insulating barriers OD-BC-ISO2
 - mounting bolts set OD-BC-M501 (2x M3x30)
 - conductor holder OD-BC-DV01

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

* - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

Characteristic D - distribution in protection lines and transformers

I_n [A]	Type	Product code	I_{cs} setting [A]	I_{cu} [A]	Weight [kg]	Package [pc]
16	BC160NT305-16-D	20209	12.5 ÷ 16	160 ÷ 240	1.00	1
20	BC160NT305-20-D	20211	16 ÷ 20	200 ÷ 300	1.00	1
25	BC160NT305-25-D	20212	20 ÷ 25	250 ÷ 375	1.00	1
32	BC160NT305-32-D	20213	25 ÷ 32	160 ÷ 320	1.00	1
40	BC160NT305-40-D	20215	32 ÷ 40	200 ÷ 400	1.00	1
50	BC160NT305-50-D	20217	40 ÷ 50	250 ÷ 500	1.00	1
63	BC160NT305-63-D	20219	50 ÷ 63	315 ÷ 630	1.00	1
80	BC160NT305-80-D	20222	63 ÷ 80	400 ÷ 800	1.00	1
100	BC160NT305-100-D	20204	80 ÷ 100	500 ÷ 1000	1.00	1
125	BC160NT305-125-D	20206	100 ÷ 125	625 ÷ 1250	1.00	1
160	BC160NT305-160-D	20208	125 ÷ 160	800 ÷ 1600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic M - motor in motors protection

I_n [A]	Type	Product code	I_{cs} setting [A]	I_{cu} [A]	Weight [kg]	Package [pc]
16	BC160NT305-16-M	20243	12.5 ÷ 16	160	1.00	1
20	BC160NT305-20-M	20244	16 ÷ 20	200	1.00	1
25	BC160NT305-25-M	20245	20 ÷ 25	250	1.00	1
32	BC160NT305-32-M	20246	25 ÷ 32	320	1.00	1
40	BC160NT305-40-M	20247	32 ÷ 40	400	1.00	1
50	BC160NT305-50-M	20248	40 ÷ 50	500	1.00	1
63	BC160NT305-63-M	20249	50 ÷ 63	630	1.00	1
80	BC160NT305-80-M	20250	63 ÷ 80	800	1.00	1
100	BC160NT305-100-M	20242	80 ÷ 100	1000	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines

in protection lines with low starting currents
in without I_{cs} setting

I_n [A]	Type	Product code	I_{cu} [A]	Weight [kg]	Package [pc]
40	BC160NT305-40-L	20214	160	1.00	1
50	BC160NT305-50-L	20216	200	1.00	1
63	BC160NT305-63-L	20218	252	1.00	1
80	BC160NT305-80-L	20221	320	1.00	1
100	BC160NT305-100-L	20203	400	1.00	1
125	BC160NT305-125-L	20205	500	1.00	1
160	BC160NT305-160-L	20207	640	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

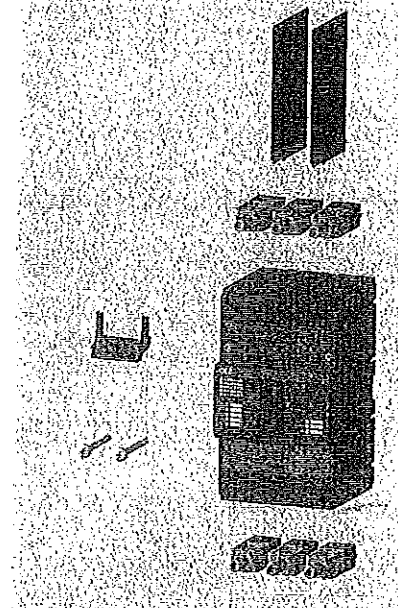
CIRCUIT BREAKERS

3P

Characteristic N - only short-circuit release

I (A)	Type	Product code	I (A)	I (A)	Weight (kg)	Package (pc)
32	BC160NT305-32-N	20641	-	160 ÷ 320	1.00	1
40	BC160NT305-40-N	20642	-	200 ÷ 400	1.00	1
50	BC160NT305-50-N	20643	-	250 ÷ 500	1.00	1
63	BC160NT305-63-N	20644	-	315 ÷ 630	1.00	1
80	BC160NT305-80-N	20645	-	400 ÷ 800	1.00	1
100	BC160NT305-100-N	20646	-	500 ÷ 1000	1.00	1
125	BC160NT305-125-N	20647	-	625 ÷ 1250	1.00	1
160	BC160NT305-160-N	20621	-	800 ÷ 1600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37



SWITCH-DISCONNECTOR

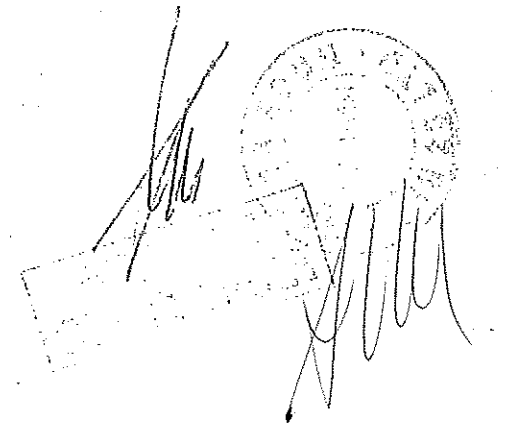
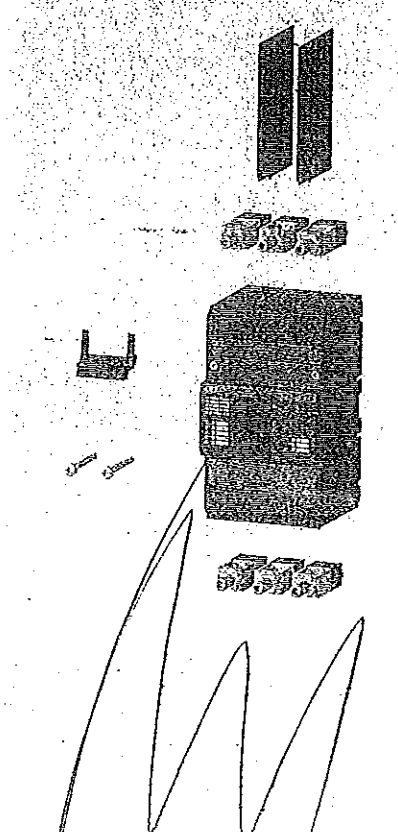
3P

- Switch-disconnector includes: - 2 connecting sets for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm² ¹⁾
- in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
- insulating barriers OD-BC-KS02
- mounting bolts set OD-BC-MS01 (2x M3x30)
- conductor holder OD-BC-DV01

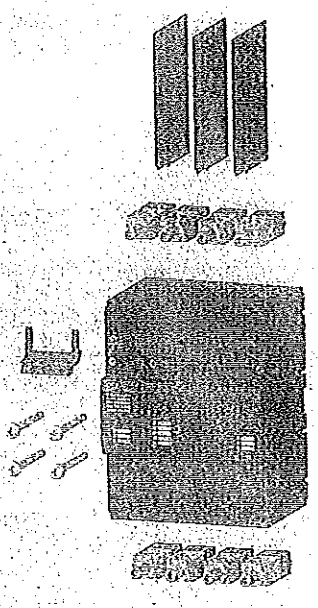
¹⁾ - for connecting in another way, one may use CS-BC... connecting sets, see page D10, D11

I (A)	Type	Product code	Weight (kg)	Package (pc)
160	BC160NT305-160-V	20585	1.00	1

- TECHNICAL INFORMATION, see page D15



CIRCUIT BREAKERS



- Circuit breaker includes:
- connecting terminals for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
 - insulating barriers OD-BC-R502 and OD-BC-R542
 - 2 sets of mounting bolts OD-BC-M501 (4x M3x30)
 - conductor holder OD-BC-NV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

*) - for connecting in another way, it is necessary to use CS-BC... connecting sets, see page D10, D11

Characteristic D - distribution
 protection lines and transformers

3P + N - for unprotected N conductor

I_n (A)	Type	Product code	I_n setting (A)	I_n (A)	Weight (kg)	Package (pc)
16	BC160NT405-16-D	33617	12.5 ÷ 16	160 ÷ 240	1.3	1
20	BC160HT405-20-D	33616	16 ÷ 20	200 ÷ 300	1.3	1
25	BC160HT405-25-D	33615	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT405-32-D	33614	25 ÷ 32	160 ÷ 320	1.3	1
40	BC160NT405-40-D	33613	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT405-50-D	33611	40 ÷ 50	250 ÷ 500	1.3	1
63	BC160HT405-63-D	33609	50 ÷ 63	315 ÷ 630	1.3	1
80	BC160HT405-80-D	33607	63 ÷ 80	400 ÷ 800	1.3	1
100	BC160HT405-100-D	33605	80 ÷ 100	500 ÷ 1 000	1.3	1
125	BC160HT405-125-D	33603	100 ÷ 125	625 ÷ 1 250	1.3	1
160	BC160HT405-160-D	33601	125 ÷ 160	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines
 protection lines with low starting currents
 without I_n setting

3P + N - for unprotected N conductor

I_n (A)	Type	Product code	I_n setting (A)	I_n (A)	Weight (kg)	Package (pc)
40	BC160HT405-40-L	33612	-	160	1.3	1
50	BC160HT405-50-L	33610	-	200	1.3	1
63	BC160HT405-63-L	33608	-	252	1.3	1
80	BC160HT405-80-L	33606	-	320	1.3	1
100	BC160HT405-100-L	33604	-	400	1.3	1
125	BC160HT405-125-L	33602	-	500	1.3	1
160	BC160HT405-160-L	33600	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37
 - custom production

Characteristic N - only short-circuit release
 without I_n setting

3P + N - for unprotected N conductor

I_n (A)	Type	Product code	I_n setting (A)	I_n (A)	Weight (kg)	Package (pc)
32	BC160HT405-32-N	33625	-	160 ÷ 320	1.3	1
40	BC160HT405-40-N	33624	-	200 ÷ 400	1.3	1
50	BC160HT405-50-N	33623	-	250 ÷ 500	1.3	1
63	BC160HT405-63-N	33622	-	315 ÷ 630	1.3	1
80	BC160HT405-80-N	33621	-	400 ÷ 800	1.3	1
100	BC160HT405-100-N	33620	-	500 ÷ 1 000	1.3	1
125	BC160HT405-125-N	33619	-	625 ÷ 1 250	1.3	1
160	BC160HT405-160-N	33618	-	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37
 - custom production

1291

CIRCUIT BREAKERS



- Circuit breaker includes:
- connecting terminals for connecting cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$ ¹⁾
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
 - insulating barriers OD-BC-KS02 and OD-BC-KS42
 - 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
 - conductor holder OD-BC-DV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

¹⁾ - for connecting in another way, it is necessary to use CS-BC-... connecting sets, see page D10, D11

Characteristic **D** - distribution

4P - for protected N conductor

■ protection lines and transformers

I _n (A)	Type	Product code	I _{setting} (A)	I (A)	Weight (kg)	Package (pc)
16	BC160NT406-16-D	33644	12.5 ÷ 16	160 ÷ 240	1.3	1
20	BC160NT406-20-D	33643	16 ÷ 20	200 ÷ 300	1.3	1
25	BC160NT406-25-D	33642	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT406-32-D	33641	25 ÷ 32	160 ÷ 320	1.3	1
40	BC160NT406-40-D	33640	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT406-50-D	33638	40 ÷ 50	250 ÷ 500	1.3	1
63	BC160NT406-63-D	33636	50 ÷ 63	315 ÷ 630	1.3	1
80	BC160NT406-80-D	33634	63 ÷ 80	400 ÷ 800	1.3	1
100	BC160NT406-100-D	33632	80 ÷ 100	500 ÷ 1000	1.3	1
125	BC160NT406-125-D	33630	100 ÷ 125	625 ÷ 1250	1.3	1
160	BC160NT406-160-D	33628	125 ÷ 160	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic **L** - lines

4P - for protected N conductor

■ protection lines with low starting currents
■ without I_n setting

I _n (A)	Type	Product code	I _{setting} (A)	I (A)	Weight (kg)	Package (pc)
40	BC160NT406-40-L	33639	-	160	1.3	1
50	BC160NT406-50-L	33637	-	200	1.3	1
63	BC160NT406-63-L	33635	-	252	1.3	1
80	BC160NT406-80-L	33633	-	320	1.3	1
100	BC160NT406-100-L	33631	-	400	1.3	1
125	BC160NT406-125-L	33629	-	500	1.3	1
160	BC160NT406-160-L	33627	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

Characteristic **N** - only short-circuit release

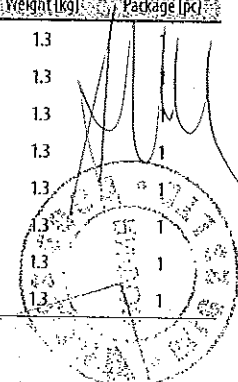
4P - for protected N conductor

■ without I_n setting

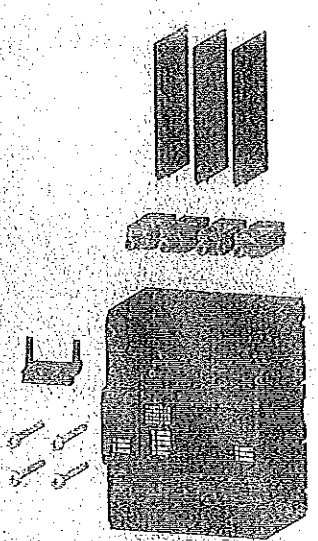
I _n (A)	Type	Product code	I _{setting} (A)	I (A)	Weight (kg)	Package (pc)
32	BC160NT406-32-N	33652	-	160 ÷ 320	1.3	1
40	BC160NT406-40-N	33651	-	200 ÷ 400	1.3	1
50	BC160NT406-50-N	33650	-	250 ÷ 500	1.3	1
63	BC160NT406-63-N	33649	-	315 ÷ 630	1.3	1
80	BC160NT406-80-N	33648	-	400 ÷ 800	1.3	1
100	BC160NT406-100-N	33647	-	500 ÷ 1000	1.3	1
125	BC160NT406-125-N	33646	-	625 ÷ 1250	1.3	1
160	BC160NT406-160-N	33645	-	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production



SWITCH-DISCONNECTOR



Switch-disconnector includes:

- 2 connecting sets for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm²
- in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
- insulating barriers OD-BC-KS02 and OD-BC-KS42
- 2 sets of mounting bolts OD-BC-M501 (4x M3x30)
- conductor holder OD-BC-DV01 (it is installed in the switch-disconnector)

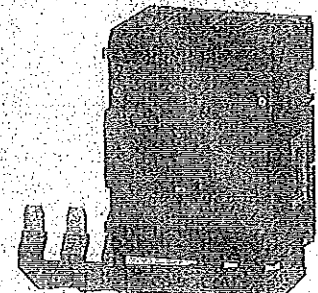
* - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

IAI	Type	Product code	Weight [kg]	Package [pc]
160	BC160HT405-160-V	33626	1.3	1

- TECHNICAL INFORMATION, see page D15



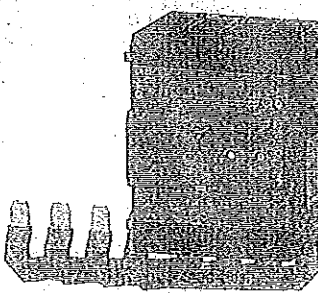
RESIDUAL CURRENT DEVICES



3-pole design, with interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC3-EF06	37745	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EF16	37746	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.65	1
RCD-BC3-EA06	37747	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EA16	37748	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.65	1

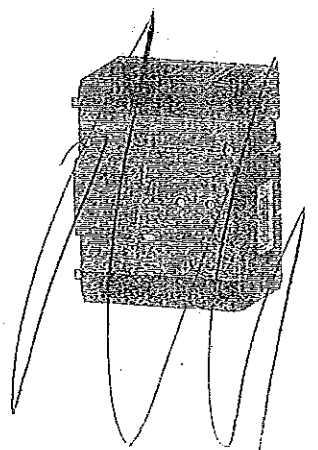
- CS-BC-L006 or CS-BC-L016 is part of residual current module
 - TECHNICAL INFORMATION, see page D22



4-pole design, with interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC4-EF06	37753	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EF16	37754	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	2.03	1
RCD-BC4-EA06	37755	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EA16	37756	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	2.03	1

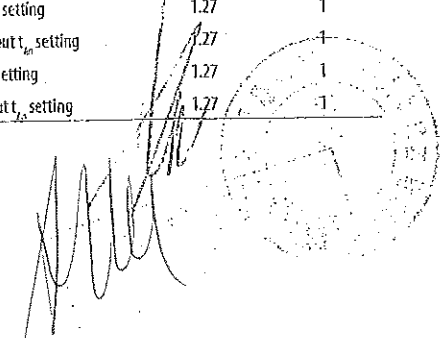
- CS-BC-L406 or CS-BC-L416 is part of residual current module
 - TECHNICAL INFORMATION, see page D22



4-pole design, without interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC0-EF16	37761	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA16	37762	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EF06	38375	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA06	38376	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1

- TECHNICAL INFORMATION, see page D22



CONNECTING SETS FOR RESIDUAL CURRENT DEVICE

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
CS-BC-S006	38379	Interconnecting busbars, $I_n = 63$ A, for 3P design	0.17	1
CS-BC-S016	38380	Interconnecting busbars, $I_n = 160$ A, for 3P design	0.44	1

- TECHNICAL INFORMATION, see page D24



Type	Product code	Description	Weight (kg)	Package (set)
CS-BC-S406	38383	Interconnecting busbars, $I_n = 63$ A, for 4P design	0.21	1
CS-BC-S416	38384	Interconnecting busbars, $I_n = 160$ A, for 4P design	0.64	1

- TECHNICAL INFORMATION, see page D24

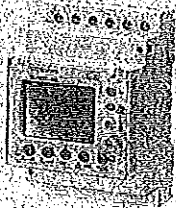
RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
SSV8000-6KK	42658	Analogue design, I_n and t_a setting	0.18	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8001-6KK	42659	Digital design, I_n and t_a setting	0.26	1
SSV8200-6KK	42660	Digital design, I_n and t_a setting, 4 channels	0.26	1

- TECHNICAL INFORMATION, see page P4

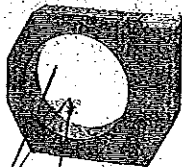
CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
SSV8700-OKK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
SSV8701-OKK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8702-OKK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
SSV8703-OKK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
SSV8704-OKK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
SSV8705-OKK	42666	Internal diameter 140 mm, including holder on the panel	1.2	1
SSV8706-OKK	42667	Internal diameter 210 mm, including holder on the panel	2.8	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
SSV8 900-1KK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4

CONNECTING SETS

3 terminals



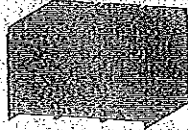
Type	Product code	Description	S (mm)	Method of connection	Weight (kg)	Package (set)
CS-BC-A011	20223	Front connection	2x (25 ÷ 120)	Cu/Al busbars, cable lugs	0.05	1

- TECHNICAL INFORMATION, see page D18



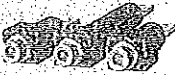
CS-BC-B021	20237	Double block terminal	2x (25 ÷ 120)	Cu/Al cables	0.18	1
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- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20



CS-BC-A021	20236	Rear connection		Cu/Al busbars, cable lugs	0.18	1
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- TECHNICAL INFORMATION, see page D18



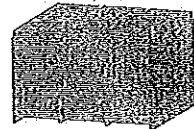
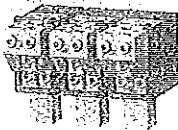
CS-BC-PS01	20239	Potential terminals	15 ÷ 25; 4 ÷ 6	Cu flexible conductor	0.01	1
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- TECHNICAL INFORMATION, see page D18



CS-BC-B014	34957	Block terminals - for 5 cables	5x (2.5 ÷ 25)	Cu/Al cables	0.18	1
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- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20



CS-BC-R033	20608	Reduction for BA...33		Cu/Al busbars, cable lugs	0.1	1
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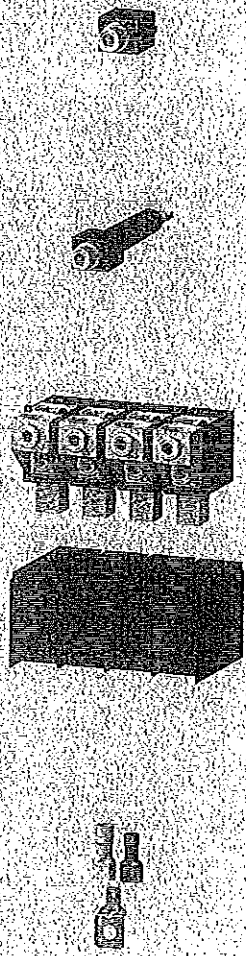
TECHNICAL INFORMATION, see page D18
- for total replacement of BA...33 circuit breaker also is necessary the OD-BC-MS33 mounting set
- one set provides for connecting one side of the circuit breaker (set includes three terminals with necessary connecting elements)

RETROFIT

CONNECTING SETS

3P 4P

1 terminal



IP20	Product code	Description	Weight (kg)	Package (set)
CS-BC-A411	33653	Front connection	0.02	1

- TECHNICAL INFORMATION, see page D18

CS-BC-A421	33654	Rear connection	0.08	1
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- TECHNICAL INFORMATION, see page D18

CS-BC-B421	33658	Double block terminal	0.25	1
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- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20

CS-BC-B414	34958	Block terminal for 5 cables	0.24	1
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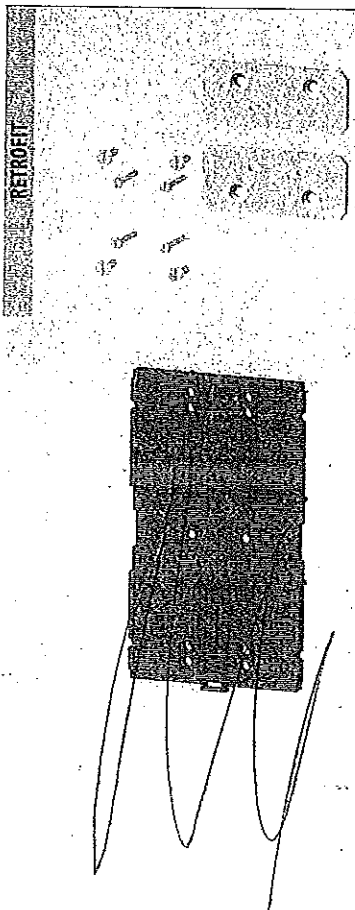
- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20

CS-BC-PS41	36030	Potential terminals	0.005	1
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- TECHNICAL INFORMATION, see page D18

MOUNTING SETS

3P 4P



IP20	Product code	Description	Weight (kg)	Package (set)
OD-BC-MS33	20625	Reduction for BA...*33	0.13	1

- for total replacement of BA...*33 circuit breaker 2 connecting sets CS-BC-A033 are necessary

OD-BC-D1N1	20238	For mounting on „U“ rail according to EN 60715 wide 35 mm	0.05	1
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- DIMENSIONS, see page D29

²⁾ - one set provides for replacing one circuit breaker (set includes coupling elements necessary to assemble circuit breaker and mounting set)
RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

SWITCHES



Auxiliary - signal state of the main contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pc)
PS-BC-0010	20227	60 ÷ 250 V a.c./d.c.		0.01	1
PS-BC-0010-Au	20228	5 ÷ 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45



Signal - signal tripping of circuit breaker by overcurrent release

Type	Product code	Description	Contacts	Weight (kg)	Package (pc)
HS-BC-0010	20225	60 ÷ 250 V a.c./d.c.		0.01	1
HS-BC-0010-Au	20226	5 ÷ 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45

SHUNT TRIPS



Type	Product code	Operating voltage	Weight (kg)	Package (pc)
SV-BC-X024	20233	24, 48 V a.c./d.c.	0.05	1
SV-BC-X110	20234	110, 230 V a.c./110, 220 V d.c.	0.05	1
SV-BC-X230	20235	230, 400 V a.c./220 V d.c.	0.05	1

- TECHNICAL INFORMATION, see page D46

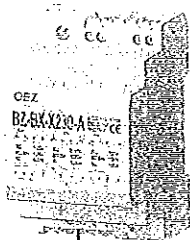
UNDERVOLTAGE RELEASES



Type	Product code	Operating voltage	Description	Weight (kg)	Package (pc)
SP-BC-X024	20229	24, 48 V a.c./d.c.		0.05	1
SP-BC-X110	20231	110, 230 V a.c./110, 220 V d.c.		0.05	1
SP-BC-X230	20232	230, 400 V a.c./220 V d.c.		0.05	1

- TECHNICAL INFORMATION, see page D47

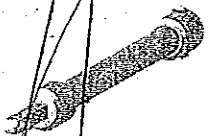
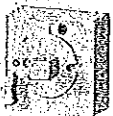
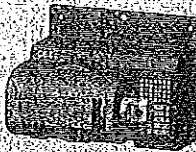
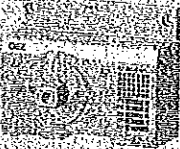
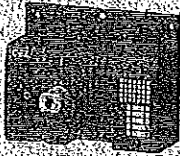
DELAY UNIT



Type	Product code	Description	Weight (kg)	Package (pc)
BZ-BX-X230-A	36696	- enables to delay the undervoltage release tripping of circuit breakers Modeion	0.12	1

- the delay can be set up at three levels (according to wiring)
 - TECHNICAL INFORMATION, see page P2

HAND DRIVES



TYPE	Product code	Name - description	Weight (kg)	Package (pc)
RP-BC-CK10	20560	Hand drive unit - without locking	0.08	1
RP-BC-CK20	20593	Hand drive unit - with locking	0.08	1

- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with:

- ☑ for control on the circuit breaker - hand drive lever RP-BC-CP.
- ☑ for control on the switchboard door - extension shaft RP-BC-CH.
- hand drive bearing RP-BC-CN.
- hand drive lever RP-BC-CP.

RP-BC-CK21	20594	Hand drive unit - yellow - with locking	0.08	1
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- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with:

- ☑ for control on the switching unit - hand drive lever RP-BC-CP.
- ☑ for control on the switchboard door - extension shaft RP-BC-CH.
- hand drive bearing RP-BC-CN.
- hand drive lever RP-BC-CP.

RP-BC-CK30	20595	Hand drive unit for right side control - without locking	0.14	1
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RP-BC-CK31	20596	Hand drive unit left side control - without locking	0.14	1
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- TECHNICAL INFORMATION, see page D48

Hand drive unit must be fitted with: with the extension shaft RP-BC-CH, with the hand drive bearing RP-BC-CN, with the hand drive lever RP-BC-CP.

RP-BC-CP10	20561	Hand drive lever - black - without locking	0.02	1
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RP-BC-CP20	20562	Hand drive lever - black - with locking	0.02	1
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- TECHNICAL INFORMATION, see page D48

RP-BC-CP21	20597	Hand drive lever - red - with locking	0.02	1
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- TECHNICAL INFORMATION, see page D48

RP-BC-CN10	20564	Hand drive bearing - degree of protection IP40	0.05	1
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RP-BC-CN20	20565	Hand drive bearing - degree of protection IP66	0.05	1
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- TECHNICAL INFORMATION, see page D48

- is used in combination with the black lever of RP-BC-CP10 or RP-BC-CP20 hand drive

RP-BC-CN11	20598	Hand drive bearing - yellow - degree of protection IP40	0.05	1
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RP-BC-CN21	20599	Hand drive bearing - yellow - degree of protection IP66	0.05	1
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- TECHNICAL INFORMATION, see page D48

- is used in combination with the red lever of RP-BC-CP21 hand drive

RP-BC-CH10	20563	Extension shaft - length 350 mm	0.12	1
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- TECHNICAL INFORMATION, see page D48

RP-BC-CH20	20600	Extension shaft - telescopic, length 190 / 352 mm	0.92	1
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- TECHNICAL INFORMATION, see page D48

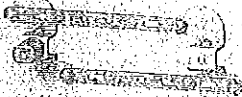
MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
RP-BC-CB10	20601	Mechanical interlocking	0.09	1

- TECHNICAL INFORMATION, see page D49
 - Mechanical interlocking must be fitted with: 2 hand drive units RP-BC-CK.. (cannot be combined with hand drive unit for side control)
 2 hand drive levers RP-BC-CP.

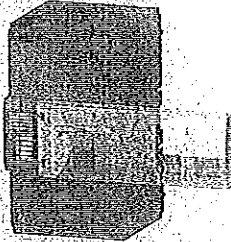


RP-BC-CB10	20602	Mechanical parallel switching	0.11	1
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- TECHNICAL INFORMATION, see page D49
 - Mechanical parallel switching must be fitted with: 2 hand drive units RP-BC-CK.. (cannot be combined with hand drive unit for side control)
 1 hand drive lever RP-BC-CP.

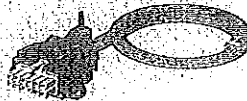
MOTOR DRIVES

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
MP-BC-X024-B	34450	Motor drive side, 24 V a.c./d.c.	0.9	1
MP-BC-X048-B	34451	Motor drive side, 48 V a.c./d.c.	0.9	1
MP-BC-X110-B	34452	Motor drive side, 110 V a.c./d.c.	0.9	1
MP-BC-X230-B	34453	Motor drive side, 230 V a.c./d.c.	0.9	1

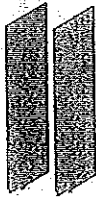
- TECHNICAL INFORMATION, see page D50



OD-BC-KA02-A	34454	Extension cable, length 0.6 m, for motor drive	0.1	1
OD-BC-KA02-B	37510	Extension cable, length 3 m, for motor drive	0.2	1

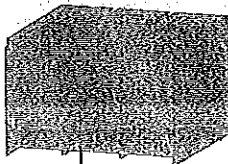
ACCESSORIES

3P 4P



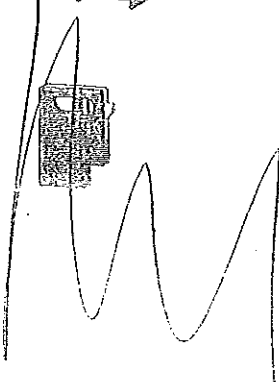
Type	Product code	Název - popis	Weight (kg)	Package (pc)
OD-BC-KS02	20224	Insulating barriers - set (two pieces), for 3P and 4P design	0.03	1
OD-BC-KS42	33660	Insulating barrier - one piece, for 4P design	0.02	1

- included with each circuit breaker or switch-disconnector order
 - in case connection is reversed (supply to terminals 2, 4, 6) it is necessary to install these barriers also on the lower side, for more detailed information see page D21



OD-BC-KS03	20240	Terminal cover - degree of protection IP20, for 3P	0.05	1
OD-BC-KS43	33661	Terminal cover - degree of protection IP20, for 4P	0.07	1

- Increases degree of protection of connection point to IP20, e.g. when used with cable lugs



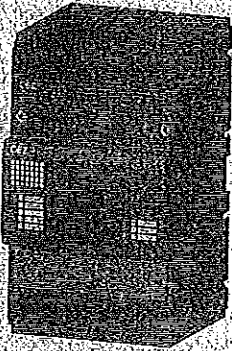
OD-BC-UP01	20241	Lever with locking		1
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- enables to lock the circuit breaker/switch-disconnector in "switched off manually" position (locked)
 - locking is possible using padlock with shank diameter 3 - 4 mm

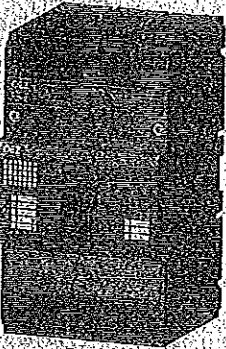
123

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

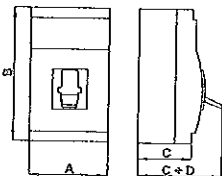
3P 4P



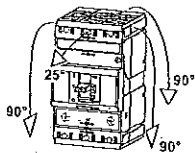
Circuit breaker



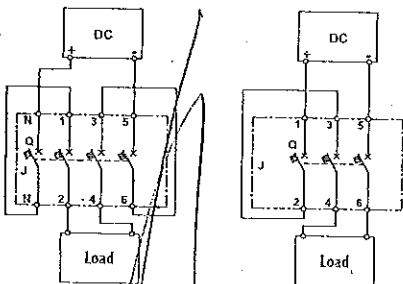
Switch-disconnector



Dimensions



Installation positions



Connection of 3P circuit breaker in DC circuit up to 250 V d.c.

Connection of 4P circuit breaker in DC circuit up to 440 V d.c.

Specifications

	CIRCUIT BREAKER	SWITCH-DISCONNECTOR
Type	BC160N1	BC160N1-SV
Series	NORMAL	
Dimensions A x B x C + D (3P/4P design)	75/100x130x70+23 mm	75/100x130x70+23 mm
Weight (3P/4P design)	1/1.3 kg	1/1.3 kg
Standards	EN 60947-2, IEC 60947-2	EN 60947-3, IEC 60947-3
Approval marks	CE (E) (S)	CE (E) (S)
Number of poles	3, 4	3, 4
Rated current	$16 \div 160 A^{2)}$	
Rated normal current	$16 \div 160 A^{2)}$	160 A
Rated operating current		160 A
Rated operating voltage	U_n max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)	U_n max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)
Rated frequency	f_n 50/60 Hz	50/60 Hz
Rated impulse withstand voltage	U_{imp} 8 kV	8 kV
Rated insulation voltage	U_i 690 V	690 V
Utilization category (selectivity)	690 V a.c. A	
Utilization category (switching mode)	AC-3 (16 ÷ 100 A) AC-2 (125 ÷ 160 A) DC-22A	AC-23 A DC-22A
Rated short-time withstand current	I_{sc} / t	2 kA/1 s
Rated short-circuit ultimate breaking capacity (rms) ¹⁾	I_{cs} / U_e 6 kA/690 V a.c. 12 kA/500 V a.c. 25 kA/415 V a.c. 40 kA/230 V a.c. 25 kA/250 V d.c. $\tau = \text{max. } 15 \text{ ms (3P)}$ 20 kA/440 V d.c. $\tau = \text{max. } 15 \text{ ms (4P)}$	
Off time at I_{cs}	7 ms	
Rated short-circuit service breaking capacity (rms)	I_{sc} / U_e 3 kA/690 V a.c. 6 kA/500 V a.c. 13 kA/415 V a.c. 20 kA/230 V a.c. 13 kA/250 V d.c. $\tau = \text{max. } 10 \text{ ms (3P)}$ 13 kA/440 V d.c. $\tau = \text{max. } 10 \text{ ms (4P)}$	
Rated short-circuit making capacity (peak value)	I_{cm} / U_e 52 kA/415 V a.c.	2.8 kA/415 V a.c.
Losses per 1 pole at $I_n = 160 A$	15 W	15 W
Mechanical endurance	20 000 cycles	20 000 cycles
Electrical endurance ($U_e = 415 V$ a.c.)	6 000 cycles	6 000 cycles
Switching frequency	120 cycles/hr	120 cycles/hr
Control force (3P/4P design)	55/65 N	55/65 N
Degree of protection from front side of the device	IP40	IP40
Degree of protection of terminals	IP20	IP20
Operating conditions		
Reference ambient temperature	40 °C	40 °C
Ambient temperature range	-40 °C ÷ +55 °C	-40 °C ÷ +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Climatic resistance	EN 60068	EN 60068
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz
Design modifications		
Front/rear connection	o/o	o/o
Plug-in design	-	-
Withdrawable design	-	-
Accessories		
Switches - auxiliary/relative/signal/early	o/-/o/-	o/-/o/-
Shunt trip/with signal switch	o/o	o/o
Undervoltage release/with early switch/with signal switch	o/-/o	o/-/o
Front hand drive/side drive right/left	o/o/o	o/o/o
Mechanical interlocking - with Bowden cable/for hand drive	-/o	-/o
Motor drive/with counter of cycles	o/-	o/-
Lever with locking	o	o

o - available, - unavailable, + being prepared

¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_{cs} does not change

²⁾ - ranges of rated currents vary according to characteristics see page D37

- protection of Modelon switch-disconnectors, see page R

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

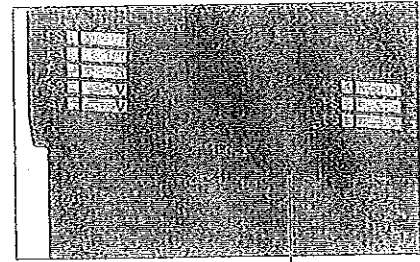
Description of push button function and signalling

TEST push button - by pressing you will switch off the circuit breaker/switch-disconnector, including to actuate the auxiliary switches

Inspection push button - by pressing you will simulate tripping of the circuit breaker by the overcurrent release, including to actuate the auxiliary switches and signal switch. Pressing

requires a suitable instrument, such as a wire with cross-section of about 1 mm.

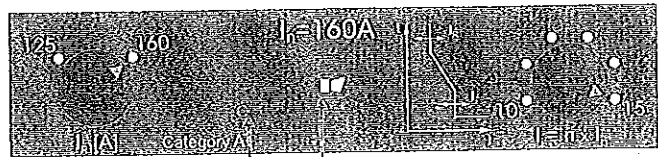
Signalling of tripping by the overcurrent release - after tripping of the circuit breaker by the overcurrent release, it will display the indicator



TEST push button

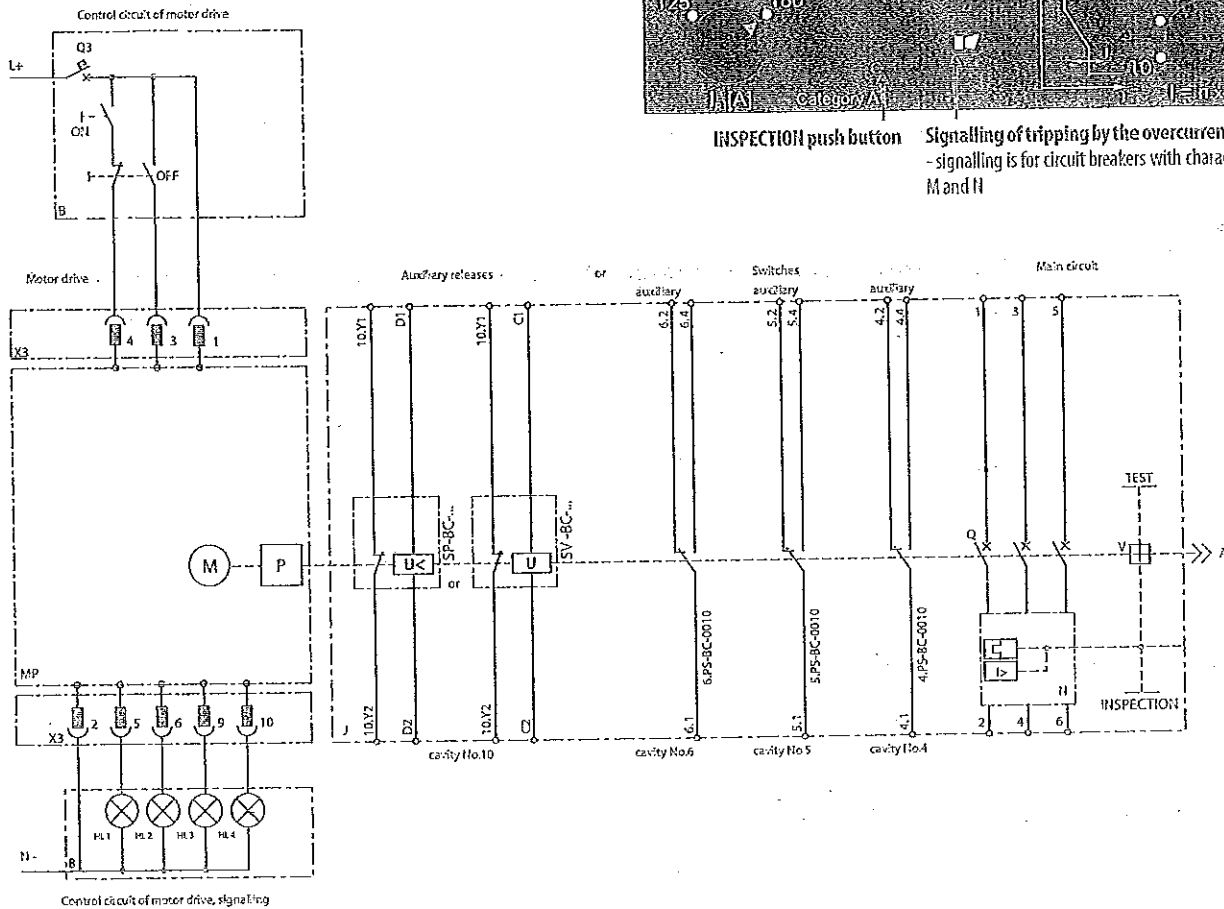
Diagram

Circuit breaker with accessories (3-pole design)

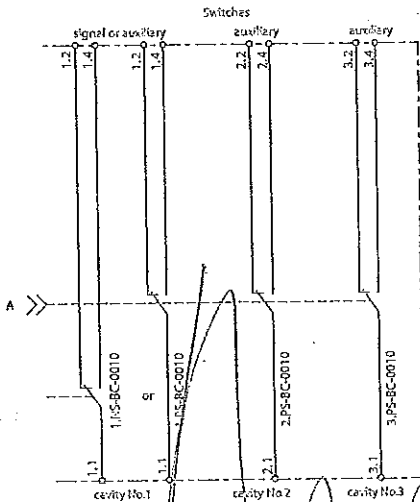


INSPECTION push button

Signalling of tripping by the overcurrent release - signalling is for circuit breakers with characteristic D, M and N



Control circuit of motor drive, signalling



Power losses (per 1 pole)

I [A]	P [W]
16	4
20	4
25	4
32	4
40	4
50	4
63	5
80	6
100	10
125	15
160	15

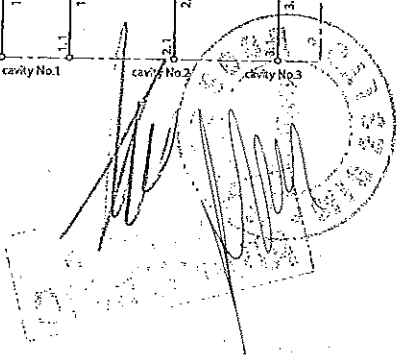
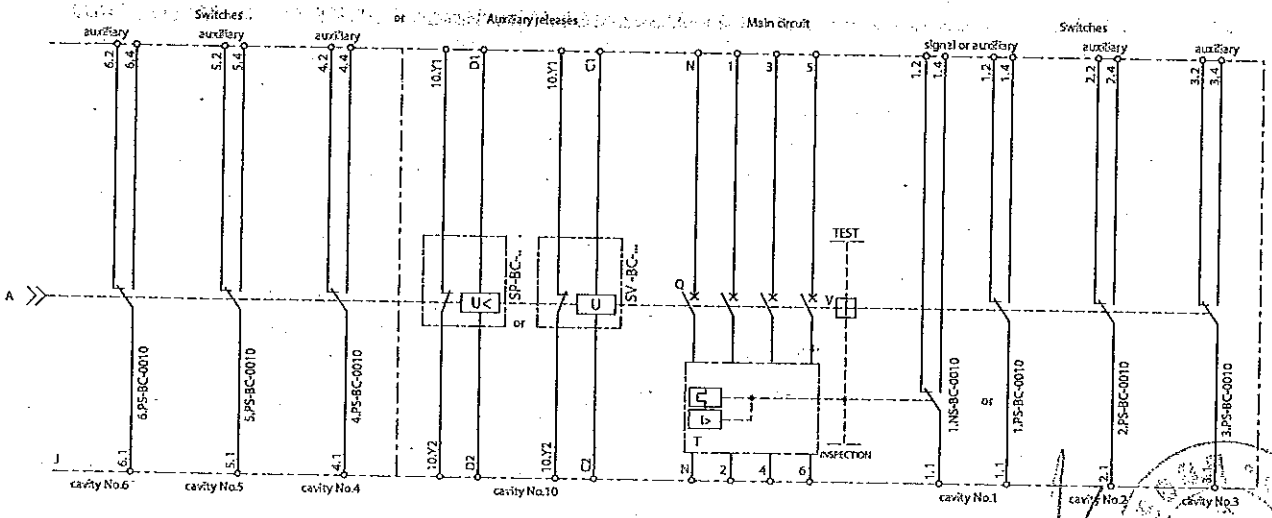
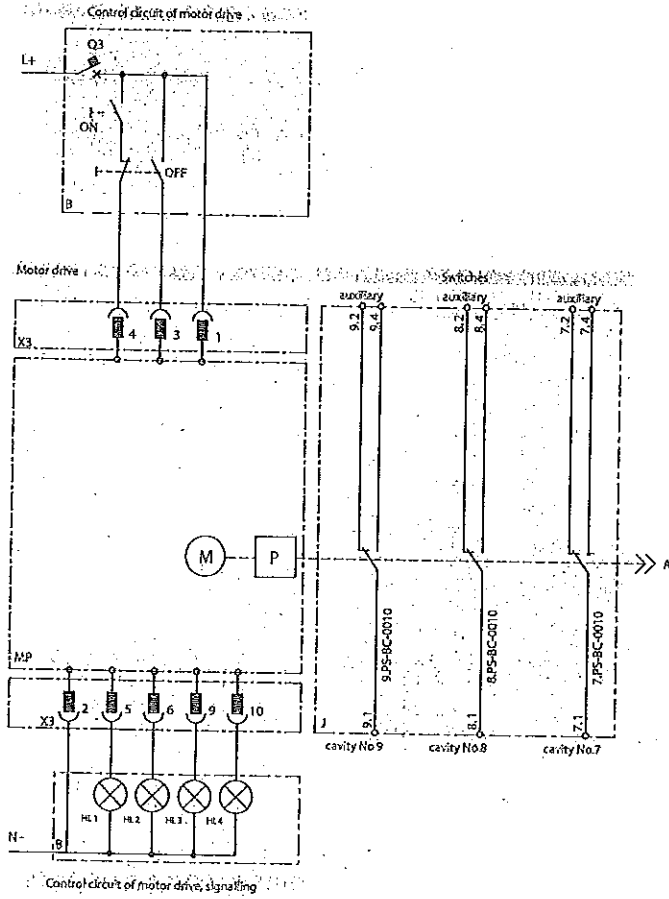
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

Circuit breaker with accessories (4-pole design)

Diagram description

- MP motor drive - MP-BC
 - M motor
 - P gear unit
 - X3 connector for connection of control and signalling circuits
 - B recommended wiring of the control circuits
 - It is not a part of motor drive
 - ON switch on button
 - OFF switch off button
 - Q3 motor drive circuit breaker - see page D50
 - J circuit breaker BC160
 - Q main contacts
 - T thermomagnetic overcurrent release
 - 3P+N (3 poles are protected, 11 pole is unprotected)
 - 4P (all 4 poles are protected)
 - V trip-free mechanism
 - TEST push button to test release
 - REVIZE inspection push button of release
 - SP-BC-X undervoltage release
 - SV-BC-X shunt trip
 - HL1 remote failure signalling (unreliable switching on or switching off)
max. permissible load 10 W¹⁾
 - HL2 signalling of circuit breaker lever position, "loaded", max. permissible load 10 W¹⁾
 - HL3 signalling of opening of the front safety cover of the drive, max. permissible load 10 W¹⁾
 - HL4 signalling of exertion of the drive locking bar, max. permissible load 10 W¹⁾
- ¹⁾ Voltage on terminals 5, 6, 9, 10 is the same as U_n of the motor drive



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

Connecting and installation

Power circuit

- connected with Cu/Al busbars or cables and possibly cables with cable lugs
- connection sets are produced to provide greater connecting options, see page D10
- generally, conductors from the supply are connected to input terminals 1, 3, 5 and conductors from the load to terminals 2, 4, 6; however, it is possible to reverse the connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{cs})
- in case of reversed connection, circuit breaker/switch-disconnector must be fitted with ODBL-KS02 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page D21

- we recommend painting the connecting busbars
- input and output conductors/busbars must be mechanically enforced in order to avoid transferring electrodynamic forces to the circuit breaker during short-circuiting
- the method of connecting the power circuit must observe the deionization space of the circuit breaker/switch-disconnector, see page D21

Auxiliary circuits

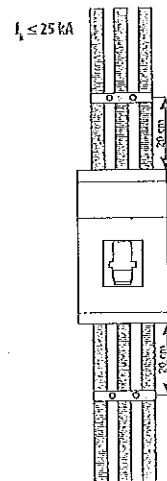
- switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section $0.5 \div 1 \text{ mm}^2$ directly to terminals on these devices

Recommended minimum cross-sections of cables, busbars and flexibars

I_n (A)	Cables S (mm ²)		Busbars W x H (mm)	
	Cu	Al	Cu	Al
16	2,5	-	-	-
20	2,5	-	-	-
25	4	-	-	-
32	6	-	-	-
40	10	-	-	-
50	10	16	-	-
63	16	25	-	-
80	25	35	-	-
100	35	50	16 x 2; 12 x 3	16 x 4; 12 x 5
125	50	70	16 x 4; 12 x 5	16 x 5; 12 x 6
160	70	95	16 x 5; 12 x 6	16 x 6; 12 x 8

it is necessary to follow the relevant valid standards when cables are designed

Mechanical reinforcement of conductors for BC160

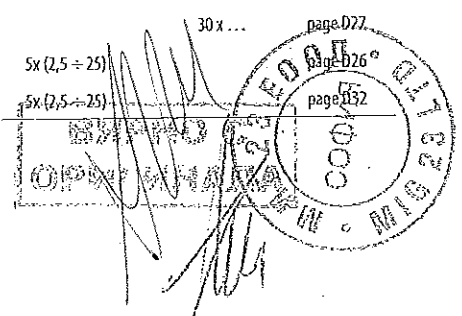


Connecting set specifications

Typ	I_n (A)	Cable - ranges of connection cross-sections ¹⁾ S (mm ²)				Busbars and cable lugs W x H:	Technical information
		Type of cable	sector stranded	sector solid	round stranded		
CS-BC-B021	160		2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	page D25
CS-BC-B421	160		2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	2x (25 ⁰ ÷ 120)	2x (25 ÷ 120)	page D31
CS-BC-A011	160					16 x ...	page D25
CS-BC-A4T1	160						page D31
CS-BC-A021	160					16 x ...	page D26
CS-BC-A421	160						page D32
CS-BC-PS01	10/16			1,5 ÷ 2,5 / 4 ÷ 6			
CS-BC-PS41	10/16			1,5 ÷ 2,5 / 4 ÷ 6			
CS-BC-A033	160	REYFIT [®] - reduction for circuit breaker BA... ³³ with front connection				30 x ...	page D27
CS-BC-B014	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D26
CS-BC-B414	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D32

REYFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

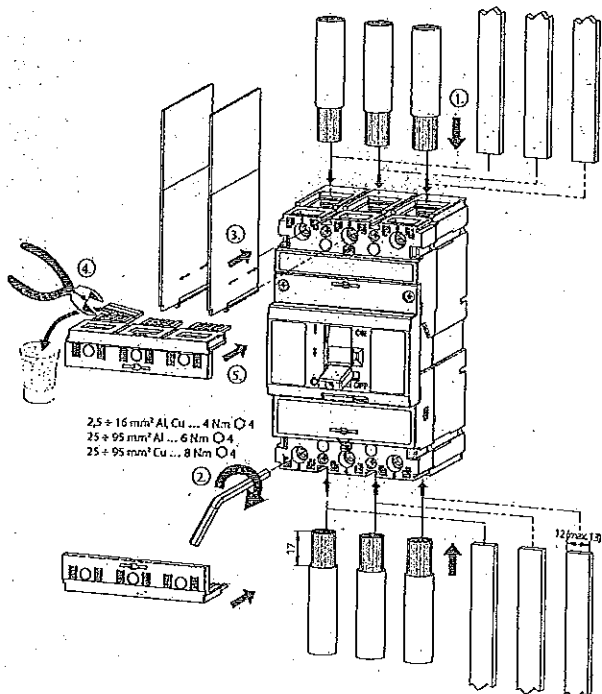
¹⁾ stranded conductor with cross-sections 25 mm² ÷ 50 mm² only with end sleeve



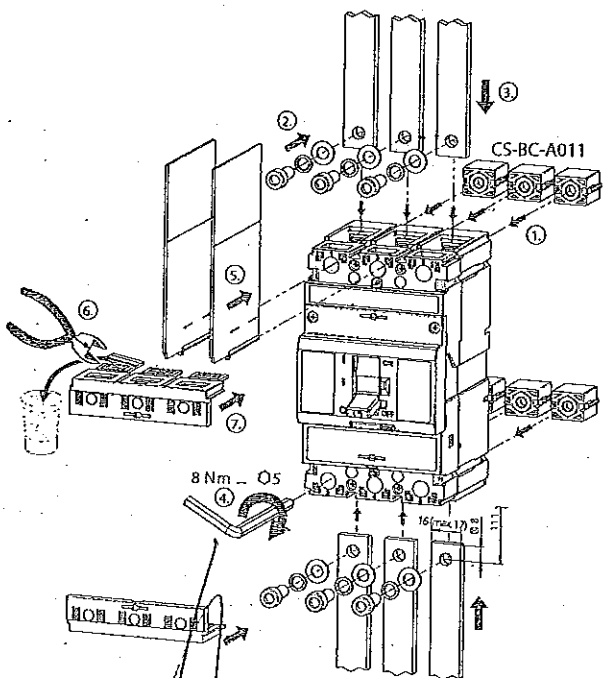
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

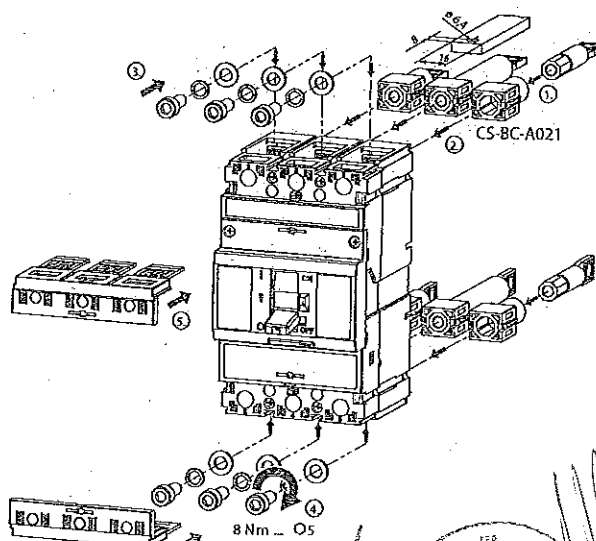
Front connection - Cu/Al cables, busbars (connecting set is a part of circuit breaker/switch-disconnector)



Front connection - Cu/Al busbars



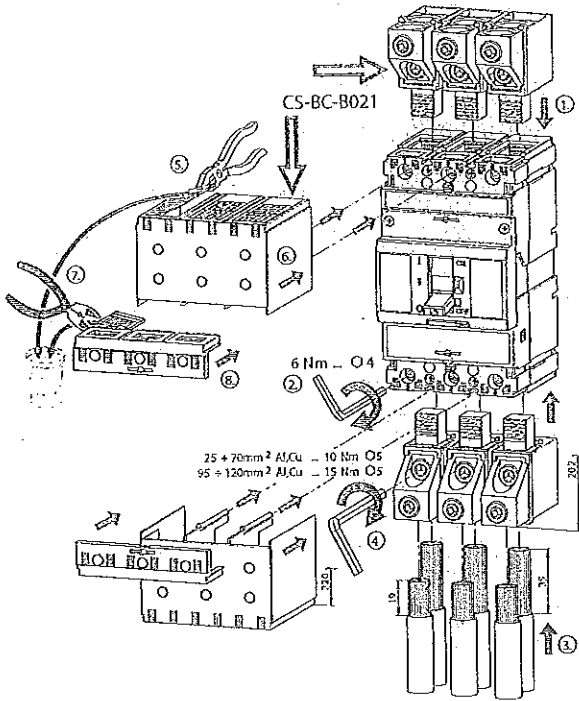
Rear connection - Cu/Al busbars



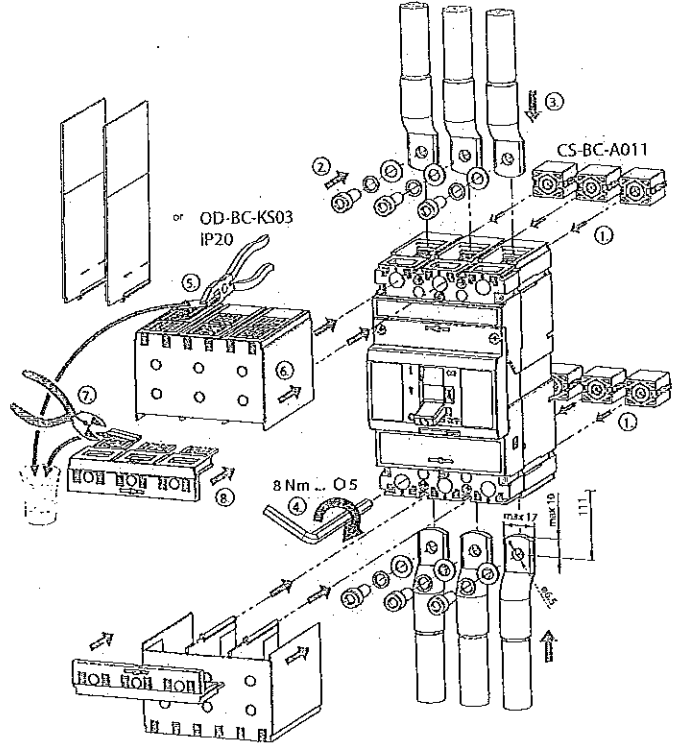
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

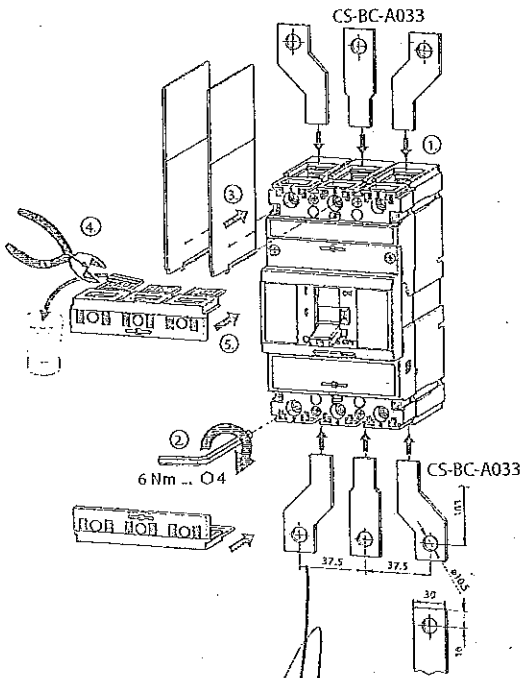
Front connection - 2x Cu/Al cables



front connection - cable lugs



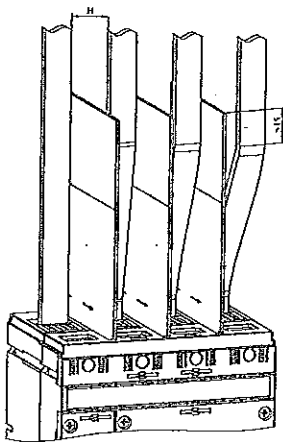
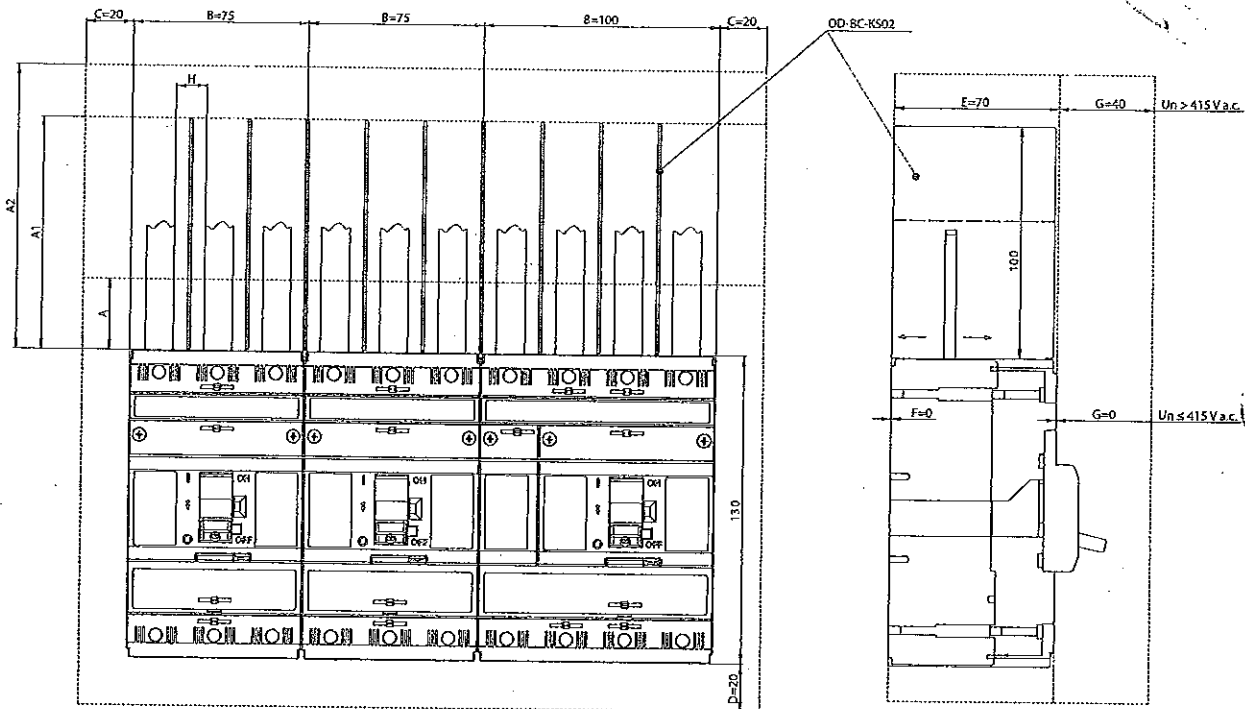
Front connection - reduction to BA...#33



Handwritten signature and stamp.

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Deionization spaces



A... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connection using insulated conductors, cables, flexibars or with rear connection)

A1... minimum insulation length of bare conductors (using OD-BC-KS02 and OD-BC-KS42 insulating barriers from 50 mm to max. 100 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)

Reference	Dimension
A	50 mm
A1	100 mm
A2	150 mm
H	30 mm

A2... minimum distance:

- between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)
- between the circuit breaker/switch-disconnector and busbar
- between two circuit breakers/switch-disconnectors situated vertically above one another
- between uninsulated connections of two circuit breakers/switch-disconnectors above one another

C, D, E, F, G... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall

H... minimum distance between uninsulated conductors

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

FIXED DESIGN

- front connection

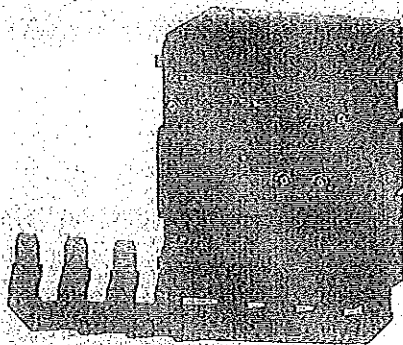
- terminals N, 1, 3, 5 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or OD-BC-KS03 and OD-BC-KS43 terminal cover (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

- terminals N, 2, 4, 6 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or a OD-BC-KS43 terminal cover if circuit breaker/switch-disconnector is connected to the supply using terminals N, 2, 4, 6 (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

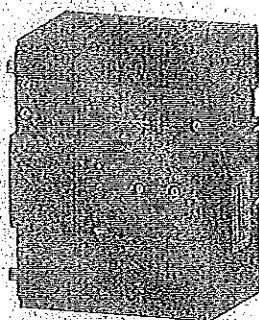
- rear connection

- insulating barriers and covers need not be used

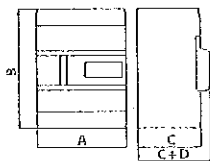
RESIDUAL CURRENT DEVICES



RCD-BC3-E...
RCD-BC4-E...



RCD-BC0-E...



Dimensions

Specifications

		RESIDUAL CURRENT DEVICE	
Type		RCD-BC3-E... RCD-BC4-E...	RCD-BC0-E...
Dimensions A x B x C + D		100 x 130 x 70 + 10 mm	100 x 130 x 70 + 10 mm
Weight		1.7 kg	1.3 kg
Standards		EN 60947-2 IEC 60947-2	EN 60947-2 IEC 60947-2
Approval marks			
Type		A	A
Number of poles		3; 4	3; 4
Rated current		63; 160 A	63; 160 A
Rated residual current		RCD...-EF: 0,3 - fixed/ RCD...-EA: /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A	RCD...-EF: 0,3 - fixed/ RCD...-EA: /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A
Maximum inactivity time		RCD...-EF: 0 - without delay/ RCD...-EA: /0; 0,1; 0,2; 0,3; 0,5; 1,0 s	RCD...-EF: 0 - without delay/ RCD...-EA: /0; 0,1; 0,2; 0,3; 0,5; 1,0 s
Rated voltage		440 V a.c.	440 V a.c.
Rated operating voltage		80 ÷ 253 V a.c./ /80 ÷ 440 V a.c.	80 ÷ 253 V a.c./ /80 ÷ 440 V a.c.
Rated impulse voltage		6 kV	6 kV
Rated frequency		50/60 Hz	50/60 Hz
Losses per 1 pole		4 W	4 W
Mechanical/electrical endurance		8 000 cycles	8 000 cycles
Degree of protection from front side of the device		IP40	IP40
Degree of protection of terminals		IP20	IP20
Method of mounting		side	side
Installation on „U“ rail		o	o
Use		circuit breaker BC160	circuit breaker BC160
Operating conditions			
Reference temperature		40 °C	40 °C
Ambient temperature range		-40 ÷ +55 °C	-40 ÷ +55 °C
Working environment		dry and tropical climate	dry and tropical climate
Pollution degree		3	3
Max. sea level		2 000 m	2 000 m
Seismic resistance		3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz
Accessories			
Connecting sets are part of delivery/have to be bought separately		o/-	-/o

Description

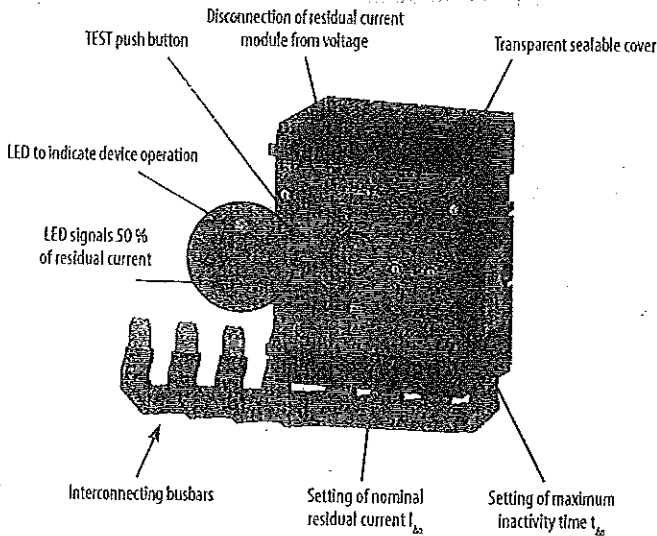
- ☑ Designed to protect against leakage/residual current
- ☑ Accessories for BC160NT circuit breakers... - simple mounting on left side of the device
- ☑ Can be mounted on DIN rail by means of adapter
- ☑ Can be connected with the circuit breaker by interconnecting busbars (can be part of the device itself) or by standard cable
- ☑ Design according to the way of connection:
 - ☐ Version without interconnecting busbars (they are not a part of module)
 - interconnecting busbars can be bought separately, see RCD connection
 - can be connected to the circuit breaker by a cable, see RCD connection (cable is not part of the module)
 - ☐ Version with interconnecting busbars
 - the interconnecting busbars for connection to the circuit breaker are part of the (module circuit breaker terminals H, 2, 4, 6 and module terminals H, 1, 3, 5 are connected)
- ☑ The circuit breaker is switched off by special shunt trip, that is part of the residual current module
- ☑ Design according to nominal current:
 - ☐ Version up to 63 A for BC160NT ... circuit breakers up to 63 A
 - ☐ Version up to 160 A for BC160NT ... circuit breakers from 80 up to 160 A

- ☑ Design according to the parameters setting:
 - ☐ Version with fixed residual current $I_{\Delta n} = 300$ mA, without delay
 - ☐ Design with gradual setting of residual current $I_{\Delta n}$ and with setting of ultimate no action time of $t_{\Delta n}$ (see table)
 - ☐ When there is set $I_{\Delta n} = 0.03$ A the delay is always 0 s
- ☑ Setting can be sealed
- ☑ Module can be connected directly by means of CU/Al cable max. 95 mm²
- ☑ For other connection standard BC160 terminals with the exception of rear connection can be used
- ☑ LED to indicate device operation
- ☑ LED signals 50 % $I_{\Delta n}$
- ☑ Remote signalling of 50 % $I_{\Delta n}$ by means of make contact (only at RCD-BC-EA...)
- ☑ Remote signalling of circuit breaker switch off based on $I_{\Delta n}$ level by means of break contact in shunt trip
- ☑ Mechanism for disconnection of electronic parts of module from voltage - disconnection has to be done before the insulation resistance test is effected
- ☑ TEST push button - complete test of the device by means of stimulation of real residual current
- ☑ Circuit breaker can not be assembled by another shunt trip or undervoltage release
- ☑ Two circuit breakers with residual current module can be assembled neither by mechanical interlocking nor by parallel switching

RESIDUAL CURRENT DEVICES

3P 4P

Description

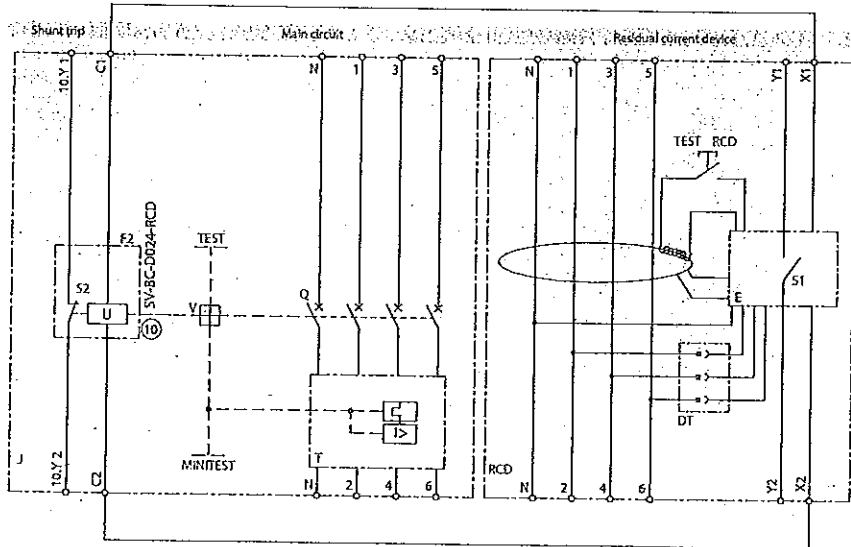


Signal contact specifications

Signalling switch of switch off by a failure		
Rated operating voltage	U_f	230 V a.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_f/U_c	2 A/230 V a.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		01

Signalling switch of exceeding the value of 50 % I _{Δn}		
Rated operating voltage	U_f	250 V a.c./30 V d.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	6 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_f/U_c	5 A/250 V a.c. 5 A/30 V d.c.
Thermal current	I_{th}	5 A
Arrangement of contacts		10

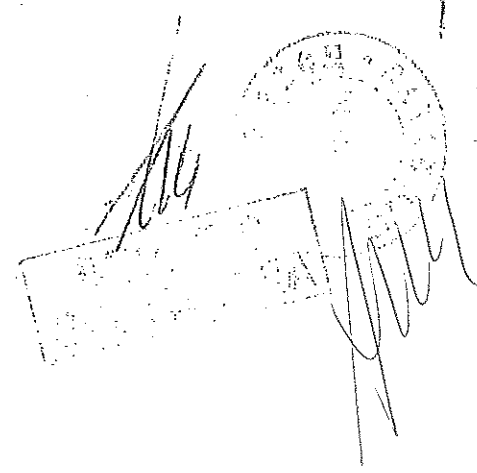
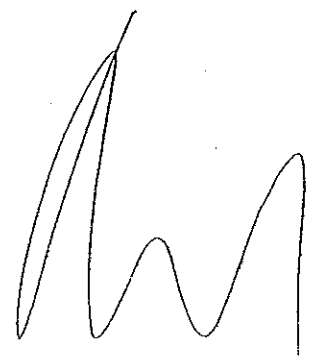
Wiring diagram



- J circuit breaker BC160
- RCD residual current device
- Q main contacts
- V trip-free mechanism
- T thermomagnetic overcurrent release
- E electronic of residual current device
- TEST push button to test release
- MINITEST inspection push button of release
- TEST RCD button of residual current module
- S1 signalling of 50% residual current value
- S2 signalling switch of switch off by a failure
- FZ shunt trip
- DT disconnection of residual current module from voltage

Total max. switching off time

	Maximum inactivity time - adjusted value					
	0 ms	100 ms	200 ms	300 ms	500 ms	1000 ms
$1 \times I_{\Delta n}$	< 70 ms	< 230 ms	< 350 ms	< 440 ms	< 630 ms	< 1200 ms
$2 \times I_{\Delta n}$	< 40 ms	< 200 ms	< 320 ms	< 430 ms	< 620 ms	< 1200 ms
$5 \times I_{\Delta n}$	< 40 ms	< 210 ms	< 310 ms	< 420 ms	< 630 ms	< 1200 ms



RESIDUAL CURRENT DEVICES

Connecting and installation

Reduction of rated current of circuit breaker according to connection type

Circuit breaker	Rated current of circuit breaker	Residual current device	Connection between circuit breaker and RCD	Inlet/outlet cables	Reduction coefficient k ¹⁾	Adjusted current	Real current $I_n = I_n \times k$	Real current $I_n (t = 40^\circ C)$ ⁴⁾	Figure
BC160NT305-160-D	160 A	RCD-BC0-EF16	CS-BC-5016 ²⁾	Cu, 70 mm ² ³⁾	0,9	160 A	144 A	(160 x 0,90)	1
		RCD-BC0-EA16	CS-BC-5416 ²⁾			125 A	112,5 A	(125 x 0,90)	
BC160NT405-160-D	160 A	RCD-BC3-EF16	CS-BC-L016	Cu, 70 mm ² ³⁾	0,95	160 A	152 A	(160 x 0,95)	2
		RCD-BC3-EA16				125 A	119 A	(125 x 0,95)	
BC160NT406-160-D	160 A	RCD-BC4-EF16	CS-BC-L416	Cu, 95 mm ² ³⁾	1	160 A	160 A		1
		RCD-BC4-EA16	125 A			125 A			
BC160NT305-160-L	160 A	RCD-BC0-EF16	CS-BC-5016 ²⁾	Cu, 95 mm ² ³⁾	1	160 A	160 A		2
		RCD-BC0-EA16	CS-BC-5416 ²⁾			125 A	125 A		
BC160NT405-160-L	160 A	RCD-BC3-EF16	CS-BC-L016	Cu, 95 mm ² ³⁾	1	160 A	160 A		2
		RCD-BC3-EA16				125 A	125 A		
BC160NT406-160-L	160 A	RCD-BC4-EF16	CS-BC-L416	cable S = 95 mm ² ³⁾	1	160 A	160 A		3
		RCD-BC4-EA16				125 A	125 A		

¹⁾ - for others circuit breaker is reduction coefficient $k = 1$

²⁾ - connecting sets can be mounted on both upper/lower terminals

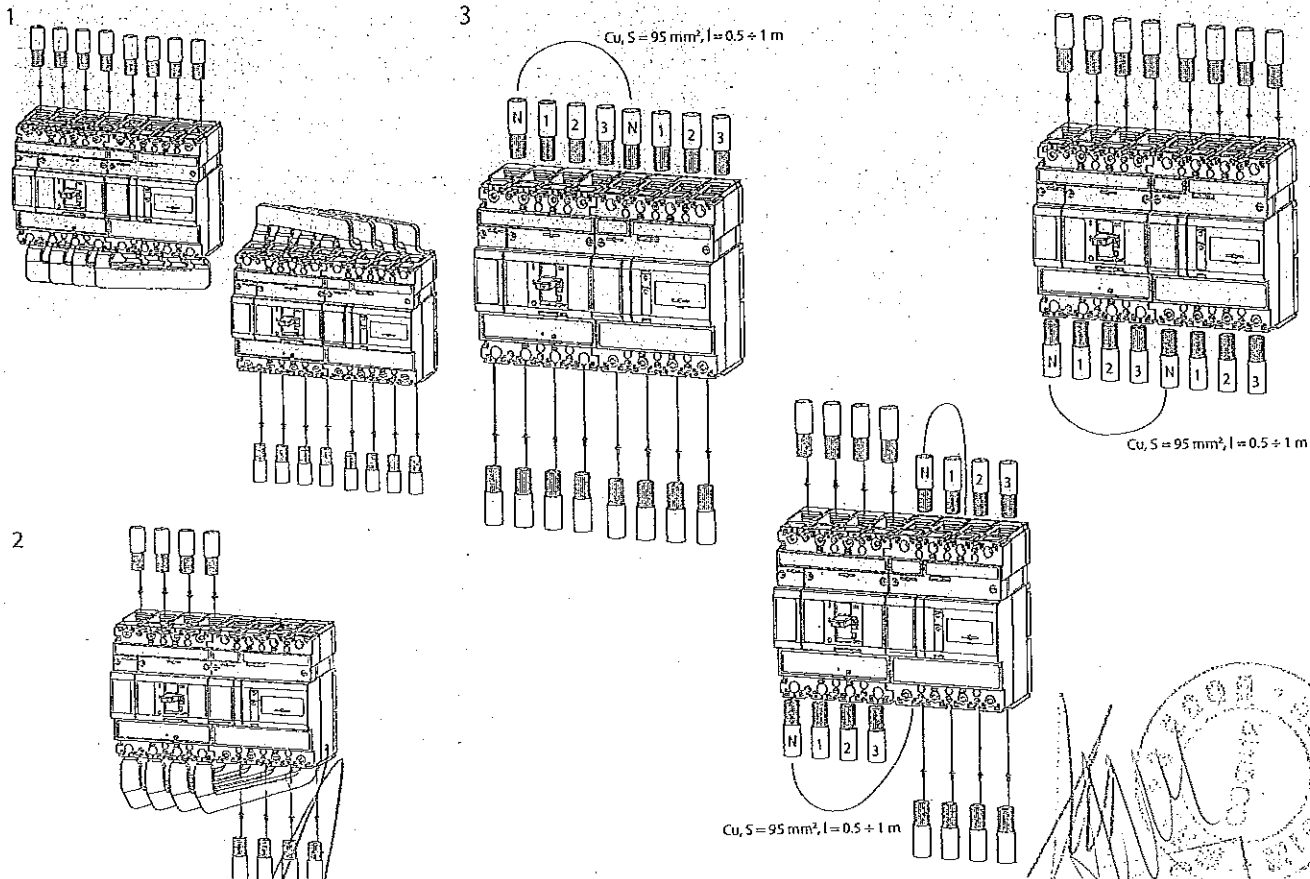
³⁾ - coefficients „k“ are not dependent on ambient temperature

⁴⁾ - dependency of nominal current I_n on ambient temperature can be found in the catalogue, see page D37

⁵⁾ - length of cables 2 m is given by standard EN 60 947-1

⁶⁾ - cables length 0.5 up to 1 m

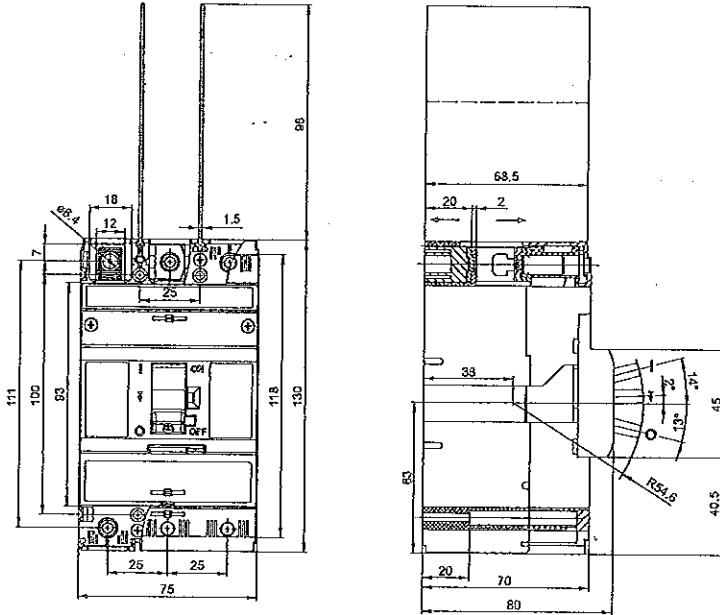
- In case of the connection of the fine stranded conductor, we recommend using of the end sleeve



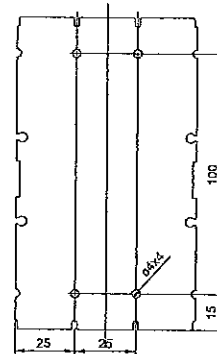
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

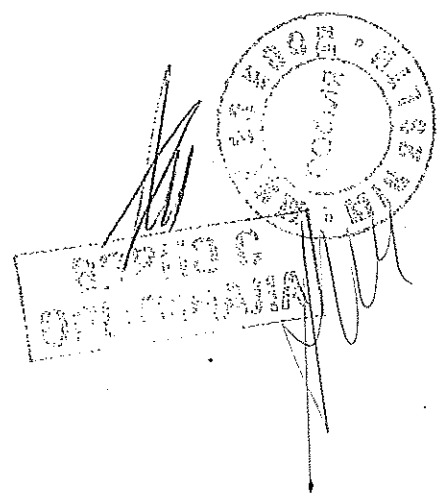
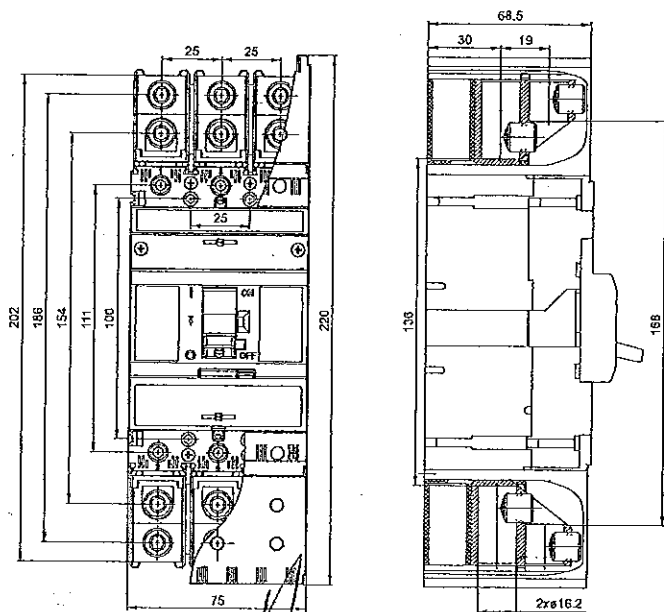
Fixed design, front connection



Drilling diagram



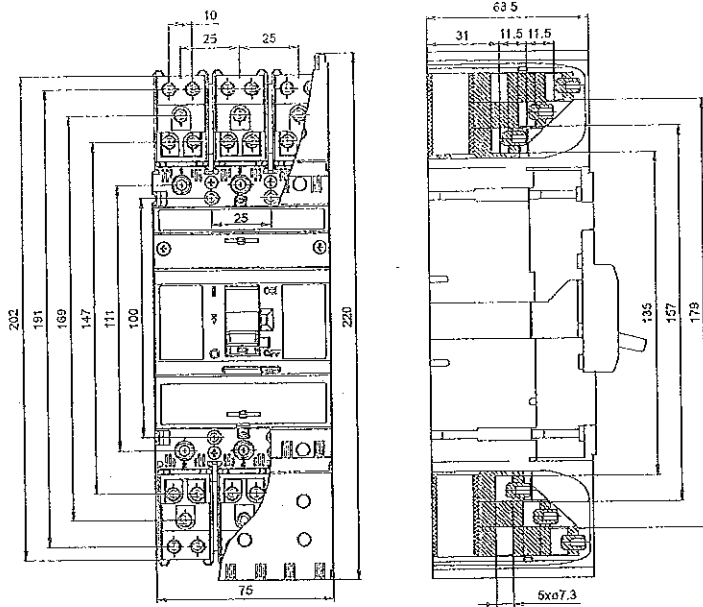
Fixed design, front connection (CS-BC-B021 connecting set)



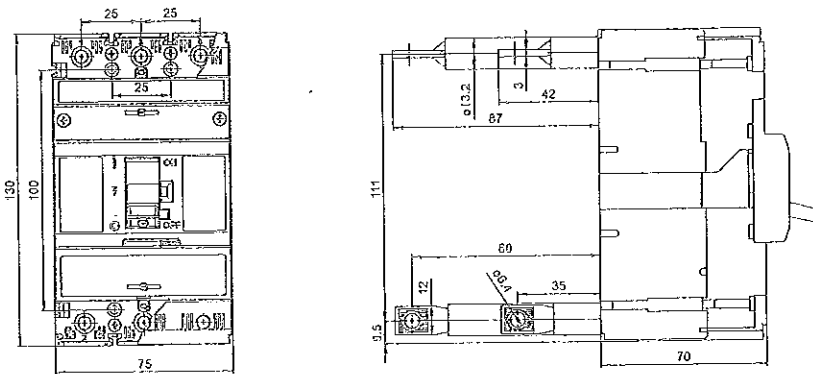
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

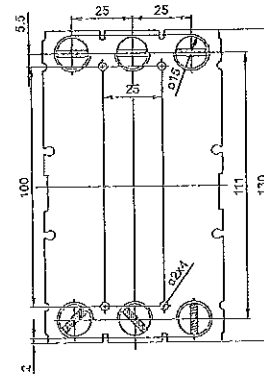
Fixed design, front connection (CS-BC-B014 connecting set)



Fixed design, rear connection (CS-BC-A021 connecting set)



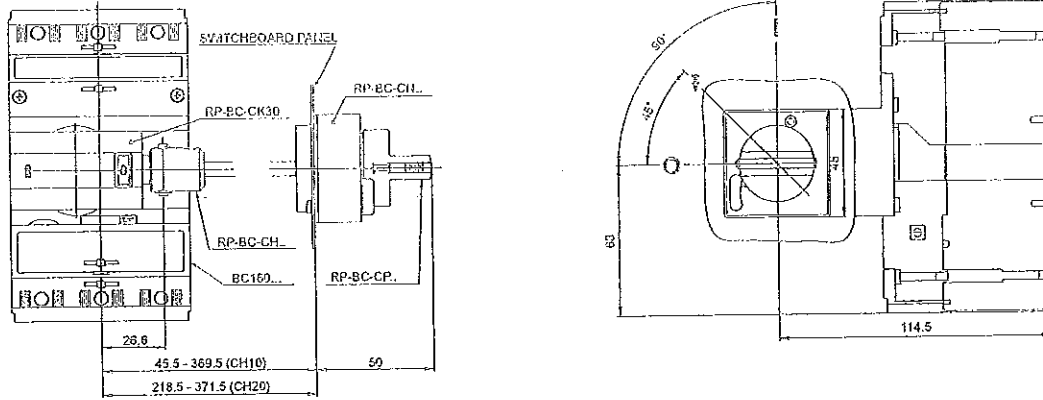
Drilling diagram



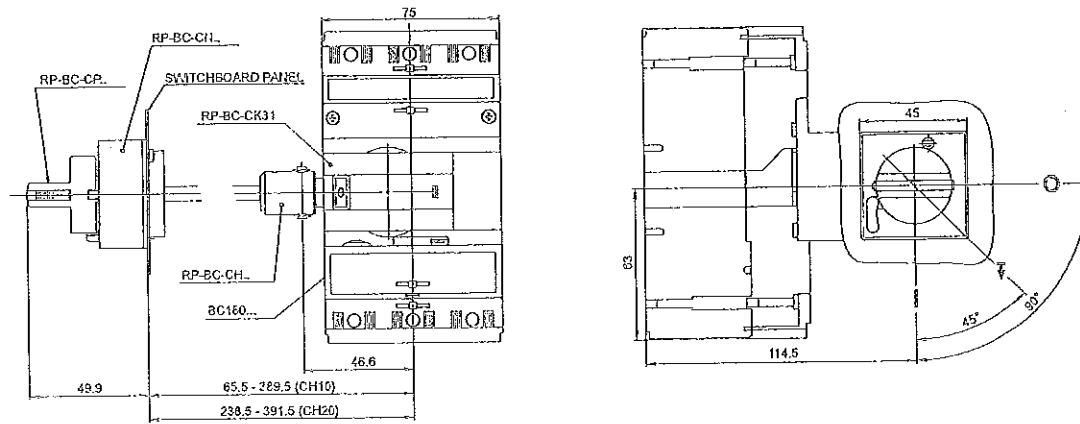
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

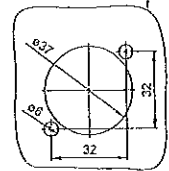
Fixed design, hand drive - control on right side, with adjustable lever



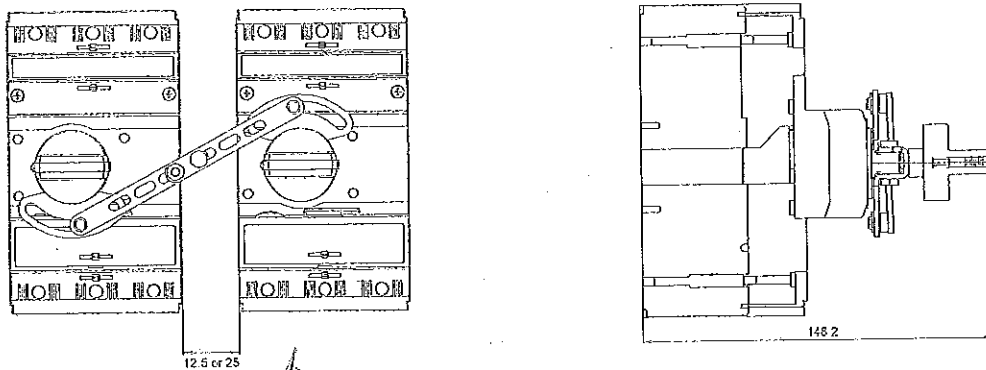
Fixed design, hand drive - control on left side, with adjustable lever



Switchboard modification



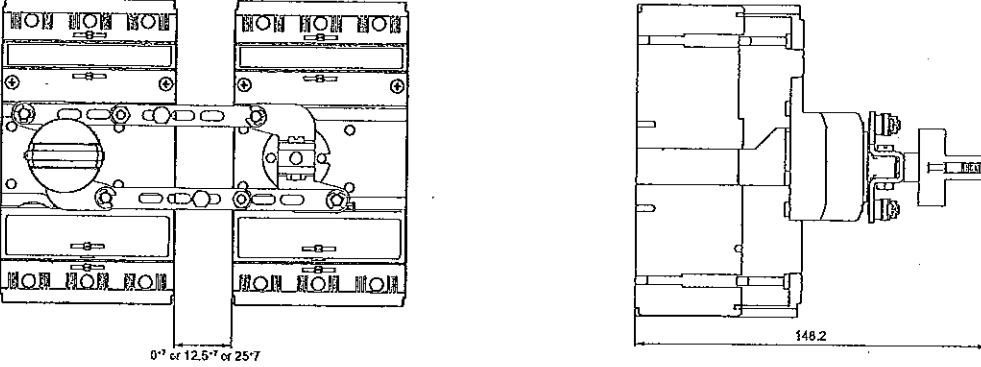
Fixed design, circuit breaker with RP-BC-CB10 mechanical interlocking



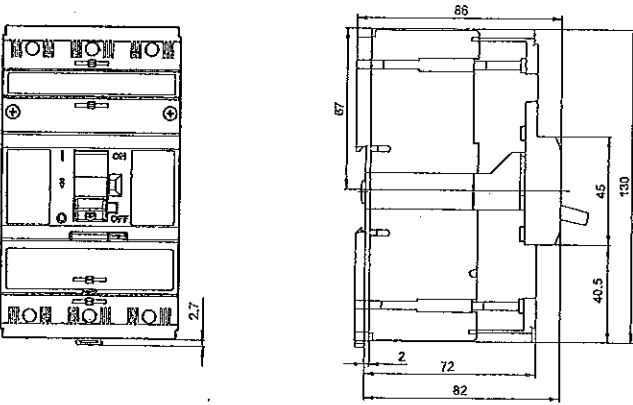
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

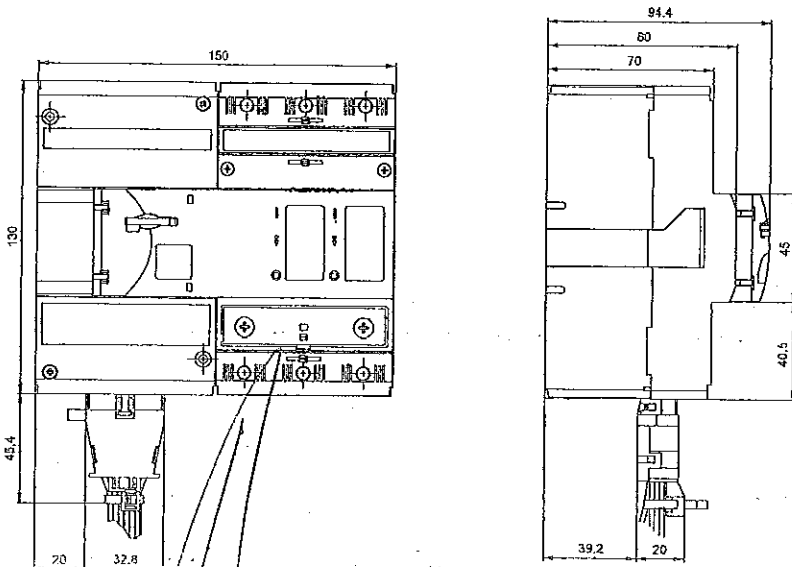
Fixed design, circuit breaker with RP-BC-CD10 mechanical parallel switching



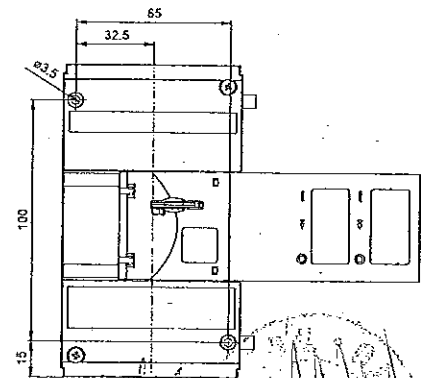
Fixed design, installation on 35 mm DIN rail



Fixed design, motor drive



Drilling diagram

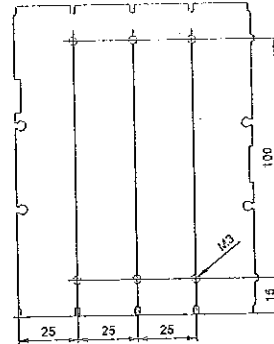
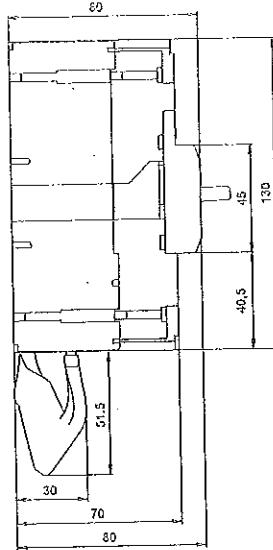
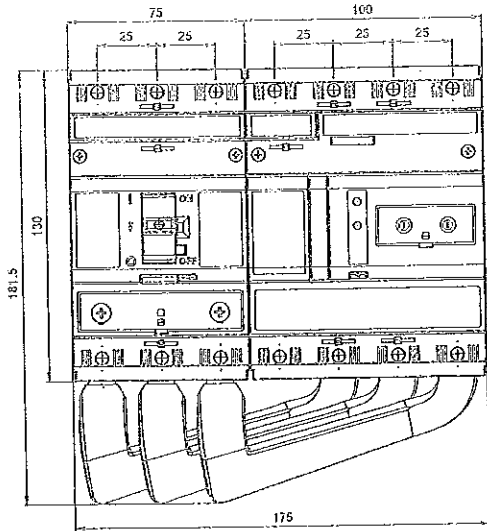


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

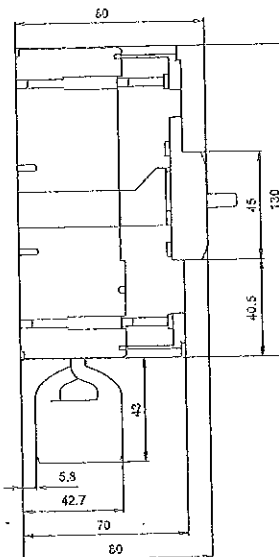
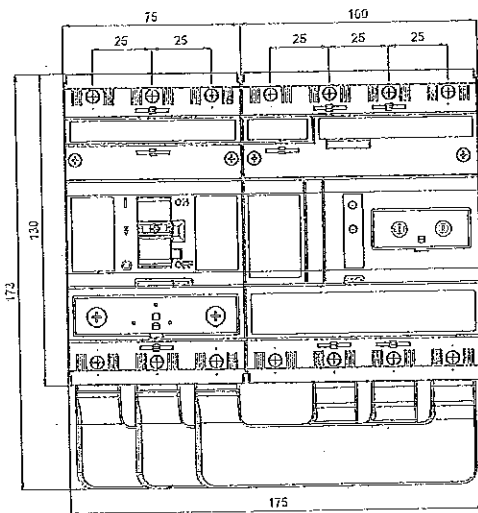
Dimensions

Fixed design, residual current device, rear connection

Drilling diagram



Fixed design, residual current device, bottom connection

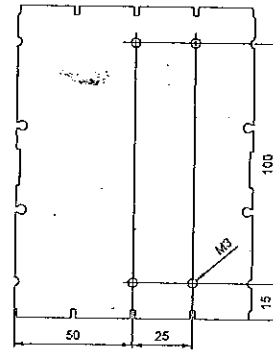
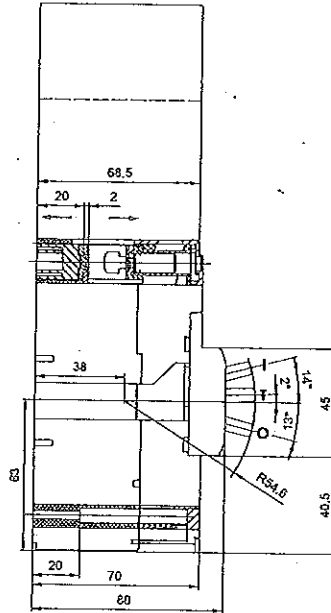
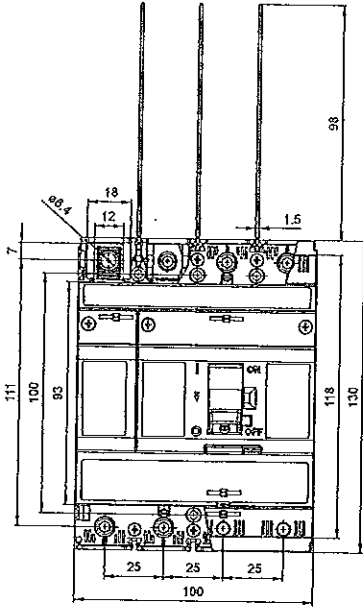


CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

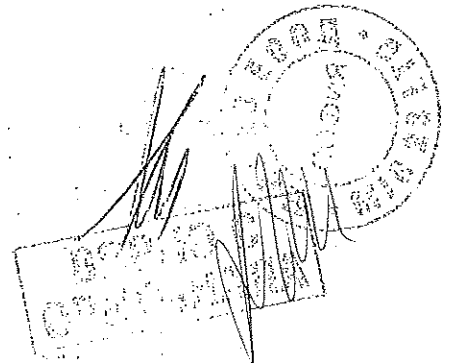
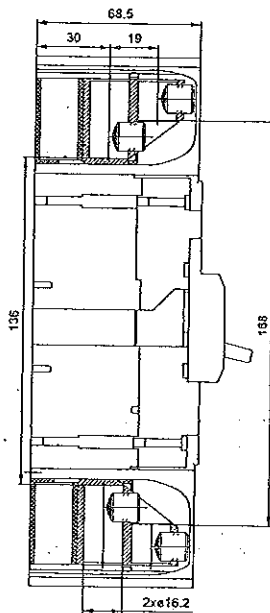
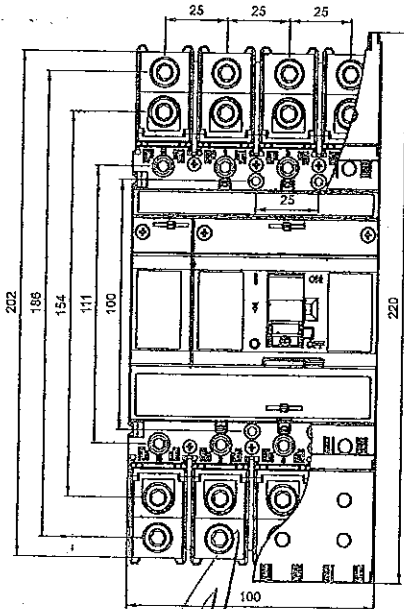
Dimensions

Fixed design, front connection

Drilling diagram



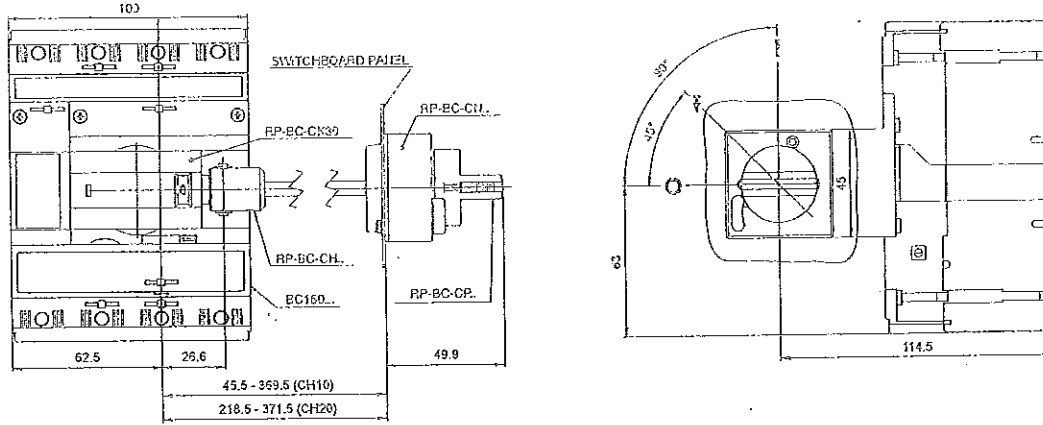
Fixed design, front connection (CS-BC-B421 connecting set)



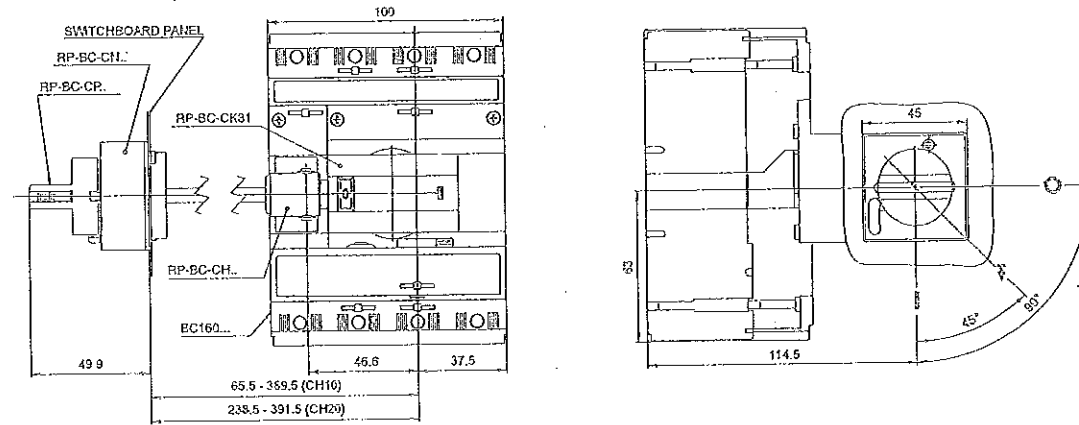
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

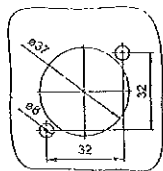
Fixed design, hand drive - control on right side, with adjustable lever



Fixed design, hand drive - control on left side, with adjustable lever



Switchboard modification



[Handwritten signature]

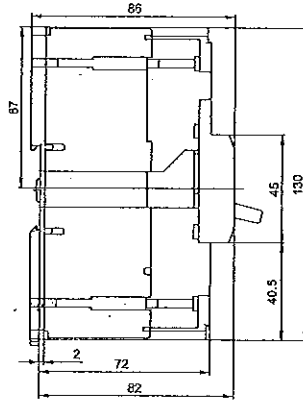
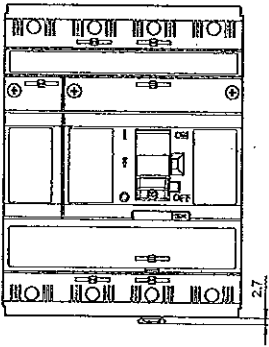
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[Circular stamp]

[Handwritten mark]

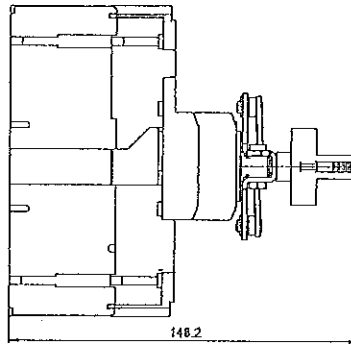
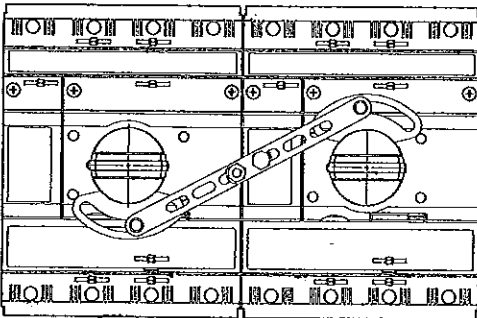
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

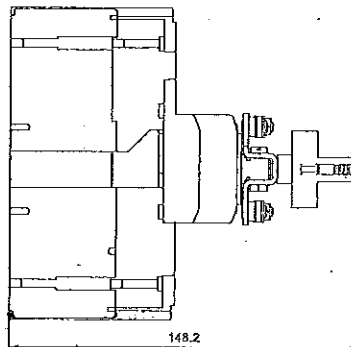
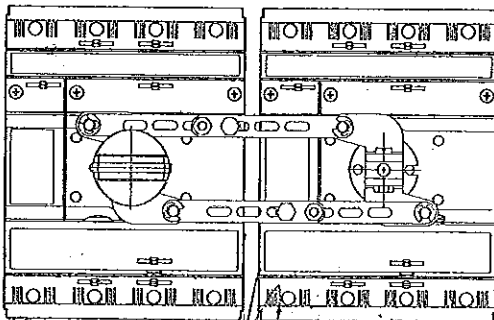
Fixed design, installation on 35 mm DIN rail



Fixed design, circuit breaker with RP-BC-CB10 mechanical interlocking

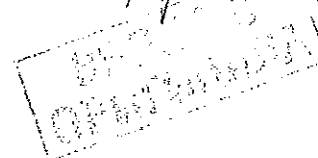


Fixed design, circuit breaker with RP-BC-CD10 mechanical parallel switching



max 6

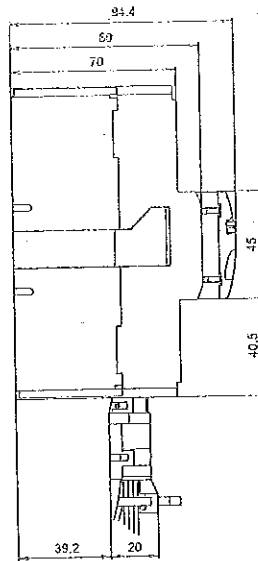
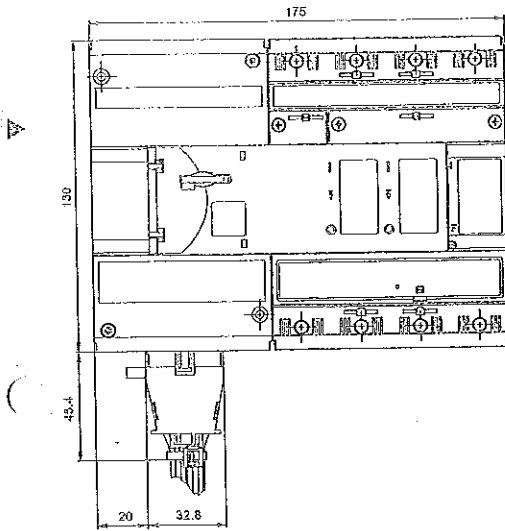
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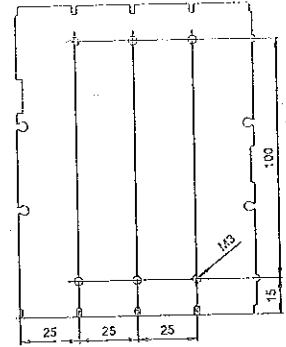
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

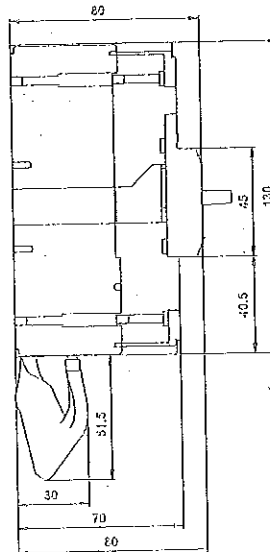
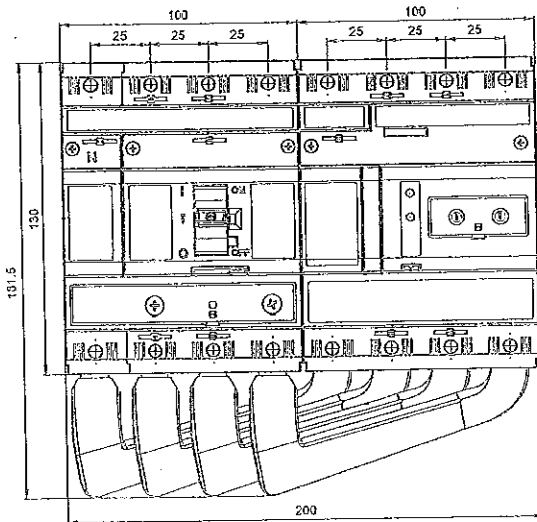
fixed design, motor drive



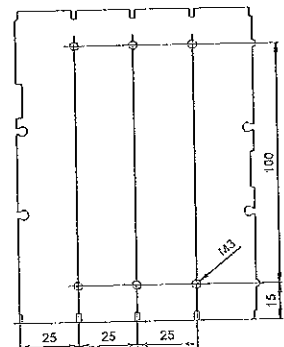
Drilling diagram



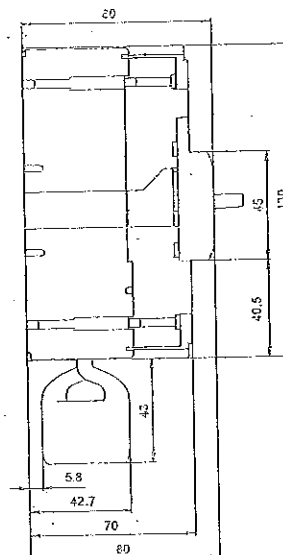
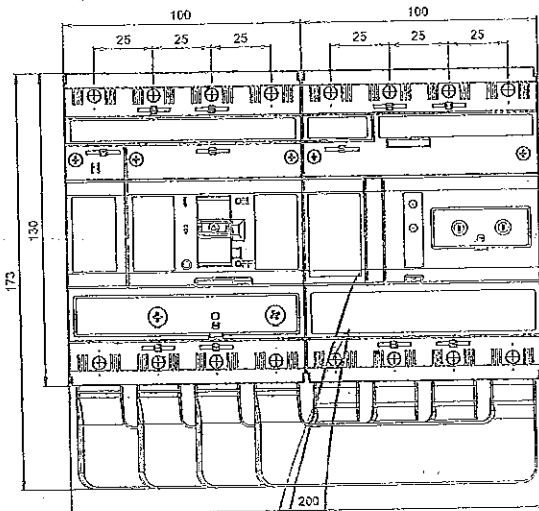
Fixed design, Residual current device, rear connection



Drilling diagram



Fixed design, Residual current device, bottom connection



OVERCURRENT RELEASES

Overcurrent release is built into circuit breaker. Release cannot be demounted and exchanged.

4-pole circuit breakers are produced in variants:

- 3P+N (3 poles are protected, N pole is unprotected)
- 4P (all 4 poles are protected)

Permissible strength of N pole is 100% I_n .

Tripping characteristics

Circuit breakers are supplied with four types of tripping characteristics.

They are designated with the letters:

- „L” - lines (3P, 3P+N, 4P)
 - protection lines with low starting currents
- „D” - distribution (3P, 3P+N, 4P)
 - protection lines and transformers
- „M” - motor (3P, 3P+N, 4P)
 - motors protection
- „N” - only short-circuit release (3P, 4P)

BC160N circuit breakers with “L” characteristic have a given and fixed rated current value. The circuit breakers are produced with I_n values in a standardized series of currents 40 ÷ 160 A see table. Short-circuit release is fixed at the setting 4x I_n .

BC160 circuit breakers with “D” characteristic have the option of setting to a reduced current in a range of approximately 0.75 ÷ 1 I_n . The circuit breakers are produced with I_n values in a standardized series of currents 16 ÷ 160 A see table. Short-circuit release is adjustable. Adjustment values are given in the table.

BC160N circuit breakers with “M” characteristic have the option of setting to a reduced current in a range of approximately 0.75 ÷ 1 I_n . The circuit breakers are produced with I_n values in a standardized series of currents 16 ÷ 100 A see table. Short-circuit release is fixed at the setting 10x I_n . Circuit breakers are not produced in 4-pole design.

BC160N circuit breakers with “N” characteristic have only short-circuit release. They are produced with I_n values in a standardized series of currents from 32 A to 160 A. Short-circuit release is adjustable. Values are given in the table.

Circuit breaker designation is set according to the requested rated current and protection characteristics.

For example: Motors protection with $I_n = 32$ A. Type designation will be BC160NT305-32M.

Tripping characteristic setting:

dependent release (thermal) L (for circuit breakers with characteristics „D” and „M”). Dependent release (reduced current value I_r) is being set in a continuous range using the I_r adjustment dial on the overcurrent release. The I_r adjustment range is 0.75 ÷ 1 I_n .

Independent instantaneous release (short-circuit trip) I (for circuit breakers with “D” and “M” characteristics). With an independent instantaneous release (short-circuit current value I_i), adjustment is possible in a continuous range. All values are given in the table.

The value of short-circuit release in DC circuit
In case that the circuit breaker is used in a DC circuit, it is necessary to set the value of the short-circuit release correctly. DC circuit the short-circuit release $I_i(DC) = I_i \times \sqrt{2}$

Rated currents in accordance with ambient temperature

I _n (A)	I _n			
	35°C	40°C	20°C	15°C
16	15	16	17	19
20	19	20	22	25
25	23	25	28	31
32	29	32	36	41
40	38	40	45	53
50	48	50	56	66
63	57	63	69	83
80	73	80	88	100
100	92	100	108	122
125	112	125	133	145
160	145	160	168	175

Ranges of overcurrent release and their possible setting at 40 °C

I _n (A)	BC160NT305...L		BC160NT305...D		BC160NT305...M		BC160NT305...N	
	I _r (A)	I _i (A)	I _r (A)	I _i (A)	I _r (A)	I _i (A)	I _i (A)	I _i (A)
16	-	-	12.5 ÷ 16	160 ÷ 240	12.5 ÷ 16	160	-	-
20	-	-	16 ÷ 20	200 ÷ 300	16 ÷ 20	200	-	-
25	-	-	20 ÷ 25	250 ÷ 375	20 ÷ 25	250	-	-
32	-	-	25 ÷ 32	160 ÷ 320	25 ÷ 32	320	-	160 ÷ 320
40	40	160	32 ÷ 40	200 ÷ 400	32 ÷ 40	400	-	200 ÷ 400
50	50	200	40 ÷ 50	250 ÷ 500	40 ÷ 50	500	-	250 ÷ 500
63	63	252	50 ÷ 63	315 ÷ 630	50 ÷ 63	630	-	315 ÷ 630
80	80	320	63 ÷ 80	400 ÷ 800	63 ÷ 80	800	-	400 ÷ 800
100	100	400	80 ÷ 100	500 ÷ 1 000	80 ÷ 100	1 000	-	500 ÷ 1 000
125	125	500	100 ÷ 125	625 ÷ 1 250	-	-	-	625 ÷ 1 250
160	160	640	125 ÷ 160	800 ÷ 1 600	-	-	-	800 ÷ 1 600

Tripping characteristic class

Tripping times of the overcurrent release of circuit breakers BC160 with characteristic M at 7.2 I_n corresponds to the release class 10 A, 10 and 20 according to EN 60947-4-1.

I _n	Type	Class
16	BC160NT305-16-M	10A
20	BC160NT305-20-M	10A
25	BC160NT305-25-M	10A
32	BC160NT305-32-M	10
40	BC160NT305-40-M	10
50	BC160NT305-50-M	20
63	BC160NT305-63-M	20
80	BC160NT305-80-M	20
100	BC160NT305-100-M	20

OVERCURRENT RELEASES - D



Reduced current

Short-circuit release

$I_n = 16 \text{ A}$
BC160NT305-16-D

$I_n = 20 \text{ A}$
BC160NT305-20-D

$I_n = 25 \text{ A}$
BC160NT305-25-D

$I_n = 32 \text{ A}$
BC160NT305-32-D

$I_n = 40 \text{ A}$
BC160NT305-40-D

$I_n = 50 \text{ A}$
BC160NT305-50-D

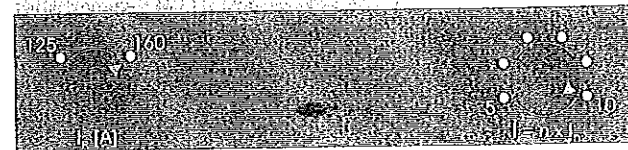
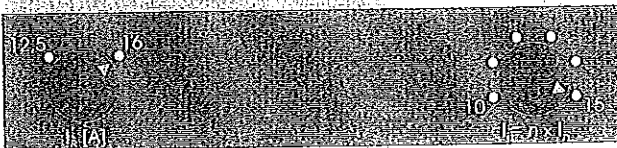
$I_n = 63 \text{ A}$
BC160NT305-63-D

$I_n = 80 \text{ A}$
BC160NT305-80-D

$I_n = 100 \text{ A}$
BC160NT305-100-D

$I_n = 125 \text{ A}$
BC160NT305-125-D

$I_n = 160 \text{ A}$
BC160NT305-160-D

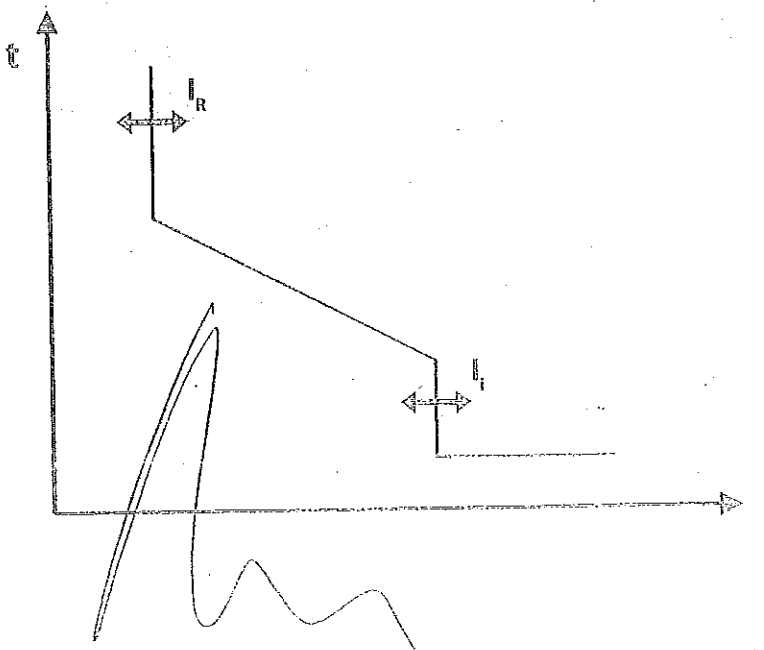


Properties

- ☐ suitable for protection of lines and distribution transformers
- ☐ protects against both overcurrent and short circuit
- ☐ reduced current setting $I_R = 0.75 \div 1 I_n$
- ☐ setting of short-circuit release:
 - circuit breakers with $I_n = 16 \text{ A}, 20 \text{ A}, 25 \text{ A}, 32 \text{ A}$ in the range of $10 \div 15 I_n$
 - circuit breakers with $I_n = 40 \text{ A}$ to 160 A in the range of $5 \div 10 I_n$
- ☐ setting of I_R and I_I by means of knobs is smooth and linear in the marked range
- ☐ overcurrent release indicates circuit breaker switching off by overcurrent or short circuit by an optical symbol
- ☐ the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	D
Overcurrent release setting	
Reduced current	$I_R \dots \text{A}$
Short-circuit release current	$I_I \dots \text{A} (\dots \times I_n)$



IMPORTANT

- ☐ the set value of current of the short-circuit release must correspond to the impedance loop
- conditions must be fulfilled for automatic disconnection from power supply in case of failure

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OVERCURRENT RELEASES - M

3P 4P

$I_n = 16 A$
BC160NT305-16-M

$I_n = 20 A$
BC160NT305-20-M

$I_n = 25 A$
BC160NT305-25-M

$I_n = 32 A$
BC160NT305-32-M

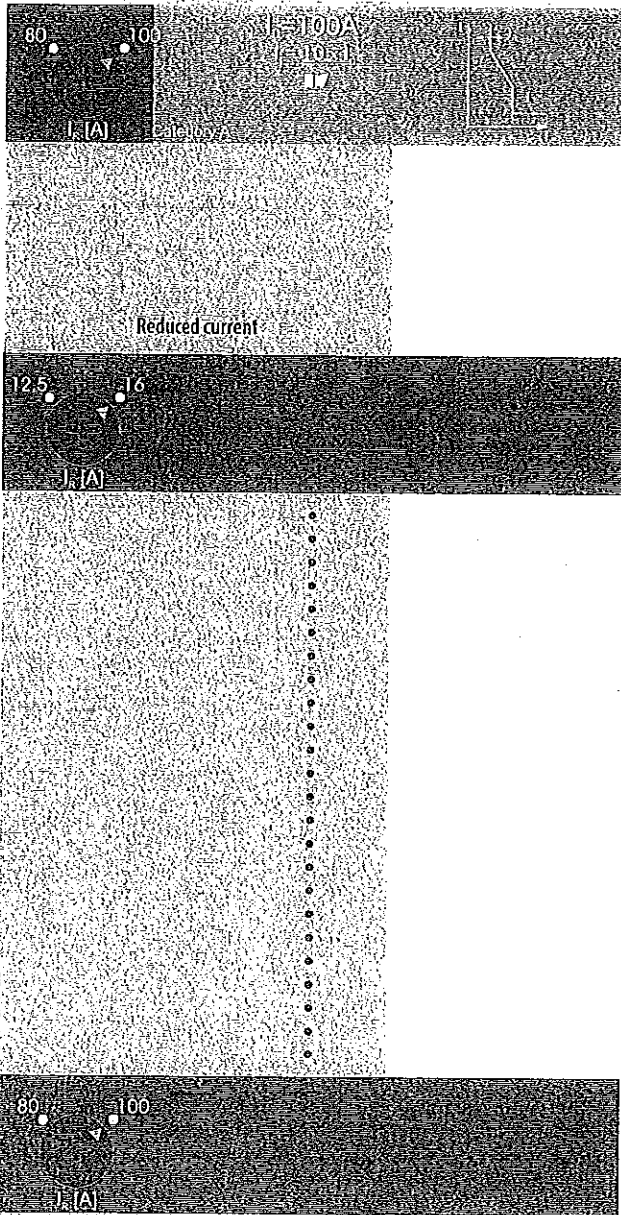
$I_n = 40 A$
BC160NT305-40-M

$I_n = 50 A$
BC160NT305-50-M

$I_n = 63 A$
BC160NT305-63-M

$I_n = 80 A$
BC160NT305-80-M

$I_n = 100 A$
BC160NT305-100-M

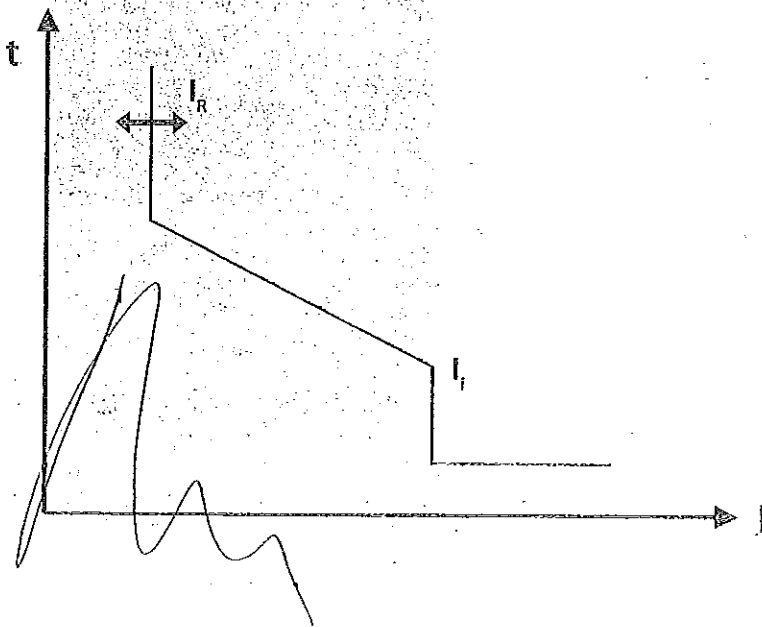


Properties

- appropriate for protection of motors
- protects against both overcurrent and short circuit
- reduced current setting $I_R = 0.75 \div I_n$
- the value of the short-circuit release is fixed at $10 I_n$
- setting of I_R by means of knob is smooth and linear in the marked range
- overcurrent release indicates circuit breaker switching off by overcurrent or short circuit by an optical symbol
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	M
Overcurrent release setting	I_n A
Reduced current	I_R A
Short-circuit release current	$10 I_n$ A (10xI _n)



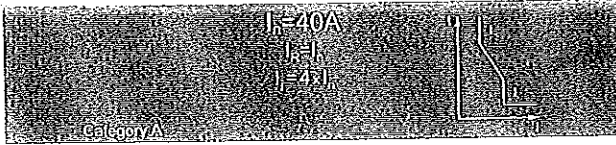
IMPORTANT

- reduced current I_R must not be higher than rated current of the motor

Handwritten signature and a circular stamp from 'MNT 23 P.O. 2000' and a rectangular stamp from 'BAPNO E OFIETNAIA'.

OVERCURRENT RELEASES - L

$I_n = 40 \text{ A}$
BC160NT305-40-L



$I_n = 50 \text{ A}$
BC160NT305-50-L

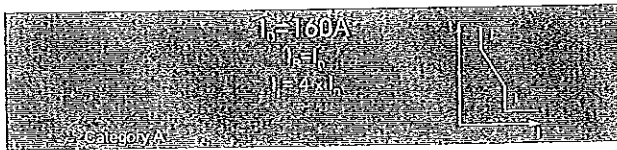
$I_n = 63 \text{ A}$
BC160NT305-63-L

$I_n = 80 \text{ A}$
BC160NT305-80-L

$I_n = 100 \text{ A}$
BC160NT305-100-L

$I_n = 125 \text{ A}$
BC160NT305-125-L

$I_n = 160 \text{ A}$
BC160NT305-160-L



Properties

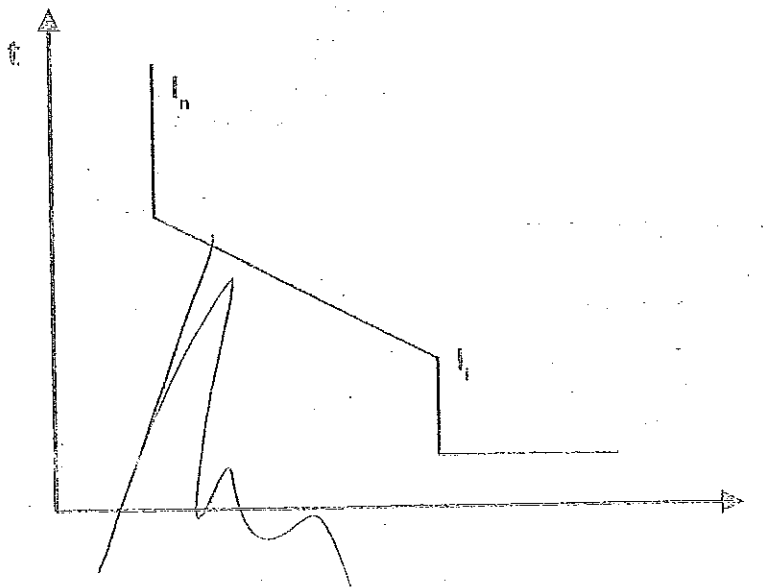
- ▣ the release is suitable for protection of lines with low impulse currents
- ▣ protects against both overcurrent and short circuit
- ▣ it is not possible to set a reduced current I_a
- ▣ the value of the short-circuit release I_s is fixed at $4 I_n$

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	L
Overcurrent release values	
Rated current	I_n A
Short-circuit release current	I_s A ($4 \times I_n$)

Rated current

Short-circuit release

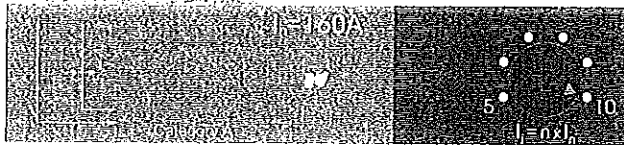


IMPORTANT

- ▣ high impulse current must not be in the circuit - undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$.

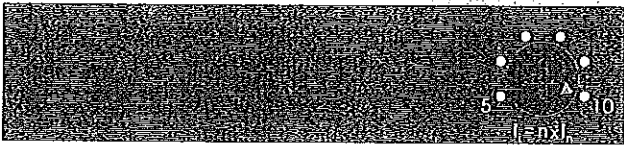
OVERCURRENT RELEASES - N

3P 4P



Short-circuit release

$I_n = 32 \text{ A}$
BC160NT305-32-N



$I_n = 40 \text{ A}$
BC160NT305-40-N

$I_n = 50 \text{ A}$
BC160NT305-50-N

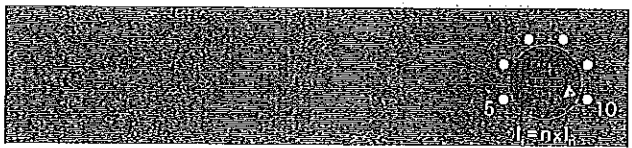
$I_n = 63 \text{ A}$
BC160NT305-63-N

$I_n = 80 \text{ A}$
BC160NT305-80-N

$I_n = 100 \text{ A}$
BC160NT305-100-N

$I_n = 125 \text{ A}$
BC160NT305-125-N

$I_n = 160 \text{ A}$
BC160NT305-160-N

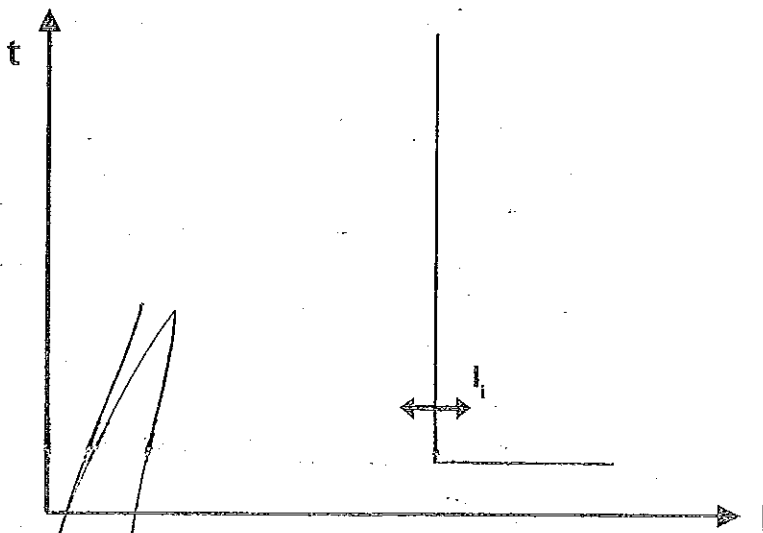


Properties

- for protection of e.g. motors with own overload protection
- it does not protect in the overload range – it does not react to low over-currents
- the set values of the short-circuit release within $5 \div 10 I_n$
- setting of I_1 by means of knobs is smooth and linear in the marked range
- the overcurrent release indicates circuit breaker switching off by short circuit by an optical symbol
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT305-...
Overcurrent release	N
Overcurrent release setting	
Rated current	I_n ... A
Short-circuit release current	I_1 ... A (... x I_n)



IMPORTANT

- the set value of current of the short-circuit release must correspond to the impedance loop – conditions must be fulfilled for automatic disconnection from power supply in case of failure

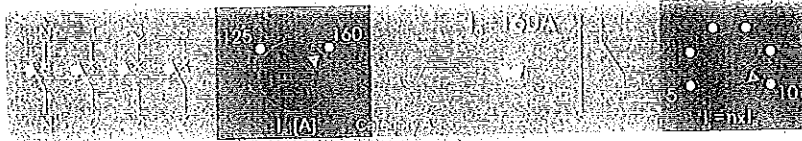
[Handwritten signatures and stamps]

Stamp: **OPSTIMANA**

Stamp: **D41**

[Handwritten number: 285]

OVERCURRENT RELEASES - D



$I_n = 16\text{ A}$
BC160NT406-16-D

$I_n = 20\text{ A}$
BC160NT406-20-D

$I_n = 25\text{ A}$
BC160NT406-25-D

$I_n = 32\text{ A}$
BC160NT406-32-D

$I_n = 40\text{ A}$
BC160NT406-40-D

$I_n = 50\text{ A}$
BC160NT406-50-D

$I_n = 63\text{ A}$
BC160NT406-63-D

$I_n = 80\text{ A}$
BC160NT406-80-D

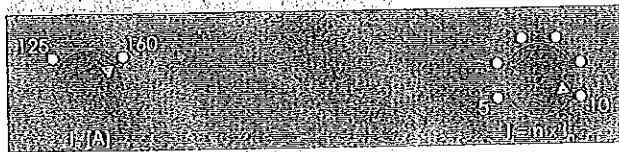
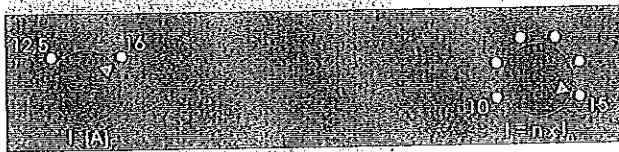
$I_n = 100\text{ A}$
BC160NT406-100-D

$I_n = 125\text{ A}$
BC160NT406-125-D

$I_n = 160\text{ A}$
BC160NT406-160-D

Reduced current

Short-circuit release

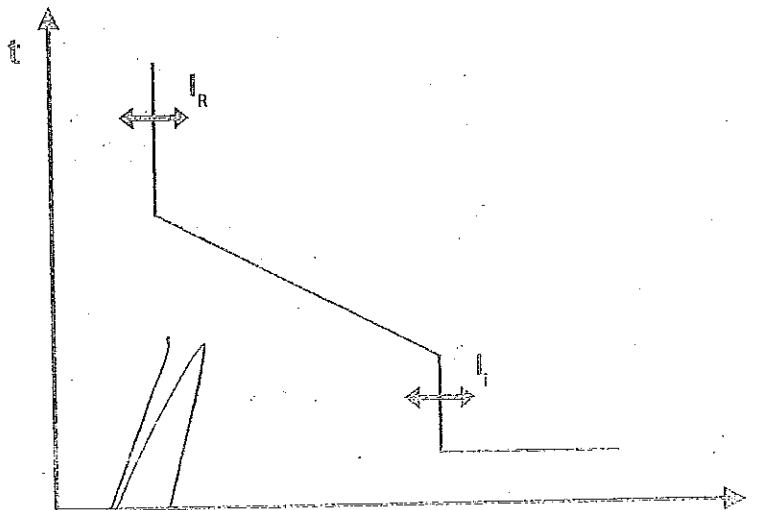


Properties

- ☑ it is appropriate for protection of lines and distribution transformers with protected „N“ conductor in TH-C-S and TH-S networks
- ☑ protects against both overcurrent and short circuit
- ☑ reduced current setting $I_R = 0.75 \div 1 I_n$
- ☑ setting of short-circuit release:
 - circuit breakers with $I_n = 16\text{ A}, 20\text{ A}, 25\text{ A}, 32\text{ A}$ in the range of $10 \div 15 I_n$
 - circuit breakers with $I_n = 40\text{ A}$ to 160 A in the range of $5 \div 10 I_n$
- ☑ the value of reduced current I_R and of short-circuit release I_I for the fourth pole is the same as for the other three poles
- ☑ setting of I_R and I_I by means of knobs is smooth and linear in the marked range
- ☑ the overcurrent release indicates circuit breaker switching off by short circuit by an optical symbol
- ☑ the values of parameters of the overcurrent release are set by the manufacturer to maximum

Data for the project

Circuit breaker	BC160NT405-...
Overcurrent release	D
Overcurrent release setting	
Reduced current	I_R A
Short-circuit release current	I_I A (.... x I _n)



IMPORTANT

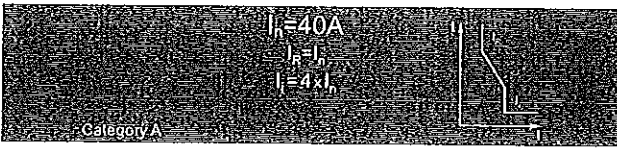
- ☑ the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure

OVERCURRENT RELEASES - L

4P



$I_n = 40\text{ A}$
BC160NT406-40-L



$I_n = 50\text{ A}$
BC160NT406-50-L

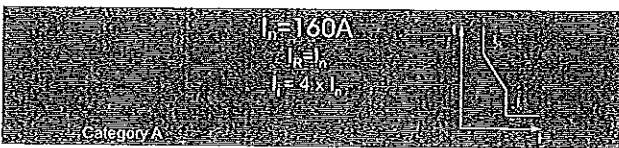
$I_n = 63\text{ A}$
BC160NT406-63-L

$I_n = 80\text{ A}$
BC160NT406-80-L

$I_n = 100\text{ A}$
BC160NT406-100-L

$I_n = 125\text{ A}$
BC160NT406-125-L

$I_n = 160\text{ A}$
BC160NT406-160-L

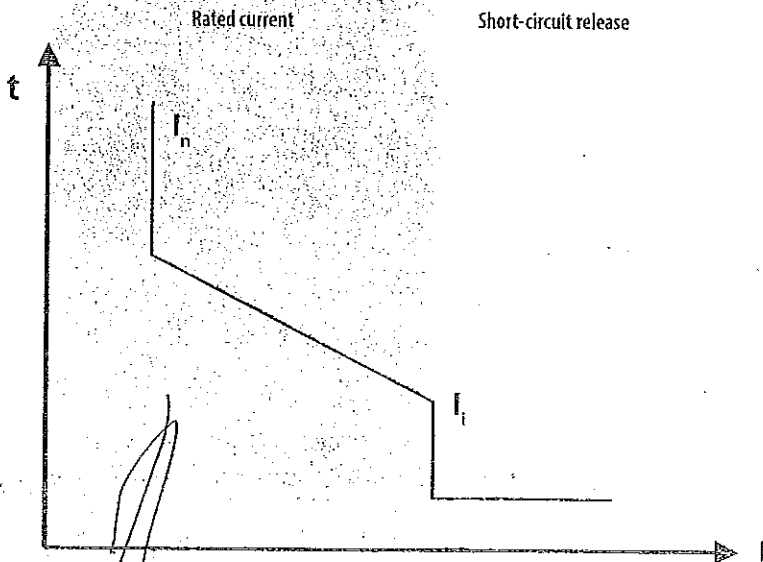


Properties

- it is appropriate for protection of lines with low starting currents including the protected „N“ conductor in TN-C-S and TN-S networks
- it protects against overcurrent and short circuit
- it is not possible to set a reduced current I_R
- the value of the reduced release I_t is fixed at $4 I_n$
- the value of reduced current I_R and of short-circuit release I_t for the fourth pole is the same as for the other three poles
- the values of parameters of the overcurrent release are set by the manufacturer to maximum

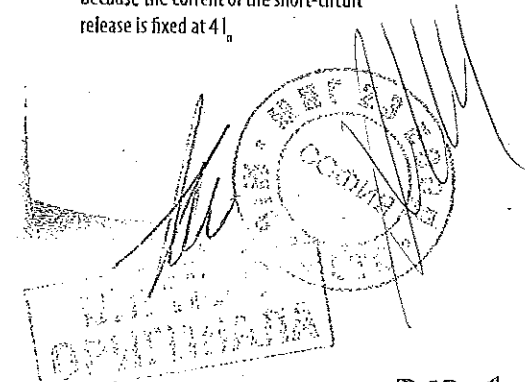
Data for the project

Circuit breaker	BC160NT406-...
Overcurrent release	...
Overcurrent release values	...
Rated current	I_n ... A
Short-circuit release current	I_t ... A ($4 \times I_n$)

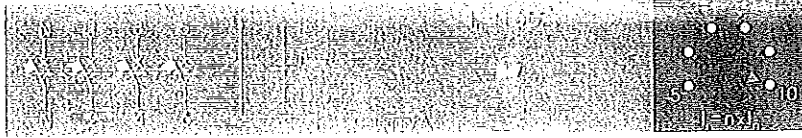


IMPORTANT

- high impulse current must not be in the circuit - undesirable breaking would take place, because the current of the short-circuit release is fixed at $4 I_n$

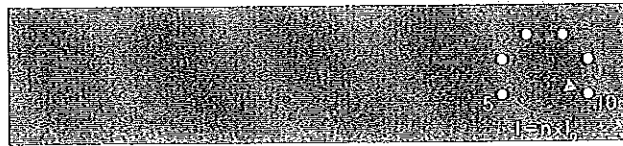


OVERCURRENT RELEASES - N



Short-circuit release

$I_n = 32 \text{ A}$
BC160NT406-32-N



$I_n = 40 \text{ A}$
BC160NT406-40-N

$I_n = 50 \text{ A}$
BC160NT406-50-N

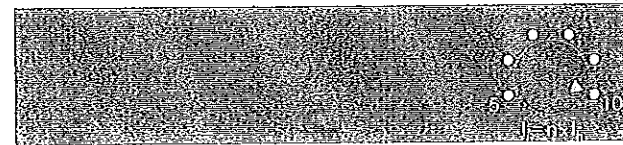
$I_n = 63 \text{ A}$
BC160NT406-63-N

$I_n = 80 \text{ A}$
BC160NT406-80-N

$I_n = 100 \text{ A}$
BC160NT406-100-N

$I_n = 125 \text{ A}$
BC160NT406-125-N

$I_n = 160 \text{ A}$
BC160NT406-160-N

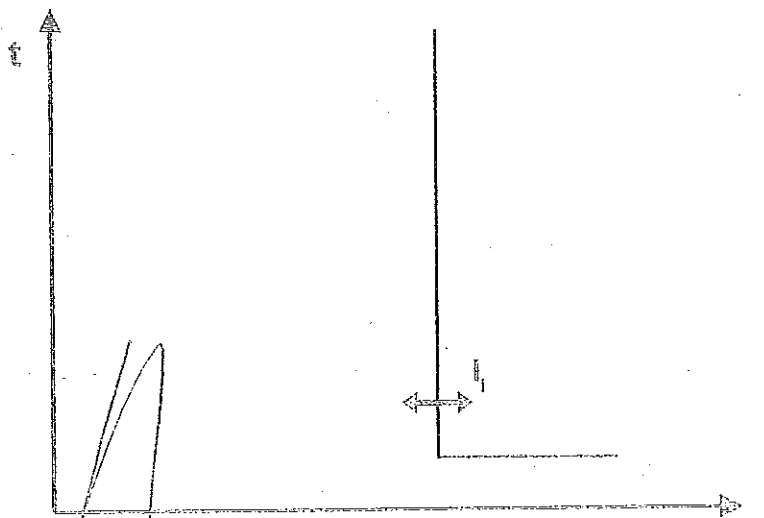


Properties

- ▣ the release is suitable for protection of e.g. motors with own overload protection in TN-C-S a TN-S networks
- ▣ it does not protect in the overload range – it does not react to low over-currents
- ▣ the set values of the short-circuit release within $5 \div 10 I_n$
- ▣ the value of the short-circuit release I_1 for the fourth pole is the same as for the other three poles
- ▣ setting of I_1 by means of knobs is smooth and linear in the marked range
- ▣ the overcurrent release indicates circuit breaker switching off by short circuit by an optical symbol
- ▣ the values of parameters of the overcurrent release are set by the manufacturer to maximum

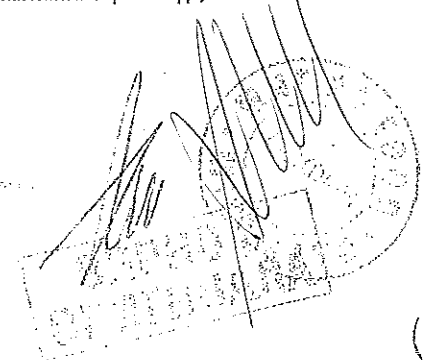
Data for the project

Circuit breaker	BC160NT406-...
Overcurrent release	N
Overcurrent release setting	
Rated current	I_n A
Rated current	I_1 A (.... x I_n)



IMPORTANT

- ▣ the set value of current of the short-circuit release must correspond to the impedance loop - conditions must be fulfilled for automatic disconnection from power supply in case of failure



SWITCHES

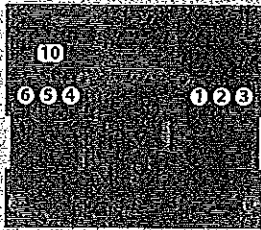
3P 4P



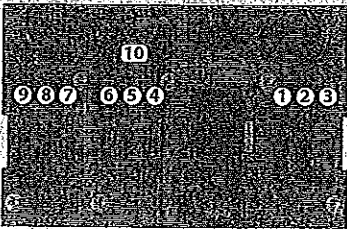
Auxiliary switch PS-BC-0010 / PS-BC-0010-Au make and break contact



Signal switch NS-BC-0010 / NS-BC-0010-Au make and break contact
switch can be used only in cavity No. 1



Position of cavities in BC160N... circuit breaker / switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used with a shunt trip or undervoltage release.



Position of cavities in BC160NT4... circuit breaker / switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used a shunt trip or undervoltage release.

Specifications

Type	PS-BC-0010 / NS-BC-0010	PS-BC-0010-Au / NS-BC-0010-Au
Rated operating voltage U_n	60 ÷ 250 V a.c. 60 ÷ 250 V d.c.	5 ÷ 60 V a.c. 5 ÷ 60 V d.c.
Rated insulation voltage U_i	250 V	250 V
Rated impulse withstand voltage U_{imp}	4 kV	4 kV
Rated frequency f_n	50/60 Hz	50/60 Hz
Rated operating current I_n / U_n	AC-12 6 A/250V AC-15 5 A/60V, 3 A/110V, 1.5 A/230V DC-12 0.25 A/250V DC-13 0.5 A/60V, 0.2 A/110V, 0.1 A/250V	0.004 ÷ 0.1 A/5 ÷ 60V 0.004 ÷ 0.1 A/5 ÷ 60V 0.1 A/60V 0.004 ÷ 0.1 A/5 ÷ 60V
Thermal current I_{th}	6 A	0.5 A
Arrangement of contacts	001	001
Connection cross-section S	0.5 ÷ 1 mm ²	0.5 ÷ 1 mm ²
Degree of protection of terminals (connected switch)	IP20	IP20

Function, name and location of switches according to type designation

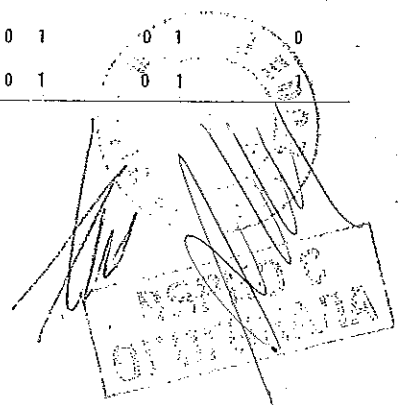
Type	Switch name	Position of switch	Switch function
PS-BC-0010	Auxiliary	Cavity 1 ^a , 2, 3, 4, 5, 6 ^b	Signals state of circuit breaker/switch-disconnector's main contacts
NS-BC-0010	Signal	Cavity 1 ^a	Signals tripping of circuit breaker by overcurrent release

^a - when one of cavities 4, 5 or 6 is in use for auxiliary switches, cannot be used a shunt trip or undervoltage release
^b - in cavity 1, PS-BC-0010 auxiliary switch and NS-BC-0010 signal switch cannot be used simultaneously

States of switches in circuit breaker/switch-disconnector

Cavity	1	2	3	4	5	6 (7,8,9)	10
State of circuit breaker							
Circuit breaker/lever position	1	0	0	0	0	0	0
State of the main contacts	1	0	0	0	0	0	0
PS-BC-0010	1	0	0	1	0	0	1
NS-BC-0010	0	1	0	1	0	0	1
SV-BC-X... SP-BC-X...	1	1	1	1	1	1	1

note: 0 - contact open, 1 - contact closed
* only 4P design

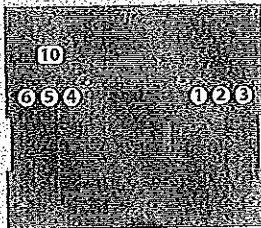


SHUNT TRIPS

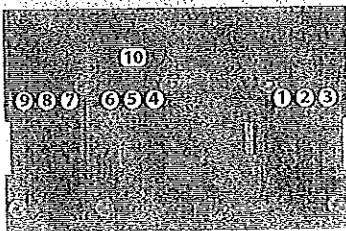


Specifications

Type		SV-BCX...
Rated operating voltage	U_e	24, 48, 110, 230, 400 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e	AC DC	2 VA 2 W
Characteristic		$U \geq 0.7 U_e$ the circuit breaker must trip
Time to switching off		15 ms
Loading time		∞
Connection cross-section	S	0.5 ÷ 1 mm ²
Degree of protection of terminals	(connected release)	IP20
Position in cavity No.		10
SIGNAL SWITCH - signals tripping by shunt trip		
Rated operating voltage	U_e	230 V a.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	2 A/230 V a.c.
Thermal current	I_b	6 A
Arrangement of contacts		01



Position of cavities in BC160NT... circuit breaker/switch-disconnector. When shunt trip is used, cavities 4, 5, 6 cannot be used for auxiliary switches.



Position of cavities in BC160NT4.. circuit breaker/switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used a shunt trip or undervoltage release.

Type designation according to rated operating voltage

U_e	Type
24, 48 V a.c./d.c.	SV-BC-X024
110, 230 V a.c./110, 220 V d.c.	SV-BC-X110
230, 400 V a.c./220 V d.c.	SV-BC-X230

The specific rated operating voltage of the release is set up by jumpers directly on the release. The setting from the manufacturer is always to the value corresponding to the type designation. (see fig. 1)

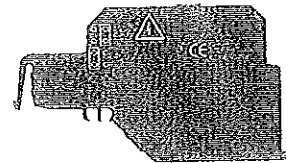
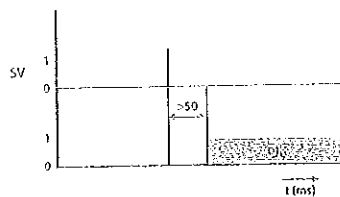


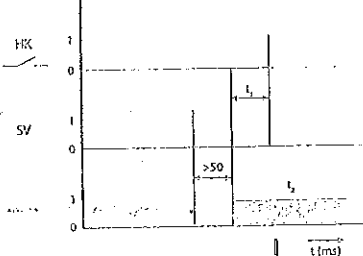
Fig. 1 - The rated operating voltage setting

Reaction time of the shunt trip



Cooperation of motor drive and shunt trip

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and shunt trip at once. The following time delays have to be kept between the disconnection of voltage from the shunt trip and the control impulse for switch on of the motor drive:



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Lever position of circuit breaker/switch-disconnector
Switched on	⏏
Switched off by releases or by TEST push button	⏏
Switched off manually or by motor drive electrically (loaded state)	⊙

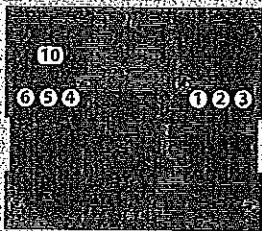
Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SV	Control voltage on the shunt trip

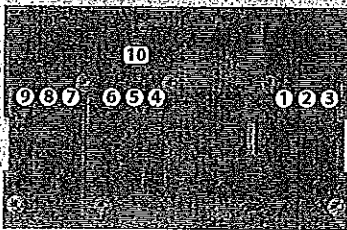
$t_1 = 70$ ms (mode 1, 2), 140 ms (mode 3)
 $t_2 = 60 + 500$ ms (mode 1, 3); 60 + ∞ (mode 2)

Handwritten signature or mark.

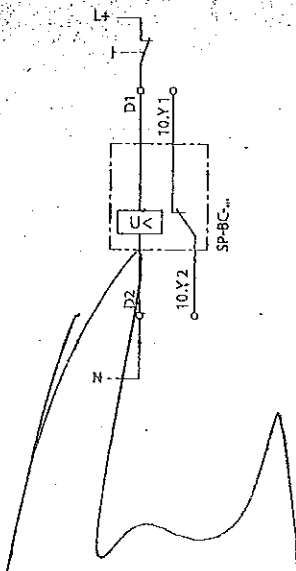
UNDERVOLTAGE RELEASES



Position of cavities in BC160NT... circuit breaker/switch-disconnector. When undervoltage release is used, cavities 4, 5, 6 cannot be used for auxiliary switches.



Position of cavities in BC160NT4... circuit breaker/switch-disconnector. When one of cavities 4, 5 or 6 is in use, cannot be used a shunt trip or undervoltage release.



Specifications

Type		SP-BC-X...
Rated operating voltage	U_e	24, 48, 110, 230, 400 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f_n	50/60 Hz
Input power at 1.1 U_e	AC DC	2 VA 2 W
Characteristic ¹⁾		$U \leq 0.35 U_e$ - the circuit breaker must trip $U \geq 0.85 U_e$ - it is possible to switch on the circuit breaker
Time to switching off		15 ms
Loading time		∞
Connection cross-section	S	0.5 - 1 mm ²
Degree of protection of terminals (connected release)		IP20
Position in cavity No.		10
SIGNAL SWITCH - signals tripping by undervoltage release		
Rated operating voltage	U_e	230 V a.c.
Rated insulation voltage	U_i	250 V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	2 A/230 V a.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		01

¹⁾ - tripping of the undervoltage release can be delayed using the delay unit BZ-BX-X230-A, for more detailed information see page P2

Type designation according to rated operating voltage

U_e	Type
24, 48 V a.c./d.c.	SP-BC-X024
110, 230 V a.c./110, 220 V d.c.	SP-BC-X110
230, 400 V a.c./220 V d.c.	SP-BC-X230

The specific rated operating voltage of the release is set up by jumpers directly on the release. The setting from the manufacturer is always to the value corresponding to the type designation (see fig. 1).

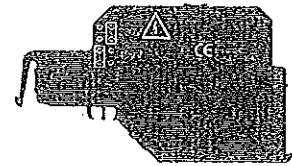
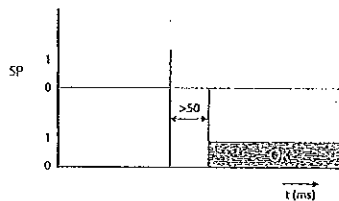


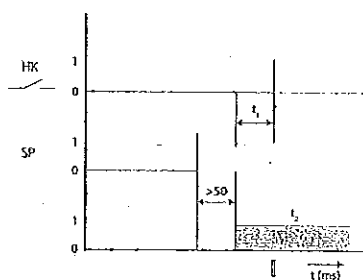
Fig. 1 - The rated operating voltage setting

Reaction time of the undervoltage release



Cooperation of motor drive and undervoltage release

It is necessary to keep time delay when the control of the circuit breaker is done by motor drive and undervoltage release at once. The following time delays have to be kept between bringing the voltage to the undervoltage release and the control impulse for switch on of the motor drive:



States and positions of circuit breaker/switch-disconnector lever

States of circuit breaker/switch-disconnector	Lever position of circuit breaker/switch-disconnector
Switched on	
Switched off by releases or by TEST push button	
Switched off manually or by motor drive electrically (loaded state)	

Description of graphs

Symbol	Description
HK	Main contacts
OK	Circuit breaker is ready for further handling
IMP ON	Make impulse for the motor drive
SP	Control voltage on the undervoltage release

$t_1 = 70$ ms (mode 1, 2), 140 ms (mode 3)
 $t_2 = 60 \div 500$ ms (mode 1, 3), $60 \div \infty$ (mode 2)

HAND DRIVES

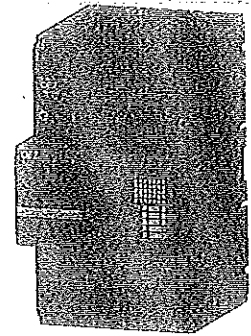
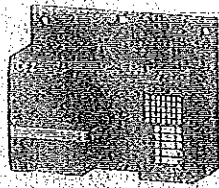


Fig. 1 - DIMENSIONS, see page D27, D32

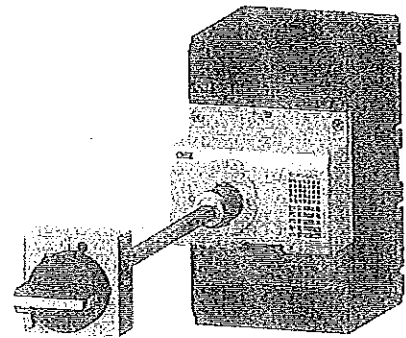
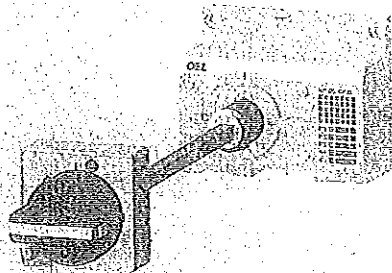


Fig. 2 - DIMENSIONS, see page D27, D33

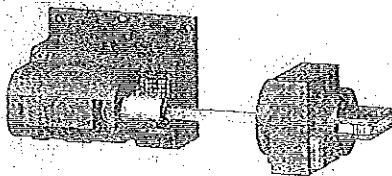


Fig. 3 - DIMENSIONS, see page D28, D34

Description

The hand drive permits controlling the circuit breaker/switch-disconnector by turning the lever, e.g. to switch machines on and off. Modular conception of the drives enables simple mounting on the circuit breaker (also additionally) after the cover of cavities is removed. The fixed drive can be sealed. The drive and its accessories are ordered separately according to your choice, see page D13.

The hand drive makes possible to control the circuit breaker:

a) from the front panel (fig. 1)

- Hand drive unit RP-BC-CK..
- + Hand drive lever RP-BC-CP..

b) through the switchboard door (fig. 2)

- Hand drive unit RP-BC-CK..
- + Extension shaft RP-BC-CH..
- + Hand drive bearing PR-BC-CN..
- + Hand drive lever + RP-BC-CP..

c) through the side wall of the switchboard (fig. 3)

- in left- or right-side designs
- Hand drive unit for side control
- right RP-BC-CK30
- or left RP-BC-CK31
- + Extension shaft RP-BC-CH..
- + Hand drive bearing PR-BC-CN..
- + Hand drive lever + RP-BC-CP..

The hand drive unit is fixed directly to circuit breaker or switch-disconnector.

The hand drive bearing is fixed to the switchboard door and it provides degree of protection IP40 or IP66.

Hand drive lever is fixed on the hand drive unit or on the hand drive bearing.

The extension shaft is supplied in two options, standard (length 350 mm - can be shortened) and telescopic (adjustable length 199 ÷ 352 mm).

Enhanced safety for operator:

The hand drive unit and hand drive lever are also supplied with the possibility to lock the circuit breaker in position „switched off manually“. The unit and lever of the hand drive can be locked using three padlocks with shank diameter max. 4 mm.

Each hand drive bearing prevents the switchboard door from opening when the circuit breaker is switched on or in a state of being switched off by releases. By means of the device, it is possible to turn off this locking and to open the door. Locking of the switchboard door opening also is possible in the circuit breaker's switched off manually state. It is necessary to activate the locking by means of the lever on the bearing and to lock the hand drive.

Two circuit breakers with hand drives can be fitted also with reciprocal mechanical interlocking or mechanical parallel switching, see page D49.

Specifications

Type	Description	Colour	Locking while the circuit breaker is in OFF state	Degree of protection	Locking of the switchboard door opening in the circuit breaker state		Switchboard door opening with the circuit breaker switched on	Length [mm]
					switched on	switched off manually and locked		
RP-BC-CK10	Hand drive unit blue	blue	no	-	-	-	-	-
RP-BC-CK20	Hand drive unit blue	blue	yes	-	-	-	-	-
RP-BC-CK21	Hand drive unit blue	yellow	yes	-	-	-	-	-
RP-BC-CK30	Hand drive unit - right side	blue	no	-	-	-	-	-
RP-BC-CK31	Hand drive unit - left side	blue	no	-	-	-	-	-
RP-BC-CP10	Hand drive lever	black	no	-	-	-	-	-
RP-BC-CP20	Hand drive lever	black	yes	-	-	-	-	-
RP-BC-CP21	Hand drive lever	red	yes	-	-	-	-	-
RP-BC-CN10	Hand drive bearing	black	-	IP40	yes	yes	-	-
RP-BC-CN11	Hand drive bearing	yellow	-	IP40	yes	yes	-	-
RP-BC-CN20	Hand drive bearing	black	-	IP66	yes	yes	-	-
RP-BC-CN21	Hand drive bearing	yellow	-	IP66	yes	yes	-	-
RP-BC-CH10	Extension shaft	-	-	-	-	-	-	350 (can be shortened)
RP-BC-CH20	Extension shaft	-	-	-	-	-	-	199 ÷ 352 telescopic design

Handwritten signature and stamp. The stamp contains the text: '350 (can be shortened)', '199 ÷ 352 telescopic design', and a date '02.12.2010'.

Handwritten signature.

MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

RP-BC-CB10 Mechanical interlocking

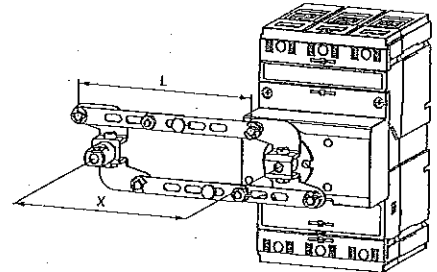
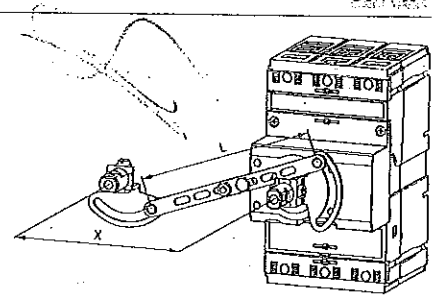
Provides mechanical interlocking of two circuit breakers/switch-disconnectors so that they cannot both be tripped simultaneously, but only one of them at a time. Both circuit breakers may be switched off simultaneously. Interlocking can be used between two BC160N circuit breakers. Both circuit breakers must be equipped with a hand drive (at least one with a hand drive unit and hand drive lever) see page D48. In order to use the interlocking, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table. For correct function and signalling the state of the BC160 circuit breaker with RP-BC-CB10 mechanical interlocking, circuit breaker must be switched off, or switch-disconnector must be in loaded position.

Dimension	(mm)
X	87.5 or 100
L	94.5 or 106

RP-BC-CD10 Mechanical parallel switching

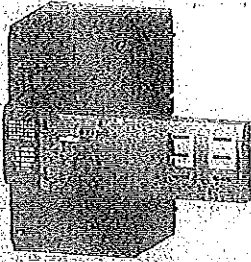
Enables for simultaneous switching of two circuit breakers/switch-disconnectors. Parallel switching can be used between two BC160N circuit breakers. Both circuit breakers must be equipped with a hand drive unit and at least one with a hand drive lever, see page D48. In order to use parallel switching, it is absolutely necessary to comply with the dimensions that are shown in the figure and given in the table.

Dimension	(mm)
X	75 ⁺² or 87.5 ⁺² or 100 ⁺²

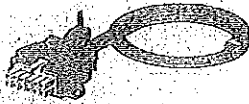


Handwritten signature and a circular stamp. Below the stamp is a rectangular stamp with the text: "KSPHO S. 118" and "CPUTREANA".

MOTOR DRIVES



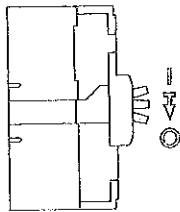
Motor drive side MP-BC-X...-B



Connecting cable OD-BC-KA02

Description

- ❑ Motor drive is an accessory of the circuit breaker/switch-disconnector, by means of which it is possible to switch the circuit breaker or switch-disconnector on and off remotely. Modular conception of the drives enables simple mounting on the circuit breaker also additionally. The drive is used for both remote and local control of 3-pole and 4-pole circuit breakers BC160. It is manufactured in the design for side mounting next to the circuit breaker on the switchboard panel or on DIN rail. The mounting of motor drive to the circuit breaker is done by bayonet mechanism placed on the side of the circuit breaker. The mounted motor drive can be locked by means of terminal cover seal.
- ❑ Modeion BC160 circuit breakers with the motor drive are intended for industrial, power engineering and infrastructure applications. The motor drives have a system of direct control of the circuit breaker, without a spring storage unit.
- ❑ The motor drive can work in the local or remote control mode. The local control mode is used, for instance in loss of control voltage. Local control of the circuit breaker is accessible only after lifting the transparent safety cover of the drive off. This action locks the remote electrical control circuits automatically. The lifted off position of the cover can be indicated remotely.
- ❑ The circuit breaker is switched on and off by means of the control lever driver. After returning the safety cover to the original position, the drive is switched into the remote control mode automatically.
- ❑ After lifting the safety cover off it is possible to handle an automatic mode presetting change-over switch. Under the transparent cover there is also a red LED which lighting indicates a failure (unfinished switching on/off/loading operations).
- ❑ Electronics circuits of the motor drive block erroneous control processes, e.g. drive cycling after overcurrent or auxiliary release tripping.
- ❑ Side drive can be locked in off position of the circuit breaker by up to three padlocks with shaft diameter with shank diameter max. 4 mm. It is possible to signal the locking remotely. The protective cover of the drives can also be sealed.
- ❑ The position of the main contacts of the circuit breaker is indicated by the position of the circuit breaker driver lever under the transparent protective cover of the drive. The wound up position of the circuit breaker can also be signalled remotely.
- ❑ In the remote control mode the circuit breaker is switched on and off by ON and OFF push buttons respectively. The motor drive accessories include an extension cable OD-BC-KA02.



Symbol	Description
⏏	Switched on manually or by motor drive electrically
⏏	Switched off by overcurrent releases, short trip or undervoltage release, TEST or INSPECTION push button
⦿	Switched off manually or by motor drive electrically, loaded state

Motor drive automatic mode presettings

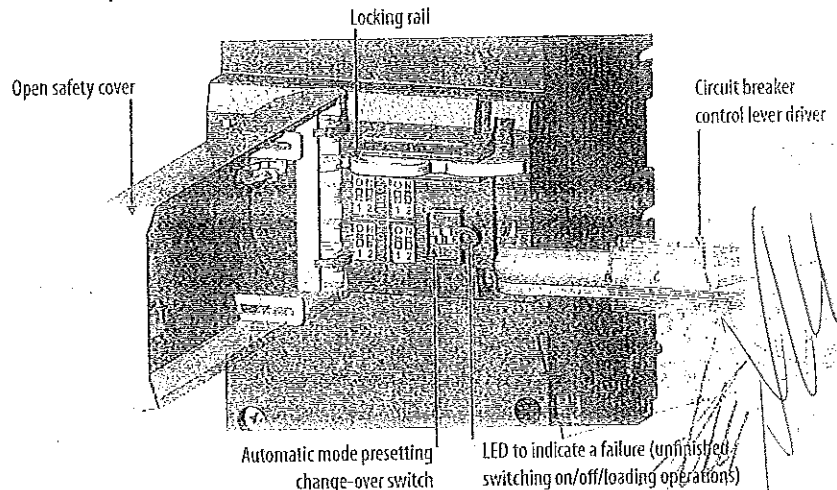
Switch position	Automatic mode presetting	Preset description	Circuit breaker switching off to position ⏏	Circuit breaker loading to position ⦿	Circuit breaker switching on to position ⏏
	1	Automatic loading is on	- By overcurrent release	Motor drive performs automatically	By pressing of ON push button
	2	Automatic loading is off	- By inspection push button - By auxiliary release	The operator must press the OFF push button	By pressing of ON push button
	3	Simultaneous loading and switching on	- By TEST push button	By pressing of ON push button the motor drive will loading and switch on the circuit breaker**)	
		The motor drive is out of operation, the red LED is lighting			

¹⁾ Standard factory setting of the switch.

²⁾ When the circuit breaker is switched off by the motor drive electrically with the use of the OFF push button, the circuit breaker control lever gets into the wound up position automatically, independently of the automatic mode presetting.

³⁾ By pressing the OFF push button, the motor drive only winds the circuit breaker up to the position.

Side drive description



MOTOR DRIVES

Diagram

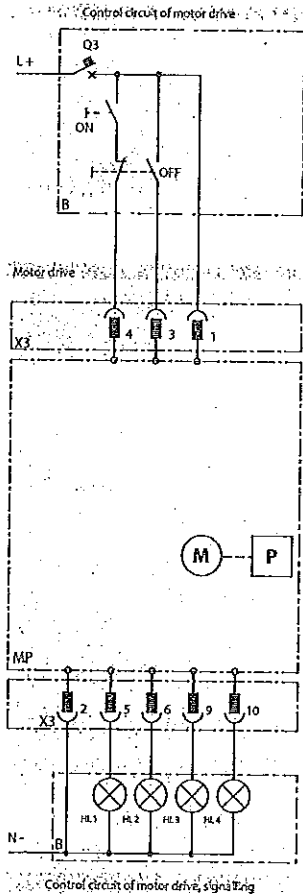


Diagram description

- MP - motor drive - MP-BC
- M - motor
- P - gear unit
- X3 - connector for connection of control and signalling circuits
- B - recommended wiring of the control circuits; it is not a part of MP-BC
- ON - switch on button
- OFF - switch off button
- Q3 - motor drive circuit breaker
- HL1 - remote failure signalling (unreliable switching on or switching off), max. permissible load 10 W^{*)}
- HL2 - signalling of circuit breaker lever position, loaded; max. permissible load 10 W^{*)}
- HL3 - signalling of opening of the front safety cover of the drive, max. permissible load 10 W^{*)}
- HL4 - signalling of exertion of the drive locking bar, max. permissible load 10 W^{*)}

^{*)} voltage on terminals 5, 6, 7, 8, 9, 10 is the same as U_n of the motor drive

For complete wiring diagram of the circuit breaker BC160 with motor drive see page D16

Specifications

Type		MP-BC-X ₃ -B
Rated operating voltage	U _n	24, 48, 110, 230 V a.c. 24, 48, 110, 220 V d.c.
Rated frequency	f _n	50/60 Hz
Control impulse length	for switching on for switching off	60 ms ÷ ∞ ^{*)} 60 ms ÷ ∞ ^{*)}
Time to switching on		< 70 ms ^{*)}
Time to switching off		< 50 ms ^{*)}
Frequency of cycles ON/OFF		5 cycles/min
Frequency of cycles - Instant successive ON/OFF		10 cycles
Mechanical endurance		20 000 cycles
Input power	AC DC	100 VA 100 W
Starting current		12 A / 24 V a.c./d.c. 6 A / 48 V a.c./d.c. 4 A / 110 V a.c./d.c. 2 A / 230 V a.c. / 220 V d.c.
Protection	24, 48, 110 V a.c.; 230 V a.c. 24, 48, 110 V d.c.; 220 V d.c.	LPN-4C-1; LPN-2C-1 LPN-DC-4C-1; LPN-DC-2C-1
Type		OD-BC-KA02-A
Number of conductors		8
Conductor cross-section	S	0.35 mm ²
Conductor lengths		0.6 m

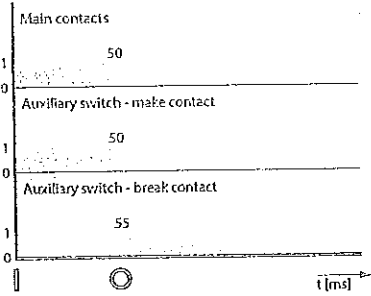
^{*)} The values depend on the motor drive automatic mode presetting, see pages D50, D52, D53, D54

MOTOR DRIVES

Specifications

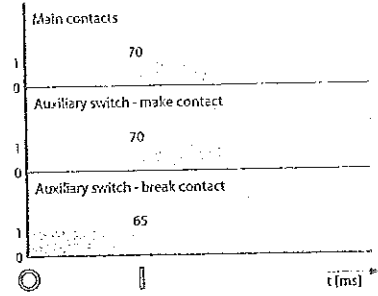
Circuit breaker switching off by motor drive electrically with OFF push button

Automatic operation No. 1, 2, 3



Circuit breaker switching on electrically by motor drive with ON push button

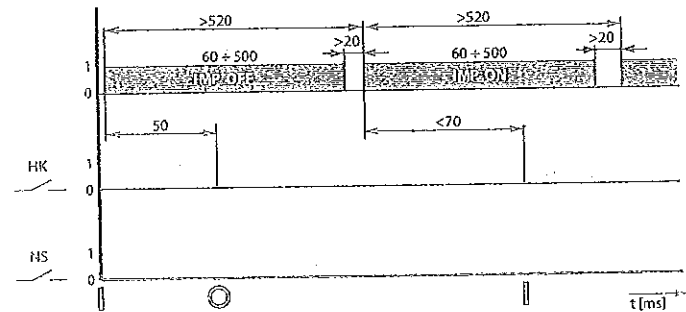
Automatic operation No. 1, 2, 3



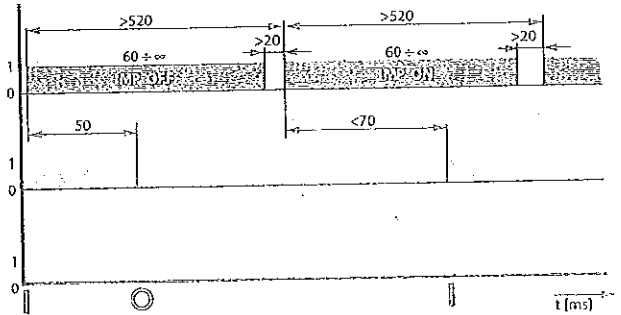
Recommended control impulses

Circuit breaker switching on and off by motor drive electrically using the ON and OFF push buttons

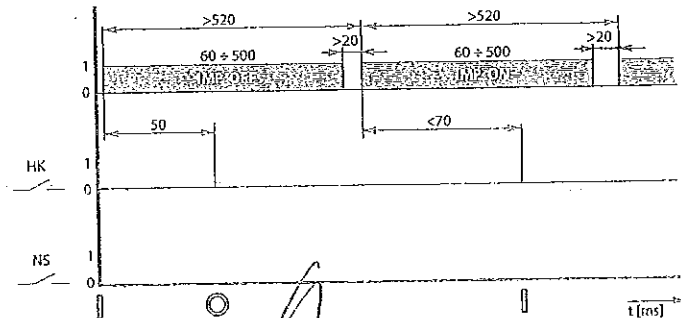
Automatic operation No. 1



Automatic operation No. 2



Automatic operation No. 3



Description of graphs

Symbol	Description
HK	Main contacts
HS	Signal switch
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
	Switched on
○	Switched off manually or by motor drive electrically (loaded state)

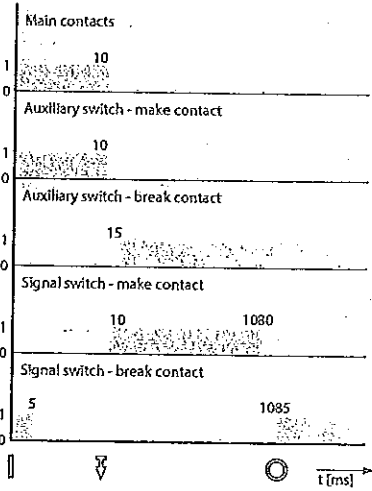
MOTOR DRIVES

3P 4P

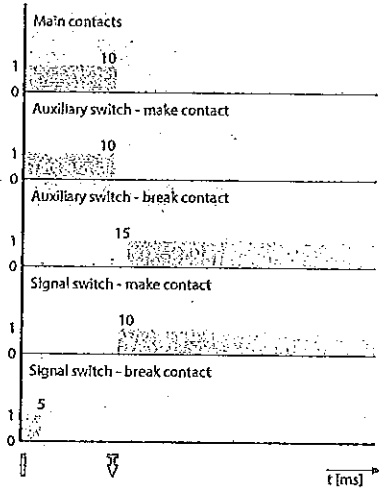
Specifications

Circuit breaker switching off by overcurrent release or inspection push button

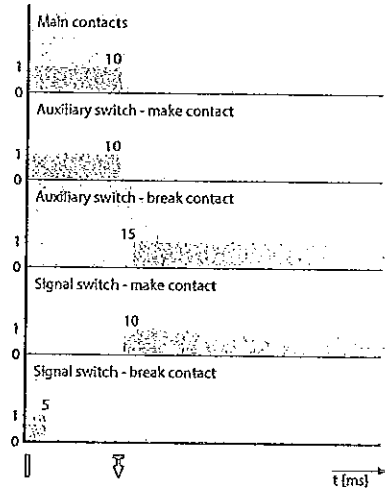
Automatic operation No. 1



Automatic operation No. 2



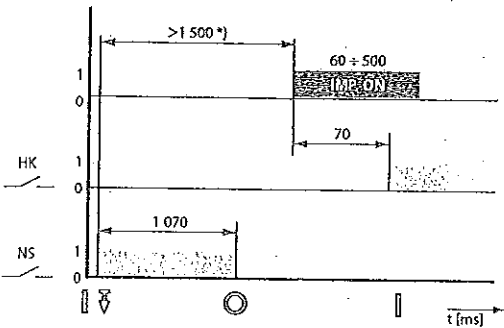
Automatic operation No. 3



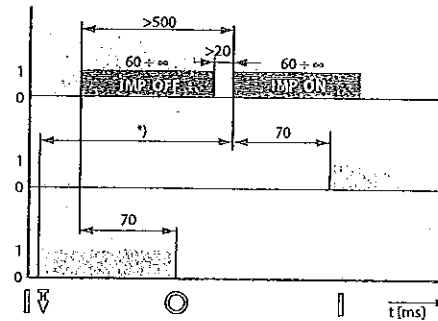
Recommended control impulses

Circuit breaker switching on with motor drive after its tripping by overcurrent release or inspection push button

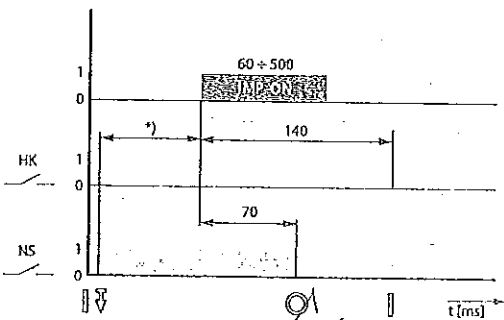
Automatic operation No. 1



Automatic operation No. 2



Automatic operation No. 3



Description of graphs

Symbol	Description
HK	Main contacts
NS	Signal switch
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
⏏	Switched on
⏏	Switched off by releases, TEST or INSPECTION push button
⦿	Switched off manually or by motor drive electrically (loaded state)

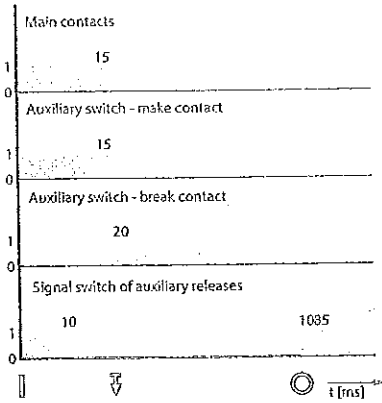
^{*)} If the circuit breaker was switched off by an overcurrent release, it is necessary to remove the cause of the error before its switching on.

MOTOR DRIVES

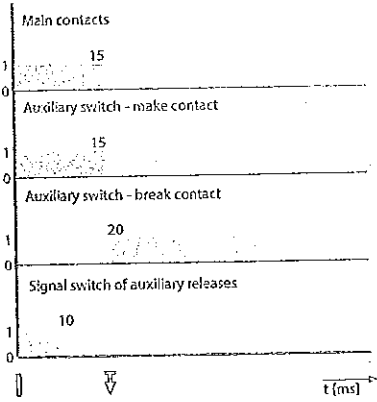
Specifications

Circuit breaker switching off by shunt trip, undervoltage release or TEST push button

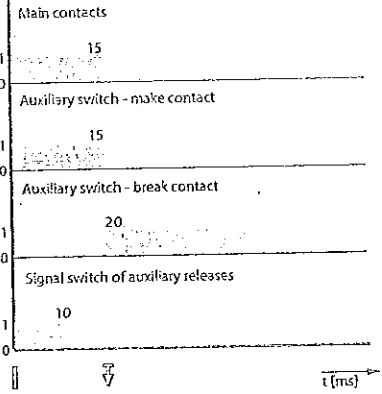
Automatic operation No. 1



Automatic operation No. 2



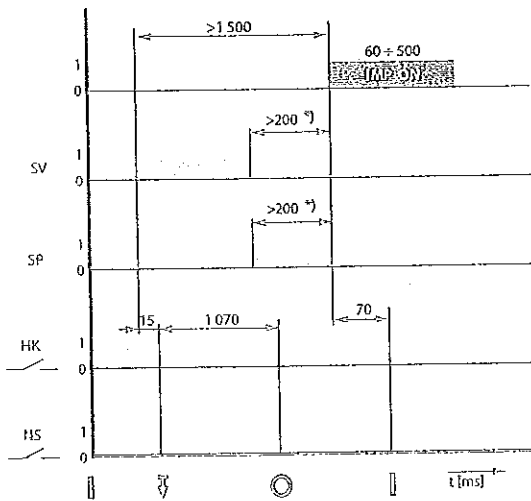
Automatic operation No. 3



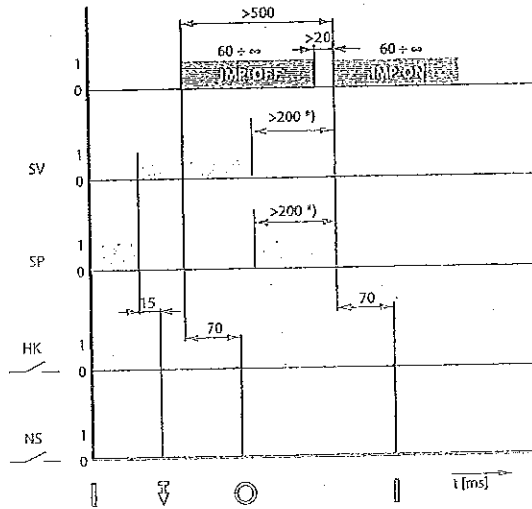
Recommended control impulses

Circuit breaker switching on by motor drive after tripping by shunt trip or undervoltage release

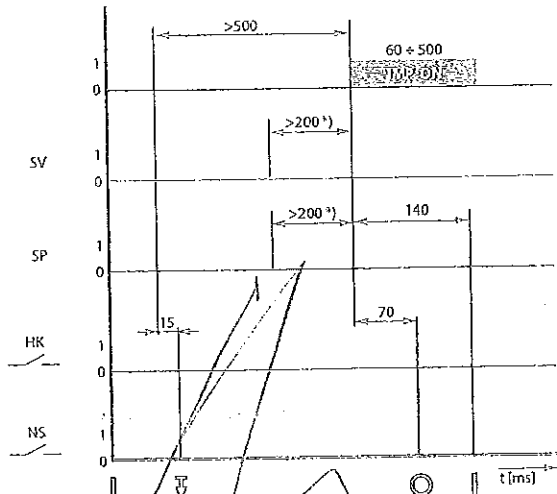
Automatic operation No. 1



Automatic operation No. 2



Automatic operation No. 3

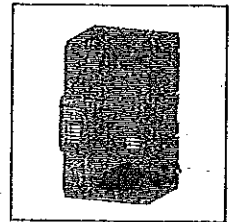


Description of graphs

Symbol	Description
HK	Main contacts
HS	Signal switch
SV	Impulse for shunt trip
SP	Impulse for undervoltage release
IMP ON	Make impulse for the motor drive
IMP OFF	Break impulse for the motor drive
	Switched on
∇	Switched off by releases, TEST or INSPECTION push button
○	Switched off manually or by motor drive electrically (loaded state)

*) Restart is only possible after deactivation of shunt trip or undervoltage release.

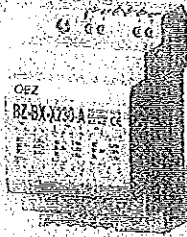
OTHER ACCESSORIES OF MOULDED CASE CIRCUIT BREAKERS



Handwritten signature and a circular stamp with text around the perimeter. Below the signature is a rectangular stamp with the text "ИЗДАНИЕ 2011" and "ОПРЕДЕЛЕНИЕ".

Handwritten signature.

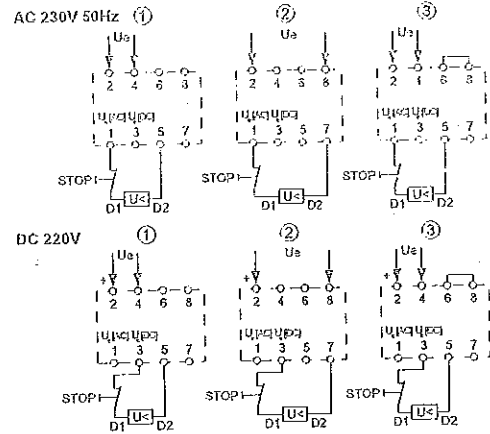
DELAY UNIT



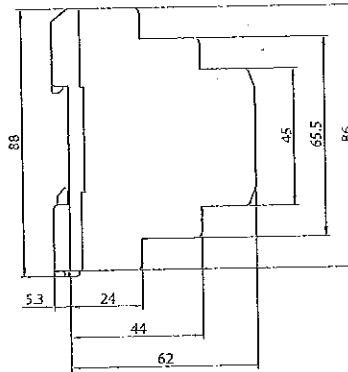
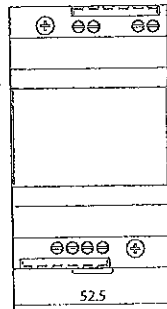
Type	Product code	Description	Weight [kg]	Package [pc]
BZ-BX-X230-A	36696	enables to delay the undervoltage release tripping of circuit breakers	0.12	1

- the delay can be set up at three levels (according to wiring)

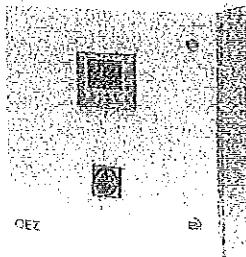
Circuit breaker	Delay [s]		
	1st level	2nd level	3rd level
BC160	1.0	2.0	3.2
BD250, BH630	0.6	1.2	1.9
BL1000, BL1600	0.5	1.0	1.5



BZ-BX-X230-A



AUTOMATIC STANDBY UNIT MODI



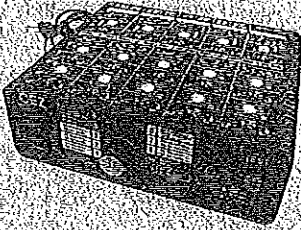
Type	Description	Weight [kg]	Package [pc]
MODI ZA...	<ul style="list-style-type: none"> - enables safe control of switching of two power supplies to one or two loads with exclusion of parallel operation of the power supplies - enables various adaptations according to the customer's requirements - for backup operation with a transformer or generator - from 16 to 6300 A 	10	1

- for circuit breakers and switch-disconnectors Modelon and Aston WL
- for detail information see catalogue Automatic standby unit MODI ZA

Type	Description	Weight [kg]	Package [pc]
MODI ZB...	<ul style="list-style-type: none"> - enables safe control of two power supplies to one load with exclusion of parallel operation of the power supplies - for backup operation, in particular with a generator - from 40 to 630 A 	10	1

- for Modelon circuit breakers
- for detail information see catalogue Automatic standby unit MODI ZB

TESTER OF OVERCURRENT RELEASES OF CIRCUIT BREAKERS



Type	Product code	Description	Weight (kg)	Package (pc)
ZES4	17273	Tester of overcurrent releases of circuit breakers BD250..., BH630..., BL1000S and BL1600S	3.75	1

- service device for checking the functionality of electronic overcurrent releases and switching units for Modeion circuit breakers
- tests:
 - overcurrent releases
 - functionality of switching unit tripping mechanism
 - current transformers
- tests overcurrent releases: L001, DTV3, MIV8, MIV9, U001
- tests switching units for circuit breakers: BD250N, BD250S, BH630N, BH630S, BL1000S, BL1600S

Tester must be connected to an external power supply. Power supply voltage of tester is 230 V a.c.

For more detailed information and documentation contact our technical support No.: +420 465 672 191 or visit our websites www.oez.com

CONTROL RELAYS FOR BD250 AND BH630



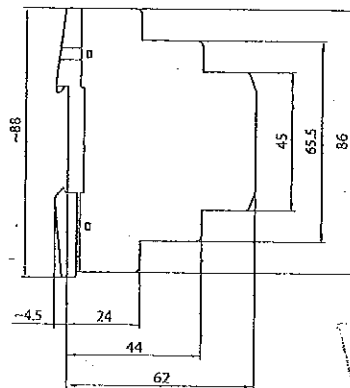
Type	Product code	Specification	Weight (kg)	Package (pc)
OD-BHD-RX01	37425	24 V a.c./d.c.	0.06	1
OD-BHD-RX02	37426	48 V a.c./d.c.	0.06	1
OD-BHD-RA03	37427	110 ÷ 230 V a.c.	0.06	1
OD-BHD-RD04	37428	110 V d.c.	0.06	1

- control relay is suitable for control of the circuit breaker with motor drive in withdrawable/plug-in device or in combination with mechanical interlocking by Bowden, see page E72, E73, F70, F71

Specifications

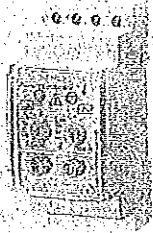
Type	OD-BHD-R...	
Standards	EN 61812-1	
Approval marks		
Control circuit		
Rated operating voltage	U_c	24 V a.c./d.c., 48 V a.c./d.c., 110 ÷ 230 V a.c./d.c., 110 V d.c.
Rated frequency		50 Hz
Consumption at U_c	at 24 ÷ 230 V a.c.	1.2 VA ÷ 2.6 VA
	at 24 ÷ 220 V d.c.	1.4 W ÷ 1.7 W
Mechanical endurance		30 000 cycles
Electrical endurance		30 000 cycles
Connection		0.2 ÷ 2.5 mm ²
Torque		0.5 Nm
Control impulse		
Min. excitation time		15 ms
Max. excitation time		unlimited
Other data		
Mounting on „U“ rail according to EN 60715 - type		TH 35
Degree of protection		IP20
Ambient temperature		-20 ÷ +50 °C
Working position		arbitrary
Seismic resistance		3g / 8 ÷ 50 Hz

OD-BHD-R...

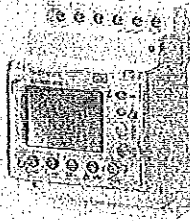


Handwritten signature and a circular stamp with text: "LAPNIK OPUSHTVACHA".

RESIDUAL CURRENT MONITOR



SSV8000-6KK



SSV8001-6KK, SSV8200-6KK

Specifications

Type designation	SSV8 000-6KK	SSV8 001-6KK	SSV8 200-6KK
Dimensions - number of modules	2	3	3
Weight	0.17 kg	0.24 kg	0.24 kg
Standards	EN 62020 IEC 62020	EN 62020 IEC 62020	EN 62020 IEC 62020
Approval marks	CE	CE	CE
Number of independent circuits	1	1	4
Rated residual current	0.03 ÷ 5 A	0.03 ÷ 30 A	0.03 ÷ 30 A
Maximum inactivity time	0.02 ÷ 5 s	0.02 ÷ 10 s	0.02 ÷ 10 s
Type	A (up to $I_{\Delta n} = 3$ A) AC ($I_{\Delta n}$ from 3 to 5 A)	A (up to $I_{\Delta n} = 3$ A) AC ($I_{\Delta n}$ from 3 to 30 A)	A (up to $I_{\Delta n} = 3$ A) AC ($I_{\Delta n}$ from 3 to 30 A)
Rated voltage	230 V a.c.	230 V a.c.	230 V a.c.
Rated operating voltage	164 ÷ 284 V a.c.	164 ÷ 284 V a.c.	164 ÷ 284 V a.c.
Rated frequency	50 Hz	50 Hz	50 Hz
Electrical endurance	10 x 10 ⁵ cycles	10 x 10 ⁵ cycles	10 x 10 ⁵ cycles
Degree of protection from front side of the device	IP41	IP41	IP41
Degree of protection of terminals	IP20	IP20	IP20
Method of mounting	„U“ rail 35 mm	„U“ rail 35 mm	„U“ rail 35 mm
Ambient temperature range	-10 ÷ 50 °C	-10 ÷ 50 °C	-10 ÷ 50 °C
Max. sea level	2 000 m	2 000 m	2 000 m
Relative humidity	5 ÷ 95 %	5 ÷ 95 %	5 ÷ 95 %
Connection cross-section	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²
External remote trip/reset	-/o	o/o	o/o
Internal diameter of the transformer	30 ÷ 210 mm	30 ÷ 210 mm	30 ÷ 210 mm
Local signalling of reach of relative low value of $I_{\Delta n}$ (ALARM)	o	o	o
Remote signalling of reach of relative low value of $I_{\Delta n}$ (ALARM)	--	o	o
Local signalling of power supply/ALARM/failure/value of $I_{\Delta n}$	o/o/o/o	o/o/o/o	o/o/o/o
Display	-	o	o
Sealing of setting/control panel	o	o	o
Control circuit - outputs			
Rated operating voltage	230 V a.c.	230 V a.c.	230 V a.c.
Rated current	6 A	6 A	6 A
Max. switched power - AC	2 500 VA	2 500 VA	2 500 VA
Rated frequency	50 Hz	50 Hz	50 Hz
Number of control contacts	1 CO	2 CO	4 NO
Control circuit - inputs			
Rated voltage	--	110 ÷ 230 V a.c./d.c.	230 V a.c.
Rated operating voltage	--	110 ÷ 284 V a.c./d.c.	230 ÷ 284 V a.c.
Input power	--	0.7 W	0.7 W

o available, -- unavailable, + being prepared

Total max. switching off time

	Maximum inactivity time - adjusted value							
	20 ms	100 ms	200 ms	300 ms	400 ms	500 ms	750 ms	1 000 ms
1x $I_{\Delta n}$	< 80 ms	< 135 ms	< 240 ms	< 340 ms	< 440 ms	< 540 ms	< 790 ms	< 1 050 ms
2x $I_{\Delta n}$	< 60 ms	< 130 ms	< 230 ms	< 330 ms	< 435 ms	< 540 ms	< 780 ms	< 1 040 ms

RESIDUAL CURRENT MONITOR -- ANALOG



SSV8000-6KK

Description

- ▣ designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- ▣ possibility of setting of residual current $I_{\Delta n}$ and setting of limit time of inactivity of $I_{\Delta n}$ (see parameters) by means of rotary switches

- ▣ mounting on „U“ rail
- ▣ measurement by means of external summation current transformer
- ▣ circuit breaker switching off by means of shunt trip or undervoltage release

Local signalling

- ▣ first LED signals functionality of the relay and current transformer:
LED is lighting - the relay is in order
LED does not light - the relay is not supplied
LED is flashing - interrupted connection between the relay and the transformer, or broken secondary winding
- ▣ the second LED signals value of the passing current:
LED is lighting - signalling reach of 100 % residual current
LED is flashing - flashing period increases with increasing residual current

Remote signalling:

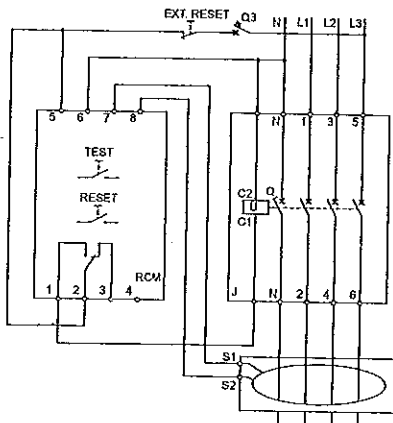
- ▣ by means of make-and-break contact (CO)
- ▣ serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip

Control

- ▣ the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- ▣ if the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET“ push-button, or interrupt its supply and thus perform the remote reset
- ▣ setting can be sealed

Wiring diagram

Wiring diagram with shunt trip



Wiring diagram with undervoltage release

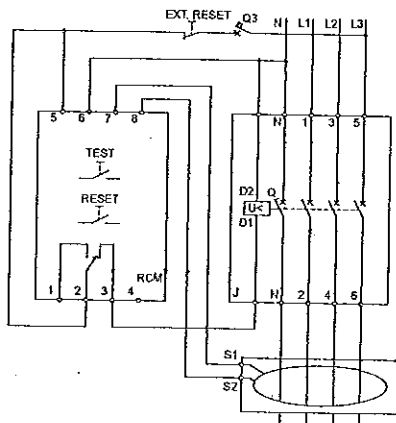
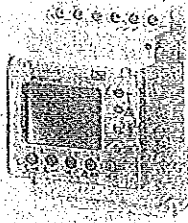


Diagram description

Symbol	Description
J	circuit breaker
RCM	residual current monitor
TEST	test push-button of the relay
RESET	local reset push-button
EXT. STOP/RESET	remote reset push-button or STOP push-button
S1, S2	current transformer terminals
Q3	protection of relay LPN-2C-7

¹⁾ only in combination with an undervoltage release

RESIDUAL CURRENT MONITOR - DIGITAL



SSV8001-6KK

Description

- ☑ designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- ☑ possibility of setting of residual current $I_{\Delta n}$ and setting of maximum inactivity time t_{Δ} by means of push-buttons and the display (see table)
- ☑ presentation of cause of trip and of current value of residual current on the display

- ☑ mounting on „U“ rail
- ☑ measurement by means of external transformer
- ☑ circuit breaker switching off by means of shunt trip or undervoltage release
- ☑ possibility of setting of characteristic S - selective

Local signalling

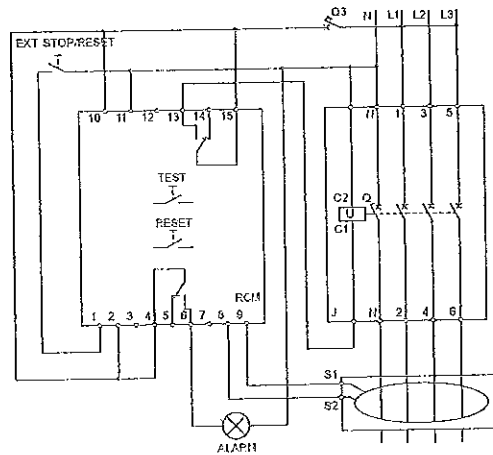
- ☑ the first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- ☑ the second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value

Remote signalling

- ☑ by means of make-and-break contact (CO)
- ☑ serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip
- ☑ possibility of remote switching off by applying voltage 110 ÷ 230 V a.c./d.c. on potential free terminals number 1 and 2
- ☑ the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- ☑ if the relay trips (switches the circuit breaker off) it is necessary to reset it by the "RESET" push-button, or interrupt its supply and thus perform the remote reset
- ☑ setting can be sealed

Wiring diagram

Wiring diagram with shunt trip



Wiring diagram with undervoltage release

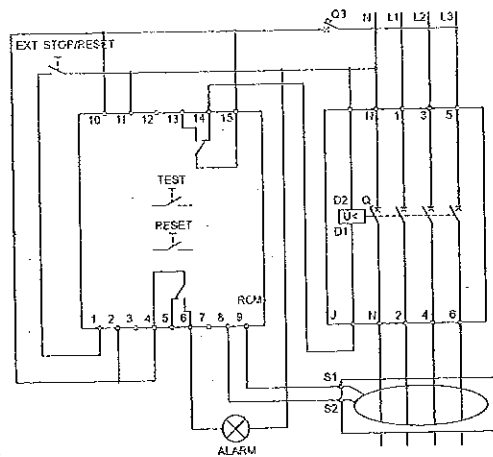
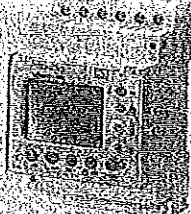


Diagram description

Symbol	Description
J	circuit breaker
RCM	residual current monitor
TEST	test push-button of the relay
RESET	local reset push-button
EXT.STOP/RESET	remote reset push-button or STOP push-button
S1, S2	current transformer terminals
ALARM	signalling of reach of the set value of $I_{\Delta n}$
Q3	protection of relay APR-2C

RESIDUAL CURRENT MONITOR - DIGITAL, 4-CHANNEL



SSV8200-6KH

Description

- ▣ designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents
- ▣ possibility of setting of residual current $I_{\Delta n}$ and setting of maximum inactivity time t_{in} by means of push-buttons and the display (see table)
- ▣ presentation of cause of trip and of current value of residual current on the display

- ▣ mounting on „U“ rail
- ▣ measurement by means of an external transformer; it is possible to connect up to 4 transformers
- ▣ circuit breaker switching off by shunt trip
- ▣ possibility of setting of characteristic S – selective

Local signalling

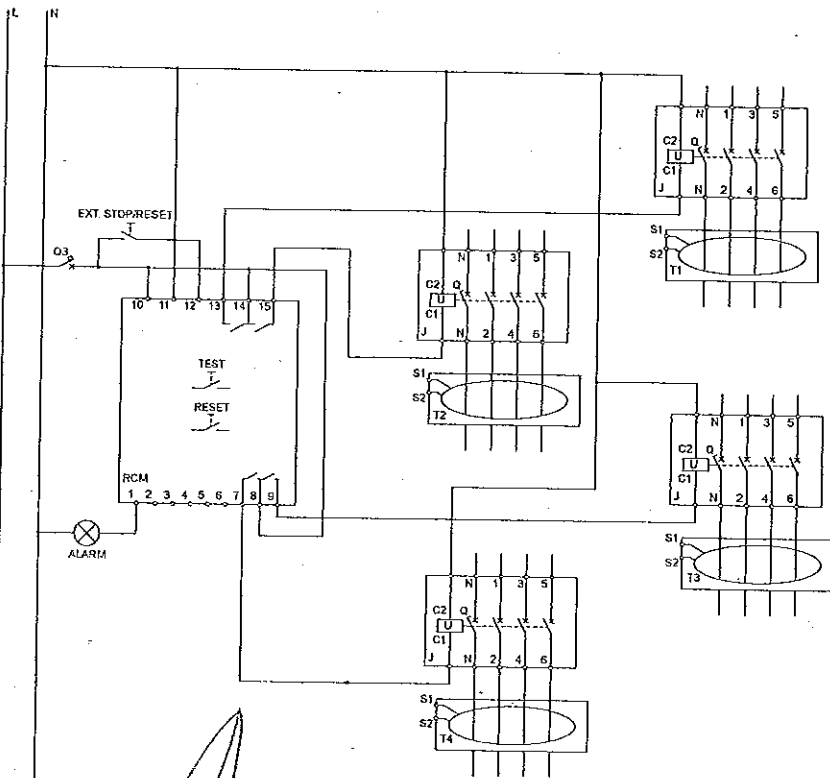
- ▣ the first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- ▣ the second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value

Remote signalling

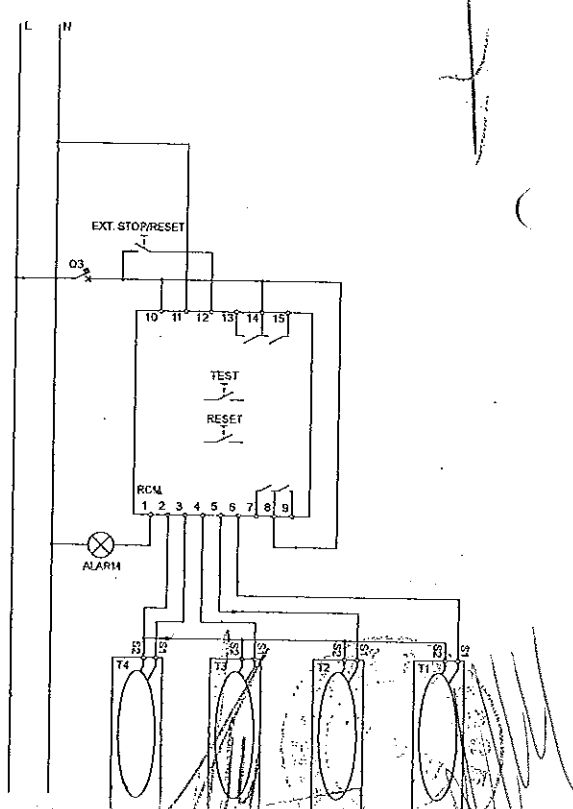
- ▣ by means of make-and-break contact (CO)
- ▣ serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip
- ▣ possibility of remote switching off by applying voltage 110 ÷ 230 V a.c./d.c. on potential free terminal number 12
- ▣ the TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit
- ▣ if the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET“ push-button, or interrupt its supply and thus perform the remote reset
- ▣ setting can be sealed

Wiring diagram

Wiring diagram with shunt trip
- connecting of circuit breakers



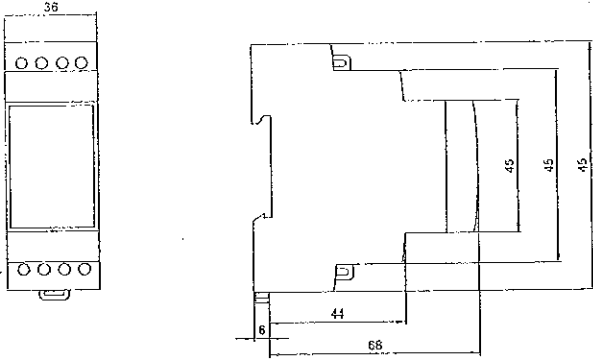
- connecting of current transformers



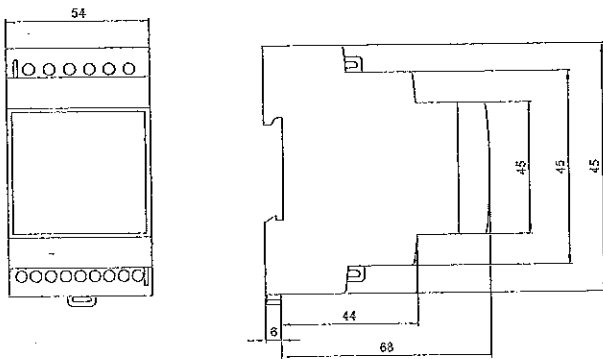
RESIDUAL CURRENT MONITOR

Dimensions

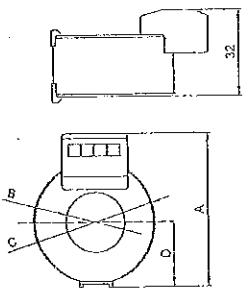
Residual current monitor 5SV8000-6KKK



Residual current monitor 5SV8001-6KKK, 5SV8200-6KKK

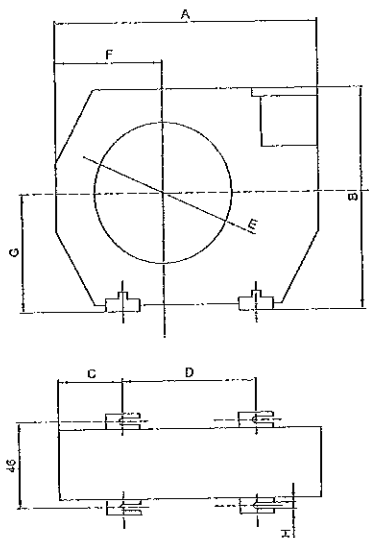


Measuring current transformers 5SV8700-0KKK, 5SV8701-0KKK



Type	A	B	C	D
5SV8700-0KKK	60	20	46	24
5SV8701-0KKK	70	30	59	30

Measuring current transformers 5SV87...-0KKK



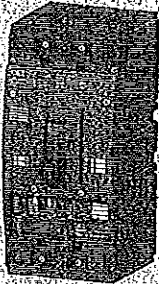
Type	A	B	C	D	E	F	G	H
5SV8702-0KKK	100	79	26	49	35	35	43	6.5
5SV8703-0KKK	130	110	32	66	70	52	67	6.5
5SV8704-0KKK	170	146	38	94	105	72	78	6.5
5SV8705-0KKK	230	196	49	123	140	97	98	6.5
5SV8706-0KKK	299	284	69	161	210	141	142	6.5

SPARE PARTS OF CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS MODEION



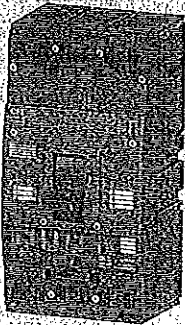
Spare parts for BC160N

Type	Product code	Name, description	Weight (kg)	Package
OD-BC-SP01	34456	Control lever	0.002	1
OD-BC-DV01	20606	Conductor holder	0.001	1
OD-BC-MS01	20607	Set of screws M3x30, 2 pcs	0.005	1
CS-BC-T411	33656	Connecting terminal	0.094	1
CS-BC-T412	33657	Connecting terminal	0.095	1
OD-BC-KS01	20624	Terminal cover, upper or lower terminals, 3P design, 1 pc	0.01	1
OD-BC-KS41	33659	Terminal cover, upper or lower terminals, 4P design, 1 pc	0.015	1
OD-BC-KON2	37798	Connector and sockets for MP-BC-X...-B	0.02	1



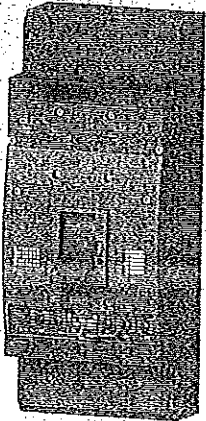
Spare parts for BD250N, BD250S

Type	Product code	Name, description	Weight (kg)	Package
OD-BD-SP01	34457	Control lever	0.007	1
OD-BD-DV01	15329	Conductor holder	0.002	1
OD-BD-MS01	14419	Set of screws M4x35, 4 pcs	0.018	1
OD-BD-KS01	24720	Terminal cover, upper or lower terminals, 3P design, 4 pc	0.1	1
OD-BD-KS44	35896	Terminal cover, lower terminals, 4P design, 1 pc	0.1	1
OD-BD-KS45	35897	Terminal cover, upper terminals, 4P design, 1 pc	0.1	1
OD-BHD-JUMP	34460	Jumper for auxiliary releases	0.001	1
OD-BHD-KON2	34461	Connector and sockets for MP-BD, BH	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1



Spare parts for BH630N, BH630S

Type	Product code	Name, description	Weight (kg)	Package
OD-BH-SP01	34458	Control lever	0.012	1
OD-BH-DV01	15331	Conductor holder	0.002	1
OD-BH-MS01	14420	Set of screws M5x25, 4 pcs	0.03	1
OD-BH-KS01	24730	Terminal cover, upper or lower terminals, 3P design, 1 pc	0.15	1
OD-BH-KS44	35894	Terminal cover, lower terminals, 4P design, 1 pc	0.2	1
OD-BH-KS45	35895	Terminal cover, upper terminals, 4P design, 1 pc	0.2	1
OD-BHD-JUMP	34460	Jumper for auxiliary releases	0.001	1
OD-BHD-KON2	34461	Connector and sockets for MP-BD, BH	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1

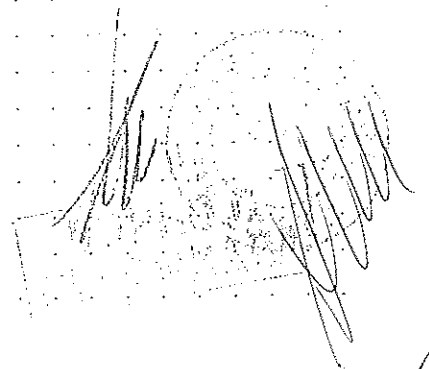
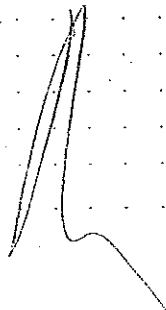


Spare parts for BL1000S, BL1600S

Type	Product code	Name, description	Weight (kg)	Package
OD-BL-SP01	34459	Control lever	0.03	1
OD-BL-MS01	14854	Set of screws M8x80, 4 pcs	0.144	1
OD-BL-KON2	34463	Connector and sockets for MP-BL-X...	0.004	1
OD-BX-KON1	34462	Connector and sockets for OD-xx-KA01	0.017	1

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TIME: 14:30

NOTES



THE USAGE OF SWITCH-DISCONNECTORS AT GIVEN OVERCURRENT PROTECTION



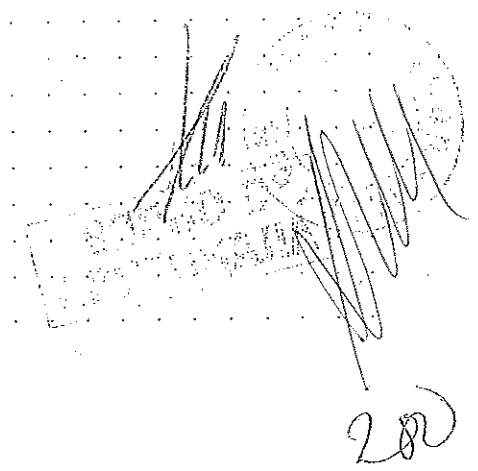
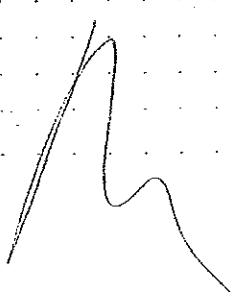
Particular designs of Modeion switch-disconnectors can be used together with the assigned device (circuit breaker, fuse-link) at the spot of electrical circuit where the value of initial peak short-circuit current I_p is lower or max equal to the related value from the table:

Backup protective device	Type of Modeion switch-disconnector				
	I_p [kA/400 V]				
	BC	BD	BH	BL1000	BL1600
BC160 (all overcurrent releases types)	25	25	25	25	25
BD250 (all overcurrent releases types)	18	18	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾
BH630 (all overcurrent releases types)	-	-	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾	36 ¹⁾ , 65 ²⁾
BL1000 (all overcurrent releases types)	-	-	-	50	50
BL1600 (all overcurrent releases types)	-	-	-	-	50
PN, PLN, PNH gG max. $I_n = 125 A^3)$	100	65	65	65	65
PN, PLN, PNH gG max. $I_n = 224 A^3)$	-	65	65	65	65
PN, PNH gG max. $I_n = 500 A^3)$	-	-	65	65	65
PN, PNH gG max. $I_n = 630 A^3)$	-	-	-	65	65

Notes:

- ¹⁾ Additional values in table 1) are related to the back-up circuit breaker of design N.
- ²⁾ Additional values in table 2) are related to the back-up circuit breaker of design S.
- ³⁾ Max value of initial peak short-circuit current that enables the usage of switch-disconnector with backup fuse-links of lower rated currents (see ³⁾) is determined on the basis of equality of their limited current I_{lim} .
- I_{lim} rated current of backup fuse-link has to be min by one degree lower than I_n rated current of the switch-disconnector.
- Given values are valid for voltage 400 V a.c.

NOTES



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GLOSSARY OF TERMS

Note: Precise wording of definitions and texts relating to a given term are detailed in the respective standards, see Name.

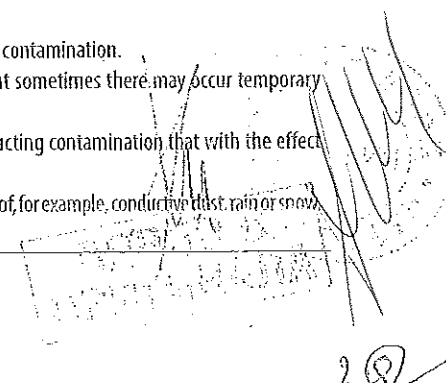
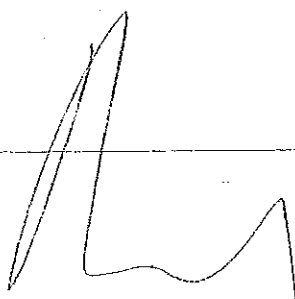
Name	Symbol	Explanation
Rated operating voltage EN 60947-1; 4.3.1.1	U_e	Voltage fixed by the manufacturer. Several pertinent tests relate to its determination, as may also the utilization category. Along with the rated (operating) current, it determines the device's utilization. The highest value of rated operating voltage may in no case be greater than the value of the rated insulation voltage U_i .
Rated insulation voltage EN 60947-1; 4.3.1.2	U_i	Voltage measure to which are related tests of dielectric strength and creepage distance.
Rated current EN 60947-2; 4.3.2.3	I_n	Current value of particular circuit breaker that can be handled uninterruptedly. The highest current valued tripping the circuit breaker in conformity with a specifically stated tripping characteristic.
Reduced rated current	I_R	Specifically established, reduced value of I_n current for a regulated time-dependent (thermal) release and that the circuit breaker can handle continuously. Maximum setting is at value equal to I_n . Changing I_R moves the release's tripping characteristic along the current axis. $I_n = k \times I_R$ holds where $k \leq 1$
Tripping time at a given I_R multiple	t_R	Time after which circuit breaker will trip, if a current flows through it that is equal to the given multiple of I_R . Changing t_R moves the tripping characteristic along the time axis.
Release current of independent instantaneous (selective) release	I_{sd}	Minimum current value that causes tripping of the time-independent delayed release.
Delay of time-independent delayed release	t_{sd}	If a current flows through the circuit breaker equal to at least I_{sd} but not reaching I_{sa} the circuit breaker will trip with time delay t_{sd} . Total switching off time is influenced by the tripping of the circuit breaker itself and is about 10 ÷ 20 ms longer.
Release current of independent instantaneous (short-circuit) release	I_i	Minimum current value that causes tripping of the time-independent instantaneous release.
Rated operating current EN 60947-1; 4.3.2.3	I_e	Rated operating current of device (switch-disconnector) is fixed by the manufacturer with consideration for the rated operating voltage, rated frequency, rated operation, utilization category and type of protective cover, if that comes into consideration.
Rated normal current EN 60947-1; 4.3.2.4	I_u	Current value set by the manufacturer and which the device can handle in continuous operation, i.e. during a period longer than 8 hours (weeks, months, or longer).
Rated short-circuit ultimate breaking capacity EN 60947-2; 2.15.1; 4.3.5.2.1	I_{cu}	Value of ultimate short-circuit breaking capacity expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short-circuit and a following 1x make-break sequence. After testing, the circuit breaker need not be able to conduct the rated current uninterruptedly. I_{cu} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Must fulfil the condition: $I_{cu} \geq I_k''$
Rated short-circuit service breaking capacity. EN 60947-2; 2.15.2; 4.3.5.2.2	I_{cs}	Value of the operating short-circuit breaking capacity expressed as the rms value of the alternating component of the assumed short-circuit current that the circuit breaker must be able to manage in the mode: 1x switching off of the short-circuit and a following 2x make-break sequence. May also be expressed as a percentage of I_{cu} . After testing, the circuit breaker must be able uninterruptedly to conduct the rated current and to switch off the overcurrent. Temperature increase of the main terminals may be greater. I_{cs} is set for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. Permitted: $I_{cs} \geq I_k''$
Rated short-time withstand current EN 60947-1; 4.3.6.1 EN 60947-2; 4.3.5.4 EN 60947-3; 4.3.6.1	I_{cw}	Value of short-time withstand current specified by the manufacturer that the device is able to handle without damage during a designated time period (short-time delay). In case of alternating current, it is the rms value of the alternating component of the assumed short-circuit current I_p .

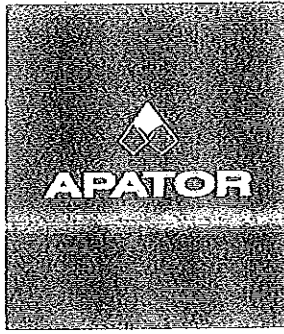
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DATE: 10/10/2010
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GLOSSARY OF TERMS

Note: Precise wording of definitions and texts relating to a given term are detailed in the respective standards, see Name.

Name	Symbol	Explanation
Rated short-circuit making capacity EN 60947-1; 4.3.6.2 EN 60947-2; 4.3.5.1 EN 60947-3; 4.3.6.2	I_m	Value of short-circuit making capacity specified by the manufacturer for the rated operating voltage at the rated frequency and at the established power factor for alternating current or at the time constant for direct current. It is expressed as the maximum assumed peak current. Must fulfil the condition: $I_{m1} \geq I_p$
Initial peak short-circuit current EN 60909-0; 1.3.5	I_s''	Short-circuit current value at the moment of its arising at a given point in the electrical distribution expressed as the rms value of the alternating symmetrical component of the assumed short-circuit current.
Surge short-circuit current EN 60909-0; 1.3.8	i_p	Maximum possible momentary value of the assumed short-circuit current. (Corresponds to the moment the short arises, as a result of which there occurs the peak value of the short-circuit current.)
Prospective short-circuit current EN 60947-1; 2.5.5 EN 60909-0; 1.3.3	I_p	Short-circuit current value, which would flow through the circuit if the protection device were replaced and a short-circuit were experienced by conductors with negligible impedance. (In a three-phase distribution, it is assumed that the short-circuit is simultaneous in all phases.)
Rated impulse withstand voltage EN 60947-1; 4.3.1.3	U_{imp}	Peak value of the voltage impulse of the prescribed form and polarity which the device is able to withstand without failure at the established conditions and pertinent to which is the value of the separating air distance. U_{imp} of the device must be equal to or higher than the value established for momentary overvoltage at the point in the circuit (overvoltage category) where the device is used.
Overvoltage category EN 60947-1; 2.5.60		Numerically defined level of momentary overvoltage, i.e. overvoltage having its origin in atmospheric or switching. Standard EN 60664-1 establishes for electrical equipment the overvoltage categories: Overvoltage category IV - service entrance, outside lead Overvoltage category III - fixed wiring Overvoltage category II - appliances Overvoltage category I - light-current appliances
Rated frequency EN 60947-1; 4.3.3	f_n	Frequency of the supply network for which the device is proposed and that corresponds to its other characteristics values.
Utilization category (circuit breakers -- time selectivity) EN 60947-2; 4.4		Utilization category of circuit breaker establishes whether or not the circuit breaker specifically is intended for providing selectivity by means of intentional time delay (timing selectivity) with other protective devices connected in series on the load side in short-circuiting conditions. Utilization category: A - circuit breakers are not specifically intended for providing timing selectivity B - circuit breakers are specifically intended for providing timing selectivity
Utilization category (switch-disconnectors -- switching mode) EN 60947-3; 4.4		Utilization category defines the assumed use of switch devices (switch-disconnectors). Characterized by values of current and voltage, expressed as multiples of rated operating current and rated operating voltage, and further by power factors or time constants of the circuit. Utilization category: AC-21B (DC-21B) - infrequent switching of resistive loads, including moderate overloading AC-22B (DC-21B) - infrequent switching of mixed resistive and inductive loads, including moderate overloading AC-23B (DC-23B) - infrequent switching of motor loads or other highly inductive loads
Pollution degree EN 60947-1; 2.5.58; 6.1.3.2		Pollution degree relates to the conditions of the surrounding environment for which the device is intended. Pollution degree: 1 - No contamination will occur, or only dry, non-conducting contamination. 2 - Normally occurs only non-conducting contamination, but sometimes there may occur temporary conductivity due to condensation. 3 - There occurs conductive contamination or dry non-conducting contamination that with the effect of condensation will become conductive. 4 - Contamination generates continuous conductivity, by means of, for example, conductive dust, rain or snow.





PL 10 784 01 2010

DEKLARACJA C E ZGODNOŚCI

EC Declaration of conformity

Nr 0125/12
No

Producent Apator SA
Manufacturer

Adres ul. Żółkiewskiego 21/29; 87-100 Toruń PL
Address

Oznaczenie produktu Rozłącznik izolacyjny bezpiecznikowy typu:
(nazwa, typ) ARS 1250 PRO
Product designation (name, type)

Deklarujemy, że oznaczony wyrób jest zgodny z następującymi wymaganiami:
It is declared that the designed product is in conformity with the provisions of the following requirements:

Dyrektyw europejskich: 2006/95/WE
European Directives: Dyrektywa niskonapięciowa dotycząca harmonizacji przepisów prawnych państw członkowskich odnoszących się do sprzętu elektrycznego przeznaczonego do użytkowania w określonych zakresach napięć.
PN-EN 60947-1 PN-EN 60947-3

Norm zharmonizowanych i/lub norm IEC: Aparatura rozdzielcza i sterownicza niskonapięciowa
Harmonised standards and/or IEC standards: Część 1: Postanowienia ogólne
Część 3: Rozłączniki, odłączniki, rozłączniki izolacyjne i zestawy łączników z bezpiecznikami topikowymi

Norm krajowych i/lub dokumentacji technicznych: Dokumentacja techniczna
National standards and/or technical specification:

Dokumenty identyfikujące wyrób: Karta katalogowa "Rozłączniki izolacyjne bezpiecznikowe typu ARS"
Product identification documents:

Miejscowość, data Toruń, 2012-05-24
Place, date

Imię nazwisko stanowisko podpis Władysław Wiatrowski,
Name, surname, function, signature Kierownik Biura ds. Certyfikacji i Normalizacji

*W przypadku wprowadzenia niezgodnych z producentem zmian w wyrobie lub zastosowania go niezgodnie z przeznaczeniem niniejsza deklaracja traci ważność
If any changes of the product are not agreed with the manufacturer or the product is inappropriately used, this declaration becomes null and void.*

Zintegrowany System Zarządzania
Integrated Management System

ISO 9001:2008

ISO 14001:2004

PN-N-16001:2004



253

Превод от полски език

СЕ Декларация за съответствие на

Ciślo / No.: 0125/12

Име / Име, Apator SA

Декларирам, на нашата собствена отговорност, че

Продукт: предпазител ARS 1250 PRO

Име заявяваме, че продукта отговаря на следните изисквания:

Производител:

APATOR SA

Адрес:

ул. Золкиевскиего 13/29; 87-100 Торун Полша

Обозначение на продукта (име, тип):

Вертикални разединители с ножови предпазители тип ARS 2-

Декларираме, че посочения продукт съответства на следните изисквания:
Европейски директиви:

2006/95WE

Директива за ниско напрежение, касае хармонизирането на правните предписанията на държавите членки, които се отнасят за електрическата техника, предназначена за използване в определени граници на напрежение.

Съгласувани стандарти и/или стандарти на IEC: PN-EN 60947-1

Комутационна и контролна апаратура ниско напрежение

Част 1: Общи решения

PN-EN 60947-3

Комутационна и контролна апаратура ниско напрежение

Част 3: Превключватели, разединители, превключващи разединители и комбинирани устройства със стопяеми предпазители

Интегрирана система за управление

ISO -9001: 2008 ISO - 14001: 2004 PN-N - 18001: 2004

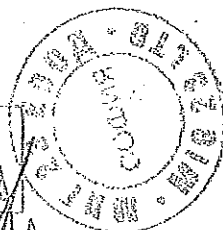
Място на издаване: Торун

подпис: не се чете

Дата на издаване: 24.05.2012г.



ВЕРНО С
ОРИГИНАЛ

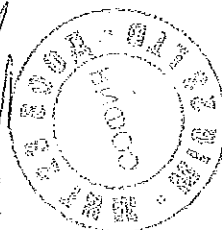
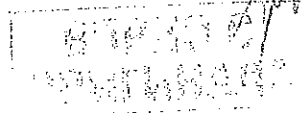


2012

Report No.600332-03/01

TEST REPORT	
IEC 60 947-2	
Low-voltage switchgear and controlgear	
Part 2: Circuit - breakers	
Report Reference No.....	600332-01/01
Tested by (name+signature).....	Rezková Alena <i>Alena Rezková</i>
Witnessed by (name+signature).....	Hlavatý Jan <i>Jan Hlavatý</i>
Supervised by (name+signature).....	Hlavatý Jan <i>Jan Hlavatý</i>
Approved by (name+signature).....	Hlavatý Jan <i>Jan Hlavatý</i>
Date of issue.....	29.03.2006
CB Testing Laboratory.....	Elektrotechnický zkušební ústav, s.p.
Address.....	Pod lisem 129, 171.02 Praha 8 – Troja, Czech Republic
Testing location/ procedure.....	CBTL X
Testing location/ address.....	Pod lisem 129, 171 02 Praha 8 – Troja, Czech Republic
Applicant's name.....	OEZ s.r.o
Address.....	Šedivská 339, 56151 Letohrad, Czech Republic
Test specification:	
Standard.....	IEC 60 947 - 2 : 2003 (3 rd Edition)
Test procedure.....	CB
Non-standard test method.....	N/A
Test Report Form No.....	IEC60947_2C
TRF Originator.....	KEMA Nederland B.V.
Master TRF.....	Dated 2004-12
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Test item description.....	Circuit-breakers
Trade Mark.....	OEZ
Manufacturer.....	OEZ s.r.o.
Address.....	OEZ s.r.o. Šedivská 339 56151 Letohrad
Model/Type reference.....	BC 160N (see page 5 of 162)
Ratings.....	160 A; 230 V/415 V/500 V/690 V AC

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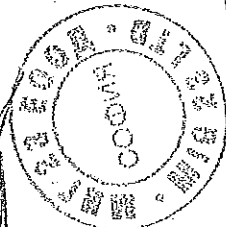


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Particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B).....	A
3.2. Interruption medium: (air, vacuum, gas Break).....	Air
3.3. Design: (open construction, moulded case).....	moulded case
3.4. Method of controlling the operation mechanism: (dependent manual operation, independent manual operation, dependent power operation, independent power operation)	independent manual operation
3.5. Suitability for insulation: (suitable, not -suitable)	suitable
3.6. Provision for maintenance: (maintainable, non maintainable).....	non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable:	fixed
3.8. Degree of protection: (IP code)	IP 20
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD	N/A
4.9. Switching overvoltages: (when Uimp. is declared)	Yes
7.3 Electromagnetic compatibility (EMC) Environment A or B.....	-
Circuit-breaker for use on phase-earthed systems.....	Yes
Circuit-breaker for use in IT systems.....	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V).....	230 V/415 V/500 V/690 V AC
- rated insulation voltage: Ui (V)	690 V
- rated impulse withstand voltage: Uimp (kV).....	8 kV
- rated operational current; Ie (A).....	160 A
- kind of current	AC
- conventional free air thermal current; Ith (A).....	160 A
- conventional enclosed thermal current: Ithe (A)	N/A
- current rating for four-pole circuit-breakers: (A).....	N/A
- number of poles.....	3
- rated frequency: (Hz)	50/60 Hz
- integral fuses (rated values)	No
- suitability for environment (A or B)	B
Rated duty :	
- eight-hour duty.....	Yes
- uninterrupted duty: Iu (A).....	160 A

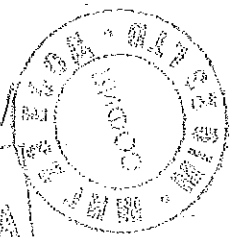
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COLUMBIA



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Short-circuit characteristic :	
rated short-time making capacity: I_{cm} (kA).....	230 V 84 kA, 415 V 53 kA, 500 V 24 kA , 690V 9 kA
rated ultimate short-circuit breaking capacity: I_{cu} (kA)	230 V 40 kA, 415 V 25 kA, 500 V 12 kA , 690 V 6kA
rated service short-circuit breaking capacity: I_{cs} (kA).....	230 V 20 kA, 415 V 13 kA, 500 V 6 kA , 690 V 3 kA
rated short-time withstand current: I_{cw} (kA/s).....	-
Control circuits :	N/A
Electrical control circuits :	
- kind of current: (AC, DC)	--
- rated frequency: (Hz).....	--
- rated control circuit voltage: U_c (nature, frequency, V)	--
- rated control supply voltage: U_s (nature, frequency V)	--
Air supply control circuits: (pneumatic or electro-pneumatic) :--	
- rated pressure and its limit	--
- volumes of air, at atmospheric pressure, required for each closing and each opening operation	--
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits	
- rated operational voltage U_e (V).....	5+250 V AC/DC
- rated insulation voltage: U_i (V)	250 V AC/DC
- rated operational current: I_e (A).....	6 A/250 V 5 A/60 V 3 A/110 V 1,5 A/230 V AC 0,25 A/250 V 0,5 A/60 V 0,2 A/110 V 0,1 A/250 V 0,1 A DC
- kind of current	AC/DC
- rated frequency: (Hz).....	50/60 HZ
- number of circuits	6
- number and kind of contact elements.....	1a and 1b
- rated uninterrupted current: I_u (A).....	6 A
- utilization category: (AC, DC, current and voltage).....	6 A/250 V AC12, 5 A/60 V 3 A/110 V 1,5 A/230 V AC15 0,25 A/250 V DC12, 0,5 A/60 V 0,2 A/110 V 0,1 A/250 V 0,1 A DC13

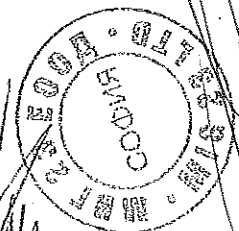


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Short-circuit characteristic :	
Rated conditional short-circuit current: Icn (kA)	-
Co-ordination of short-circuit protective devices	
- kind of protective device	-
Releases :	
1) shunt release	Yes
2) Over current release	Yes
a) instantaneous	-
b) definite time delay	-
c) inverse time delay	Yes
- independent of previous load	X
- dependent on previous load; (for example thermal type release)	Yes
3) Undervoltage release (for opening).....	Yes
4) Other releases	X
Characteristics :	
1) Shunt release and undervoltage release (for opening).. :	
- rated control circuit voltage: Uc (nature, frequency, V) ... :	AC/DC, 50/60 Hz, 24 V, 48 V, 110 V, 230 V, 400 V
- kind of current	AC/DC
-rated frequency: (if AC).....	50/60 Hz

2) Overcurrent release	
- rated current	160 A
- kind of current	AC
- rated frequency: (if AC).....	50/60 Hz
- current setting (or range of settings)	0,75 -1Ir
- time settings (or range of settings)	X

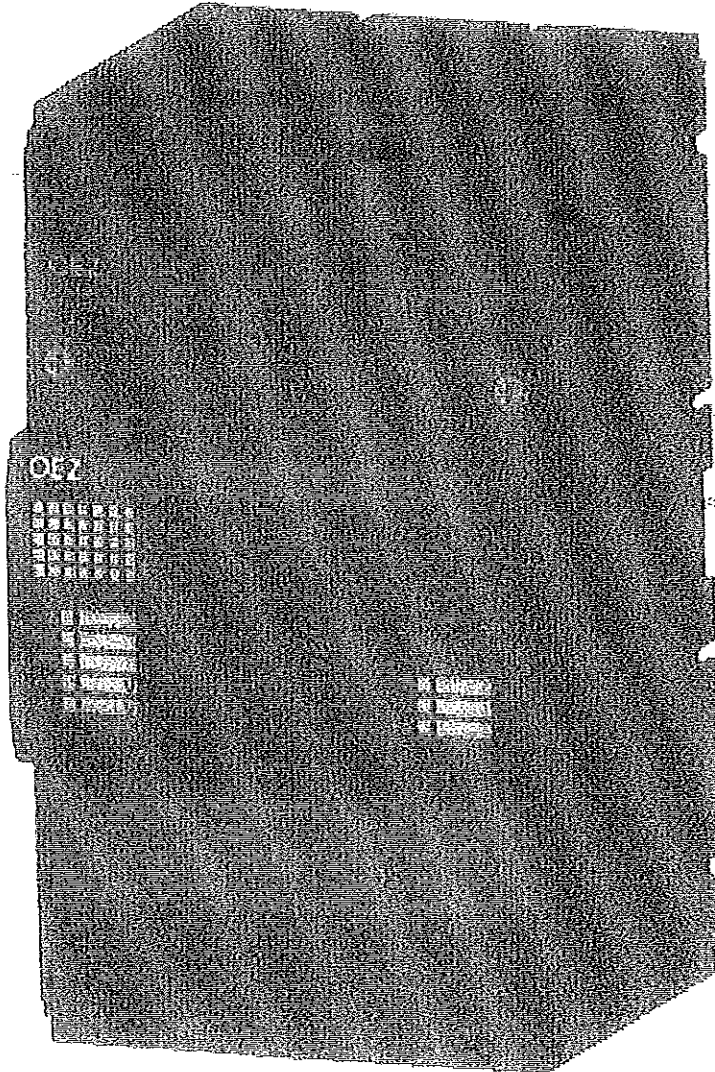
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Copy of marking plate



Type circuit -breakers

BC160NT305-16-D

BC160NT305-20-D

BC160NT305-25-D

BC160NT305-32-D

BC160NT305-40-D

BC160NT305-50-D

BC160NT305-63-D

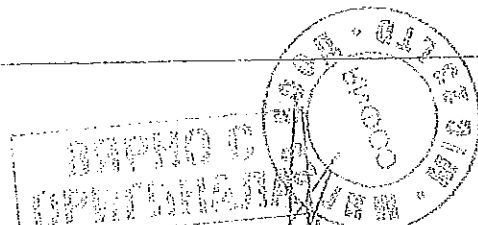
BC160NT305-80-D

BC160NT305-100-D

BC160NT305-125-D

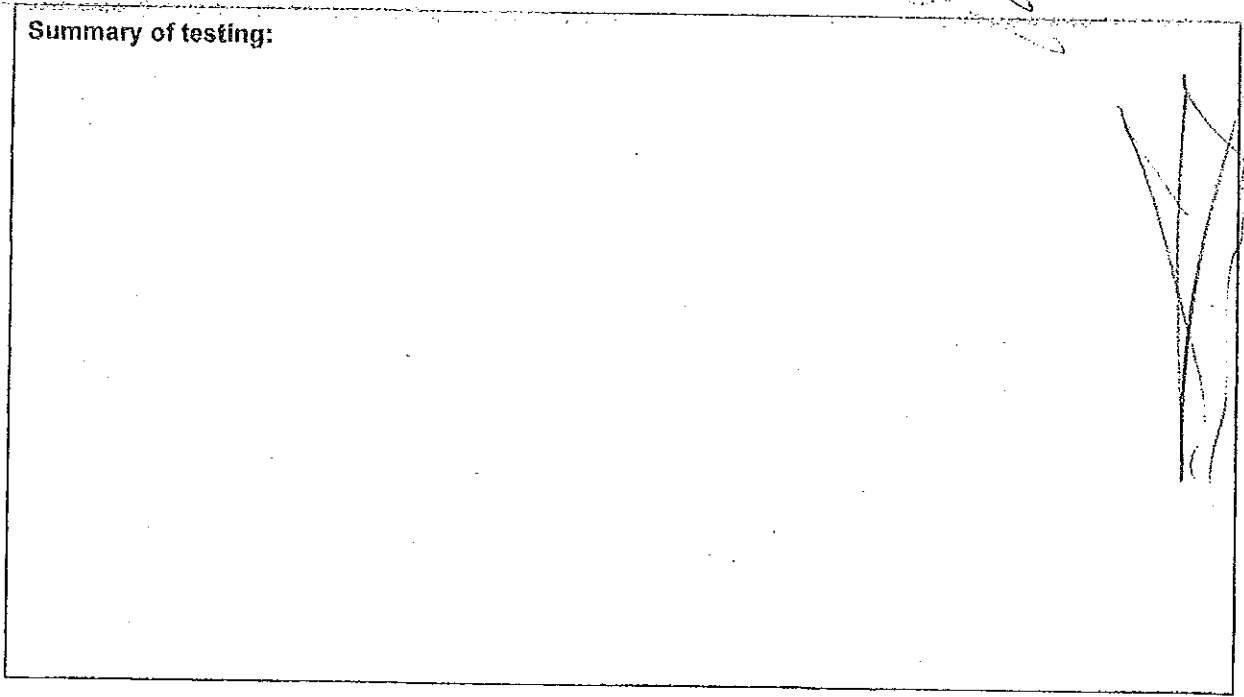
BC160NT305-160-D

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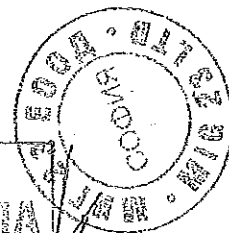
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Summary of testing:



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ОПРЕДЕЛЕНИЕ



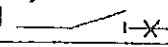

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Test item particulars	
Classification of installation and use.....	X
Supply Connection.....	X
.....	
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement.....	P(Pass)
- test object does not meet the requirement.....	F(Fail)
Testing	
Date of receipt of test item.....	02.02.2006
Date (s) of performance of tests.....	27.03.2006 -- 29.03.2006
General remarks:	
<p>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 IEC60072.</p> <p>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.</p> <p>"(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a comma (point) is used as the decimal separator.</p>	
General product information:	

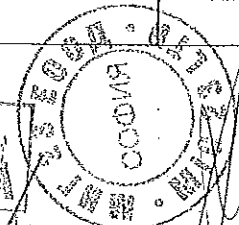
TRF No. IEC60947_2C

A circular stamp from the National Commission for Certification of Bodies (NCCB) is visible, with the text "NCCB" and "1000" around the perimeter. A signature is written over the stamp. In the bottom right corner, the number "261" is handwritten.

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	160 A	
	- suitability for isolation, if applicable, with the symbol 	Yes	P
	- indication of the open and closed position: with \bigcirc and I respectively, if symbols are used	Yes	P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	OEZ	P
	- type designation or serial number	BC 160N	P
	- IEC 60947-2 if the manufacturer compliance with this standard.	Yes	P
	- utilization category	A	P
	- rated operational voltage(s) U_e	230 V, 415 V, 500 V, 690 V AC	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	Circuit-breaker is suitable for use in IT systems 230 V, 415 V, 500 V, 690 V	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50/60 Hz	P
	- rated service short-circuit breaking capacity, I_{cs}	20 kA/230 V, 13 kA/415 V, 6 kA/500 V, 3 kA/690 V	P
	- rated ultimate short-circuit breaking capacity, I_{cu}	40 kA/230 V, 25 kA/415 V, 12 kA/500 V, 6 kA/690 V	P
	- rated short-time withstand current, (I_{cw}) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	Yes	P
	- neutral pole terminals, if applicable, by the letter N		N/A
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A

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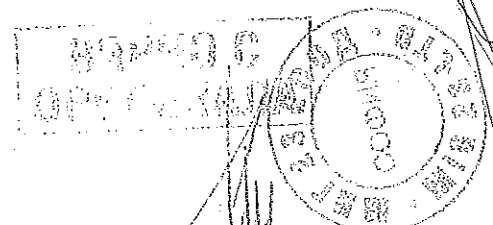
ВЕРНО С
ОПРЕДЕЛЕНИЕМ



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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- ref. temperature for non-compensated thermal releases, if different from 30°C	+40°C	P
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (I _{cm}) (if higher than specified in 4.3.5.1)	53 kA/415 V	P
	- rated insulation voltage. (U _i) if higher than the maximum rated operational voltage)	690 V	P
	- rated impulse withstand voltage (U _{imp}), when declared.	8 kV	P
	- pollution degree if other than 3	3	P
	- conventional enclosed thermal current (I _{th}) if different from the rated current:	I _{th} =I _n	P
	- IP Code, where applicable:	IP 20	P
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:	N/A	P
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Vide catalogue	P
	- r.m.s sensing if applicable, according to F.4.1.1	-	N/A
	- suitability for environment A or B	B	P
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:	24,48,110,230,400 V AC/DC 50/60 Hz	P
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.	Vide catalogue	P
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L.:		
	- line terminal	Satisfy	P
	- load terminal	Satisfy	P

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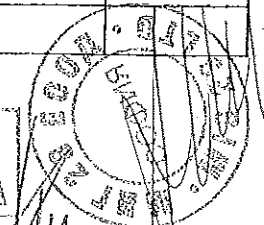
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- neutral pole terminal "N"		N/A
	- protective earth terminal \oplus		N/A
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)	Satisfy	P
	- terminals of under-voltage release (D)	Satisfy	P
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A

7.1	CONSTRUCTION		
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.1.1	Resistance to abnormal heat and fire	Satisfy IEC 60947-1	P
7.1.2	Current-carrying parts and their connection	Satisfy IEC 60947-1	P
7.1.3	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:	13 mm	
	- Uimp is given as:	8 kV	
	- max. value of rated operational voltage to earth	400 V	

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BARNO C
OPERATIONAL



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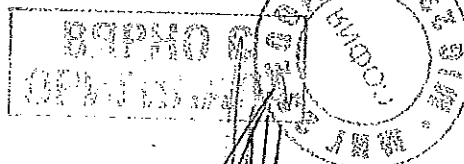
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- nominal voltage of supply system:	N/A	
	- overvoltage category:	IV	
	- pollution degree:	3	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	8 mm	
	- measured clearances (mm):	13 mm	R
	Creepage distances:		
	- rated insulation voltage Ui (V)	690 V	
	- pollution degree	3	
	- comparative tracking index (V)	400 V	
	- material group	2	
	Minimum creepage distances (mm)	9 mm	
	Measured creepage distances (mm)	19 mm	P
7.1.4 part 1	Actuator		
7.1.4.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage	Satisfy	P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation	Satisfy	P
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage	Satisfy	P
7.1.4.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.	Satisfy	P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation	Satisfy	P

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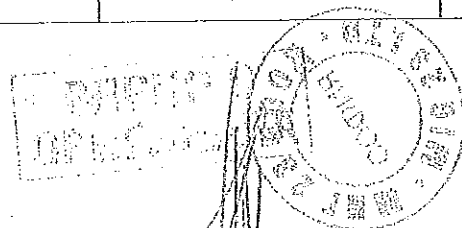
IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
7.1.5 part 1	Indication of contact position		
7.1.5.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated	Satisfy	P
	This is done by means of a position indicating device (see 2.3.18)	Satisfy	P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)	Satisfy	P
	- 60417-2-IEC-5007 O Off (power)	Satisfy	P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.5.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided	Satisfy	P
7.1.6	Additional safety requirements for equipment suitable for isolation		
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator	Yes	P
	- a separate mechanical indicator		N/A

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position	Satisfy	P
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking	Yes	P
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.	Satisfy	P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	8 mm	
	- measured clearances (mm) :	20 mm	P
	- test Uimp across gap (kV) :	8 kV	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer's instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A

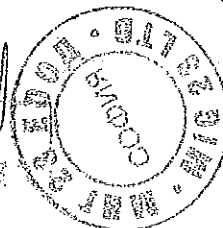
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed	Satisfy	P
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :	165 N	P
	rated impulse withstand voltage (kV) :	8 kV	P
	test Uimp on open main contacts at the test force		P
7.1.7	Terminals		
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	Satisfy	P
	Terminal connections shall be such that necessary contact pressure is maintained	Satisfy	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	Satisfy	P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	Satisfy	P
7.1.7.2	Connection capacity		
	type of conductors :		P
	minimum cross-sectional area of conductor (mm ²) :	2,5 mm ²	P
	maximum cross-sectional area of conductor (mm ²) :	95 mm ²	P
	number of conductors simultaneously connectable to the terminal :	1	P
7.1.7.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation	Satisfy	P

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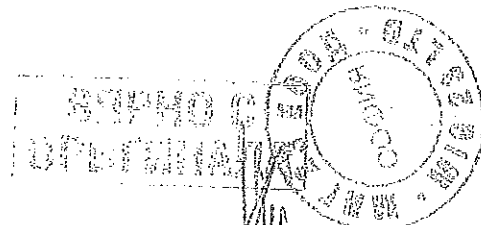
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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	clamping screws and nuts shall not serve to fix any other component	Satisfy	P
7.1.7.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		N/A
	protective earth terminal		N/A
	other terminals		N/A
7.1.8 part 1	Additional requirements for equipment provided with a neutral pole		
	When an equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		N/A
	A switched neutral pole shall break not before and shall make not after the other poles		N/A
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles		N/A
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher		N/A
	if a pole with a appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		N/A
7.1.9	Provisions for protective earthing		
7.1.9.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A

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Clause	Requirement – Test	Result – Remark	Verdict
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.9.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.9.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019  Protective earth (ground) in accordance with IEC 60417-2		N/A

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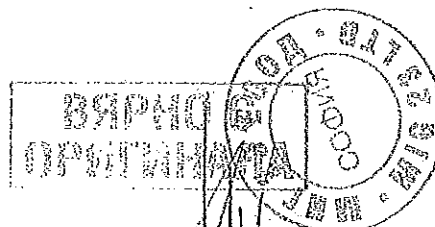
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.10	Enclosure for equipment		
7.1.10.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A
	Sufficient space shall be provided inside the enclosure		N/A
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N/A
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N/A
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N/A
	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/A
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N/A
7.1.10.2	Insulation		
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure	Satisfy	P
7.1.11	Degree of protection of enclosed equipment		
	Degree of protection.	IP 20	
	Test for first characteristic.	IP 20	
	Test for first numeral :	2	P
	Test for second characteristic	IP 20	
	Test for second numeral :	0	P

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.1.12 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity	Satisfy	P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation	Satisfy	P

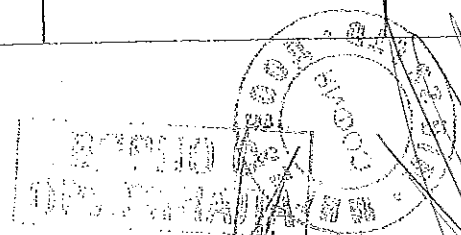
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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage	Satisfy	P
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value	Satisfy	P
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value	Satisfy	P
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency	Satisfy	P
7.2.1.5 part 1	Limits of operation of current operated relays and releases		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard	Satisfy	P

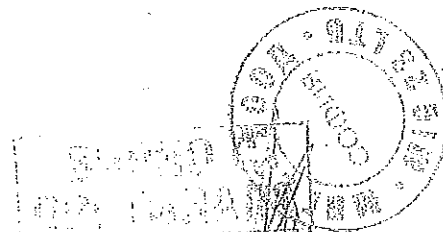
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release	Satisfy	P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing	Satisfy	P
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)	Vide catalogue	P
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see not to 8.3.5)	Vide catalogue	P
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of $\pm 10\%$ of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	Satisfy	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	Satisfy	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K	Satisfy	P
	The width of the temperature band shall be at least 10 K on either side of the reference temperature	Satisfy	P

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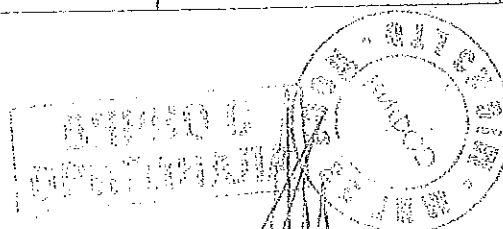


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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	conductor of the largest cross-sectional area (mm ²) :	95 mm ²	
	number of conductor of the largest cross section :	1	
	diameter of bushing hole (mm) :	13x16 mm	
	height between the equipment and the platen :	368 mm	
	mass at the conductor(s) (kg) :	14 kg	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	135	P
	Pull-out test		
	force (N) :	351 N	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	Meets	P
	conductor of the largest and smallest cross-sectional area (mm ²) :		
	number of conductor of the smallest cross section, number of conductor of the largest cross section :		
	diameter of bushing hole (mm) :		
	height between the equipment and the platen :		
	mass at the conductor(s) (kg) :	-	
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A
	Pull-out test		
	force (N) :	-	
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit	-	N/A

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1	
	Rated operational voltage: U _e (V)	230 V, 415 V, 500 V, 690 V AC	

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Rated current: In (A)	16 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	240 A	P
	Range of adjustable setting current. (A)	160-240 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	128 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	192 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	192 A	P

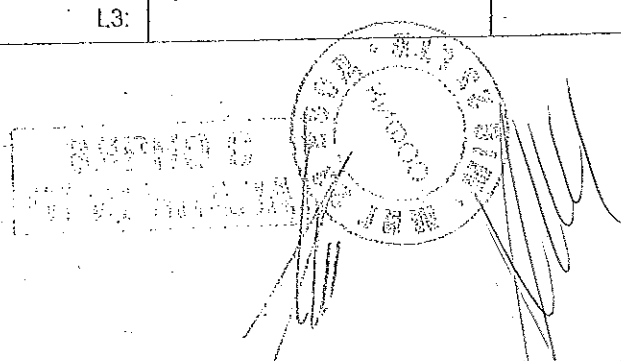
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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable - setting current: (A)	288 A	P
	Operating time: <0,2s in case of instantaneous - releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	240 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

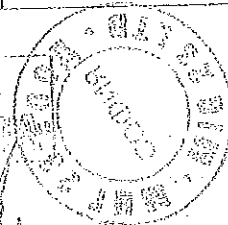
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1a	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	16 A	
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	P
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	13,125 A	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	16,25 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	Operate of the release	P

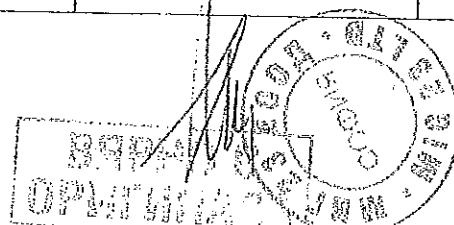
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 105% of the maximum adjustable setting current: (A)	16,8 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	20,8 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Short-circuit release $\pm 20\%$ Inverse time-delay Releases $\pm 30\%$	P

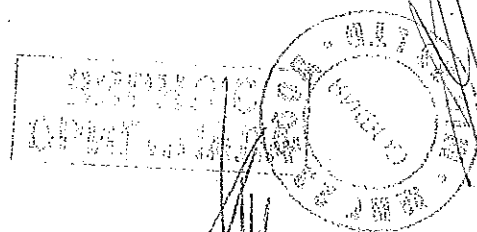
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
			N/A
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1a	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	20 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	300 A	P
	Range of adjustable setting current. (A)	200-300 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	160 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

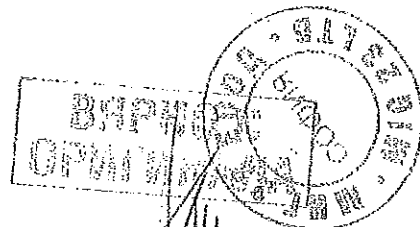
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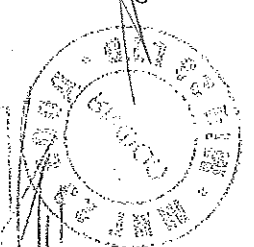
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:	N/A	
	Test current: 80% of the maximum adjustable setting current: (A)	240 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	240 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	360 A	P

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	300 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A

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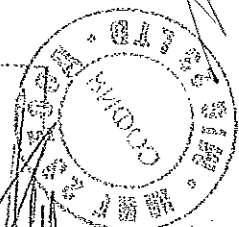


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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1b	
	Rated operational voltage: Ue (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: In (A)	20 A	

TRF No. IEC60947_2C

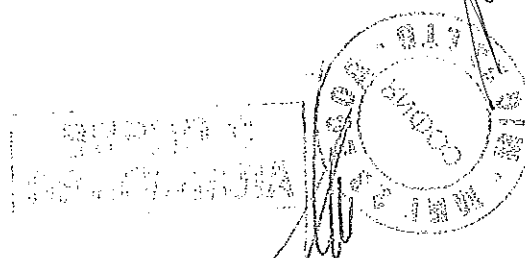
IEC 60947-2
 01/11/2011



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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	16,8 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	20, 8A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	21 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	26 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A

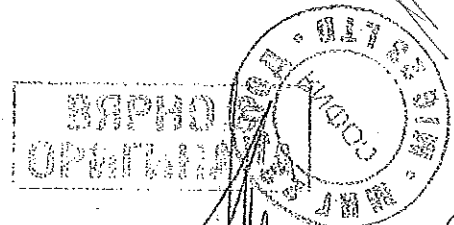
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Short-circuit release ±20% Inverse time-delay Releases ±30%	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A

TRF No. IEC60947_2C

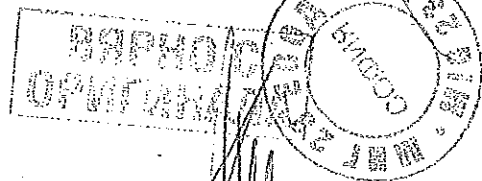


IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1c	
	Rated operational voltage: U_e (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: I_n (A)	25 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	375 A	P
	Range of adjustable setting current. (A)	250-375 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	200 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	300 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

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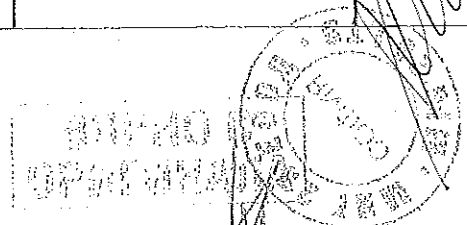


IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	300 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	450 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	375 A	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

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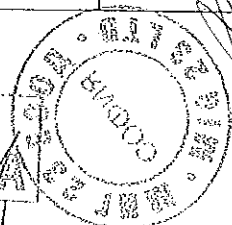


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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1c	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	25 A	
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C.		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	21 A	P

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ВЕРНО
ОПТИМАЛ



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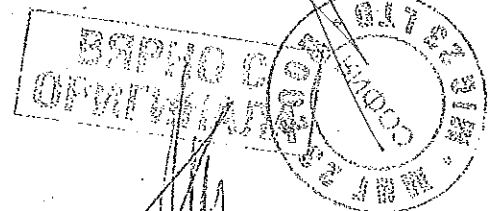
IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	26 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	26,25 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	32,5 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Short-circuit release $\pm 20\%$ Inverse time-delay Releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
			N/A
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1d	
	Rated operational voltage: U_e (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: I_n (A)	32 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	320 A	P
	Range of adjustable setting current. (A)	160-320 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	128 A	P

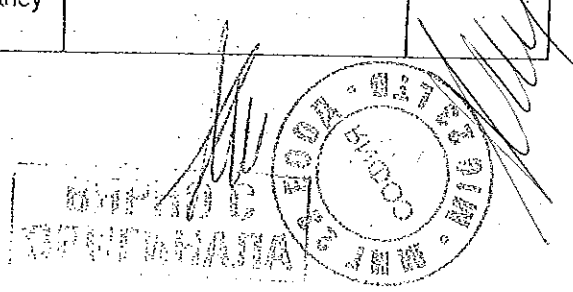
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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	256 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	192 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	384 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	320 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A

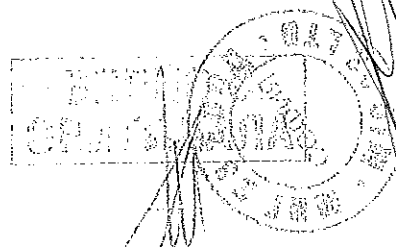
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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1d	
	Rated operational voltage: Ue (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: In (A)	32 A	

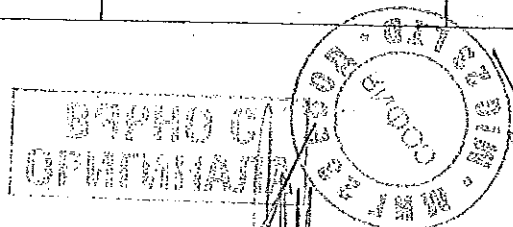
TRF No. IEC60947_2C



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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	26,25 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	26 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	32,5 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	41,6 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	Short-circuit release ±20% Inverse time-delay Releases ±30%	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Manufacturer's name or trademark	OEZ s.r.o.	

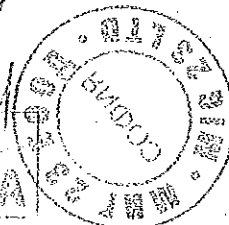
TRF No. IEC60947_2C



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Type designation or serial number	BC 160N	
	Sample no:	1e	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	40 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	400 A	P
	Range of adjustable setting current. (A)	200-400 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	160 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	320 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

TRF No. IEC60947_2C

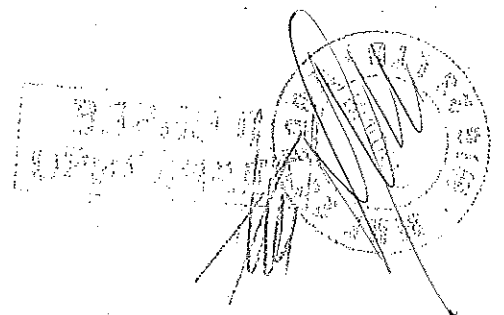
БСРП/С
ОПЕРАТОРАТА



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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	240 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	480 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	400 A	P

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

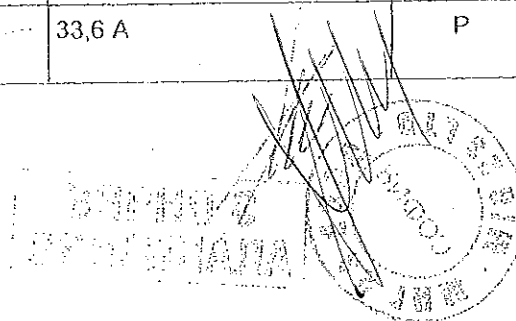
TRF No. IEC60947_2C



2007

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1e	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690V AC	
	Rated current: In (A)	40 A	
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	33,6 A	P

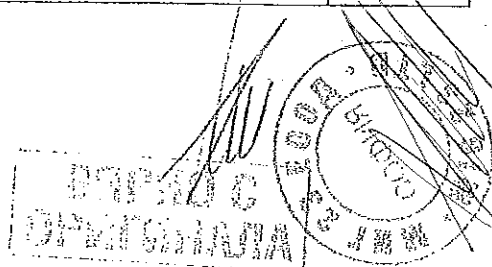
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	41,6 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	42 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	52 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P

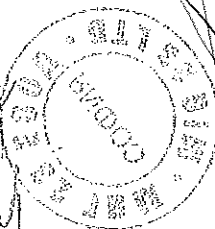
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	short-circuit release $\pm 20\%$ Inverse time-delay releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
			N/A
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1f	
	Rated operational voltage: U_e (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: I_n (A)	50 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	50 A	P
	Range of adjustable setting current. (A)	250-500 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	200 A	P

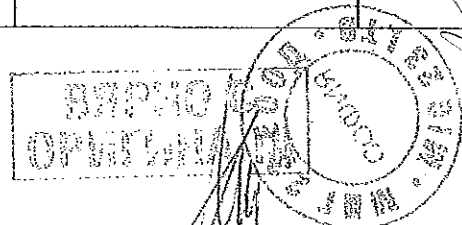
TRF No. IEC60947_2C



BON

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	400 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	300 A	
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A

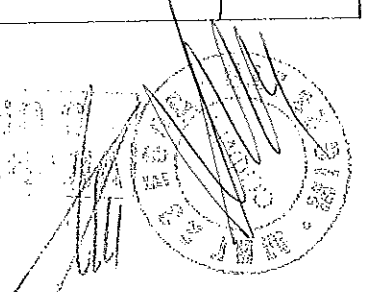
TRF No. IEC60947_2C



201

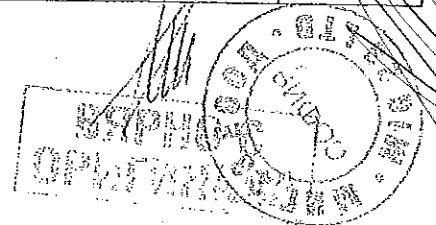
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	600 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	500 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A

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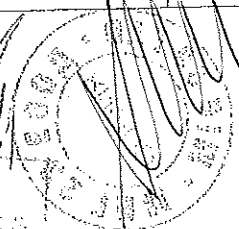
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1f	
	Rated operational voltage: Ue (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: In (A)	50 A	

TRF No. IEC60947_2C



IEC 60947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C	N/A	N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	42 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	52 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	52,25 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	65 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A

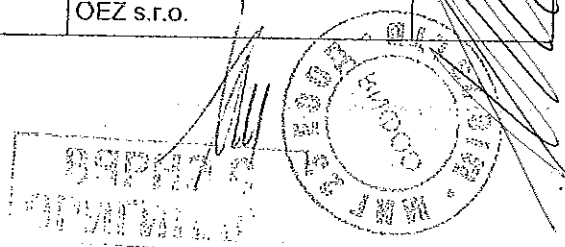
TRF No. IEC60947_2C



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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	short-circuit release ±20% Inverse time-delay releases ±30%	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Manufacturer's name or trademark	OEZ s.r.o.	

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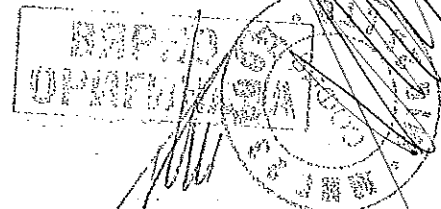
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Type designation or serial number	BC 160N	
	Sample no:	1g	
	Rated operational voltage: Ue (V)	230 V,415 V,500V,690 V AC	
	Rated current: In (A)	63 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	630 A	P
	Range of adjustable setting current. (A)	315-630 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	252 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	504 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	409,5 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	756 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	630 A	P

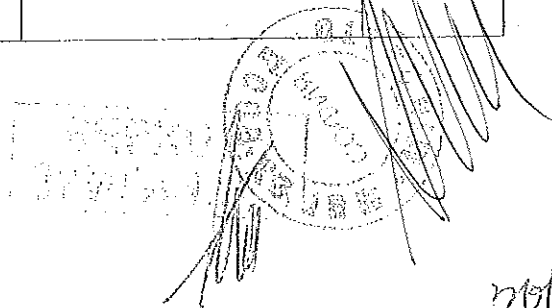
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

TRF No. EC60947_2C

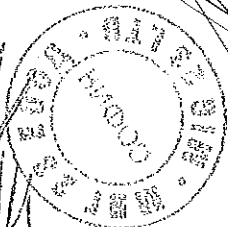


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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1g	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V, 690 V AC	
	Rated current: In (A)	63 A	
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C.	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	52,5 A	P

TRF No. IEC60947_2C

ALPHATEC
S. R. O.



2024

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	65 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	66,15 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	81,9 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	short-circuit release $\pm 20\%$ Inverse time-delay releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC160N	
	Sample no:	1h	
	Rated operational voltage: U_e (V)	230 V, 415 V, 500 V, 690 V AC	
	Rated current: I_n (A)	80 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	800 A	P
	Range of adjustable setting current. (A)	400-800 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	320 A	P

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REPORT C
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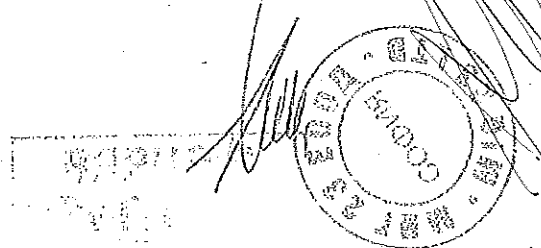


IEC 60947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	640 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	480 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A



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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	960 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	800 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A



IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	66,15 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	81,9 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	84 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	104 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A

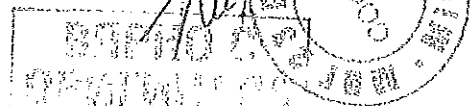
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	short-circuit release $\pm 20\%$ Inverse time-delay releases $\pm 30\%$	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
			N/A
	Manufacturer's name or trademark	OEZ s.r.o.	

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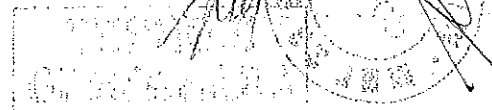


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IEC 60-947-2			
Clause	Requirement – Test	Result – Remark	Verdict

	Type designation or serial number	BC 160N	
	Sample no:	11	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	100 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1000 A	P
	Range of adjustable setting current. (A)	500-1000 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	400 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	800 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P

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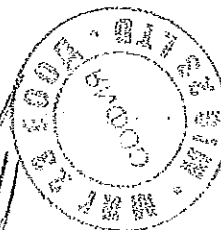


368

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	600 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the maximum adjustable setting current: (A)	1200 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	1000 A	P

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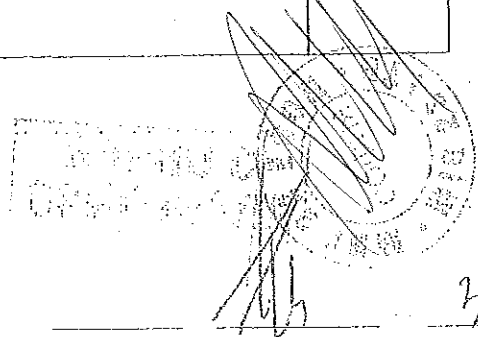
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IEC 60.947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A

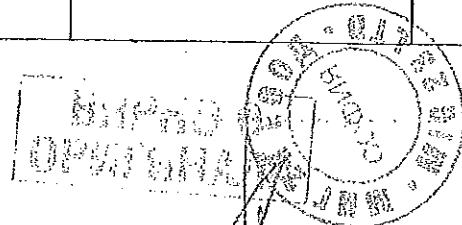
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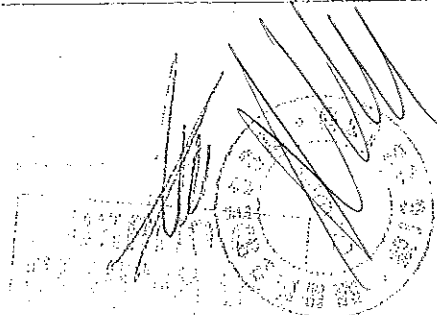
367

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1i	
	Rated operational voltage: Ue (V)	230 V,415 V,500 V,690 V AC	
	Rated current: In (A)	100 A	
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C	N/A	N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	84 A	P

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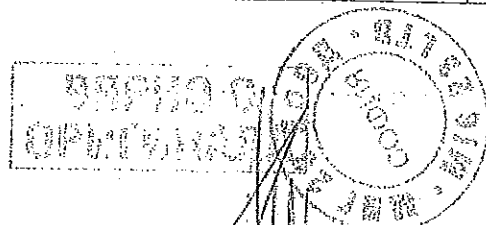


IEC 60947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	104 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	105 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	130 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63A$		N/A
	Test current: 105% of the maximum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63A$		N/A
	Test current: 130% of the maximum adjustable setting current: (A)		N/A
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63A$		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	P



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Releases, independent of ambient air temperature: at 30°C	-	N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	short-circuit release ±20% Inverse time-delay releases ±30%	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Yes	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A
			N/A
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1j	
	Rated operational voltage: Ue (V)	230 V,415 V, 500 V,690 V AC	
	Rated current: In (A)	125 A	
	Ambient temperature 10-40 °C :	40°C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	1250 A	P
	Range of adjustable setting current. (A)	625-1250 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 80% of the rated, or minimum adjustable setting current: (A)	500 A	P

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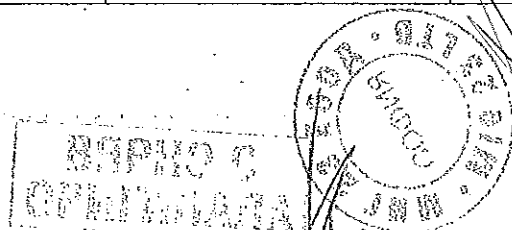
IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 80% of the maximum adjustable setting current: (A)	1000 A	P
	Operating time: >0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	No operate of the release No operate of the release No operate of the release	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or minimum adjustable setting current: (A)	750 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A

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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test current: 120% of the maximum adjustable setting current: (A)	1500 A	P
	Operating time: <0,2s in case of instantaneous releases: L1-L2: L1-L3: L2-L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases: L1-L2: L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	1250 A	P
	Operating time: < 200 ms in case of instantaneous release: L1: L2: L3:	operate of the release operate of the release operate of the release	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases L1: L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	OEZ s.r.o.	
	Type designation or serial number	BC 160N	
	Sample no:	1j	
	Rated operational voltage: Ue (V)	230 V, 415 V, 500V, 690V AC	
	Rated current: In (A)	125 A	

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	For releases dependent of ambient air temperature: Reference temperature	40°C	P
	Test ambient temperature (°C)	40°C	P
	If test made at a difference ambient temperature: Acc. manufacturer's correction temperature/current data:	40°C	P
	Range of adjustable setting current: (A)	-	N/A
	For releases independent of ambient temperature: Test made at 30°C and/or at 20/40°C		N/A
	Test ambient air temperature:	40°C	N/A
	Releases, dependent of ambient air temperature: Reference temperature (°C)	40°C	N/A
	Releases, independent of ambient air temperature: at 30°C	N/A	N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)	105 A	P
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the rated, or minimum adjustable setting current: (A)	130 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Test current: 105% of the maximum adjustable setting current: (A)	131,25A	
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$	No operate of the release	P
	Test current: 130% of the maximum adjustable setting current: (A)	162,5 A	P
	Conventional tripping time: <1h when $I_n < 63A$, <2h when $I_n > 63 A$	Operate of the release	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or minimum adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when $I_n < 63A$, 2h when $I_n > 63 A$		N/A
	Test current: 130% of the rated, or minimum adjustable setting current: (A)		N/A

TRF No. IEC60947_2C

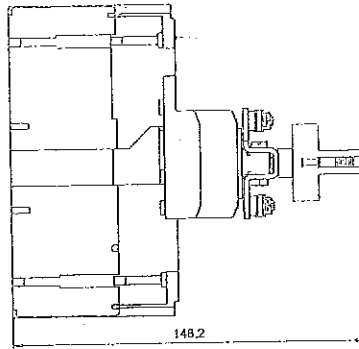
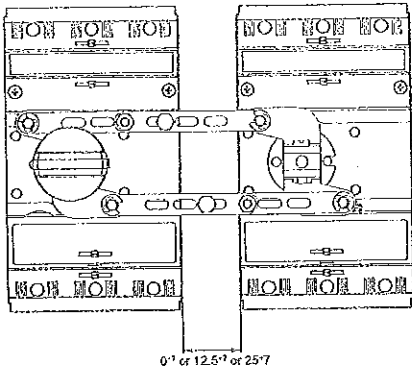


223

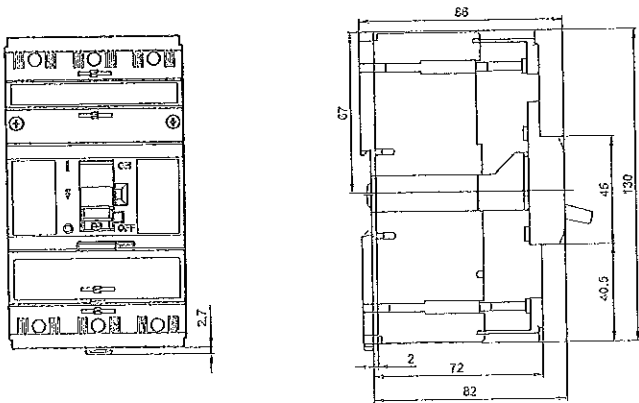
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

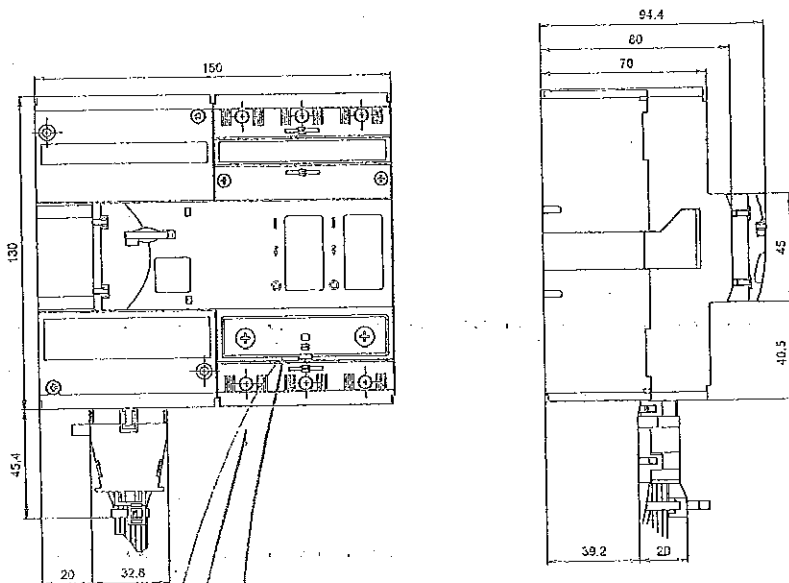
Fixed design, circuit breaker with RP-BC-CD10 mechanical parallel switching



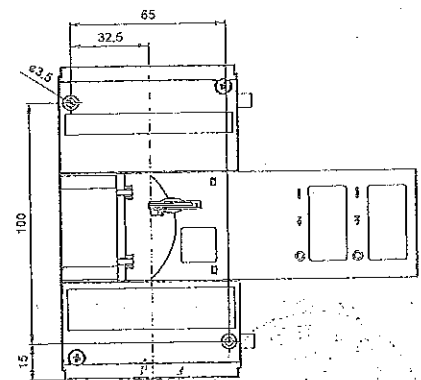
Fixed design, installation on 35 mm DIN rail



Fixed design, motor drive



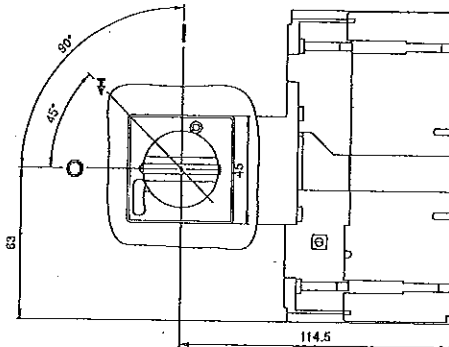
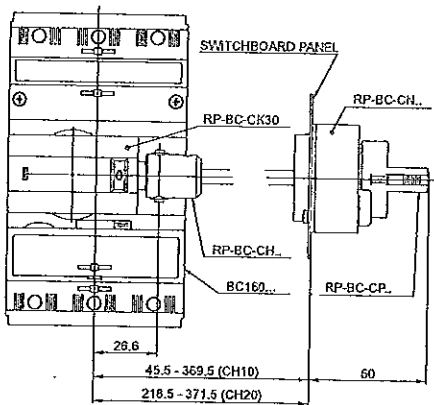
Drilling diagram



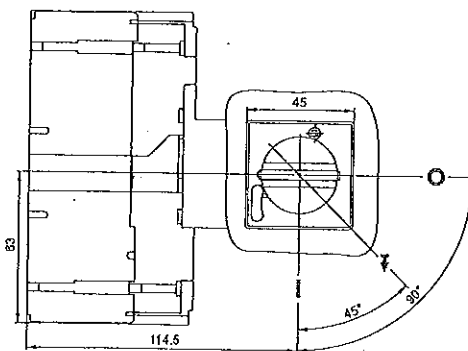
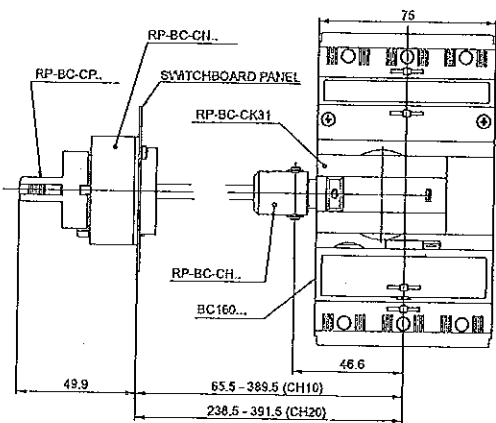
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

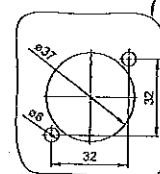
Fixed design, hand drive - control on right side, with adjustable lever



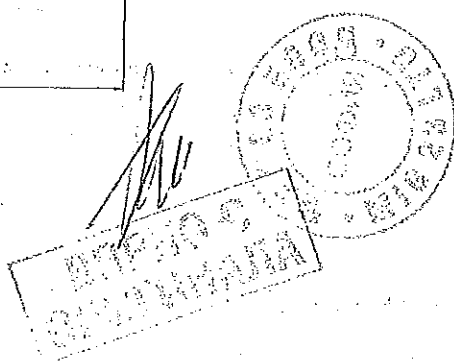
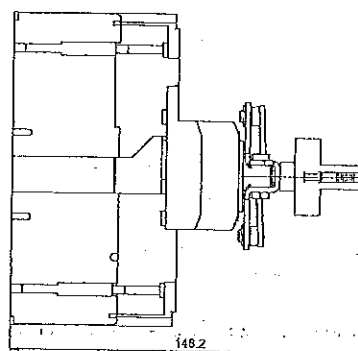
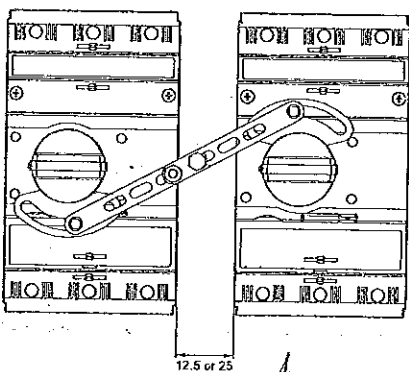
Fixed design, hand drive - control on left side, with adjustable lever



Switchboard modification



Fixed design, circuit breaker with RP-BC-CB10 mechanical interlocking

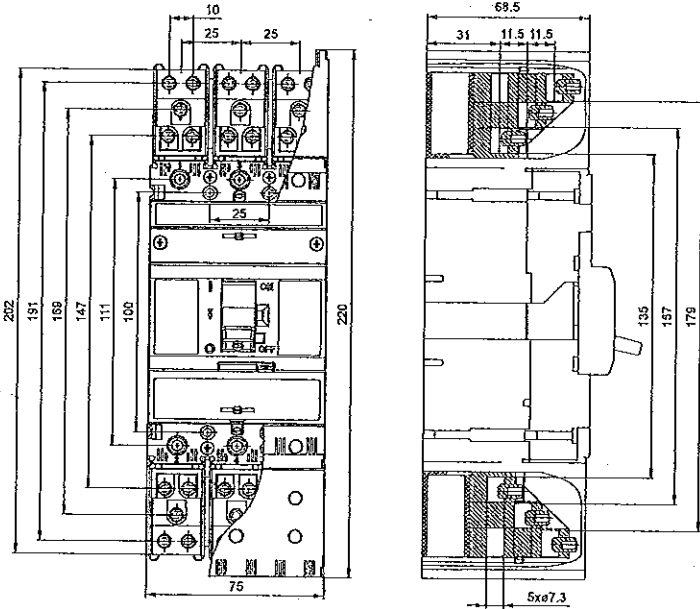


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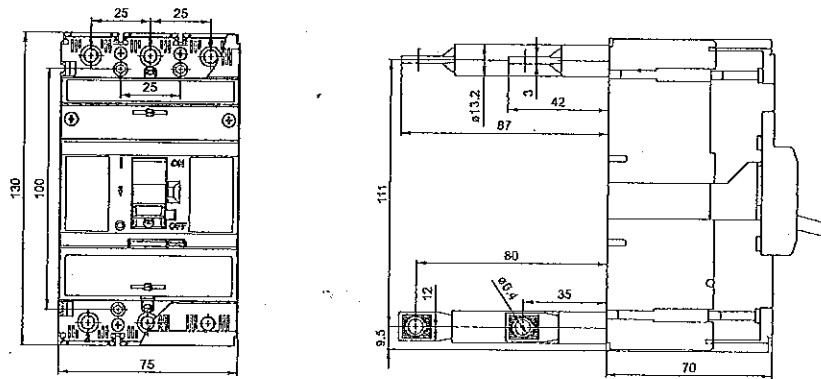
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Dimensions

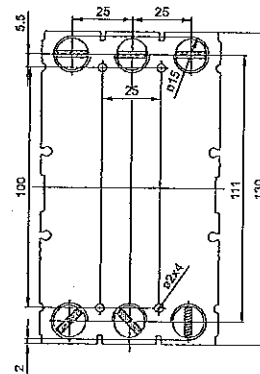
Fixed design, front connection (CS-BC-B014 connecting set)



Fixed design, rear connection (CS-BC-A021 connecting set)



Drilling diagram



RESIDUAL CURRENT DEVICES

3P 4P

Connecting and installation

Reduction of rated current of circuit breaker according to connection type

Circuit breaker	Rated current of circuit breaker (I _n)	Residual current device	Connection between circuit breaker and RCD	Inlet/outlet cable	Reduction coefficient (k)	Adjusted current (I _n × k)	Real current (I _n × k)	Real current (I _n × k)	Figure
BC160NT305-160-D	160 A	RCD-BC0-EF16	CS-BC-S016 ²⁾	Cu, 70 mm ² 3)	0.9	160 A	144 A	(160 x 0.90)	1
		RCD-BC0-EA16	CS-BC-S416 ²⁾			125 A	112.5 A	(125 x 0.90)	
		RCD-BC3-EF16	CS-BC-L016	Cu, 70 mm ² 3)	0.95	160 A	152 A	(160 x 0.95)	2
		RCD-BC3-EA16	CS-BC-L416			125 A	119 A	(125 x 0.95)	
BC160NT405-160-D	160 A	RCD-BC4-EF16	CS-BC-S016 ²⁾	Cu, 95 mm ² 3)	1	160 A	160 A		1
RCD-BC4-EA16		CS-BC-S416 ²⁾	125 A			125 A			
BC160NT305-160-L	160 A	RCD-BC3-EF16	CS-BC-L016	Cu, 95 mm ² 3)	1	160 A	160 A		2
RCD-BC3-EA16		CS-BC-L416	125 A			125 A			
BC160NT405-160-L	160 A	RCD-BC4-EF16	CS-BC-S016 ²⁾	Cu, 70 mm ² 3)	1	160 A	160 A		3
RCD-BC4-EA16		CS-BC-S416 ²⁾	125 A			125 A			

¹⁾ - for others circuit breaker is reduction coefficient k = 1

²⁾ - connecting sets can be mounted on both upper/lower terminals

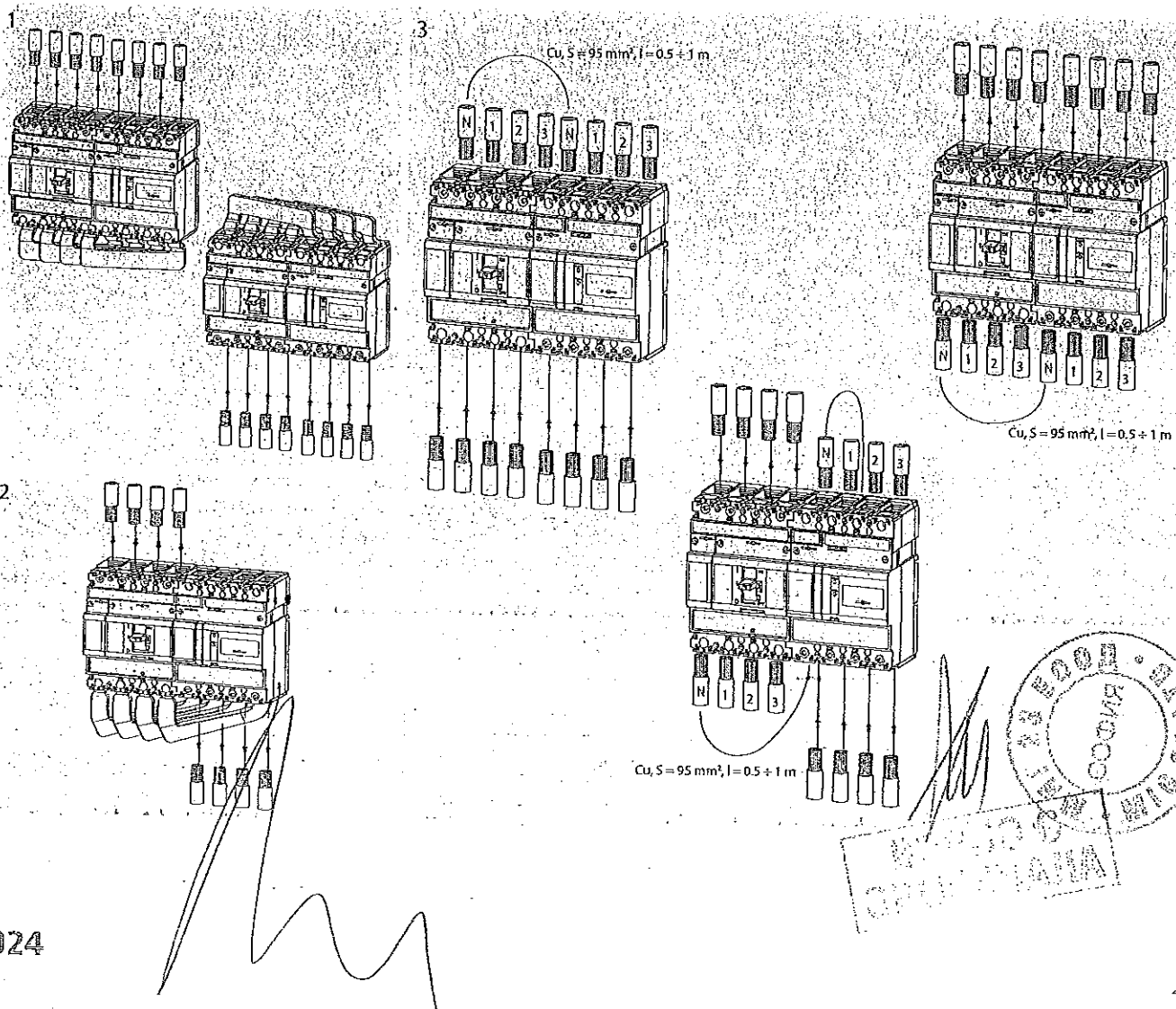
³⁾ - coefficients „k“ are not dependent on ambient temperature

⁴⁾ - dependency of nominal current I_n on ambient temperature can be found in the catalogue, see page D37

⁵⁾ - length of cables 2 m is given by standard EN 60 947-1

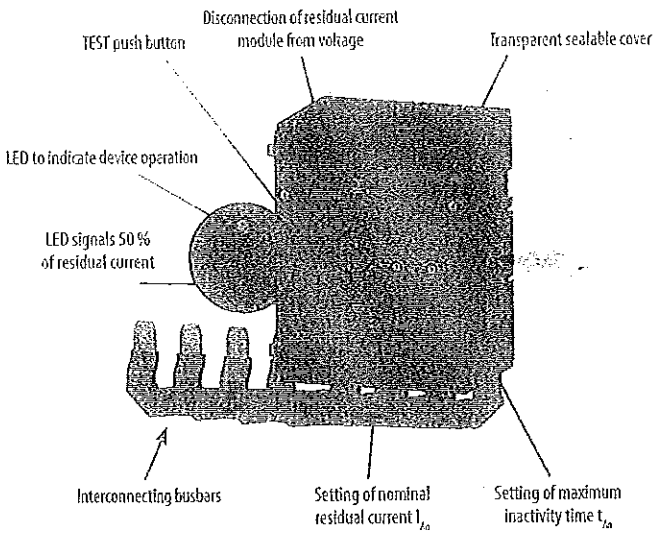
⁶⁾ - cables length 0.5 up to 1 m

- In case of the connection of the fine stranded conductor, we recommend using of the end sleeve



RESIDUAL CURRENT DEVICES

Description

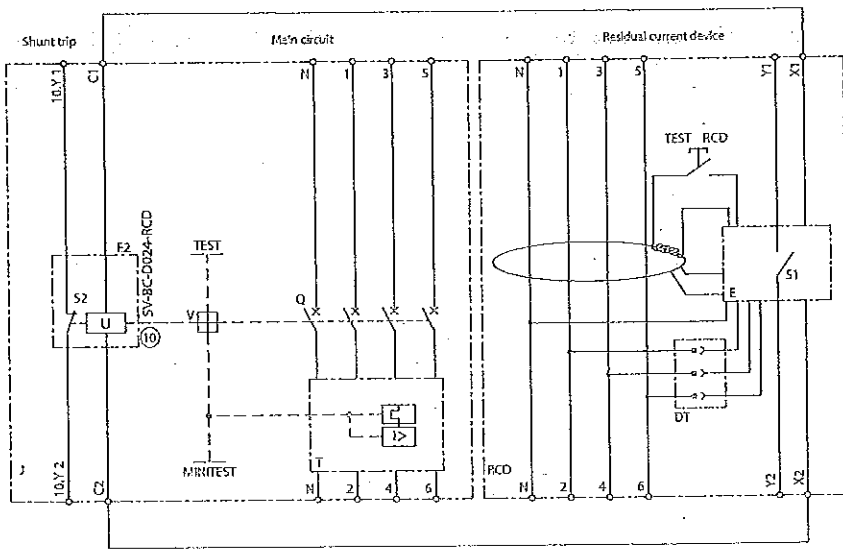


Signal contact specifications

	Signalling switch (or switch off by a failure)	
Rated operating voltage	U_e	230V a.c.
Rated insulation voltage	U_i	250V
Rated impulse withstand voltage	U_{imp}	4 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	2 A / 230 V a.c.
Thermal current	I_{th}	6 A
Arrangement of contacts		01

	Signalling switch of meeting the value of 50% I_n	
Rated operating voltage	U_e	250V a.c. / 30V d.c.
Rated insulation voltage	U_i	250V
Rated impulse withstand voltage	U_{imp}	6 kV
Rated frequency	f_n	50/60 Hz
Rated operating current	I_n/U_e	5 A / 250V a.c. 5 A / 30V d.c.
Thermal current	I_{th}	5 A
Arrangement of contacts		10

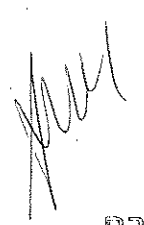
Wiring diagram



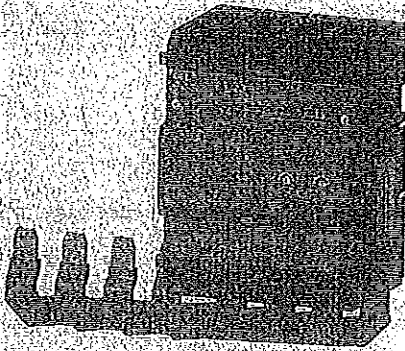
- J : circuit breaker BC160
- RCD : residual current device
- Q : main contacts
- V : trip-free mechanism
- T : thermomagnetic overcurrent release
- E : electronic of residual current device
- TEST : push button to test release
- MINITEST : inspection push button of release
- TEST RCD : button of residual current module
- S1 : signalling of 50% residual current value
- S2 : signalling switch of switch off by a failure
- F2 : shunt trip
- DT : disconnection of residual current module from voltage

Total max. switching off time

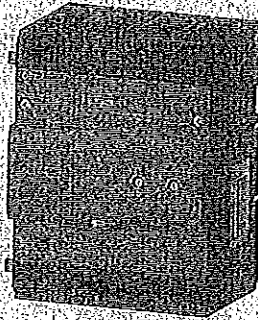
	Maximum inactivity time - adjusted value					
	0 ms	100 ms	200 ms	300 ms	500 ms	1000 ms
1x I_{th}	< 70 ms	< 230 ms	< 350 ms	< 440 ms	< 630 ms	< 1200 ms
2x I_{th}	< 40 ms	< 200 ms	< 320 ms	< 430 ms	< 620 ms	< 1200 ms
5x I_{th}	< 40 ms	< 210 ms	< 310 ms	< 420 ms	< 630 ms	< 1200 ms



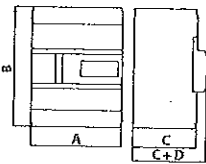
RESIDUAL CURRENT DEVICES



RCD-BC3-E
RCD-BC4-E



RCD-BC0-E



Dimensions

Specifications

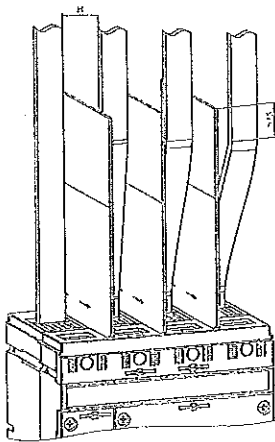
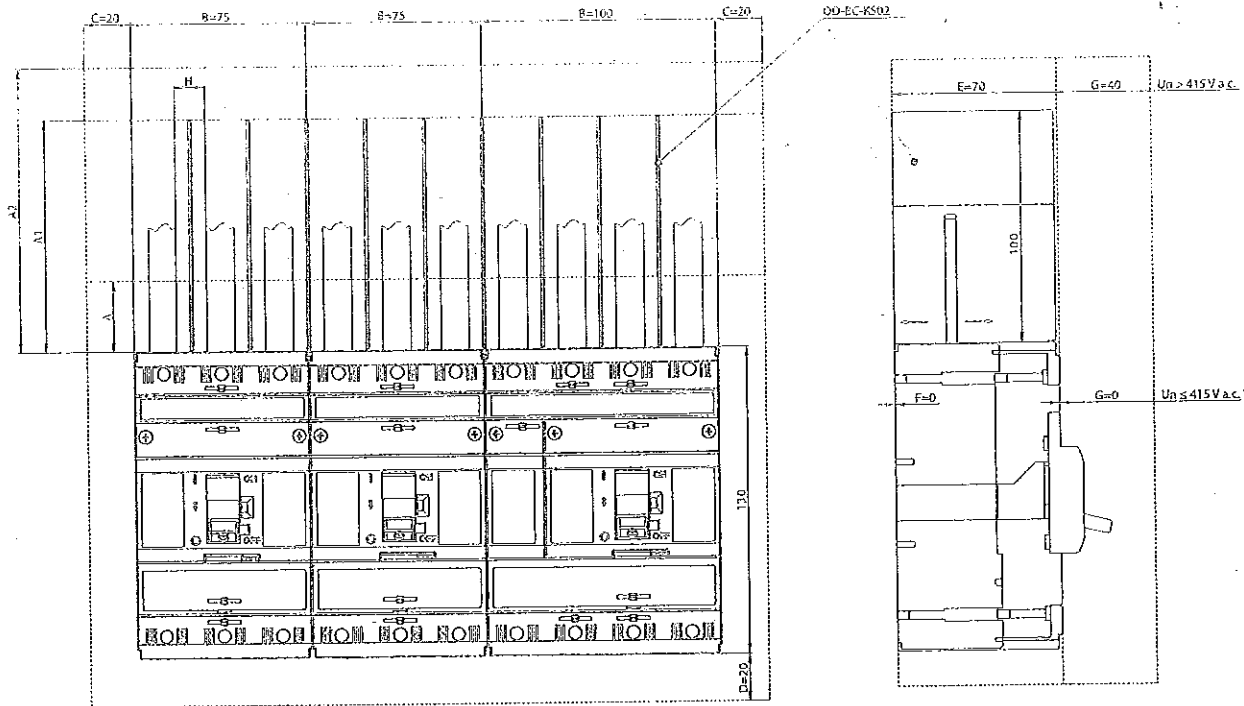
	RESIDUAL CURRENT DEVICE	
	RCD-BC3-E RCD-BC4-E	RCD-BC0-E
Dimensions A x B x C + D	100 x 130 x 70 + 10 mm	100 x 130 x 70 + 10 mm
Weight	1.7 kg	1.3 kg
Standards	EN 60947-2 IEC 60947-2	EN 60947-2 IEC 60947-2
Approval marks		
Type	A	A
Number of poles	3; 4	3; 4
Rated current	I_n 63; 160 A	63; 160 A
Rated residual current	$I_{\Delta n}$ RCD-...-EF: 0,3 - fixed/ RCD-...-EA: /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A	0,3 - fixed/ /0,03; 0,1; 0,3; 0,5; 1,0; 3,0 A
Maximum inactivity time	t_{in} RCD-...-EF: 0 - without delay/ RCD-...-EA: /0; 0,1; 0,2; 0,3; 0,5; 1,0 s	0 - without delay/ /0; 0,1; 0,2; 0,3; 0,5; 1,0 s
Rated voltage	U_n 440 V a.c.	440 V a.c.
Rated operating voltage	U_t 80 ÷ 253 V a.c./ /80 ÷ 440 V a.c.	80 ÷ 253 V a.c./ /80 ÷ 440 V a.c.
Rated impulse voltage	U_{imp} 6 kV	6 kV
Rated frequency	f_n 50/60 Hz	50/60 Hz
Losses per 1 pole	4 W	4 W
Mechanical/electrical endurance	8 000 cycles	8 000 cycles
Degree of protection from front side of the device	IP40	IP40
Degree of protection of terminals	IP20	IP20
Method of mounting	side	side
Installation on „U“ rail	•	•
Use	circuit breaker BC160	circuit breaker BC160
Operating conditions		
Reference temperature	40 °C	40 °C
Ambient temperature range	-40 ÷ +55 °C	-40 ÷ +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz
Accessories		
Connecting sets are part of delivery/have to be bought separately	•/-	-/•

Description

- ▣ Designed to protect against leakage/residual current
- ▣ Accessories for BC160NT circuit breakers... - simple mounting on left side of the device
- ▣ Can be mounted on DIN rail by means of adapter
- ▣ Can be connected with the circuit breaker by interconnecting busbars (can be part of the device itself) or by standard cable
- ▣ Design according to the way of connection:
 - ▣ Version without interconnecting busbars (they are not a part of module)
 - interconnecting busbars can be bought separately, see RCD connection
 - can be connected to the circuit breaker by a cable, see RCD connection (cable is not part of the module)
 - ▣ Version with interconnecting busbars
 - the interconnecting busbars for connection to the circuit breaker are part of the (module circuit breaker terminals N, 2, 4, 6 and module terminals N, 1, 3, 5 are connected)
- ▣ The circuit breaker is switched off by special shunt trip, that is part of the residual current module
- ▣ Design according to nominal current:
 - ▣ Version up to 63 A for BC160NT... circuit breakers up to 63 A
 - ▣ Version up to 160 A for BC160NT... circuit breakers from 80 up to 160 A
- ▣ Design according to the parameters setting:
 - ▣ Version with fixed residual current $I_{\Delta n} = 300$ mA, without delay
 - ▣ Design with gradual setting of residual current $I_{\Delta n}$ and with setting of ultimate no action time of t_{in} (see table)
 - ▣ When there is set $I_{\Delta n} = 0.03$ A the delay is always 0 s!
- ▣ Setting can be sealed
- ▣ Module can be connected directly by means of CU/Al cable max. 95 mm²
- ▣ For other connection standard BC160 terminals with the exception of rear connection can be used
- ▣ LED to indicate device operation
- ▣ LED signals 50 % I_n
- ▣ Remote signalling of 50 % I_n by means of make contact (only at RCD-BC-...EA...)
- ▣ Remote signalling of circuit breaker switch off based on $I_{\Delta n}$ level by means of break contact in shunt trip
- ▣ Mechanism for disconnection of electronic parts of module from voltage - disconnection has to be done before the insulation resistance test is effected
- ▣ TEST push button - complete test of the device by means of stimulation of real residual current
- ▣ Circuit breaker can not be assembled by another shunt trip or undervoltage release
- ▣ Two circuit breakers in residual current module can be assembled neither by mechanical interlocking nor by parallel switching

CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Detonization spaces



A... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for connection using insulated conductors, cables, flexibars or with rear connection)

A1... minimum insulation length of bare conductors (using OD-BC-KS02 and OD-BC-KS42 insulating barriers from 50 mm to max. 100 mm, or by adding additional insulation for the conductors with barriers to obtain at least A1 value)

Reference	Dimension
A	50 mm
A1	100 mm
A2	150 mm
H	30 mm

A2... minimum distance:

- between the circuit breaker/switch-disconnector and uninsulated earthed wall (applicable for uninsulated conductors and busbars)
- between the circuit breaker/switch-disconnector and busbar
- between two circuit breakers/switch-disconnectors situated vertically above one another
- between uninsulated connections of two circuit breakers/switch-disconnectors above one another

C, D, E, F, G... minimum distance between the circuit breaker/switch-disconnector and uninsulated earthed wall

H... minimum distance between uninsulated conductors

USE OF INSULATING BARRIERS AND TERMINAL COVERS WITH CIRCUIT BREAKERS AND SWITCH-DISCONNECTORS

FIXED DESIGN

front connection

- terminals H, 1, 3, 5 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or OD-BC-KS03 and OD-BC-KS43 terminal cover (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

- terminals N, 2, 4, 6 - it is always necessary to use OD-BC-KS02 and OD-BC-KS42 insulating barriers or a OD-BC-KS43 terminal cover if circuit breaker/switch-disconnector is connected to the supply using terminals H, 2, 4, 6 (when using CS-BC-B421 connections sets for connecting circuit breaker/switch-disconnector, the terminal cover is included in the connecting set)

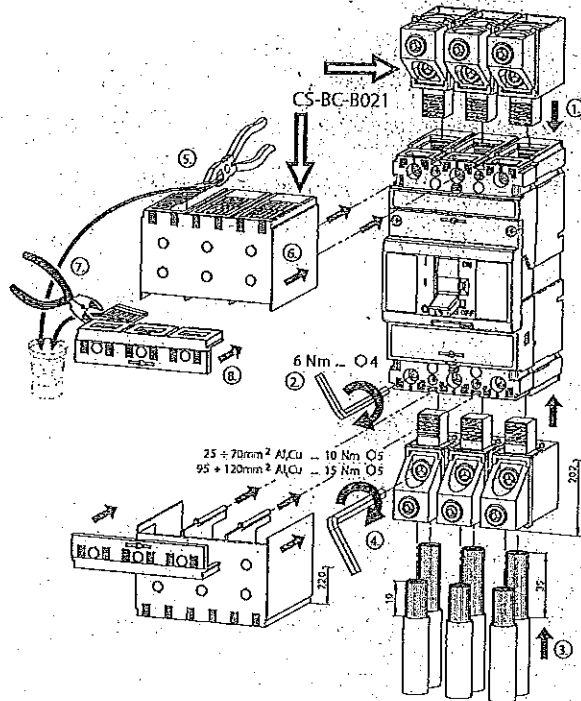
rear connection

- insulating barriers and covers need not be used

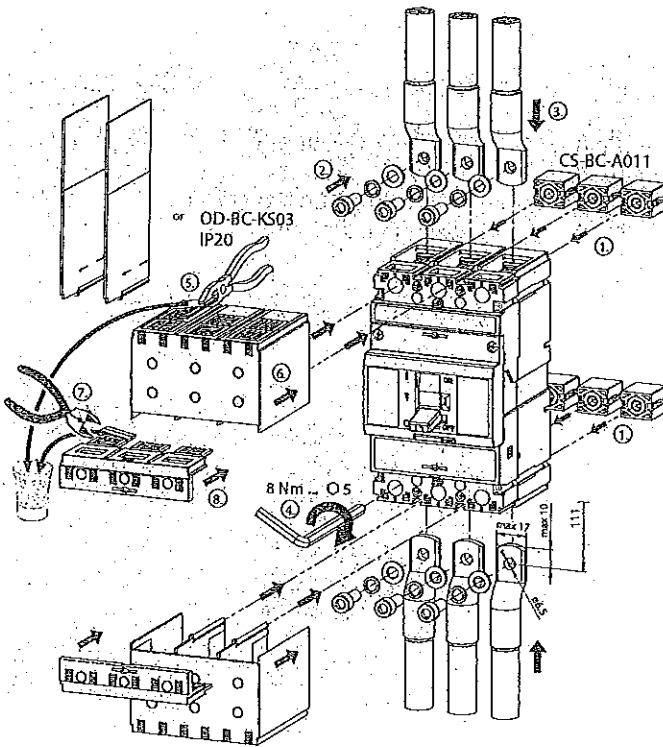
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

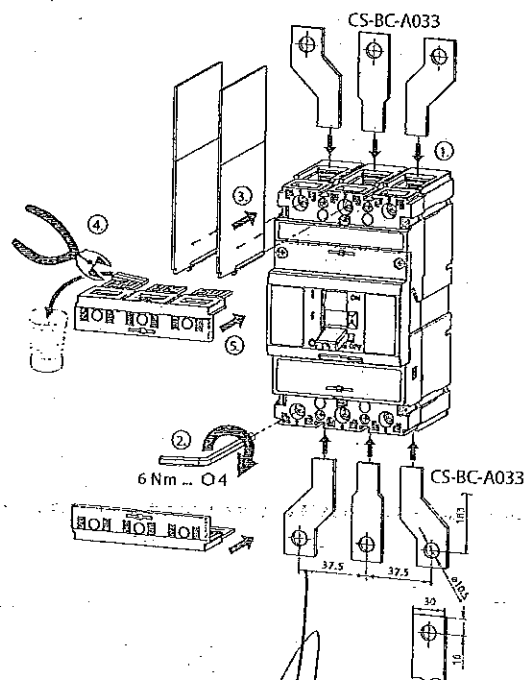
Front connection - 2x Cu/Al cables



Front connection - cable lugs



Front connection - reduction to BA...#33



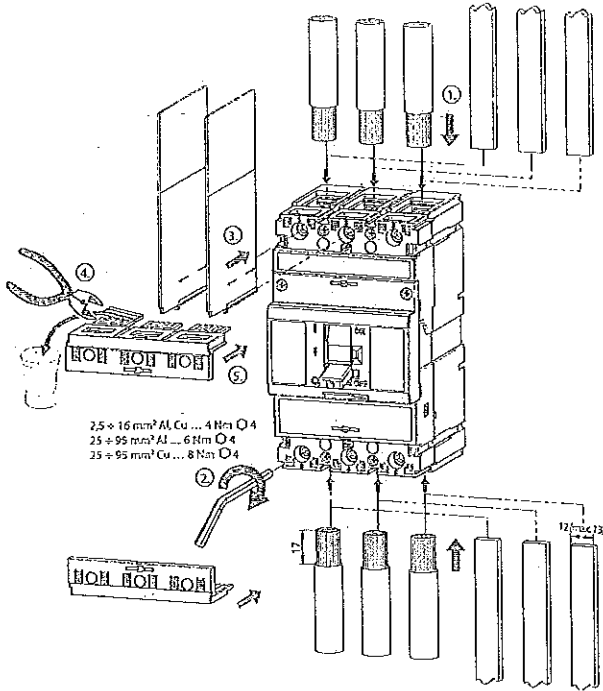
Handwritten signature and a circular stamp with text: "STEFANO BELLINI" and "DIPLOMA".

Handwritten mark resembling "WOF".

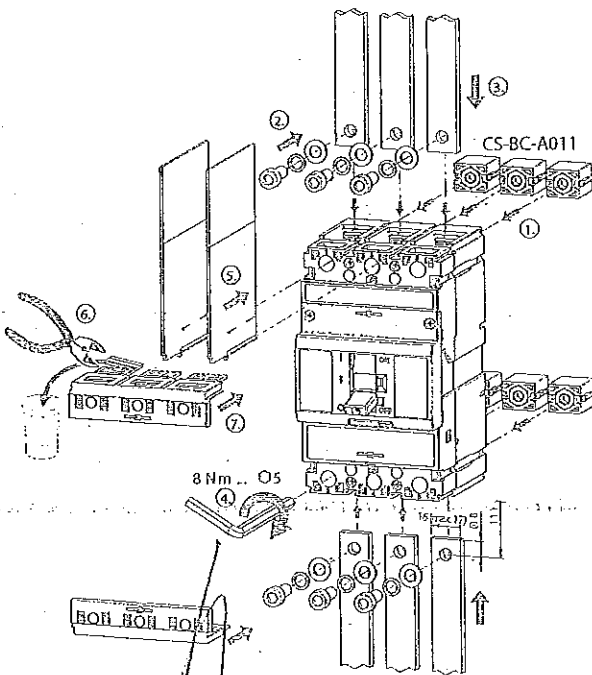
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Connecting and installation

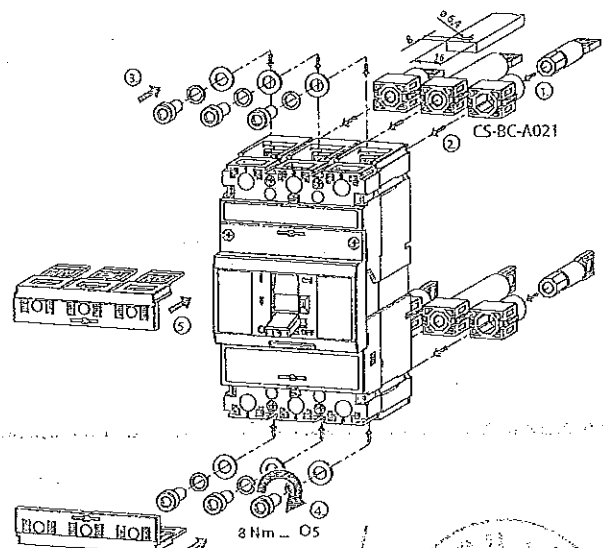
Front connection - Cu/Al cables, busbars (connecting set is a part of circuit breaker/switch-disconnector)



Front connection - Cu/Al busbars



Rear connection - Cu/Al busbars



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

Connecting and installation

Power circuit

- connected with Cu/Al busbars or cables and possibly cables with cable lugs
- connection sets are produced to provide greater connecting options, see page D10
- generally, conductors from the supply are connected to input terminals 1, 3, 5 and conductors from the load to terminals 2, 4, 6; however, it is possible to reverse the connection (exchanging input and output terminals without limiting rated short-circuit ultimate breaking capacity I_{cs})
- in case of reversed connection, circuit breaker/switch-disconnector must be fitted with ODBL-KS02 insulating barriers also on the side of terminals 2, 4, 6, for more detailed information see page D21

- we recommend painting the connecting busbars
- input and output conductors/busbars must be mechanically enforced in order to avoid transferring electrodynamic forces to the circuit breaker during short-circuiting
- the method of connecting the power circuit must observe the deionization space of the circuit breaker/switch-disconnector, see page D21

Auxiliary circuits

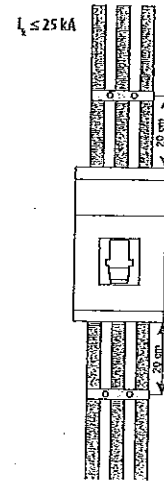
- switches, shunt trips or undervoltage releases are connected using flexible Cu conductors with cross-section $0.5 \div 1 \text{ mm}^2$ directly to terminals on these devices

Recommended minimum cross-sections of cables, busbars and flexibars

I _n (A)	Cables S (mm ²)		Busbars W x H (mm)	
	Cu	Al	Cu	Al
16	2,5	-	-	-
20	2,5	-	-	-
25	4	-	-	-
32	6	-	-	-
40	10	-	-	-
50	10	16	-	-
63	16	25	-	-
80	25	35	-	-
100	35	50	16 x 2; 12 x 3	16 x 4; 12 x 5
125	50	70	16 x 4; 12 x 5	16 x 5; 12 x 6
160	70	95	16 x 5; 12 x 6	16 x 6; 12 x 8

it is necessary to follow the relevant valid standards when cables are designed

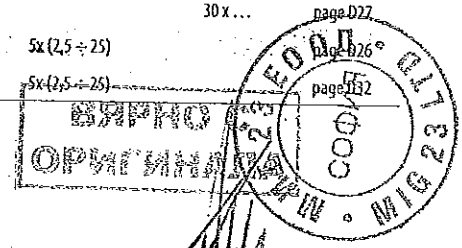
Mechanical reinforcement of conductors for BC160



Connecting set specifications

Type	I _n (A)	Cable - ranges of connection cross-sections S (mm ²)				Busbars and cable lugs W x H	Technical information
		type of cable	sector stranded	sector solid	round stranded		
CS-BC-B021	160		2x (25 ¹⁾ ÷ 120)	2x (25 ÷ 120)	2x (25 ¹⁾ ÷ 120)	2x (25 ÷ 120)	page D25
CS-BC-B421	160		2x (25 ¹⁾ ÷ 120)	2x (25 ÷ 120)	2x (25 ¹⁾ ÷ 120)	2x (25 ÷ 120)	page D31
CS-BC-A011	160					16 x ...	page D25
CS-BC-A411	160					16 x ...	page D31
CS-BC-A021	160					16 x ...	page D26
CS-BC-A421	160					16 x ...	page D32
CS-BC-PS01	10/16			1,5 ÷ 2,5/4 ÷ 6			
CS-BC-PS41	10/16			1,5 ÷ 2,5/4 ÷ 6			
CS-BC-A033	160	RETROFIT -- reduction for circuit breaker BA...*33 with front connection				30 x ...	page D27
CS-BC-B014	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D32
CS-BC-B414	160		5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	5x (2,5 ÷ 25)	page D32

RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction
¹⁾ stranded conductor with cross-sections 25 mm² ÷ 50 mm² only with end sleeve



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Diagram

(Circuit breaker with accessories (4-pole design))

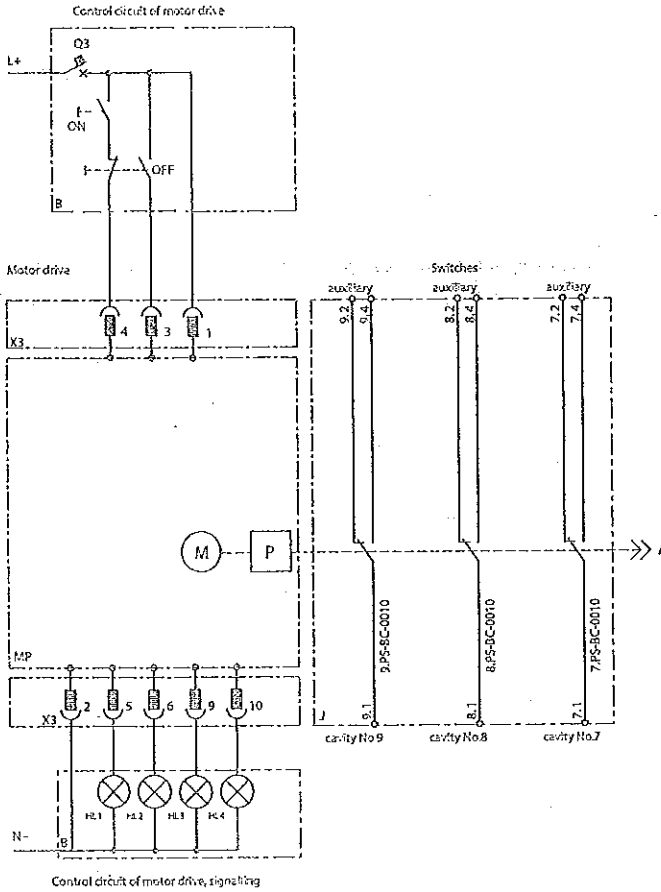
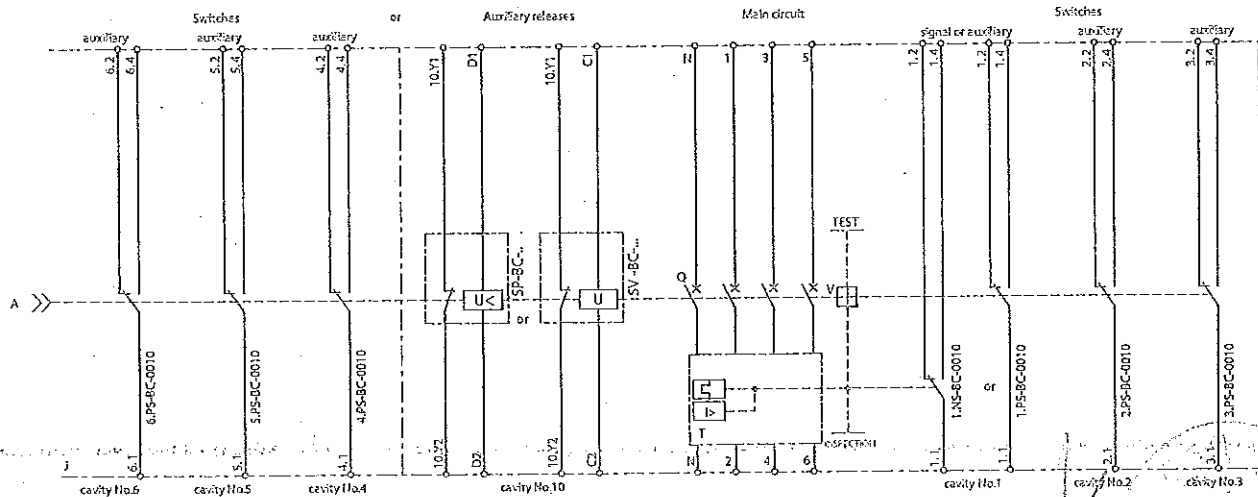


Diagram description

- MP motor drive - MP-BC...
- M motor
- P gear unit
- X3 connector for connection of control and signalling circuits recommended wiring of the control circuits - it is not a part of motor drive
- B switch on button
- ON switch on button
- OFF switch off button
- Q3 motor drive circuit breaker - see page D50
- J circuit breaker BC160
- Q main contacts
- T thermomagnetic overcurrent release
- 3P+N (3 poles are protected, N pole is unprotected)
- 4P (all 4 poles are protected)
- V trip-free mechanism
- TEST push button to test release
- REVIZE inspection push button of release
- SP-BC-X... undervoltage release
- SV-BC-X... shunt trip
- HL1 remote failure signalling (unreliable switching on or switching off), max. permissible load 10 W⁹⁾
- HL2 signalling of circuit breaker lever position „loaded“, max. permissible load 10 W⁹⁾
- HL3 signalling of opening of the front safety cover of the drive, max. permissible load 10 W⁹⁾
- HL4 signalling of exertion of the drive locking bar, max. permissible load 10 W⁹⁾

⁹⁾ voltage on terminals 5, 6, 9, 10 is the same as U_n of the motor drive



CIRCUIT BREAKERS, SWITCH-DISCONNECTORS

Specifications

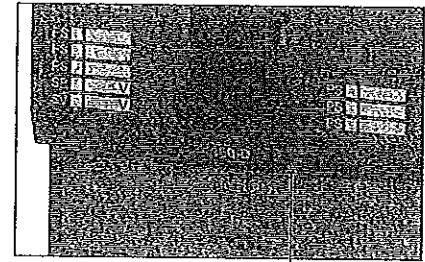
Description of push button function and signalling

TEST push button - by pressing you will switch off the circuit breaker/switch-disconnector, including to actuate the auxiliary switches

Inspection push button - by pressing you will simulate tripping of the circuit breaker by the overcurrent release, including to actuate the auxiliary switches and signal switch. Pressing

requires a suitable instrument, such as a wire with cross-section of about 1 mm.

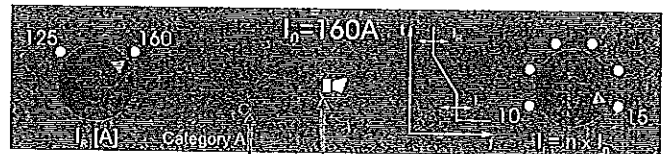
Signalling of tripping by the overcurrent release - after tripping of the circuit breaker by the overcurrent release, it will display the indicator „OFF“



TEST push button

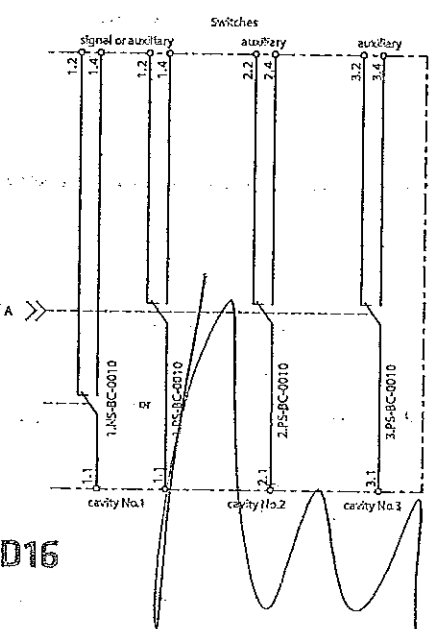
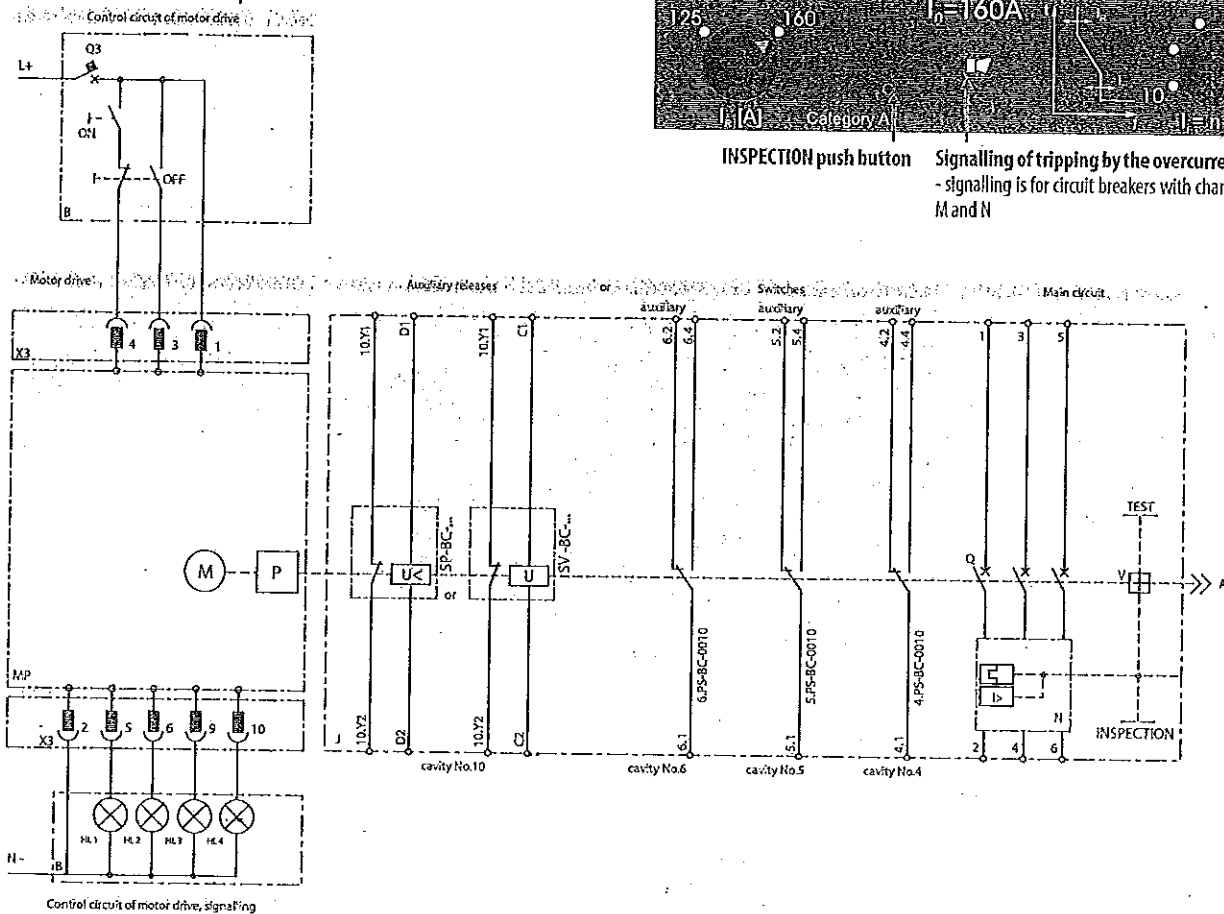
Diagram

Circuit breaker with accessories (3-pole design)



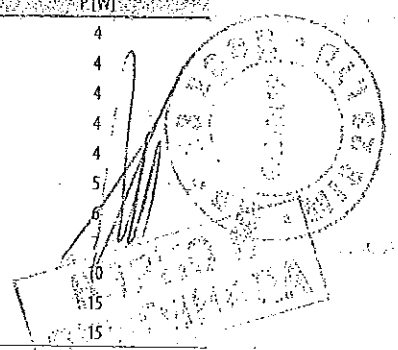
INSPECTION push button

Signalling of tripping by the overcurrent release - signalling is for circuit breakers with characteristic D, M and N



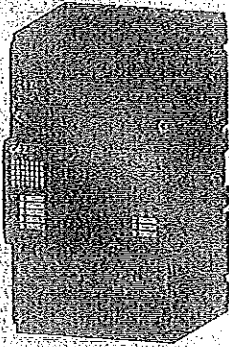
Power losses (per 1 pole)

I [A]	P [W]
16	4
20	4
25	4
32	4
40	4
50	5
63	6
80	7
100	10
125	15
160	15

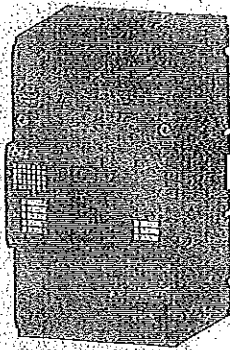


201

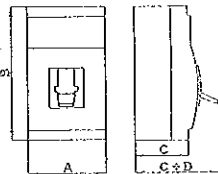
CIRCUIT BREAKERS, SWITCH-DISCONNECTORS



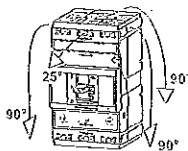
Circuit breaker



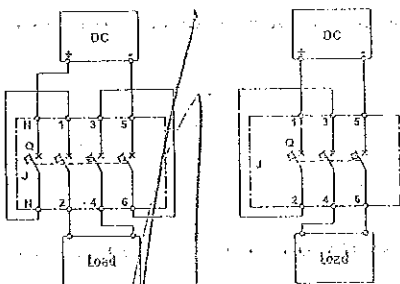
Switch-disconnector



Dimensions



Installation positions



Connection of 3P circuit breaker in DC circuit up to 250 V d.c.

Connection of 4P circuit breaker in DC circuit up to 440 V d.c.

Specifications

Type	CIRCUIT BREAKER BC160N	SWITCH-DISCONNECTOR BC160N...V
Series	NORMAL	
Dimensions A x B x C + D (3P/4P design)	75/100x130x70+23 mm	75/100x130x70+23 mm
Weight (3P/4P design)	1/1.3 kg	1/1.3 kg
Standards	EH 60947-2, IEC 60947-2	EH 60947-3, IEC 60947-3
Approval marks		
Number of poles	3, 4	3, 4
Rated current	16 ÷ 160 A ¹⁾	-
Rated normal current	16 ÷ 160 A ²⁾	160 A
Rated operating current	-	160 A
Rated operating voltage	max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)	max. 690 V a.c. max. 250 V d.c. (3P) max. 440 V d.c. (4P)
Rated frequency	50/60 Hz	50/60 Hz
Rated impulse withstand voltage	8 kV	8 kV
Rated insulation voltage	690 V	690 V
Utilization category (selectivity)	690 V a.c.	A
Utilization category (switching mode)	AC-3 (16 ÷ 100 A) AC-2 (125 ÷ 160 A) DC-22A	AC-23 A DC-22A
Rated short-time withstand current	I_{sc} / t	2 kA/1 s
Rated short-circuit ultimate breaking capacity (rms) ³⁾	I_{cu} / U_c 6 kA/690 V a.c. 12 kA/500 V a.c. 25 kA/415 V a.c. 40 kA/230 V a.c. 25 kA/250 V d.c. $\tau = \text{max. } 15 \text{ ms}$ (3P) 20 kA/440 V d.c. $\tau = \text{max. } 15 \text{ ms}$ (4P)	-
Off time at I_n	7 ms	-
Rated short-circuit service breaking capacity (rms)	I_{cs} / U_c 3 kA/690 V a.c. 6 kA/500 V a.c. 13 kA/415 V a.c. 20 kA/230 V a.c. 13 kA/250 V d.c. $\tau = \text{max. } 10 \text{ ms}$ (3P) 13 kA/440 V d.c. $\tau = \text{max. } 10 \text{ ms}$ (4P)	-
Rated short-circuit making capacity (peak value)	I_{cm} / U_c 52 kA/415 V a.c.	2.8 kA/415 V a.c.
Losses per 1 pole at $I_n = 160 \text{ A}$	15 W	15 W
Mechanical endurance	20 000 cycles	20 000 cycles
Electrical endurance ($U_c = 415 \text{ V a.c.}$)	6 000 cycles	6 000 cycles
Switching frequency	120 cycles/hr	120 cycles/hr
Control force (3P/4P design)	55/65 N	55/65 N
Degree of protection from front side of the device	IP40	IP40
Degree of protection of terminals	IP20	IP20
Operating conditions		
Reference ambient temperature	40 °C	40 °C
Ambient temperature range	-40 °C ÷ +55 °C	-40 °C ÷ +55 °C
Working environment	dry and tropical climate	dry and tropical climate
Climatic resistance	EN 60068	EN 60068
Pollution degree	3	3
Max. sea level	2 000 m	2 000 m
Seismic resistance	3g (8 ÷ 50) Hz	3g (8 ÷ 50) Hz
Design modifications		
Front/rear connection	o/o	o/o
Plug-in design	-	-
Withdrawable design	-	-
Accessories		
Switches - auxiliary/relative/signal/early	o/-/o/-	o/-/o/-
Shunt trip/with signal switch	o/o	o/o
Undervoltage release/with early switch/with signal switch	o/-/o	o/-/o
Front hand drive/side drive right/left	o/o/o	o/o/o
Mechanical interlocking - with Bowden cable/for hand drive	-/o	-/o
Motor drive/with counter of cycles	o/-	o/-
Lever with locking	o	o

o - available, - unavailable, + being prepared

¹⁾ - in case circuit breaker connection is reversed (input terminals 2, 4, 6, output terminals 1, 3, 5) I_n does not change

²⁾ - ranges of rated currents vary according to characteristics see page D37

- protection of Modelon switch-disconnectors, see page R

MECHANICAL INTERLOCKING AND PARALLEL SWITCHING

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
RP-BC-CB10	20601	Mechanical interlocking	0.09	1

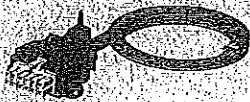
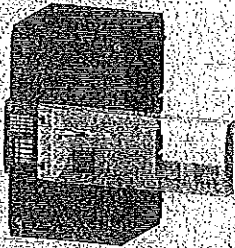
- TECHNICAL INFORMATION, see page D49
 - Mechanical interlocking must be fitted with: 2 hand drive units RP-BC-CK. (cannot be combined with hand drive unit for side control)
 2 hand drive levers RP-BC-CP.

RP-BC-CD10	20602	Mechanical parallel switching	0.11	1
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- TECHNICAL INFORMATION, see page D49
 - Mechanical parallel switching must be fitted with: 2 hand drive units RP-BC-CK. (cannot be combined with hand drive unit for side control)
 1 hand drive lever RP-BC-CP.

MOTOR DRIVES

3P 4P



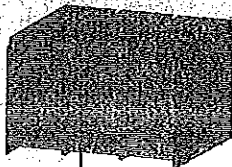
Type	Product code	Name	Weight (kg)	Package (pc)
MP-BC-X024-B	34450	Motor drive slide, 24V a.c./d.c.	0.9	1
MP-BC-X048-B	34451	Motor drive slide, 48V a.c./d.c.	0.9	1
MP-BC-X110-B	34452	Motor drive slide, 110V a.c./d.c.	0.9	1
MP-BC-X230-B	34453	Motor drive slide, 230V a.c./d.c.	0.9	1

- TECHNICAL INFORMATION, see page D50

OD-BC-KA02-A	34454	Extension cable, length 0.6 m, for motor drive	0.1	1
OD-BC-KA02-B	37510	Extension cable, length 3 m, for motor drive	0.2	1

ACCESSORIES

3P 4P



Type	Product code	Name	Weight (kg)	Package (pc)
OD-BC-KS02	20224	Insulating barriers - set (two pieces), for 3P and 4P design	0.03	1
OD-BC-KS42	33660	Insulating barrier - one piece, for 4P design	0.02	1

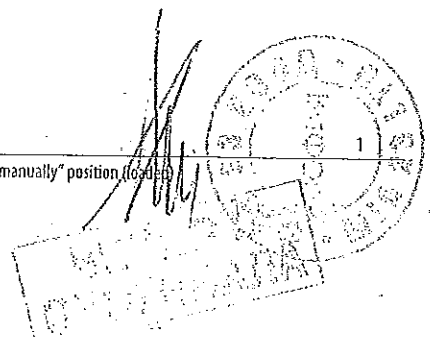
- Included with each circuit breaker or switch-disconnector order
 - in case connection is reversed (supply to terminals 2, 4, 6) it is necessary to install these barriers also on the lower slide, for more detailed information see page D21

OD-BC-KS03	20240	Terminal cover - degree of protection IP20, for 3P	0.05	1
OD-BC-KS43	33661	Terminal cover - degree of protection IP20, for 4P	0.07	1

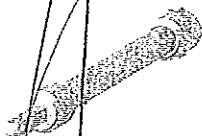
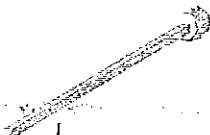
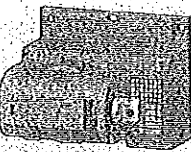
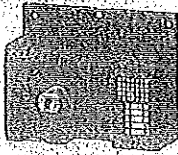
- Increases degree of protection of connection point to IP20, e.g. when used with cable lugs

OD-BC-UP01	20241	Lever with locking		1
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- enables to lock the circuit breaker/switch-disconnector in "switched off manually" position (locked)
 - locking is possible using padlock with shank diameter 3 ÷ 4 mm



HAND DRIVES



Type	Product code	Name - description	Weight (kg)	Package (pc)
RP-BC-CK10	20560	Hand drive unit - without locking	0.08	1
RP-BC-CK20	20593	Hand drive unit - with locking	0.08	1
- TECHNICAL INFORMATION, see page D48 Hand drive unit must be fitted with: <input type="checkbox"/> for control on the circuit breaker - hand drive lever RP-BC-CP. <input type="checkbox"/> for control on the switchboard door - extension shaft RP-BC-CH. - hand drive bearing RP-BC-CH. - hand drive lever RP-BC-CP.				
RP-BC-CK21	20594	Hand drive unit - yellow - with locking	0.08	1
- TECHNICAL INFORMATION, see page D48 Hand drive unit must be fitted with: <input type="checkbox"/> for control on the switching unit - hand drive lever RP-BC-CP. <input type="checkbox"/> for control on the switchboard door - extension shaft RP-BC-CH. - hand drive bearing RP-BC-CH. - hand drive lever RP-BC-CP.				
RP-BC-CK30	20595	Hand drive unit for right side control - without locking	0.14	1
RP-BC-CK31	20596	Hand drive unit left side control - without locking	0.14	1
- TECHNICAL INFORMATION, see page D48 Hand drive unit must be fitted with: with the extension shaft RP-BC-CH, with the hand drive bearing RP-BC-CH, with the hand drive lever RP-BC-CP.				
RP-BC-CP10	20561	Hand drive lever - black - without locking	0.02	1
RP-BC-CP20	20562	Hand drive lever - black - with locking	0.02	1
- TECHNICAL INFORMATION, see page D48				
RP-BC-CP21	20597	Hand drive lever - red - with locking	0.02	1
- TECHNICAL INFORMATION, see page D48				
RP-BC-CH10	20564	Hand drive bearing - degree of protection IP40	0.05	1
RP-BC-CH20	20565	Hand drive bearing - degree of protection IP66	0.05	1
- TECHNICAL INFORMATION, see page D48 - is used in combination with the black lever of RP-BC-CP10 or RP-BC-CP20 hand drive				
RP-BC-CH11	20598	Hand drive bearing - yellow - degree of protection IP40	0.05	1
RP-BC-CH21	20599	Hand drive bearing - yellow - degree of protection IP66	0.05	1
- TECHNICAL INFORMATION, see page D48 - is used in combination with the red lever of RP-BC-CP21 hand drive				
RP-BC-CH10	20563	Extension shaft - length 350 mm	0.12	1
- TECHNICAL INFORMATION, see page D48				
RP-BC-CH20	20600	Extension shaft - telescopic, length 199 / 352 mm	0.92	1
- TECHNICAL INFORMATION, see page D48				

SWITCHES

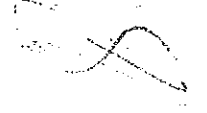
3P 4P



Auxiliary - signal state of the main contacts

Type	Product code	Operating voltage	Contacts	Weight (kg)	Package (pc)
PS-BC-0010	20227	60 ÷ 250 V a.c./d.c.		0.01	1
PS-BC-0010-Au	20228	5 ÷ 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45



Signal - signal tripping of circuit breaker by overcurrent release

Type	Product code	Description	Contacts	Weight (kg)	Package (pc)
NS-BC-0010	20225	60 ÷ 250 V a.c./d.c.		0.01	1
NS-BC-0010-Au	20226	5 ÷ 60 V a.c./d.c.		0.01	1

- TECHNICAL INFORMATION, see page D45

SHUNT TRIPS

3P 4P



Type	Product code	Operating voltage	Weight (kg)	Package (pc)
SV-BC-X024	20233	24, 48 V a.c./d.c.	0.05	1
SV-BC-X110	20234	110, 230 V a.c./110, 220 V d.c.	0.05	1
SV-BC-X230	20235	230, 400 V a.c./220 V d.c.	0.05	1

- TECHNICAL INFORMATION, see page D46

UNDERVOLTAGE RELEASES

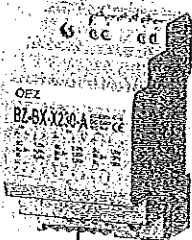
3P 4P



Type	Product code	Operating voltage	Description	Weight (kg)	Package (pc)
SP-BC-X024	20229	24, 48 V a.c./d.c.		0.05	1
SP-BC-X110	20231	110, 230 V a.c./110, 220 V d.c.		0.05	1
SP-BC-X230	20232	230, 400 V a.c./220 V d.c.		0.05	1

- TECHNICAL INFORMATION, see page D47

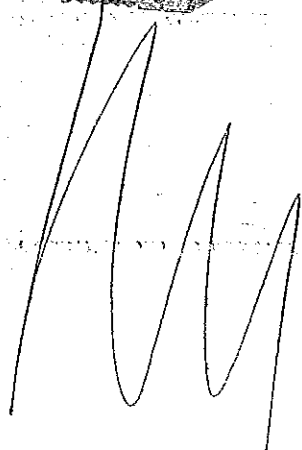
DELAY UNIT



Type	Product code	Description	Weight (kg)	Package (pc)
BZ-BX-X230-A	36696	- enables to delay the undervoltage release tripping of circuit breakers Modeion	0.12	1

- the delay can be set up at three levels (according to wiring)

- TECHNICAL INFORMATION, see page P2



CONNECTING SETS

1 terminal



Type	Product code	Description	Terminal	Method of connection	Weight (kg)	Package (set) ¹⁾
CS-BC-A411	33653	Front connection		Cu/Al busbars, cable lugs	0.02	1

- TECHNICAL INFORMATION, see page D18



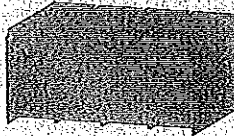
CS-BC-A421	33654	Rear connection		Cu/Al busbars, cable lugs	0.08	1
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- TECHNICAL INFORMATION, see page D18



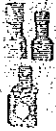
CS-BC-B421	33658	Double block terminal	2x (25 ÷ 120)	Cu/Al cables	0.25	1
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- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20



CS-BC-B414	34958	Block terminal for 5 cables	5x (2,5 ÷ 25)	Cu/Al cables	0.24	1
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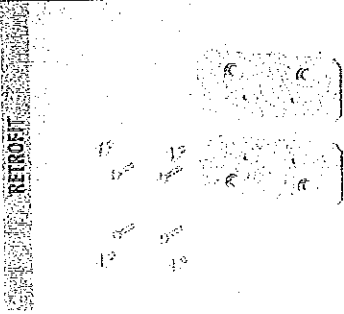
- TECHNICAL INFORMATION, see page D18
- terminals cover included - degree of protection IP20



CS-BC-PS41	36030	Potential terminals	1,5 ÷ 2,5/4 ÷ 6	Cu flexible conductor	0.005	1
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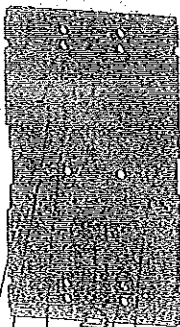
- TECHNICAL INFORMATION, see page D18

MOUNTING SETS



Type	Product code	Description	Weight (kg)	Package (set) ¹⁾
OD-BC-#533	20625	Reduction for BA...#33	0.13	1

- for total replacement of BA...#33 circuit breaker 2 connecting sets CS-BC-A033 are necessary



OD-BC-DH1	20238	For mounting on „U“ rail according to EN 60715 wide 35 mm	0.05	1
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- DIMENSIONS, see page D29

¹⁾ - one set provides for replacing one circuit breaker (set includes coupling elements necessary to assemble circuit breaker and mounting set)
RETROFIT - sets, which enable replacement of older circuit breakers by a new circuit breakers without switchboard reconstruction

CONNECTING SETS



3 terminals

Type	Product code	Description	Dimensions (mm)	Method of connection	Weight (kg)	Package (set)
CS-BC-A011	20223	Front connection		Cu/Al busbars, cable lugs	0.05	1

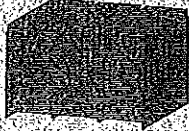
- TECHNICAL INFORMATION, see page D18



CS-BC-B021	20237	Double block terminal	2x (25 + 120)	Cu/Al cables	0.18	1
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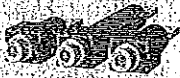
- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20



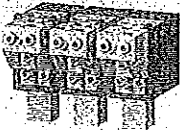
CS-BC-A021	20236	Rear connection		Cu/Al busbars, cable lugs	0.18	1
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- TECHNICAL INFORMATION, see page D18



CS-BC-P501	20239	Potential terminals	15 + 25 + 4 + 6	Cu flexible conductor	0.01	1
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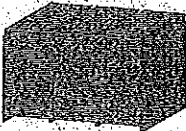
- TECHNICAL INFORMATION, see page D18



CS-BC-B014	34957	Block terminals - for 5 cables	5x (2.5 + 25)	Cu/Al cables	0.18	1
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- TECHNICAL INFORMATION, see page D18

- terminals cover included - degree of protection IP20

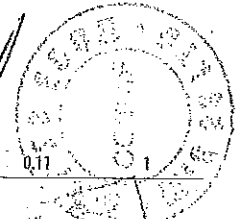


CS-BC-A033	20608	Reduction for BA... *33		Cu/Al busbars, cable lugs	0.11	1
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TECHNICAL INFORMATION, see page D18

- for total replacement of BA... *33 circuit breaker also is necessary the OD-BC-MS33 mounting set

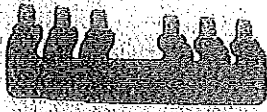
* one set provides for connecting one side of the circuit breaker (set includes three terminals with necessary coupling elements)



RETROFIT

CONNECTING SETS FOR RESIDUAL CURRENT DEVICE

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
CS-BC-S006	38379	Interconnecting busbars, $I_n = 63$ A, for 3P design	0.17	1
CS-BC-S016	38380	Interconnecting busbars, $I_n = 160$ A, for 3P design	0.44	1

- TECHNICAL INFORMATION, see page D24

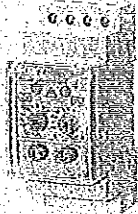


Type	Product code	Description	Weight (kg)	Package (set)
CS-BC-S406	38383	Interconnecting busbars, $I_n = 63$ A, for 4P design	0.21	1
CS-BC-S416	38384	Interconnecting busbars, $I_n = 160$ A, for 4P design	0.64	1

- TECHNICAL INFORMATION, see page D24

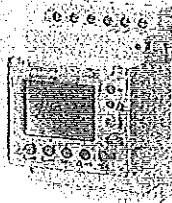
RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
5SV8000-6KK	42658	Analogue design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.18	1

- TECHNICAL INFORMATION, see page P4



Type	Product code	Description	Weight (kg)	Package (set)
5SV8001-6KK	42659	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting	0.26	1
5SV8200-6KK	42660	Digital design, $I_{\Delta n}$ and $t_{\Delta n}$ setting, 4 channels	0.26	1

- TECHNICAL INFORMATION, see page P4

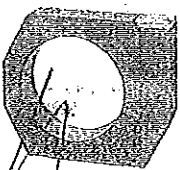
CURRENT TRANSFORMERS FOR RESIDUAL CURRENT MONITOR

3P 4P



Type	Product code	Description	Weight (kg)	Package (set)
5SV8700-0KK	42661	Internal diameter 20 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.09	1
5SV8701-0KK	42662	Internal diameter 30 mm, including holder on „U“ rail according to EN 60715 wide 35 mm	0.11	1

- TECHNICAL INFORMATION, see page P4



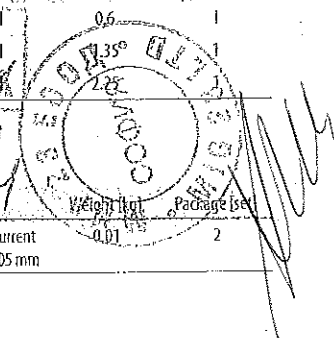
Type	Product code	Description	Weight (kg)	Package (set)
5SV8702-0KK	42663	Internal diameter 35 mm, including holder on the panel	0.2	1
5SV8703-0KK	42664	Internal diameter 70 mm, including holder on the panel	0.31	1
5SV8704-0KK	42665	Internal diameter 105 mm, including holder on the panel	0.6	1
5SV8705-0KK	42666	Internal diameter 140 mm, including holder on the panel	1.1	1
5SV8706-0KK	42667	Internal diameter 210 mm, including holder on the panel	2.4	1

- TECHNICAL INFORMATION, see page P4



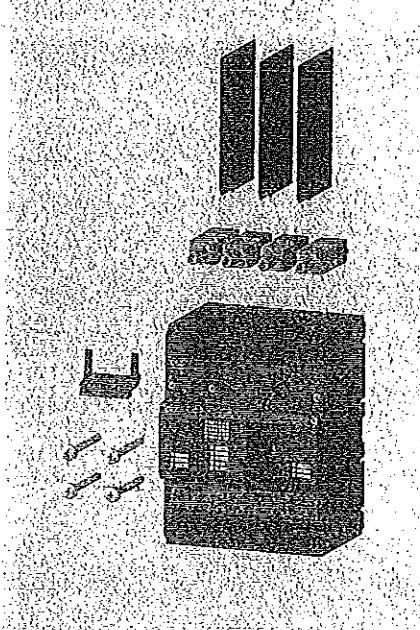
Type	Product code	Description	Weight (kg)	Package (set)
5SV8900-TRK	42668	Holder on „U“ rail according to EN 60715 wide 35 mm for current transformers with internal diameter up to and including 105 mm	0.01	2

- TECHNICAL INFORMATION, see page P4



SWITCH-DISCONNECTOR

4P



- Switch-disconnector includes:
- 2 connecting sets for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm²
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
 - insulating barriers OD-BC-KS02 and OD-BC-KS42
 - 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
 - conductor holder OD-BC-DV01 (it is installed in the switch-disconnector)

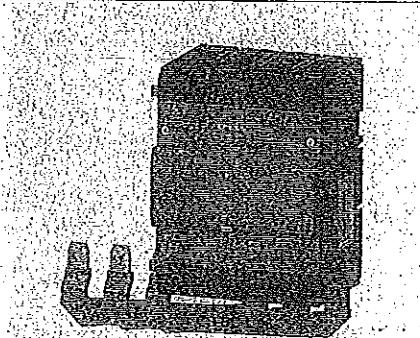
*) - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

Rating (A)	Type	Product code	Weight [kg]	Package [pc]
160	BC160HT405-160-V	33626	1.3	1

- TECHNICAL INFORMATION, see page D15

RESIDUAL CURRENT DEVICES

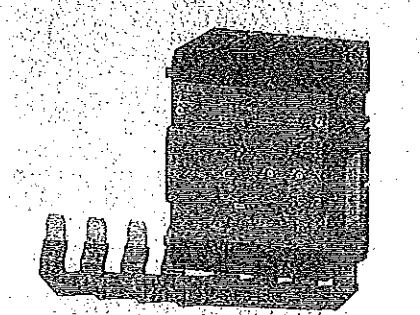
3P 4P



3-pole design, with interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC3-EF06	37745	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EF16	37746	I _n 160 A, I _{Δn} 0.3 A, without I _{Δn} setting	1.65	1
RCD-BC3-EA06	37747	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.44	1
RCD-BC3-EA16	37748	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.65	1

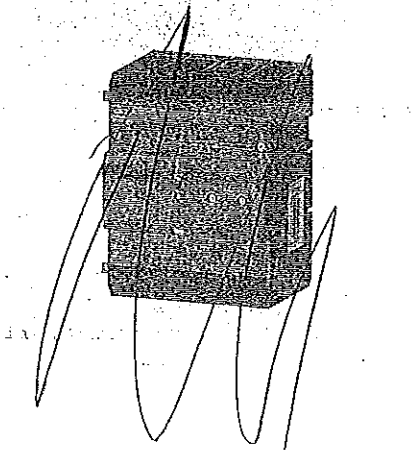
- CS-BC-L006 or CS-BC-L016 is part of residual current module
 - TECHNICAL INFORMATION, see page D22



4-pole design, with interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC4-EF06	37753	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EF16	37754	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	2.03	1
RCD-BC4-EA06	37755	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.75	1
RCD-BC4-EA16	37756	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	2.03	1

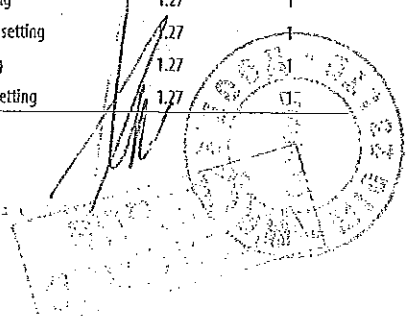
- CS-BC-L406 or CS-BC-L416 is part of residual current module
 - TECHNICAL INFORMATION, see page D22



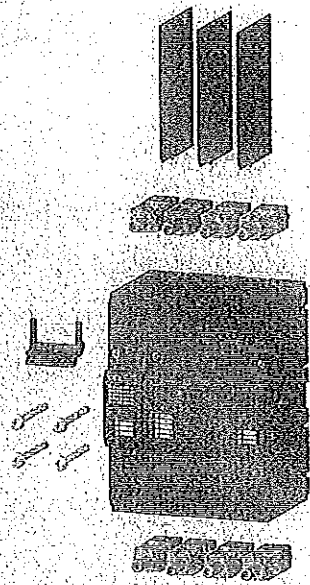
4-pole design, without interconnecting busbars

Type	Product code	Description	Weight [kg]	Package [pc]
RCD-BC0-EF16	37761	I _n 160 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA16	37762	I _n 160 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EF06	38375	I _n 63 A, I _{Δn} 0.3 A, without t _{Δn} setting	1.27	1
RCD-BC0-EA06	38376	I _n 63 A, I _{Δn} 0.03 ÷ 3 A, without t _{Δn} setting	1.27	1

- TECHNICAL INFORMATION, see page D22



CIRCUIT BREAKERS



- Circuit breaker includes:
- connecting terminals for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm² ¹⁾
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
 - insulating barriers OD-BC-K502 and OD-BC-K542
 - 2 sets of mounting bolts OD-BC-K501 (4x M3x30)
 - conductor holder OD-BC-DV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

¹⁾ - for connecting in another way, it is necessary to use CS-BC-... connecting sets, see page D10, D11

Characteristic D - distribution
for protection lines and transformers

4P - for protected N conductor

I _n [A]	Type	Product code	I _n setting [A]	I _{Δn} [A]	Weight [kg]	Package [pc]
16	BC160NT406-16-D	33644	12.5 ÷ 16	160 ÷ 240	1.3	1
20	BC160NT406-20-D	33643	16 ÷ 20	200 ÷ 300	1.3	1
25	BC160NT406-25-D	33642	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT406-32-D	33641	25 ÷ 32	160 ÷ 320	1.3	1
40	BC160NT406-40-D	33640	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT406-50-D	33638	40 ÷ 50	250 ÷ 500	1.3	1
63	BC160NT406-63-D	33636	50 ÷ 63	315 ÷ 630	1.3	1
80	BC160NT406-80-D	33634	63 ÷ 80	400 ÷ 800	1.3	1
100	BC160NT406-100-D	33632	80 ÷ 100	500 ÷ 1000	1.3	1
125	BC160NT406-125-D	33630	100 ÷ 125	625 ÷ 1250	1.3	1
160	BC160NT406-160-D	33628	125 ÷ 160	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines

4P - for protected N conductor

- protection lines with low starting currents
- without I_n setting

I _n [A]	Type	Product code	I _n setting [A]	I _{Δn} [A]	Weight [kg]	Package [pc]
40	BC160NT406-40-L	33639	-	160	1.3	1
50	BC160NT406-50-L	33637	-	200	1.3	1
63	BC160NT406-63-L	33635	-	252	1.3	1
80	BC160NT406-80-L	33633	-	320	1.3	1
100	BC160NT406-100-L	33631	-	400	1.3	1
125	BC160NT406-125-L	33629	-	500	1.3	1
160	BC160NT406-160-L	33627	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

Characteristic N - only short-circuit release

4P - for protected N conductor

- without I_n setting

I _n [A]	Type	Product code	I _n setting [A]	I _{Δn} [A]	Weight [kg]	Package [pc]
32	BC160NT406-32-N	33652	-	160 ÷ 320	1.3	1
40	BC160NT406-40-N	33651	-	200 ÷ 400	1.3	1
50	BC160NT406-50-N	33650	-	250 ÷ 500	1.3	1
63	BC160NT406-63-N	33649	-	315 ÷ 630	1.3	1
80	BC160NT406-80-N	33648	-	400 ÷ 800	1.3	1
100	BC160NT406-100-N	33647	-	500 ÷ 1000	1.3	1
125	BC160NT406-125-N	33646	-	625 ÷ 1250	1.3	1
160	BC160NT406-160-N	33645	-	800 ÷ 1600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

CIRCUIT BREAKERS

3P + N



- Circuit breaker includes:
- connecting terminals for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$ ¹⁾
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting terminals are installed in the circuit breaker)
 - insulating barriers OD-BC-KS02 and OD-BC-KS42
 - 2 sets of mounting bolts OD-BC-MS01 (4x M3x30)
 - conductor holder OD-BC-DV01 (it is installed in the circuit breaker)

- the method of power circuit connection must observe recommendations, see page D18 as well as deionization space, see page D21

¹⁾ - for connecting in another way, it is necessary to use CS-BC... connecting sets, see page D10, D11

Characteristic D - distribution

3P + N - for unprotected N conductor

■ protection lines and transformers

I _n (A)	Type	Product code	I _n setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
16	BC160NT405-16-D	33617	12.5 ÷ 16	160 ÷ 240	1.3	1
20	BC160NT405-20-D	33616	16 ÷ 20	200 ÷ 300	1.3	1
25	BC160NT405-25-D	33615	20 ÷ 25	250 ÷ 375	1.3	1
32	BC160NT405-32-D	33614	25 ÷ 32	160 ÷ 320	1.3	1
40	BC160NT405-40-D	33613	32 ÷ 40	200 ÷ 400	1.3	1
50	BC160NT405-50-D	33611	40 ÷ 50	250 ÷ 500	1.3	1
63	BC160NT405-63-D	33609	50 ÷ 63	315 ÷ 630	1.3	1
80	BC160NT405-80-D	33607	63 ÷ 80	400 ÷ 800	1.3	1
100	BC160NT405-100-D	33605	80 ÷ 100	500 ÷ 1 000	1.3	1
125	BC160NT405-125-D	33603	100 ÷ 125	625 ÷ 1 250	1.3	1
160	BC160NT405-160-D	33601	125 ÷ 160	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic L - lines

3P + N - for unprotected N conductor

■ protection lines with low starting currents

■ without I_n setting

I _n (A)	Type	Product code	I _n setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
40	BC160NT405-40-L	33612	-	160	1.3	1
50	BC160NT405-50-L	33610	-	200	1.3	1
63	BC160NT405-63-L	33608	-	252	1.3	1
80	BC160NT405-80-L	33606	-	320	1.3	1
100	BC160NT405-100-L	33604	-	400	1.3	1
125	BC160NT405-125-L	33602	-	500	1.3	1
160	BC160NT405-160-L	33600	-	640	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production

Characteristic N - only short-circuit release

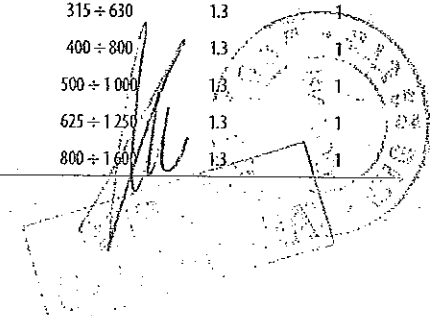
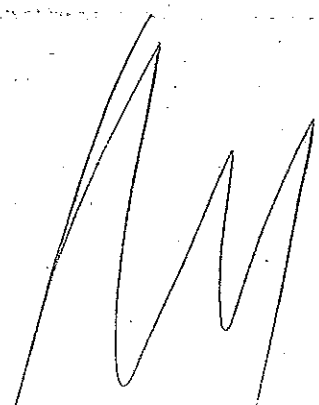
3P + N - for unprotected N conductor

■ without I_n setting

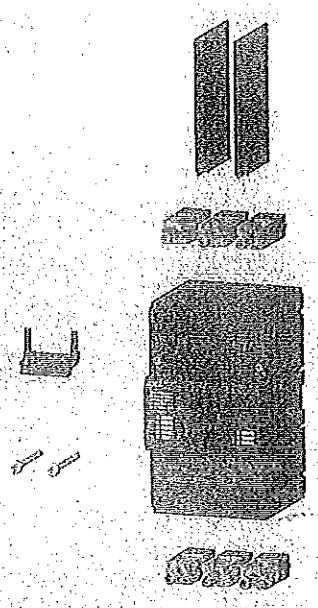
I _n (A)	Type	Product code	I _n setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
32	BC160NT405-32-N	33625	-	160 ÷ 320	1.3	1
40	BC160NT405-40-N	33624	-	200 ÷ 400	1.3	1
50	BC160NT405-50-N	33623	-	250 ÷ 500	1.3	1
63	BC160NT405-63-N	33622	-	315 ÷ 630	1.3	1
80	BC160NT405-80-N	33621	-	400 ÷ 800	1.3	1
100	BC160NT405-100-N	33620	-	500 ÷ 1 000	1.3	1
125	BC160NT405-125-N	33619	-	625 ÷ 1 250	1.3	1
160	BC160NT405-160-N	33618	-	800 ÷ 1 600	1.3	1

- TECHNICAL INFORMATION, see page D15, D37

- custom production



CIRCUIT BREAKERS

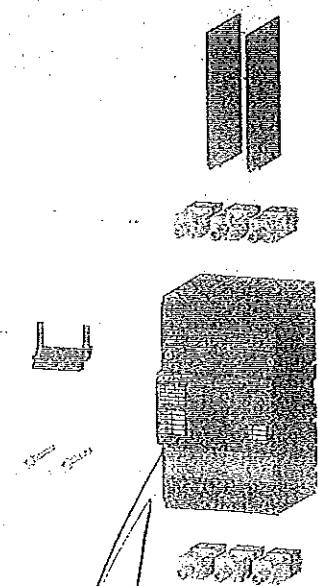


Characteristic M - only short-circuit release

I _n (A)	Type	Product code	I _n (A)	I _n (A)	Weight (kg)	Package (pc)
32	BC160NT305-32-M	20641	-	160 ÷ 320	1.00	1
40	BC160NT305-40-M	20642	-	200 ÷ 400	1.00	1
50	BC160NT305-50-M	20643	-	250 ÷ 500	1.00	1
63	BC160NT305-63-M	20644	-	315 ÷ 630	1.00	1
80	BC160NT305-80-M	20645	-	400 ÷ 800	1.00	1
100	BC160NT305-100-M	20646	-	500 ÷ 1000	1.00	1
125	BC160NT305-125-M	20647	-	625 ÷ 1250	1.00	1
160	BC160NT305-160-M	20621	-	800 ÷ 1600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

SWITCH-DISCONNECTOR



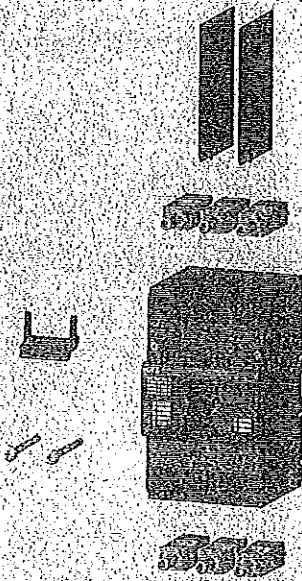
- Switch-disconnector includes:
 - 2 connecting sets for connecting Cu/Al cables with cross-sections 2.5 ÷ 95 mm² ¹⁾
 - in case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the switch-disconnector)
 - insulating barriers OD-BC-ISO2
 - mounting bolts set OD-BC-MS01 (2x M3x30)
 - conductor holder OD-BC-DV01

¹⁾ - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

I _n (A)	Type	Product code	Weight (kg)	Package (pc)
160	BC160HT305-160-V	20585	1.00	1

- TECHNICAL INFORMATION, see page D15

CIRCUIT BREAKERS



- Circuit breaker includes:
 - 2 connecting sets for connecting Cu/Al cables with cross-sections $2.5 \div 95 \text{ mm}^2$ ¹⁾
 - In case of the connection of the fine stranded conductor, we recommend using of the end sleeve (connecting sets are installed in the circuit breaker)
 - insulating barriers OD-BC-KS02
 - mounting bolts set OD-BC-M501 (2x M3x30)
 - conductor holder OD-BC-DV01

- the method of power circuit connection must observe recommendations, see page D18 as well as delonization space, see page D21

¹⁾ - for connecting in another way, one may use CS-BC-... connecting sets, see page D10, D11

Characteristic D - distribution

■ protection lines and transformers

I _n (A)	Type	Product code	Setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
16	BC160NT305-16-D	20209	12.5 ÷ 16	160 ÷ 240	1.00	1
20	BC160NT305-20-D	20211	16 ÷ 20	200 ÷ 300	1.00	1
25	BC160NT305-25-D	20212	20 ÷ 25	250 ÷ 375	1.00	1
32	BC160NT305-32-D	20213	25 ÷ 32	160 ÷ 320	1.00	1
40	BC160NT305-40-D	20215	32 ÷ 40	200 ÷ 400	1.00	1
50	BC160NT305-50-D	20217	40 ÷ 50	250 ÷ 500	1.00	1
63	BC160NT305-63-D	20219	50 ÷ 63	315 ÷ 630	1.00	1
80	BC160NT305-80-D	20222	63 ÷ 80	400 ÷ 800	1.00	1
100	BC160NT305-100-D	20204	80 ÷ 100	500 ÷ 1 000	1.00	1
125	BC160NT305-125-D	20206	100 ÷ 125	625 ÷ 1 250	1.00	1
160	BC160NT305-160-D	20208	125 ÷ 160	800 ÷ 1 600	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

Characteristic M - motor

■ motors protection

I _n (A)	Type	Product code	Setting (A)	I _{Δn} (A)	Weight (kg)	Package (pc)
16	BC160NT305-16-M	20243	12.5 ÷ 16	160	1.00	1
20	BC160NT305-20-M	20244	16 ÷ 20	200	1.00	1
25	BC160NT305-25-M	20245	20 ÷ 25	250	1.00	1
32	BC160NT305-32-M	20246	25 ÷ 32	320	1.00	1
40	BC160NT305-40-M	20247	32 ÷ 40	400	1.00	1
50	BC160NT305-50-M	20248	40 ÷ 50	500	1.00	1
63	BC160NT305-63-M	20249	50 ÷ 63	630	1.00	1
80	BC160NT305-80-M	20250	63 ÷ 80	800	1.00	1
100	BC160NT305-100-M	20242	80 ÷ 100	1 000	1.00	1

- TECHNICAL INFORMATION, see page D15, D37

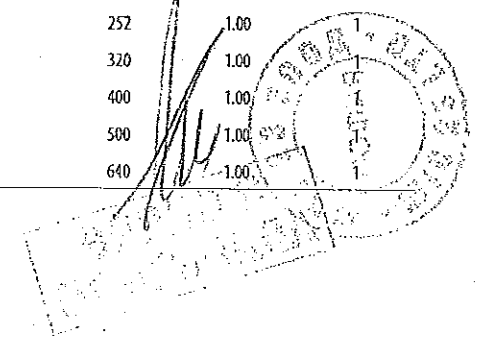
Characteristic L - lines

■ protection lines with low starting currents

■ without I_{Δn} setting

I _n (A)	Type	Product code	I _{Δn} (A)	Weight (kg)	Package (pc)
40	BC160NT305-40-L	20214	160	1.00	1
50	BC160NT305-50-L	20216	200	1.00	1
63	BC160NT305-63-L	20218	252	1.00	1
80	BC160NT305-80-L	20221	320	1.00	1
100	BC160NT305-100-L	20203	400	1.00	1
125	BC160NT305-125-L	20205	500	1.00	1
160	BC160NT305-160-L	20207	640	1.00	1

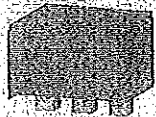
- TECHNICAL INFORMATION, see page D15, D37



SUMMARY OF MODELS AND ACCESSORIES

CONNECTING SETS

Double block terminals



CS-BC-B021

Output terminals



CS-BC-B014

Front connection



CS-BC-A011

Rear connection



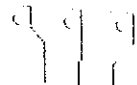
CS-BC-A021

Potential terminals



CS-BC-PS01

Reduction for BA...#33



CS-BC-A033

HAND DRIVES

Hand drive unit - front

RP-BC-CK20
RP-BC-CP...



Hand drive unit - front

RP-BC-CK21
RP-BC-CH...
RP-BC-CN...



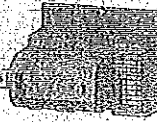
Hand drive unit - right side

RP-BC-CK30



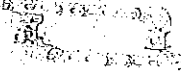
Hand drive unit - left side

RP-BC-CK31



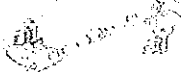
Mechanical parallel switching

RP-BC-ED10



Mechanical interlocking

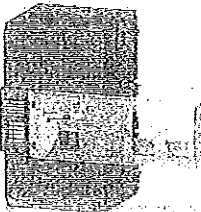
RP-BC-CB10



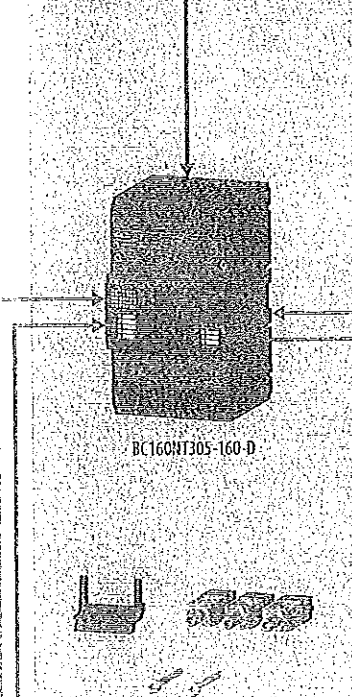
MOTOR DRIVES

Motor drive - side

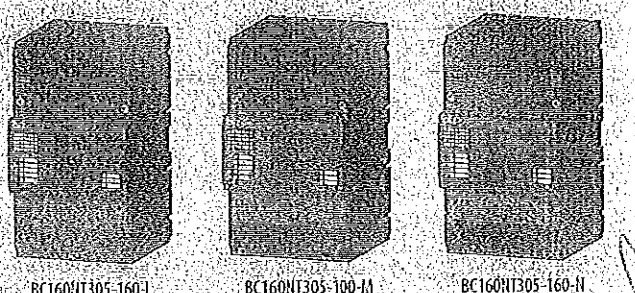
MP-BC-X...-B



CIRCUIT BREAKERS



BC160NT305-160-D

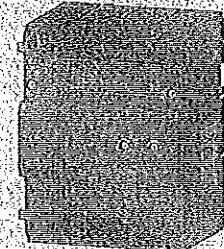


BC160NT305-160-L

BC160NT305-100-M

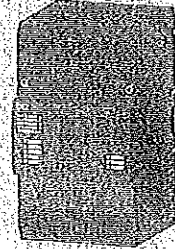
BC160NT305-160-N

RESIDUAL CURRENT DEVICE



RCD-BC4-EA16

SWITCH-DISCONNECTOR



BC160NT305-160-V

AUXILIARY RELEASES

Shunt trip



SV-BC-X...

Undervoltage release



SP-BC-X...

SWITCHES

Signal switch



HS-BC-0010

Auxiliary switch



PS-BC-0010

MOUNTING SETS

Adapter for „U“ rail 35 mm



OD-BC-DI11

ACCESSORIES

Lever with locking



OD-BC-UF01

Terminal cover - IP20



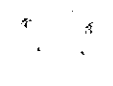
OD-BC-KS03

Insulating barriers



CS-BC-KS02

Reduction for BA...#33



OD-BC-MS33

Handwritten scribble

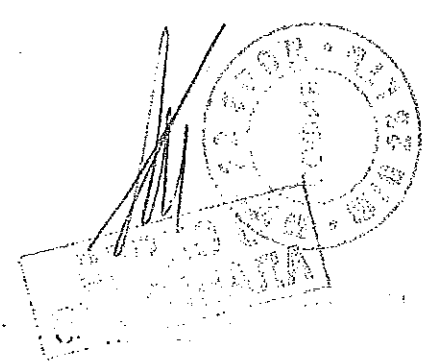
Handwritten scribbles and signature

COMMERCIAL INFORMATION

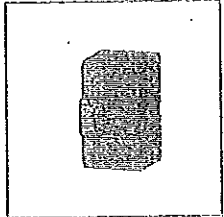
- Circuit breakersD4
- Switch-disconnectorsD5, D8
- Residual current devicesD8
- Connecting sets for residual current deviceD9
- Residual current monitorD9
- Current transformers for residual current monitorD9
- Connecting setsD10
- Mounting setsD11
- SwitchesD12
- Shunt tripsD12
- Undervoltage releasesD12
- Delay unitD13
- Hand drivesD13
- Mechanical interlocking and parallel switchingD14
- Motor drivesD14
- AccessoriesD14

TECHNICAL INFORMATION

- Circuit breakers, switch-disconnectors**
 - specificationsD15
 - diagramD16
 - connecting, mountingD18
 - deionization spaceD21
 - dimensionsD25
- Residual current devices**
 - specificationsD22
 - diagramD23
 - connecting, mountingD24
- Overcurrent releases**
 - description, specificationsD37
- Connecting sets** - specificationsD18
- Switches** - specificationsD45
- Shunt trips** - specificationsD46
- Undervoltage releases**
 - specifications, diagramD47
- Hand drives** - description, specificationsD48
- Mechanical interlocking and parallel switching**
 - description, specifications, dimensionsD49
- Motor drives**
 - description, specifications, dimensionsD50



MOULDED CASE CIRCUIT BREAKERS BC160N



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D
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CERTYFIKAT CERTIFICATE

Przyznany organizacji:
Issued for:

APATOR S.A.

**ul. Gdańska nr 4a lok. C4
87-100 Toruń**

Biuro Certyfikacji Systemów Zarządzania Polskiego Rejestru Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, zaświadcza, że Zintegrowany System Zarządzania obejmujący System Zarządzania Jakością, System Zarządzania Środowiskowego oraz System Zarządzania Bezpieczeństwem i Higieną Pracy wyżej wymienionej organizacji został oceniony i stwierdzono jego zgodność z wymaganiami:

Management Systems Certification Bureau of Polski Rejestr Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, certifies that the Integrated Management System including the Quality Management System, Environmental Management System and Occupational Health and Safety Management System of the above organization has been assessed and found to be in accordance with the requirements of:

**ISO 9001:2008
ISO 14001:2004
PN-N-18001:2004**

Zakres certyfikacji:

**PROJEKTOWANIE I PRODUKCJA APARATURY I SYSTEMÓW POMIAROWYCH
I APARATURY ŁĄCZENIOWEJ**

Scope of certification:

**DESIGN AND MANUFACTURING OF METERING EQUIPMENT AND SYSTEMS
AND SWITCHGEAR**

Pierwsze wydanie Certyfikatu:
Certificate first issue:

07.02.1995

Certyfikat jest ważny do:
The Certificate is valid until:

18.06.2016

Nr Certyfikatu:
Certificate No.: **NC- 0007**

Gdańsk, 19.06.2013



AC 014
QMS, EMS,
BHP



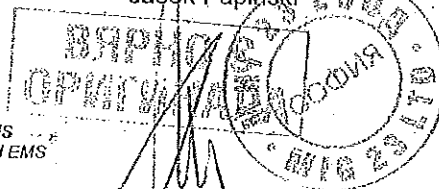
Porozumienie IAF MLA dotyczy QMS i EMS
The Arrangement IAF MLA refers to QMS and EMS

Dariusz Rudziński

Dariusz Rudziński

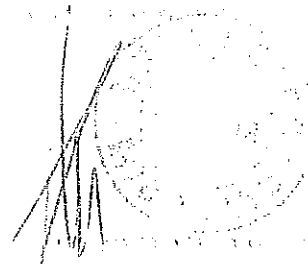
Jacek Papiński

Jacek Papiński



1985

№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	BC160NT305 OEZ s.r.o. Чешка Република 2010 Приложение № 1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение № 1
3.	ЕО декларация за съответствие	Приложение № 2
4.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение № 3
5.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение № 4
6.	Техническо описание и чертежи с нанесени размери на монтажни планки, единичната цена на които не се включва в цената на прекъсвачите	Приложение № 5
7.	Инструкции за транспортиране, складиране, монтиране, вкл. въртящия момент на затягане на клемовите съединения, обслужване и поддържане	Приложение № 6

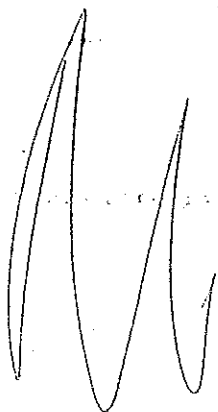


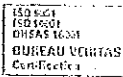
Наименование на материала:

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

Номер на техническа спецификация на
стандарт - 20 17 60 ZZ към

МТТ20/100, Д – отпред и отстрани





НИКДИМ FOOD Казанлък България

ПРОИЗВОДСТВО НА ЕЛЕКТРО АПАРАТУРА 6100 Казанлък, бул. „23ти Шипченски Полк“ 60

Тел: 0431 / 65016
Факс: 0431 / 65028

e-mail: info@nikdim.bg
web: www.nikdim.bg

6. Въвеждане в експлоатация.

Включването в експлоатация на основите за ВВП става след монтаж и осъществяване на електрическите връзки.

6.1. Първоначални проверки:

В момента на доставяне на основите тип СВВП/О проверете:

- съответствието с документите
- целостта на опаковката и основите.

В случай на поражение вследствие транспортирането веднага се свържете с нас.

Непосредствено преди монтаж проверете целостта на основата. Не се допускат до монтаж основи с пукнати или счупени изолатори и деформирани контактни части.

6.2. Проверки непосредствено след монтаж:

Проверка на налягането на контактите – проверява се наличие на усилие на притискане между контактните втулки на ВВП и държателя. Не се допуска контакта да е осъществен в точка или права от държателя.

7. Експлоатационни изисквания

По време на експлоатация се следи за състоянието на :

- подпорните изолатори
- контактните части(държателите)

7.1. Огледи – огледите на основите се извършват денем и нощем.

През деня се следи за състоянието на:

- механичната здравина и електрическото състояние на подпорните изолатори
- състоянието на контактите

През нощта се следи за наличието на лоши електрически контакти.

7.2. Ремонти – текущите и плановите ремонти се извършват в съответствие със съществуващите инструкции. Основен ремонт се извършва на 5 години.

8. Техника на безопасност.

Монтажа на предназначители и стойките да се извършва от правоспособни лица притежаващи четвърта квалификационна група.

Манипулации се извършват при изключено напрежение.

Носещата конструкция на основата да е свързана видимо със земния контур.

9. Съхранение и транспортиране.

Основите тип СВВП/О на НИКДИМ FOOD се доставят в дървени каси според типа:

9.1 Основите да се транспортират внимателно в стандартни каси на производителя. Не се допуска удряне и нанасяне на други механически повреди върху касите и основите.

9.2 При съхранението е необходимо да се спазват следните правила:

- помещенията за съхранение да са сухи и проветриви;
- да са оборудвани с подемна техника с цел избягване повреждането на основите при преместване;
- при поддръжане един върху друг да се има предвид следното ограничение – касите на основите тип СВВП и СВВП/О да не се слагат на височина повече от 3 бр;

2011г.

гр.Казанлък

Съставил:

ГИ: ил.с.Донес

18



ISO 9001
ISO 14001
BUREAU VERITAS
Certification



НИКДИМ ЕООД Казанлък България

ПРОИЗВОДСТВО НА ЕЛЕКТРО АПАРАТУРА 6100 Казанлък, Бул. „23ти Шопченски Полк“ 80

Тел: 0431 / 65016
Факс: 0431 / 65028

e-mail: info@nikdim.bg
web: www.nikdim.bg

НД 00.105.00

Утвърдил:

Управител: /инж.Н.Димитров/

Основа за ВВП тип СВВП и СВВПО
12 kV и 24 kV за монтаж на открито и закрито

ИНСТРУКЦИЯ

за транспортиране, складиране, монтаж,
експлоатация и поддържане

Настоящата инструкция се отнася за транспортиране, складиране, въвеждане в експлоатация, експлоатация и техническо обслужване на основи за предпазители тип СВВП и СВВПО – 12 и 24kV производство на „НИКДИМ“ ЕООД – гр.Казанлък.

1. Предназначение.

Основите за монтаж на открито и закрито от типа СВВП и СВВПО се използват за свързване на патрона за високо напрежение от типа ВВП към външната верига и за неговата лесна подмяна.

2. Съответствия.

Основите тип СВВП и СВВПО се произвеждат в съответствие със стандарт БДС EN 60282-1.

3. Технически характеристики

3.1. Електрически характеристики

Номинално напрежение	kV	10 или 20
Максимално напрежение	kV	12 или 24
Номинален ток	A	100
Номинална честота	Hz	50

3.2. Означения

Примерно означение на основи за ВВП:

С	стойка
В	високо
в	волтов
П	предпазител
О	за открито

4. Устройство

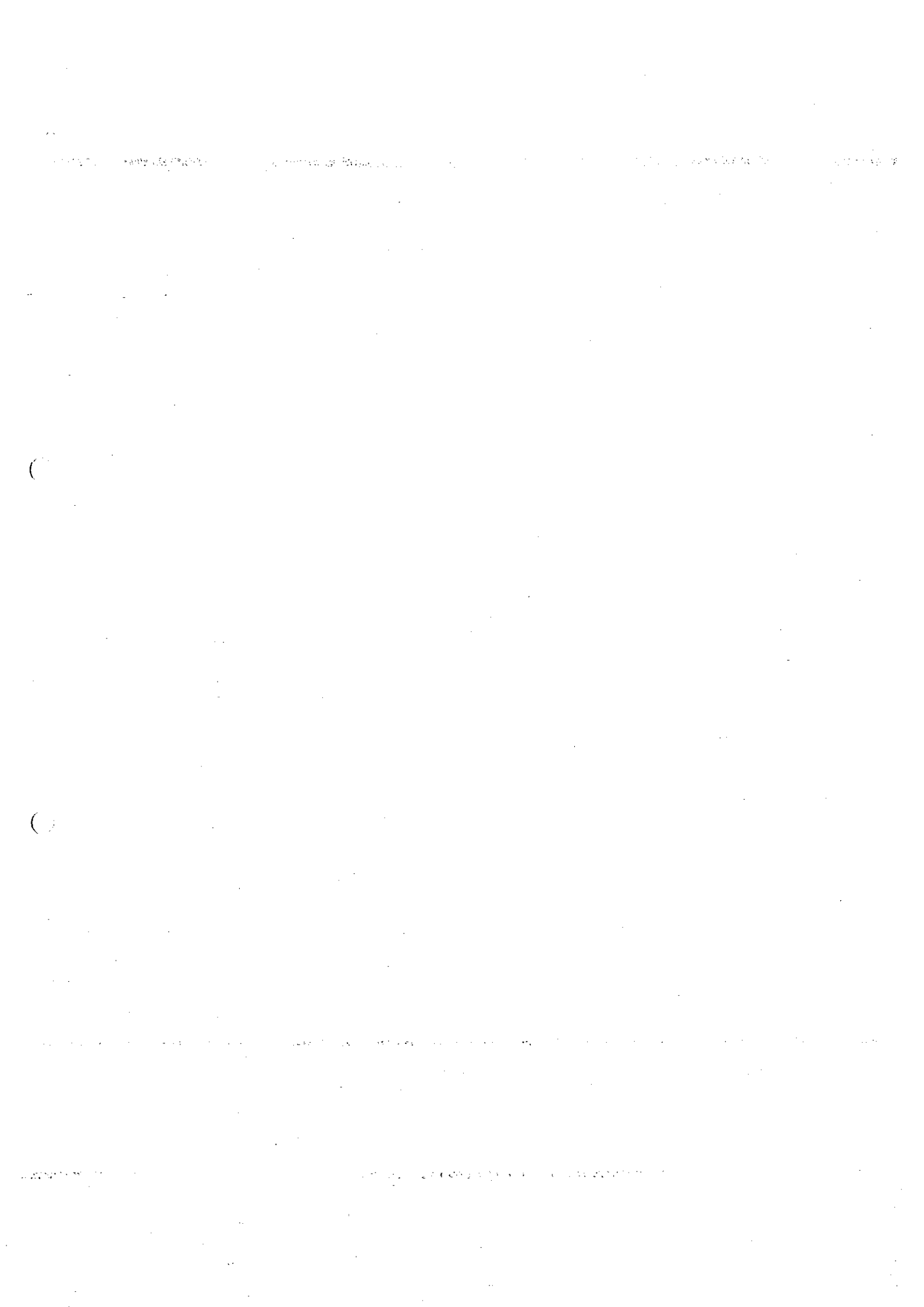
Основата за предпазител ВВП е фиксирана част от предпазителя състояща се от:

- носеща конструкция с два отвора за закрепване
- подпорни изолятори – два броя
- контактни части (държатели) и изводи - два броя

Носещата конструкция е изработена от горещо цинкован студеноогънат „П“ профил от стомана, върху който е разположена заземителна клема. Подпорните изолятори са монтирани върху носещата конструкция посредством болтови съединения. Контактните части (държателите) и изводите са изработени от мед със сребърно покритие, монтирани са върху изоляторите и са свържени с болтови съединения за свързване към външните вериги.

5. Монтаж.

Основите тип СВВП и СВВПО се монтират върху стоманена (винцелова или „П“-профилна) основа посредством болтови съединения М16 за отворите върху носещата конструкция.

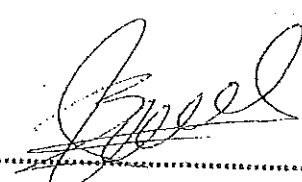




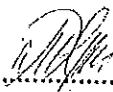
Използвани технически средства:

№	Наименование	Тип	Производител	Идентиф.№	Дата на последно калибриране
1.	Цифров шублер	-	Китай	090	10.05.2007
2.	Ролетка	-	-	Z 414130	10.05.2007

ПРОВЕЛ ИЗПИТВАНЕТО:


.....
/инж. Здр. Дончев /

РЪКОВОДИТЕЛ НА ЛАБОРАТОРИЯТА :

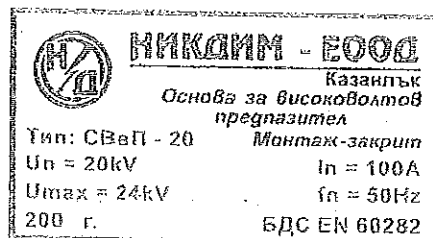
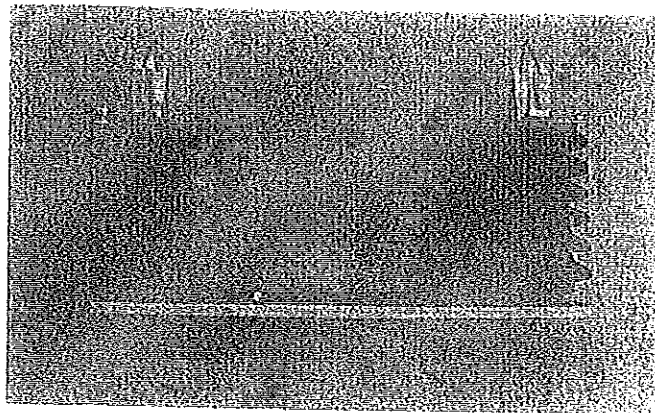
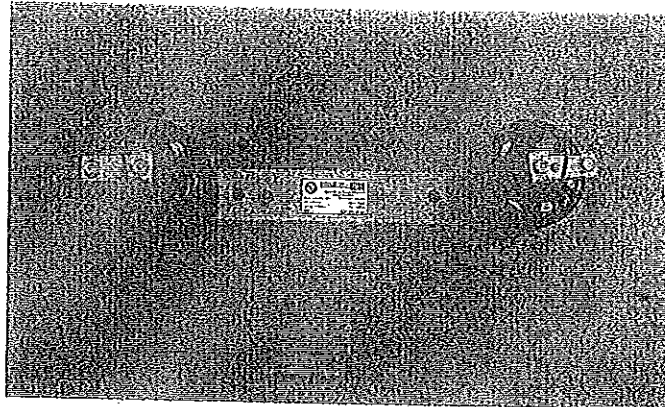

.....
/инж. Т. Христов /

Резултатите посочени в настоящия протокол се отнасят само за изпитвания образец.

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и с писменото разрешение на ЛАБОРАТОРИЯТА



Копие от идентификационната табела и/или снимка на обекта на изпитването



Резултатите посочени в настоящия протокол се отнасят само за изпитвания образец.

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и с писменото разрешение на ЛАБОРАТОРИЯТА



РЕЗУЛТАТИ ОТ ИЗПИТВАНЕТО :

Стр. 3 от 4

БДС EN 60282-1:2003

Протокол : № 2-08-574/24.04.2008 г.

№ по ред	Наименование на показателя	Единица на величината	Методи стандартизирани	№ на образеца по вх.-изх. регистър	Резултати от изпитването (неопределеност)	Стойност и допуск на показателя по метода	Условия на изпитването
----------	----------------------------	-----------------------	------------------------	------------------------------------	---	---	------------------------

1.	МАРКИРОВКА :	-	т. 5.2	574	-	т. 5.2	-
1.1	име на производителя или търговска марка	-	т. 5.2	574	изпълнено "NIKDIM"	т. 5.2 а)	-
1.2	описание на типа от производителя	-	т. 5.2	574	изпълнено СВВП-20	т. 5.2 а)	-
1.3	номинално напрежение	-	т. 5.2	574	изпълнено 20/24 kV	т. 5.2 а)	-
1.4	номинален ток	-	т. 5.2	574	изпълнено 100 A	т. 5.2 а)	-

2.	ИЗПИТВАНЕ ЗА ЕЛЕКТРИЧЕСКА ЯКОСТ НА ИЗОЛАЦИЯТА:	-	т. 6.4	574	-	т. 6.4	-
2.1	Изпитване на импулсно напрежение	-	т. 6.4.4	574	изпълнено Протокол № ТУ-08/03-04 от 26.03.2006г.	т. 6.4.4	-
2.2	Изпитване на напрежение с мрежова честота	-	т. 6.4.5	574	изпълнено Протокол № 2-08-571 / 28.03.2008 г.	т. 6.4.5	-

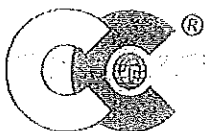
3.	ПРЕГРЯВАНЕ И РАЗСЕЙВАНА МОЩНОСТ	-	т. 6.5	574	Протокол № 9971/09.08.2007, ICMET CRAIOVA, ROMANA	т. 6.5	-
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4.	ТЕРМИЧНА И ДИНАМИЧНА УСТОЙЧИВОСТ	-	т. 6.6	574	Протокол № 9831/26.02.2007, ICMET CRAIOVA, ROMANA	т. 6.6	-
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5.	ПРОВЕРКА НА РАЗМЕРИТЕ:	-	-	574	-	сугласно чертеж НД 20.01.00.00.00	-
5.1		mm	-	574	A = 443	A = 445	-
5.2		mm	-	574	B = 288	B = 290	-
5.3		mm	-	574	C = 470	C = 475	-
5.4		mm	-	574	D = 578	D = 580	-
5.5		mm	-	574	E = 295	E = 295	-

Резултатите посочени в настоящия протокол се отнасят само за изпитвания образец.

Протоколът от изпитване може да бъде възпроизвеждан само цялостно и с писменото разрешение на ЛАБОРАТОРИЯТА



Център за Изпитване и
Европейска сертификация

ЛАБОРАТОРИЯ "ИЗПИТВАНЕ НА МАШИНИ, СЪОРЪЖЕНИЯ И УСТРОЙСТВА"

към ЦЕНТЪР ЗА ИЗПИТВАНЕ И ЕВРОПЕЙСКА СЕРТИФИКАЦИЯ

6000 гр. Стара Загора П.К. 131 ул. „Индуриална " 2 www.ctec-sz.com
тел: +359 42 630476; +359 42 620368; факс +359 42 602377; e-mail:ctec_limsu@abv.bg

ПРОТОКОЛ

ОТ ИЗПИТВАНЕ

№ 2-08-574 / 24.04.2008 г.

ОБЕКТ НА ИЗПИТВАНЕ: Основа за високоволтов предпазител за закрит монтаж тип СВВП-20
(наименование на продукта - тип, марка, вид и др.)

ЗАЯВИТЕЛ НА ИЗПИТВАНЕТО: "НИКДИМ" ЕООД гр. Казанлък
бул. "23 Шипченски полк" 80 тел. 0431/6 50 16
Заявка № 574 / 25.02.2008 г.
(наименование на фирмата-заявител, адрес, телефон, номер и дата
на заявката за изпитване)

МЕТОД ЗА ИЗПИТВАНЕ: БДС EN 60282-1:2003 Предпазители за високо напрежение.
Част 1: Токоограничаващи предпазители
(номер и наименование на стандартите или валидираните методи)

ДАТА НА ПОЛУЧАВАНЕ НА ОБЕКТА ЗА ИЗПИТВАНЕ В ЛАБОРАТОРИЯТА: 25.02.2008 г.

КОЛИЧЕСТВО ИЗПИТВАНИ ОБРАЗЦИ: СВВП-20 - 1 брой - произв. 2008 г.
(фабричен номер на образците, количество на пробите, дата на производство)

ПРОИЗВОДИТЕЛ: "НИКДИМ" ЕООД гр. Казанлък бул. "23 Шипченски полк" 80 тел. 0431 / 6 50 16
(фирма, търговска марка, адрес)

ОБЯВЕНИ ДАННИ: Обявено напрежение -- $U_n = 20/24$ kV
Обявена честота -- 50 Hz
Номинален ток -- $I_n = 100$ A

ДАТА НА ИЗВЪРШВАНЕ НА ИЗПИТВАНЕТО: 25.02.2008 г. ÷ 24.04.2008 г.

РЪКОВОДИТЕЛ НА ЛАБОРАТОРИЯТА:
Инж. Т. Христов /

Резултатите посочени в настоящия протокол се отнасят само за изпитвания образец.
Протоколът от изпитване може да бъде възпроизведен само цялостно и с писменото
разрешение на ЛАБОРАТОРИЯТА

Стр. 1 от 4

1272



ЦЕНТЪР ЗА ИЗПИТВАНЕ И ЕВРОПЕЙСКА СЕРТИФИКАЦИЯ
гр. Стара Загора-бул. "Св.Патр.Евтимий" № 23; тел 042/ 620 368; fax 042/602 377
ctec@ctec-sz.com, www.ctec-sz.com

СЕРТИФИКАТ

№ LVD- 08- 000 - (2-08-574)- 059

"ЦИЕС" ЕООД удостоверява, че продукт

Основа за високоволтов предпазител за закрит монтаж тип СВВП-20

Произведен във фирма:

„НИКДИМ“ ЕООД,
гр.Казанлък, бул."23 Шипченски полк" № 80

Отговаря на изискванията на:

БДС EN 60282-1:2003 Предпазители за високо
напрежение.
Част 1: Токоограничаващи предпазители -
т.т. 5.2; 6.4; 6.5; 6.6

Сертификатът се издава въз основа на:

Протоколи от изпитване:
№ 2-08-574/24.04.2008 г.
№ 2-08-571/28.03.2008 г.
№ ТУ-08/03-04 от 26.03.2008 г.
№ 9971/09.08.2007 г.
№ 9831/26.02.2007 г.

Дата на издаване: 07.05.2008 г.
Стара Загора

Управител "ЦИЕС" ЕООД:
/инж. Благовеста Шинева/





ISO 9001
ISO 14001
DIN EN ISO 9001
DUREAU VERITAS
Certifications

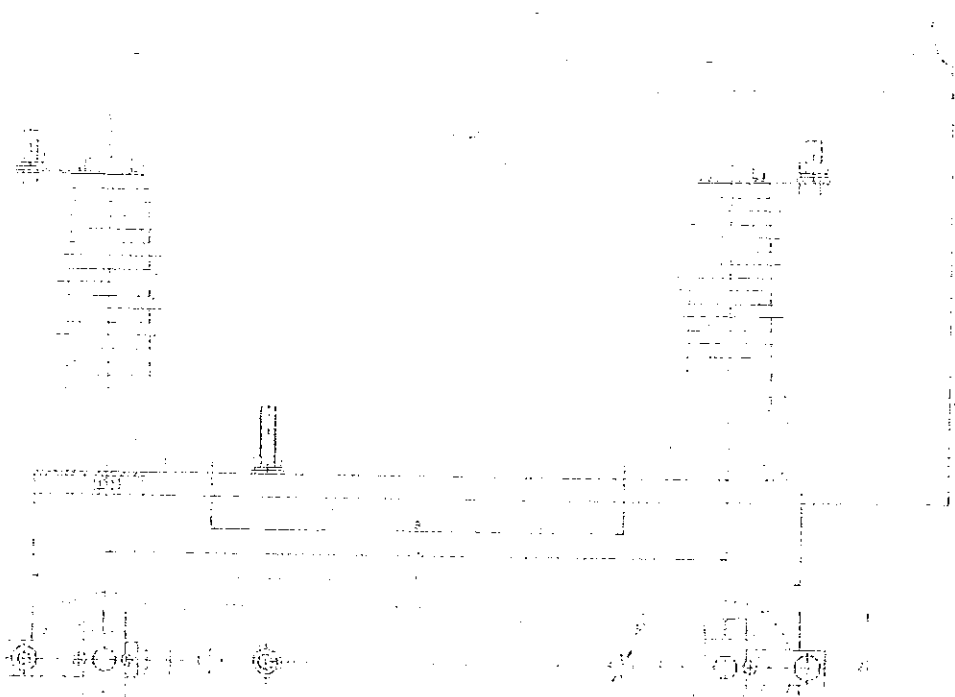


НИКДИМ ЕООД Казанлък България

ПРОИЗВОДСТВО НА ЕЛЕКТРО АПАРАТУРА 6100 Казанлък, бул. „23ти Шипченски Полк“ 60

Тел: 0431 / 65016
Факс: 0431 / 65028

e-mail: info@nikdim.bg
web: www.nikdim.bg



4. Гаранционна карта.

Типоразмер на основата:	
Дата на производство:	
Количество:	
Производител:	„НИКДИМ“ ЕООД - Казанлък
Дата на доставка:	
Клиент:	
Адрес на клиента:	
Гаранция:	
Фактура:	
Доставчик:	

Продавач:

Купувач

475



ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification



НИКДИМ ЕООД Казанлък България

ПРОИЗВОДСТВО НА ЕЛЕКТРО АПАРАТУРА 6100 Казанлък, бул. „23ти Шипченски Понк“ 80

Тел: 0431 / 65016
Факс: 0431 / 65028

e-mail: info@nikdim.bg
web: www.nikdim.bg

ТЕХНИЧЕСКИ ПАСПОРТ

Основи за токоограничаващи предпазители за средно напрежение тип СВвП и СВвПО 12 и 24kV

Основите за монтаж на открито и закрито от типа СВвП и СВвПО се използват за свързване на патрона за средно напрежение от типа ВвП към външната верига и за неговата лесна подмяна.

Завода производител дава гаранция за нормална работа на основите при следните условия на работа:

- режим на работа – продължителен
- монтаж – на закрито и на открито
- температура на околната среда - $-25 \div +40$ °C
- надморска височина – до 2000м
- относителна влажност на въздуха – до 90% при 20 °C

1. Технически данни:

Основите за ВвП от типа СВвП и СВвПО се произвеждат съгласно БДС EN 60282-1.

- номинално напрежение – 12 или 24kV
- номинален ток – 100A
- номинална честота - 50Hz

2. Техническо описание:

Основите за токоограничаващи предпазители за средно напрежение тип СВвП и СВвПО се състоят от следните основни компоненти:

- Основа от цинкувана стомана – Ст3 по БДС EN 10084
- Полимерни изолатори – епоксидни за вътрешен монтаж и силиконови за открит монтаж.
- Контактни щипки – направени от електролитна мед – ЕСu57 по DIN 1787, покритие сребро - min 4µm.

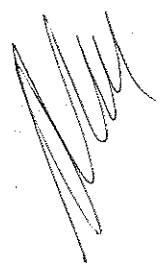
3. Технически характеристики.

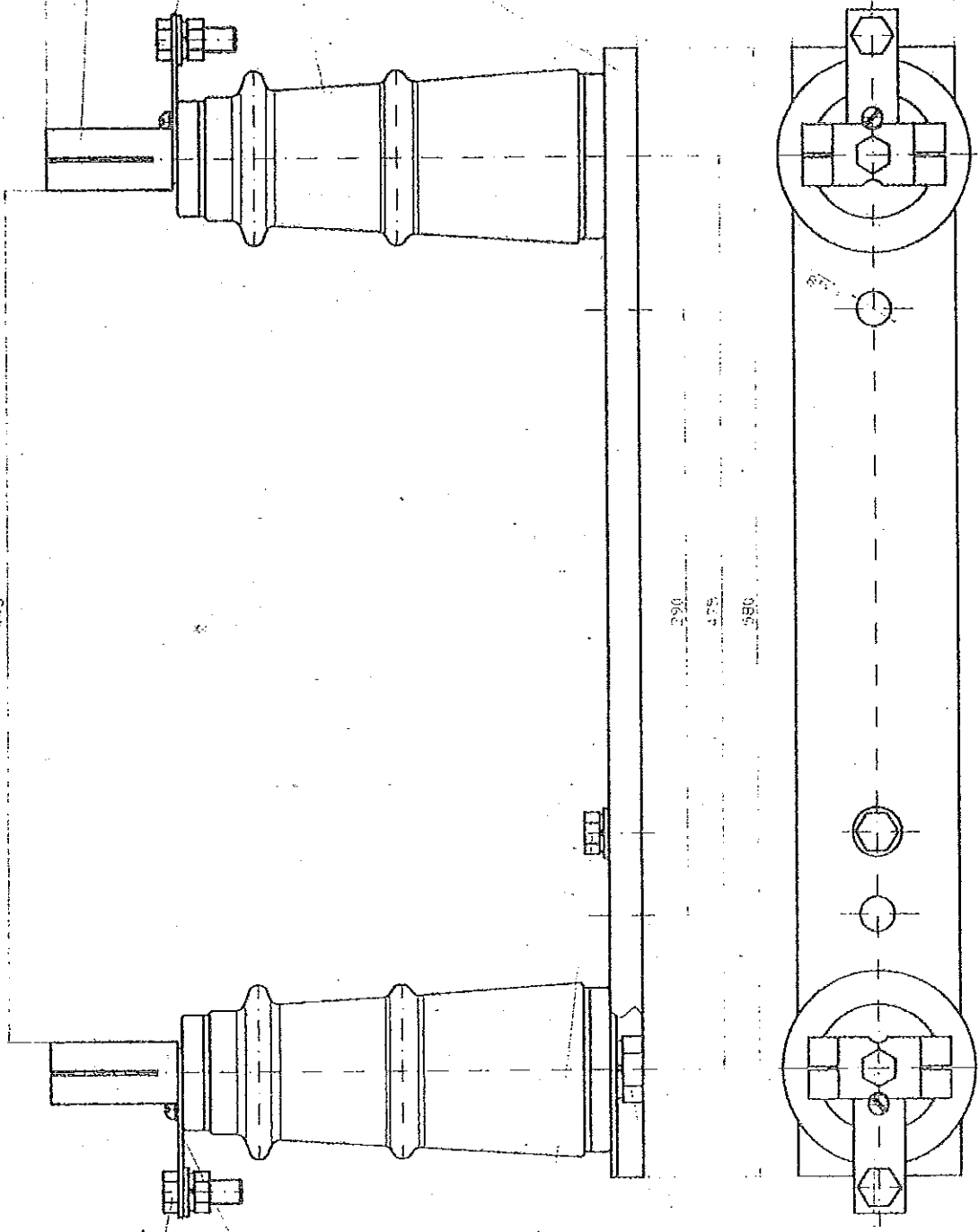
Основните размери на СВвП/О са дадени на схемата:

Типоразмер	A, мм	B, мм	C, мм	D, мм	E, мм
СВвП 12kV	295	140	325	435	215
СВвП 24kV	445	290	475	580	295
СВвПО 24kV	445	300	475	600	420

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A handwritten signature in black ink, consisting of several stylized, overlapping loops and lines, located in the bottom right corner of the page.



Технически изисквания:


1. Техническите характеристики и размерите отговарят на БДС EN 60282-1.
2. Техническите данни на СВВП 24kV:
 - номинално напрежение - 20 kV
 - максимално напрежение - 24 kV
 - номинален ток - до 100A

НД 20.01.00.00.00 - "ЧС"		СВП	
Степан	Масо	1. А. А. А.	Казанлък
Стойка за ВВП за вътрешен монтаж		7.6kg; 11	
тип СВВП 24kV		Лист 2	
Разработчик		"НИКДИМ"ЕООД	
Проверил		Казанлък	
Утвърден		Датум	

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(

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A handwritten signature or set of initials in the bottom right corner, written in dark ink. The signature is stylized and appears to consist of several overlapping, slanted strokes.



ISO 9001
ISO 14001
DIN EN ISO 9001
BUREAU VERITAS
Certification



НИКДИМ ООД, Казанлък България

ПРОИЗВОДСТВО НА ЕЛЕКТРО АПАРАТУРА

5100 Казанлък, Бул. „Димитър Благоев“ 80

Тел: 0431 / 65016
Факс: 0431 / 65028

e-mail: info@nikdim.bg
web: www.nikdim.bg

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

№ 054

Доставчик: НИКДИМ ООД

Адрес: гр.Казанлък бул. 23 Пехотен шипченски полк № 116

Тел: 0431 625 84 Факс: 0431 625 84 e.mail: info@nikdim.bg

Продукт: Основа за високоволтов предпазител 12 kV; 24 kV закрит монтаж

Горепосоченият продукт е в съответствие със:

БДС EN 62271-1:2008 „Общи технически изисквания за стандартите за комутационни апарати за високо напрежение“;

БДС EN 60282-1:2010 „Предпазители за високо напрежение. Част 1: Токоограничаващи предпазители (IEC 60282-1:2009)“;

БДС 1906:1982 „Изолатори подпорни порцеланови за напрежение над 1000 V. Технически изисквания“;

БДС IEC 60273:2003 „Характеристики на подпорни изолатори за работа на закрито и на открито за системи с номинални напрежения, по-високи от 1000 V“;

БДС EN ISO 1461:2009 „Горещопоцинковани покрития на готови продукти от чугун и стомана. Технически изисквания и методи за изпитване (ISO 1461:2009)“и

Наредба № 3 от 9 юни 2004 г. за устройството на електрическите уредби и електропроводните линии, издадена от министъра на енергетиката и енергийните ресурси (Наредба № 3 УЕУЕЛ).

Гр. Казанлък 15.09.2014

Управител НИКДИМ ООД



High Voltage Fuse Holders

Стойки за високоволтови предпазители

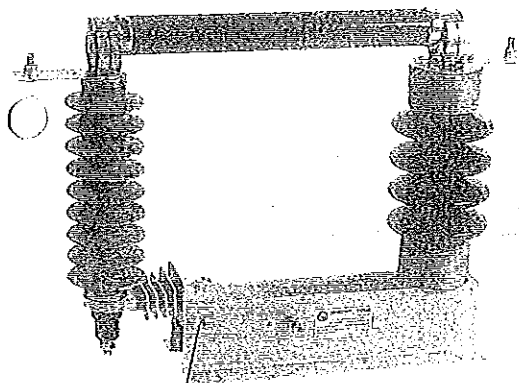
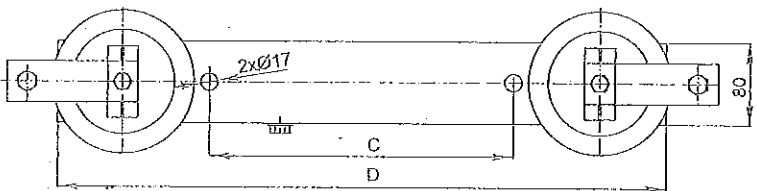
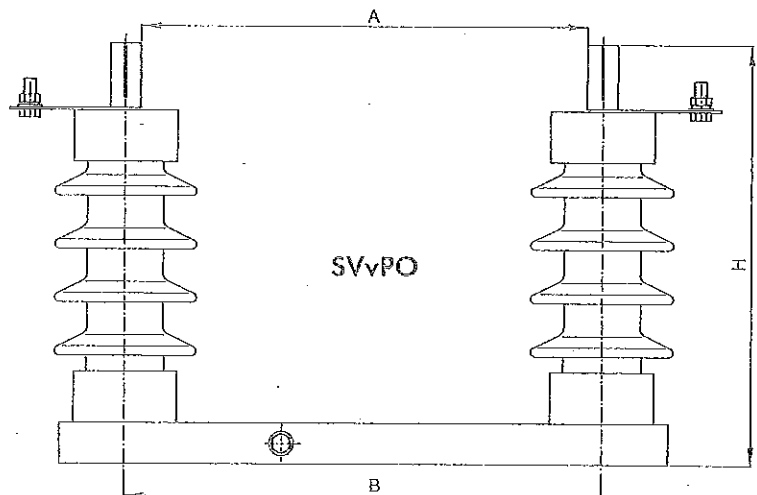
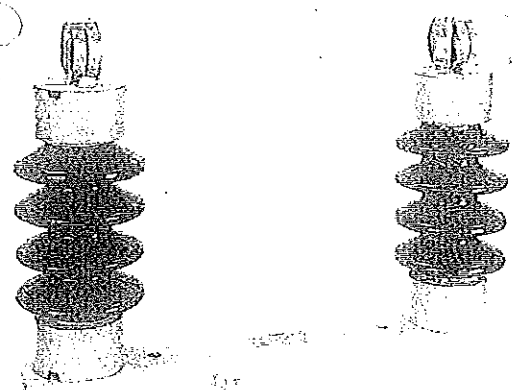
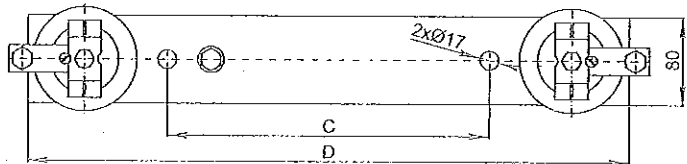
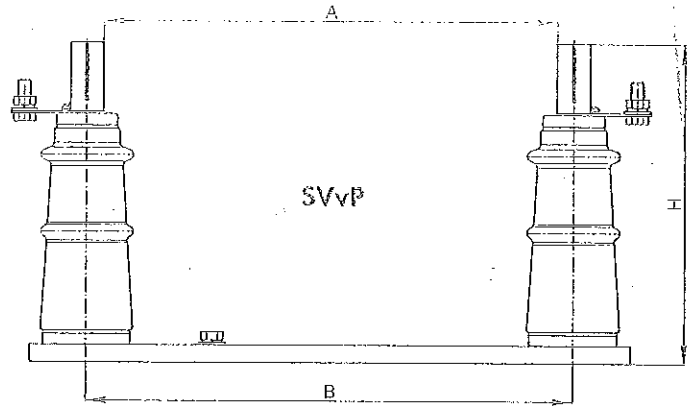
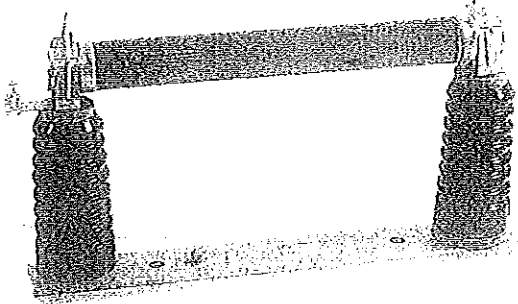
Типология Типология

SVvP - HV fuse holders for indoor mounting

SVvPO - HV fuse holders for outdoor mounting

SVvP - Стойки за високоволтови предпазители за вътрешен монтаж

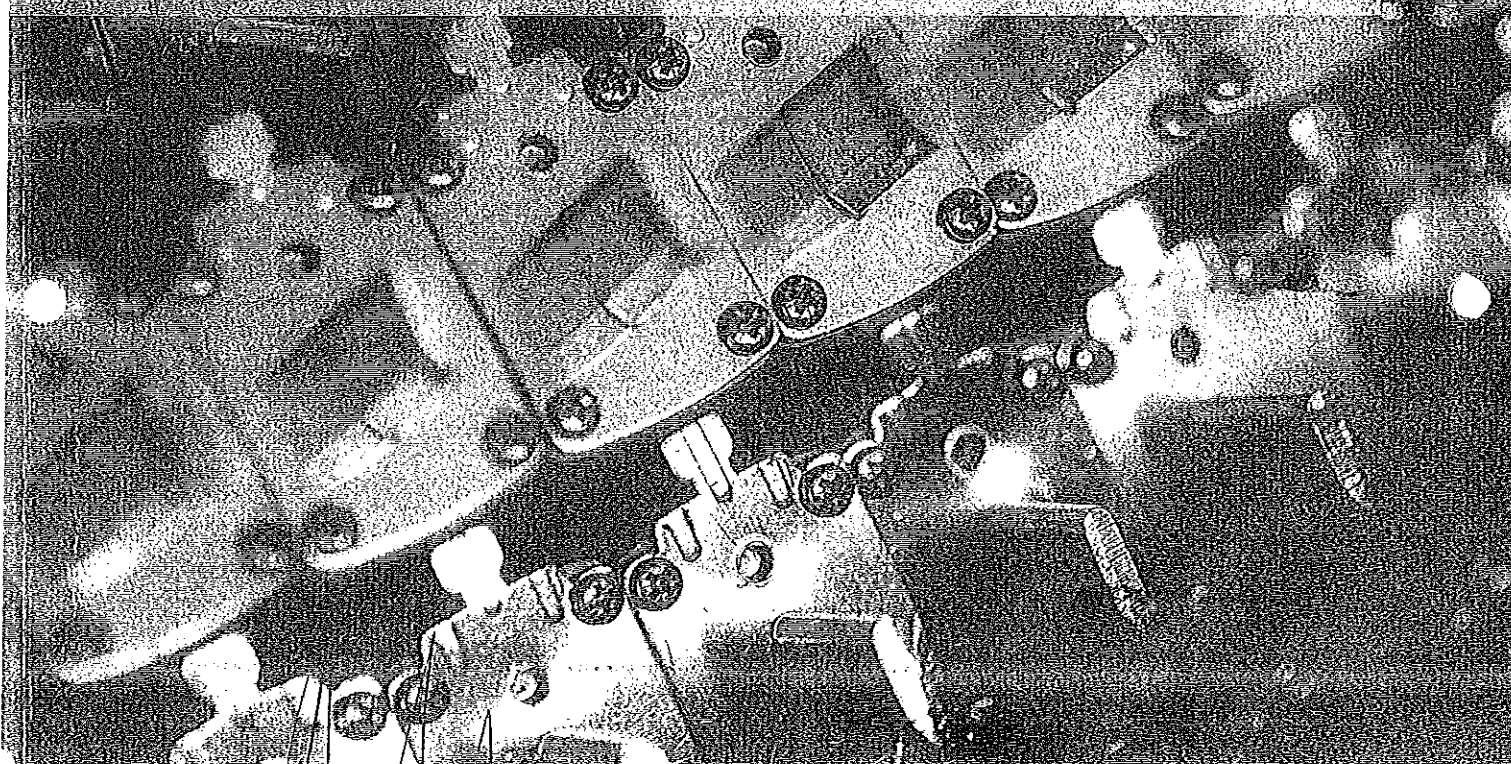
SVvPO - Стойки за високоволтови предпазители за открит монтаж



Type / Тип	Order No / Каталоген №	Order No / Каталоген №	Rated voltage / Ном. Напрежение	Dimensions / Размери					Weight / Тегло
	with insulators / с изолатори	with arrester / с кам.омбоз		kV	A	B	C	D	
SVvP 12kV	2410001	2410002	12	295	325	140	435	230	5.5
SVvP 24kV	2420001	2420002	24	445	475	290	580	295	7.6
SVvP 36kV	2435001	2435002	36	540	570	385	680	435	18.0
SVvPO 12kV	2510001	2510002	12	295	325	145	435	380	17.5
SVvPO 24kV	2520001	2520002	24	445	475	300	600	420	18.0
SVvPO 36kV	2535001	2535002	36	540	570	390	680	547	36.0

PRODUCTION
CATALOG
2015

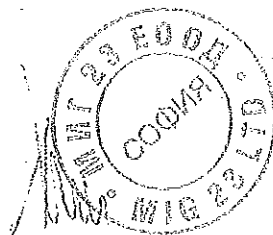
FUSES SWITCHES INSULATORS
ПРЕДПАЗИТЕЛИ РАЗЕДИНИТЕЛИ ИЗОЛАТОРИ



NIKDIM

(37)

№ по ред	Документ	Приложение № (или текст)
1.	Точно обозначение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	НИКДИМ ООД БЪЛГАРИЯ 2015 г. SVVPO Приложение 1
2.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“ по-горе	Приложение 2
3.	Чертежи с размери и общо тегло	Приложение 3 7.600 кг.
4.	Техническо описание, в т.ч. на гарантираните параметри, типа и качествата на използваните материали и съоръжаване	Приложение 4
5.	Изпитвателни протоколи за електрическа якост на изолацията и измерване на съпротивлението на главната верига и на прегряването съгласно БДС EN 62271-1.	Приложение 5
6.	Изисквания за транспортиране, манипулиране и складиране	Приложение 6
7.	Инструкция за експлоатация и поддържане	Приложение 6
8.	Експлоатационна дълготрайност, год.	10 год.



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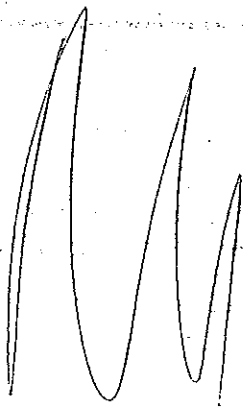
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Наименование на материала:

**Основа за предпазител 20 kV,
с два отвора, за монтиране на закрито**

**Номер на техническа спецификация на
стандарт – 20 16 8101 ZZ КЪМ**

МТТ20/100, Д – отпред и отстрани





РЕПУБЛИКА БЪЛГАРИЯ

ДЪРЖАВНА АГЕНЦИЯ ЗА МЕТРОЛОГИЧЕН И ТЕХНИЧЕСКИ НАДЗОР

РАЗРЕШЕНИЕ

№ 010 - ОС / 10.03.2008г.

На основание чл. 9, ал. 1 от Закона за техническите изисквания към продуктите (ЗТИП) и чл. 13, ал. 2 от Наредба за съответствието на изисквания и условията на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, и след установено съответствие с изискванията на чл. 10 от ЗТИП и чл. 13 от Наредбата, по писмено заявление жк.№ АУ-01-312 / 09.03.2008г.,

РАЗРЕШАВАМ:

"ЕАТЕСТ СЕРТИФИКАЦИЯ" ЕООД

представявано от

Владимир Веселин Тодоров - управител

све създадено в адрес на управление:

гр. Варна

ул. "Бойнишки" № 7, кв.В, ет. I, ам. I

да изготви експертен доклад за съответствието на:

електрическо оборудване, предназначено за използване в определени граници на напрежението

съгласно чл. 5а от Наредба за съответствието на изисквания и условията на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, обн. ДВ, бр. 62/13.07.07г., в сила. ИЛИ. ДВ, бр. 37/08.05.07г.,

като прилага процедура за оценяване на съответствието:

"ИЗГОТВЯНЕ НА ЕКСПЕРТЕН ДОКЛАД ЗА СЪОТВЕТСТВИЕТО"

След получаване на нотификация, Европейската комисия е обзавела "ЕАТЕСТ СЕРТИФИКАЦИЯ" ЕООД за LVD Евр / № 2024/.

И. Д. ПРЕДСЕДАТЕЛ:

/ ОЛГА МАНАФОВА

Tasks performed by the Body :

Created : 19/03/2015 | Last update : 19/03/2015

Product family, product /Intended use/Product range	Procedure/Modules	Annexes or articles of the directives
Electrical equipment designed for use within certain voltage limits	Report consequent on a challenge (Art 8)	Article 8

BRPHO C
CERTIFICATA

Notification of a Body in the framework of a technical harmonization directive

From : State Agency for Metrological and Technical Surveillance
52A, G.M. Dimitrov, Biv.
1797 Sofia
Bulgaria

To : European Commission
GROWTH Directorate-General
200 Rue de la Loi,
B-1049 Brussels.
Other Member States

Reference :

Legislation : 2006/95/EC (ex-73/23/EEC) Low voltage directive

Body name, address, telephone, fax, email, website :

"ELTEST CERTIFICATION" Ltd.
7-b, Voynishka Str.,
9002 Varna
Bulgaria
Phone : +359 (52) 383 526
Fax : +359 (52) 721 198
Email : office@eltestcertification.com
Website : www.eltestcertification.com

Body :

LVD body

Created : 15/02/2007 | **Last update :** 06/03/2008

Period of validity of the notification :

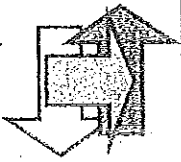
Valid until : 15/07/2020

The body is assessed according to :

In accordance with the requirements of the Directive 2006/95/EC (ex-73/23/EEC) Low voltage directive /Ordinance of essential requirements and conformity assessment of low voltage, Law on Technical Requirements for Products, EN 45011/EN ISO/IEC 17065, EN ISO/IEC 17025, applying "Procedure for designation of conformity assessment bodies" of SAMTS - Designation of CABs Department

The competence of the body was assessed by : SAMTS - Designation of CABs Department

The assessment of the body covers the product categories and conformity assessment procedures concerned by this notification : Yes



“ЕЛТЕСТ СЕРТИФИКАЦИЯ” ЕООД
РАЗРЕШЕНИЕ № 010 – ОС / 10.03.2008г. от ДАМТН

LVD
Body
NB 2024

Чл. 8(2)4	да осигуряват изолацията да е съобразена с предвидимите условия на работа на електрическото съоръжение.	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т.8.2.2.7; т.8.2.5; т.8.2.2.4; т.8.2.2.6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(3)	Мерките от технически характер за защита от опасности, дължащи се на външни въздействия върху електрическото съоръжение, трябва да осигурят.	Да	Чл. 8(3)1; Чл. 8(3)2; Чл. 8(3)3
Чл. 8(3)1	електрическото съоръжение да издържа на очакваните механични натоварвания така, че да не застрашава хората, домашните животни и вещите;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 7.1.1 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(3)2	електрическото съоръжение да издържа немеханични влияния при очаквани условия на околната среда и да не застрашава хората, домашните животни и вещите;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 7.4.3.1.5; т. 7.8; т.8.2.2.4; т.8.2.2.6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(3)3	електрическото съоръжение да не застрашава хората, домашните животни и вещите в предвидими условия на претоварване.	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т.8.2.3 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)

Заверил:
Имж. Владимир Тодоров
Дата: 21.06.2014г.

ВАРШО С
ОРГАНИЗАЦИЯ

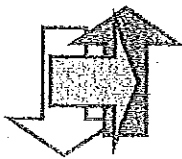
Експерт-оценител:

Д-Р ИМЖ. Михаил Валентинов Скопчанов
Страница 3/3

“ЕЛЕКТ СЕРТИФИКАЦИЯ” ЕООД
РАЗРЕШЕНИЕ № 010 – ОС / 10.03.2008г. ОТ ДАМТИ

LVD
Body
NB 2024

Чл. 7 (4)2	се поддържа по изисквания за съоръжението начин	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 7.4.6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8 (1)	Защитата от опасности, дължащи се на електрическото съоръжение или на външни въздействия върху електрическото съоръжение, се осигурява чрез мерки от технически характер в съответствие с изискванията по чл. 7.	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 7.1.1; т. 7.4.2.2.3; т. 7.6.1, т. 7.6.2, т. 7.6.3 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(2)	Мерките от технически характер за защита от опасности, дължащи се на електрическото съоръжение, трябва:	Да	Чл. 8(2)1; Чл. 8(2)2; Чл. 8(2)3; Чл. 8(2)4;
Чл. 8(2)1	да осигуряват подходяща защита на хората и домашните животни срещу опасност от физическо нараняване или друго увреждане, което може да бъде причинено от директен или индиректен електрически допир;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 8.2.7; т. 7.4.2; т. 7.4.3 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(2)2	да не създават такива температури, електрически дъги или лъчения, които биха причинили опасност;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 8.2.1.1 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 8(2)3	да защитават достатъчно хората, домашните животни и вещите от опасности от неелектрически характер, които могат да бъдат причинени от електрическото съоръжение и са известни от практиката;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 8.2.6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)



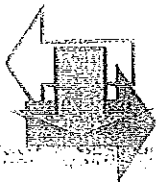
“ЕЛЕКТ СЕРТИФИКАЦИЯ” ЕООД
РАЗРЕШЕНИЕ № 010 – ОС / 10.03.2008г. от ДАМТН

LVD
Body
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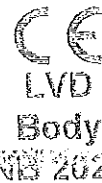
ПРИЛОЖЕНИЕ 1

Член, алинея, точка	Съществени изисквания	Съотв. Да / Не	Доказателства
Чл. 7 (1)	Съществени характеристики, познатото и съобразяването с които осигурява безопасност използване на електрическото съоръжение, трябва да бъдат нанесени върху съоръжението или ако това е невъзможно - в придружаващо указание;	Да	Електрическото съоръжение е придружавано от техническо досие и технически спецификации. Електрическото съоръжение отговаря на изискванията на БДС EN 60439-1:2002+A1:2006 – т. 5.1 - информация върху фирмените табелки; т. 5.2, 7.6.5 – маркировки във вътрешността на разпред. табло; т. 5.3 - инструкции за съхранение - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 7 (2)	Наименованието (фирмата) на производителя или търговската марка трябва да са ясно изписани върху електрическото съоръжение или ако това е невъзможно - върху опаковката;	Да	Оглед на електрическото съоръжение и приложен снимков материал към “Становище за преглед на техническо досие”
Чл. 7(3)	Електрическото съоръжение и неговите съставни части трябва да са изработени по начин, който позволява безопасност отговаряване и свързване;	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 7.1.3; т. 7.1.3.6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)
Чл. 7(4)	Електрическото съоръжение трябва да е проектирано и изработено по начин, който осигурява защита от опасностите, посочени в чл. 8, при условие че:	Да	Чл. 7(4)1., Чл. 7(4)2
Чл. 7(4)1	се използва по предназначение, и	Да	Електрическото съоръжение удовлетворява изискванията на стандарт БДС EN 60439-1:2002+A1:2006 – т. 6 - (Протокол № 11.0024/02.035 от „ЕЛПРОМ - ИЛЕП“ ООД – София)

ВАЖНО СЪОБЩЕНИЕ



"ЕЛТЕСТ СЕРТИФИКАЦИЯ" ЕООД
 България, Варна 9002, ул. "Войнишка" №7;
 тел./ф +35952721198, e-mail: office@eltestcertification.com
 РАЗРЕШЕНИЕ № 010 - ОС / 10.03.2008г. от ДАНТН



ДОКЛАД ЗА ОЦЕНЯВАНЕ

Относно:

Оценяване на съответствието със съществените изисквания съгласно "Наредба за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението"

Заявка № 1120/26.05.2011г.
 Договор № 1114/30.06.2011г.

Заявител на оценяването:
 „МИГ 23“ ЕООД
 Управител: АНТОН ИВАНОВ ИЛИЕВ

ОПИСАНИЕ НА ПРОДУКТА:

Табло главно трансформаторно - разпределително за ниско напрежение, отворен тип стоящо табло затворено от пред и от страни, за горно свързване и едностранно обслужване от лицевата страна, за неподвижен монтаж на закрито – типопредставител от серия, съдържаща РТ НН 4x400 А V и ГТРТ НН 1250 А/8x400 А, модел или типа ГТРТ НН 1250 А/8x400 А, сериен № Т11853-3

КОНСТАТАЦИИ ПРИ ПРЕГЛЕДА НА ТЕХНИЧЕСКОТО ДОСИЕ:

Описани в "Становище за прегледа на техническото досие" с дата 30.05.2011г.

ОЦЕНКА НА РЕЗУЛТАТИТЕ ОТ ИЗПИТВАНИЯТА:

Резултатите от лабораторните изпитвания съгласно протокол № 11.0024/02.035 издаден от „ЕЛПРОМ-ИЛЕП“ ООД „Изпитвателна лаборатория за електротехническа продукция“ – София са описани в ПРИЛОЖЕНИЕ 1.

ПРЕДЛОЖЕНИЕ:

Въз основа на направената оценка считам, че оцененото електрическо съоръжение **СЪОТВЕТСТВА** на приложимите за него съществени изисквания, при което предлагам това да бъде отразено в експертния доклад

Съставил:

Михаил Валентинов

Дата: 21.06.2011г.

Експерт-оценител – д-р инж. Михаил Валентинов Скопчанов

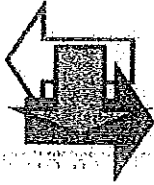


инж. Владимир Тодоров
 Ръководител на „ЕЛТЕСТ СЕРТИФИКАЦИЯ“ ЕООД

Дата: 22.06.2011г.

Не се опуско каквато и да е част от този доклад и не е разрешено да се размножават в каквато и да е форма, нито каквато и да е средства – електронни или механични (ксерокопиране, сканер, микро филми и други подобни начини) без разрешение в писмена форма от Управителя на "ЕЛТЕСТ СЕРТИФИКАЦИЯ" ЕООД

Михаил Валентинов



“ЕЛТЕСТ СЕРТИФИКАЦИЯ” ЕООД
България, Варна 9002, ул. “Войнишка” №7;
тел./факс +359721198; e-mail: office@eltestcertification.com
РАЗРЕШЕНИЕ № 010 – ОС / 10.03.2008г. от ДАМТН



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ЕКСПЕРТЕН ДОКЛАД

№ 015/22.06.2011г.

Заявител: „МИГ 23” ЕООД
Производител: „МИГ 23” ЕООД
Упълномощен представител:
Търговска марка: MIG 23®
Ел. съоръжение: Табло главно трансформаторно – разпределително за ниско напрежение
Модел: РТ НН 4x400 А V и ГТРТ НН 1250 А/8x400 А
Вид: Отворен тип стоящо табло затворено от пред и от страни, за горно свързване и едностранно обслужване от лицевата страна, за неподвижен монтаж на закрито

ОСНОВАНИЕ

Заявка: № 1120/26.05.2011г.
Експертиза на техническата документация: 30.05.2011г.
Протокол от изпитване: № 11.0024/02.035
Доклад на експерт-оценител: 21.06.2011г.

С този експертен доклад “ЕЛТЕСТ СЕРТИФИКАЦИЯ” ЕООД удостоверява, че електрическо съоръжение „Табло главно трансформаторно – разпределително, за ниско напрежение, отворен тип стоящо табло затворено от пред и от страни, за горно свързване и едностранно обслужване от лицевата страна, за неподвижен монтаж на закрито” **СЪОТВЕТСТВА** на приложимите за него съществени изисквания на Директива 2006/95/ЕС, въведена с Наредба за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението.

Управител:

Иж. Владимир Тодоров

Неразделна част от този документ е Доклад на експерт-оценител

Долуподписаният Иван Спасов Клончев удостоверява верността на извършения от мен превод от немски на български език на приложният документ. Преводът се състои от 9 страници.

Преводач: Иван Спасов Клончев

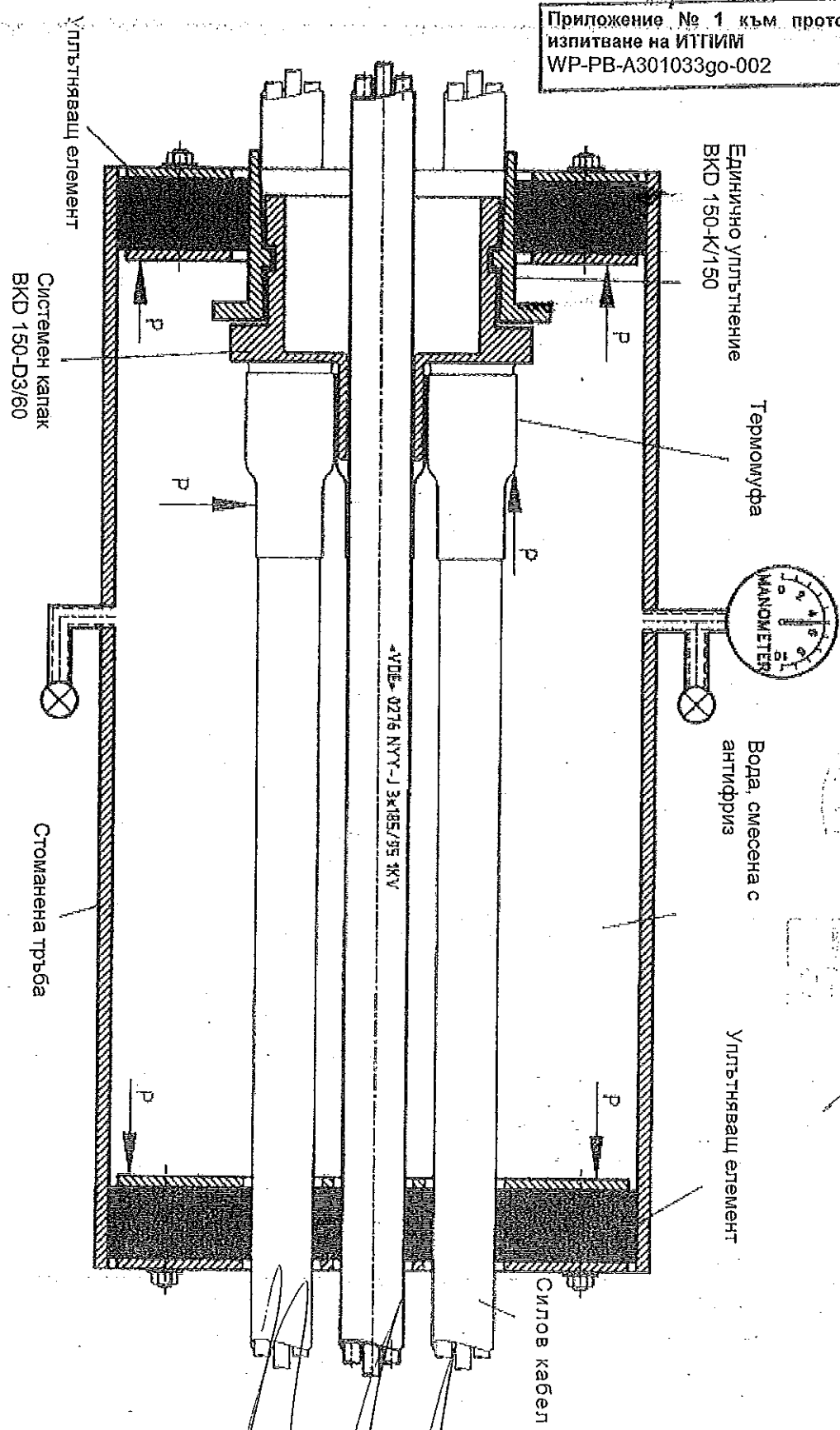


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Приложение № 1 към протокол от
изпитване на ИТГИИ
WP-PB-A301033go-002



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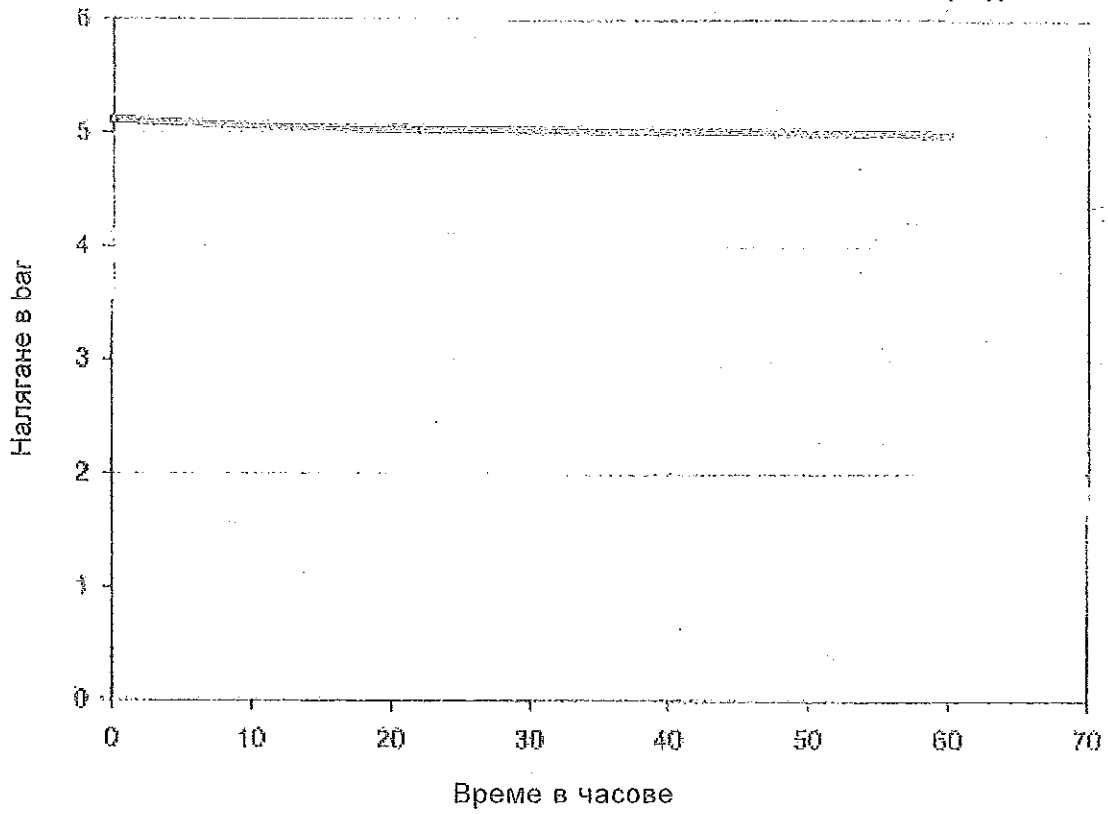
ВОДА, СМЕСЕНА С
АНТИФРИЗ

МАНОМЕТЪР

Уплътняващ елемент

Графично представяне:

Изпитвателна температура: -25°C



4 Протокол от изпитване

WP-PB-A301033Go-002

5 Забележки

няма

1 Задание

Измерване на херметичността на кабелен въвод на фирма UGA модел BKD 150 по отношение на водно налягане при -25°C

Обекти на изпитване: Система кабелен въвод BKD 150

2 Обект на изпитване

Отделни части на системата, подлежащи на изпитване: Единично уплътнение BKD 150-K/150

Системен капак BKD 150-D3/60

Изпитвателно приспособление: вж. чертеж Приложение 1

Провеждане на опита:

Изпитвателното приспособление беше подготвено за измерването от сътрудник на Възложителя. След охлаждане на изпитвателната структура до -25°C на системата беше подадено налягане от 5 bar.

Големината на постъпващото водно налягане беше измервана и регистрирана в интервал от време > 24 часа.

Дата на изпитването: 29.06.2001 г. до 02.07.2001 г.

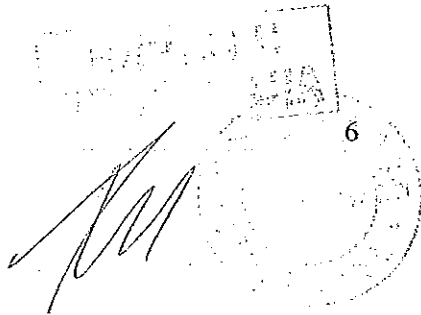
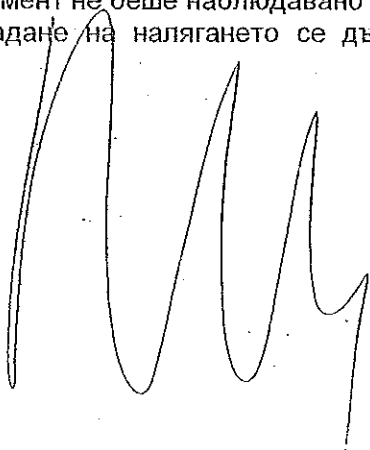
Изпитващ: Михаел Гом

3 Резултати от измерването

Таблица с резултатите:

Изпитване	Изпитвателна среда	Изпитвателно налягане [bar]	Времетраене на изпитването [часове]	Налягане в началото на измерването [bar]	Налягане в края на измерването [bar]
1	Вода с антифриз	5	60	5,11	4,99

В никой момент не беше наблюдавано излизане на вода.
Лекото спадане на налягането се дължи на охлаждане на изпитвателната среда.



ИТПИМ
Фрауенхофер

институт
технология
изследване на материалите

**Измерване на херметичността на
кабелен въвод на фирма UGA
модел BKD 150
по отношение на водно налягане при -25°C**

Кратък протокол WP-PB-A301033go-002 към
оферта № А301033go
Постъпване на поръчката: 25.06.2001 г.

UGA SYSTEM-TECHNIK OOD и К°
Хайденхаймер щрасе 80-82


89542 Хербрехтинген

Фрауенхофер институт технология изследване на материалите
Технология на слепването и полимери
Винер щрасе 12, 28359 Бремен
Ръководител на института: проф. д-р О.-Д. Хенеман

подпис /не се чете/
М. Бреде

подпис /не се чете/
М. Гом

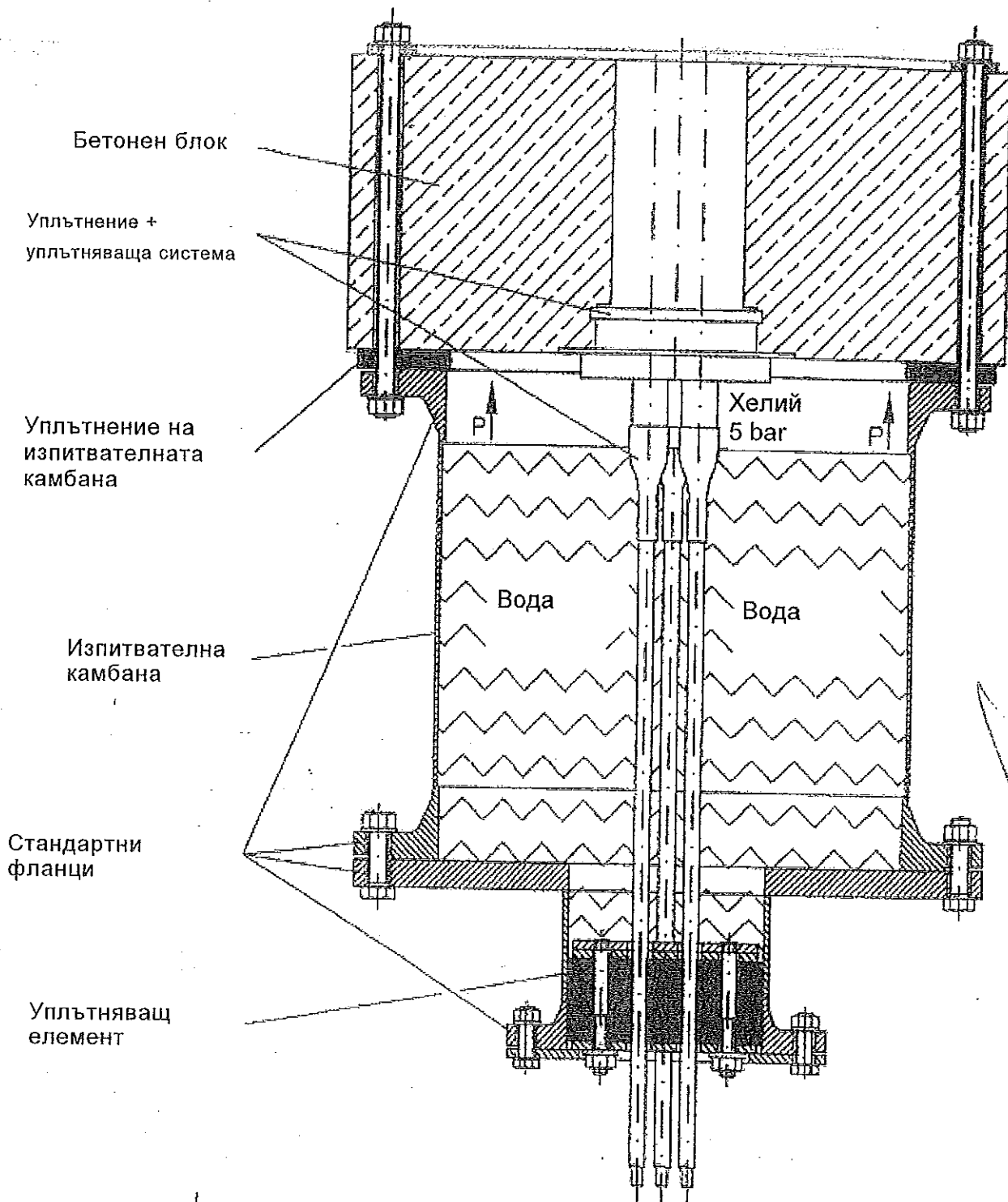
Бремен, 23.08.2001 г.



5



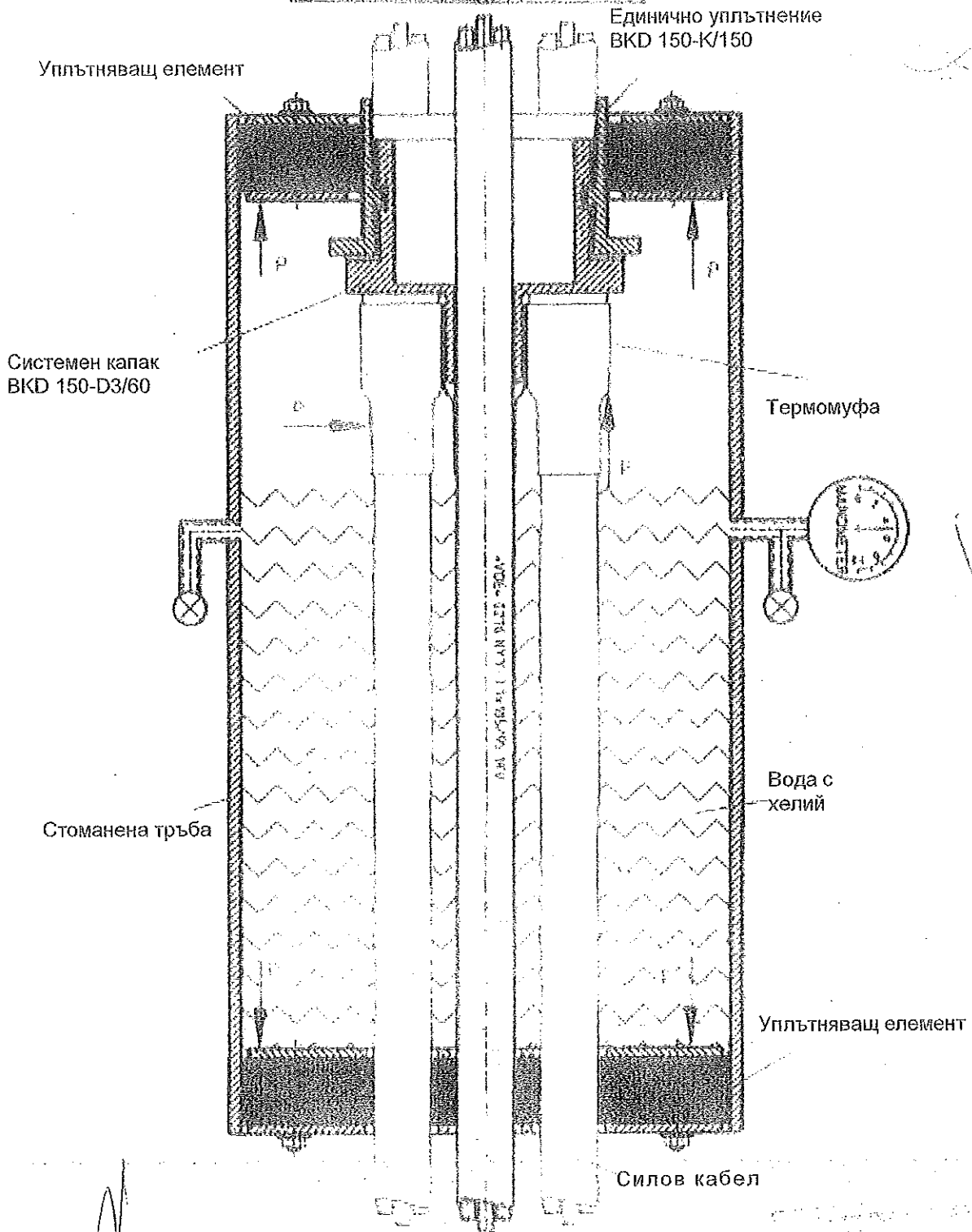
СГ



Приложение № 1 към протокол от
изпитване на ИТПИМ
WP-PB-A301033go-001

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Приложение № 1 към протокол от
изпитване на ИТГИИМ
WP-PB-A301033go-001



1 Задание

Измерване на херметичността на кабелен въвод на фирма UGA модел BKD 150 по отношение на хелий

Обекти на изпитване: Система кабелен въвод BKD 150

2 Обект на изпитване

Отделни части на системата, подлежащи на изпитване: Единично уплътнение BKD 150-K/150

Системен капак BKD 150-D3/60

Изпитвателно приспособление: вж. чертеж Приложение 1

Провеждане на опита: Изпитвателното приспособление беше подготвено за измерването от сътрудник на Възложителя. След подаване на изпитвателното налягане от 5 bar с хелий беше измерено налягането на частиците на газа с помощта на детектор за хелий Leybold UL 200.

Дата на изпитването: 25.06.2001 г.

Изпитващ: Михаел Гом

3 Резултати от измерването

Таблица с резултатите:

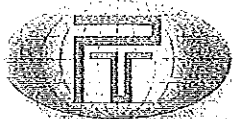
Изпитване	Изпитвателна среда	Изпитвателно налягане [bar]	Измерено налягане на частиците [mbar l/s]	Налягане на частиците на атмосферата [mbar l/s]
1	Хелий	5	$\approx 4,8 \text{ E-6}$	$\approx 4,8 \text{ E-6}$

4 Протокол от изпитване

WP-PB-A301033Go-001

5 Забележки

Херметичността по отношение на хелий на уплътнението на система (B)KD в бетонно пробно тяло се потвърждава в протокол от изпитване WP-PB-398012-007 на ИТПИМ от 28.01.1999 г. с измерено парциално налягане от $5,4 \text{ E-6 mbar}$. Опитната конструкция е представена под формата скица в Приложение 2.



Професионален преводен център ООД - България - 1000 София, ул. АМИ БУЛ № 24/11, 1-3

Превод от немски език

ИТПИМ
Фраунхофер
институт
технология
изследване на материалите

**Измерване на херметичността на
кабелен въвод на фирма UGA
модел BKD 150
по отношение на хелий**

Кратък протокол WP-PB-A301033go-001 към
оферта № A301033go
Постъпване на поръчката: 25.06.2001 г.

UGA SYSTEM-TECHNIK OOD и K°
Хайденхаймер шрасе 80-82

89542 Хербрехтинген

Фраунхофер институт технология изследване на материалите
Технология на слепването и полимери
Винер шрасе 12, 28359 Бремен
Ръководител на института: проф. д-р О.-Д. Хенеман

подпис /не се чете/
М. Бреде

подпис /не се чете/
М. Гом

Бремен, 23.08.2001 г.

1 Aufgabenstellung

Messung der Dichtigkeit einer Kabeldurchführung der Fa. UGA des Typs BKD 150 gegenüber Wasserdruck bei -25 °C

Prüfgegenstände: Kabeldurchführungssystem BKD 150

2 Prüfgegenstand

Zu prüfende Einzelteile des Systems: Einfach-Dichtpackung BKD 150-K/150
Systemdeckel BKD 150-D3/60

Prüfvorrichtung: s. Zeichnung Anlage 1

Versuchsdurchführung: Die Prüfvorrichtung wurde von einem Mitarbeiter des Auftraggebers für die Messung vorbereitet. Nach Kühlung der Prüfanordnung auf -25 °C wurde das System mit einem Wasserdruck von 5 bar beaufschlagt. Die Höhe des anstehenden Wasserdruckes wurde über einen Zeitraum von > 24 Stunden gemessen und aufgezeichnet.

Prüfdatum: 29.06.2001 bis 02.07.2001

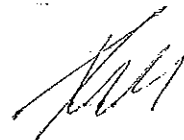
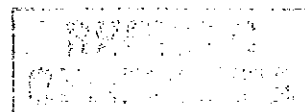
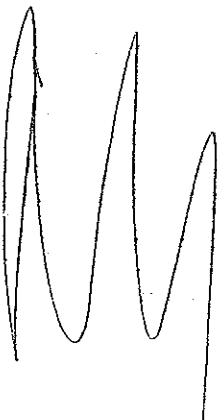
Prüfer: Michael Gomm

3 Messergebnisse

Ergebnistabelle:

Prüfung	Prüfmedium	Prüfdruck [bar]	Prüfdauer [Stunden]	Druck zu Beginn der Messung [bar]	Druck am Ende der Messung [bar]
1	Wasser mit Frostschutz	5	60	5.11	4.99

Es war zu keinem Zeitpunkt ein Wasseraustritt zu beobachten.
Der leichte Druckabfall ist durch die Abkühlung des Prüfmedium zurückzuführen.





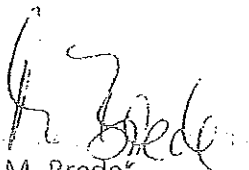
Fraunhofer Institut
Fertigungstechnik
Materialforschung

Messung der Dichtigkeit einer
Kabeldurchführung der Fa. UGA
des Typs BKD 150
gegenüber Wasserdruck bei -25°C

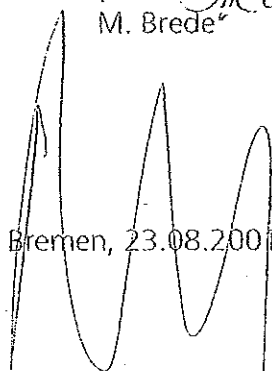
Kurzbericht WP-PB-A301033go-002 zum
Angebot Nr. A301033go
Auftragseingang: 25.06.2001

UGA SYSTEM-TECHNIK GmbH & Co.
Heidenheimer Straße 80-82
89542 Herbrechtingen

Fraunhofer-Institut Fertigungstechnik Materialforschung
Klebtechnik und Polymere
Wiener Straße 12, 28359 Bremen
Institutsleiter: Prof. Dr. O.-D. Hennemann

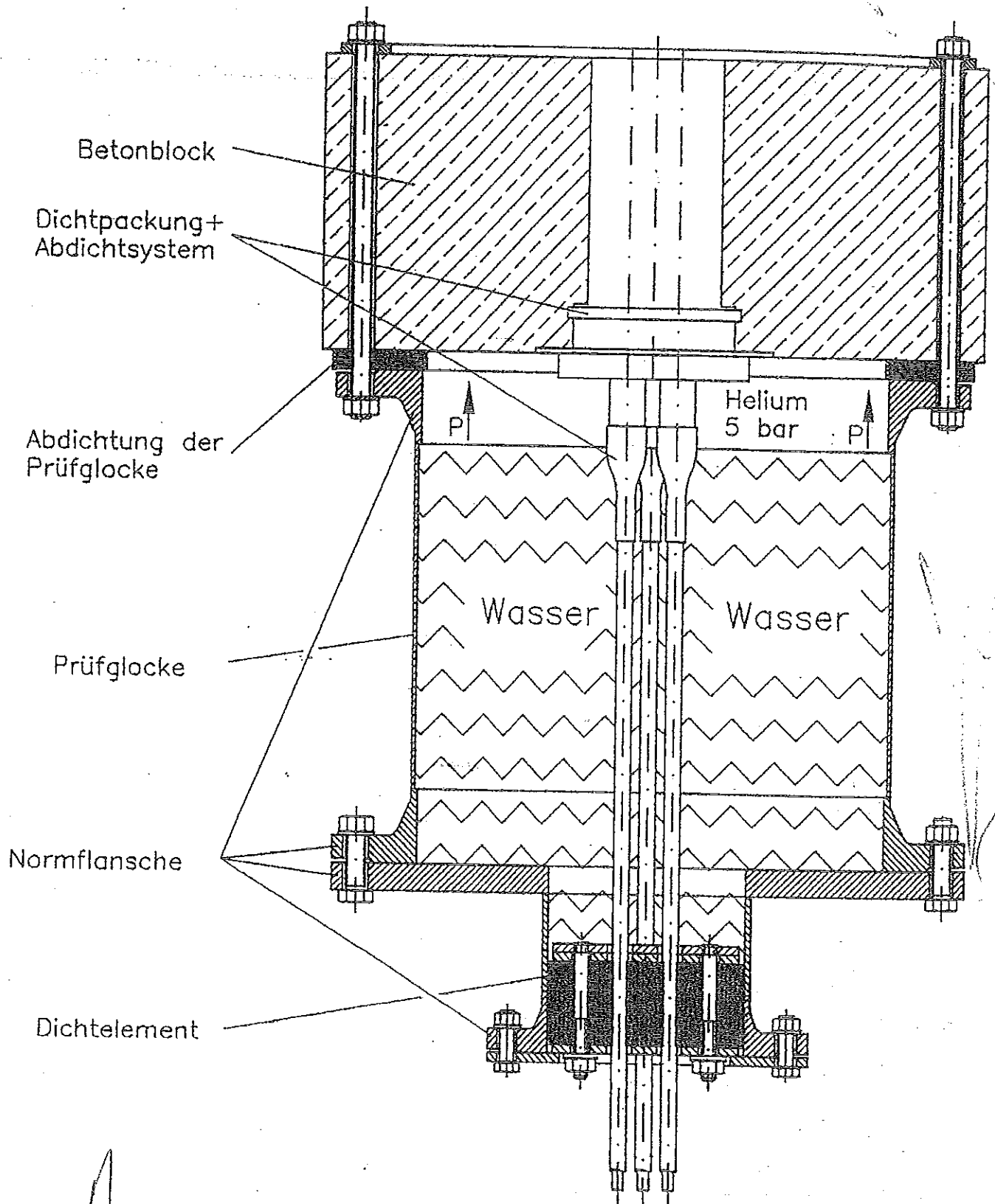

M. Brede


M. Gomm


Bremen, 23.08.2001

89



Betonblock

Dichtpackung+
Abdichtsystem

Abdichtung der
Prüfglocke

Prüfglocke

Normflansche

Dichtelement

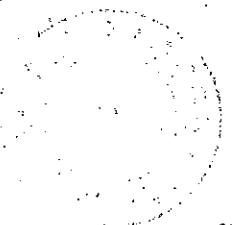
Helium
5 bar

Wasser

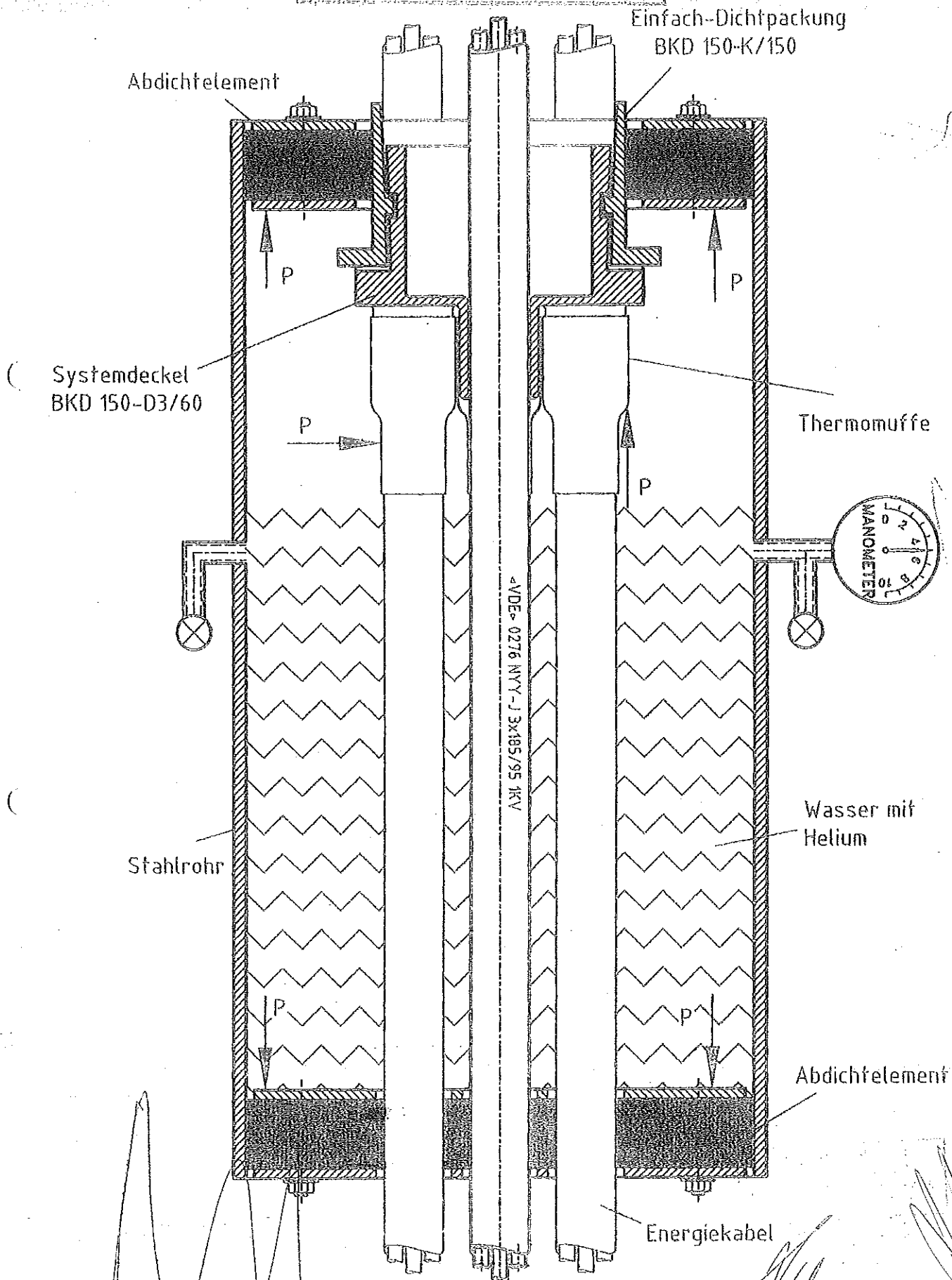
Wasser

Anlage Nr. 2 zu IFAM Prüfbericht
WP-PB 430/033 90 - 00.1

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Anlage Nr. zu IFAM Prüfbericht
WP-PB-17e/16/18 gc 001



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1 Aufgabenstellung

Messung der Dichtigkeit einer Kabeldurchführung der Fa. UGA des Typs BKD 150 gegenüber Helium

Prüfgegenstände: Kabeldurchführungssystem BKD 150

2 Prüfgegenstand

Zu prüfende Einzelteile des Systems: Einfach-Dichtpackung BKD 150-K/150
Systemdeckel BKD 150-D3/60

Prüfvorrichtung: s. Zeichnung Anlage 1

Versuchsdurchführung: Die Prüfvorrichtung wurde von einem Mitarbeiter des Auftraggebers für die Messung vorbereitet. Nach Beaufschlagung des Prüfdruckes von 5 bar mit Helium, wurde der Partikeldruck des Gases mit Hilfe eines Heliumdetektors Leybold UL 200 gemessen.

Prüfdatum: 25.06.2001

Prüfer: Michael Gomm

3 Messergebnisse

Ergebnistabelle:

Prüfung	Prüfmedium	Prüfdruck [bar]	gemessener Partikeldruck [mbar l/s]	Partikeldruck der Atmosphäre [mbar l/s]
1	Helium	5	≈ 4.8 E-6	≈ 4.8 E-6

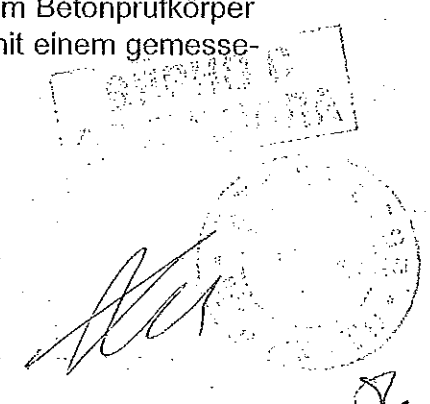
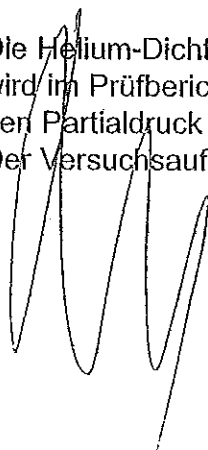
4 Prüfbericht

WP-PB-A301033Go-001

5 Bemerkungen

Die Helium-Dichtigkeit der Dichtpackung des (B)KD-Systems in einem Betonprüfkörper wird im Prüfbericht WP-PB-398012-007 der IFAM vom 28.01.1999 mit einem gemessenen Partikeldruck von 5.4E-6 mbar nachgewiesen.

Der Versuchsaufbau ist in Form einer Skizze in Anlage 2 dargestellt.





Fraunhofer Institut
Fertigungstechnik
Materialforschung

Messung der Dichtigkeit einer
Kabeldurchführung der Fa. UGA
des Typs BKD 150
gegenüber Helium

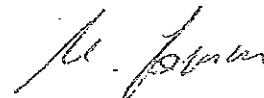
Kurzbericht WP-PB-A301033go-001 zum
Angebot Nr. A301033go
Auftragseingang: 25.06.2001

UGA SYSTEM-TECHNIK GmbH & Co.
Heidenheimer Straße 80-82
89542 Herbrechtingen

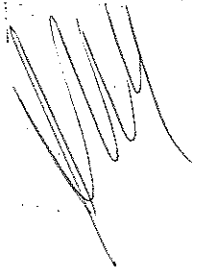
Fraunhofer-Institut Fertigungstechnik Materialforschung
Klebertechnik und Polymere
Wiener Straße 12, 28359 Bremen
Institutsleiter: Prof. Dr. O.-D. Hennemann

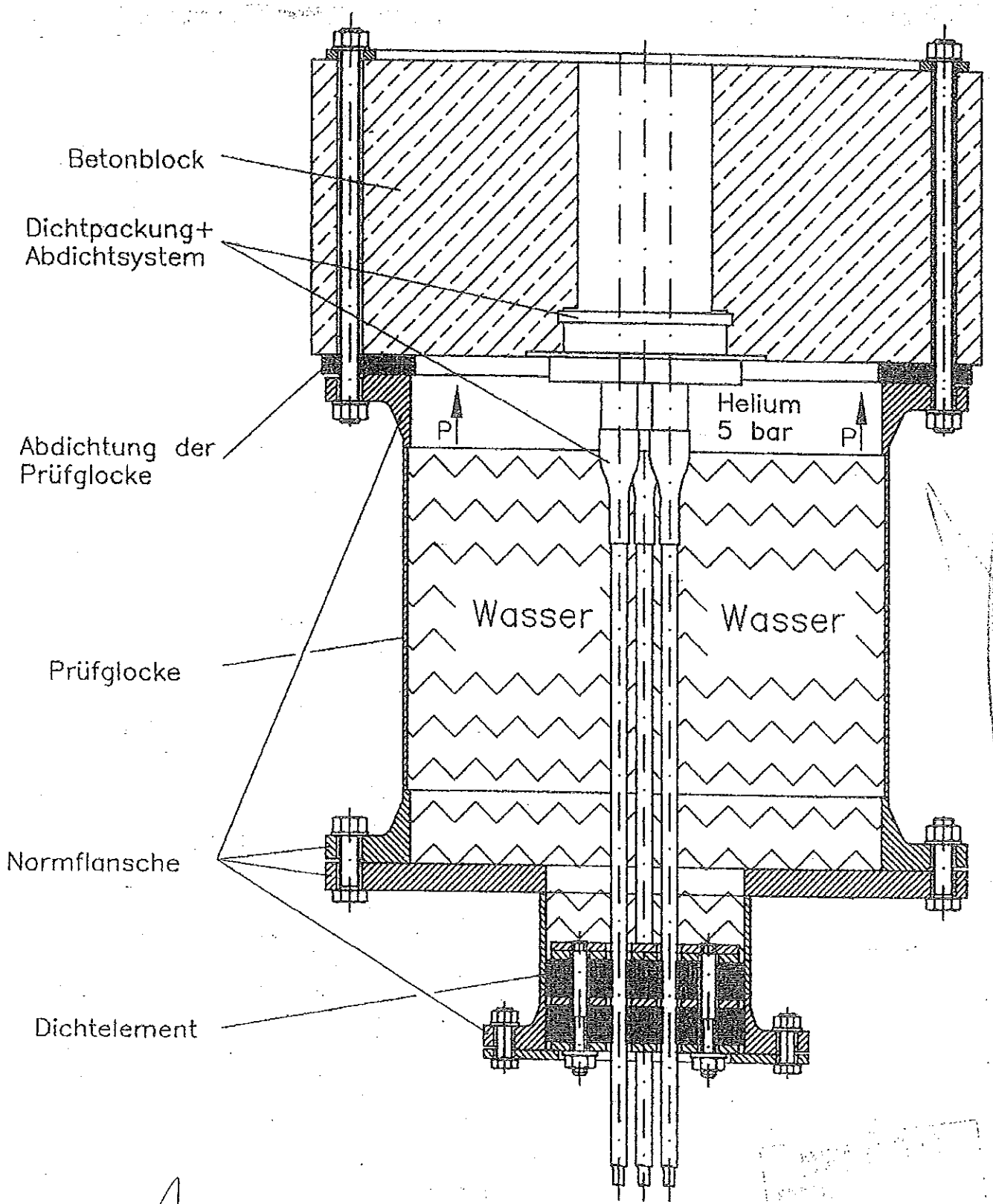

M. Brede

Bremen, 23.08.2001


M. Gomm







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298012 007 *[Handwritten signature]*

1 Aufgabenstellung

Gegenstand der Untersuchung war eine Kabeldurchführung des Typ KD 85 / BKD 90-D1/75, die von UGA SYSTEM-TECHNIK, Herbrechtingen (Auftraggeber AG) zur Prüfung beigelegt worden waren.

Ziel der Untersuchung war die Messung der Leckrate, die diese Kabeldurchführung bei Beaufschlagung mit Helium unter einem Druck von 5 bar erreicht.

2 Durchführung des Versuches

Der Versuchskörper wurde von Mitarbeitern des AG im Institut für die Messung in die entsprechende Versuchsvorrichtung (Anlage WP-PB-398012-007-1) eingebaut. Nach Beaufschlagung mit Helium unter einem Druck von 5 bar wurde der Partialdruck des Heliums mit Hilfe eines Heliumdetektors Leybold UL 200 gemessen.

Folgender Versuch mit einem Prüfkörper des Typs KD, bzw. BKD wurde durchgeführt:

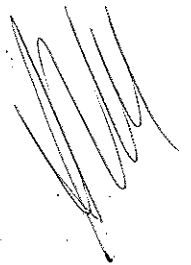
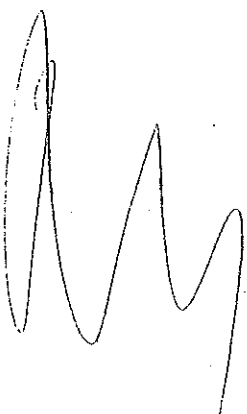
Prüfung	Prüfkörper	Anzahl	Sollprüfzeitraum [h]	Prüfmedium	Druck bei t_0 [bar]
	KD 85/BKD 90-D1/75	1	-	Helium	5

3 Ergebnis

Bei diesem Prüfkörper wurde ein Partialdruck von maximal $5.4E-6$ mbar gemessen. Der normale Partialdruck von Helium in der Luft beträgt $4.8E-6$ mbar.

Die Arbeiten werden unter Zugrundelegung der allgemeinen Geschäftsbedingungen der Fraunhofer-Gesellschaft durchgeführt.

Bremen, 28.01.99/Wu



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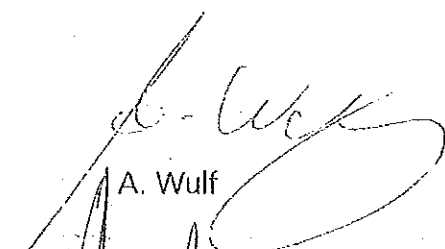
Fraunhofer Institut
Angewandte
Materialforschung

**Messung der Dichtigkeit
einer Kabeldurchführung des
Typs KD 85/BKD 90-D1/75
gegenüber Helium**

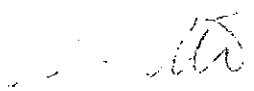
Kurzbericht WP-PB-398012-007 zum
Angebot Nr. 398012
Auftragseingang: 19.08.1998

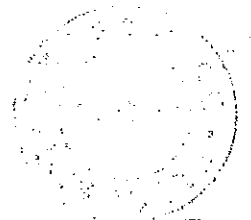
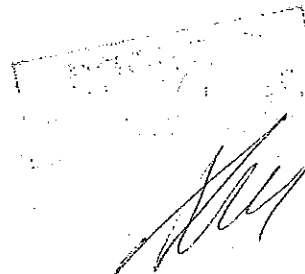
UGA SYSTEM-TECHNIK GmbH & Co. KG
Heidenheimer Str. 80-82
D-89542 Herbrechtingen

Fraunhofer-Institut für Angewandte Materialforschung
Bereich Klebtechnik und Polymere
Lesumer Heerstraße 36, D-28717 Bremen
Institutsleiter: Prof. Dr. rer. nat. O.-D. Hennemann


A. Wulf

Bremen, 28.01.1999


M. Clüver



52

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 10 IΔn or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms)		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 10 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 20 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of IΔn: 50 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A

TRF No. IEC60947_2C

400

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	A residual current is sudden appear on the MRCD of I _{Δn} : 100 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting I _{Δn} .(ms): Intern. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		N/A
	A residual current is sudden appear on the MRCD of I _{Δn} : 200 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting I _{Δn} .(ms): Intern. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		N/A
	A residual current is sudden appear on the MRCD of I _{Δn} : 500 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting I _{Δn} .(ms): Intern. setting I _{Δn} .(ms): Max. setting I _{Δn} .(ms):		N/A
M.8.3.4.5	Verification of the limiting non-operating time of time delayed type MRCDs (figure M3)		N/A
	A residual current is sudden appear on the MRCD of 2 I _{Δn} for a time declared by the manufacturer Required : The MRCD shall not operated		N/A
	Min. setting I _{Δn} . Min. setting time delay (ms): Min. setting I _{Δn} . Max. setting time delay (ms):		N/A
M.8.3.5	Tests at the temperature limits .		N/A
M.8.3.5.1	General (clause B.8.2.5 applies)		
	Minimum temperature (°C)		
	Maximum temperature (°C)		
M.8.3.5.2	Verification of operating in case of a sudden appearance of the residual current at -5°C or minimum temperature limit (figure M.2 and M3)		

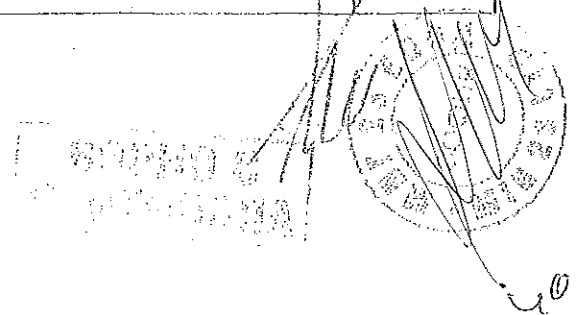
TRF No. IEC60947_2C



408

IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	A residual current is sudden appear on the MRCD of $I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting $I_{\Delta n}$ (ms): Interm. setting $I_{\Delta n}$ (ms): Max. setting $I_{\Delta n}$ (ms):		N/A
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting $I_{\Delta n}$ (ms): Interm. setting $I_{\Delta n}$ (ms): Max. setting $I_{\Delta n}$ (ms):		N/A
	A residual current is sudden appear on the MRCD of $\square 5 I_{\Delta n}$ or $\square 0,25 A$ Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting $I_{\Delta n}$ (ms): Interm. setting $I_{\Delta n}$ (ms): Max. setting $I_{\Delta n}$ (ms):		N/A
	A residual current is sudden appear on the MRCD of $\square 10 I_{\Delta n}$ or $\square 0,5 A$ Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting $I_{\Delta n}$ (ms): Interm. setting $I_{\Delta n}$ (ms): Max. setting $I_{\Delta n}$ (ms):		N/A
	Verification of the limiting non-operating time of time delayed type MRCDs at $-5^{\circ}C$ or minimum temperature limit (figure M3)		N/A
	A residual current is sudden appear on the MRCD of $2 I_{\Delta n}$ for a time declared by the manufacturer Required : The MRCD shall not operated		N/A
	Min. setting $I_{\Delta n}$. Min. setting time delay (ms): Min. setting $I_{\Delta n}$. Max. setting time delay (ms):		N/A
M.8.3.5.3	Verification of operating in case of a sudden appearance of the residual current at $+40^{\circ}C$ (figure M.2 and M3)		N/A

TRF No/IEC60947_2C



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Load :	_____ A	
	Torque :	_____ Nm	
	Connection :	_____ mm ²	
	A residual current is sudden appear on the MRCD of IΔn Required : no value exceeds the specified limiting value of Table B1: 300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn Required : no value exceeds the specified limiting value of Table B1: 150 ms) or Table B2 (200 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 5 IΔn or <input type="checkbox"/> 0,25 A Required : no value exceeds the specified limiting value of Table B1: 40ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of <input type="checkbox"/> 10 IΔn or <input type="checkbox"/> 0,5 A Required : no value exceeds the specified limiting value of Table B1 (40 ms) or Table B2 (150 ms) and a non actuating time of 60 ms		N/A
	Min. setting IΔn.(ms): Interm. setting IΔn.(ms): Max. setting IΔn.(ms):		N/A
	A residual current is sudden appear on the MRCD of 2 IΔn for a time declared by the manufacturer Required : The MRCD shall not operated		N/A

TRF No. IEC60947_2C

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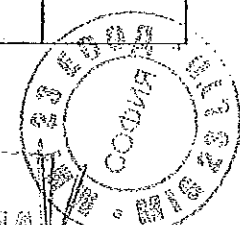
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Min. setting I Δ n, Min. setting time delay (ms); Min. setting I Δ n, Max. setting time delay (ms);		N/A
M.8.4.	Verification of dielectric properties		N/A
M.8.4.1	Verification of rated impulse withstand voltage		N/A
	rated impulse withstand voltage		
	test impulse voltage (see table 12 part 1)		
	test impulse voltage for isolating (see table 14 part 1)		
M.8.4.1.2	Verification of rated impulse withstand voltage with respect to the monitored circuit		N/A
M.8.4.1.2.1	Test for terminal type MRCD		N/A
M.8.4.1.2.2	Tests for MRCDs of through-conductor type		N/A
M.8.4.1.3	Verification of rated impulse withstand of the voltage source circuit (if applicable)		N/A
M.8.5	Verification of the operation of the test device at the limits of the rated voltage		N/A
	For MRCDs having an adjustable time-delay the test is made at the maximum setting of time-delay:	_____ s	
M.8.5.a	Setting I Δ n or minimum setting of I Δ n	_____ A	
	Test voltage (1,1 x U _e max)	_____ V	
	Number of operations	25	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	N/A
M.8.5.b	Setting I Δ n or minimum setting of I Δ n	_____ A	
	Test voltage 0,85 x U _e max)	_____ V	
	Number of operations	3	
	Interval time	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	N/A
M.8.5.c	Setting I Δ n or minimum setting of I Δ n	_____ A	
	Test voltage (1,1 x U _e max)	_____ V	
	Number of operations	1	
	Operating means of the test device held in close position	5 s	
	Tripping	<input type="checkbox"/> Yes / <input type="checkbox"/> No	N/A

TRF No. IEC60947_2C

IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
M.8.6	Verification of the limiting value of non-operating current under overcurrent conditions , in case of a single phase load.		N/A
M.8.6	Circuit diagram	Fig. M4 _____	
	Setting IΔn or minimum setting of IΔn if adjustable	_____ A	
	Test current equal to the lower value of: <input type="checkbox"/> 6 x In or <input type="checkbox"/> 80 % of the maximum short-circuit release current setting	_____ A	
	Test voltage: <input type="checkbox"/> rated voltage or <input type="checkbox"/> any convenient voltage	_____ V	
	Test frequency	_____ Hz	
	Power factor (0,5)	_____	
	Current flow time	2 s	
	Interval time	60 s	
	Calibration plot number	_____	
	No tripping / change of state		N/A
M.8.7	Resistance against unwanted tripping due to surge currents resulting from impulse voltages		N/A
M.8.7.2	Verification of the resistance to unwanted tripping in case of loading of the network capacitance		N/A
B.8.6.1	Current surge test for RMCDs (0,5 μs / 100kHz ring wave test)		
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 200 A + 10/0%		
	- virtual front time: 0,5 μs ± 30%		
	- period of the following oscillatory wave: 10 μs ± 20%		
	- each successive peak: about 60% of the preceding peak		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		

RF No. IEC60947_2C

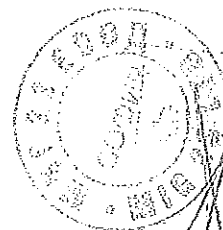
ВСТУПО С
ОПРЕДЕЛЕНА



409

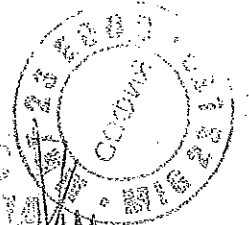
IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	During the test the MRCD shall not trip:	-	N/A
M.8.7.3	Verification of the resistance to unwanted tripping in case of flashover without follow-on current.		N/A
B.8.6.2	Verification of behaviour at surge current up to 250 A (8/20 μ s surge current test)		N/A
	One pole of the MRCD is submitted to 10 applications of a surge current according to the following requirements:		
	- peak value: 250 A \pm 10/0%		
	- virtual front time: 8 μ s \pm 20%		
	- virtual time to half value: 20 μ s \pm 20%		
	- peak of reverse current: less than 30% of peak value		
	The polarity shall be inverted after every two applications		
	The interval between two consecutive applications shall be about 30 s		
	During the test the MRCD shall not trip:		N/A
M.8.8	Verification of the behaviour in case of an earth fault current comprising a d.c. component.		N/A
M.8.8.2	Type A MRCD		N/A
	For MRCDs the operation of which depends on a voltage source the test are made at 1,1 and 0,85 times the rated voltage of the voltage source (U_s).		
M.8.8.2.2	Verification of operation in case of a continuous rise of a residual pulsating direct current		N/A
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n} > 0,01$ A with 1,4 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- steady increase from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} < 0,01$ A with 2 $I_{\Delta n}/30$ A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
M.8.8.2.3	Verification of operation in case of a suddenly appearing residual pulsating direct current		N/A

TRF No. IEC60947_2C



IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle = 0°)		N/A
	Rated voltage	_____ V	
	RCCB's with $I\Delta n > 0,015$ A:		
	- maximum break time (ms) at: $1,4 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $2,8 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $7 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $14 I\Delta n$ (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
	RCCB's with $I\Delta n = 0,015$ A:		N/A
	- maximum break time (ms) at: $2 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $4 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $10 I\Delta n$ (+/-) :		
	- maximum break time (ms) at: $20 I\Delta n$ (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
M.8.8.2.4	Verification of operation with load at reference temperature		N/A
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: $1,4 I\Delta n$ for $I\Delta n > 0,015$ A with $1,4 I\Delta n/30$ A/s (mA)	_____ mA	
	- steady increase from zero to: $2 I\Delta n$ for $I\Delta n < 0,015$ A with $2 I\Delta n/30$ A/s (mA)	_____ mA	
	- angle = 0 (+/-) :		
	- angle = 90 (+/-) :		
	- angle = 135 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
M.8.8.2.5	Verification of operation of a residual pulsating direct current superimposed by a smooth direct current of 6 mA.		N/A
	Rated voltage	_____ V	
B.8.7.2.1	- steady increase from zero to: $1,4 I\Delta n$ for $I\Delta n > 0,015$ A with $1,4 I\Delta n/30$ A/s (mA) + 6 mA	_____ mA	

TRF No. IEC60947_2C



SK

IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	-steady increase from zero to: 2 IΔn for IΔn < 0,015 A with 2 IΔn/30 A/s (mA) + 6 mA	_____ mA	
	- angle = 0 (+/-) :		
	No value exceeds the relevant specified limiting values		N/A
M.8.8.3	Type B MRCD		N/A
M.8.8.3.2	Verification of operation in case of a slowly rising residual smooth direct current		
	Rated voltage (1,1*Un)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)	_____ mA	
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		N/A
	Rated voltage (0,85*Un)	_____ V	
B.8.7.2.1	- steady Increase from zero to: 2 IΔn A with 1,4 IΔn/30 A/s (mA)		
	- angle = 90 (+/-) :		
	Operation shall occur between 0,5 and 2IΔn		N/A
M.8.8.3.3	Verification of operation in case of a suddenly appearing residual smooth direct current		N/A
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		
	Rated voltage (1,1*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		
	- maximum break time (ms) at: 4 IΔn (+/-) :		
	- maximum break time (ms) at: 10 IΔn (+/-) :		
	- maximum break time (ms) at: 20 IΔn (+/-) :		
	No value exceeds the relevant specified limiting value		N/A
B.8.7.2.2	Verification of the correct operation in case of suddenly appearing a smooth residual direct currents by closing S2		N/A
	Rated voltage (0,85*Un)	_____ V	
	RCCB's with IΔn > 0,015 A:		
	- maximum break time (ms) at: 2 IΔn (+/-) :		

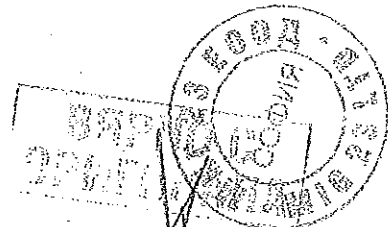
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
B.8.7.2.1	- steady increase from zero to: 2 I _{Δn} A with 1,4 I _{Δn} /30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)		
	Operation shall occur between 0,5 and 2I _{Δn}		N/A
M.8.8.3.6- M.8.8.3.4	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse connection		N/A
	Rated voltage (1,1*U _n)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 I _{Δn} A with 1,4 I _{Δn} /30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)		
	Operation shall occur between 0,5 and 2I _{Δn}		N/A
	Rated voltage (0,85*U _n)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 I _{Δn} A with 1,4 I _{Δn} /30 A/s (mA)	_____ mA	
	- angle = 90 (+/-)		
	Operation shall occur between 0,5 and 2I _{Δn}		N/A
M.8.8.3.6- M.8.8.3.5.	Verification of operation in case of a slowly rising residual current resulting from a fault in a circuit fed by two-pulse bridge connection line-to-line.		N/A
	Rated voltage (U _n)	_____ V	
B.8.7.2.1	- steady increase from zero to: 2 I _{Δn} A with 1,4 I _{Δn} /30 A/s (mA)	_____ mA	
	- angle = 0 (+/-)		
	Operation shall occur between 0,5 and 1,4I _{Δn}		N/A
			N/A
M.8.9.	Verification of the behaviour of MRCDs with separate sensing means in case of a failure of the sensing means connection		N/A
M.8.9.2	Test method 1		N/A
	Rated voltage of the sensing means		
	Interval time Required <5 sec		N/A
M.8.9.3	Test method 2		N/A
	Test shall be carried out as follows: - The test device is activated - The sensing means are disconnected and the test device is activated. The MRCD shall not operate		

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Clause	Requirement – Test	Result – Remark	Verdict
	Rated voltage of the sensing means		
	Test device activated MRCD shall operate		N/A
	Rated voltage of the sensing means		
	Sensing device disconnected and Test device activated MRCD shall not operate		N/A
M.8.10	Verification of temperature-rise of terminal type MRCDs		N/A
M.8.10.2	Tambient: _____°C		
8.3.2.5	Main circuits		
	Conventional thermal current I_{th}	_____ A	
	Conventional thermal current for enclosure I_{the}	_____ A	
	Conventional thermal current for the neutral pole	_____ A	
	Cabling characteristics		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Arrangement	<input type="checkbox"/> 3 phase - <input type="checkbox"/> poles on serie	
	Tightening torque	_____ Nm	
	Neutral pole (if applicable)		
	Cable	_____ mm ²	
	Bar / number / length	_____ mm / ___ / ___ m	
	Tightening torque	_____ Nm	
	Terminals(see table 2)		
	Manual operating means		
	Parts which need not be touched but not hand held		
	Parts which need not be touched during normal operation		
M.8.11	Verification of mechanical and electrical endurance		N/A
	500 off-load operations controlled by the test device		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Result:	after _____ operations,	N/A

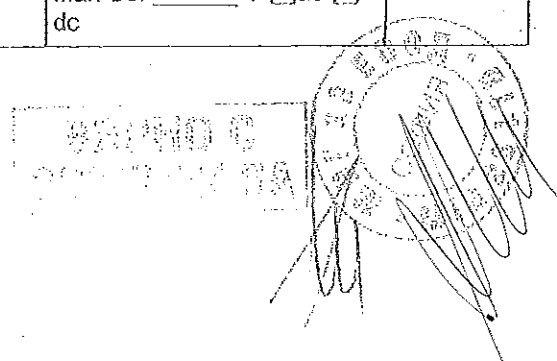
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	500 off load operations by passing the rated residual operating current $I_{\Delta n}$ through one current path		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Rated residual current	_____ mA	
	Result:	after _____ operations,	N/A
	500 on-load operations controlled by the test device		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	_____ A	
	Power factor	_____	
	Test circuit		
	Result:	after _____ operations,	N/A
	500 on-load operations by passing the rated residual operating current $I_{\Delta n}$ through one current path.		
	Rated voltage:	_____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Test current	_____ A	
	Power factor	_____	
	Test circuit		
	Rated residual current	_____ mA	
	Result:	after _____ operations,	N/A
	Show no damage		N/A
	High voltage test: twice rated voltage	Test voltage: _____ V	N/A
	A residual current is sudden appear on the MRCD of $I_{\Delta n}$ (_____ mA) Required : no value exceeds the specified limiting value of Table B1 (300 ms) or Table B2 (500 ms) and a non actuating time of 60 ms		N/A
M.8.12.	Verification of the behaviour of MRCDs in case of failure of the voltage source for MRCDs classified under M.3.2.2.1		N/A
M.8.12.2	Determination of the limiting value of the voltage source		N/A
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	

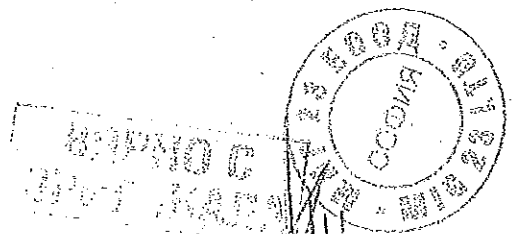
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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period of voltage decreasing	30 s or a period enough with respect to delayed opening	
	Min voltage to automatic opening ($U > 0,85 \times U_s$)		
	A residual current is sudden appear on the MRCD of $I_{\Delta n}$ (_____ mA) at a value just above highest measured value Required : no value exceeds the specified limiting value of Table B1: 300 ms		N/A
	It's not possible to switch "ON" by manual operating means at a lower value than the lower measured value.		N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		N/A
	Source voltage (U_s)	Max U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		
	No value exceeds the relevant specified limiting value		N/A

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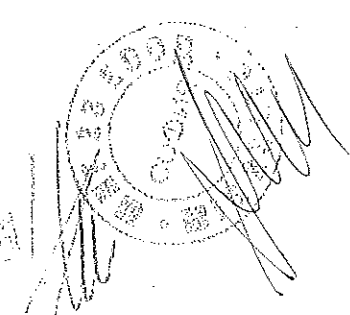


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IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

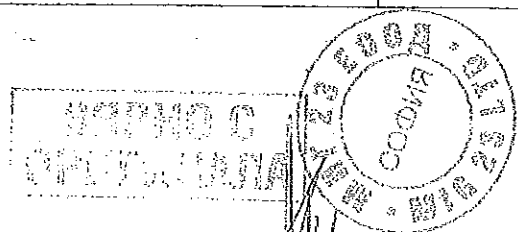
M.8.13	Verification of the behaviour of MRCDs with voltage source as classified under M.3.2.2.2 in case of failure of the voltage source.		N/A
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Switch off and reclosed Sa or S1 and reduced the source voltage to 70 %	70% Us = _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	N/A
	Time period to automatic opening		N/A
MII	Test sequence MII		N/A
M.8.14	Verification of the behaviour of the MRCD under short-circuit conditions		N/A
	Type designation or serial number		
	Sample no:		
M.8.14.3	Verification of the rated conditional short-circuit current (I_{cc})		N/A
	Verification of the coordination between the MRCD and the SCPD		
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O-t-O		

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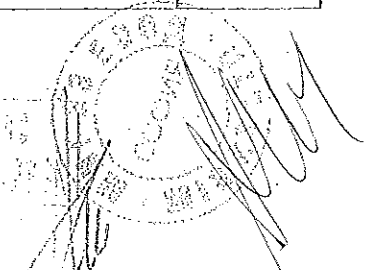
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	I^2t (kA ² s); I_p (kA)	First O: I_p : _____ kA I^2t : _____ kA ² s Plot no. _____	
		Second O: I_p : _____ kA I^2t : _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U_n for 1 min:		
	Test voltage		N/A
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 $I_{\Delta n}$ (ms) in minimum setting:	I test: _____ mA trip time: _____ ms	N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		N/A
	Source voltage (U_s)	Max U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		N/A
	No value exceeds the relevant specified limiting value		N/A
	The polyethylene sheet shows no holes		N/A
			N/A
M.8.14.4	Verification of rated short-time withstand current (I_{cw})		N/A

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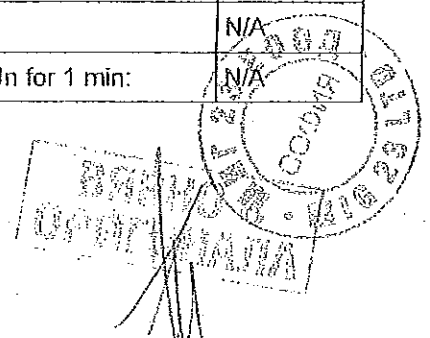
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O		
	I^2t (kA ² s); I_p (kA) :	I_p : _____ kA I^2t : _____ kA ² s Test duration: _____ ms Plot no. _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U_n for 1 min:		N/A
	Test voltage		N/A
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 $I_{\Delta n}$ (ms) in minimum setting:	I test: _____ mA trip time: _____ ms	N/A
			N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		N/A
	Source voltage (U_s)	Max U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min U_s : _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	

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IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Time period to automatic opening		N/A
	No value exceeds the relevant specified limiting value		N/A
	The polyethylene sheet shows no holes		N/A
			N/A
M.8.14.5	Verification of the rated conditional residual short-circuit current (I _{Δc})		N/A
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Silver wire diameter (mm) . :		
	Used SCPD during the tests		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio <i>n</i> :		
	Power factor / ratio <i>n</i> obtained :		
	Plot no.		
	Test sequence: O-t-O		
	I ² t (kA ² s); I _p (kA) :	First O: I _p : _____ kA I ² t; _____ kA ² s Plot no. _____	
		Second O: I _p : _____ kA I ² t; _____ kA ² s Plot no.: _____	
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 U _n for 1 min:		N/A

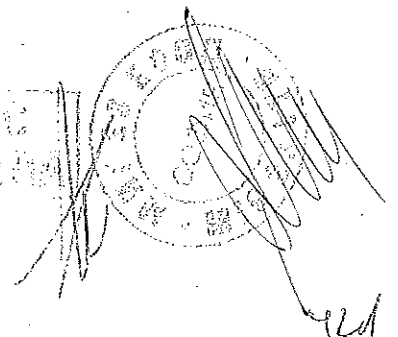
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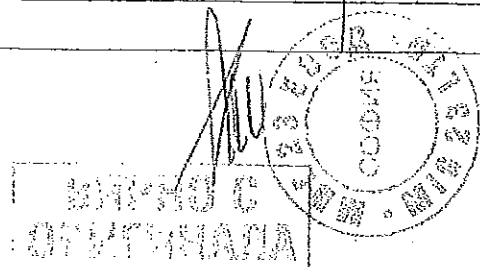
IEC 60 947-2			
Clause	Requirement -- Test	Result -- Remark	Verdict
	Test voltage	-	N/A
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 I _{Δn} (ms) in minimum setting :	1 test: _____ mA trip time: _____ ms	N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		N/A
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	
	Time period to automatic opening		N/A
	No value exceeds the relevant specified limiting value		N/A
	The polyethylene sheet shows no holes		N/A
			N/A
M.8.14.6	Verification of rated residual short-time withstand current (I _{Δw})		N/A
	Test circuit according to figure :		
	Point of test circuit which is directly earthed :		
	Grid distance "a" (mm) :		
	Prospective current (A) :		
	Prospective current obtained (A) :		
	Power factor / ratio n :		
	Power factor / ratio n obtained :		
	Plot no.		
	Test sequence: O		
	I _p ² (kA ² s); I _p (kA) :	I _p : _____ kA I _p ² : _____ kA ² s Test duration: _____ ms Plot no. _____	

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Clause	Requirement – Test	Result – Remark	Verdict
	If tested at separate testing station see report	No.: _____ of _____ testing station	
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
8.3.3.5	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		N/A
	Test voltage	-	N/A
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	N/A
			N/A
M.8.12.3	Verification of automatic opening in case of voltage source failure		N/A
	Source voltage (Us)	Max Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
		Min Us: _____ V <input type="checkbox"/> ac <input type="checkbox"/> dc	
	Adjustable residual current setting	_____ mA (lowest)	
	Adjustable time-delay setting	_____ s	
	Time period	Max 1 s or max. 1 s+time delay setting	N/A
	Time period to automatic opening		N/A
	No value exceeds the relevant specified limiting value		N/A
	The polyethylene sheet shows no holes		N/A
M.III	Test sequence MIII		N/A
M.8.15	Verification of effects of environmental conditions		N/A
	Type designation or serial number		
	Sample no:		
B.8.10.3.2	The RCCB shall trip with a test current of 1,25 IΔn (ms) in minimum setting :	I test: _____ mA trip time: _____ ms	N/A
			N/A
M.IV	Test sequence MIV		N/A
M.8.16	Verification of electromagnetic compatibility		

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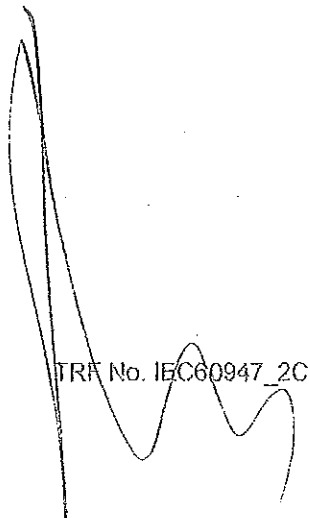
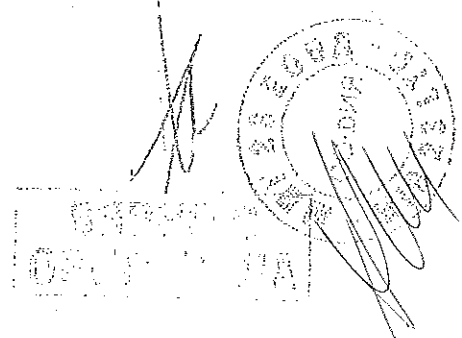
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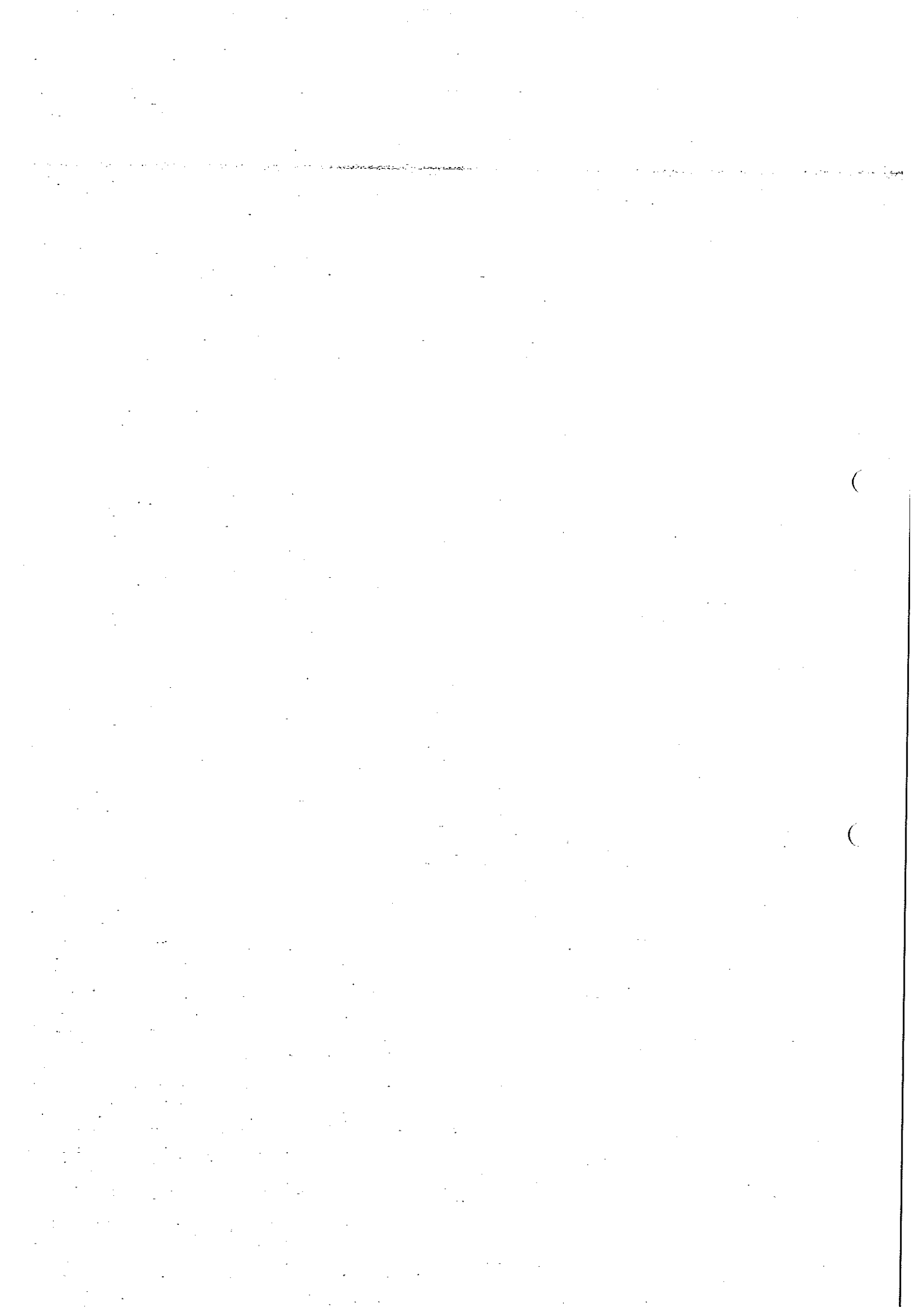
IEC 60 947-2			
Clause	Requirement – Test	Result – Remark	Verdict

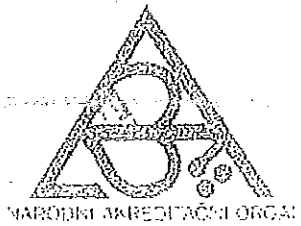
TABLE: Heating Test			
Test voltage (V).....		20 V	
Ambient (°C)		40°C	
Thermocouple Locations	max. temperature measured, (°C)	max. temperature limit, (°C)	
Terminals for external connections	97	110	
Manual operating means non-metalic	51	65	
Parts intended to be touched non-metalic	61	80	
Parts which no need be touched for normal operation non-metalic	78	90	

TABLE: dielectric strength		
test voltage applied between:	test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals main circuit	1890 V	no
Between each pole of the main circuit and the other poles and to the mounting plate	1890 V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the main circuit	1890 V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the other circuit	1890 V	no
Between each control and auxiliary circuit not normally connected to the main circuit and the mounting plate	1890 V	no
For equipment suitable for isolation, across the poles of the main circuit	1890 V	no
supplementary information:		

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Český institut pro akreditaci,
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110 00 Praha 1 - Nové Město, Opletalova 41

vydává

OSVĚDČENÍ O AKREDITACI

č. 587 / 2008

pro

zkušební laboratoř č. 1056

Elektrotechnický zkušební ústav, s.p.
(IČ 00001481)
Zkušební laboratoř
Pod Lisem 129, 171 02 Praha 8 - Troja

Předmět akreditace:

Zkoušení výrobků, dílů, součástí, materiálů a pomůcek v rozsahu uvedeném v příloze tohoto osvědčení.

Jménem akreditované zkušební laboratoře jedná Ing. František Nekola a za správnost protokolů odpovídají Ing. František Nekola, Ing. Jiří Vlach, Jan Hlavatý, Jan Tůma, Petr Ungerman, Ing. Miroslav Vondra, RNDr. Drahotomíra Vančurová, Ing. Josef Meřter a Stanislav Šeda.

Toto osvědčení o akreditaci vydal Český institut pro akreditaci, o.p.s. na základě posouzení splnění akreditace dle ustanovení

ČSN EN ISO/IEC 17025:2005

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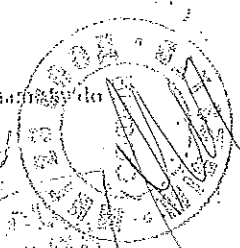
Toto osvědčení platí do: 31.10.2012

a v plném rozsahu nabytí ze osvědčení o akreditaci vydané ČIA č. 634/2007 ze dne 01.11.2007

V Praze dne: 18.12.2008

Ing. Jiří Růžička, MBA
ředitel
Českého institutu pro akreditaci, o.p.s.

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Лого: Пас-MRA

Лого: Национален орган за акредитация

ЧЕШКИ ИНСТИТУТ ЗА АКРЕДИТАЦИЯ
Сдружение с общественопозелна дейност
110 00 Прага 1 -- Нове Место, Оплеталова 41

издава

на
изпитвателна лаборатория № 1056
Електротехнически изпитвателен институт, държ.предпр.
(Ид.№ 00001481)
Изпитвателна лаборатория
Под Лисем 129, 171 02 Прага 8 -- Троя

СЕРТИФИКАТ ЗА АКРЕДИТАЦИЯ

№ 587/2008

Предмет на акредитация:

Изпитване на изделия, детайли, части, материали и пособия в границите, определени в приложението на настоящия сертификат.

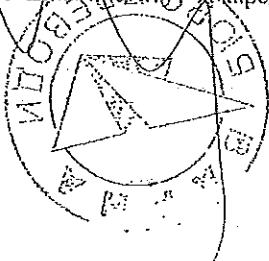
От името на акредитираната изпитвателна лаборатория действа инж.Франтишек Некола, а за верността на протоколите отговарят инж.Франтишек Некола, инж.Ирки Влак, Ян Хлавати, Ян Тума, Петър Унгрман, инж.Мирослав Вондра, д-р пр.н.Драгомира Ванчурова, инж.Йозеф Меттер и Станислав Шеда.

Настоящият сертификат за акредитация се издава от Чешкия институт за акредитация СОД, след разглеждане изпълнението на критериите за акредитация съгласно:

CSN EN ISO/IEC 17025:2005

и след като се установи, че изпитвателната лаборатория е годна компетентно, обективно и независимо да извършва дейностите, посочени в предмета на акредитация.

Адресатът на настоящия сертификат има право да използва в своята дейност в границите на настоящия сертификат и през срока на неговото действие, освен своето название, и обозначението „акредитирана изпитвателна лаборатория № 1056“, ако спазва всички съответстващи предписания, отнасящи се до дейността на акредитираната изпитвателна лаборатория, включително предписанията, издадени от Чешкия институт за акредитация, СОД.



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БЮРО ПРЕВОДИ

052 612 909
052 604 769
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Ако се докаже, че адресатът на настоящия сертификат не изпълнява критериите за акредитация, редицата за неговото изплаване, и задълженията, обуславящи акредитацията, Чешкият институт за акредитация СОД може да преустанови действието на настоящия сертификат или да отмени или промени сертификата за акредитация.

Настоящият сертификат е в сила до: 31.10.2012 г.

и в пълна степен заменя сертификата за акредитация, издаден от СТА № 631/2007 от 01.11.2007 г.

Прага, 18.12.2008 г.

Инж. Иржи Ружичка, директор на Чешкия институт за акредитация СОД:

Подпис: (не се чете)

Правна информация:

Адресатът има възможност да подаде писмени възражения срещу настоящия сертификат, във връзка с предмета на акредитация, до 10 дни от получаването му. Възраженията нямат отменителен ефект.

Аз, долуподписаната Юлиана Руменова Василева удостоверявам верността на извършения от мен превод от чешки език на български език на приложения документ: Сертификат за акредитация № 587/2008 от 18.12.2008 г. Преводът се състои от две страници.

Преводач:

Юлиана Руменова Василева, ЕГН: 7107161111

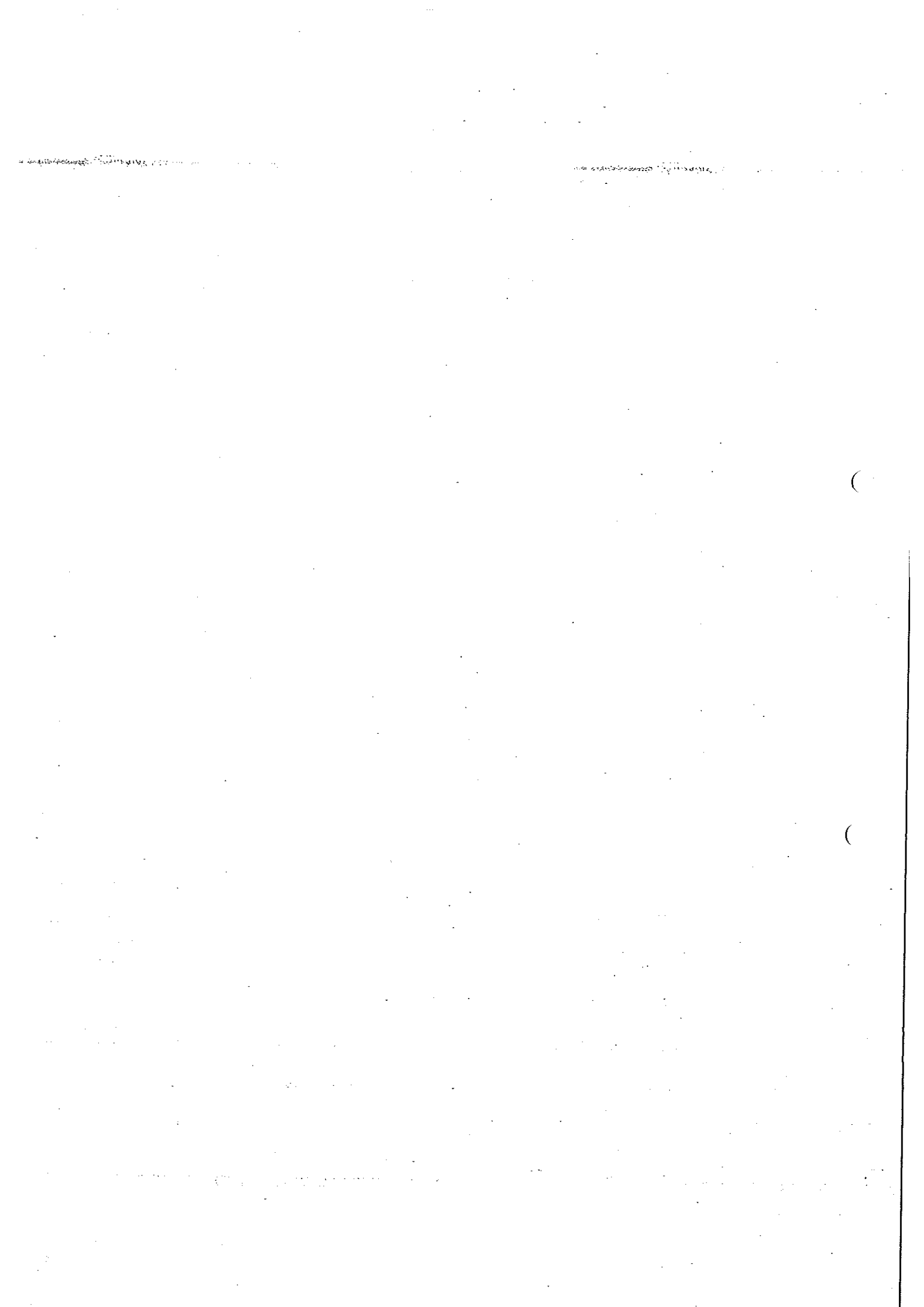
Юлиана Руменова Василева

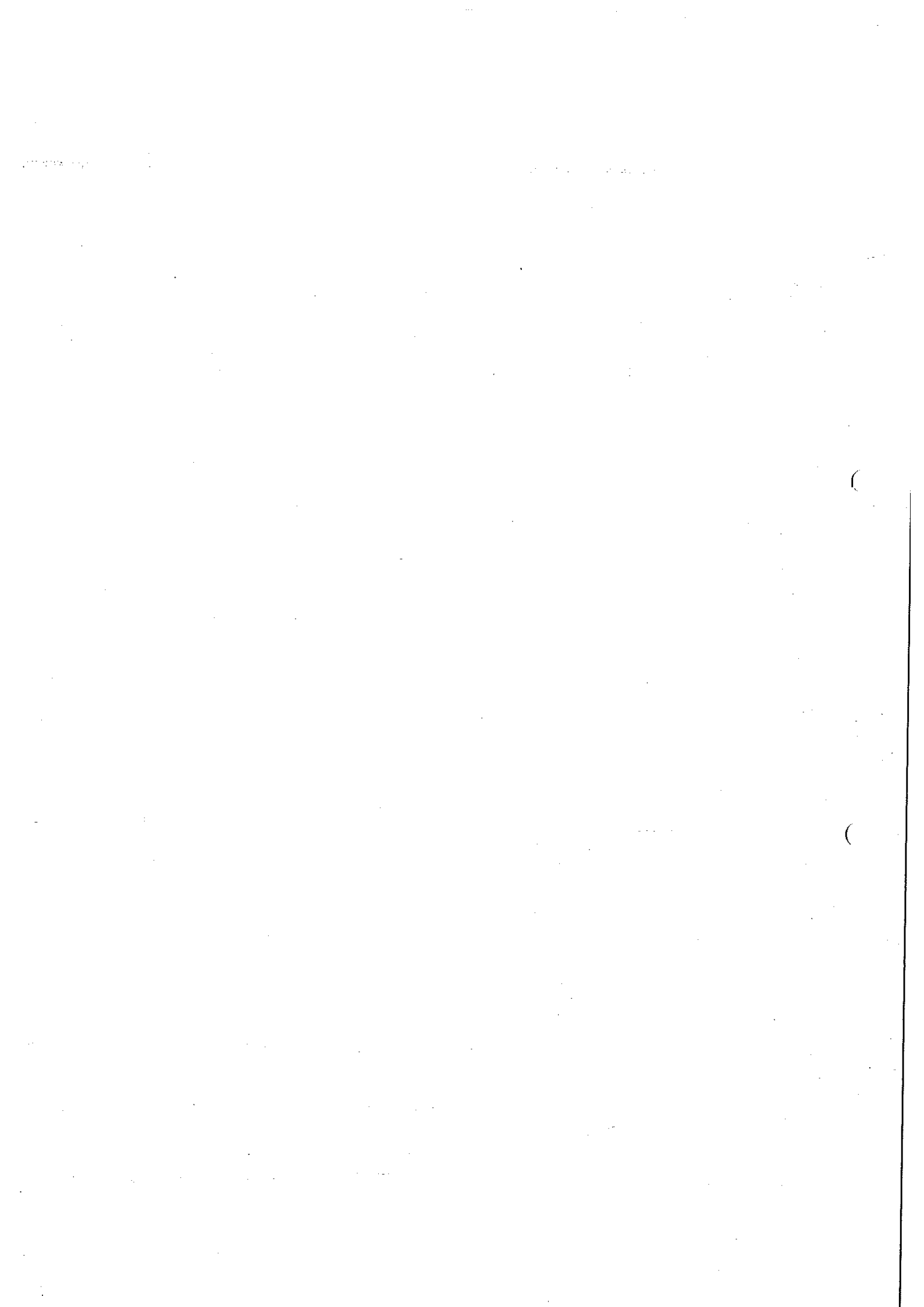


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ИНСТРУКЦИИ ЗА ТРАНСПОРТ, СКЛАДИРАНЕ, МОНТИРАНЕ, ПОДДЪРЖАНЕ И ЕКСПЛУАТАЦИЯ

МЕХАНИЧНО НАТОВАРВАНЕ НА КЛЕМОВИТЕ СЪЕДИНЕНИЯ:

Транспортиране и складиране:

Автоматичните прекъсвачи лят корпус трябва да се транспортират в заводската си опаковка, добре застопорени, за избягване на наранявания на корпуса, механични повреди и в следствие отклонения от характеристиките и създаване на нежелани условия за нарушаване безопасността на електрическата верига и работа.

Прекъсвачите трябва да се съхраняват в сухи помещения и нормална температура.

1. Инсталиране и обслужване.

1.1. Инсталиране

1.1.1. Проверете маркировката за да се убедите, че е в съответствие с нормалните работни условия.

1.1.2. Превключете ръчно няколко пъти автоматичния прекъсвач за да няма задържане. Проверете го и се убедете, че няма видими повреди по него и тогава го инсталирайте.

1.1.3. Фиксирайте автоматичния прекъсвач на монтажната шина и натиснете застопоряващия механизъм нагоре. По този начин той няма да може да се освободи от монтажната шина. Натиснете надолу застопоряващия механизъм за да извадите автоматичния прекъсвач.

1.1.4. Схемата е включена и символа „ON“ ще се покаже, когато ръкохватката е в затворено положение. Схемата е изключена и символа „OFF“ ще се покаже, когато ръкохватката е в отворено положение.

1.1.5. Входящата линия се свързва в горната страна на автоматичния прекъсвач, а изходящата линия се свързва в долната страна на прекъсвача. Не разменяйте страните на свързване. Напречното сечение на медните проводници е дадено в таблица 3. Поставете проводниците в отворите за свързване, след това завийте винта. Проводниците не би трябвало да са хлабави и да не се местят. Не оставяйте оголени проводници извън терминала за връзка.

1.1.6. Автоматичният прекъсвач би трябвало да се превключи няколко пъти преди да се свърже към схемата. Механизмът трябва да бъде подвижен, заслужаващ доверие и без задържане.

1.2. Обслужване

1.2.1. Проверете автоматичния прекъсвач по разписанието по време на неговата работа. Според експлоатационния режим определете контролния период.

1.2.2. След прекъсване на ток на претоварване или ток на късо съединение, би трябвало първо да се отстрани дефекта преди да се включи прекъсвача, иначе това може да въздейства злополучно на издръжливостта на прекъсвача.

1.2.3. Не трябва да има вода и продукта не трябва да се поврежда по време на работа, когато е на склад или при транспортиране.

2. Предупреждения за безопасност.

2.1. Не тествайте функцията на продукта, като свързвате проводник под напрежение непосредствено към земята или към нулата, иначе това ще въздейства на личната безопасност.

2.2. Завийте винта до края така, че проводниците да не са хлабави и да не се местят, когато ги свързвате към автоматичния прекъсвач. Не оставяйте

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оголени проводници извън отворите на връзката.

3. Често срещани неизправности повреди и начини за отстраняване то им.

Често срещаните неизправности и начините за отстраняването им са показани в таблица 5.

Таблица 5

Неизправност	Причина	Метод за отстраняване	Забележка
Прекъсвача не може да затвори	Късо съединение в защитаваната верига.	Елиминирайте късото съединение	
	Дефект в механизма	Заменете продукта.	
	Номиналният ток на прекъсвача не съответства на тока на товара.	Променете спецификацията на продукта.	
Загриване в горната част.	Винта не притиска плътно проводника или е хлабав.	Стегнете винта!	
	Напречното сечение на проводника е малко.	Променете спецификацията на проводника.	
Прекъсвача не може да изключи при условие на късо съединение.	Прекъсвача е в несъответствие с работните условия на товара.	Променете спецификацията на продукта	
Прекъсвача не осъществява верига.	Оголения проводник е твърде къс.	Оголете проводника отново	
	Винта не притиска плътно проводника или е хлабав.	Стегнете винта!	

Механично натоварване на клемовите съединения:

За автоматични прекъсвачи лят корпус 100А:

Макс. напречно сечение на проводник (mm²):

120 mm², Готови проводници (кабели с обувка)

диаметър на резба (мм): 8мм

въртящ момент (Nm): 6Nm

5 пъти по 2 отделни единици затягане: Готови проводници (кабели с обувка)

За автоматични прекъсвачи лят корпус 250А:

Макс. напречно сечение на проводник (mm²):

120 mm², Готови проводници (кабели с обувка)

диаметър на резба (мм): 8мм

въртящ момент (Nm): 6Nm

5 пъти по 2 отделни единици затягане: Готови проводници (кабели с обувка)

За автоматични прекъсвачи лят корпус 630А:

Макс. напречно сечение на проводник (mm²):

2 x 240 mm², Готови проводници (кабели с обувка)

диаметър на резба (мм): 10мм на клемова връзка към кабел,

6 мм на клемова връзка към прекъсвач

въртящ момент (Nm): 10Nm на клемова връзка към кабел,

3Nm на клемова връзка към прекъсвач;

5 пъти по 2 отделни единици затягане: Готови проводници (кабели с обувка)

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ИНСТАЛАЦИЯ, РАБОТА И РЕМОНТ НА АВТОМАТИЧНИ ПРЕКЪСВАЧИ ЛЯТ КОРПУС

Инсталация и работа

За безопасността на лицето и електрическо оборудване, трябва да се спазват следните инструкции, преди да пуснете в експлоатация автоматичните прекъсвачи лят корпус:

- Моля, прочетете тази инструкция за експлоатация внимателно преди инсталиране на автоматични прекъсвачи.
- Автоматичните прекъсвачи лят корпус трябва да се използват при нормални условия на експлоатация.
- Проверете възможностите на прекъсвач за точното му приложени, преди инсталацията.
- Измерете изолационното съпротивление с помощта на 500V мегом метра преди инсталацията. Измерената стойност не трябва да бъде по-ниска от 10M при стайна температура 20 ± 5 , и относителна влажност 50% до 70%. В противен случай, прекъсвачът трябва да се изсуши, и не може да се използва, докато не подобри съпротивление на изолацията съгласно изискванията.
- Инсталацията на прекъсвач в избрана позиция е възможно, без влияние върху неговата ефективност. Но определеното разстояние отгоре, отдолу, отстрани и отпред, както и от другите прекъсвачи следва да бъде спазено за безопасна работа.
- Прекъсвача може да се монтира на неподвижна опора или плоча-база със стандартни винтове.
- Трябва да се внимава да не попаднат чужди проводими предмети в прекъсвача, когато го инсталирате.
- Кабелите, използвани за свързване на прекъсвач трябва да бъде гладки, ненаранени и да не са пречупени при инсталацията на прекъсвача за предотвратяване на повреди на прекъсвач и отклонения от неговите стандартни характеристики.
- След като инсталирате прекъсвача, следните оперативни тестове се провеждат преди да се пусне веригата. Тя не може да бъде пусната в експлоатация докато всички условия не са коректни и точни:
 - 1) Проверете внимателно дали няма да има чужди частици в трифазовите проводници и кабели. Премахнете, ако има такива. Прекъсвачът трябва да се пази в чиста състояние.
 - 2) Ако прекъсвачът е оборудван с електрически аксесоари или електрически работен механизъм, трябва да се свърже с допълнителна верига с тях в съответствие с диаграмата в техническия каталог, а след това проверка на съответствието на номинално работно напрежение от напрежение освобождаване, шунт и мотор със захранващото напрежение.
 - 3) Проверка на текущите настройки на защитите от претоварване и късо съединение.
 - 4) След всички проверки и инспекции, допълнителната верига може да бъде пусната. Само в този случай, прекъсвачът може да бъде затворен, след като защитата е затворен.
 - 5) Ръчен тест на работа на прекъсвача: Ръчно включване и ръчно изключване няколко пъти. Прекъсвачът трябва да се държи нормално.
 - 6) Електрически тест на работа на прекъсвача: включване от електрически работен механизъм, а след това изключване от него няколко пъти Прекъсвачът трябва да се държи нормално

ВЯРНО С
ОРИГИНАЛА



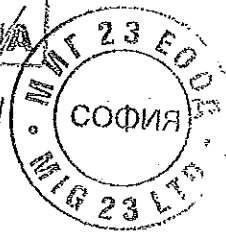
Поддръжка

- По време на работа, прекъсвачът се проверява периодично в съответствие с посочените по-горе процедури.
- Почистете всяко прекомерно натрупване на прах, за да бъде изолацията на прекъсвач в добро състояние.
- Проверка на условията за експлоатация на прекъсвача след всяко кратко прекъсване на прекъсвача, сменете нов, ако не е в състояние да бъде използван.

Ремонт

Проблеми могат да възникнат по време на инсталация, настройка или експлоатация на прекъсвача. Решаването на проблемите се извършва от квалифицирани лица или можете да се свържете с офис на дистрибутора, където инженери ще ви помогнат и ще предоставят допълнителни услуги.

ВЯРНО С
ОРИГИНАЛА



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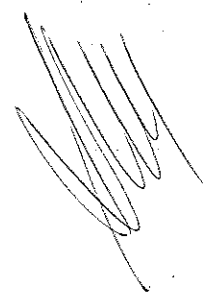
Наименование на материала:

Вертикален предпазител-разединител
НН 400 А, с триполюсно управление

Номер на техническа спецификация на
стандарт – 20 1608301 ZZ към

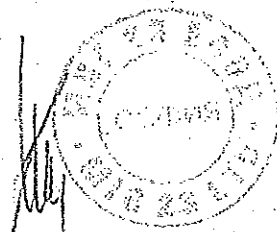
МТТ20/100, Д – отпред и отстрани

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№ по ред	Документ	Приложение № или текст
1.	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	ARS 2 АПАТОР Полша Приложение 1
2.	Техническо описание и чертежи с нанесени на тях размери	Приложение 1
3.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 2
4.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 3 – заверено копие	Приложение 3
5.	ЕО декларация за съответствие	Приложение 4
6.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на този стандарт за материал, вкл. на параграфи „Характеристика на материала“ и „Съответствие на предложеното изпълнение с нормативно-техническите документи“ по-горе	Приложение 5
7.	Инструкции за транспортиране, складиране, монтиране, поддържане и експлоатация	Приложение 6
8.	Описание на потенциалната заплаха за увеличаване опасността и рисковете от замърсяване на околната среда и класификация на отпадъците съгласно Наредба №3/2004 г. за класификация на отпадъците, издадена от министъра на околната среда и водите и министъра на здравеопазването, обн. ДВ, бр. 44 от 25.05.2004 г.	Приложение 7
9.	Декларация за възможността за рециклиране на използваните материали или за начина на ликвидацията им	Приложение 8





CERTYFIKAT CERTIFICATE

Przyznany organizacji:
Issued for:

APATOR S.A.

**ul. Gdańska nr 4a lok. C4
87-100 Toruń**

Biuro Certyfikacji Systemów Zarządzania Polskiego Rejestru Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, zaświadcza, że Zintegrowany System Zarządzania obejmujący System Zarządzania Jakością, System Zarządzania Środowiskowego oraz System Zarządzania Bezpieczeństwem i Higieną Pracy wyżej wymienionej organizacji został oceniony i stwierdzono jego zgodność z wymaganiami:

Management Systems Certification Bureau of Polski Rejestr Statków S.A., al. gen. Józefa Hallera 126, 80-416 Gdańsk, certifies that the Integrated Management System including the Quality Management System, Environmental Management System and Occupational Health and Safety Management System of the above organization has been assessed and found to be in accordance with the requirements of:

**ISO 9001:2008
ISO 14001:2004
PN-N-18001:2004**

Zakres certyfikacji:

**PROJEKTOWANIE I PRODUKCJA APARATURY I SYSTEMÓW POMIAROWYCH
I APARATURY ŁĄCZENIOWEJ**

Scope of certification:

**DESIGN AND MANUFACTURING OF METERING EQUIPMENT AND SYSTEMS
AND SWITCHGEAR**

Pierwsze wydanie Certyfikatu:
Certificate first issue:

07.02.1996

Certyfikat jest ważny do:
The Certificate is valid until:

18.06.2016

Nr Certyfikatu: **NC-0007**
Certificate No.:



Dariusz Rudziński

Dariusz Rudziński

Jacek Papiński

Jacek Papiński

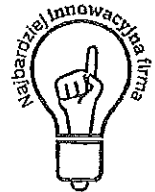
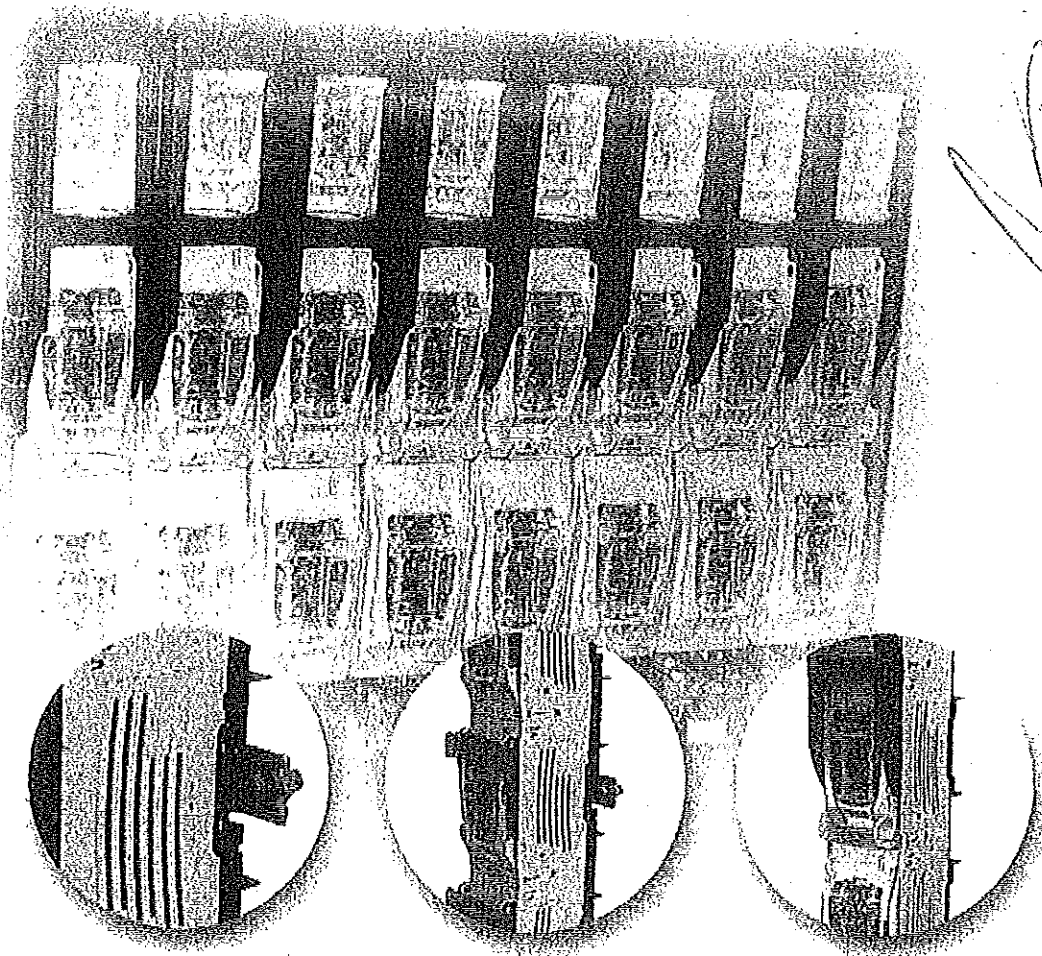
Gdańsk, 19.06.2013

**AC 014
QMS, EMS,
BHP**

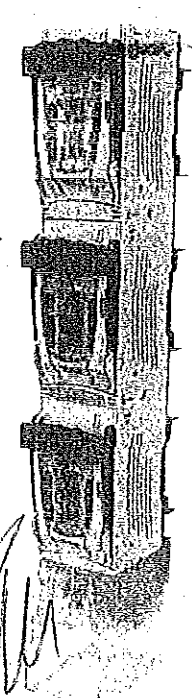
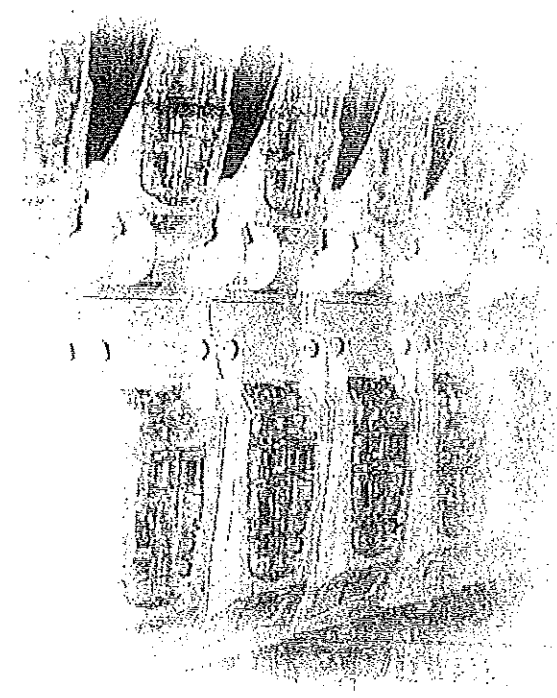
Porozumienie IAF MLA dotyczy QMS i EMS
The Arrangement IAF MLA refers to QMS and EMS



APATOR



Вертикални предпазител-разединители ARS Основи за предпазители PBS



НОВО!

438

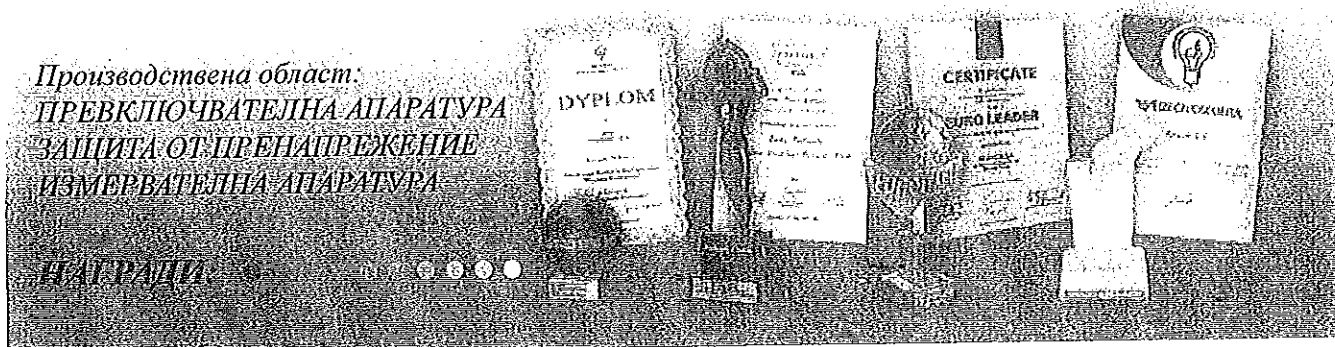
ПРЕДСТАВЯНЕ НА ГРУПА АПАТОР

ГРУПА АПАТОР е лидер в Централно-източна Европа в областта на измервателната и превключвателната апаратура

Производствена област:
ПРЕВКЛЮЧВАТЕЛНА АПАРАТУРА
ЗАЩИТА ОТ ПРЕНАПРЕЖЕНИЕ
ИЗМЕРВАТЕЛНА АПАРАТУРА

НАУРАДИ

СЕРВИС



ОБЩА ИНФОРМАЦИЯ:

Основите за предпазители тип PBS и вертикалните предпазител-разединители ARS се използват за разединяване на електрически съоръжения и обезопасяване от влиянието на къси съединения и претоварвания в трифазните вериги за променлив ток. Предназначени са за директен монтаж на хоризонтални или вертикални системи шини като трифазни вертикални апарати, което в сравнение с класическите основи за предпазители позволява голяма икономия на място в разпределителните уредби. Във всички типове апарати има възможност да се монтира охранващия кабел и отгоре. Конструкцията им осигурява голяма видимост, безопасно прекъсване на веригата след изваждане на предпазителната вложка. Предпазител-разединителите ARS имат категория на експлоатация - AC21B, AC22B, AC23B. Допълнително предимство е лекотата на монтиране на заземителните устройства. Предпазител-разединителите ARS позволяват да се изпълняват следните функции:

- обезопасяване;
- разединяване;
- заземяване;
- включване;
- защита от допир.

СТАНДАРТИ И ПРЕДПИСАНИЯ:

IEC 947-3, EN 60947-3, PN-93/E-06150/30

IEC 947-1, EN 60947-1, PN-90/E-06150/10

IEC 60269-2-1, PN-91/E-06160/21

IEC 60269-1, PN-91/E-06160/10

VDE 0660; BBJ CERTIFICATE за знак за безопасност „B”

“CE” декларация за съответствие с Европейска директива 73/23/EED



ОСНОВИ ЗА ПРЕДПАЗИТЕЛИ „PBS”

КОНСТРУКЦИЯ:

Основите за предпазители се предлагат в следните големина: 00 – 160А; 1 – 250А; 2 – 400А; 3 – 630А. Ширината на основите за предпазители PBS 1 – 250А, 2 – 400А и 3 – 400А е 100 mm. Основите за предпазители PBS са предназначени за монтаж на шини на разстояния 185 mm. Апаратите с големина „00” са с широчина 50 mm и се произвеждат в две изпълнения:

- основи PBS 00 – (160А) за монтаж на шини с разстояния между тях 185 mm
- основи PBS 00/100 mm – (160А) за монтаж на шини с разстояния между тях 100 mm.

Основата за предпазители (част от PBS стокони вериги) се произвежда от самогасящ се полиестер усилен със стъклено влакно. Сребърното галванично покритие на контактите на основите PBS осигурява ниски загуби.

Кабелните клеми в основите PBS осигуряват директно свързване, както на изолирани жила от кабелите, така и на кабелни жила със запресовани кабелни крайници. Основите с големина от 1 до 3 могат да бъдат оборудвани с капази за предпазителите, което им осигурява степен на защита IP20. Допълнително предлаганите аксесоари позволяват да се монтират различни големина PBS на обща система от шини и облекчават експлоатацията.

Съществуват също така и специални изпълнения:

- PBS 2/400А и 3/630А с възможност за директно свързване на два кабела с диаметър 240 mm² на всяка клема

Всички основи PBS са доставят комплектовани с кабелни клеми (например винтови, мостови или тип V) и капази за свързващите клеми.

Основа за предпазители PBS 690V~

Таблица 1. Технически характеристики

ОЗНАЧЕНИЕ НА PBS	Големина на основата РМЕС	Номинален термичен ток I_{th}	Номинално напрежение U_n	Номинално изолационно напрежение U_i	Номинално напрежение на изпитване	Номинална честота	Номинална разсеяна мощност	Ток ограничен, на който издържа предпазителите	Механична износостойчивост	Тегло	Степен на защита	Големина на влажките на предпазителите РМЕС
		A	V~	V	kV	Hz	W	KA	бр. цикли	kg	IP	
PBS 00/100mm	00	160	690	1000	3	40-60	12	100	1600	0,75	00	00
PBS 00 SM	00	160	690	1000	3	40-60	12	100	1600	2,00	00	00
PBS 1	1	250	690	1000	3	40-60	32	100	1600	4,00	20*	1
PBS 2	2	400	690	1000	3	40-60	45	100	1000	4,50	20*	2
PBS 3	3	630	690	1000	3	40-60	60	100	1000	5,00	20*	3

*с капак на предпазителите

УСЛОВИЯ НА РАБОТА

- инсталиране в помещения несъдържащи прах, разяждащи и взривоопасни газове;
- околна температура от -25°C до +55°C - в случай на използване на основите при температура от +41°C до +45°C трябва да се намали стойността на тока I_{th}

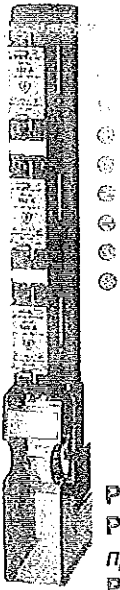
- с 5%, а температурния интервал от +46°C до +55°C стойността на тока I_{th} трябва да се намали с 10%;
- до височина над 2000 метра над морското равнище;
- вън от помещенията – в табла със степен на защита \geq IP 34.

Основа за предпазители PBS 00/100 mm 160A 690 V ~ разстояния между шините 100 mm
НОВО!

Таблица 2. Означение на PBS 00 съгласно вида на клемите

Означение на апарата	Клема	Снимка на клемата	Сечение на кабелните жила	Момент на затягане
PBS 00/100 mm	S – мостова (2xM5)		4 - 70 mm ²	6 Nm
	M- винтова M8		Кабелен накрайник до 185mm ²	20 Nm
	V-секторна (2xM5)		1,5 - 95 mm ²	6 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 20 mm.



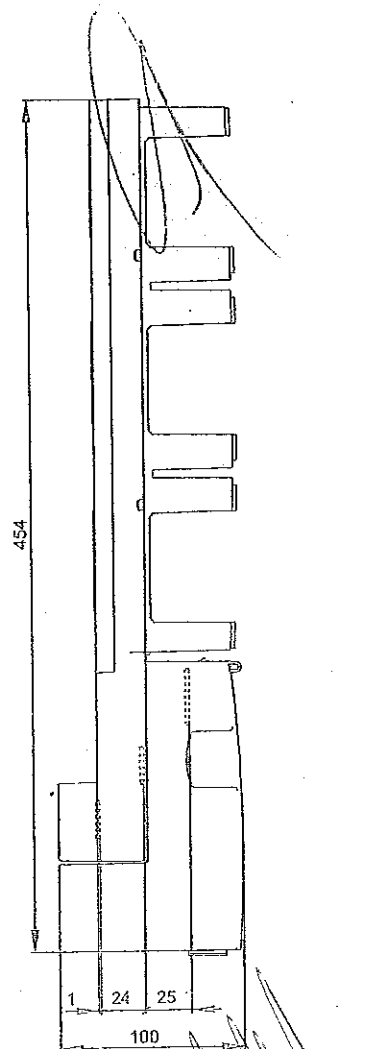
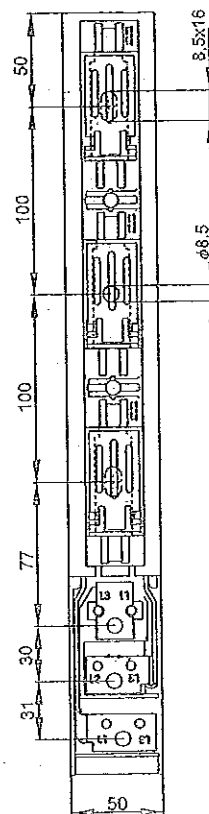
PBS 00/100mm

PBS 00/100mm-W – означение на основи оборудвани със светлинна сигнализация за изгаряне на предпазителя

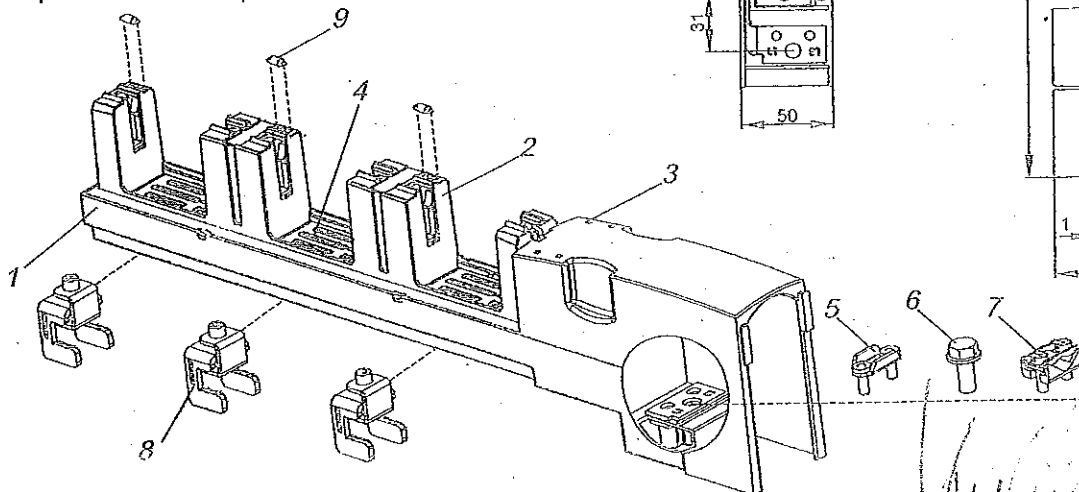
PBS 00/100mm-V

Таблица 3. Основа PBS 00 / 160 A 690 V ~

Изпълнение	Означение	Артикул №
PBS 00-160 A разстояния между шините 100 mm, клемни S – мостови (4-70 mm ²) + M-винтови (M8)	PBS 00/100mm	63-811627-011
PBS 00-160 A разстояния между шините 100 mm, клемни S – мостови (4-70 mm ²) + M-винтови (M8) + сигнализация за предпазителя вложки	PBS 00/100mm-W	63-811627-021
PBS 00-160 A разстояния между шините 100 mm, клемни V-секторни (1,5-95 mm ²)	PBS 00/100mm-V	63-811627-031



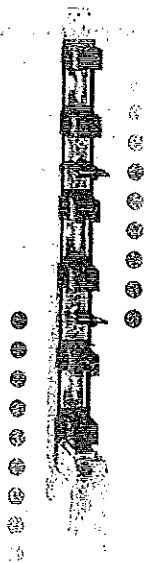
1. Основа
2. Капак на контактите
3. Капак на клемите
4. Защитни плочки
5. Клема мост 00-S
6. Клема винтова 00-M
7. Клема на секторен проводник 00-SV
8. Клема кука
9. Сигнализиращ елемент за стопяването на предпазителя (PBS 00/100 mm-W)



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Основа за предпазители PBS 00-SM 160A 690 V~ разстояния между шините 185 mm



PBS 00-SM
PBS 00-V

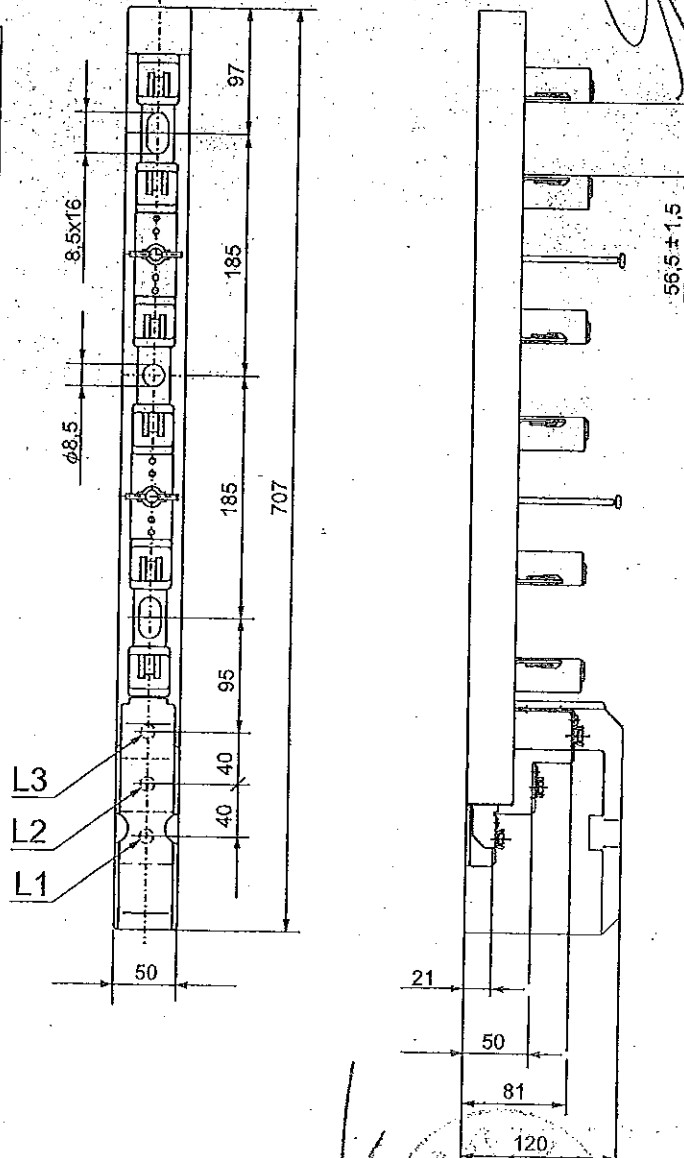
Таблица 4. Означение на PBS 00 съгласно вида на клемите

Означение на апарата	Клема	Снимка на клемата	Сечение на кабелните жила	Момент на затягане
PBS 00-SM	S – мостова (2xM5)		4 - 70 mm ²	6 Nm
	M – винтова M8		Кабелен накрайник до 185 mm ²	20 Nm
PBS 00-V	V-секторна (2xM5)		1,5 - 95 mm ²	6 Nm

Към изходящите могат да се свържат шини с максимална ширина 25 mm.

Таблица 5. Основа PBS 00 / 160 A 690 V~

Изпълнение	Означение	Артикул №
PBS 00-160 A с клемни тип S (4-70 mm ²) и винтове M8 за кабелни накрайници	PBS 00-SM	63-811411-011
PBS 00-160 A с клемни тип V (1,5-95 mm ²)	PBS 00-V	63-811411-021



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Таблица 6. Общи аксесоари за PBS 00 и PBS 00/100 mm



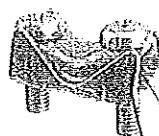
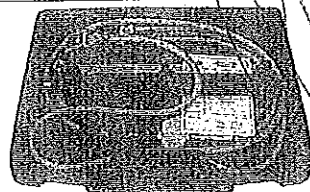
Обозначение/ № на артикула	Описание	Снимка
00 – M	Винтова клема – винт М8 за свързване на проводници с кабелен накрайник (компл. - 3 бр.)	
1361400006T	Капак за резервното място на шините за разстояние 185 mm, шир. 50 mm, дълж. 562 mm, деб. 3 mm	
1361400001T	Изоляционен щифт за монтиране на капака с ширина 50 mm М8 (компл. - 2 бр.)	
00 – S	Клема мостова завита към апарата посредством 2 винта М5 за свързване на почистените от изолацията жила със сечение от 4 mm ² до 70 mm ² . (компл. - 3 бр.)	
1115281034T	Клема за секторен проводник + подложка „V“ завита към апарата посредством 2 винта М5 за свързване на почистените от изолацията жила на секторния кабел с диаметър 1,5 mm ² до 70 mm ² . При еднородни жила до 95 mm ² (компл. - 3 бр.)	
U.U. 00+3	Заземител универсален за големини: 00, 1, 2, 3	

Таблица 7. Аксесоари за PBS 00/100 mm


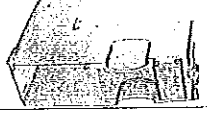
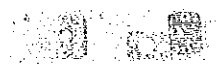



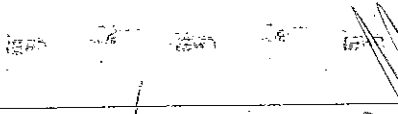

51-823166-011	Капак на кабелните клеми	
51-930282-011	Капак изравнителен долен	
1115281030T	Единичен адаптор 100/185 mm (за един брой PBS 00/100) позволяващ монтаж на апарата върху шини с разстояние 185 mm.	
1115281029T	Двоен адаптор 100/185 mm (за два броя PBS 00/100) позволяващ монтаж на апаратите върху шини с разстояние 185 mm и перфорация на отворите в шините на 100 mm	
53-945361-011	Притискаща клема тип кука позволяваща монтаж на PBS 00/100 върху неперфорирани шини (компл. - 3 бр.).	

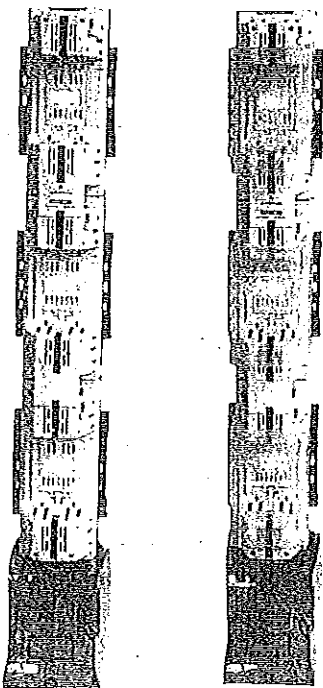
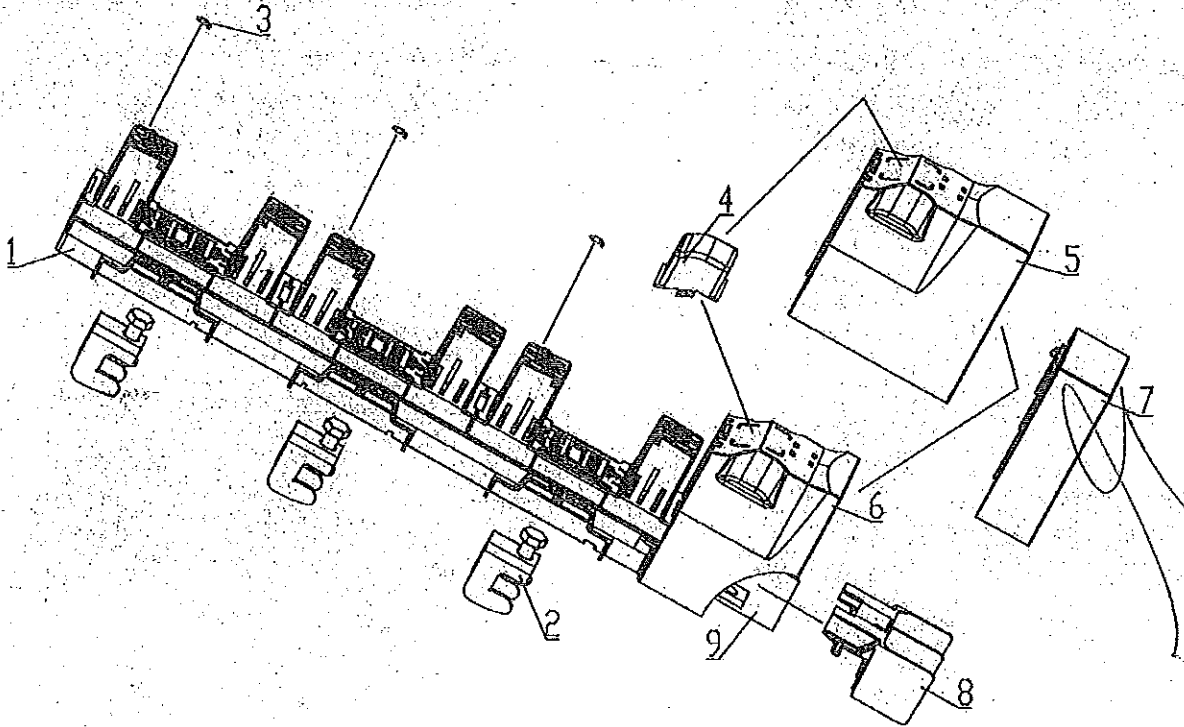
Таблица 8. Аксесоари за PBS 00

51-945116-011 (№ се отнася за 1 бр.)	Единичен адаптор дистанционен 185/185 mm (за един брой PBS 00/185) позволяващ изравняването към предната линия на таблото PBS 1, 2, 3 (компл. - 3 бр.)	
51-945158-011 (№ се отнася за 1 бр.)	Двоен адаптор дистанционен 185/185 mm (за два броя PBS 00/185) позволяващ изравняването към предната линия на таблото PBS 1, 2, 3 при разстояние на отворите в шините на всеки 100 mm. (компл. - 3 бр.)	
51-837437-011	Капак на кабелните клеми	

Основа за предпазители

PBS 1 250A 690 V~
 PBS 2 400A 690 V~
 PBS 3 630A 690 V~


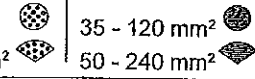
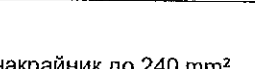

- 1. Основа
- 2. Клема кука
- 3. Сигнализиращ елемент за стопяването на предпазителите
- 4. Капак на клемата 2 x 240 V
- 5. Капак на клемите
- 6. Капак на клемите
- 7. Изравняващ капак
- 8. Капак на захранването
- 9. Преграда



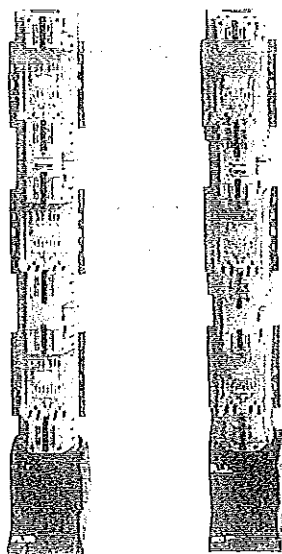
PBS 2-V

PBS 2-V-O

Таблица 9. Означение на PBS 1, 2 съгласно вида на клемите

Означение на апарата	Клема	Чертеж на клемата	Сечение на кабелните жила	Момент на затягане
PBS 1-V (250 A) PBS 2-V (400 A)	V – клема 50-240 SW		V-клемата за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ²  50 - 185 mm ² 	30 Nm
PBS 1-M (250 A) PBS 2-M (400 A)	M - винтова M10		Кабелен накрайник до 240 mm ²	32 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 40 mm.



PBS 2-V

PBS 2-V-O

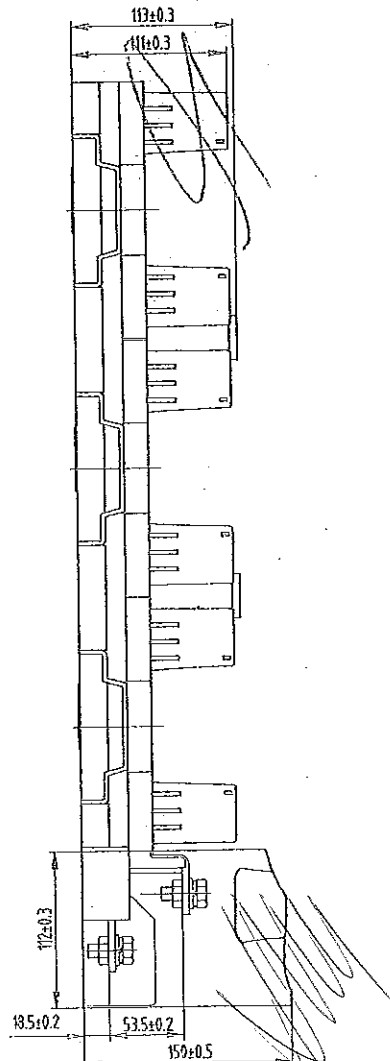
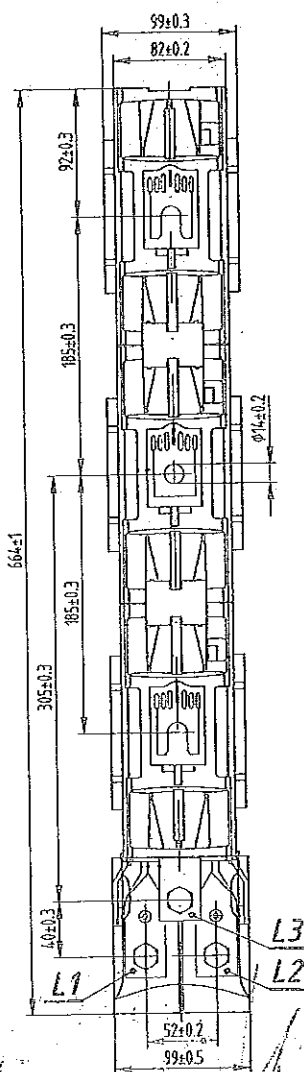
Таблица 10. Означение на PBS 3 съгласно вида на притискащите клемми

Означение на апарата	Клема	Чертеж	Сечение на кабелните жила	Момент на затягане
PBS 3-V (630 A)	V - клема 50 - 240 SW		V-клема за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ² 50 - 185 mm ² 35 - 120 mm ² 50 - 240 mm ²	30 Nm
PBS 3-M (630 A)	M - клема M12		Кабелен накрайник до 240 mm ²	56 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 40 mm.

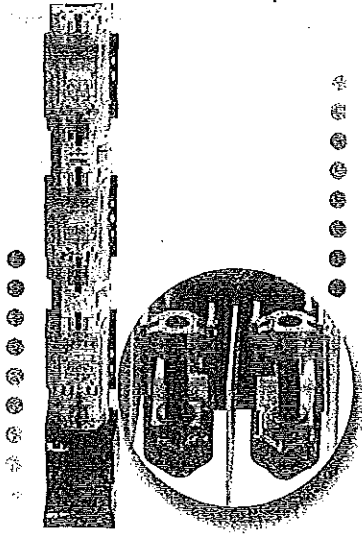
Таблица 11. Основа PBS 1 / 250A PBS 2 / 400 A и PBS 3 / 630A 690 V~

Изпълнение	Означение	Артикул №
PBS 1-250 A с клемми тип V (V клема 35-240 mm ²)	PBS 1-V	63-811639-071
PBS 1-250 A с клемми тип M (винт M10)	PBS 1-M	63-811639-081
PBS 1-250 A с клемми тип V (V клема 35-240 mm ²) с капаци на предпазителите	PBS 1-V-O	конфигурация
PBS 1-250 A с клемми тип M (винт M10) с капаци на предпазителите	PBS 1-M-O	конфигурация
PBS 2-400 A с клемми тип V (V клема 35-240 mm ²)	PBS 2-V	63-811639-011
PBS 2-400 A с клемми тип M (винт M10)	PBS 2-M	63-811639-031
PBS 2-400 A с клемми тип V (V клема 35-240 mm ²) с капаци на предпазителите	PBS 2-V-O	конфигурация
PBS 2-400 A с клемми тип M (винт M10) с капаци на предпазителите	PBS 2-M-O	конфигурация
PBS 3-630 A с клемми тип V (V клема 35-240 mm ²)	PBS 3-V	63-811639-021
PBS 3-630 A с клемми тип M (винт M12)	PBS 3-M	63-811639-041
PBS 3-630 A с клемми тип V (V клема 35-240 mm ²) с капаци на предпазителите	PBS 3-V-O	конфигурация



Основа за предпазители PBS с V клемма 2 x 240 mm² / 1 полюс

(възможност за монтиране на 2 жила със сечение 240 mm² във всяка клемма)



PBS 3-2V-O

Таблица 12. Означения на PBS 2 x 240 mm² съгласно вида на клемите

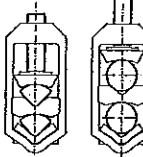




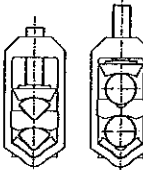




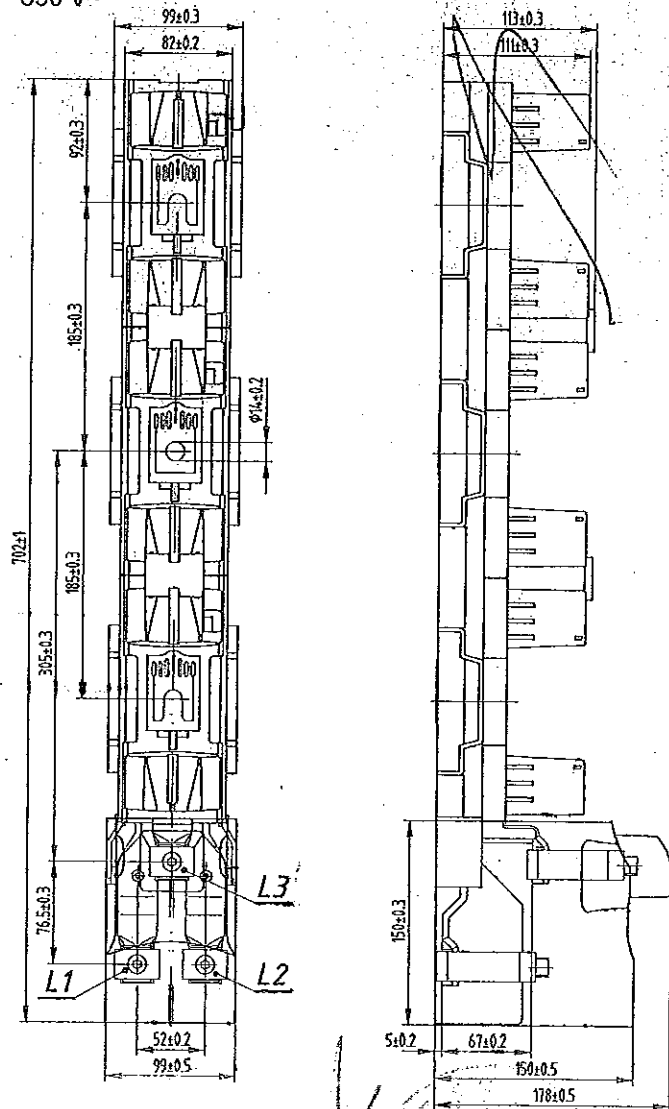
Означение на апарата	Клема	Чертеж на клемата	Сечение на кабелните жила	Момент на затягане
PBS 2-2V (400 A)	V-клемма № 2V0240 2150 - 240SW		Два проводника 35-240 mm ² V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 120 mm ²  35 - 150 mm ²  50 - 185 mm ²  50 - 240 mm ² 	30 Nm
PBS 3-2V (630 A)	V-клемма № 2V0240 2150 - 240SW		V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 120 mm ²  35 - 150 mm ²  50 - 185 mm ²  50 - 240 mm ² 	30 Nm

Таблица 13. Основа PBS 2 / 400 A и PBS 3 / 630 A

Изпълнение	Означение	Артикул №
PBS 2-400 A с двойни клемми тип V (V клемма 2x50-240 mm ²)	PBS 2-2V	63-811639-051
PBS 2-400 A с двойни клемми тип V (V клемма 2x50-240 mm ²) с капаци на предпазителите	PBS 2-2V-O	конфигурация
PBS 3-630 A с двойни клемми тип V (V клемма 2x50-240 mm ²)	PBS 3-2V	63-811639-061
PBS 3-630 A с двойни клемми тип V (V клемма 2x50-240 mm ²) с капаци на предпазителите	PBS 3-2V-O	конфигурация



690 V~



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Основа за предпазители PBS със странично отвеждане на изводите
(разделяне, съединяване на шините)

Таблица 14. Означение на PBS тип „соединител“

Означение на апарата	Клема	Чертеж на клемата	Извод	Момент на затягане
PBS 2-NL (400 A)	M -- винтова M12		Лява страна	32 Nm
PBS 2-NR (400 A)	M -- винтова M12		Дясна страна	32 Nm
PBS 3-NL (630 A)	M -- винтова M12		Лява страна	56 Nm
PBS 3-NR (630 A)	M -- винтова M12		Дясна страна	56 Nm

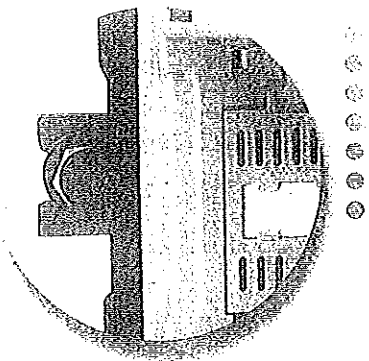
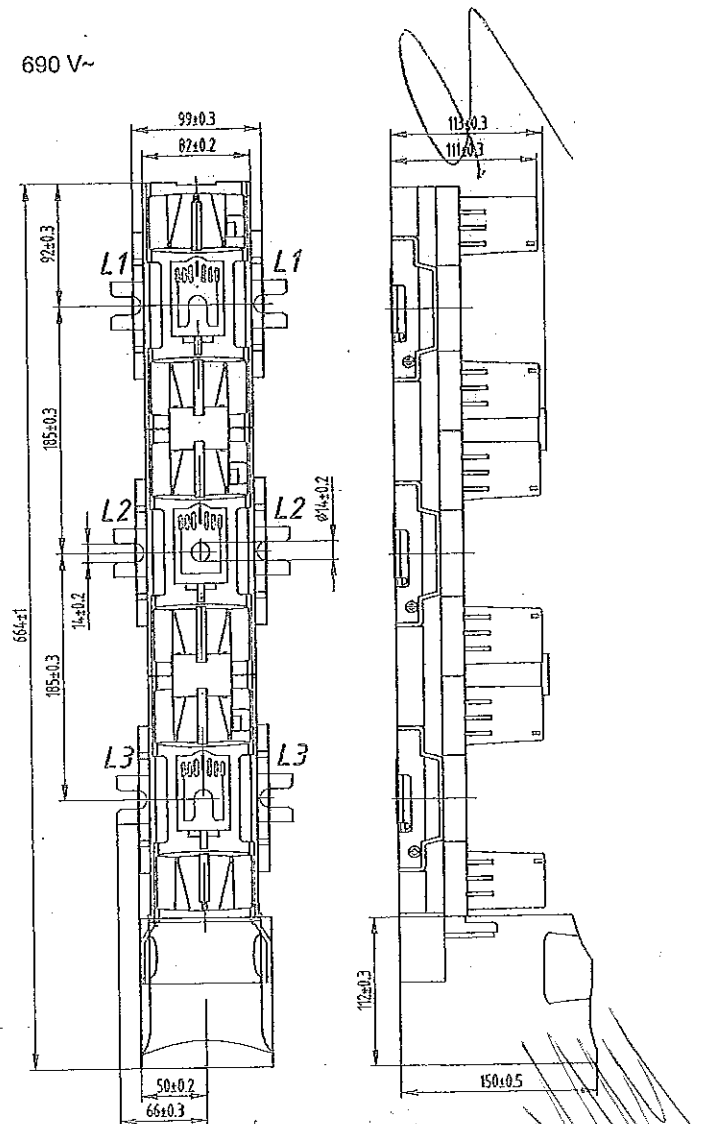


Таблица 15. Основа PBS 1 / 250A PBS 2 / 400 A и PBS 3 / 630A





















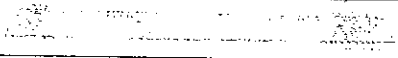
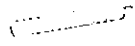
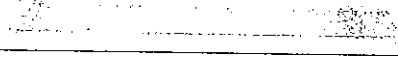



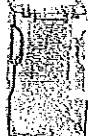

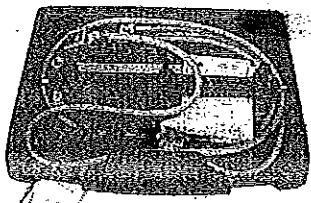
Изпълнение	Означение	Артикул №
PBS 1-250 A с отвеждане на изводите от лявата страна	PBS 1-NL	63-811673-051
PBS 1-250 A с отвеждане на изводите от дясната страна	PBS 1-NR	63-811673-061
PBS 1-250 A с отвеждане на изводите от лявата страна с капаци на предпазителите	PBS 1-NL-O	конфигурация
PBS 1-250 A с отвеждане на изводите от дясната страна с капаци на предпазителите	PBS 1-NR-O	конфигурация
PBS 2-400 A с отвеждане на изводите от лявата страна	PBS 2-NL	63-811673-011
PBS 2-400 A с отвеждане на изводите от дясната страна	PBS 2-NR	63-811673-031
PBS 2-400 A с отвеждане на изводите от лявата страна с капаци на предпазителите	PBS 2-NL-O	конфигурация
PBS 2-400 A с отвеждане на изводите от дясната страна с капаци на предпазителите	PBS 2-NR-O	конфигурация
PBS 3-630 A с отвеждане на изводите от лявата страна	PBS 3-NL	63-811673-021
PBS 3-630 A с отвеждане на изводите от дясната страна	PBS 3-NR	63-811673-041
PBS 3-630 A с отвеждане на изводите от лявата страна с капаци на предпазителите	PBS 3-NL-O	конфигурация
PBS 3-630 A с отвеждане на изводите от дясната страна с капаци на предпазителите	PBS 3-NR-O	конфигурация

690 V~



Основа за предпазители PBS със странично разположение на изводите

ТАБЛИЦА 16. Аксесоари до PBS 1, PBS 2, PBS 3 690V~

Означение / Артикул - №	Описание	Снимка
M	Винтова клемма – M10 за PBS 1 и PBS 2, M12 за PBS 3 за свързване на кабели оборудвани с кабелни накрайници . (компл. - 3 бр.)	
50-40SW 1119510001T	V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ²  35 - 120 mm ²  50 - 185 mm ²  50 - 240 mm ² 	
70-300SW 1119510013T	V-клемма за директно свързване на почистените от изолация жила със сечение: 50 - 120 mm ²  70 - 150 mm ²  70 - 240 mm ²  95 - 300 mm ² 	
2150-240SW 1119510007T	V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 120 mm ²  35 - 150 mm ²  50 - 185 mm ²  50 - 240 mm ² 	
VL240/ 1119510002T	Присъединителна шина към V- клемма за монтаж на жила със сечение от 35 mm ² до 240 mm ²	
HS 50-240	V- клемма HS (стоманена) за монтаж на проводник със сечение 50 - 240 mm ² „se“	
HS 2/50-240	V- клемма двойна HS (стоманена) за монтаж на 2 проводника със сечение 50 - 240 mm ² „se“	
	Притискаща клемма тип кука позволяваща монтаж на PBS 1,2,3 върху неперфорирани шини (компл.=3 бр.).	
1361400006T	Капак на резервното място на шините на разстояние 185 mm – ширина: 50 mm, дължина: 562 mm, дебелина: 3 mm	
1361400001T	Изоляционен щифт за монтаж на капак с ширина 50 mm, M8 (компл. - 2 бр.)	
1361400007T	Капак на резервното място на шините на разстояние 185 mm – ширина: 100 mm, дължина: 562 mm, дебелина: 3 mm	
1361400002T	Изоляционен щифт за монтаж на капак с ширина 100 mm, M12 (компл. - 2 бр.)	
51-930313-01	Капак изравнителен, допълнителен капак за изравняване на удължаването от капаците на кабелните клеми	
51-930272-011	Капак на присъединителната шина, преграда отделяща шините на кабелната клемма	
51-930271-021	Капак на кабелните клеми	
51-836288-011	Капак на предпазителите	
U.U. 00+3	Заземител универсален за големини: 00, 1, 2, 3	

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ВЕРТИКАЛНИ ПРЕДПАЗИТЕЛ-РАЗЕДИНИТЕЛИ - ARS

КОНСТРУКЦИЯ

Предпазител-разединителите се произвеждат в две версии:

- еднополюсно включване/изключване (отделно всяка фаза)
- триполюсно включване/изключване (трите фази едновременно)

Конструкцията е със зависимо задвижване (ръчно), поради което операциите на включване и изключване трябва да се извършват с резки движения.

Разединителите ARS се предлагат в три големина: 00 – 160A; 1 – 250A; 2 – 400A; 3 – 630A.

Ширината на разединителите ARS с големина „00“ е 50 mm, а на големините 1 – 250A, 2 – 400A и 3 – 400A е 100 mm. Разединителите ARS са предназначени за монтаж на шини на разстояния 185 mm между тях. Апаратите с ширина „00“ и се произвеждат в две разновидности:

- основни ARS 00/185 – (160A) за монтаж на шини с разстояния 185 mm;
- основни ARS 00/100 – (160A) за монтаж на шини с разстояния 100 mm.

Основата на предпазител-разединителя е произведена от негорим стъклонапълнен полиестер. Сребърното галванично покритие на контактите на ARS осигурява

ниски загуби. Кабелните клеми в апаратите ARS осигуряват директно свързване, както на почистените от изолацията жила от кабелите, така и на кабелни жила със запресовани кабелни крайници. Корпусът на ARS с дъгогасителните камери е изпълнен от негорим полиамид усилен със стъклено влакно. В стандартното си изпълнение има контролни отвори за измерване на напрежението. Апаратите ARS позволяват използването на токови трансформатори и амперметри. Разединителите имат степен на защита IP20. Предлаганите допълнително аксесоари позволяват да се монтират различни големина ARS на обща система от шини и улесняват експлоатацията.

Съществуват също така и специални изпълнения между които:

- ARS 2/400A и 3/630A с възможност за директно свързване на два кабела с диаметър 240 mm² на всяка клема;
- 2 x ARS 3-6-M – двоен разединител 2 x 630A с ширина 200 mm позволяващи включване и изключване на ток до 1250 A.

Всички големина разединители са доставяни в комплект с клеми (например винтови, мостови или тип V) и капацити за захранващите клеми.

Разединител с предпазител ARS 690V AC

Таблица 17. Технически характеристики

ОЗНАЧЕНИЕ НА ARS	Номинален термичен ток I_{th}	Номинално напрежение U_n	Категория на експлоатация	Ном. захранващо напрежение U_c	Ном. ток на късо съединение подаван условно	Ном. ток на късо съединение задържан условно	Ном. изолационно напрежение на U_i	Устойчивост на импулсно напрежение U_{imp}	Номинална честота	Механична износостойчивост	Електрическа износостойчивост	Степен на защита	Тегло	Големина на вложките на предпазителите PN/IEC
	A													
ARS 00/100mm	160	690	AC-21B	690	25	100	1000	8	40-60	1600	200	30	1,2	00
			AC-22B	690										
			AC-23B	400										
ARS 00	160	690	AC-21B	690	25	100	1000	12	40-60	1600	200	20	2,6	00
			AC-22B	500										
ARS 1	250	690	AC-21B	690	50	100	1000	12	40-60	1600	200	20	6,8	1
			AC-22B	500										
ARS 2	400	690	AC-21B	690	50	100	1000	12	40-60	1000	200	20	6,8	2
			AC-22B	500										
ARS 3	630	690	AC-21B	690	50	100	1000	12	40-60	1000	200	20	7,2	3
			AC-22B	500										
2ARS 3	1250	690	AC-21B	690	50	100	1000	12	40-60	1000	200	20	15	3

УСЛОВИЯ НА РАБОТА

- инсталиране в помещения, несъдържащи прах, разяждащи и взривоопасни газове;
- до височина над 2000 метра над морското равнище
- вън от помещенията – в табла със степен на защита \geq IP 34.

- околна температура от -25°C до +55°C - при използване на разединителите при температура от +41°C до +45°C трябва да се намали стойността на тока I_{th} с 5%, а в температурния интервал от +46°C до +55°C стойността на тока I_{th} трябва да се намали с 10%.

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Вертикален предпазител-разединител ARS 00/100 mm 160A 690 V ~
 разстояния между шините 100 mm



Таблица 18: Означение на ARS 00 съгласно вида на клемите

Означение на апарата	Клема	Снимка на клемата	Сечение на кабелните жила	Момент на затягане
ARS 00/100mm (160 A)	S – мостова (2xM5)		4 - 70 mm ²	6 Nm
	M – винтова M8		Кабелен накрайник до 185 mm ²	20 Nm
	V – секторна (2xM5)		1,5 - 95 mm ²	6 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 20 mm.

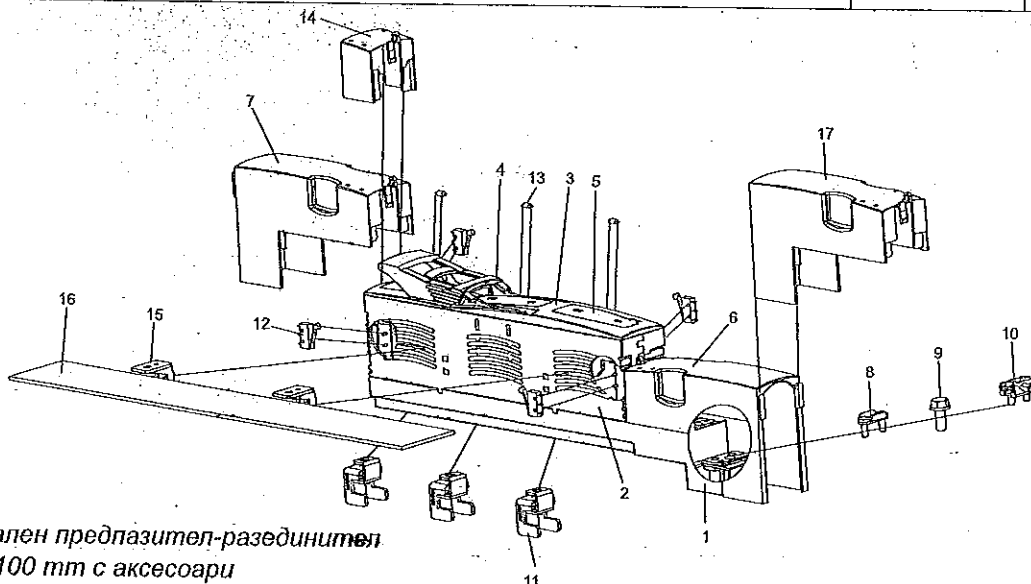
ARS 00/100mm

ARS 00/100mm-W – означение на апарат оборудван със светлинна сигнализация за изгаряне на предпазителя

ARS 00/100mm-V

Таблица 19. Разединител ARS 00 / 160 A 690 V ~

Изпълнение	Означение	Артикул №
ARS 00-160 A включване на 3 фази едновременно с една дръжка (разстояния между шините 100 mm, клемни S – мостови (4-70 mm ²) + M-винтови (M8).	ARS 00/100mm-W	63-811628-021
ARS 00-160 A включване на 3 фази едновременно седна дръжка (разстояния между шините 100 mm + капак, клемни S – мостови (4-70 mm ²) + M-винтови (M8)	ARS 00/100mm	63-811628-011
ARS 00-160 A разстояния между шините 100 mm + капак, V-клемни секторни (1,5 - 95 mm ²)	ARS 00/100mm-V	63-811628-031



Вертикален предпазител-разединител
 ARS 00/100 mm с аксесоари

- | | | |
|-------------|--|---|
| 1. Основа | 8. Клема мостова 00-S | 13. Елемент сигнализиращ изгарянето на предпазителя W |
| 2. Корпус | 9. Клема винтова 00-M | 14. Табелка информационна |
| 3. Капак | 10. Клема секторна 00-SV | 15. Опора под капака за резервното място |
| 4. Дръжка | 11. Клема кука | 16. Капак за резервното място |
| 5. Прозорче | 12. Микропревключвател за положението капака на разединителя | 17. Долен капак изравняващ |

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ARS 00/100mm
ARS 00/100mm-W

Положение отворено / затворено

Положение паркиране

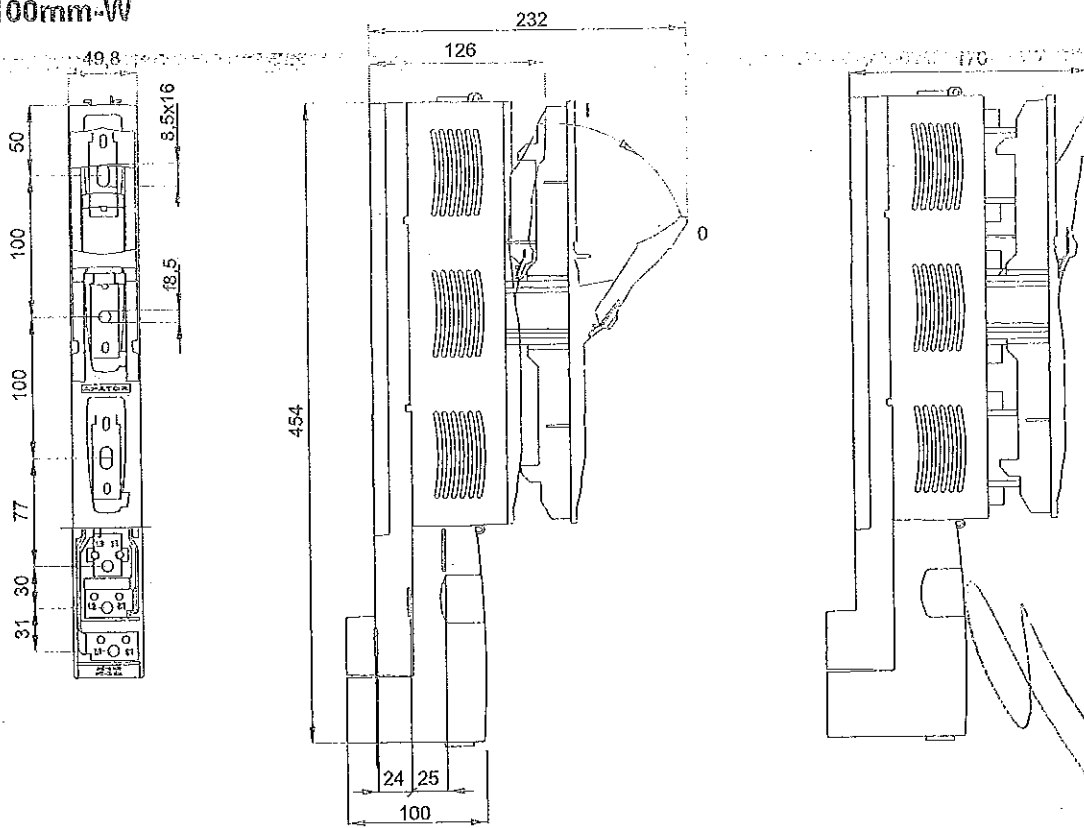
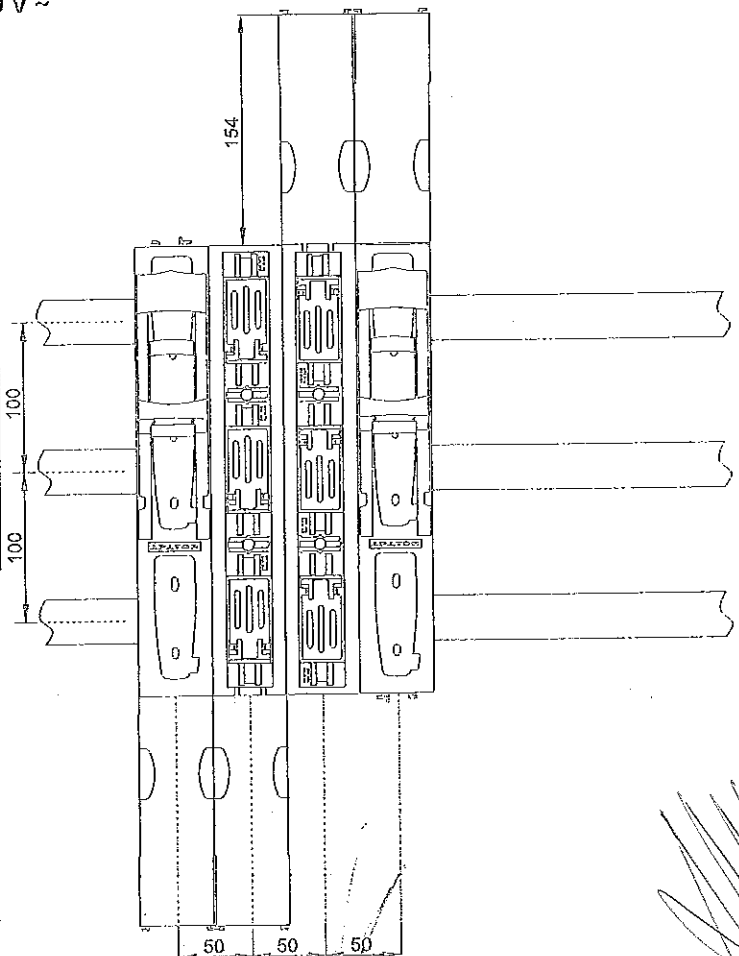


Таблица 19. Разединител ARS 00 / 160 A 690 V ~

Изпълнение	Означение	Артикул №
ARS 00-160 A включване на 3 фази едновременно с една дръжка (разстояния между шините 100 mm), клемми M и S (4-70 mm ²) + сигнализация за предпазителите	ARS 00/100mm-W	63-811628-021
ARS 00-160 A включване на 3 фази едновременно а една дръжка (разстояния между шините 100 mm) + капак на клемите S – мостови (4-70 mm ²) + M вятрови (M8)	ARS 00/100mm	63-811628-011
ARS 00-160 A включване на 3 фази едновременно а една дръжка (разстояния между шините 100 mm) + капак на V-клемите секторни (1,5 - 95 mm ²)	ARS 00/100mm-V	63-811628-031



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Разединители ARS 00-SM 160A 690 V~
разстояния между шините 185 mm

Таблица 20. Означение на ARS 00 съгласно вида на клемите

Означение на апарата	Клема	Снимка на клемата	Сечение на кабелните жила	Момент на затягане
ARS 00-SM (160 A)	S – мостова (2xM5)		4 - 70 mm ²	6 Nm
	M - винтова M8		Кабелен накрайник до 185 mm ²	20 Nm
ARS 00-V (160 A)	V-секторна (2xM5)		1,5 - 95 mm ²	6 Nm

Към изходящите могат да се свържат шини с максимална ширина 25 mm.

ARS 00-SM
ARS 00-V

Таблица 21. Разединители ARS 00 / 160 A 690 V~

Изпълнение	Означение	Артикул №
ARS 00-160 A Включване на фазите – поединично, кабелни накрайници с мостови клемни тип S (4-70 mm ²) капак	ARS 00-SM	63-811410-011
ARS 00-160 A Включване на фазите – поединично, кабелни накрайници със секторни клемни проводник (1,5-95 mm ²)	ARS 00-V	63-811410-021

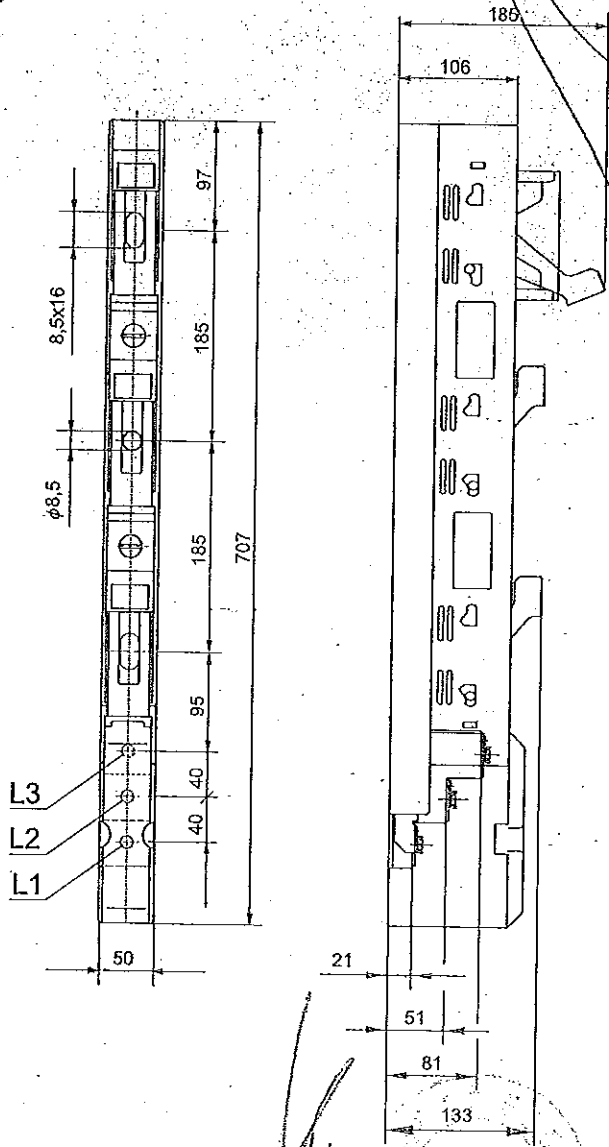


Таблица 22. Общи аксесоари за ARS 00 и ARS 00/100 mm








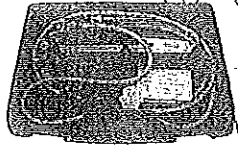
Обозначение / Артикул №	Описание	Снимка
00 – M	Винтова клемма – винт M8 за свързване на проводници с кабелен накрайник (компл. - 3 бр.)	
1361400006T	Капак за резервното място на шините за разстояние 185 mm, ширина 50 mm, дължина 562 mm, дебелина 3 mm	
1361400001T	Изолационен щифт за монтиране на капака с ширина 50 mm M8 (компл. - 2 бр.)	
1115718002T	Токов трансформатор ASR21.3, клас на точност 1 Преводно отношение: от 50/5 A до 150/5 A	
1115718010T	Дистанционна втулка за токов трансформатор ASR21.3, дълж. 36 mm, външен диаметър Ф22,5 mm, вътрешен Ф12,5 mm	
00 – S	Клема мостова завита към апарата посредством 2 винта M5 за свързване на почистените от изолацията жила със сечение от 4 mm ² до 70 mm ² . (компл. - 3 бр.)	
00 – SV 1115281034	Притискаща клемма -- линейна + подложка „V“ завита към апарата посредством 2 винта M5 за свързване на почистените от изолацията жила на секторния кабел с диаметър 1,5 mm ² до 70 mm ² . При еднородни жила до 95 mm ² (компл. - 3 бр.)	
U.U. 00+3	Заземител универсален за големини: 00, 1, 2, 3	

Таблица 23. Аксесоари за ARS 00/100 mm



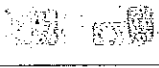



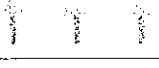
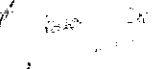
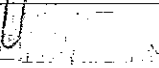
51-823166-011	Горен капак изравняващ височината на ARS 00/100 mm до ARS 1, 2, 3	
51-930282-011	Капак изравняващ долен	
1115281030T	Единичен адаптор 100/185 mm (за един брой ARS 00/100) позволяващ монтаж на апарата върху шини с разстояние 185 mm.	
1115281029T	Двоен адаптор 100/185 mm (за два броя ARS 00/100) позволяващ монтаж на апаратите върху шини с разстояние 185 mm и перфорация на отворите в шините на 100 mm	
53-945361-011	Притискаща клемма тип кука позволяваща монтаж на ARS 00/100 върху неперфорирани шини (компл. - 3 бр.)	
1115296049	Микропревключвател за контрол на включването (0-1) на разединител ARS 00/100	
	Опора под капака на резервното място	
53-945333-011	Табелка информационна	

Таблица 24. Аксесоари за ARS 00

51-945160-011 (№ се отнася за 1 бр.)	Единичен адаптор дистанционен 185/185 mm (за един брой ARS 00/185) позволяващ изравняването към предната линия на таблото ARS 1, 2, 3 (компл. - 3 бр.)	
52-945158-011 (№ се отнася за 1 бр.)	Двоен адаптор дистанционен 185/185 mm (за два броя ARS 00/185) позволяващ изравняването към предната линия на таблото ARS 1, 2, 3 при разстояние на отворите в шините на всеки 100 mm. (компл. - 3 бр.)	
51-837437-011	Капак на кабелните клемми	

Вертикален предпазител-разединител

ARS 1 250 A 690V~

ARS 2 400 A 690V~

Таблица 25. Означение на ARS 1 и ARS 2 съгласно вида на клемите


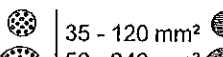
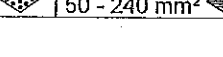

Означение на апарата	Клема	Чертеж на клемата	Сечение на кабелните жила	Момент на затягане
ARS 1-V (250 A) ARS 2-V (400 A)	V – клема 50-240 SW		V-клема за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ²  50 - 185 mm ² 	30 Nm
ARS 1-M (250 A) ARS 2-M (400 A)	M - винтова M10		Кабелен накрайник max 240 mm ²	32 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 40 mm.

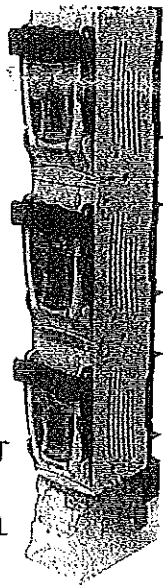
Вертикален предпазител-разединител

ARS 3 630 A 690V~

Таблица 26. Означение на ARS 3 съгласно вида на притискащите клеми

Означение на апарата	Клема	Чертеж на клемата	Сечение на кабелните жила	Момент на затягане
ARS 3-V (630 A)	V – клема 50-240 SW		V-клема за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ²  50 - 185 mm ² 	30 Nm
ARS 3-M (630 A)	M - винтова M12 (пресована гайка)		Кабелен накрайник max 240 mm ²	56 Nm

Към клемите тип M могат да се свържат шини с максимална ширина 40 mm.



ARS 2-1-V



ARS 2-6-V

1. Основа
2. Клема кука
3. Сигнализиращ елемент за стопяването на предпазителите
4. Капак на клема 2 x 240 V
5. Капак на клемите
6. Капак на клемите
7. Изравняващ капак
8. Капак на захранването
9. Преграда

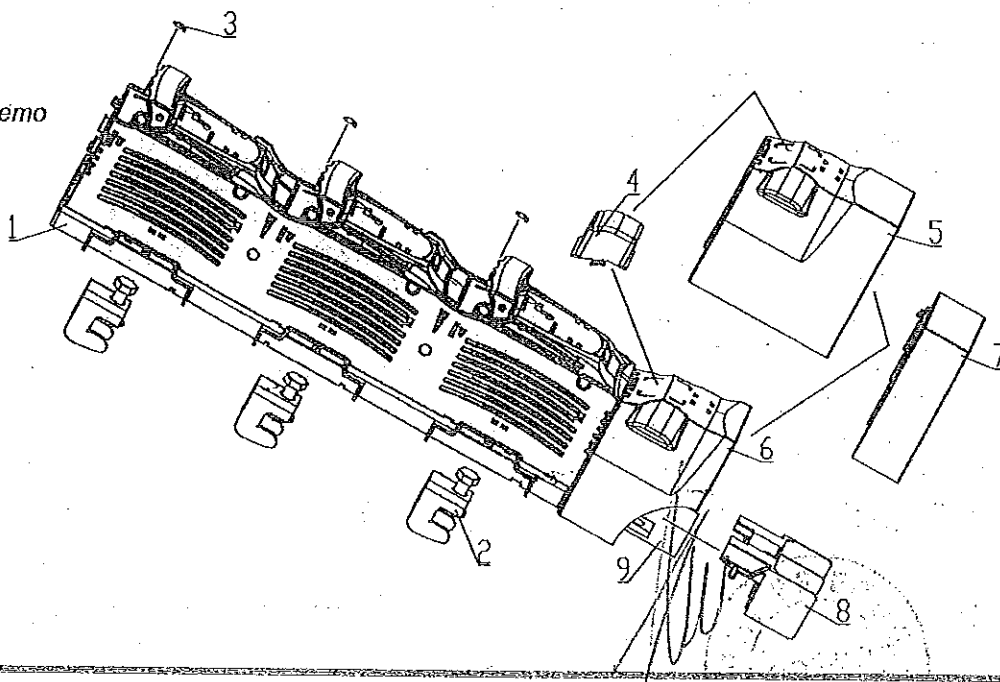
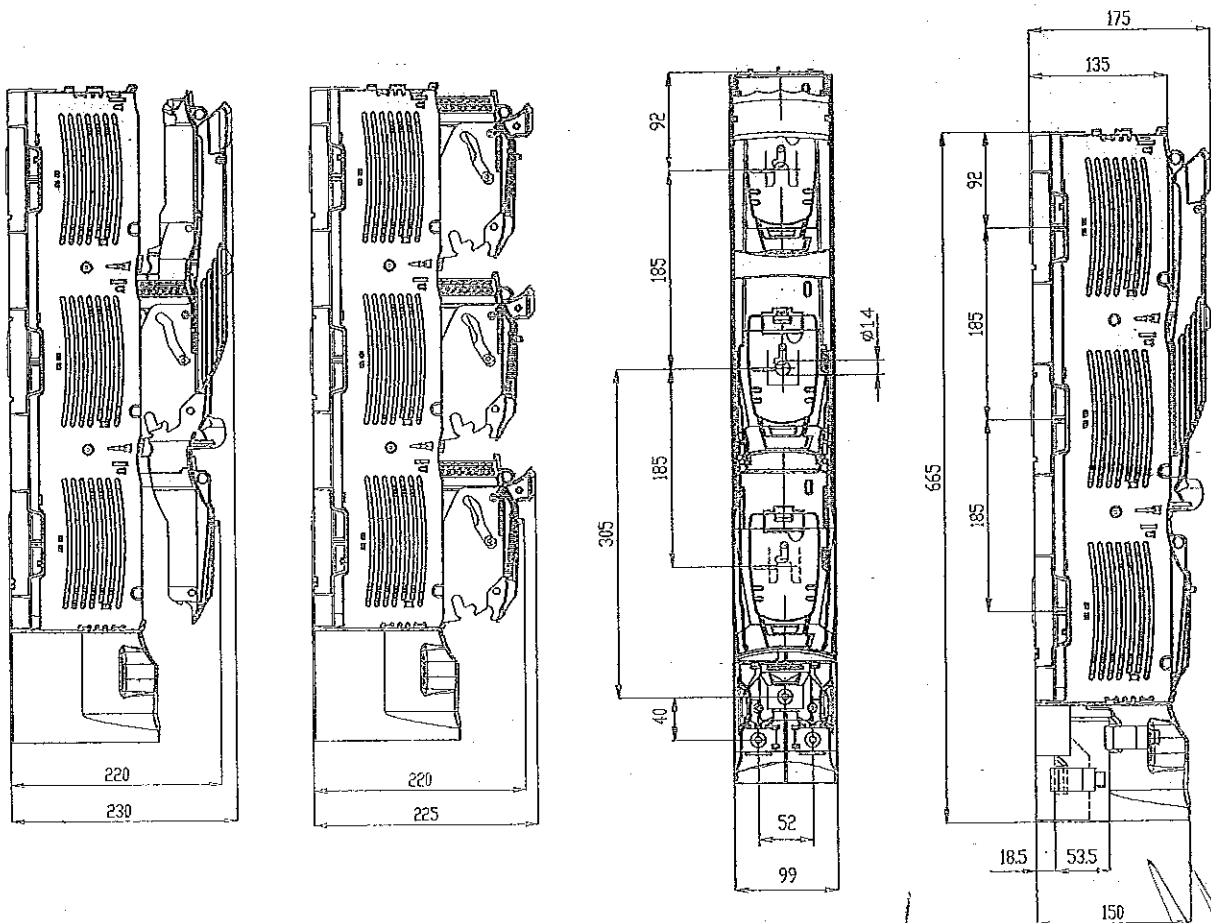
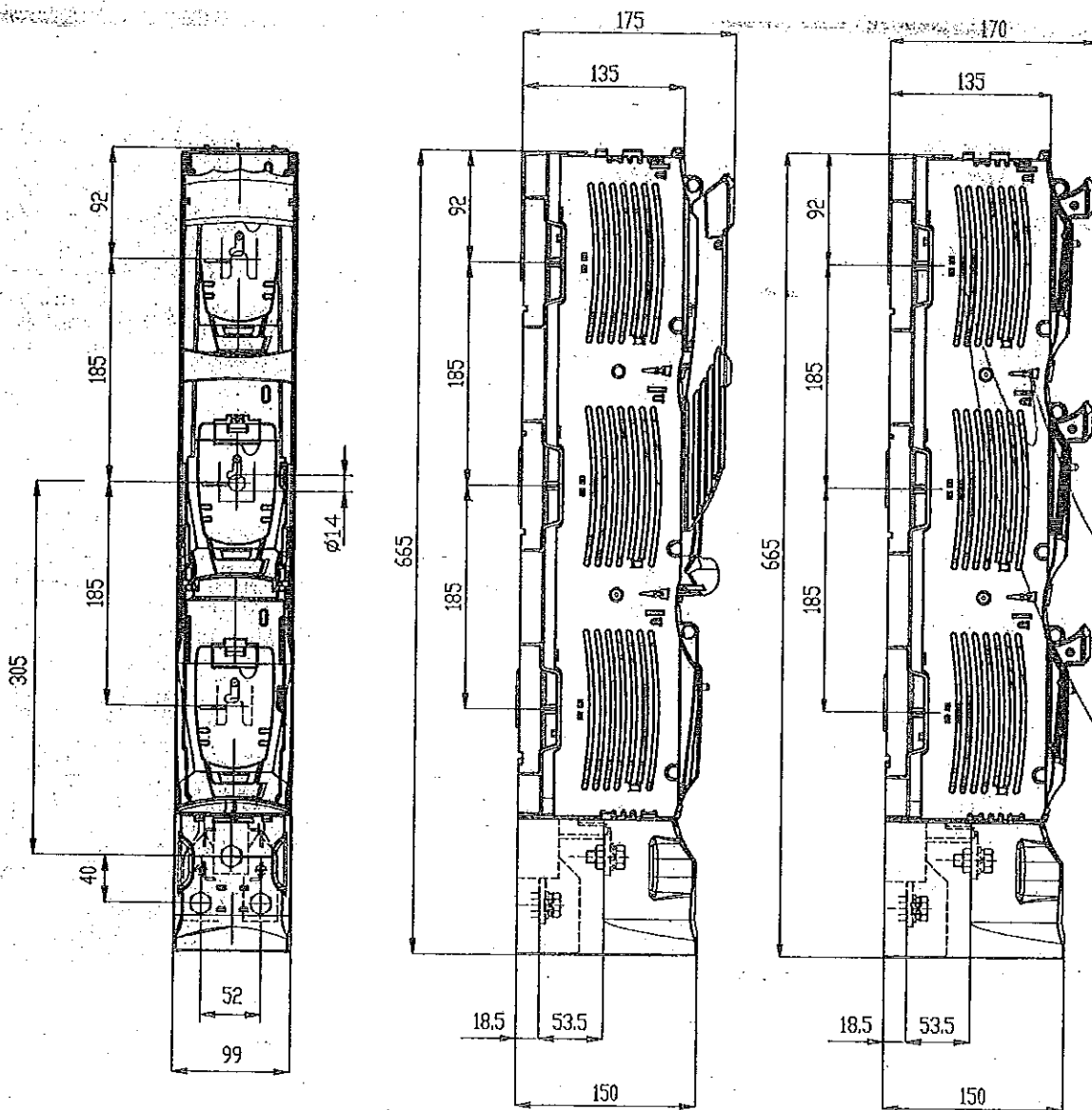


Таблица 27. Разединител ARS 1 / 250A ARS 2 / 400 A и ARS 3 / 630A 690 V~

Изпълнение	Означенне	Артикул №
ARS 1-250 A включване на фазите - отделно кабелни накрайници, пресовани гайки M10, капак	ARS 1-1-M	63-811706-111
ARS 1-250 A включване на фазите -- трите фази едновременно, кабелни накрайници, пресовани гайки M10, капак	ARS 1-6-M	63-811707-111
ARS 1-250 A включване на фазите -- отделно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 1-1-V	63-811706-121
ARS 1-250 A включване на фазите -- едновременно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 1-6-V	63-811707-121
ARS 2-400 A включване на фазите - отделно кабелни накрайници, пресовани гайки M10, капак	ARS 2-1-M	63-811706-031
ARS 2-400 A включване на фазите -- трите фази едновременно, кабелни накрайници, пресовани гайки M10, капак	ARS 2-6-M	63-811707-031
ARS 2-400 A включване на фазите -- отделно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 2-1-V	63-811216-011
ARS 2-400 A включване на фазите -- едновременно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 2-6-V	63-811463-011
ARS 3-630 A включване на фазите - отделно кабелни накрайници, пресовани гайки M10, капак	ARS 3-1-M	63-811706-041
ARS 3-630 A включване на фазите -- трите фази едновременно, кабелни накрайници, пресовани гайки M10, капак	ARS 3-6-M	63-811707-041
ARS 3-630 A включване на фазите -- отделно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 3-1-V	63-811706-021
ARS 3-630 A включване на фазите -- трите фази едновременно, кабелни накрайници тип V, V клемма 240 mm ² , капак	ARS 3-6-V	63-811707-021



4.4.8



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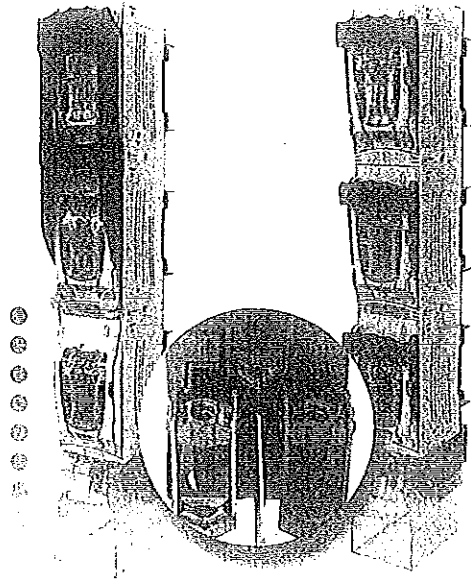
40

Предпазител-разединители с ARS с V клемма 2 x 240 mm²
 (възможност за монтиране на 2 жила със сечение 240 mm² във всяка клемма)

ARS 2 400 A 690V_~
 ARS 3 630 A 690V_~

Таблица 28. Означение на ARS 2 x 240 mm² съгласно вида на клемите

Означение на апарата	Клема	Чертеж на клемата	Сечение на кабелните жила	Момент на затягане
ARS 2-2V (400 A)	V-клемма № 2V0240		V-клемма за директно свързване на почистените от изолация 2 жила със сечение: 35 - 120 mm ² 35 - 150 mm ² 50 - 185 mm ² 50 - 240 mm ²	30 Nm
ARS 3-2V (630 A)	V-клемма № 2V0240		V-клемма за директно свързване на почистените от изолация 2 жила със сечение: 35 - 120 mm ² 35 - 150 mm ² 50 - 185 mm ² 50 - 240 mm ²	30 Nm



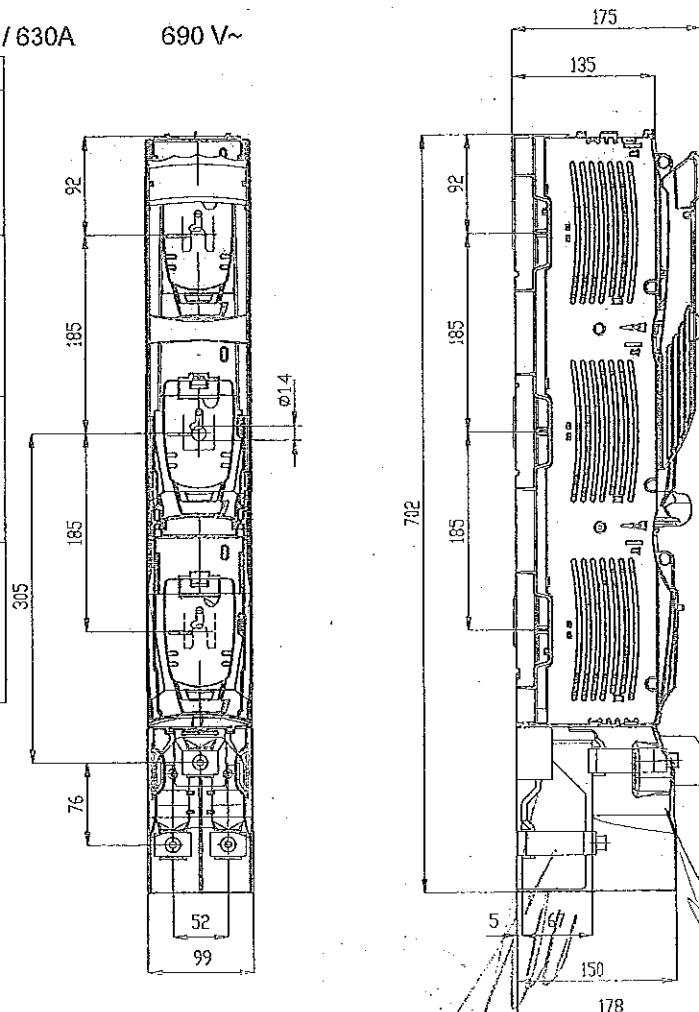
ARS 3-6-2V

ARS 3-1-2V

Таблица 29. Разединител ARS 2 / 400 A и ARS 3 / 630A

690 V~

Изпълнение	Означение	Артикул №
ARS 2-400 A включване на фазите – отделно, кабелни накрайници тип 2 V + V клемма 2 x 35 - 240 mm ² , капак	ARS 2-1-V	63-811706-011
ARS 2-400 A включване на фазите – 3 фази едновременно с една дръжка, кабелни накрайници тип 2 V + V клемма 2 x 35 - 240 mm ² , капак V	ARS 2-6-2V	63-811707-051
ARS 3-630 A включване на фазите – отделно, кабелни накрайници тип 2 V + V клемма 2 x 35 - 240 mm ² , капак	ARS 3-1-2V	63-811706-061
ARS 3-630 A включване на фазите – 3 фази едновременно с една дръжка, кабелни накрайници тип 2 V + V клемма 2 x 35 - 240 mm ² + капак	ARS 3-6-2V	63-811707-061



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Предпазител-разединител ARS със странично отвеждане на изводите
(разделяне, съединяване на шините)

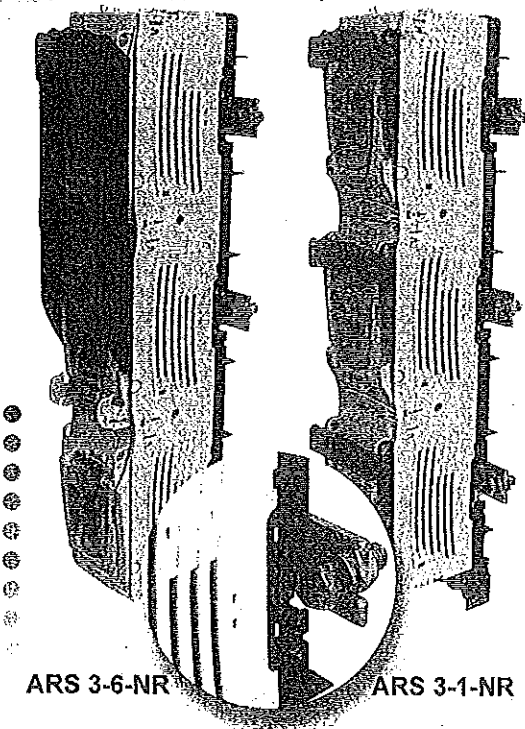
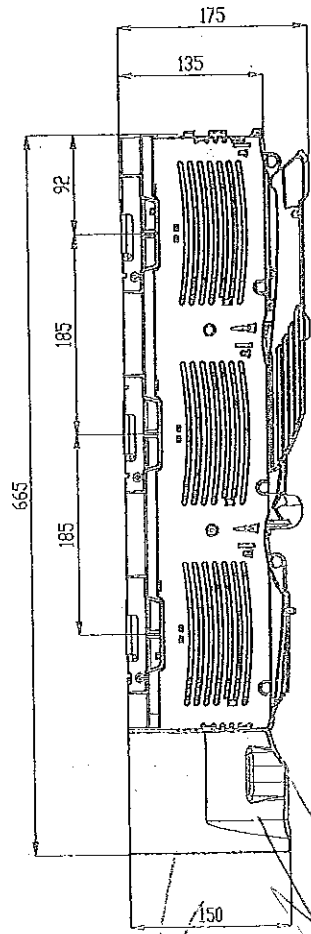
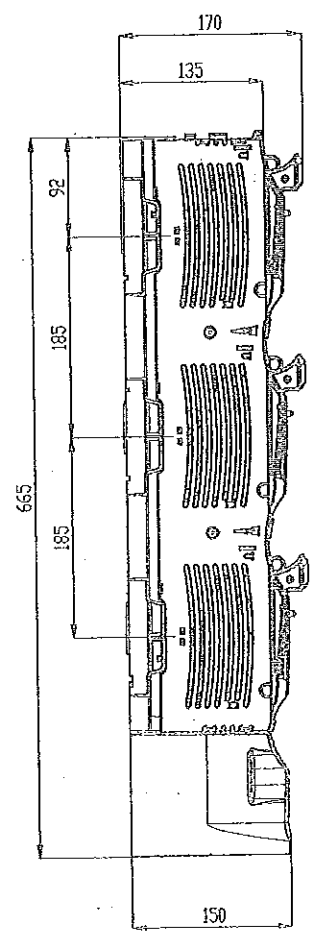
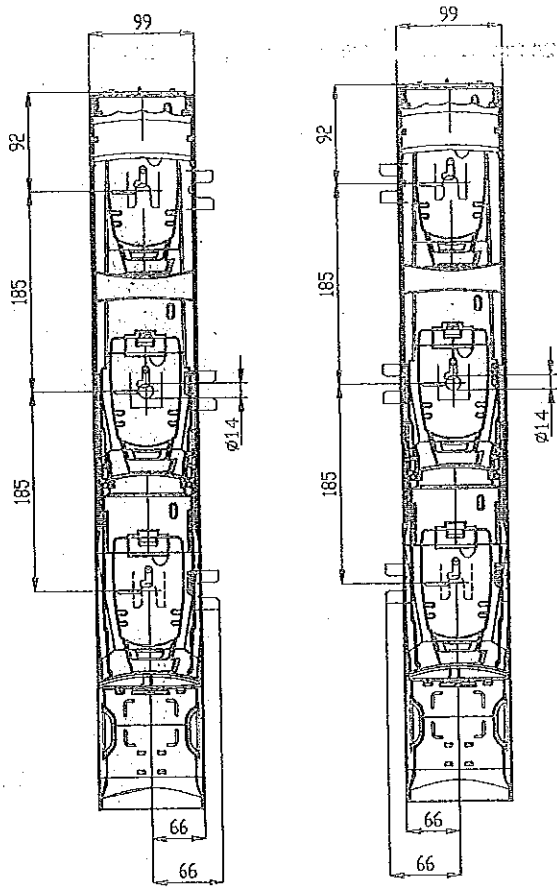


Таблица 30. Означение на ARS тип „съединител“

Означение на апарата	Клема	Чертеж на клемата	Извод	Момент на затягане
ARS 2-NL (400 A)	M – винтова M10		Лява страна	32 Nm
ARS 2-NR (400 A)	M – винтова M10		Дясна страна	32 Nm
ARS 3-NL (630 A)	M – винтова M12		Лява страна	56 Nm
ARS 3-NR (630 A)	M – винтова M12		Дясна страна	56 Nm

Таблица 31. Разединител ARS 1 / 250A, ARS 2 / 400 A и ARS 3 / 630A 690 V~

Изпълнение	Означение	Артикул №
ARS 2-400 A включване на фазите – отделно, отвеждане на изводите от лявата страна, клеми винтови M10, капак	ARS 2-1-NL	63-811706-071
ARS 2-400 A включване на фазите – отделно, с отвеждане на изводите от дясната страна, клеми винтови M10, капак	ARS 2-1-NR	63-811706-091
ARS 2-400 A включване на фазите – едновременно с една дръжка, отвеждане на изводите от лявата страна, клеми винтови M10, капак	ARS 2-6-NL	63-811707-071
ARS 2-400 A включване на фазите – едновременно с една дръжка, отвеждане на изводите от дясната страна, клеми винтови M10, капак	ARS 2-6-NR	63-811707-091
ARS 3-630 A включване на фазите – отделно, отвеждане на изводите от лявата страна, клеми винтови M12, капак	ARS 3-1-NL	63-811706-081
ARS 3-630 A включване на фазите – отделно, отвеждане на изводите от дясната страна, клеми винтови M12, капак	ARS 3-1-NR	63-811706-101
ARS 3-630 A включване на фазите – едновременно с една дръжка, отвеждане на изводите от лявата страна, клеми винтови M12, капак	ARS 3-6-NL	63-811707-081
ARS 3-630 A включване на фазите – едновременно с една дръжка, отвеждане на изводите от дясната страна, клеми винтови M12, капак	ARS 3-6-NR	63-811707-101

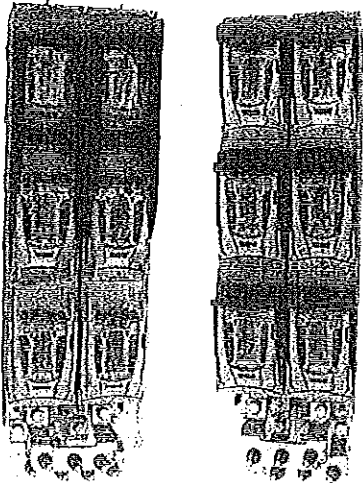


Вертикален предпазител-разединител ARS със странично разположение на изводите

403

Вертикален предпазител-разединител (двоен)

2ARS 3 2 x 630 A ширина на модула – 200 mm



2ARS 3-6-M

2ARS 3-1-M

Таблица 32. Означение на 2ARS 3 съгласно вида на клемите

Означение на апарата	Клема	Чертеж на клемата	Сечение на жилото	Момент на затягане
2ARS 3-1-M 2ARS 3-6-M (2 x 630 A)	M12 винт		Кабелни накрайници до 300 mm ²	56 Nm

Таблица 33. Разединител 2ARS 3 x 630A (1250A) 690 V~

Изпълнение	Означение	Артикул №
включване на фазите – едновременно трите фази, механично и електрически свързани два разединителя ARS 3	2ARS 3-6 M	63-811644-1
включване на фазите – отделно, механично и електрически свързани два разединителя ARS 3	2ARS 3-1 M	конфигурация

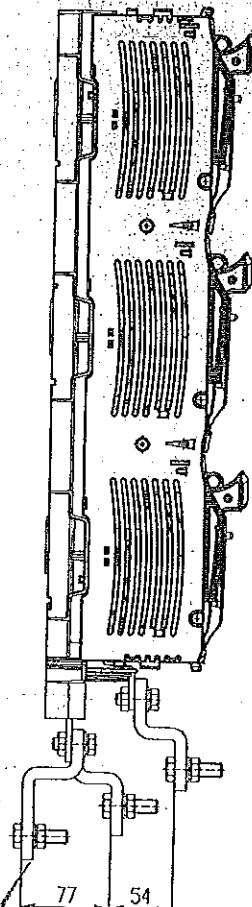
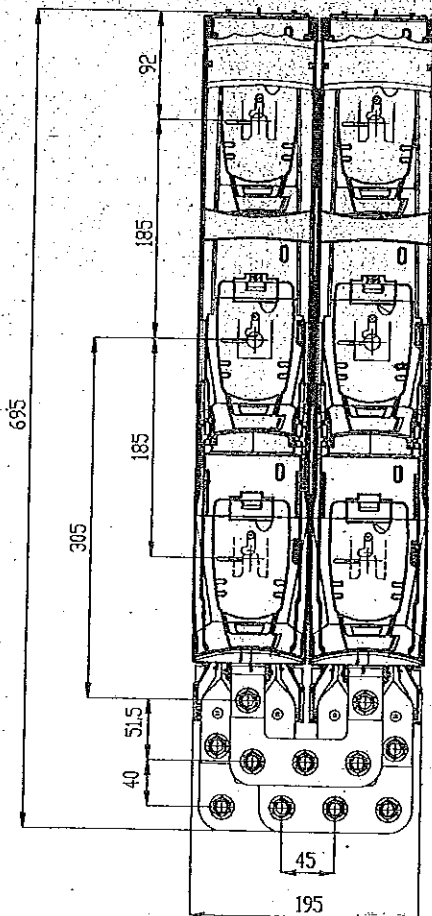
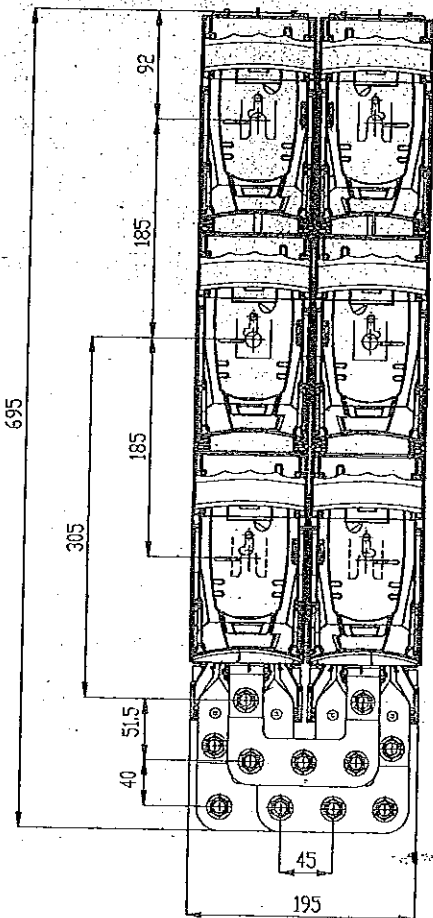














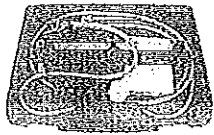


Таблица 34. Аксесоари до:

ARS 1 250 A 690V~

ARS 2 400 A 690V~

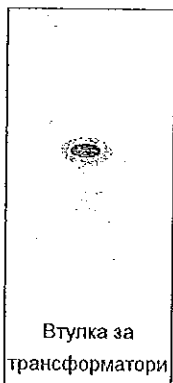
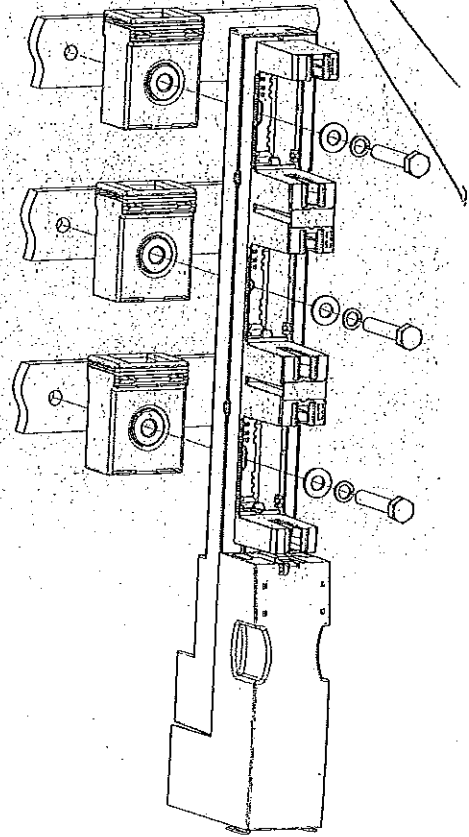
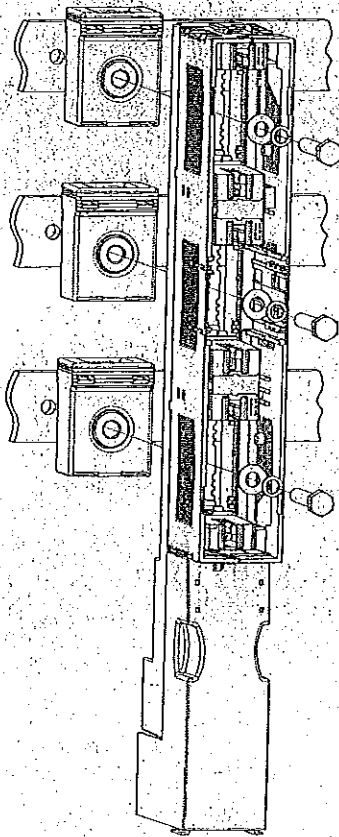
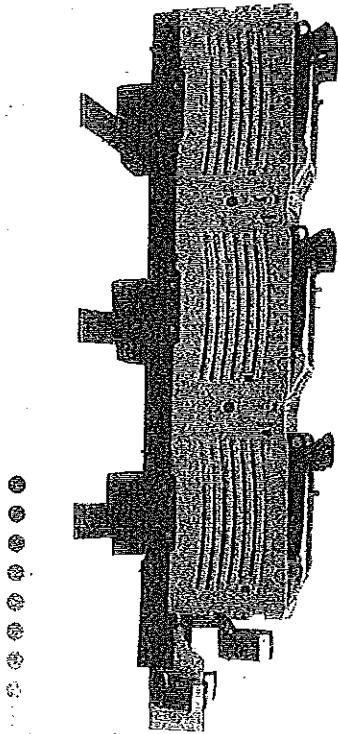
ARS 3 630 A 690V~

Обозначение/ Артикул/№	Описание	Облика
M	Винтова клемма – M10 за ARS 1 и ARS 2, M12 за ARS 3 за свързване на кабели оборудвани с кабелни накрайници . (компл. - 3 бр.)	
50-240SW 1119510001T	V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 95 mm ² 35 - 120 mm ² 50 - 185 mm ² 50 - 240 mm ²	
70-300SW 1119510013T	V-клемма за директно свързване на почистените от изолация жила със сечение: 50 - 120 mm ² 70 - 150 mm ² 70 - 240 mm ² 95 - 300 mm ²	
2150-240SW 1119510007T	V-клемма за директно свързване на почистените от изолация жила със сечение: 35 - 120 mm ² 35 - 150 mm ² 50 - 185 mm ² 50 - 240 mm ²	
HS 50-240	V-клемма HS (стоманена) за монтаж на проводник със сечение 50 - 240 mm ² „se“	
HS 2/50-240	V-клемма двойна HS (стоманена) за монтаж на 2 проводника със сечение 50 - 240 mm ² „se“	
VL240/ 1119510002T	Присъединителна шина към V-клемма за монтаж на жила със сечение от 35 mm ² до 240 mm ²	
	Притискаща клемма тип „кука“ позволяваща монтаж на ARS 1, 2, 3 върху неперфорирани шини (компл. - 3 бр.).	
1361400006T	Капак на резервното място на шините на разстояние 185 mm -- ширина: 50 mm, дължина: 562 mm, дебелина: 3 mm	
1361400001T	Изоляционен щифт за монтаж на капак с ширина 50 mm, M8 (компл. - 2 бр.)	
1361400007T	Капак на резервното място на шините на разстояние 185 mm -- ширина: 100 mm, дължина: 562 mm, дебелина: 3 mm	
1361400002T	Изоляционен щифт за монтаж на капак с ширина 100 mm, M12 (компл. - 2 бр.)	
51-930313-01	Капак изравнителен, допълнителен капак за изравняване на удължаването от капаците на кабелните клемми	
51-930272-011	Капак на присъединителната шина, преграда отделяща клемите	
51-930271-021	Капак на клем клемите	
1115718006T	Токов трансформатор ASR 22.3, клас на точност 1. Преводно отношение: от 50/5A до 600/5A.	
115718010T	Дистанционна втулка за трансформатора ASR 22.3: дълж. 36mm, външен диаметър 22,5mm, вътрешен диаметър 12,5mm	
63-822645-011	Заземител URS-3 за разединители ARS (големина от 1 до 3)	
U.U. 00÷3	Заземител универсален за големина: 00, 1, 2, 3	

ТРИФАЗНО ИЗМЕРВАНЕ НА ТОКА

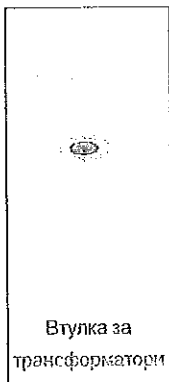
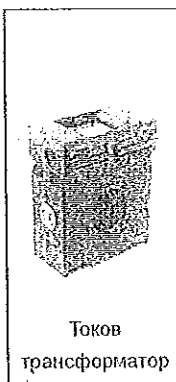
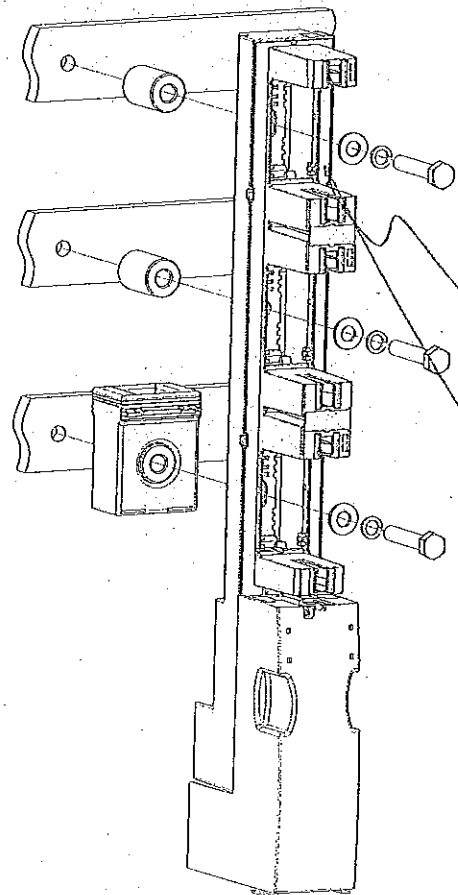
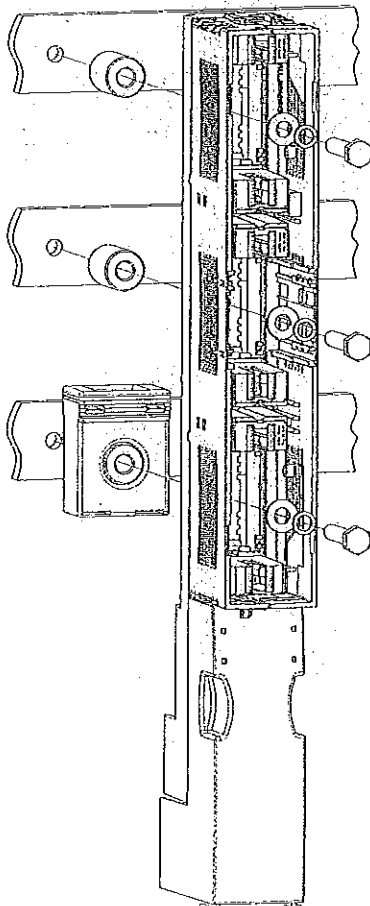
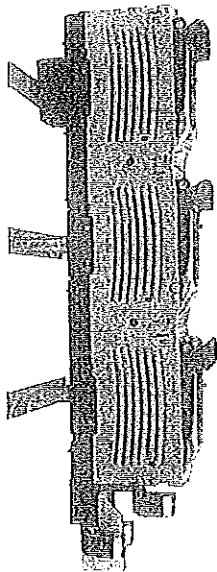
Предпазител-разединител ARS

Основи за предпазители PBS

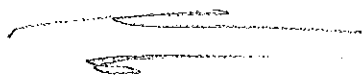
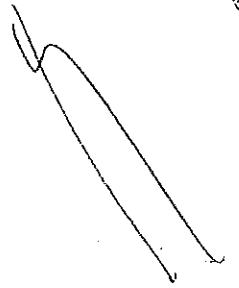
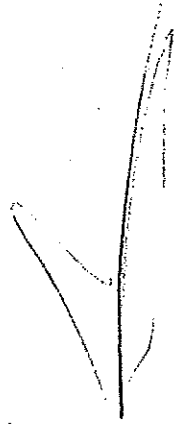


<p>Разединители: ARS 1/250A; ARS 2/400A; ARS 3/630A</p>	<p>Разединители: ARS 00/160A</p>
<p>Трансформатор ASR22.3 - с преводно отношение: 50A/5A, 100A/5A, 150A/5A, 200A/5A, 250A/5A, 300A/5A, 400A/5A, 500A/5A, 600A/5A Размери: a = 61 mm; b = 35 mm; c = 78,5 mm. Втулка: дълж. 36 mm. Ф вътр. = 12,5 mm Ф външ. = 22,5 mm, Клас на точност = 1</p>	<p>Трансформатор ASR21.3 - с преводно отношение: 100A/5A, 150A/5A Размери: a = 48,5 mm; b = 35 mm; c = 65 mm. Втулка: дълж. 36 mm. Ф вътр. = 12,5 mm Ф външ. = 22,5 mm, Клас на точност = 1</p>

ЕДНОФАЗОВО ИЗМЕРВАНЕ НА ТОКА
Предпазител-разединител ARS
Основи за предпазители PBS





Разединители: ARS 1/250A; ARS 2/400A; ARS 3/630A	Разединители: ARS 00/160A
<p>Трансформатор ASR22.3 - с преводно отношение: 50A/5A, 100A/5A, 150A/5A, 200A/5A, 250A/5A, 300A/5A, 400A/5A, 500A/5A, 600A/5A Размери: a = 61 mm; b = 35 mm; c = 78,5 mm. Втулка: дълж. 36 mm. Ф вътр. = 12,5 mm Ф външ. = 22,5 mm, Клас на точност = 1</p>	<p>Трансформатор ASR21.3 - с преводно отношение: 100A/5A, 150A/5A Размери: a = 48,5 mm; b = 35 mm; c = 65 mm. Втулка: дълж. 36 mm. Ф вътр. = 12,5 mm Ф външ. = 22,5 mm, Клас на точност = 1</p>




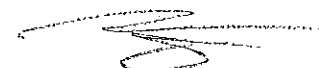
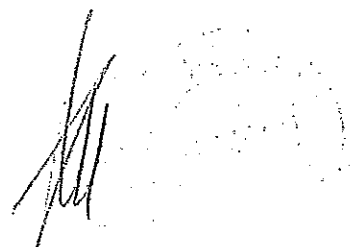


Test Report issued under the responsibility of:



TEST REPORT IEC/EN 60947-3 Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units	
Report Reference No.	LA-08.121/E
Date of issue	2008-07-31
Total number of pages	48
CB/CCA Testing Laboratory	 BBJ-SEP TESTING LABORATORY
Address	04-703 Warszawa, ul. Pożaryskiego 28, POLAND
Applicant's name	APATOR S.A.
Address	87-100 Toruń, ul. Żółkiewskiego 21/29 POLAND
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	CCA
Non-standard test method	N/A
Test Report Form No.	IECEN60947_3B
Test Report Form(s) Originator	OVE
Master TRF	Dated 2006-08
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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.	
If this Test Report Form is used by non-CCA members, the CIG logo and the reference to the CCA Procedure shall be removed.	
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 disconnectors
Trade Mark	
Manufacturer	APATOR S.A. 87-100 Toruń ul. Żółkiewskiego 21/29 POLAND
Model/Type reference	ARS 2
Ratings	see page 4

Testing procedure and testing location:	
<input checked="" type="checkbox"/> CB/CCA Testing Laboratory:	 BBJ-SEP TESTING LABORATORY
Testing location/ address.....	20-150 Lublin, ul. Rapackiego 13/15, POLAND
<input type="checkbox"/> Associated CB Laboratory:	
Testing location/ address.....	N/A
Tested by (name + signature).....	Dariusz Szczepanowski <i>D. Sz</i>
Approved by (+ signature)	Leszek Krzyżanowski <i>LK</i>
<input type="checkbox"/> Testing procedure: TMP	
Tested by (name + signature).....	N/A
Approved by (+ signature)	N/A
Testing location/ address.....	N/A
<input type="checkbox"/> Testing procedure: WMT	
Tested by (name + signature).....	N/A
Witnessed by (+ signature).....	N/A
Approved by (+ signature)	N/A
Testing location/ address.....	N/A
<input type="checkbox"/> Testing procedure: SMT	
Tested by (name + signature).....	N/A
Approved by (+ signature)	N/A
Supervised by (+ signature).....	N/A
Testing location/ address.....	N/A
<input type="checkbox"/> Testing procedure: RMT	
Tested by (name + signature).....	N/A
Approved by (+ signature)	N/A
Supervised by (+ signature).....	N/A
Testing location/ address.....	N/A






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Summary of testing:				
Test sequence	Clause	Requirements - Test	Sample No.	Verdict
0	5	Product information	A2/10	P
	7	Constructional and performance requirements	A2/10, A2/11, A2/15	P
I	8.3.3.1	Temperature rise		P
	8.3.3.2	Dielectric properties		P
	8.3.3.3	Making and breaking capacity	A2/1 (AC-22B, 690 V)	P
	8.3.3.4	Dielectric verification	A2/3 (AC-22B, 400 V)	P
	8.3.3.5	Leakage current	A2/4 (AC-21B, 690 V)	P
	8.3.3.6	Temperature-rise verification	A2/6 (AC-21B, 400 V)	P
	8.3.3.7	Strength of actuator mechanism	—	N/A
II	8.3.4.1	Operational performance	A2/2 (AC-22B, 690 V)	P
	8.3.4.2	Dielectric verification	A2/7 (AC-22B, 400 V)	P
	8.3.4.3	Leakage current	A2/5 (AC-21B, 690 V)	P
	8.3.4.4	Temperature-rise verification	A2/8 (AC-21B, 400 V)	P
III	8.3.5	Short-circuit performance capability	—	N/A
IV	8.3.6.2	Fuse protected short-circuit withstand	3W	P ^{*)}
	8.3.6.3	Dielectric verification		P
	8.3.6.4	Leakage current		P
	8.3.6.5	Temperature-rise verification		P
V	8.3.7.1	Overload test	A2/9	P
	8.3.7.2	Dielectric verification		P
	8.3.7.3	Leakage current		P
	8.3.7.4	Temperature-rise verification		P




*) Short-circuit breaking capacity with alternating current test was carried out at Laboratorium Badawcze Aparatury Rozdzielczej of Instytut Elektrotechniki in Warsaw. The particular results of the test are given in test report No. 7670/NBR/08 from 2008-06-12, see Annex to this report.

Summary of compliance with National Differences: —




Copy of marking plate:

 **APATOR**
 Typ ARS 2-6-M 
 Nr 

$U_n=690V \sim$	$I_n=I_e=400A$
AC-21B/690V	2 $P_n=45W$
AC-22B/690V	40-60Hz IP 30
	PN-EN 60947-3

 **APATOR**
 Typ ARS 2-1-V 
 Nr 

$U_n=690V \sim$	$I_n=I_e=400A$
AC-21B/690V	2 $P_n=45W$
AC-22B/690V	40-60Hz IP 30
	PN-EN 60947-3

 **APATOR**
 Typ ARS 2-1-2V 
 Nr 

$U_n=690V \sim$	$I_n=I_e=400A$
AC-21B/690V	2 $P_n=45W$
AC-22B/690V	40-60Hz IP 30
	PN-EN 60947-3

Marking of samples for tests:

Type of fuse-switch disconnecter	Number of samples	Date of receipt
ARS 2-6-M	A2/1, A2/2, A2/3, A2/4, A2/5, A2/6, A2/7, A2/8, A2/9, A2/10,	2008-05-16
	3W (sample tested at IEL in Warsaw)	---
ARS 2-1-V	A2/11, A2/12, A2/13, A2/14	---
ARS 2-1-2V	A2/15, A2/16, A2/17, A2/18	2008-05-16

Test item particulars.....	
- method of operation.....	Manual
- switching positions.....	0 I
- number of poles.....	3
- kind of current.....	AC
- number of phases.....	3
- rated frequency (Hz).....	40...60 Hz
- number of positions of the main contacts.....	2
Rated and limiting values, main circuit.....	
- rated operational voltage U_e (V).....	400 V, 690 V - AC
- rated insulation voltage U_i (V).....	1000 V
- rated impulse withstand voltage U_{imp} (kV).....	12 kV
- conventional free air thermal current I_{th} (A).....	400 A
- conventional enclosed thermal current I_{the} (A).....	—
- rated operational current I_e (A).....	400 A
- rated uninterrupted current I_u (A).....	400 A
- utilization category.....	AC-22B, AC-21B
Short-circuit characteristic.....	
- rated short-time withstand current I_{cw} (kA).....	—
- rated short-time making capacity I_{cm} (kA).....	—
- rated conditional short-circuit current.....	100 kA (fuse link 400 A)
Rated and limiting values, auxiliary circuits.....	
- 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.....	fuse link 400 A gG
Possible test case verdicts:	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
Testing.....	
Date of receipt of test item.....	2008-05-16
Date (s) of performance of tests.....	2008-05-16 ... 2008-07-31


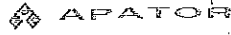
General remarks:

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 in the Appendix to the main body of this TRF.

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

General product information: —

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 isolating distance between open contacts	P
	- suitability for isolation		P
	- disconnectors AC-20 and DC-20 only: marked "Do not operate under load"		N/A
	Marking on equipment not needed to be visible after mounting:		P
	- manufacturer's name or trademark		P
	- type designation or serial number	ARS 2	P
	- rated operational current	See copies of marking plates	P
	- rated operational voltage	690 V - AC	P
	- utilization category	AC-22B, AC-21B	P
	- rated frequency	40 - 60 Hz	P
	- manufacturer's claim for compliance with IEC/EN 60947-3	EN 60947-3	P
	- degree of protection		N/A
	Marking on fuse-combination units:		P
	- fuse type	2 gG	P
	- maximum rated current	400 A	P
	- power loss of the fuse-link	45 W	P
	Identification of terminals:		P
	- line terminals		P
	- load terminals	L1, L2, L3	P
	- neutral pole terminal		N/A
	- protective earth terminal		N/A
	Data in the manufacturer's published information:		P
	- rated insulation voltage	1000 V	P
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	12 kV	P
	- pollution degree, if different from 3	3	P
	- rated duty	Uninterrupted duty	P
	- rated short-time withstand current and duration		N/A

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated short-circuit making capacity		N/A
	- rated conditional short-circuit current	100 kA (500V AC)	P
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		—
	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	see appended table 7.1.1.1	P
	Flames and glowing extinguish within 30 s	see appended table 7.1.1.1	P
	No ignition of the tissue paper	see appended table 7.1.1.1	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	see appended table 7.1.1.1	P
	Flames and glowing extinguish within 30 s	see appended table 7.1.1.1	P
	No ignition of the tissue paper	see appended table 7.1.1.1	P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances.....	see appended table 7.1.3	P
	Creepage distances	see appended table 7.1.3	P
	Pollution degree	3	—
	Comparative tracking index (V)	500 V	—
	Material group	II	—
7.1.4	Actuator		P
7.1.4.1	Insulation		—
	Actuator insulated from live parts for		—
	- rated insulation voltage	1000 V	P
	- rated impulse withstand voltage	12 kV	P
	Actuator made of metal		—
	- connected to a protective conductor or provided with an additional insulation		N/A
	Actuator made of or covered by insulating 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		N/A

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
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	Visible isolating distance between open contacts in the open position	P
7.1.5.2	Indication by the actuator.		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 (Ue > 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 XIII, Part 1) (mm)	14 mm	—
	- measured clearances (mm)	35 mm	P
	- test Uimp across gap (kV)	18,1 kV	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N/A
	Auxiliary switch is rated according to IEC 60947-5-1 (unless the equipment is rated AC-23)		N/A
	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/A
	During the closing operation the contacts of the auxiliary switch closes after or simultaneously with the contacts of the main poles		N/A
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N/A
	The locking means is so designed that it cannot be removed with the appropriate padlock(s) installed		N/A
	Test force F applied to the actuator in an attempt to operate to the closed position (N)	—	—

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated impulse withstand voltage (kV)	—	—
	Test Uimp on open main contacts at the test force		N/A
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 operator 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	Terminals of type V	P
	Mechanical strength of terminals	Sample No A2/11	P
	Maximum cross-sectional area of conductor (mm ²)	240 mm ² (rigid)	—
	Diameter of thread (mm)	11,8 mm	—
	Torque (Nm)	1,1 x 40 Nm = 44 Nm	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		P
	Conductor of the smallest cross-sectional area (mm ²)	50 mm ² (flexible)	—
	Number of conductor of the smallest cross section:	1	—
	Diameter of bushing hole (mm)	15,9 mm	—
	Height between the equipment and the platen ...	343 mm	—
	Mass at the conductor(s) (kg)	9,5 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	236 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Conductor of the largest cross-sectional area (mm ²)	240 mm ² (rigid)	—
	Number of conductor of the largest cross section :	1	—
	Diameter of bushing hole (mm)	28,6 mm	—
	Height between the equipment and the platen	464 mm	—
	Mass at the conductor(s) (kg)	20 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	578 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest and smallest cross-sectional area (mm ²)	—	—
	Number of conductor of the smallest cross section, number of conductor of the largest cross section :	—	—
	Diameter of bushing hole (mm)	—	—
	Height between the equipment and the platen	—	—
	Mass at the conductor(s) (kg)	—	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		N/A
	Pull-out test		N/A
	Force (N), applied for 1 min.	—	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		N/A
7.1.7.2	Connection capacity		P
	Type of conductors	Rigid/flexible	—
	Minimum cross-sectional area of conductor (mm ²)	50 mm ²	—
	Maximum cross-sectional area of conductor (mm ²)	240 mm ²	—
	Number of conductors simultaneously connectable to the terminal	1	—

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.2.4	Mechanical properties of terminals	Terminals of type 2V	P
	Mechanical strength of terminals	Sample No A2/15	P
	Maximum cross-sectional area of conductor (mm ²) :	2x240 mm ² (rigid)	—
	Diameter of thread (mm)	11,8 mm	—
	Torque (Nm)	1,1 x 40 Nm = 44 Nm	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		P
	Conductor of the smallest cross-sectional area (mm ²)	50 mm ² (flexible)	—
	Number of conductor of the smallest cross section:	2	—
	Diameter of bushing hole (mm)	15,9 mm	—
	Height between the equipment and the platen	343 mm	—
	Mass at the conductor(s) (kg)	9,5 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min. :	236 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest cross-sectional area (mm ²)	240 mm ² (rigid)	—
	Number of conductor of the largest cross section :	2	—
	Diameter of bushing hole (mm)	28,6 mm	—
	Height between the equipment and the platen	464 mm	—
	Mass at the conductor(s) (kg)	20 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min. :	578 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest and smallest cross- sectional area (mm ²)	240 mm ² + 50 mm ²	—

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Number of conductor of the smallest cross section number of conductor of the largest cross section :	1 1	—
	Diameter of bushing hole (mm)	28,6 mm	—
	Height between the equipment and the platen	464 mm	—
	Mass at the conductor(s) (kg)	20 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	578 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest and smallest cross- sectional area (mm ²)	240 mm ² + 50 mm ²	—
	Number of conductor of the smallest cross section, number of conductor of the largest cross section :	1 1	—
	Diameter of bushing hole (mm)	15,9 mm	—
	Height between the equipment and the platen	343 mm	—
	Mass at the conductor(s) (kg)	9,5 kg	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min.	236 N	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
7.1.7.2	Connection capacity		—
	Type of conductors	Rigid/flexible	—
	Minimum cross-sectional area of conductor (mm ²) :	50 mm ²	—
	Maximum cross-sectional area of conductor (mm ²)	240 mm ²	—
	Number of conductors simultaneously connectable to the terminal	2	—
7.1.7.3	Connection		P
	Terminals for connection to external conductors are readily accessible during installation		P

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	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/A
	Protective earth terminal		N/A
	Other terminals	L1, L2, L3	P
7.1.8	Additional requirements for equipment provided with a neutral pole		N/A
	Equipment provided with a pole intended for the connection of neutral, this pole shall be clearly marked by the letter "N"		N/A
	The switched neutral pole does not break before and does not make after the other poles except		N/A
	- a pole having the appropriate short-circuit breaking and making capacity is used as neutral pole, all poles may operate together		N/A
	Conventional thermal current of neutral pole		N/A
7.1.9	Provisions for protective earthing		N/A
7.1.9.1	The exposed conductive parts are electrically interconnected and connected to a protective earth terminal		N/A
7.1.9.2	Protective earth terminal is readily accessible		N/A
	Protective earth terminal is suitably protected against corrosion		N/A
	Electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N/A
	Protective earth terminal has no other functions		N/A
7.1.9.3.	Protective earth terminal marking and identification		N/A
7.1.10	Enclosure for equipment		P
7.1.10.1	Design		P
	When the enclosure is opened, all parts requiring access for installation and maintenance are readily accessible	Integral enclosure	P
	Sufficient space is provided inside the enclosure		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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/A
	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/A
	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/A
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means is provided to prevent loss of the fastening devices		N/A
	If the enclosure is used for mounting push-buttons, it is not possible to remove the buttons from the outside of the enclosure		N/A
7.1.10.2	Insulation		N/A
	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/A
7.1.11	Degree of protection of enclosed equipment		N/A
	Degree of protection		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		P
8.3.3.1	Temperature-rise	Samples Nos. A2/10, A2/11 and A2/15	P
	ambient temperature 10-40 °C	See appended tables 8.3.3.1	—
	test enclosure W x H x D (mm x mm x mm)	—	—
	material of enclosure	—	—
	Main circuits, test conditions:		—
	- conventional thermal current I _{th} (A)	400 A	—
	- conventional enclosed thermal current I _{the} (A) ..	—	—
	- cable/busbar cross-section (mm ²) / length (mm) :	240 mm ²	—
	Fuse-link details (fuse-combination units only):		—
	- manufacturer's name, trademark or identification mark	APATOR	—
	- manufacturer's model or type reference	WTNH gG	—
	- rated current (A)	400 A	—
	- power loss (W)	31 W	—
	- rated breaking capacity (kA)	120 kA	—
	Measured temperature-rise	See appended tables 8.3.3.1	P
	Auxiliary circuits, test conditions:		N/A
	- rated operation current (A)	—	—
	- cable cross-section (mm ²)	—	—
	Measured temperature-rise	—	N/A
8.3.3.2	Test of dielectric properties	Samples Nos. A2/10, A2/11 and A2/15	P
	Rated impulse withstand voltage (kV)	12 kV	—
	- test U _{imp} main circuits (kV)	14,5 kV	P
	- test U _{imp} auxiliary circuits (kV)	—	N/A
	- test U _{imp} on open main contacts (equipment suitable for isolation) (kV)	18,1 kV	P
	Power-frequency withstand voltage (V)	2200 V	—
	- main circuits, test voltage for 5 sec. (V)	5 s	P
	- control and auxiliary circuits, test voltage for 5 sec. (V)	—	N/A
	Devices, which have been disconnected for the power-frequency withstand voltage test	—	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Equipment suitable for isolation. leakage current not exceed 0.5 mA		---
	Test voltage 1,1 Ue (V)	759 V	---
	Measured leakage current (mA)	0,009 mA	P
8.3.3.3	Making and breaking capacity	Sample No.: A2/1	P
	- utilization category	AC-22B	---
	- rated operational voltage Ue (V)	690 V	---
	- rated operational current Ie (A) or power (kW) ..	400 A	---
	Conditions for make/break operations or make operation, AC-22B:		P
	- test voltage, U = 1,05 Ue.....(V):	L1: 725 V L2: 725 V L3: 725 V	---
	- test current, I = 3 x Ie (A):	L1: 1213 A L2: 1216 A L3: 1216 A	---
	- power factor	L1: 0,65 L2: 0,65 L3: 0,65	---
	Conditions for break operation, AC-22B		P
	- test voltage, U = 1,05 Ue.....(V):	L1: 725 V L2: 725 V L3: 725 V	---
	- test current, I = 3 x Ie (A):	L1: 1213 A L2: 1216 A L3: 1216 A	---
	- power factor	L1: 0,65 L2: 0,65 L3: 0,65	---
	Number of make/break or make and break operations	5 make 5 break	P
	- recovery voltage duration (≥ 50 ms)	725 V	P
	- current duration (ms)	440 ms	---
	- time interval between operations	35 s	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		P
	- oscillatory frequency (kHz)	44,24 kHz	---
	- measured oscillatory frequency (kHz)	L1: 42,80 kHz L2: 44,05 kHz L3: 43,30 kHz	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- factor γ	L1: 1,09 L2: 1,07 L3: 1,09	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 and 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	120 N (before the test 90 N)	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~	1380 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage ($1,1 U_e$) (V)	759 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)	0,009 mA	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm^2)	240 mm^2	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.3.6	P

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Clause	Requirement + Test	Result - Remark	Vérdict
8.3.3.3	Making and breaking capacity	Sample No.: A2/3	P
	- utilization category	AC-22B	—
	- rated operational voltage U_e (V)	400 V	—
	- rated operational current I_e (A) or power (kW) ...	400 A	—
	Conditions for make/break operations or make operation, AC-22B:		P
	- test voltage, $U = 1,05 U_e$(V):	L1: 420 V L2: 421 V L3: 421 V	—
	- test current, $I = 3$ x I_e (A):	L1: 1215 A L2: 1214 A L3: 1218 A	—
	- power factor	L1: 0,66 L2: 0,65 L3: 0,66	—
	Conditions for break operation, AC-22B		P
	- test voltage, $U = 1,05 U_e$(V):	L1: 420 V L2: 421 V L3: 421 V	—
	- test current, $I = 3$ x I_e (A):	L1: 1215 A L2: 1214 A L3: 1218 A	—
	- power factor	L1: 0,66 L2: 0,65 L3: 0,66	—
	Number of make/break or make and break operations	5 make 5 break	P
	- recovery voltage duration (≥ 50 ms)	421 V	P
	- current duration (ms)	430 ms	—
	- time interval between operations	35 s	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		P
	- oscillatory frequency (kHz)	69,43 kHz	—
	- measured oscillatory frequency (kHz)	L1: 69,30 Hz L2: 68,25 kHz L3: 68,85 kHz	P
	- factor γ	L1: 1,08 L2: 1,09 L3: 1,06	P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and 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	110 N (before the test 90 N)	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~ :	1380 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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)	0,010 mA	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm^2)	240 mm^2	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.3.6	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity	Sample No.: A2/H	P
	- utilization category	AC-21B	—
	- rated operational voltage U_e (V)	690 V	—
	- rated operational current I_e (A) or power (kW) ..	400 A	—
	Conditions for make/break operations or make operation, AC-21B:		P
	- test voltage, $U = 1,05 U_e$(V):	L1: 725 V L2: 725 V L3: 725 V	—
	- test current, $I = 1,5$ x I_e (A):	L1: 616 A L2: 625 A L3: 612 A	—
	- power factor.....	L1: 0,96 L2: 0,95 L3: 0,96	—
	Conditions for break operation, AC-21B		P
	- test voltage, $U = 1,05 U_e$(V):	L1: 725 V L2: 725 V L3: 725 V	—
	- test current, $I = 1,5$ x I_e (A):	L1: 616 A L2: 625 A L3: 612 A	—
	- power factor	L1: 0,96 L2: 0,95 L3: 0,96	—
	Number of make/break or make and break operations	5 make 5 break	P
	- recovery voltage duration (≥ 50 ms)	725 V	P
	- current duration (ms)	390 ms	—
	- time interval between operations	35 s	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and 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	100 N (before the test 90 N)	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-..... :	1380 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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)	0,010 mA	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm^2)	240 mm^2	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.3.6	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity	Sample No.: A2/6	P
	- utilization category	AC-21B	—
	- rated operational voltage Ue (V)	400 V	—
	- rated operational current Ie (A) or power (kW) ..	400 A	—
	Conditions for make/break operations or make operation, AC-21B:		P
	- test voltage, U = 1,05 Ue.....(V):	L1: 420 V L2: 421 V L3: 421 V	—
	- test current, I = 1,5 x Ie (A):	L1: 610 A L2: 612 A L3: 610 A	—
	- power factor	L1: 0,94 L2: 0,95 L3: 0,95	—
	Conditions for break operation, AC-21B		P
	- test voltage, U = 1,05 Ue.....(V):	L1: 420 V L2: 421 V L3: 421 V	—
	- test current, I = 1,5 x Ie (A):	L1: 610 A L2: 612 A L3: 610 A	—
	- power factor	L1: 0,94 L2: 0,95 L3: 0,95	—
	Number of make/break or make and break operations	5 make 5 break	P
	- recovery voltage duration (≥ 50 ms)	421 V	P
	- current duration (ms)	430 ms	—
	- time interval between operations	35 s	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only		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		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and 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	120 N (before the test 90 N)	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~	1380 V	—
	No flashover or breakdown		P
8.3.3.5	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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)	0,010 mA	P
8.3.3.6	Temperature-rise verification		P
	- conductor cross-section (mm ²)	240 mm ²	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.3.6	P
8.3.3.7	Strength of actuator mechanism		N/A
8.2.5	Verification of the strength of actuator mechanism and position indicating device		N/A
	- actuator type (fig.)	1e	—
8.2.5.2.1	Dependent and independent manual operation		N/A
	- actuating force for opening (N)	90 N	—
	- test force with blocked main contacts (N)	—	—
	- used method to keep the contact closed	—	—

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Clause	Requirement + Test	Result - Remark	Verdict
	During and after the test, open position not indicated.....	The main contacts position is visible in the open position -- test not applicable	N/A
	Equipment with locking mean, no locking in the open position while test force is applied.....	---	N/A
8.2.5.2.2	Dependent power operation	---	N/A
	- main contacts fixed together in the closed position:.....	---	N/A
	- used method to keep the contact closed.....	---	N/A
	- 110% of the rated supply voltage applied to the equipment (3 times).....	---	N/A
	During and after the test, open position not indicated.....	---	N/A
	Equipment show no damage impairing its normal operation.....	---	N/A
	Equipment with locking mean, no locking in the open position while test force is applied.....	---	N/A
8.2.5.2.3	Independent power operation	---	N/A
	- main contacts fixed together in the closed position:.....	---	N/A
	- used method to keep the contact closed.....	---	N/A
	- stored energy of the power operator released (3 times).....	---	N/A
	During and after the test, open position not indicated.....	---	N/A
	Equipment show no damage impairing its normal operation.....	---	N/A
	Equipment with locking mean, no locking in the open position while test force is applied.....	---	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY		P
8.3.4.1	Operational performance test	Sample No A2/2	P
	- utilization category	AC-22B	—
	- rated operational voltage (V)	690 V	—
	- rated operational current (A)	400 A	—
	Test conditions for electrical operation cycles:		
	- test voltage (V)	L1: 692 V L2: 693 V L3: 692 V	—
	- test current (A)	L1: 408 A L2: 410 A L3: 405 A	—
	- power factor/time constant	L1: 0,80 L2: 0,81 L3: 0,81	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current)	without current	—
	Second test sequence (with/without current)	with current	—
	- time interval between first and second test sequence	7500 s	—
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 and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	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	80 N (before the test 90 N)	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-	1380 V	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1.1 U_e) (V)	759 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	0,011 mA	P
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²)	240 mm ²	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.4.4	P
8.3.4.1	Operational performance test	Sample No A2/7	P
	- utilization category	AC-22B	—
	- rated operational voltage (V)	400 V	—
	- rated operational current (A)	400 A	—
	Test conditions for electrical operation cycles:		
	- test voltage (V)	L1: 400 V L2: 400 V L3: 401 V	—
	- test current (A)	L1: 406 A L2: 402 A L3: 405 A	—
	- power factor/time constant	L1: 0,79 L2: 0,79 L3: 0,79	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current)	without current	—
	Second test sequence (with/without current)	with current	—
	- time interval between first and second test sequence	3000 s	—
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	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	120 N (before the test 90 N)	P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.4.2	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~ :	1380 V	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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	0,010 mA	P
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²)	240 mm ²	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise.....	see appended tables 8.3.4.4	P
8.3.4.1	Operational performance test	Sample No A2/5	P
	- utilization category	AC-21B	—
	- rated operational voltage (V)	690 V	—
	- rated operational current (A)	400 A	—
	Test conditions for electrical operation cycles:		
	- test voltage (V)	L1: 691 V L2: 692 V L3: 692 V	—

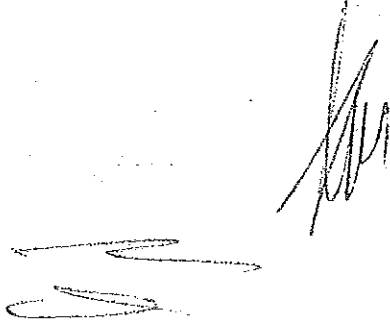
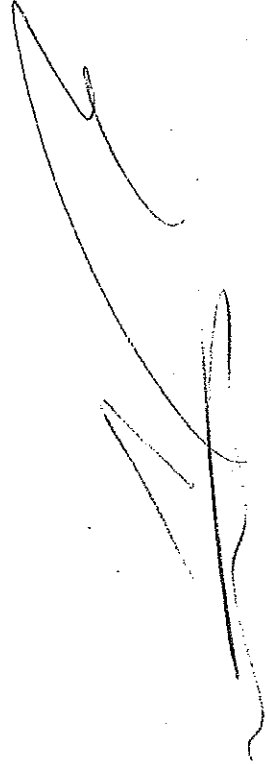
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Clause	Requirement + Test	Result - Remark	Verdict
	- test current (A)	L1: 408 A L2: 412 A L3: 405 A	—
	- power factor/time constant	L1: 0,94 L2: 0,94 L3: 0,94	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current)	without current	—
	Second test sequence (with/without current)	with current	—
	- time interval between first and second test sequence	2000 s	—
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 and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	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	100 N (before the test 90 N)	P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.4.2	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V-	1380 V	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1.1 U_e) (V)	759 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	0,011 mA	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²)	240 mm ²	—
	- test current I _e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.4.4	P
8.3.4.1	Operational performance test	Sample No. 2/8	P
	- utilization category	AC-21B	—
	- rated operational voltage (V)	400 V	—
	- rated operational current (A)	400 A	—
	Test conditions for electrical operation cycles:		
	- test voltage (V)	L1: 400 V L2: 400 V L3: 401 V	—
	- test current (A)	L1: 402 A L2: 404 A L3: 404 A	—
	- power factor/time constant	L1: 0,95 L2: 0,96 L3: 0,95	—
	Number of cycles with current	200	P
	Number of cycles without current	800	P
	First test sequence (with/without current)	without current	—
	Second test sequence (with/without current)	with current	—
	- time interval between first and second test sequence	3500 s	—
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 and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after making and breaking capacity tests		P
	Immediately after the test equipment must work satisfactorily		P

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- required opening force not greater than the test force of 8.2.5.2 and table 8	120 N (before the test 90 N)	P
	- equipment is able to carry its rated current after normal closing operation		P
8.3.4.2	Dielectric verification		P
	test voltage: $2 \cdot U_e$ with a minimum of 1000V~	1380 V	—
	No breakdown or flashover		P
8.3.4.3	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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	0,010 mA	P
8.3.4.4	Temperature-rise verification		P
	- conductor cross-section (mm ²)	240 mm ²	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise	see appended tables 8.3.4.4	P

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IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY		N/A
	Requirements of this clause not applicable to the tested products		—



IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		P
	Short-circuit breaking capacity test was carried out at Laboratorium Badawcze Aparatury Rozdzielczej of Instytut Elektrotechniki in Warsaw. The particular results of the test are given in test report No. 7670/NBR/08		--
	Protective device details:	Sample No. 3W	P
	- manufacturer's name, trademark or identification mark	APATOR	--
	- manufacturer's model or type reference	WTNH 2 gG	--
	- rated voltage (V)	500 V	--
	- rated current (A)	400 A	--
	- rated breaking capacity (kA)	120 kA	--
8.3.6.2	Fuse protected short-circuit withstand		P
	test voltage (1,05 Ue) (V)	420 V	--
	test current (kA)	100 kA	--
	rated frequency (Hz)	50 Hz	--
	power factor	0,2	--
	Time constant (ms)	--	--
	Fuse protected short-circuit withstand (equipment in closed position)		
	- max. let-through current (kA)	L1: 35,54 kA L2: 26,164 kA L3: 40,95 kA	--
	- Joule integral I ² dt (A ² s)	L1: 1610 kA ² s L2: 780 kA ² s L3: 1530 kA ² s	--
	Fuse protected short-circuit making		P
	- mean velocity of 15 manually under no-load conditions operations (m/s)	1 m/s	--
	- point at which the measurement is made	Actuator	--
	- test speed during the fuse protected short-circuit making (m/s)	1 m/s	--
	- max. let-through current (kA)	L1: 39,89 kA L2: 28,07 kA L3: 11,24 kA	--
	- Joule integral I ² dt (A ² s)	L1: 1340 kA ² s L2: 648 kA ² s L3: 146 kA ² s	--
8.3.6.2.5	Behaviour of the equipment during the test		P

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles and poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.6.2.6	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	120 N (before the test 90 N)	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~ :	1380 V	—
	No flashover or breakdown		P
8.3.6.4	Leakage current		P
	test voltage (1,1 U_e) (V)	759 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) $\leq 2,0$ mA/pole	0,012 mA	P
8.3.6.5	Temperature-rise verification		P
	- conductor cross-section (mm^2)	240 mm^2	—
	- test current I_e (A)	400 A	—
	Measured temperature-rise.....	see appended table 8.3.6.5	P

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		P
8.3.7.1	Overload test		P
	ambient temperature 10-40	24 °C	—
	test enclosure W x H x D (mm x mm x mm)	—	—
	material of enclosure	—	—
	test current 1,6xI _{th} or 1,6xI _{lh} (A)	640 A	—
	cable/busbar cross-section (mm ²) / length (mm) ..	240 mm ²	—
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark	APATOR WTNH 2	—
	- rated current (A)	400 A	—
	- power loss (W)	29 W	—
	- rated breaking capacity (kA)	120 kA	—
	- time duration of the overload test (s)	1826 s	—
	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	5 min open and close	P
	Required opening force not greater than the test force of 8.2.5.2 and table 8	95 N	P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage: 2*U _e with a minimum of 1000V~	1380 N	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage (1,1 U _e) (V)	759 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	0,010 mA	P
8.3.7.4	Temperature-rise verification		P
	Fuse links aged during the overload test are replaced by new fuse-links	—	P
	- conductor cross-section (mm ²)	400 A	—
	- test current I _e (A)	240 mm ²	—
	Measured temperature-rise	see appended table 8.3.7.4	P


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IEC / EN 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

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
Annex A (normative)			N/A
A	Equipment for direct switching of a single motor		N/A
	Requirements of this clause not applicable to the tested products		

IEC / EN 60947-3							
Clause	Requirement + Test			Result - Remark			Verdict
7.1.3	TABLE: Clearance and creepage distance measurements						P
Type of fuse-switch disconnecter	clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm) case A / B	cl (mm)	required dcr (mm)	dcr (mm)
ARS 2-6-M	L-L	12 kV	1000	14 / 4,5	27,4	14	55,6
	L-A				9,1		15,0
ARS 2-1-V	L-L				16,6		55,6
	L-A				9,1		15,0
ARS 2-1-2V	L-L				10,0		55,6
	L-A				9,1		15,0
supplementary information: —							

7.1.1.1	TABLE: resistance to heat and fire. Glow-wire flammability test.						P
	Conditioning time	24 h					—
	Ambient temperature	20 °C					—
	Relative humidity	50 %					—
	Time of glow-wire tip application (t _a)	(30 ± 1) s					—
Tested part / material / market name / color	Thickness of material	Wire temperature	Duration from tip application to ignition	Duration from tip application to flames extinguishing	Height of flame	Specified layer ignition	Verdict
	mm	°C	(t _i) s	(t _e) s	mm	no / yes	
Viewer I, Viewer II, terminals housing / polycarbonate / Lexan 9945A / transparent	2	650	0	0	0	no	P
Enclosure, actuator, cover, conductor / poliamid / Starflam RX06082 / grey or black	3	650	0	0	0	no	P
Base, arc chamber, terminals cover, blocking plate / poliamid / Starflam RF0057E/ grey	2	960	5	31	3	no	P
supplementary information:							
Test carried out on parts from equipment. Criteria of acceptance: t _e ≤ t _a + 30 s.							

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.1	TABLE: Temperature-rise (measurements)	Sample No A2/10	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	67	70
	L2	68	
	L3	60	
	U	52	
	V	54	
	W	52	
Manual operating means: metallic / non-metallic		—/7	15/25
Parts intended to be touched but not hand-held: metallic / non-metallic		—/16	30/40
Parts which need not be touched during normal operation: metallic / non-metallic		—/25	40/50
supplementary information: ambient temperature: 23 °C			

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.1	TABLE: Temperature-rise (measurements)	Sample No A2/11	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	55	70
	L2	68	
	L3	58	
	U	41	
	V	47	
	W	42	
Manual operating means: metallic / non-metallic		—/11	15/25
Parts intended to be touched but not hand-held: metallic / non-metallic		—/36	30/40
Parts which need not be touched during normal operation: metallic / non-metallic		—/41	40/50
supplementary information: ambient temperature: 25 °C			

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.1	TABLE: Temperature-rise (measurements)	Sample No A2/15	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	47	70
	L2	65	
	L3	61	
	U	35	
	V	39	
	W	40	
Manual operating means: metallic / non-metallic		—/10	15/25
Parts intended to be touched but not hand-held: metallic / non-metallic		—/33	30/40
Parts which need not be touched during normal operation: metallic / non-metallic		—/35	40/50
supplementary information: ambient temperature: 25 °C			

8.3.3.6	TABLE: Temperature-rise (measurements)	Sample No A2/1	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	60	80
	L2	74	
	L3	66	
	U	51	
	V	53	
	W	57	
Manual operating means: metallic / non-metallic		—/7	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/27	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/45	50/60
supplementary information: ambient temperature: 24 °C			

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.6	TABLE: Temperature-rise (measurements)	Sample No A2/3	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	65	80
	L2	48	
	L3	50	
	U	43	
	V	45	
	W	43	
Manual operating means: metallic / non-metallic		—/10	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/23	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/44	50/60
supplementary information: ambient temperature: 23 °C			

IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.6	TABLE: Temperature-rise (measurements)	Sample No A2/4	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	61	80
	L2	41	
	L3	43	
	U	38	
	V	39	
	W	40	
Manual operating means: metallic / non-metallic		—/10	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/16	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/32	50/60
supplementary information: ambient temperature: 24 °C			

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IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.6	TABLE: Temperature-rise (measurements)	Sample No A2/6	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	75	80
	L2	45	
	L3	43	
	U	39	
	V	38	
	W	40	
Manual operating means: metallic / non-metallic		—/10	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/29	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/36	50/60
supplementary information: ambient temperature: 25 °C			

8.3.4.4	TABLE: Temperature-rise (measurements)	Sample No A2/2	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	62	80
	L2	71	
	L3	72	
	U	55	
	V	56	
	W	52	
Manual operating means: metallic / non-metallic		—/6	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/26	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/33	50/60
supplementary information: ambient temperature: 24 °C			

IEC / EN 60947-3				
Clause	Requirement + Test	Result	Remark	Verdict
8.3.4.4	TABLE: Temperature-rise (measurements)	Sample No A2/7		P
Temperature rise dT of part:		dT (K) measured		dT (K) required
Terminals	L1	65		80
	L2	45		
	L3	46		
	U	42		
	V	38		
	W	40		
Manual operating means: metallic / non-metallic		—/9		25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/28		40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/39		50/60
supplementary information: ambient temperature: 24 °C				

IEC / EN 60947-3				
Clause	Requirement + Test	Result	Remark	Verdict
8.3.4.4	TABLE: Temperature-rise (measurements)	Sample No A2/7		P
Temperature rise dT of part:		dT (K) measured		dT (K) required
Terminals	L1	52		80
	L2	53		
	L3	56		
	U	43		
	V	45		
	W	44		
Manual operating means: metallic / non-metallic		—/10		25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/23		40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/30		50/60
supplementary information: ambient temperature: 24 °C				

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IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4.4	TABLE: Temperature-rise (measurements)	Sample No A2/B	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	63	80
	L2	62	
	L3	60	
	U	42	
	V	41	
	W	44	
Manual operating means: metallic / non-metallic		—/9	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/28	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/37	50/60
supplementary information: ambient temperature: 25 °C			

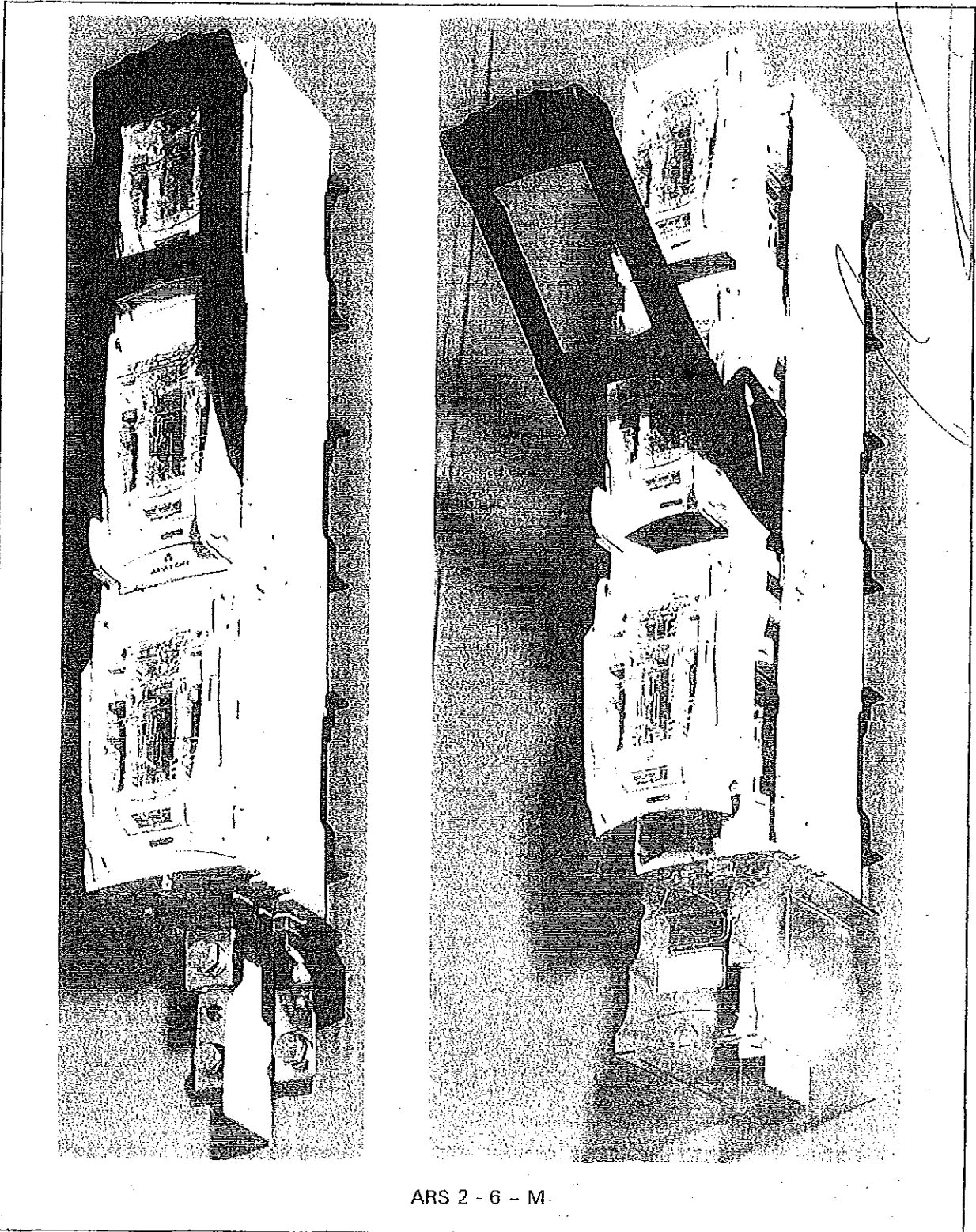
8.3.6.5	TABLE: Temperature-rise (measurements)	Sample No. 3W	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	43	80
	L2	41	
	L3	38	
	U	46	
	V	47	
	W	51	
Manual operating means: metallic / non-metallic		—/6	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/16	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—29	50/60
supplementary information: ambient temperature: 25 °C			

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IEC / EN 60947-3			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.7.4	TABLE: Temperature-rise (measurements)	Sample No. A2/9	P
Temperature rise dT of part:		dT (K) measured	dT (K) required
Terminals	L1	41	80
	L2	44	
	L3	40	
	U	41	
	V	45	
	W	43	
Manual operating means: metallic / non-metallic		—/9	25/35
Parts intended to be touched but not hand-held: metallic / non-metallic		—/22	40/50
Parts which need not be touched during normal operation: metallic / non-metallic		—/28	50/60
supplementary information: ambient temperature: 25 °C			

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Photos of ARS 2



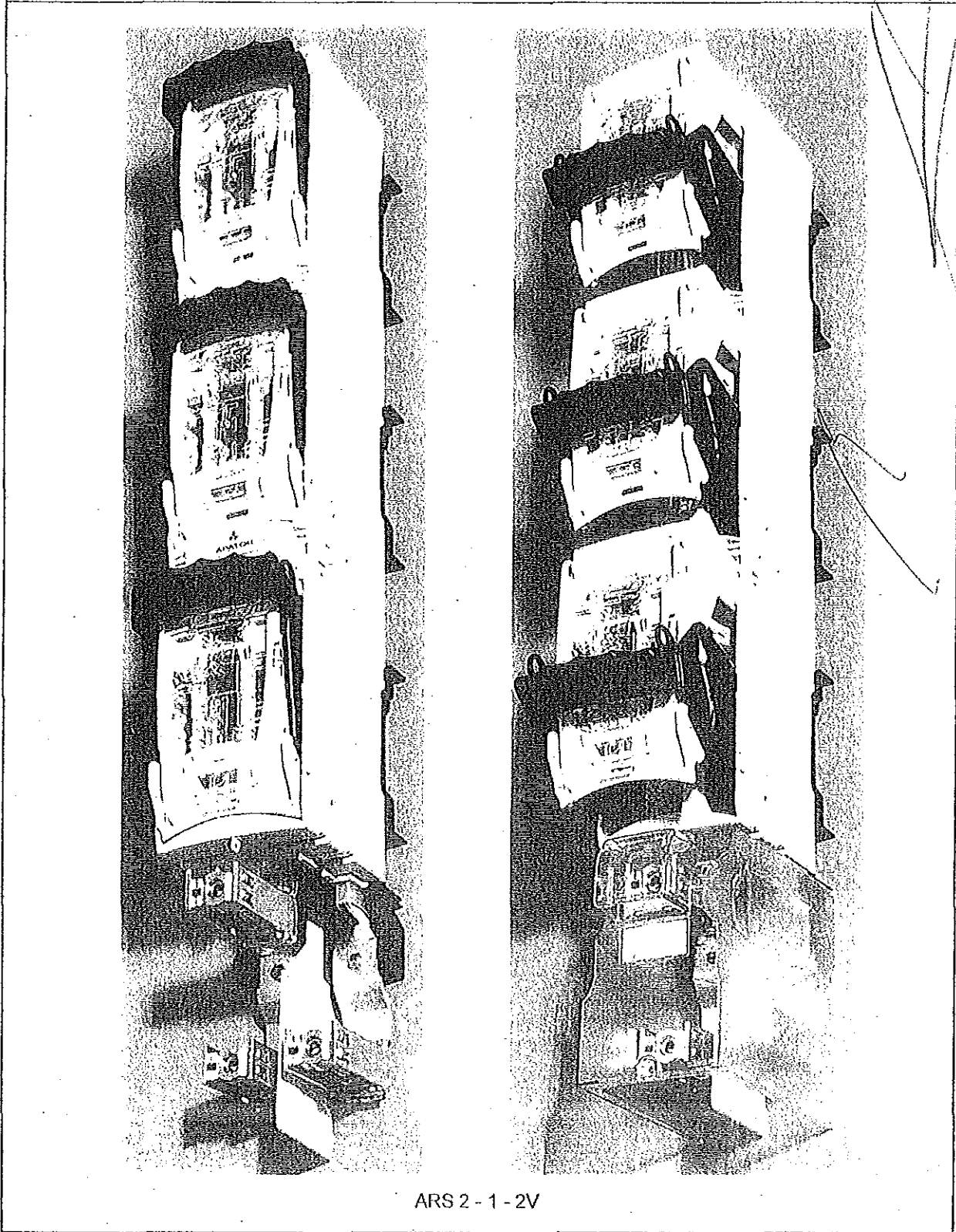
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ARS 2 - 1 - V

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СПИСЪК

на типовите изпитвания, проведени от независима изпитвателна лаборатория,
за предлаганите вертикални предпазител-разединители, както следва:

- Маркировка
- Конструкция
- Основни характеристики
- Повишаване на температурата
- Диелектрични свойства
- Работна и гранична изключвателна възможност при късо съединение
- Проверка на диелектричните свойства
- Ток на утечка
- Проверка при повишаване на температурата
- Експлоатационна възможност на задвижващия механизъм
- Работни характеристики
- Изпитване на експлоатационната възможност
- Проверка на диелектричните свойства на прекъсвач-разединителя
- Ток на утечка
- Проверка при повишаване на температурата
- Характеристики при късо съединение
- Издържан импулсен ток
- Работна изключвателна възможност при късо съединение
- Проверка на диелектричните свойства
- Ток на утечка
- Проверка при повишаване на температурата
- Условен ток на късо съединение
- Издържан ток на късо съединение със стопяем предпазител
- Проверка на диелектричните свойства
- Ток на утечка
- Проверка при повишаване на температурата
- Характеристики при претоварване
- Изпитване на претоварване
- Проверка на диелектричните свойства
- Ток на утечка
- Проверка при повишаване на температурата



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