Наименование на материала: Вентилни отводи НН, метало-оксиден тип, без искрови разрядници, 10 kA, клас II

Съкратено наименование на материала: Вент.отв. ZnO, НН/10 kA, клас II

Област: А – Въздушни електропроводни линии НН
Н – Трансформаторни постове

Категория: 20 – Защита от пренапрежения

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

Вентилни отводи НН, без искрови разрядници, с метало-оксидно съпротивление от ZnO (варистор), чиято стойност зависи от приложеното напрежение, за монтиране на открито и закрито. Вентилните отводи са съоръжени с пружинен механизъм, който в случаите на близко попадение на мълния или на топлинно претоварване ги разединява от мрежата и индицира повреда.
Елементите на вентилните отводи са поместени в устойчива на лъчения в ултравиолетовия диапазон не разпространяваща горенето полимерна изолационна обвивка, предотвратяваща от злополуки и вреди вследствие на пръсване в случаите на повреди.
Вентилните отводи са съоръжение със съответните аксесоари, позволяващи директно монтиране на неизолирани или изолирани фазови проводници на въздушните електропроводни линии НН без необходимост от използване на помощна носеща конструкция или директно на шините на разпределителните табла на мачтови трансформаторни постове.
Конструкцията и аксесоарите на вентилните отводи, предназначени за въздушни кабелни линии с изолирани усукани проводници, предпазват от допиране на тоководещи части.
Вентилните отводи могат да бъдат монтирани към електрическото съоръжаване с допустимо отклонение от вертикалата до ± 30°.

Използване:

Вентилните отводи се използват за защита на електрическото съоръжаване (силови трансформатори и електроразпределителната мрежа НН) от атмосферни и комутационни пренапрежения.

Съответствие на предлаганото изделие със стандартизационните документи:

Вентилните отводи трябва да отговарят на приложимите български и международни стандарти или еквивалентно/и, включително на посочените по-долу и на техните валидни изменения и поправки:

- **БДС EN 61643-11:2012** „Устройства за защита срещу отскоци на ниско напрежение. Част 11: Устройства за защита срещу отскоци на напрежението, свързани към електроразпределителни мрежи за ниско напрежение. Технически изисквания и методи за изпитване (IEC 61643-11:2011)“ или еквивалентно/и.
-

Изисквания към документацията и изпитванията:

№ по ред	Наименование	Приложение № или текст
1.	Точно обозначение на типа, производителя и страна на произход	LOVOS 10/440, ABB Poland, Приложение 9.16.1
2.	Техническо описание, гарантирани параметри, използвани материали и принадлежности (аксесоари)	Приложение 9.16.1
3.	Чертежи с размери	Приложение 9.16.1
4.	Декларация за съответствие на предлаганото изпълнение с изискванията на техническата спецификация на материала, вкл. на параграфи „Характеристика на материала” и „Съответствие на предложеното изпълнение със стандартизационните документи” по-горе	Приложение 9.16.4
5.	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.16.5
6.	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 5 – заверено копие	Приложение 9.16.6
7.	Информация за провежданите рутинни изпитвания	Приложение 9.16.7

№ по ред	Наименование	Приложение № или текст
7.	Информация за провежданите рутинни изпитвания	Приложение 9.16.7
8.	Изисквания за транспортиране, складиране и манипулиране	Приложение 9.16.8
9.	Инструкции за монтиране и за експлоатация и обслужване	Приложение 9.16.9
10.	Експлоатационна дълготрайност, год.	20 години

Забележка: Всички оригинални документи трябва да бъдат на български език или с превод на български език. Каталозите и изпитвателните протоколи могат да бъдат и само на английски език.

Технически данни

1. Параметри на електроразпределителната мрежа НН

№ по ред	Параметър	Стойност
1.1	***Номинално напрежение***	***400 / 230 V***
1.2	***Максимално работно напрежение***	***440 / 253 V***
1.3	***Номинална честота***	***50 Hz***
1.4	Брой проводници в разпределителната мрежа	4 - проводникова (L1, L2, L3, PEN)
1.5	Схема на разпределителната мрежа	TN-C

2. Характеристики на работната среда

№ по ред	Характеристика	Стойност
2.1	Максимална температура на въздуха на околната среда	+ 40°C
2.2	Минимална температура на въздуха на околната среда	Минус 25°C
2.3	Средна стойност на температурата на въздуха на околната среда, измерена за период от 24 h	+ 35°C
2.4	Относителна влажност	До 100 %
2.5	Надморска височина	До 1000 m

3. Технически параметри, характеристики и др. данни

№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
3.1	Трайно работно напрежение, U_c	min 440 V	440 V
3.2	Обявен разряден ток, I_n (8/20μs)	min 10 kA	10 kA
3.3	Максимален разряден ток, I_{max} (8/20 μs)	min 40 kA	40 kA
3.4	Остатъчно напрежение, U_{res} при обявен разряден ток I_n (8/20μs)	max 2,1 kV	1,8 kV
3.5	Способност за поглъщане на енергия	min 1,3 kJ/kV U_c	4 kJ/kV U_c
3.6	Материал на нелинейното съпротивление (варистора)	ZnO	ZnO
3.7	Материал на изолационната обвивка	Полимер	Полимер
3.8	Аксесоари за свързване към:	-	-

№ по ред	Параметър/характеристика	Изискване	Гарантирано предложение
3.8a	неизолирани алуминиево-стоманени проводници	Клемно съединение, подходящо за свързване към неизолирани алуминиево-стоманени проводници със сечения информативно в диапазона от min. (16÷70) mm^2.	Клемно съединение, подходящо за свързване към неизолирани алуминиево-стоманени проводници със сечения информативно в диапазона от min. (16÷70) mm^2.
3.8b	изолирани усукани алуминиеви проводници	Изолиран адаптер за свързване посредством изолирани отклонителни клеми (изолираните отклонителни клеми се доставят от възложителя).	Изолиран адаптер за свързване посредством изолирани отклонителни клеми
3.8c	правоъгълни алуминиеви шини	Шпилка съоръжена с гайка, подложна шайба и средство срещу самоотвиване или еквивалентно.	Шпилка съоръжена с гайка, подложна шайба и средство срещу самоотвиване
3.9	Материал на аксесоарите за свързване към фазовите проводници/шини	Неръждаем или еквивалентно/и	Неръждаем
3.10	Аксесоари за свързване към заземителната инсталация	Меден гъвкав проводник със сечение min 6 mm^2 с устойчива на UV лъчи PVC изолация с черен цвят с дължина min 1 m, присъединен към заземителния извод на вентилния отвод с подходящо устойчиво на корозия клемно съединение или еквивалентно.	Меден гъвкав проводник със сечение min 6 mm^2 с устойчива на UV лъчи PVC изолация с черен цвят с дължина 1 m, присъединен към заземителния извод на вентилния отвод с подходящо устойчиво на корозия клемно съединение
3.11	Клас на изпитванията (съгласно БДС EN 61643-11) или еквивалентно/и	Клас II	Клас II

4. Вентилни отводи НН - предназначение

№ по ред	Номер на стандарта	Съкратено наименование	Тип (според вида на съоръженията, за които са предназначени)	Тип/референтен номер (съгл. каталога на производителя)	Тегло, kg
4.1	20 20 4201	Вент.отв. ZnO, НН/10 kA, клас II,неизол.пров	За неизолирани алуминиево-стоманени проводници	LOVOS 10/440+27 21	0,2 kg
4.2	20 20 4202	Вент.отв. ZnO, НН/10 kA, клас II,изол.пров	За изолирани усукани алуминиеви проводници	LOVOS 10/440+27 19	0,2 kg
4.3	20 20 4203	Вент.отв. ZnO, НН/10 kA, клас II,шини	За правоъгълни алуминиеви шини	LOVOS 10/440	0,2 kg

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ПРИЛОЖЕНИЕ 9.16.1

Точно означение на типа, производителя и страна на произход

Техническо описание, гарантирани параметри, използвани материали и принадлежности (аксесоари)

Чертежи с размери

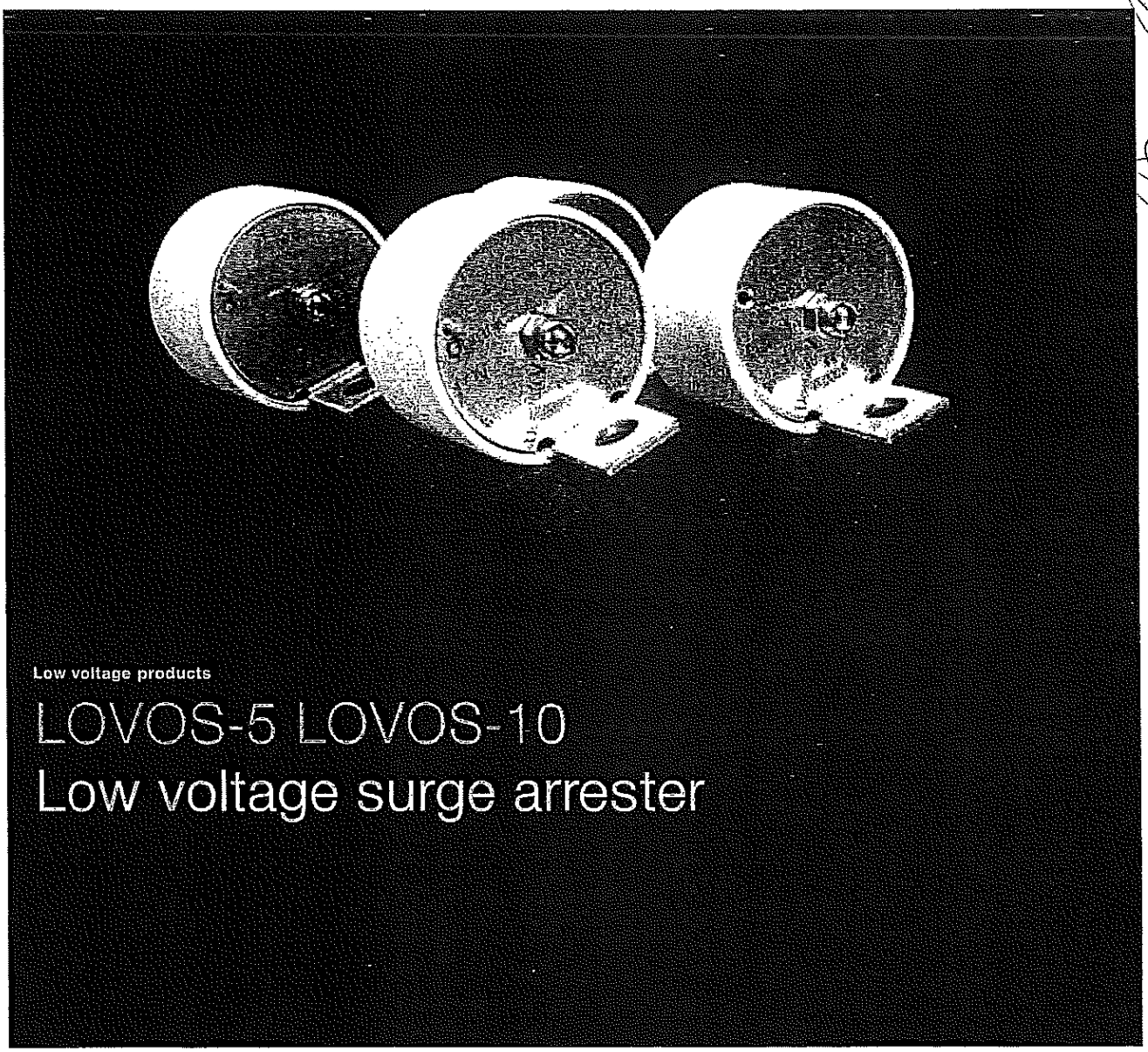
Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД



Low voltage products

LOVOS-5 LOVOS-10
Low voltage surge arrester

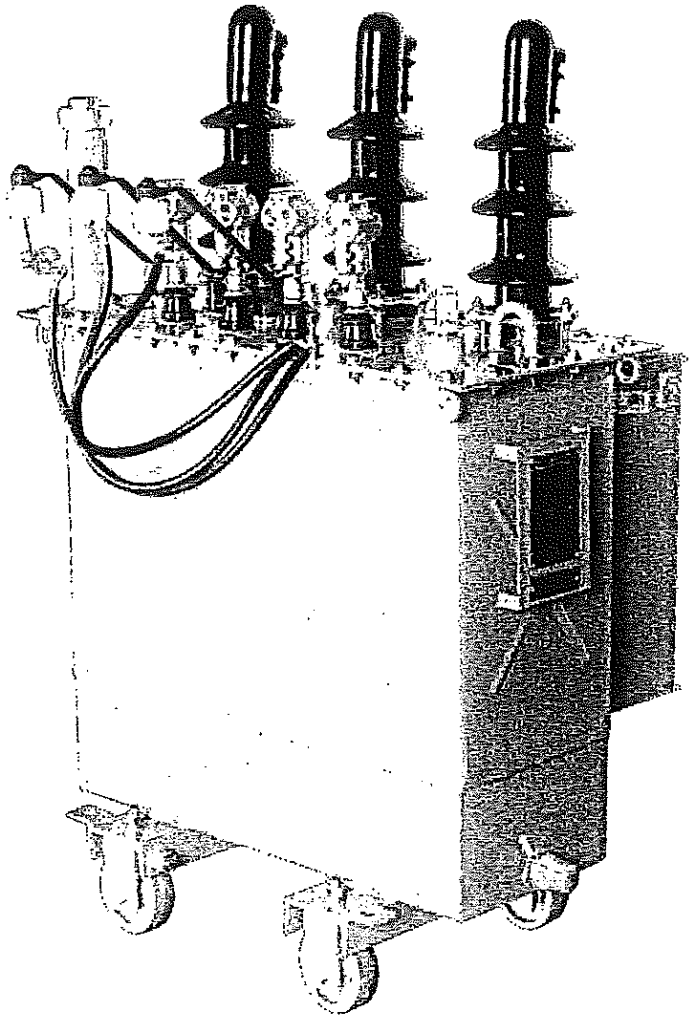
Power and productivity
for a better world™

ABB

LOVOS-5 and LOVOS-10 are a new generation of low voltage surge arresters

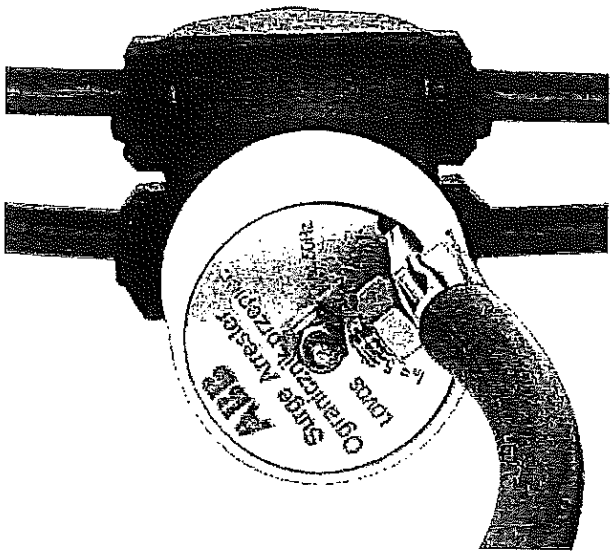
LOVOS-5 and LOVOS-10 are a new generation of low voltage surge arresters, designed in close cooperation with clients from the whole world, taking into account all needs and requirements of the market.

LOVOS-5 and LOVOS-10 ensure protection of low voltage overhead lines of individual electric energy receivers, distributing transformers and other low voltage power equipment from effects of lightning and switching overvoltage.



2 LOVOS – Low voltage surge arrester

LOVOS-5 and LOVOS-10 ensure protection of low voltage overhead lines



Principle of operation

The principal „active" element of the surge arrester is a metal oxide varistor characterised by high non-linearity. At a working voltage mainly a capacity current flows smaller than 1 mA. Any voltage increase causes a large increase of current flowing through the varistor, leading in turn to immediate limitation of further voltage increase on arrester terminals. When the overvoltage disappears, the arrester immediately returns to its basic state.

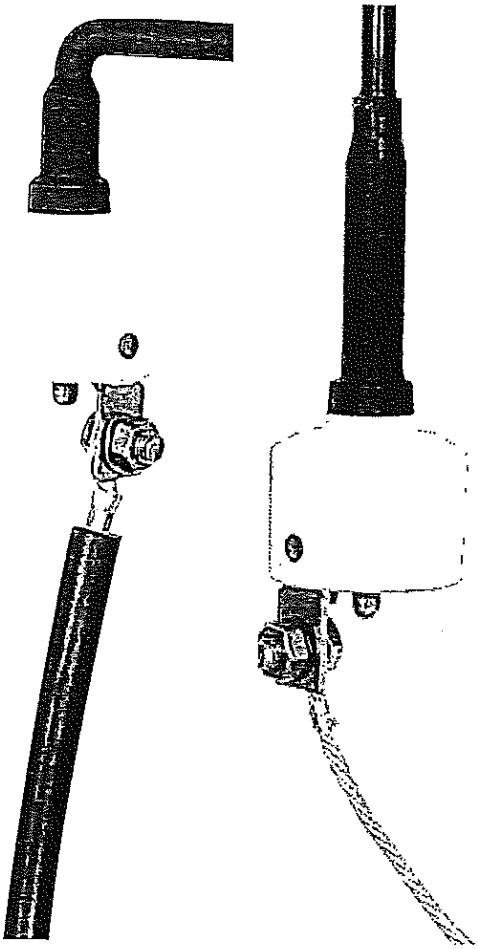
Surge arresters are equipped with a disconnecting device, that disconnects the arrester from the network if it becomes damaged as the result of overvoltage of too high energy or inadmissible voltage increase in the system. If such a situation occurs then the bottom terminal of the disconnecting device is „rejected" by the spring inside. This terminal remains suspended on an insulation „leash".

Advantages:

- easy assembly and connection
- disconnecting device simultaneously fulfilling the function of damage indicator
- large choice of accessories
- casing resistant to UV radiation, non-flammable
- maintenance-free product
- all accessories are made of corrosion-resistant materials.

Application:

- outdoor and indoor
- altitude: up to 2000 m over sea level
- ambient temperature in place of work or storage from -40°C to +70°C.



Compliance with standards:

- PN-EN 61643-11:2006/A11:2007 „Surge protective devices connected to low voltage power distribution systems Part 1: Performance requirements and testing methods"
- EN 61643-11:2002/A11:2007 Low-voltage surge protective devices - Part 11: Surge protective devices connected to low-voltage power systems – Requirements and tests
- DIN/VDE 0675/6 (Überspannungableiter zur Verwendung in Wechselstromnetzen mit Nennspannungen zwischen 100V und 1000V).

Characteristic

SPD type	limiting voltage
Number of terminals	one
SPD type (acc. to IEC61643-1: 2005)	class II
SPD type (acc. to DIN/VDE 0675/6)	A
Test classification	acc. to IEC61643-1: 2005 - class II tests
For system voltages	up to 1 kV
Location	outdoor and indoor
Accessibility	inaccessible (out of reach)
Method of installation	permanent (name plate "downwards")
SPD disconnecting device	located internally
Ambient temperatures	from -40°C to +70°C
Protection degree	IP 06 for standard execution IP 66 with insulated accessories
Nominal discharge current I_n 8/20µs	5 or 10 kA (peak value)
Maximum discharge current Imax 8/20µs	25 or 40 kA (peak value)
Limiting discharge current*	40 kA or 65kA 4/10 µs
Voltage protection level U_p	acc. to guaranteed data table
Continuous operating voltage U_c	280, 440, 500, 660, 800, 1000 V AC (effective value)
Energy absorption capability**	4, 5 or 7 kJ / kV U_c
Short-circuit withstand	3 kA
Frequency	up to 62 Hz
Total creepage distance	62 mm

* requirement acc. to IEC 60099-4; **measured at one limiting surge 4/10 µs

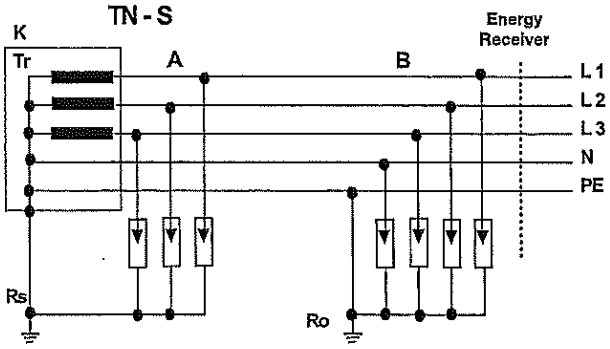
Guaranteed data

Arrester type	U_c (effective value)	U_p at I_n	I_n / I_{max}	U_p at I_{max}	Energy absorption capability	U_p at long lasting surge 2000µs
	V	V	kA	V	J	V
LOVOS – 5/280	280	1100	5/25	1500	1800	850
LOVOS – 5/440	440	1800		2500	3000	1300
LOVOS – 5/500	500	2000		2600	3200	1600
LOVOS – 5/660	660	2500		3200	4000	1800
LOVOS – 5/1000	1000	4000		5200	6400	3200
LOVOS – 10/280	280	1100	10/40	1700	2200	900
LOVOS – 10/440	440	1800		2700	3300	1400
LOVOS – 10/500	500	2000		3200	3900	1700
LOVOS – 10/660	660	2500		3800	4500	1900
LOVOS – 10/1000	1000	4000		5800	7800	3400

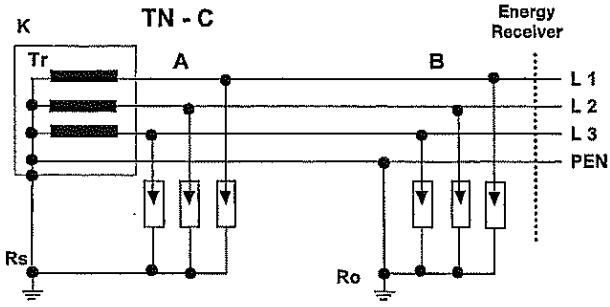
Basic selection principles for surge protection equipment in a low voltage distribution network

SPD (Surge Protective Device) selection criteria:
- continuous operating voltage Uc
- voltage protection level Up
- energy absorption capability

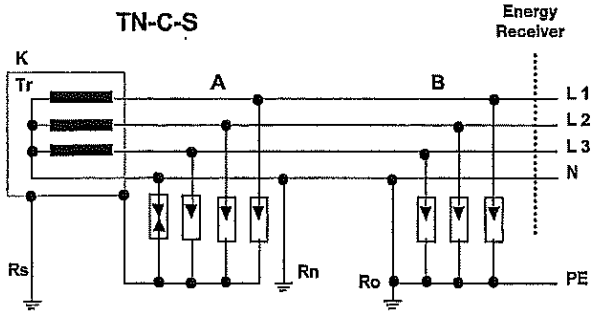
Configuration in the low voltage network and applied earthing system:
- T: direct connection to earth
- N: neutral
- C: combined
- S: separate



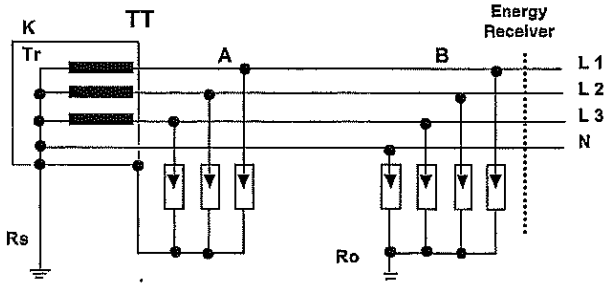
TN-S the supply network has a connection of the neutral conductor with the earthing conductor at the feeding transformer only



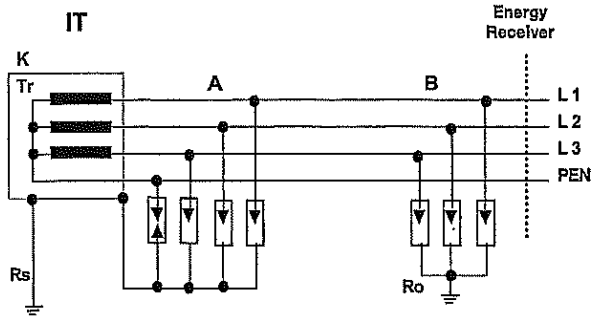
TN-C neutral and earthing conductor are common (PEN) and earthed at the transformer or near it



TN-C-S the neutral conductor is earthed at the transformer and in other network points



TT neutral point of transformer is earthed directly, while the receiver's installation is earthed by a separate earth electrode



IT in this system there is no direct connection of active network parts with earth, while accessible conducting parts of installation elements are earthed

Marking:

L1, L2, L3	phase conductor
N	neutral conductor
PE	earthing conductor
PEN	common earthing and neutral conductor
A	transformer protection Tr
K	transformer tank
B	terminal protection
R_o	SPD earthing
R_n	earthing of transformer neutral point
R_s	protective earthing of station
	SPD (surge arrester)
	spark gap

Selection of U_c

Taking into account the upper tolerance of system voltage (U_m) at 10% – the maximum continuous operating voltage U_c should be selected as below:

$$U_c \geq 1{,}1 \times U_m/\sqrt{3}$$

for SPD connected between the phase and neutral conductor

$$U_c \geq 1{,}1 \times U_m$$

for SPD connected as phase – phase or between the phase and earthing conductor.

The following U_c values can be proposed as standardised (recommended) voltages for 220/380V or 240/400 V networks:

U_c= 280 V for phase-neutral conductor and neutral conductor-earth protection (TT and TN systems)

U_c= 440 V for phase-phase protection (TT, TN, IT systems)

U_c= 440 V for phase-neutral conductor and neutral conductor-earth protection (IT system)

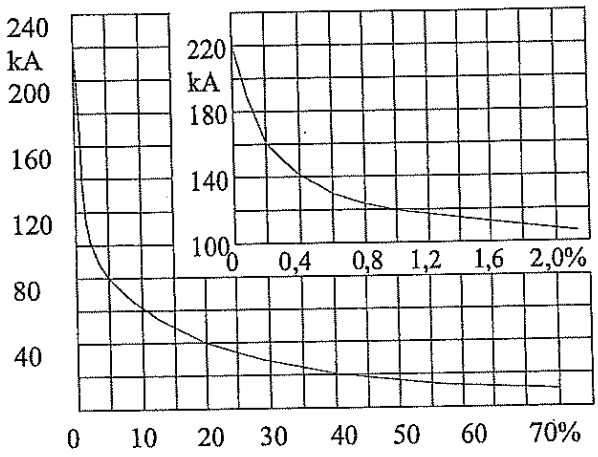
Such parameter SPD practically cover all temporary overvoltage (TOV)[1] hazards that may occur in a low voltage network, simultaneously ensuring the required protection level. If network parameters depart from standard values (e.g., increased voltage or harmonic content), instead of a voltage of U_c=440V one may use U_c=500V or 660V, respectively.

Protection level selection

The SPD protection level is usually determined as the U_p/U_c ratio (U_p – voltage peak value on SPD terminals during flow of nominal discharge current In). For different types of sparkless arresters and various manufacturers it is contained in the 3 to 5 limits. When selecting the arresters type attention should be given to the value of this ratio. The lower the U_p/U_c ratio, the greater the insulation protective margin of protected equipment.

Selection of withstood energy

The SPD energy absorption capability is in principle defined by the nominal discharge current I_n and pulse current I_{imp} for class I arresters or by I_{max} for class II arresters. Typical nominal discharge current values for class II are 5 kA and 10 kA.



Lightning current occurrence probability of amplitude greater than values on axis of ordinates

As results from statistical data (Fig. above) 90% of lightning currents have values not greater than 60 kA. In the overhead low voltage network a lightning stroke in the line usually leads to shock of all three phases due to small distances between conductors. Assuming that the lightning current flows in three phases in both directions, the lightning current in the first approximation can be divided by 6. Hence, in over 90% of direct lightning stroke in line cases, the current flowing in an arrester is not greater than 10 kA.

Class II SPD of current:
I_n =5 kA and I_{max} =25 kA

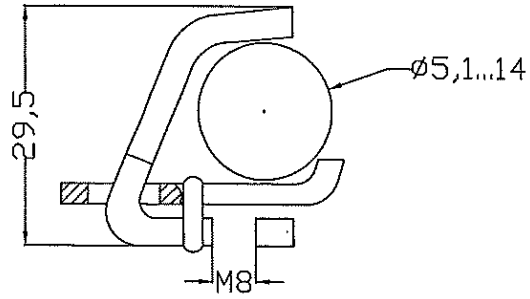
should satisfactorily fulfill a protective role in a low voltage network. In regions of large storm hazard (high isoceraunic level) one may recommend application of

Class II SPD of current:
I_n =10 kA and I_{max} =40 kA

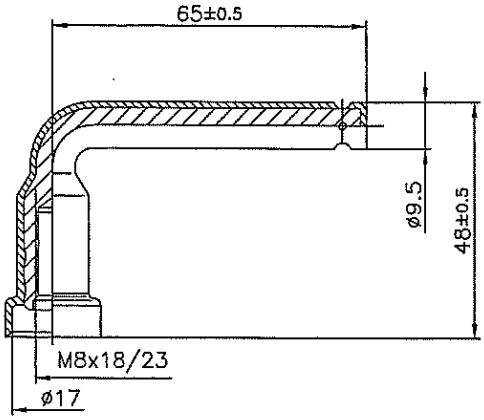
Special cases, when arresters are used for protection of equipment for storing large energies (e.g. capacitor batteries), should be considered individually as to choice of surge protection means.

[1] „temporary overvoltages"

Standard top accessories



Cat. No – 1701



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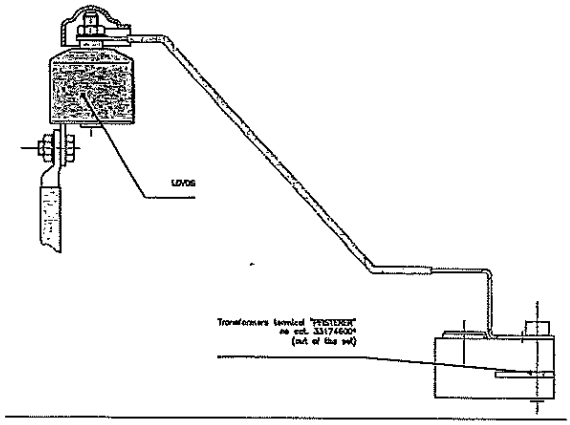

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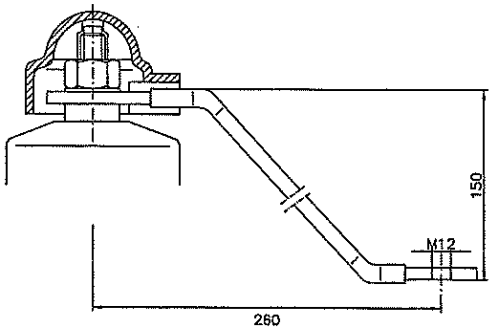

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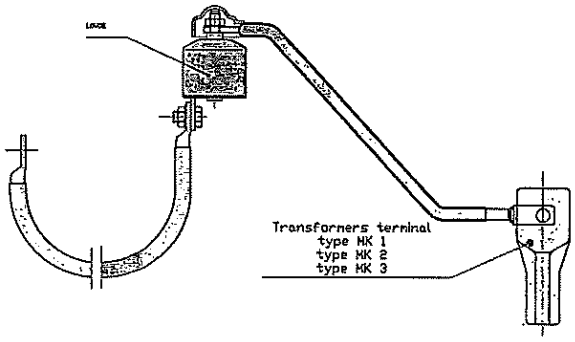

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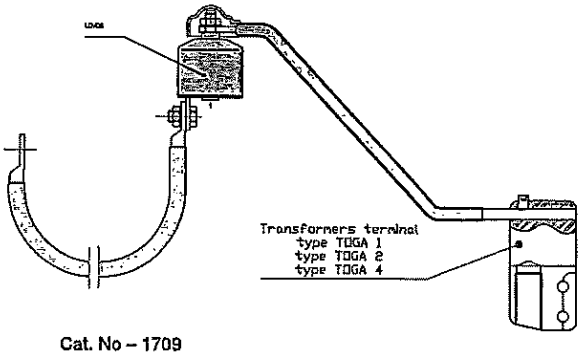
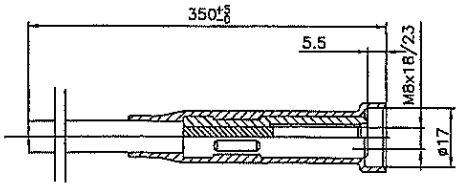
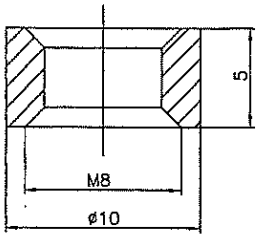


Cat. No – 1709

Insulation piercing terminals from ENSTO



Cat. No – 1704



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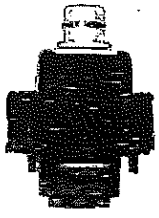
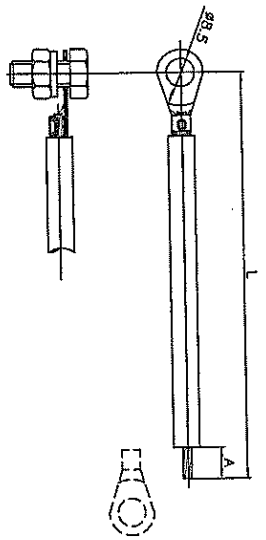


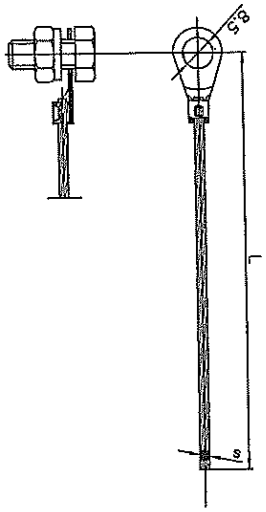
Cat. No – 1705-1

Cat. No – 1705-2

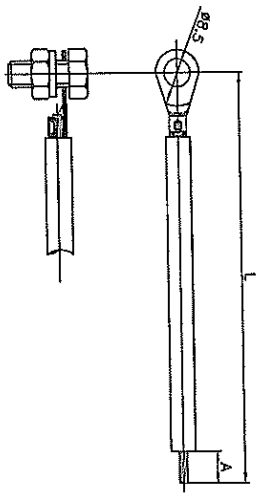
Standard bottom accessories



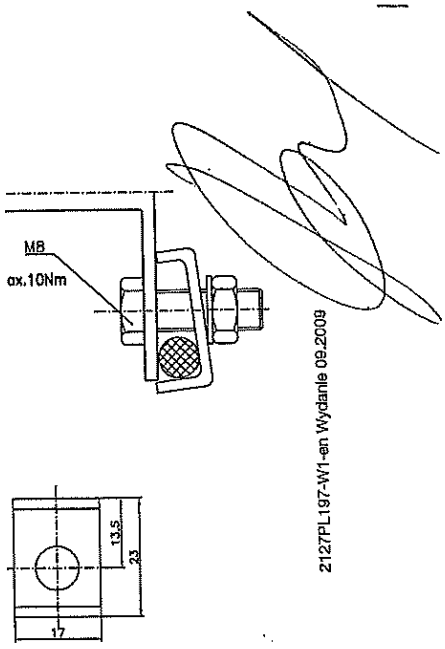
Cat. No – 2721



Tin – coated cables



Insulated cables



Cat. No – 2719

2127PL197-W1-en Wydanie 09.2009

Ordering example

LOVOS – 5 / 660 + 1701 + 2711
LOVOS – 5 / 660-2 + 1701 + 2719
LOVOS – 10/ 660 + 1701 + 2711
LOVOS – 10/ 660-2 + 1701 + 2719

- Earthing accessories
- Line terminal accessories
- 1- with disconnecting device (digit „1" can be omitted); 2- without disconnecting device
- Maximum continuous operating voltage 660 V
- Nominal discharge current 5 or 10 kA
- Type name

Earthing cables

L\S	6	16
300		2721-1 [1]
500	2711 [1]	2715 [1]
	2713 [2]	2717 [2]
		2721-2 [1]
700		2721 [1]
1000	2712 [1]	2716 [1]
	2714 [2]	2718 [2]
1200		2722 [1]

[1] Insulated
[2] tin-coated
On request all cables can be equiped with DIN 46228 TA cable end sleeve or DIN 46234 ring terminal at their second ending.

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APPLICATION

The protection of a.c. low voltage networks against lightning and switching overvoltages. From the low voltage side of transformer up to measuring instruments. It can be connected to all kinds of overheadlines, including overheadlines with conductors in insulation.

SERVICE CONDITIONS

- Outdoor application, UV radiation resistant housing
- Range of work and store temperature: -40°C to +70°C
- Humidity to 90%
- Attitude to 2000 m
- IP 06 for standard version
- IP 66 for version with insulation equipment

ADVANTAGES

- For outdoor and indoor application
- Delivered with or without disconnector on the request
- With indicator of the failure, easy-to-see from the 10 m distance
- Big variety of the accessories
  Easy-to-connect, no necessary special mounting tools
- For extending range of temperatures and bad weather conditions

TECHNICAL DATA

- For voltages systems ..... to 1000 V
- Frequency ..... to 62 Hz
- Nominal discharge current I_n ..... 8/20 µs 5kA or 10kA
- Maximum discharge current I_{max} ..... 8/20 µs 25 or 40 kA
- High current impulse 4/10 µs ..... 40 or 65 kA*
- Classification acc. IEC 61643-1 class II and DIN/VDE 0675/6 class A
- Tested according to new international standard IEC 61643-1, 1998-02, „Surge protective devices connected to low-voltage power distribution systems Part 1: Performance requirements and testing methods" and DIN/VDE 0675/6 (Überspannungableiter zur Verwendung in Wechselstromnetzen mit Nennspannungen zwischen 100 V und 1000 V)

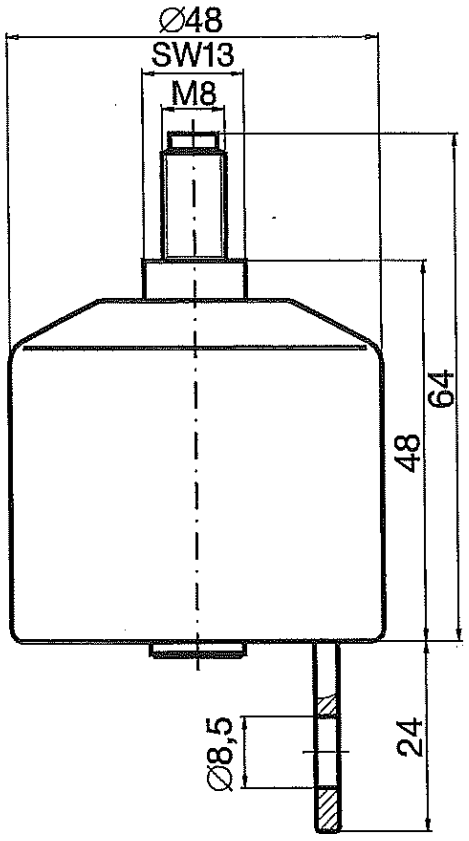
* acc. IEC 60099-4

GUARANTEED DATA FOR LOVOS-5/10

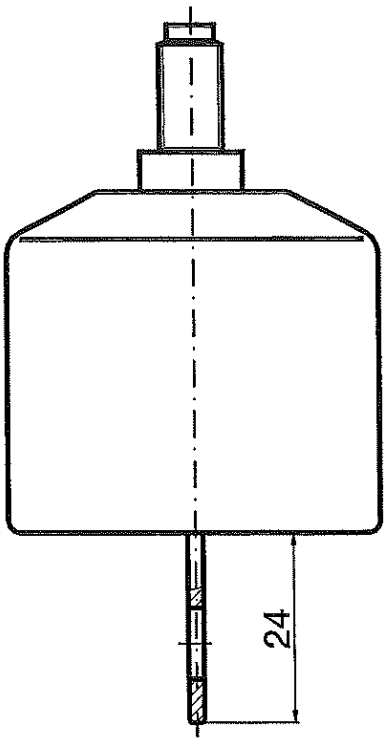
Type	U_o Continuous operating voltage V_{rms}	Minimum reference voltage at the current 1 mA_{peak} no less than V_{rms}	U_p Voltage protection level V_{peak}	Energy absorption capability J
LOVOS–5 I_n = 5 kA	280 440 660	350 550 825	1150 1800 2700	700 1100 1600
LOVOS–10 I_n = 10 kA	280 440 660	350 550 825	1150 1800 2700	1100 1750 2600

Note! Manufacturer reserves the right to change the technical data and design without early information.

DIMENSION DRAWING

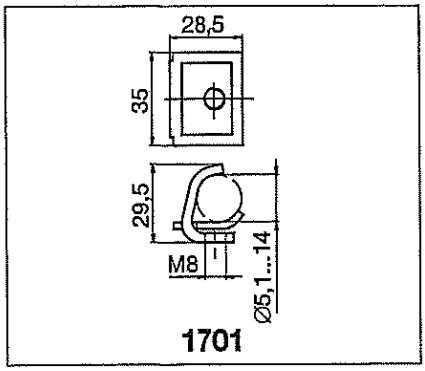


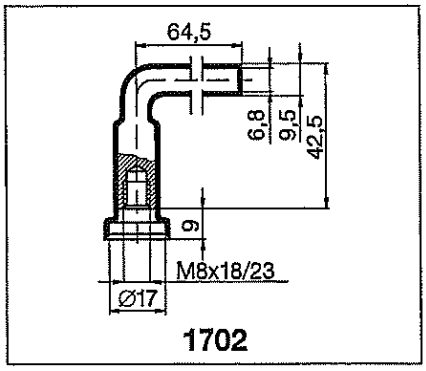
1 – surge arrester with disconnector

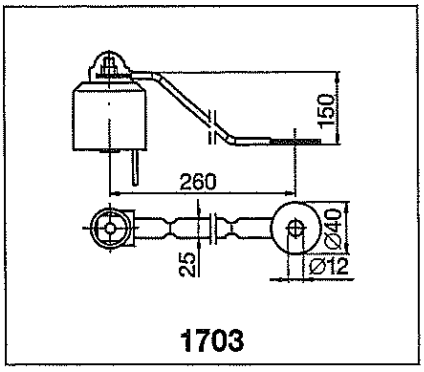


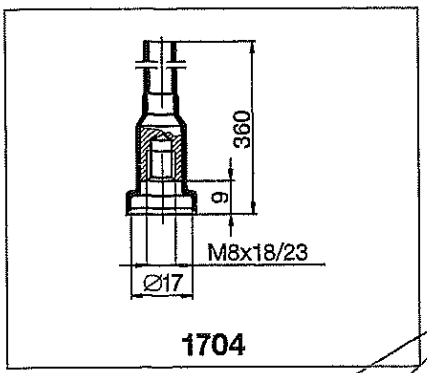
2 – surge arrester without disconnector

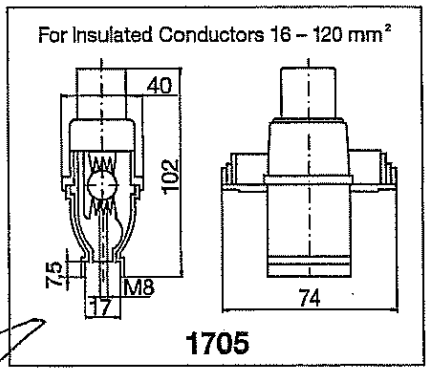
STANDARDTOP ACCESSORIES

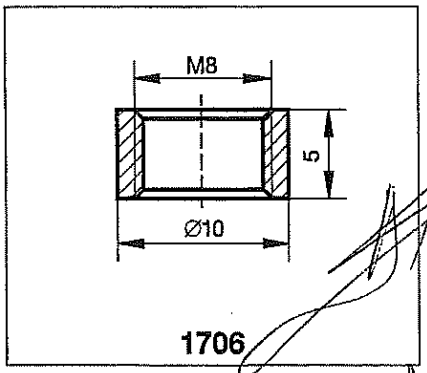




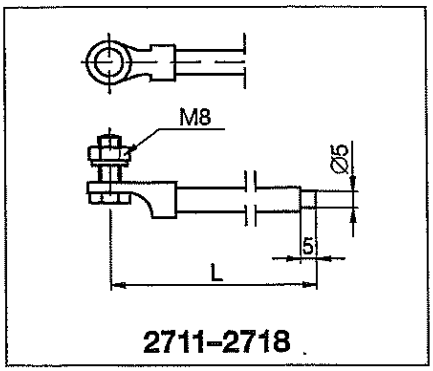




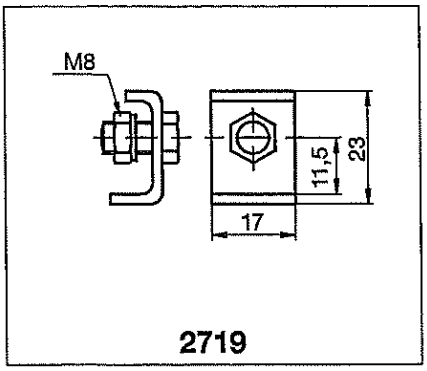




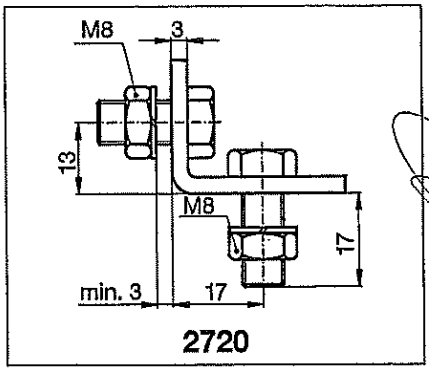
STANDARD BOTTOM ACCESSORIES



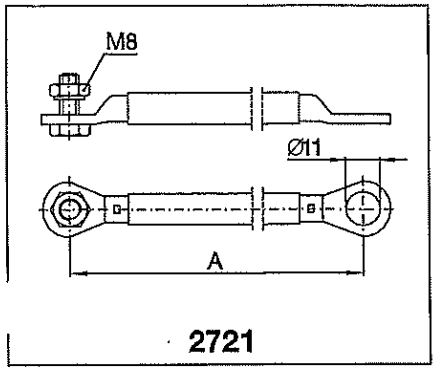
2711–2718



2719



2720

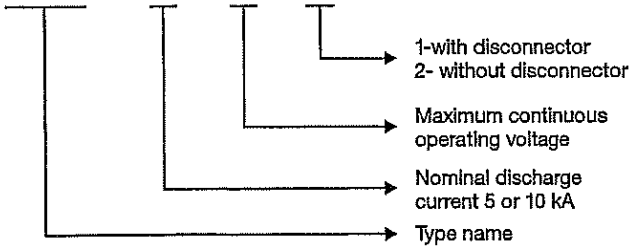


2721

2711 flexible conductor 6 mm², length 500 mm, in insulation
2712 flexible conductor 6 mm², length 1000 mm, in insulation
2713 flexible conductor 6 mm², length 500 mm, zinc coated
2714 flexible conductor 6 mm², length 1000 mm, zinc coated
2715 flexible conductor 16 mm², length 500 mm, in insulation
2716 flexible conductor 16 mm², length 1000 mm, in insulation
2717 flexible conductor 16 mm², length 500 mm, zinc coated
2718 flexible conductor 16 mm², length 1000 mm, zinc coated
2721 flexible conductor 16 mm², length 700 mm, in insulation

MARKING METHOD AND EXAMPLE OF MAKING THE ORDER

LOVOS – 5 / 280 – 1 + 1701 + 2711
LOVOS – 5 / 280 – 2 + 1701 + 2719
LOVOS – 10 / 280 – 1 + 1701 + 2711
LOVOS – 10 / 280 – 2 + 1701 + 2719



It's necessary to give in an order:
- name of the product (surge arresters)
- type (LOVOS)
- nominal discharge current (5 or 10 kA)
- continuous operating voltage (280, 440 or 660 V)
- version (1-with disconnector or 2-without disconnector)
- version of line connection (1701-1706)
- version of earthing connection (2711-2721)
- number of pieces

Example of an order:
„Surge arresters type LOVOS - 5/660-1+1701+2711, 30 pcs"

Note: accessories for low voltage surge arresters are packed separately.

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	SURGE ARRESTER TYPE LOVOS	Nr dok. 2GKG630007
ABB	LOW VOLTAGE SURGE ARRESTERS TYPE LOVOS INSTALLATION AND MAINTENANCE	Str. 1/3

APPLICATION OF SURGE ARRESTERS

LOVOS surge arresters with nominal discharge current either 5kA or 10kA, with continuous operating voltage Uc=280, 440, 500 or 660 V are intended for protection of low voltage power engineering equipment in AC networks with frequency from 48 to 62 Hz, against destructive effects of lightning and switching overvoltages. LOVOS can be connected to all kinds of overhead lines including overhead lines with conductors in insulation. It has indoor application as well.

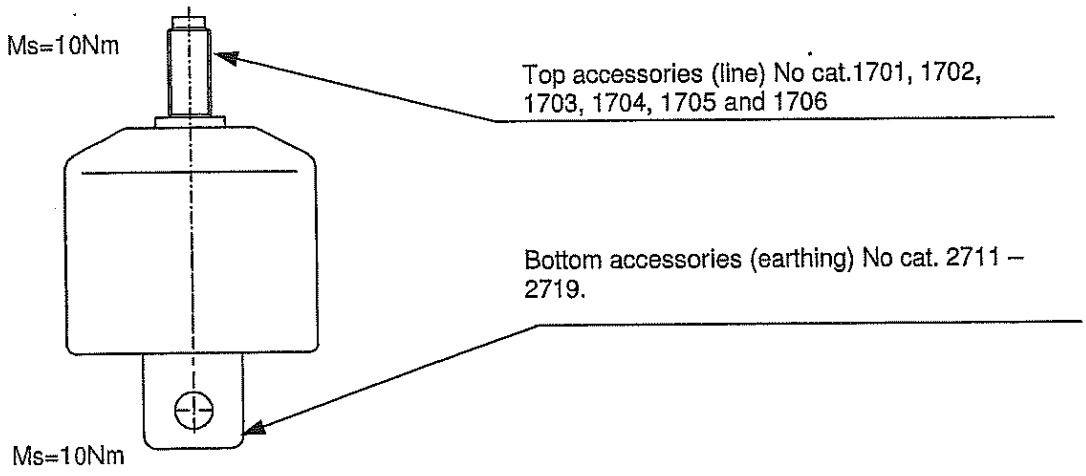
DESIGN OF SURGE ARRESTERS

It is gapless surge arrester with metal-oxide block, having screw type line outlet and earthing outlet of flat fin version with a hole. ZnO block and outlets contact parts are encapsulated, without air-gap, in UV resistant polyamide housing.
The housing ensures ZnO block protection against weather conditions, proper contact force between ZnO block and its outlets and suitable level of insulation.
Surge arrester is designed in version with or without disconnecting device.
Surge arrester has a big variety of top (line) and bottom (earthing) accessories.

INSTALLATION OF SURGE ARRESTERS

After unpacking, one should check if technical data on the rating plate of surge arrester correspond to project's specification and whether surge arrester is to be connected in between phase and earth or between phases.
The installation should be carried out with voltage switched off or under normal work of the network according to rules "Works under the voltage technology".

WARNING! It is necessary to obey local regulations in this matter in a country, where surge arresters are installed.



Opracował:	Akceptował:	Zatwierdził:

The arrester with selected accessories should be installed possibly nearest to protected device, ensuring lowest earthing impedance R_{max}=10 Ω.
Top accessories are mounted on screw outlet of surge arrester. Accessories No cat. 1701, 1702, 1704 and 1706 are mounted by screwing directly on an outlet (without any additional coupling elements), accessory No cat. 1703 – using washer and nut (included in the kit), and No cat. 1705 after screwing the sleeve (included in the kit).
Bottom accessories (earthing) are mounted to the hole of the earthing outlet of surge arrester using the kit: bolt, washer and nut. Earthing conductors of surge arresters with disconnecting device should be shaped in a form of letter "U" – they should facilitate the operation of an arrester (throwing away the earthing outlet from the housing).
The arrester should be mounted in vertical position. If project requires other (than vertical) position it is not allowed to exceed 90° inclination angle of arrester to horizon. The manufacturer recommends not to exceed 45° inclination angle. It is indispensable to leave 10 cm free space around earthing outlet in all directions – see fig. 1 & 2.

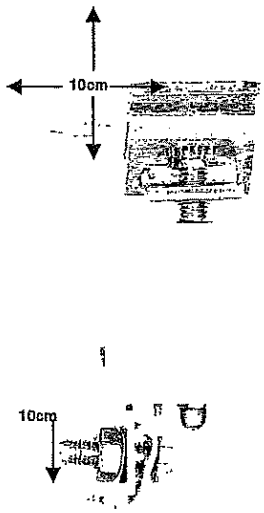


Figure 1. Normal condition

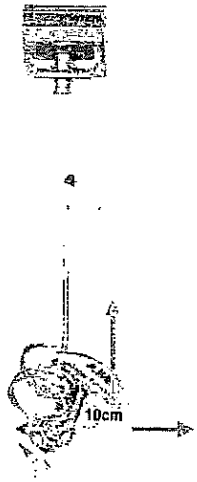


Figure 2. Damaged arrester - activated disconnecting device

MAINTENANCE

Surge arresters LOVOS do not require special maintenance. It is recommended to check surge arresters visually after big storms with atmospheric discharges. The best way to do it is to use binoculars. Damaged surge arresters and these with engaged disconnecting devices should be replaced with new ones.
Engaged disconnecting devices are visible - earthing outlet is outside the housing and it is marked with red colour.

WARNING! It is necessary to obey local regulations in this matter in a country where surge arresters are installed.

RECYCLING

During normal operating conditions (routine operation, overvoltage stresses) there are no risks for health and environment.
After a normal lifetime cycle the metallic components, the metal – oxide varistor, the other inorganic and organic materials may, of course, be recycled or disposed. Please refer to the corresponding EU Safety Data Sheet for the above mentioned material. We recommend that you contact either the authorities in charge or approved waste disposal companies who will advise you on how to dispose or recycle special waste.

Any hazardous substance that constitutes a risk to health or the environment have to be considered as "toxic and dangerous waste" in accordance with the EEC Directive and dealt with accordingly. The substances of the sintered metal – oxide varistors exist in an oxidized state. A leaching test according to EPA specifications (Federal Register / vol. 45, No 98 / Rules and regulation), has shown that the sintered bodies may be disposed of without violating the EEC Directive.

PACKING, TRANSPORT AND STORAGE

Surge arresters are packed in cardboard boxes (3 arresters in a box); accessories are packed separately in foil bags (3 pieces in a bag) and next – in a bulk package. The arresters do not require special transport conditions but they should be protected against rain. Neither storage requires special conditions (ensure protection against rain).
Transport and storage issues to be considered: 1) exhaust gases emission during transport 2) card board boxes and foil bags recycling.

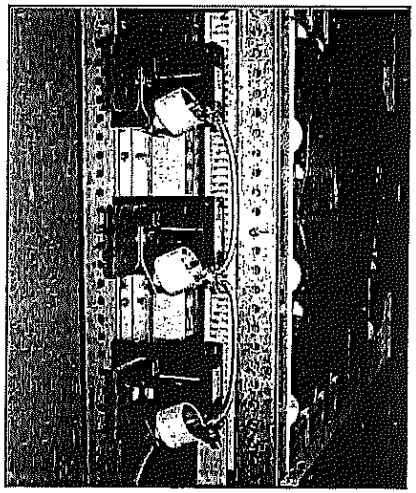
SPARE PARTS

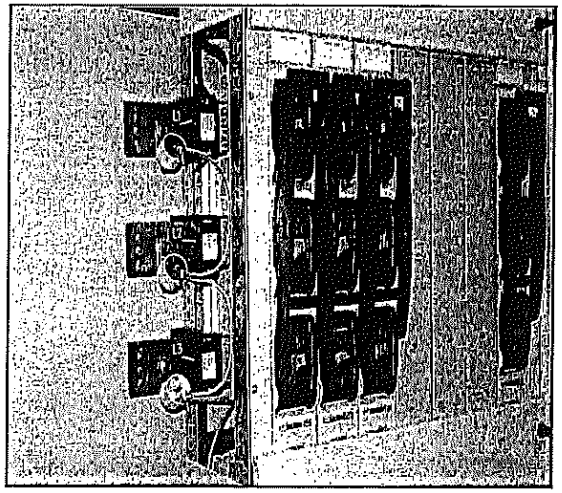
Deliveries of spare parts and repairs of surge arresters are not foreseen.

CONFORMITY

Surge arresters type LOVOS conform to Polish standard PN-EN 61643-11 and to international standard IEC 61643-11 as well as to Amendment 2 to IEC 60099-4 in relevant range.

LOVOS
Metal oxide surge arrester-protection of low voltage panels





- Lightning overvoltages caused by either direct lightning stroke at the overhead line or by induced overvoltages [when lightning strokes at some distance from the line] may be transferred to electricity end users; they endanger panels' insulation.
- Switching overvoltages created by switching on and switching off grid elements and / or electric apparatuses last longer and although they have lower amplitude they represent high danger to panels' thermal stability.
- Using surge arresters LOVOS is the most effective way of protection of low voltage switchgears and panels; LOVOS with disconnecting device will limit overvoltage amplitude and ensure safety. Besides ensuring proper resistance to TOV, it is easy to identify damaged arrester after the overstress.

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ПРИЛОЖЕНИЕ 9.16.4

Декларация за съответствие на предлаганото изпълнение с изискванията и техническата спецификация на материала, вкл. параграфи "Характеристика на материала" и "Съответствие на предложеното изпълнение със стандартизационните документи"

Вентилни отводи НН, без искрови разрядници, с метално-окисно съпротивление ZNO (варистор), чиято стойност зависи от приложеното напрежение, за монтиране на открито и закрито. Вентилните отводи са съоръжени с пружинен механизъм, който в случаите на близко попадение на мълния или на топлинно претоварване ги разединява от мрежата и индицира повреда.
Елементите на вентилните отводи са поместени в устойчива на лъчения в ултравиолетовия диапазон неразпространяваща горенето полимерна изолационна обвивка, предотвратяваща от злополуки и вреди вследствие на пръсване в случаите на повреди.
Вентилните отводи са съоръжени със съответните аксесоари, позволяващи директно монтиране на неизолирани или изолирани фазови проводници на въздушните електропроводни линии НН без необходимост от използване на допълнителна помощна конструкция или директно на шините на разпределителните табла на мачтови трансформаторни постове.
Конструкцията и аксесоарите на вентилните отводи, предназначени за въздушни кабелни линии с изолирани усукани проводници, предпазват от допиране до тоководещи части.
Вентилните отводи могат да бъдат монтирани към електрическото съоръжаване с допустимо отклонение от вертикалата до ±30°.
Вентилните отводи се използват за защита на електрическото съоръжаване (силови трансформатори и електроразпределителна мрежа НН) от атмосферни и комутационни пренапрежения.
Вентилните отводи трябва да отговарят на приложимите български и международни стандарти или еквиваленти, включително на посочените по-долу и на техните валидни изменения и поправки:

- БДС EN 61643-11:2004 "Устройства за защита срещу отскоци на ниско напрежение. Част 11: Устройства за защита срещу отскоци на ниско напрежение за захранващи системи ниско напрежение. Изисквания и изпитвания (IEC 61643-1:1998, с промени+поправка 12-1998, с промени)" и
- БДС EN 61643-11:2002/A11:2007 "Устройства за защита срещу отскоци на ниско напрежение. Част 11: Устройства за защита срещу отскоци на ниско напрежение за захранващи системи ниско напрежение. Изисквания и изпитвания.

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

гр.Петрич 2850, Промишлена зона
ул."Свобода"49
тел.:00359 745 60743; факс:00359 745 60742
e-mail: metix@metix.bg
гр.София 1090 ул."Ракидзи Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.16.5

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

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

ABB Group in Poland
Quality

Conformity with:

IEC 61643-1 for the LOVOS arrester

UL 1449 for the MO blocks

Instytut Elektrotechniki
Electrotechnical Institute

Certyfikat Systemu Jakości / Certificate of Quality System ISO 9001 PCBC 976/1/2003
Jednostka Notyfikowana Nr / Notified body No: 1450

04-703 WARSZAWA ul. Mieczysława Pożaryskiego 28; tel./fax.: (+48) 22 812 04 07

ATEST
ATTESTATION

Nr/No. 0863/NBR/06

[illegible]

Issued on the basis of § 5 clause 9 of the Electrotechnical Institute Statute and the Ministry of Economy, Labour and Social Policy disposition No. [illegible] of [illegible] relating to the authorisation of the Electrotechnical Institute to issue the opinions on the quality of high and low voltage, alternating and direct current electrical apparatus, devices and every equipment, instrumentation and components supplied by electrical energy or designated for live working.

Dla · For

ABB Sp. z o.o.

ul. Żegańska 1
04-713 Warszawa

Oddział w Przasnyszu
ul. Leszno 59
06-300 Przasnysz

Dotyczy wyrobu: Applies to the product

SPD	SPD
Urządzenia do Ograniczania Przepięć	Surge Protective Devices
typów: LOVOS-5/280; LOVOS-5/440 LOVOS-5/500; LOVOS-5/660 LOVOS-5/1000	*types: LOVOS-5/280; LOVOS-5/440 LOVOS-5/500; LOVOS-5/660 LOVOS-5/1000*

[illegible] energii elektrycznej.

Attestation is the basis for implementation of above mentioned products for Power Engineering Plants, Electric Power Stations, Industry Plants and other Enterprises which generate, transmit or utilize electrical energy.

Type test measurements made on LOVOS type surge arresters

Test sequence	Test description	Subclause requirement/test	Class II
1	Identification and marking	7.1.1/7.1.2/8.2	+
	Mounting	7.3.1	+
	Terminals and connections	7.3.2/7.3.3/8.4.2	+
	Testing for protection against direct contact	7.2.1/8.3.1	+
	Environment, IP code	7.4.1 / 8.5.1	+
	Residual current	7.2.2 / 8.3.2	+
	Operating duty test		
	Operating duty test for test classes I, II or III	8.3.4.2 / 8.3.4.3/8.3.4.5 A	+
	Thermal stability	7.2.5.2 / 8.3.5.2	+
	Air clearances and creepage distances	7.3.4 / 8.4.3	+
	Ball pressure test	7.4.2 / 8.5.3	+
	Resistance to abnormal heat and fire	7.4.3 / 8.5.4	+
	Tracking resistance	7.4.4/8.5.5	+
2	Voltage protection level	7.2.3/8.3.3	+
	Residual voltage	8.3.3.1	+
3	Insulation resistance	7.2.6 / 8.3.6	+
	Dielectric withstand	7.2.7 / 8.3.7	+
	Mechanical strength	7.3.5 / 8.4.4	+
	Temperature withstand	7.2.5 / 8.3.5.1b	+
4	Heat resistance	7.4.2 / 8.5.2	+
	TOV tests	7.2.8 / 8.3.8	
	TOVs caused by faults or disturbances in the low voltage system	7.2.8.1/8.3.8.1	+
	TOVs caused by faults in the high (medium) voltage system	7.2.8.2/8.3.8.2 b	+
5	Short-circuit current behaviour	7.2.5.3 / 8.3.5.3	+

Prepared by

Justyna Wydrzyńska

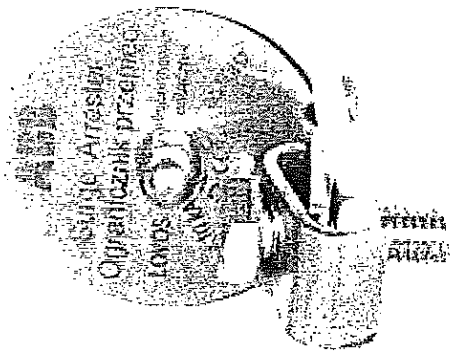
на основание чл. 36а, ал. 3 от ЗОП

1. Aim:

   To test the LOVOS 440 V for measured value of residual voltage at In

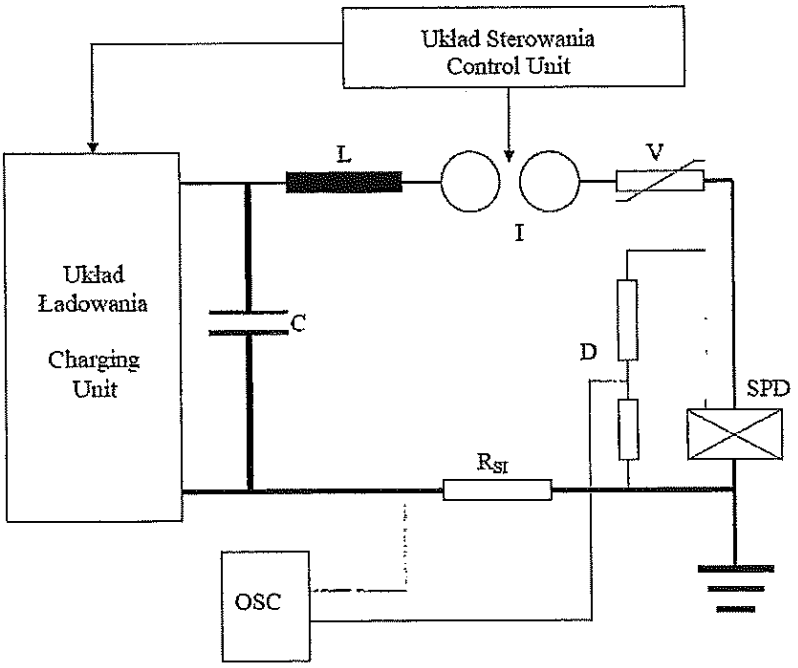
2. Description

   Tested apparatus:



All wave-shapes of impulse currents used in test meet requirements of PN_EN 60099-4. The measuring circuit of impulse current and residual voltage meet the requirements of PN-92/E-04060 (Identical with IEC 60060-1), PN-EN 60060-2, PN-EN 60099-4;The total uncertainties of measurement of the peak value of impulse current and residual voltage were less than 3%

Test circuit:



C,L – capacity and inductance of the universal current surge generator type

I- controlled spark gap

V – additional attenuating varistor

D – resistive divider of the impulse voltage

SA - tested surge arrester

OSC – digital oscilloscope type Le Croy -9360 600MHz 5Gs/s

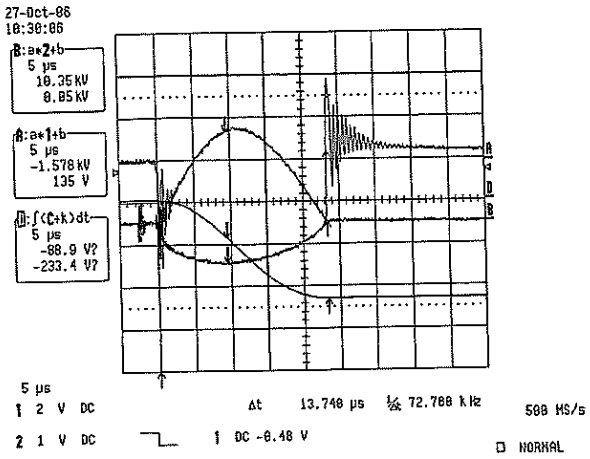
Rsi – impulse current shunt

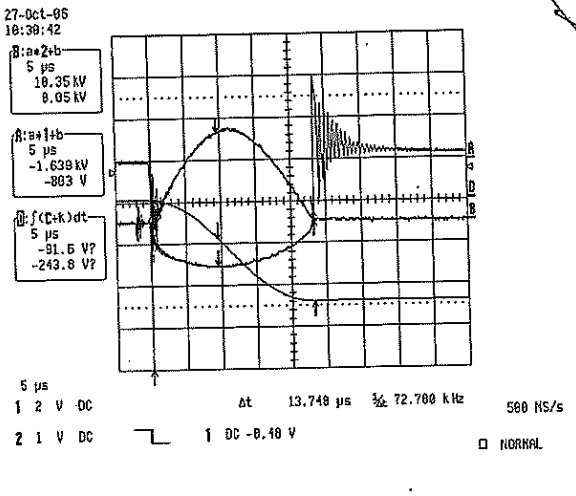
3. Results:

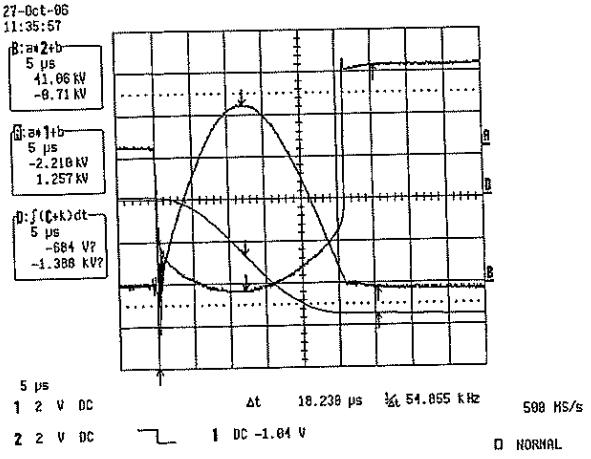
Measurements of residual voltage of SPD type LOVOS:

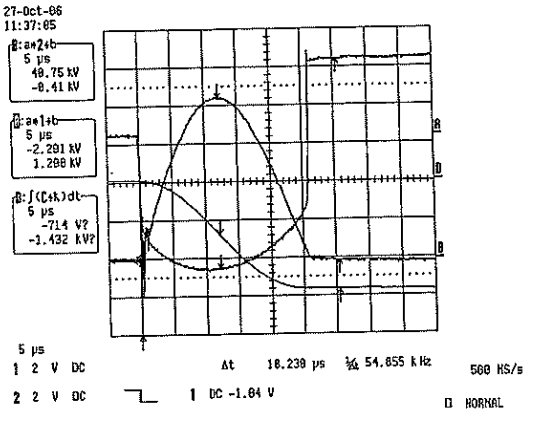
LOVOS -5/440		**LOVOS -5/440**		**LOVOS -5/440**	
I [kA]	*U [V]*	*I [kA]*	*U [V]*	*I [kA]*	*U [V]*
5,35	1599	5,29	1568	5,41	1537
26,04	2182	25,81	2197	25,62	2135

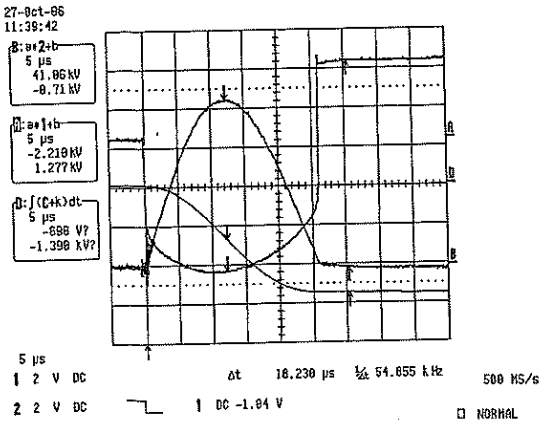
LOVOS -10/440		**LOVOS -10/440**		**LOVOS -10/440**	
I [kA]	*U [V]*	*I [kA]*	*U [V]*	*I [kA]*	*U [V]*
10,35	1578	10,35	1578	10,35	1539
40,75	2291	41,08	2210	41,06	2210


27-Oct-06
10:30:06
B:a*2+b
5 µs
10.35 kV
0.85 kV
A:a*1+b
5 µs
-1.578 kV
135 V
D:∫(C+k)dt
5 µs
-88.9 V?
-233.4 V?
5 µs
1 2 V DC
Δt 13.740 µs 1/Δt 72.780 kHz
500 MS/s
2 1 V DC
1 DC -0.48 V
NORMAL


27-Oct-06
10:30:42
B:a*2+b
5 µs
10.35 kV
0.05 kV
A:a*1+b
5 µs
-1.638 kV
-803 V
D:∫(C+k)dt
5 µs
-91.6 V?
-243.8 V?
5 µs
1 2 V DC
Δt 13.740 µs 1/Δt 72.700 kHz
500 MS/s
2 1 V DC
1 DC -0.48 V
NORMAL


27-Oct-06
11:35:57
B:a*2+b
5 µs
41.06 kV
-0.71 kV
A:a*1+b
5 µs
-2.210 kV
1.257 kV
D:∫(C+k)dt
5 µs
-684 V?
-1.388 kV?
5 µs
1 2 V DC
Δt 18.230 µs 1/Δt 54.855 kHz
500 MS/s
2 2 V DC
1 DC -1.04 V
NORMAL


27-Oct-06
11:37:05
B:a*2+b
5 µs
40.75 kV
-0.41 kV
A:a*1+b
5 µs
-2.291 kV
1.288 kV
D:∫(C+k)dt
5 µs
-714 V?
-1.432 kV?
5 µs
1 2 V DC
Δt 18.230 µs 1/Δt 54.855 kHz
500 MS/s
2 2 V DC
1 DC -1.04 V
NORMAL


27-Oct-06
11:39:42
B:a*2+b
5 µs
41.06 kV
-0.71 kV
A:a*1+b
5 µs
-2.210 kV
1.277 kV
D:∫(C+k)dt
5 µs
-698 V?
-1.398 kV?
5 µs
1 2 V DC
Δt 18.230 µs 1/Δt 54.855 kHz
500 MS/s
2 2 V DC
1 DC -1.04 V
NORMAL

Testing and Calibrating Laborartory of the Electrotechnical Institute

Testing Laboratory accredited by
Polish Centre for Accreditation, a signatory to EA MLA and ILAC MRA that include recognition of testing report
Accreditation No AB 022

Field of testing: acoustics, electrotechnics, mechanics, vibrations, photometry, chemical and physical properties, functionality, safety, electromagnetic compatibility, fire resistance, flammability, climatological and mechanical hazard resistance

AB 022

Test Report No 291/NBW/2007/SEM

Product	SUGRE ARRESTER type: LOVOS
Tested on request of	Zakład Wielkich Mocy, Instytut Elektrotechniki 04-703 Warszawa, ul. Pożaryskiego 28
Manufactured at (name and place)	ABB
Sign/date of order	Letter no NWM/14/06 dated 17-12-2007r
Testing program	Resistance to abnormal heat and fire
According to:	PN-EN 60695-2-10:2005, PN-EN 60695-2-11:2005; PN-EN 61643-11:2006
Number of pages	11 numbered pages
Number of annexes	1
Date of delivery	2007-12-17
Tests started on	2007-12-17
Tests completed on:	2007-12-18
Test results	PASS
Additional information	-

Warszawa, 18 December 2007

Person authorizing the Test Report
Technical Manager of SEM

на основание чл. 36а, ал. 3 от ЗОП

Aleksandra Krzyżostanek

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE I WZORCUJĄCE - IEL
ul. Pożaryskiego 28, 04-703 Warszawa
tel. 022 812 30 53, fax 022 812 04 05
e-mail: badania@iel.waw.pl
NIP 525-000-76-84

Approved by:
Head of the Laboratory

на основание чл. 36а, ал. 3 от ЗОП

Msc Robert Franaszek

Adress:
ul. Mieczysława Pożaryskiego 28
04-703 WARSZAWA

Bank: Pekao S.A. Oddział w Warszawie
Nr konta: 91 1060 0076 0000 4010 1000 0893
NIP: 525-000-76-84

Phone.: (0-22) 812 30 53
Fax: (0-22) 812 04 05
badania@iel.waw.pl

A. CHARACTERISTICS AND RATINGS

The sixth sugre arrester (SPD) type LOVOS produced by ABB with parameters:

Surge arrester marked: no 1

U_C = 660 V ; I_n = 5 kA

U_p= 2500 V; f = 50 Hz ; ac

Surge arrester marked: no 2

U_C = 440 V ; I_n = 5 kA

U_p= 1800 V; f = 50 Hz ; ac

Surge arrester marked: no 3

U_C = 280 V ; I_n = 5 kA

U_p= 1100 V; f = 50 Hz ; ac

Surge arrester marked: no 4

U_C = 660 V ; I_n = 10 kA

U_p= 2500 V; f = 50 Hz ; ac

Surge arrester marked: no 5

U_C = 440 V ; I_n = 10 kA

U_p= 1800 V; f = 50 Hz ; ac

Surge arrester marked: no 6

U_C = 280 V ; I_n = 10 kA

U_p= 1100 V; f = 50 Hz ; ac

The rest of information about EUT was included in Test Report NWM No 504-4025/13.
Test Report No 291/NBW/2007/SEM is Annex to Test Report NWM No 504-4025/13.

SPRAWOZDANIE Nr / TEST REPORT No 7717/NBR/08
LABORATORIUM BADAWCZE
APARATURY ROZDZIELCZEJ
High Voltage & Short-Circuit Testing Laboratory
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (48-22) 812 04 07: tel.: (48-22) 812 23 38: e'mail: nwr@iel.waw.pl
Certyfikat PCBC ISO 9001 Nr 976/1/2003; Jednostka Notyfikowana Nr 1460
AB 074

SPRAWOZDANIE Z BADAŃ – PRÓBA DZIAŁANIA
TEST REPORT OF OPERATING DUTY TEST

BADANY APARAT
APPARATUS
URZĄDZENIA OGRANICZAJĄCE PRZEPIĘCIA (SPD)
SURGE PROTECTIVE DEVICES (SPD)

TYP
DESIGNATION
LOVOS

Największe napięcie trwałej pracy
Maximum continuous operating voltage **500, 1000 V**

Znamionowy prąd wyładowczy
Nominal discharge current **5-10 kA**

PRODUCENT
MANUFACTURER
ABB Sp. z o.o.
UL. ŻEGAŃSKA 1
04-713 WARSZAWA

ZLECENIODAWCA
TESTED FOR
ODDZIAŁ W PRZASNYSZU
UL. LESZNO 59
06-300 PRZASNYSZ

WYKONAWCA BADAŃ
TESTED BY
Laboratorium Badawcze Aparatury Rozdzielczej
04-703 Warszawa; ul. Pożaryskiego 28
Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the client's instructions and
PN-EN 61643-11:2006, p. 7.6; EN 61643-11:2002, p. 7.6

Niniejsze Sprawozdanie odnosi się wyłącznie do badanego obiektu.
Producent ponosi odpowiedzialność za każdy egzemplarz wyrobu oznakowany identycznie jak wyrób badany.
The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

Sprawozdanie zawiera ogółem 32 stron i może być powielane wyłącznie w całości.
Powielanie częściowe dozwolone jest po uzyskaniu pisemnej zgody Laboratorium NBR
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Kierownik Laboratorium //Head of Laboratory
на основание чл. 36а, ал. 3 от ЗОП
PhD Eng. Albert Gmitrzak

Warszawa 10.07.2008

AB 074

SPRAWOZDANIE Nr / TEST REPORT No 7642/NBR/08
LABORATORIUM BADAWCZE
APARATURY ROZDZIELCZEJ
High Voltage & Short-Circuit Testing Laboratory
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (48-22) 812 04 07; tel.: (48-22) 812 23 38; e'mail: nwr@iel.waw.pl
Certyfikat PCBC ISO 9001 Nr 976/1/2003; Jednostka Notyfikowana Nr 1460

SPRAWOZDANIE Z BADAŃ
TEST REPORT

BADANY APARAT
APPARATUS
URZĄDZENIA OGRANICZAJĄCE PRZEPIĘCIA (SPD)
SURGE PROTECTIVE DEVICES (SPD)

TYP
DESIGNATION
LOVOS

Największe napięcie trwałej pracy **280 - 1000 V**
Maximum continuous operating voltage

Znamionowy prąd wyładowczy **5 - 10 kA**
Nominal discharge current

PRODUCENT
MANUFACTURER
ABB Sp. z o.o.
UL. ŻEGAŃSKA 1
04-713 WARSZAWA
ODDZIAŁ W PRZASNYSZU
UL. LESZNO 59
06-300 PRZASNYSZ

ZLECENIODAWCA
TESTED FOR

WYKONAWCA BADAŃ
TESTED BY
Laboratorium Badawcze Aparatury Rozdzielczej
04-703 Warszawa; ul. Pożaryskiego 28
Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the client's instructions and
PN-EN 61643-11:2006, p. 7.2.2, 7.3.2.1, 7.9.2, 7.9.3.1, 7.9.5.1, 7.9.7, 7.9.8;
EN 61643-11:2002, p. 7.2.2, 7.3.2.1, 7.9.2, 7.9.3.1, 7.9.5.1, 7.9.7, 7.9.8

Niniejsze Sprawozdanie odnosi się wyłącznie do badanego obiektu.
Producent ponosi odpowiedzialność za każdy egzemplarz wyrobu oznakowany identycznie jak wyrób badany.
The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

Sprawozdanie zawiera ogółem 9 stron i może być powielane wyłącznie w całości.
Powielanie częściowe dozwolone jest po uzyskaniu pisemnej zgody Laboratorium NBR
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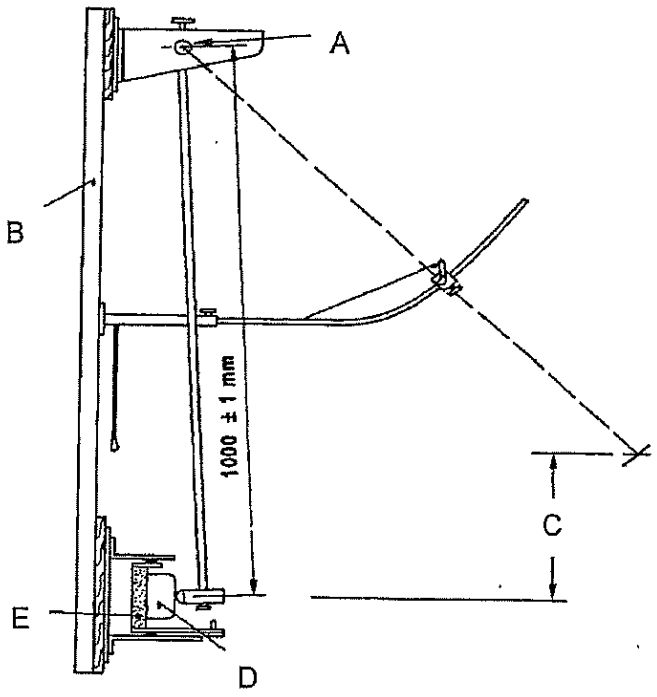
Kierownik Laboratorium / Head of Laboratory
на основание чл. 36а, ал. 3 от ЗОП

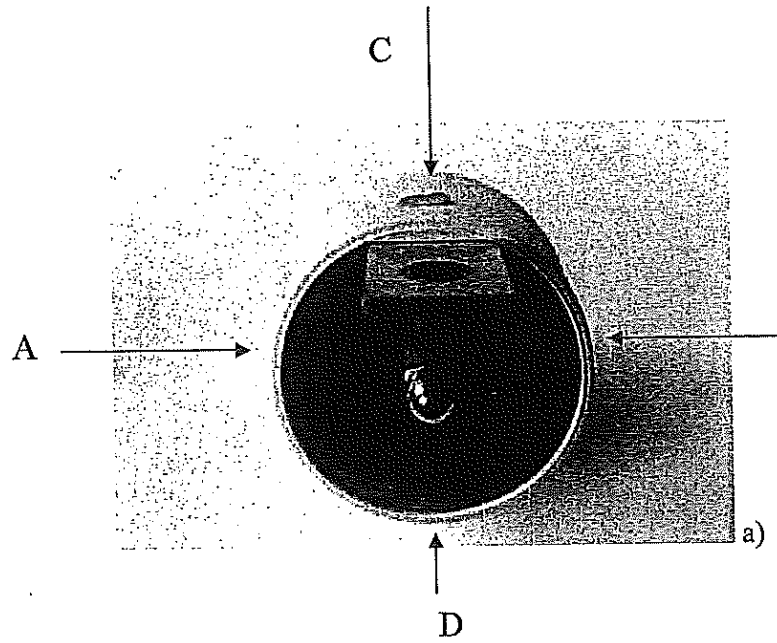
PhD Eng. Albert Gmitrzak

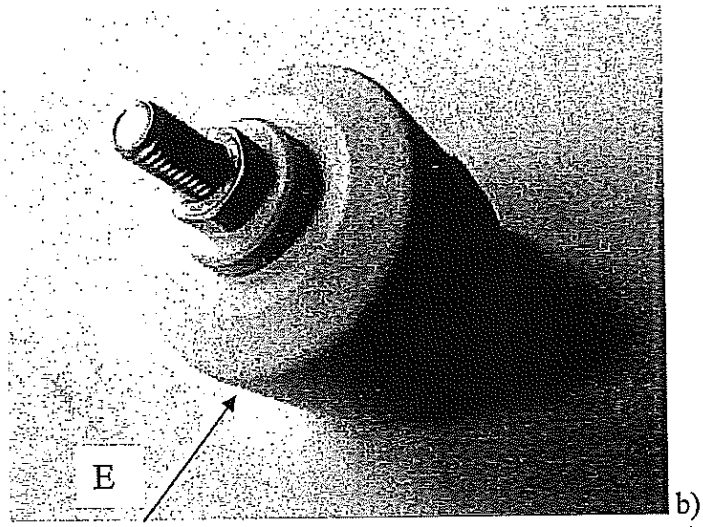
Warszawa 09.04.2008

RODZAJ PRÓBY: Wytrzymałość mechaniczna TYPE OF TEST: Mechanical strength	OBWÓD PROBIERCZY TEST CIRCUIT	OP1



A – Wahadło / Pendulum
B – Rama / Frame
C - Wysokość spadania / High of fall
D – Próbka / Specimen
E - Element mocujący / Mounting fixture



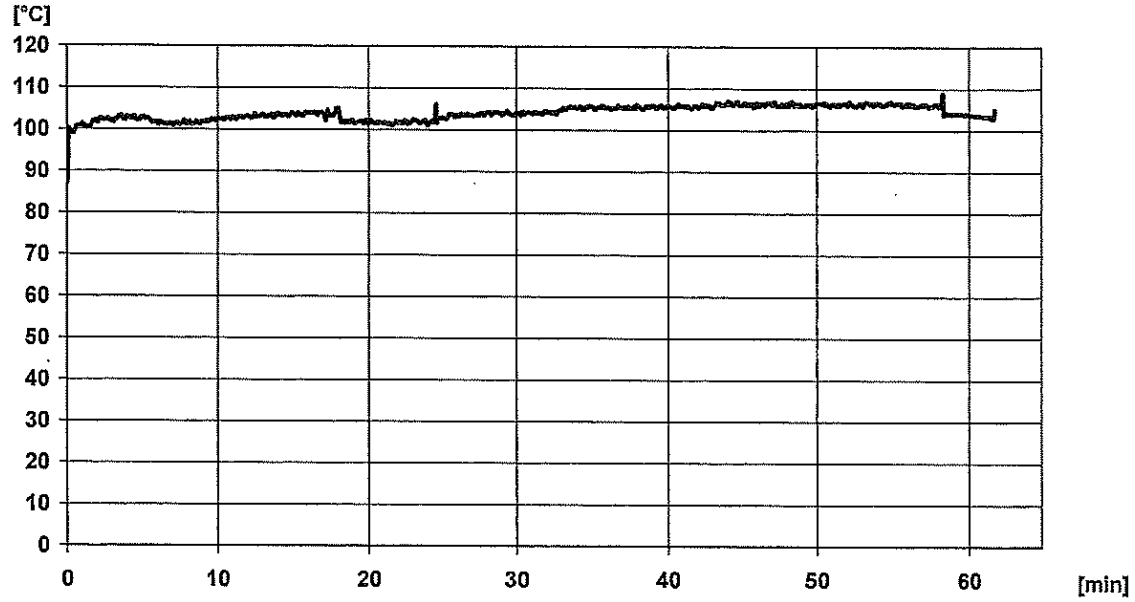


Kierunki przykładania uderzeń do badanych SPD podczas prób wytrzymałości mechanicznej:
a)obiekt zamocowany za górny zacisk, b)obiekt zamocowany za dolny zacisk.
Direction of applied the strikes at the SPD during the mechanical strength test:
a) upper terminal of tested object was mounted, b) earth terminal of tested object was mounted.

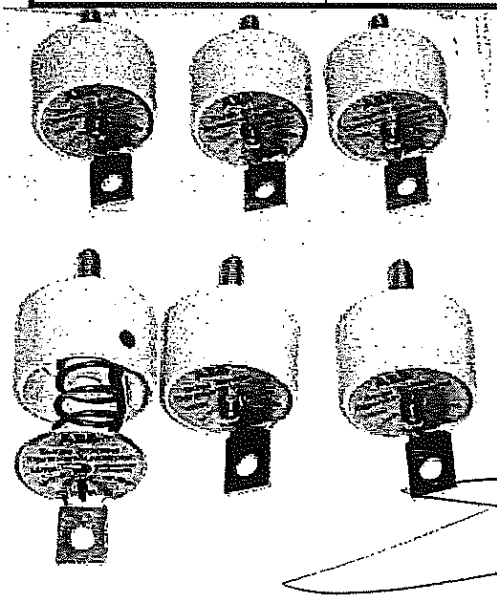
Kierunek przykładania uderzeń Direction of applied the strike	**LOVOS**					
	5/280	**10/280**	**5/440**	**10/440**	**5/660**	**10/660**
A	1 J	1 J	1 J	1 J	1 J	1 J
B	1 J	1 J	1 J	1 J	1 J	1 J
C	1 J	1 J	1 J	1 J	1 J	1 J
D	1 J	1 J	1 J	1 J	1 J	1 J
E	1 J	1 J	1 J	1 J	1 J	1 J

Po próbie próbki nie wykazywały żadnych uszkodzeń.
After the test the samples showed no damage.

2.4 Odporność na podwyższoną temperaturę
2.4 Heat resistance



	LOVOS 5/280	10/280	5/440	10/440	5/660	10/660
Komora probiercza / Test cabinet						
Czas trwania próby Duration of test [min]	60					
Temperatura powietrza Air temperature [°C]	100					
Odkształcenie obudowy Deformation of housing	**Brak** No					
Wynik Result	**Pozytywny** Positive					

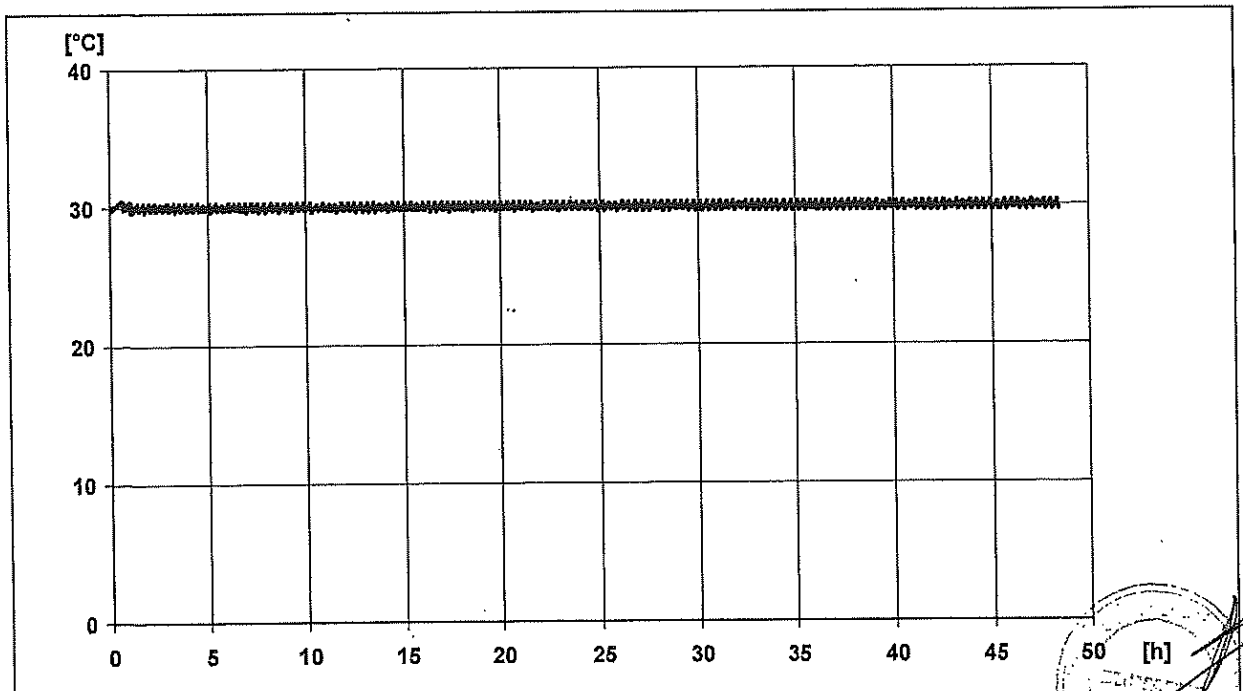


Widok SPD typu LOVOS po sprawdzeniu odporności na podwyższona temperaturę.
View of SPD after heat resistance test

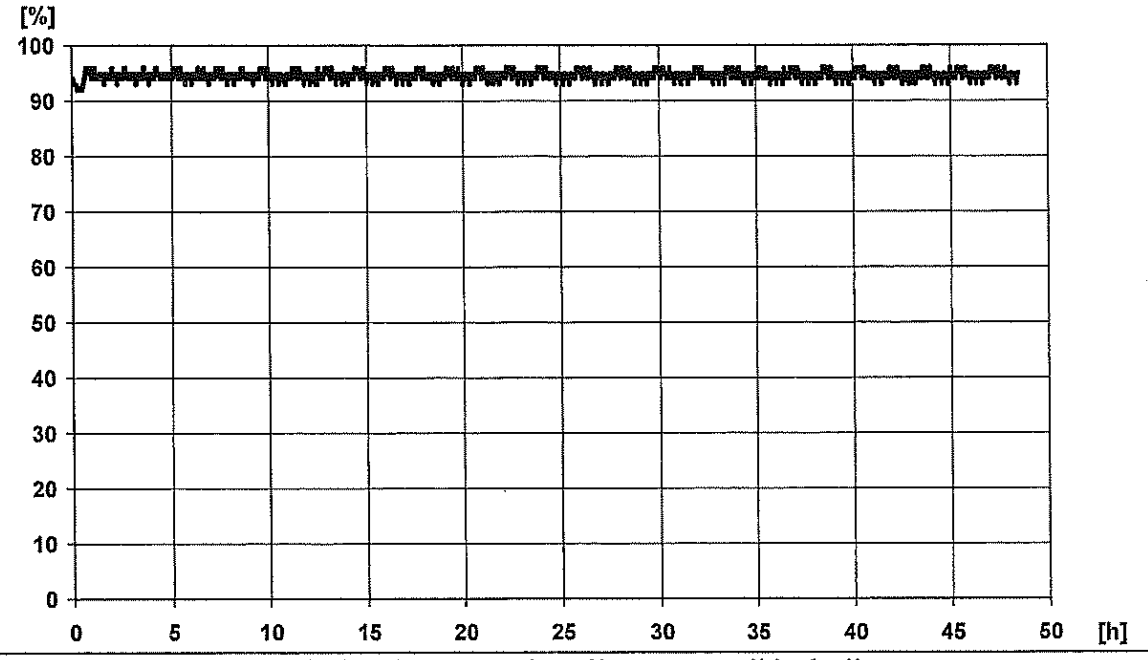
2.5 **Sprawdzenie odstępów w powietrzu i dróg upływu SPD w wykonaniu napowietrznym**
2.5 Verification of air clearnces and creepage distances
Odstęp w powietrzu dla SPD typu LOVOS pomiędzy częściami pod napięciem a ziemią wynosi 46 mm.
The air clearnce for SPD type LOVOS (between live parts and earth) is 62 mm.
Droga upływu dla SPD typu LOVOS wynosi 62 mm.
Creepage distance for SPD type LOVOS is 62 mm.

2.6 **Rezystancja izolacji**
2.6 Insulation resistance

	LOVOS					
	5/280	**10/280**	**5/440**	**10/440**	**5/660**	**10/660**
Komora wilgotnościowa / Humidity cabinet						
Czas trwania próby Duration of test [h]	48					
Temperatura powietrza Air temperature [°C]	30					
Wilgotność względna Relative humidity [%]	95					
Pomiar rezystancji / Measurement of resistance						
Napięcie probiercze Test voltage [V] dc	500					
Rezystancja / Resistance	>>5 MΩ					
Wynik Result	**Pozytywny** Positive					



Zmiany temperatury podczas trwania próby rezystancji izolacji
Temperature variation during insulation resistance test.



Zmiany wilgotności względnej podczas trwania próby rezystancji izolacji.
Relative humidity variation during insulation resistance test.

2.7 **Wytrzymałość elektryczna**
2.7 Dielectric withstand

Źródło napięcia probierczego: AP5 nr NAR 800-16800
Source of test voltage: AP5 nr NAR 800-16800

	LOVOS bez warystora LOVOS without varistor		
	5/660 nr 1X	**5/440 nr 2X**	**10/440 nr 3X**
Wytrzymałość elektryczna / Measurement of resistance			
Napięcie probiercze Test voltage [V]	4200		
Rezystywność wody Water resistivity [Ωm]	107		
Temperatura otoczenia Ambient temperature [°C]	18		
Temperatura wody Water temperature [°C]	7		
Opad deszczu: Rainfall: **- składowa pionowa** - vertical komponent [mm/min] **- składowa pozioma** - horizontal komponent [mm/min]	1,9 2		
Czas doprowadzenia pełnego napięcia Time of full voltage application [min]	1		
Wynik Result	**Brak przeskoków- Pozytywny** No arcting Positive	**Brak przeskoków- Pozytywny** No arcting Positive	**Brak przeskoków- Pozytywny** No arcting Positive

SPRAWOZDANIE Nr / TEST REPORT No 7597/NBR/08
LABORATORIUM BADAWCZE
APARATURY ROZDZIELCZEJ
High Voltage & Short-Circuit Testing Laboratory
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (48-22) 812 04 07: tel.: (48-22) 812 23 38: e'mail: nwr@icl.waw.pl
Certyfikat PCBC ISO 9001 Nr 976/1/2003; Jednostka Notyfikowana Nr 1460
AB 074

SPRAWOZDANIE Z BADAŃ – PRÓBA PRZY PRZEPIĘCIACH CZASOWYCH (TOV) SPOWODOWANYCH USZKODZENIAMI W SIECIACH NISKICH NAPIĘĆ

Test report under TOVs caused by faults in the low voltage system

BADANY APARAT
APPARATUS
URZĄDZENIA OGRANICZAJĄCE PRZEPIĘCIA (SPD)
SURGE PROTECTIVE DEVICES (SPD)

TYP
DESIGNATION
LOVOS

Największe napięcie trwałej pracy
Maximum continuous operating voltage
280 V

Znamionowy prąd wyładowczy
Nominal discharge current
5-10 kA

PRODUCENT
MANUFACTURER
ABB Sp. z o.o.
UL. ŻEGAŃSKA 1
04-713 WARSZAWA
ODDZIAŁ W PRZASNYSZU
UL. LESZNO 59
06-300 PRZASNYSZ

ZLECENIODAWCA
TESTED FOR

WYKONAWCA BADAŃ
TESTED BY
Laboratorium Badawcze Aparatury Rozdzielczej
04-703 Warszawa; ul. Pożaryskiego 28
Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the client's instructions and
PN-EN 61643-11:2006/A11:2007 , p. 7.7.6

Niniejsze Sprawozdanie odnosi się wyłącznie do badanego obiektu.
Producent ponosi odpowiedzialność za każdy egzemplarz wyrobu oznakowany identycznie jak wyrób badany.
The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

Kierownik Laboratorium / Head of Laboratory
на основание чл. 36а, ал. 3 от ЗОП
PhD Eng. Albert Gmitrzak

Warszawa 11.01.2008

PARAMETRY TECHNICZNE DEKLAROWANE PRZEZ PRODUCENTA POTWIERDZONE BADANIAMI / RATINGS ASSIGNED BY THE MANUFACTURER AND PROVED BY TESTS

Typ Type	Napięcie trwałej pracy Continuous operating voltage	Znamionowy prąd wyładowczy Nominal discharge current	Klasa prób Class of tests	Wartość przepięcia doraźnego Temporary overvoltage (5s)	Największy prąd wyładowczy Maximal discharge current
LOVOS-5/280	280	5 kA	II	393 V	25 kA
LOVOS-10/280		10 kA			40 kA

WYKAZ PRÓB / SUMMARY OF TESTS

Próby wykonał / The tests were carried out by:

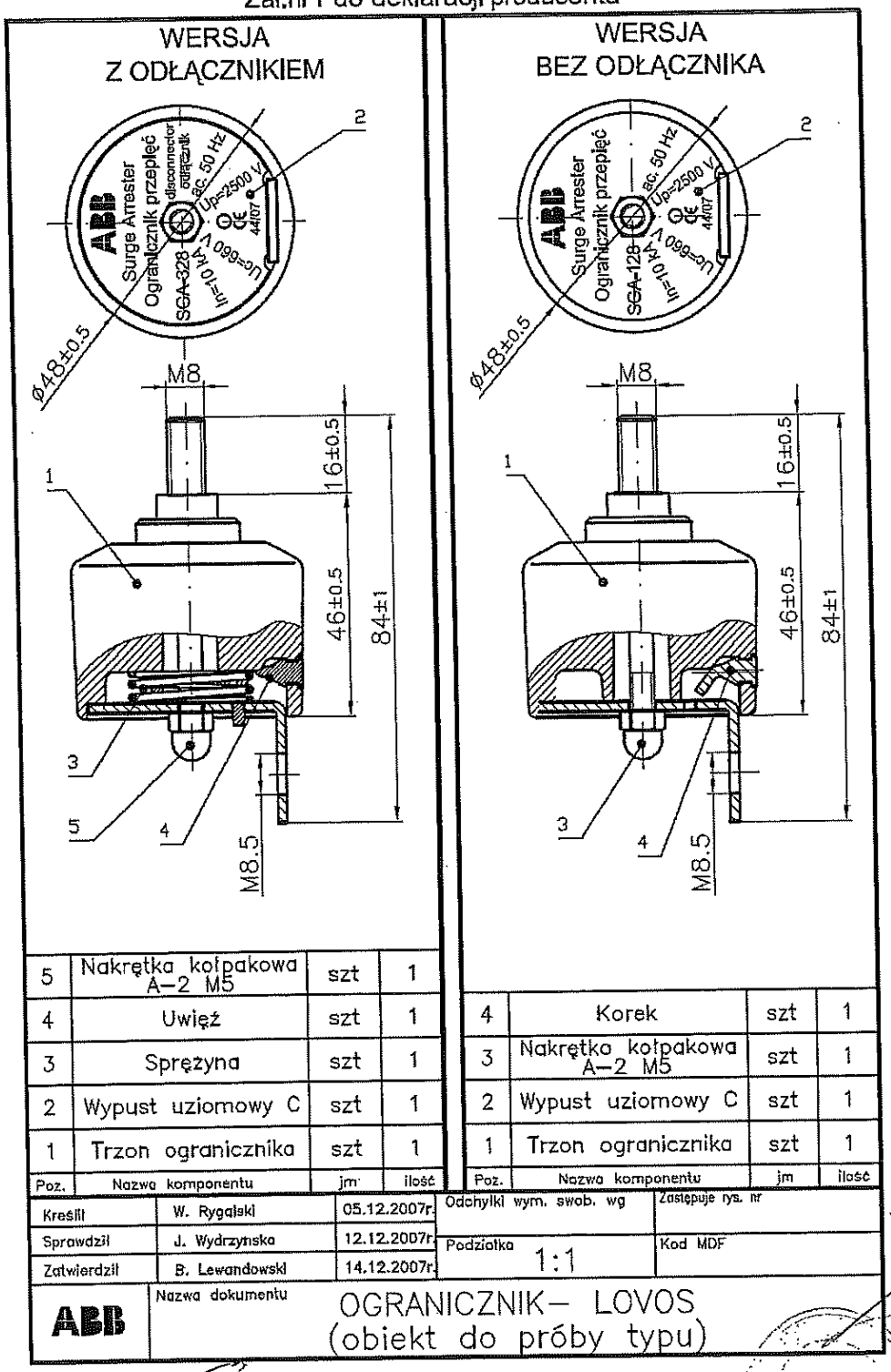
mgr ing. Janusz Bandel

Identyfikacja obiektu / Identification of the apparatus

Aparat jest skonstruowany zgodnie z rysunkiem technicznym zamieszczonym w tym sprawozdaniu.
The apparatus is constructed in accordance with the drawing incorporated in this report.

Rysunek techniczny
Drawing:

Zał.nr1 do deklaracji producenta



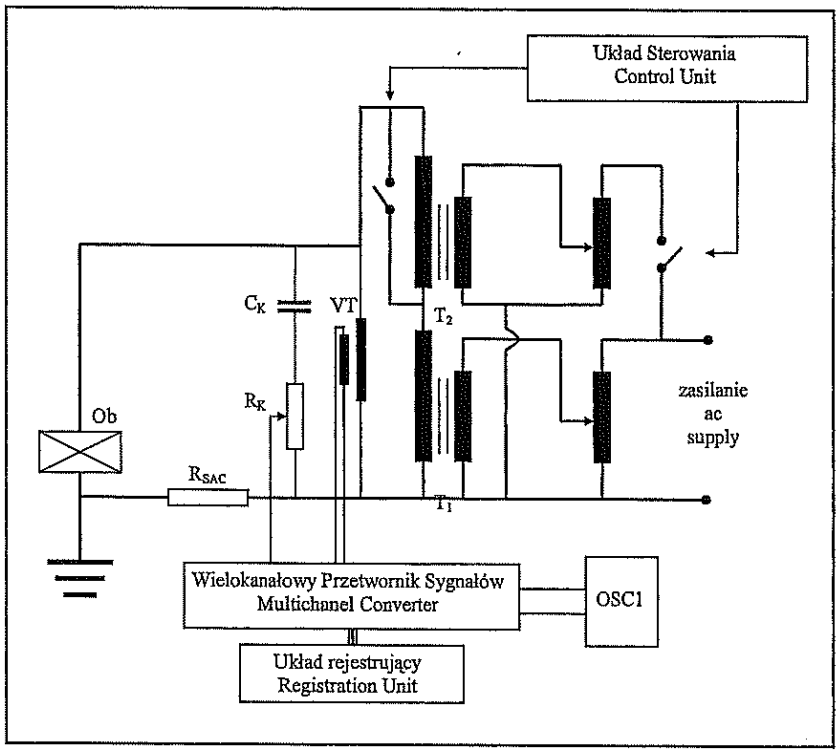
Poz.	Nazwa komponentu	jm	ilość
5	Nakrętka kołpakowa A–2 M5	szt	1
4	Uwięź	szt	1
3	Sprężyna	szt	1
2	Wypust uziomowy C	szt	1
1	Trzon ogranicznika	szt	1

Poz.	Nazwa komponentu	jm	ilość
4	Korek	szt	1
3	Nakrętka kołpakowa A–2 M5	szt	1
2	Wypust uziomowy C	szt	1
1	Trzon ogranicznika	szt	1

Kreślił	W. Rygalski	05.12.2007r.	Odchylki wym. swob. wg	Zastępuje rys. nr
Sprawdził	J. Wydrzyńska	12.12.2007r.	Podziałka 1:1	Kod MDF
Zatwierdził	B. Lewandowski	14.12.2007r.		

ABB — Nazwa dokumentu: OGRANICZNIK– LOVOS (obiekt do próby typu)

RODZAJ PRÓBY: **PRÓBA PRZY PRZEPIĘCIACH CZASOWYCH (TOV) SPOWODOWANYCH USZKODZENIAMI W SIECIACH NISKICH NAPIĘĆ** TYPE OF TEST: Test under TOVs caused by faults in the low voltage system	OBWÓD PROBIERCZY TEST CIRCUIT	OP1



OSC1- oscyloskop cyfrowy / digital oscilloscope type LeCroy-9360 **VT –przekładnik napięciowy** / voltage transformer

T_1- transformator probierczy/ Test transformer:**230/12x416 V/V 20 kVA**

T_2- transformator probierczy/ Test transformer:**230/230 V/V 1,5 kVA**

Ob - badane urządzenie ograniczające przepięcia / tested surge protective device

Układ Rejestrujący - A/D przetwornik typu Advantech PCL818LS 40 kHz / Registration unit A/D converter type Advantech PCL818LS 40 kHz

Thc – termopara typu J / thermocouple type J **R_{ac} - bocznik prądu przemiennego** - ac current shunt 50 Ω.

R_e – Dławik indukcyjny ograniczający prąd probierczy / Adjustable inductive reactor limiting the test current

Kształty napięć probierczych w próbach spełniały wymagania EN 61643-11. Obwód pomiarowy napięcia przemiennego spełniał wymagania zawarte w następujących normach: EN 61643-11. Całkowita niepewność pomiaru wartości: trwałego prądu pracy, napięcia przemiennego była mniejsza niż 3%.

All wave-shapes of test voltage used in test meet requirements of EN 61643-11. The measuring circuit of ac voltage The total uncertainties of measurements of the peak value of continuous operating current and ac voltage were less than 3%.

2.Badania / TEST

2.1 PRÓBA PRZY PRZEPIĘCIACH CZASOWYCH (TOV) SPOWODOWANYCH USZKODZENIAMI W SIECIACH NISKICH NAPIĘĆ (procedura badań wg PN-EN 61643-11 pkt.7.7.6.1).

2.1 Test under TOVs caused by faults in the low voltage system (test procedure acc. to EN 61643-11 par.7.7.6.1)

Rys. / Fig.	Obiekt/ Object	U_T [V]	Ucs [V]	t_T [s]	Ic5 [µA]	Ic10 [µA]	Ic15 [µA]	
			a, b		c	d	e	
3	LOVOS-5/280 nr 3	393	253	5	103,1	104,7	104,7	Nie zadziałał/ didn't operate
4	LOVOS-5/280 nr 4	393	253	5	106,3	103,1	103,1	Nie zadziałał/ didn't operate
5	LOVOS-5/280 nr 1	393	253	5	96,9	98,4	96,9	Nie zadziałał/ didn't operate
6	LOVOS-10/280 nr 21	393	253	5	103,1	101,6	100	Nie zadziałał/ didn't operate
7	LOVOS-10/280 nr 22	393	253	5	82,8	82,8	82,8	Nie zadziałał/ didn't operate
8	LOVOS-10/280 nr 23	393	253	5	85,9	85,9	84,4	Nie zadziałał/ didn't operate

t_T – czas dołączenia badanej próbki do źródła napięcia o wartości U_T / period connected test sample for voltage source equal to U_T

Pomiar trwałego napięcia pracy i prądu pracy dla SPD typu BOP-R po próbie TOV.
Measurement of maximum continuous operating voltage and residual current for BOP-R after TOV.

TYP	Nr	U_c [V]	I_c [µA]	P_S [mVA]
LOVOS-5/280	1	281	196	55,08
	3	281	208	58,45
	4	281	204	57,32
LOVOS-10/280	21	281	201	56,48
	22	281	188	52,83
	23	282	187	52,73

Pomiar napięcia obniżonego
Measurement of residual voltage

TYP	Nr	I_n [kA]	U_{res} [V]
LOVOS-5/280	1	5,38	915
	3	5,26	915
	4	5,30	929
LOVOS-10/280	21	10,53	1022
	22	10,53	1052
	23	10,15	1072

3.Wnioski.
3.Conclusions

Próba przy przepięciach czasowych została przeprowadzona zgodnie z wymaganiami normy PN-EN 61643-11:2006/A11:2007 punkt 7.7.6. Żaden odłącznik z badanych SPD nie zadziałał ani też oględziny badanych obiektów po próbie nie wykazały żadnych widocznych uszkodzeń. Podczas całego okresu doprowadzenia przemiennego napięcia probierczego U_{CS} stwierdzono ciągłe malenie wartości szczytowej składowej czynnej prądu upływu dla wszystkich badanych

SPD co wskazuje na występowanie ich stabilności cieplnej w trakcie prób. Trwały pobór mocy badanych próbek nie przekraczał o 20% wartości zmierzonych w próbie trwałego poboru mocy. Zmierzone napięcie obniżone badanych obiektów nie przekraczało napięciowego poziomu ochrony.

The TOV test was carried out acc. to the requirements of the standard **EN 61643-11:2002/A11:2007** par. 7.7.6 acc. to test class II. No disconnector of any one of the tested SPD didn't operated and visual inspection of the test sample after test revealed no evidence of any damage.

During the whole period of applying the ac test voltage equal U_C the peak value active part of the leakage current decreased continuously or be stable for all SPD's tested which indicates to their thermal stability during tests.

The standby power consumption of tested objects didn't increase by more than 20 % of the value measured in the standby power consumption and residual current test.

Residual voltage tested object didn't increase voltage protection level.

SPRAWOZDANIE Nr / TEST REPORT No 7717/NBR/08
LABORATORIUM BADAWCZE
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Certyfikat PCBC ISO 9001 Nr 976/1/2003; Jednostka Notyfikowana Nr 1460
AB 074

SPRAWOZDANIE Z BADAŃ – PRÓBA DZIAŁANIA
TEST REPORT OF OPERATING DUTY TEST

BADANY APARAT
APPARATUS
URZĄDZENIA OGRANICZAJĄCE PRZEPIĘCIA (SPD)
SURGE PROTECTIVE DEVICES (SPD)

TYP
DESIGNATION
LOVOS

Największe napięcie trwałej pracy
Maximum continuous operating voltage
500, 1000 V

Znamionowy prąd wyładowczy
Nominal discharge current
5-10 kA

PRODUCENT
MANUFACTURER
ABB Sp. z o.o.
UL. ŻEGAŃSKA 1
04-713 WARSZAWA
ODDZIAŁ W PRZASNYSZU
UL. LESZNO 59
06-300 PRZASNYSZ

ZLECENIODAWCA
TESTED FOR

WYKONAWCA BADAŃ
TESTED BY
Laboratorium Badawcze Aparatury Rozdzielczej
04-703 Warszawa; ul. Pożaryskiego 28
Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the client's instructions and
PN-EN 61643-11:2006, p. 7.6; EN 61643-11:2002, p. 7.6

Niniejsze Sprawozdanie odnosi się wyłącznie do badanego obiektu.
Producent ponosi odpowiedzialność za każdy egzemplarz wyrobu oznakowany identycznie jak wyrób badany.
The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

Sprawozdanie zawiera ogółem 32 stron i może być powielane wyłącznie w całości.
Powielanie częściowe dozwolone jest po uzyskaniu pisemnej zgody Laboratorium NBR
This Test Report comprises 32 sheets in total.
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Kierownik Laboratorium //Head of Laboratory
на основание чл. 36а, ал. 3 от ЗОП

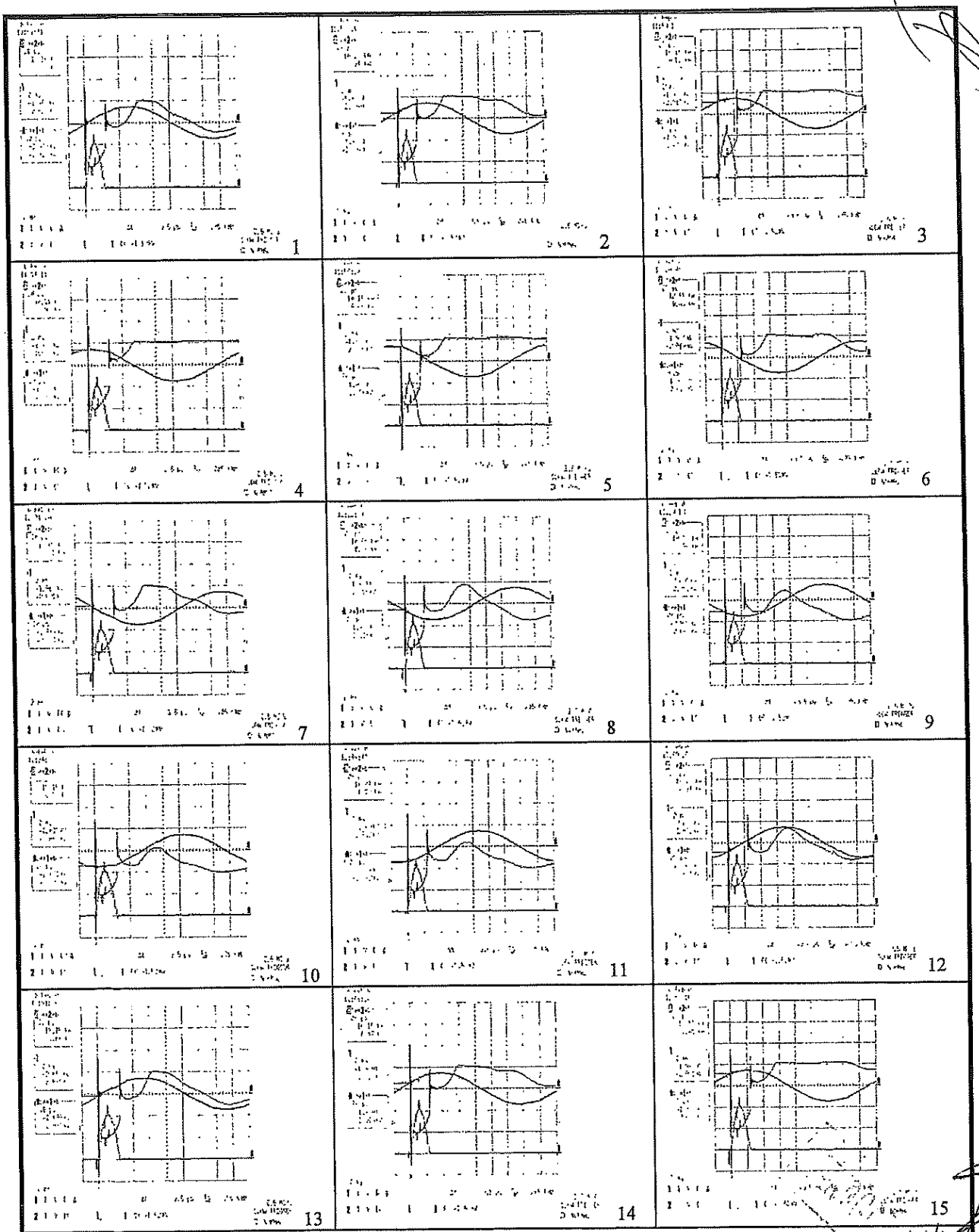
PhD Eng. Albert Gmitrzak

Warszawa 10.07.2008

3.2 Próba wstępnego kondycjonowania (procedura badań wg PN-EN 61643-11 pkt.7.6.4).
3.2 Preconditioning (test procedure acc. to EN 61643-11 par.7.6.4)

Tablica 4. **Kondycjonowanie dla LOVOS-10/500**
Table 4. Preconditioning for **LOVOS-10/500**

Udar Impulse	**Kąt synchronizacji** Synchronization angle	$I_{8/20}$	**LOVOS-10/500**		
			Nr 104	Nr 105	Nr 106
1	0°	[kA]	10,15	10,15	10,15
2	30°	[kA]	10,23	10,15	10,15
3	60°	[kA]	10,15	10,15	10,15
4	90°	[kA]	10,11	10,15	10,07
5	120°	[kA]	10,15	10,15	10,12
6	150°	[kA]	10,15	9,91	10,15
7	180°	[kA]	10,00	10,13	10,07
8	210°	[kA]	10,06	10,15	9,91
9	240°	[kA]	10,15	10,00	10,00
10	270°	[kA]	10,15	10,00	10,00
11	300°	[kA]	10,04	10,15	10,00
12	330°	[kA]	10,15	10,12	10,09
13	0°	[kA]	10,15	10,00	10,00
14	30°	[kA]	10,15	10,02	10,13
15	60°	[kA]	10,15	10,13	10,00



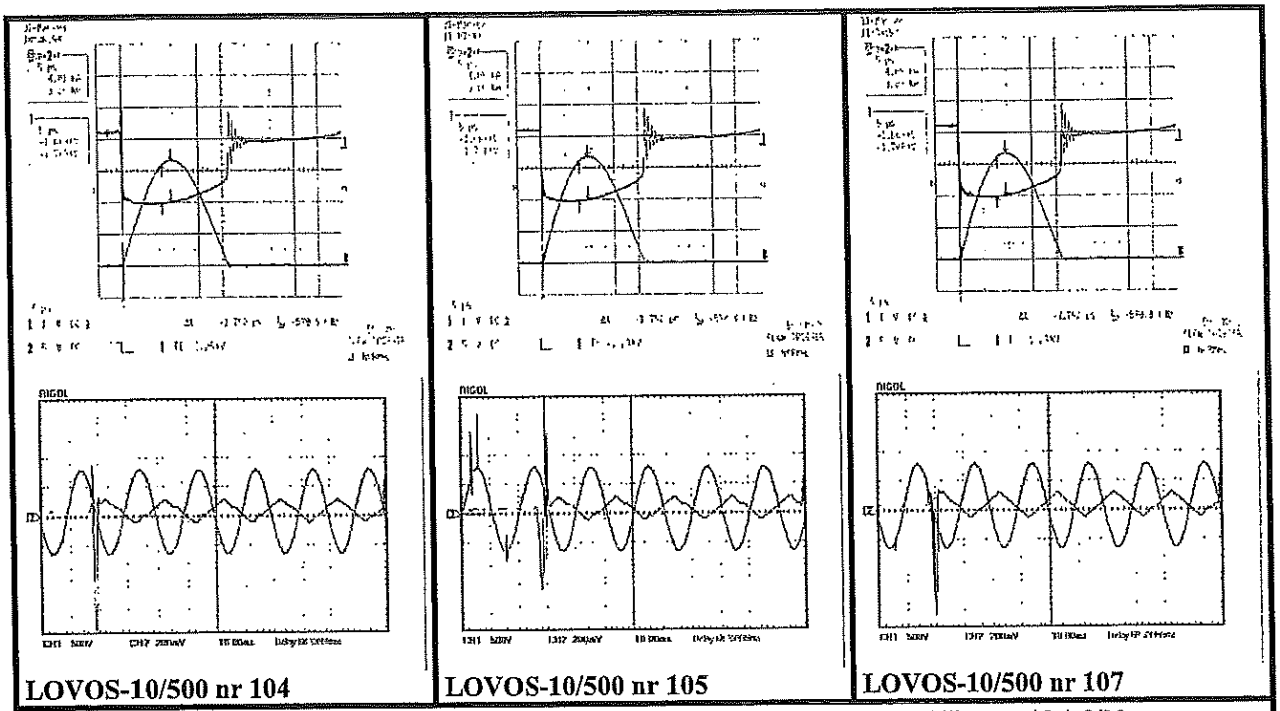
Rys 13. Przebiegi napięcia i prądu podczas próby kondycjonowania ogranicznika: LOVOS-10/500 nr 104
Fig 13. Oscillograms of voltage and during conditioning test of the SPD: **LOVOS-10/500 nr 104**

3.3 Próba działania klasy II (procedura badań wg. 7.6.5 normy PN-EN 61643-11).
3.3 Class II operating duty test (procedure acc. to 7.6.5 standard EN61643-11).

Tablica 5. **Próba działania dla LOVOS-10/500**
Table 5 Operating duty test for LOVOS-10/500

		LOVOS-10/500		
		Nr 104	Nr 105	Nr 107
0.1 I_{max}	[kA]	4,01	4,05	4,08
I_{r1}	[µA]	104	104	112
I_{r15}	[µA]	104	104	112
I_{r30}	[µA]	104	104	112
0.25 I_{max}	[kA]	10,15	10,07	10,15
I_{r1}	[µA]	150	152	160
I_{r15}	[µA]	104	108	112
I_{r30}	[µA]	104	104	112
0.5 I_{max}	[kA]	20,55	20,40	20,40
I_{r1}	[µA]	1160	1360	1680
I_{r15}	[µA]	132	148	140
I_{r30}	[µA]	128	140	136
0.75 I_{max}	[kA]	30,55	30,40	30,40
I_{r1}	[µA]	5600	6600	9400
I_{r15}	[µA]	160	150	156
I_{r30}	[µA]	120	130	140
1.0 I_{max}	[kA]	40,00	40,30	40,60
I_{r1}	[µA]	>>13400	>>13400	>>13400
I_{r15}	[µA]	176	184	198
I_{r30}	[µA]	160	176	192
1.0 I_n	[kA]	10,46	10,31	10,31
I_{r1}	[µA]	200	232	296
I_{r15}	[µA]	144	160	168
I_{r30}	[µA]	144	160	168

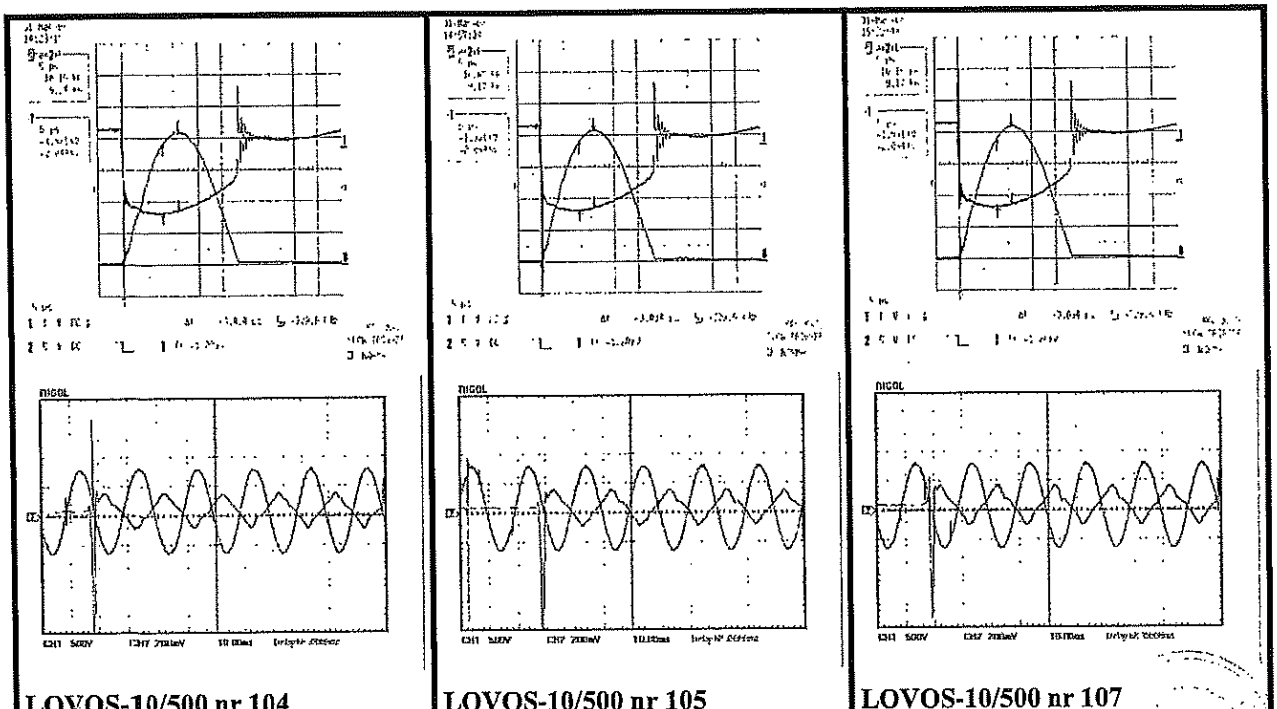
I_{r1} - **wartość szczytowa składowej czynnej prądu bezpośrednio po udarze prądowym 8/20**
the peak of the resistive component of residual current immediately after impulse 8/20
I_{r15} - **wartość szczytowa składowej czynnej prądu 15 minut po udarze prądowym 8/20**
the peak of the resistive component of residual current 15 minutes after impulse 8/20
I_{r30} - **wartość szczytowa składowej czynnej prądu 30 minut po udarze prądowym 8/20**
the peak of the resistive component of residual current 30 minutes after impulse 8/20



LOVOS-10/500 nr 104 | **LOVOS-10/500 nr 105** | **LOVOS-10/500 nr 107**

Rys. 14. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I= 0,1*Imax =4 kA 8/20.

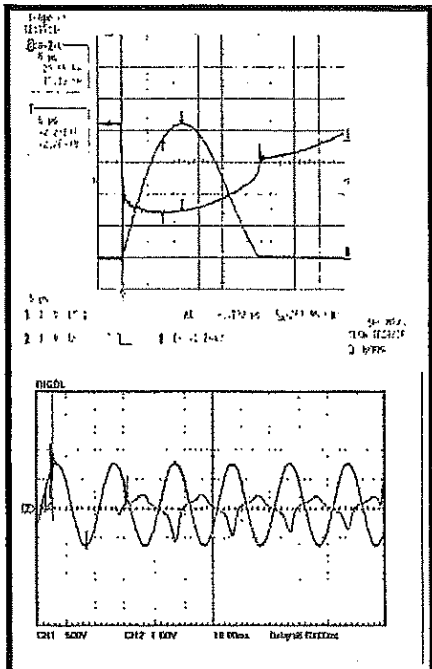
Fig. 14. Oscillograms of voltage and currents during operating duty test at I= 0,1*Imax =4 kA 8/20.



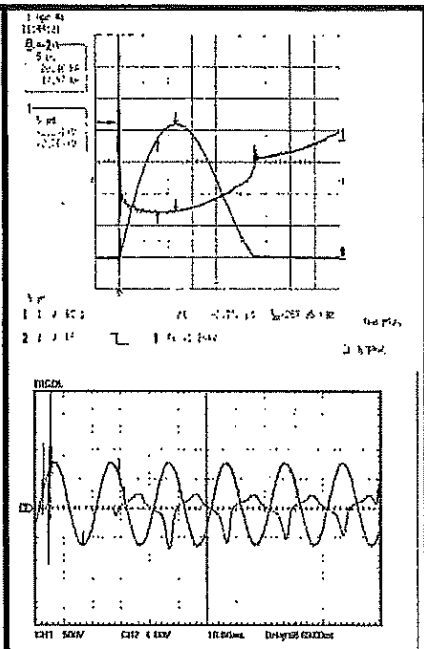
LOVOS-10/500 nr 104 | **LOVOS-10/500 nr 105** | **LOVOS-10/500 nr 107**

Rys. 15. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I=0,25*Imax =10 kA 8/20.

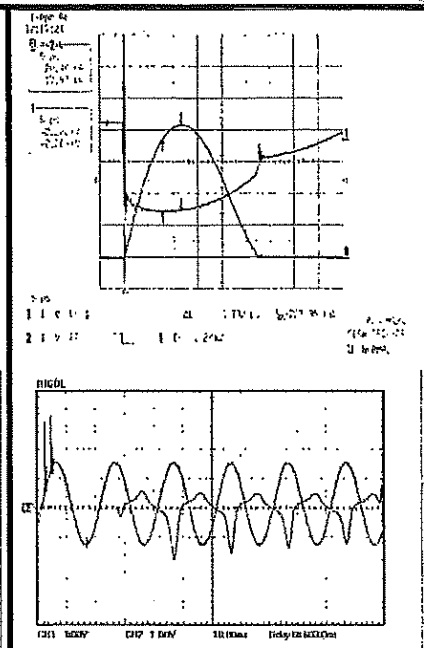
Fig 15. Oscillograms of voltage and currents during operating duty test at I= 0,25*Imax =10 kA 8/20.



LOVOS-10/500 nr 104



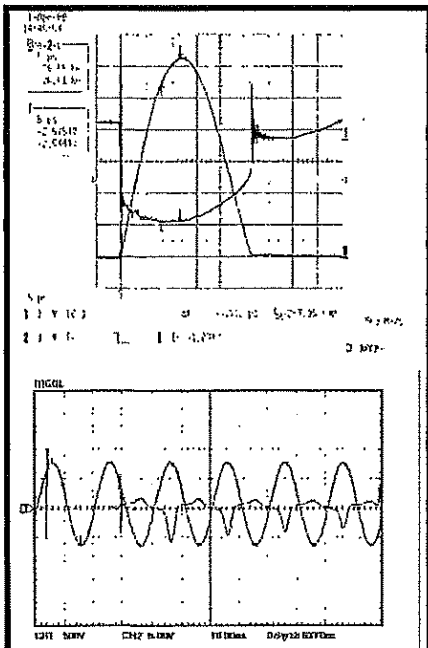
LOVOS-10/500 nr 105



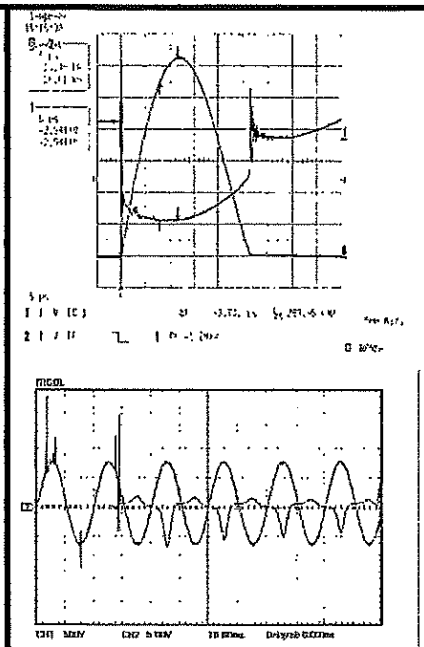
LOVOS-10/500 nr 107

Rys. 16. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I= 0,5*Imax =20 kA 8/20.

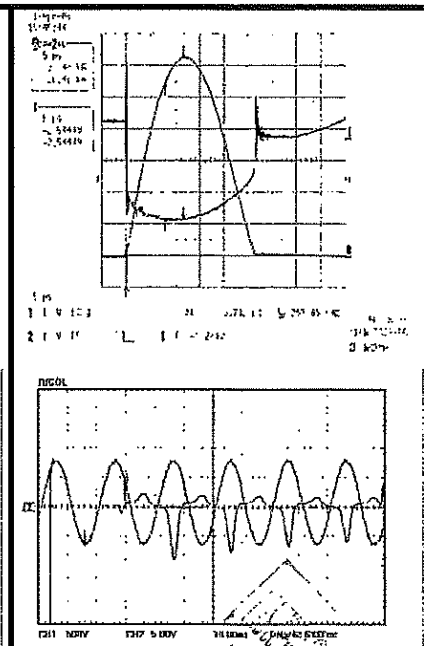
Fig 16. Oscillograms of voltage and currents during operating duty test at I= 0,5*Imax =20 kA 8/20.



LOVOS-10/500 nr 104



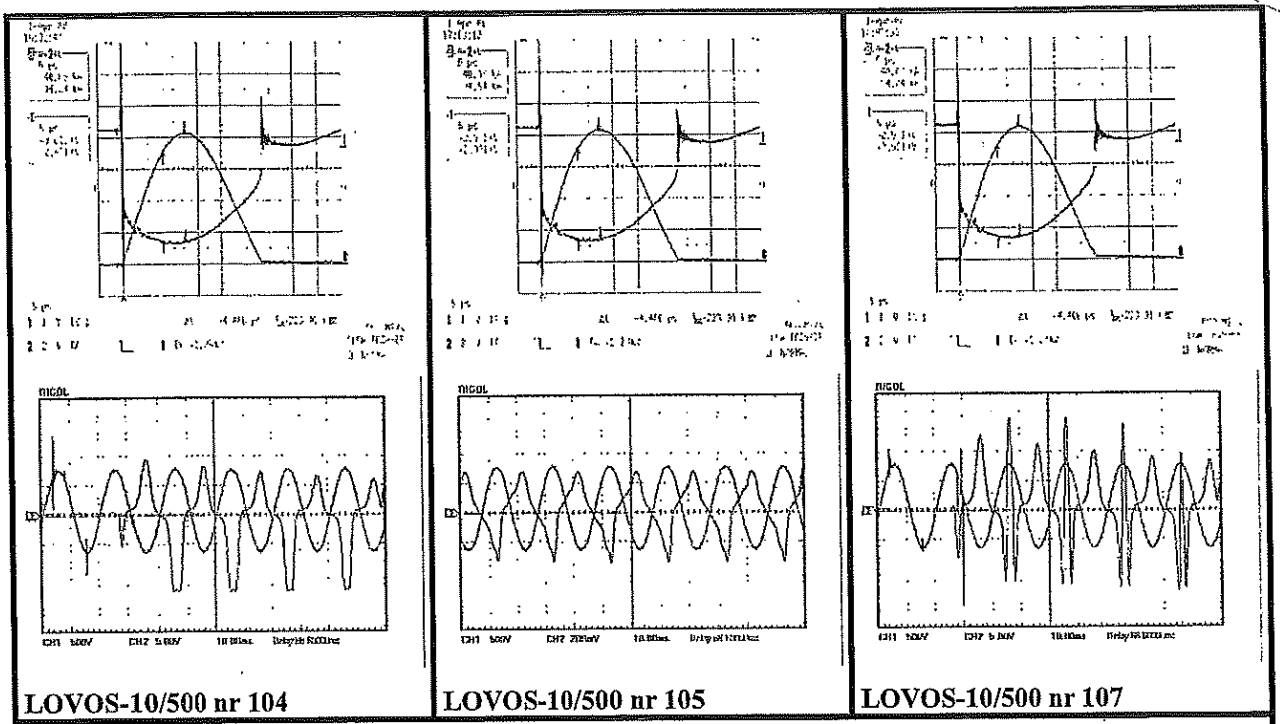
LOVOS-10/500 nr 105



LOVOS-10/500 nr 107

Rys. 17. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I= 0,75*Imax =30 kA 8/20.

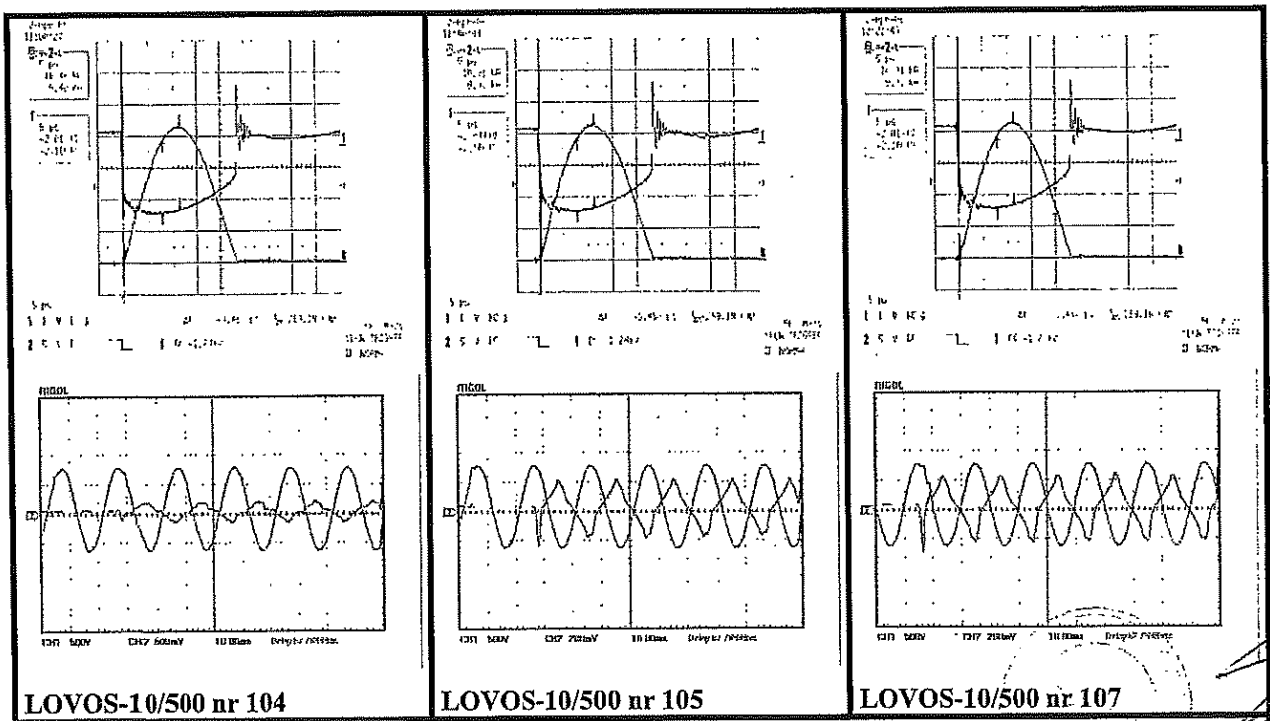
Fig 17. Oscillograms of voltage and currents during operating duty test at I= 0,75*Imax =30 kA 8/20.



LOVOS-10/500 nr 104 | **LOVOS-10/500 nr 105** | **LOVOS-10/500 nr 107**

Rys. 18. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I= Imax =40 kA 8/20.

Fig 18. Oscillograms of voltage and currents during operating duty test at I= Imax =40 kA 8/20.



LOVOS-10/500 nr 104 | **LOVOS-10/500 nr 105** | **LOVOS-10/500 nr 107**

Rys. 19. Oscylogramy napięcia i prądów w chwili przyłożenia prądu udarowego I= In =10 kA 8/20.

Fig 19. Oscillograms of voltage and currents during operating duty test at I= In =10 kA 8/20.

B. TEST PROGRAMME-- In accordance with the client's instructions

No.	Kind of test	Note
1.	Resistance to abnormal heat and fire ◊ Test temperature: (850±15)°C	

Programme, method of measurement and requirements according to:

1. **PN-EN 61643-11:2006** Low-voltage surge protective devices. Part 11 - Surge protective devices connected to low-voltage power system. requirements and test - clause 7.9.4
2. **PN-EN 60595-2-10:2005** Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods-Glow wire apparatus and common test procedures
3. **PN-EN 60595-2-11:2005** Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods—Glow-wire flammability test method for end-products

C. 1 Conclusion

Resistance to abnormal heat and fire

The surge arresters type LOVOS produced by ABB meet to requirements of PN-EN 61643-11:2006 clause 7.9.4 for 850°C.

This Test Report is Annex to Test Report NWM No 504-4025/13.

C 2. Test Results

No	Clause	Requirement test	Additional information	Result
1	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 1	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 2 s	 PASS PASS
2	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 2	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 2 s	 PASS PASS

No	Clause	Requirement test	Additional information	Result
3	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 3	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 2 s	 PASS PASS
4	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 4	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 1 s	 PASS PASS
5	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 5	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C

No	Clause	Requirement test	Additional information	Result
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 3 s	 PASS PASS
6	7.9.4	**Resistance to abnormal heat and fire**		
		NUMBER OF SAMPLES	No 6	
		CONDITIONING		
		• Relative humidity 45%<RH%<75% • temperature 15C<t<35% • time of conditioning 24 h		49% 18°C
		SEVERITY		
		• Test temperature	(850±15)°C	
		• time	30±1 s	
		• wrapping tissue of grammage	20 g/m^2	
		No visible flame and sustained glowing	Sample was burn	
		If EUT is flaming or glowing: • no ignition of tissue or scorching of pinewood board • flames and glowing parts of the sample extinguish themselves within 60 s after the removal of the glow-wire	 1 s	 PASS PASS

SPRAWOZDANIE Nr / TEST REPORT No 7717/NBR/08
LABORATORIUM BADAWCZE
APARATURY ROZDZIELCZEJ
High Voltage & Short-Circuit Testing Laboratory
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (48-22) 812 04 07; tel.: (48-22) 812 23 38; e'mail: nwr@iel.waw.pl
Certyfikat PCBC ISO 9001 Nr 976/1/2003; Jednostka Notyfikowana Nr 1460
AB 074

SPRAWOZDANIE Z BADAŃ – PRÓBA DZIAŁANIA
TEST REPORT OF OPERATING DUTY TEST

BADANY APARAT
APPARATUS
URZĄDZENIA OGRANICZAJĄCE PRZEPIĘCIA (SPD)
SURGE PROTECTIVE DEVICES (SPD)

TYP
DESIGNATION
LOVOS

Największe napięcie trwałej pracy
Maximum continuous operating voltage
500, 1000 V

Znamionowy prąd wyładowczy
Nominal discharge current
5-10 kA

PRODUCENT
MANUFACTURER
ABB Sp. z o.o.
UL. ŻEGAŃSKA 1
04-713 WARSZAWA
ODDZIAŁ W PRZASNYSZU
UL. LESZNO 59
06-300 PRZASNYSZ

ZLECENIODAWCA
TESTED FOR

WYKONAWCA BADAŃ
TESTED BY
Laboratorium Badawcze Aparatury Rozdzielczej
04-703 Warszawa; ul. Pożaryskiego 28
Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the client's instructions and
PN-EN 61643-11:2006, p. 7.6; EN 61643-11:2002, p. 7.6

Niniejsze Sprawozdanie odnosi się wyłącznie do badanego obiektu.
Producent ponosi odpowiedzialność za każdy egzemplarz wyrobu oznakowany identycznie jak wyrób badany.
The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

Kierownik Laboratorium /Head of Laboratory
на основание чл. 36а, ал. 3 от ЗОП
PhD Eng. Albert Gmitrzak

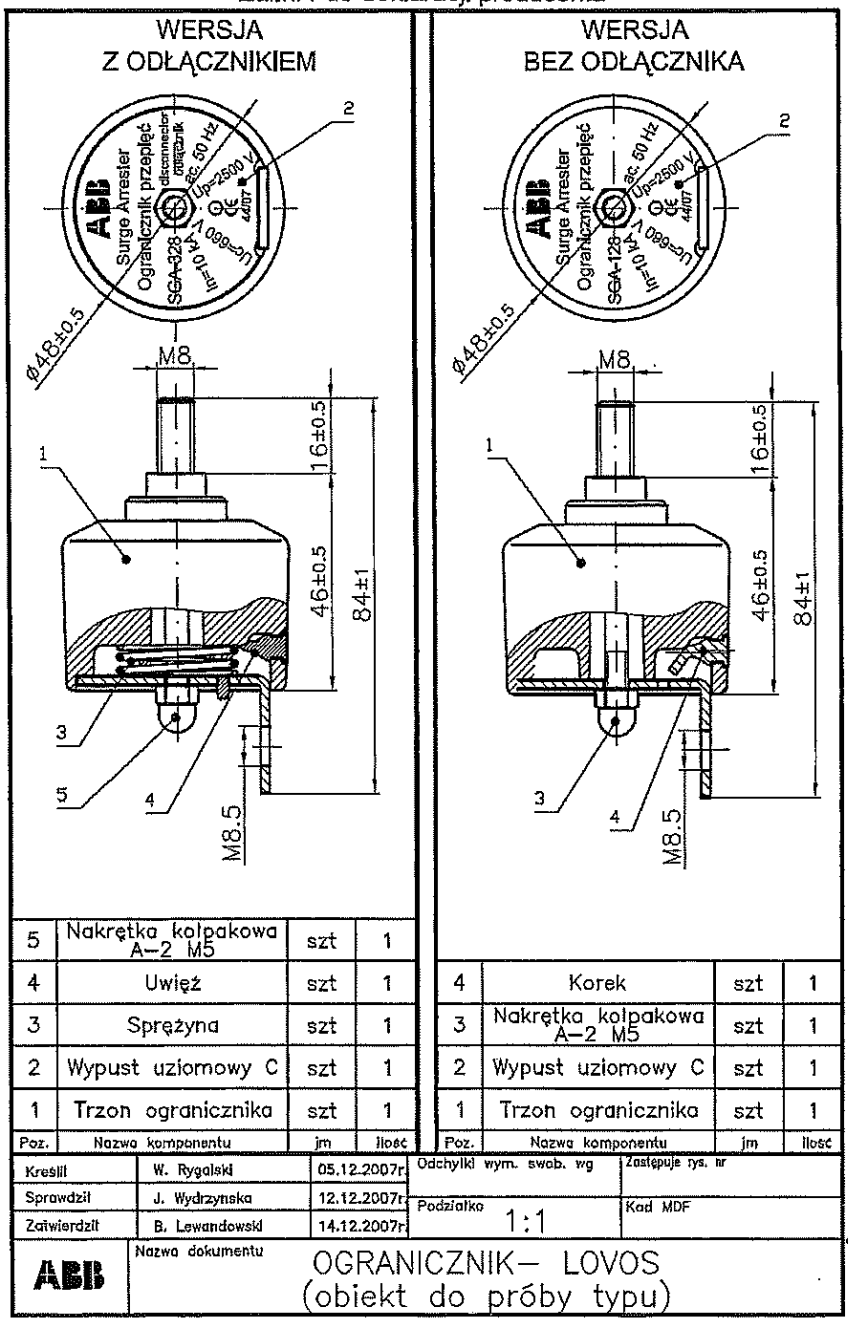
Warszawa 10.07.2008

1. PRZEDMIOT BADAŃ./ TEST OBJECT

Identyfikacja obiektu / Identification of the apparatus

Aparat jest skonstruowany zgodnie z rysunkiem technicznym zamieszczonym w tym sprawozdaniu.
The apparatus is constructed in accordance with the drawing incorporated in this report.

Zał.nr1 do deklaracji producenta



Poz.	Nazwa komponentu	jm	Ilość
5	Nakrętka kołpakowa A–2 M5	szt	1
4	Uwięź	szt	1
3	Sprężyna	szt	1
2	Wypust uziomowy C	szt	1
1	Trzon ogranicznika	szt	1

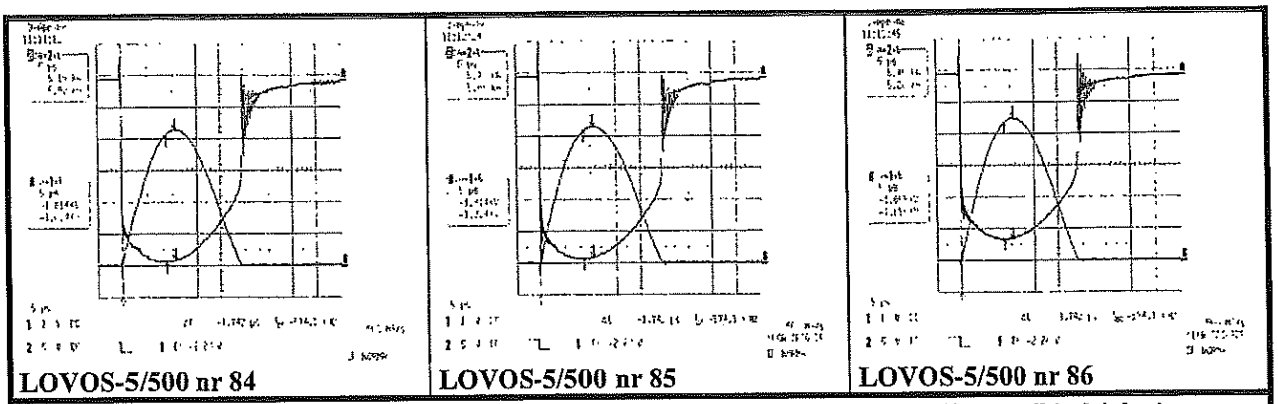
Poz.	Nazwa komponentu	jm	Ilość
4	Korek	szt	1
3	Nakrętka kołpakowa A–2 M5	szt	1
2	Wypust uziomowy C	szt	1
1	Trzon ogranicznika	szt	1

Kreślił	W. Rygalski	05.12.2007r	Odchyłki wym. swob. wg	Zastępuje rys. nr
Sprawdził	J. Wydrzyńska	12.12.2007r	Podziałka 1:1	Kod MDF
Zatwierdził	B. Lewandowski	14.12.2007r		
ABB	Nazwa dokumentu	OGRANICZNIK– LOVOS (obiekt do próby typu)		

Rys. 1. Rysunek techniczny SPD typu LOVOS
Fig 1 Drawing of the SPD type LOVOS

2.4 Kontrolny pomiar napięcia obniżonego (procedura badań wg 7.6.1 normy PN-EN 61643-11).

2.4 Control measurement of residual voltage(test procedure acc. to 7.6.1 standard EN 61643-11)



LOVOS-5/500 nr 84 | LOVOS-5/500 nr 85 | LOVOS-5/500 nr 86

Rys. 11. Przebiegi napięcia obniżonego przy znamionowym prądzie wyładowczym (5 kA) po próbie działania.
Fig. 11.Residual voltage measurements at nominal discharge current (5 kA) after operating duty test

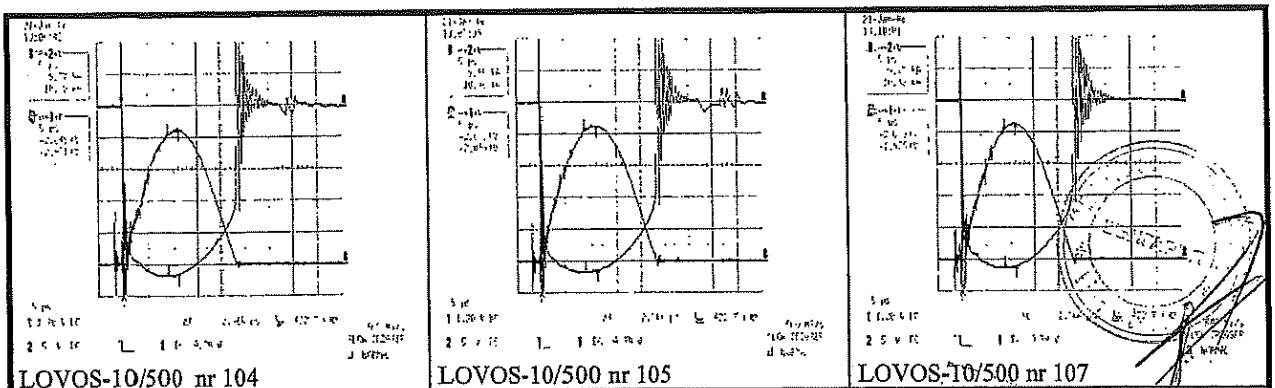
Tablica 3. Kontrolny pomiar napięcia obniżonego.
Table 3. Control measurement of residual voltage.

Napięcie obniżone Residual voltage		LOVOS-5/500		
		Nr 84	Nr 85	Nr 86
przed próbą/ before test	[V]	1801	1789	1613
po próbie/ after test	[V]	1834	1824	1665
Napięciowy poziom ochrony Voltage protection level	[V]	2050	2050	2050

3.Próba działania – LOVOS-10/500.

3.1 Pomiar wstępny napięcia obniżonego (procedura badań wg 7.6.1 normy PN-EN 61643-11).

3.1 Initial measurement of residual voltage (test procedure acc. to par. 7.6.1 standard EN 61643-11)



LOVOS-10/500 nr 104 | LOVOS-10/500 nr 105 | LOVOS-10/500 nr 107

Rys. 12. Przebiegi napięcia obniżonego przy znamionowym prądzie wyładowczym (10 kA) przed rozpoczęciem próby działania.
Fig. 12. Oscillograms of residual voltage measurement at nominal discharge current 10 kA before operating duty test

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гр.Петрич 2850, Промишлена зона
ул."Свобода"49
тел.:00359 745 60743; факс:00359 745 60742
e-mail: metix@metix.bg
гр.София 1000 ул."Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.16.6

Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т.5 – заверено копие

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

Instytut Elektrotechniki
Electrotechnical Institute
Jednostka Certyfikująca Wyroby Elektrotechniczne
Certification Body of Electrotechnical Products

04-703 Warszawa, ul. Mieczysława Pożaryskiego 28
tel.: +48 22 812 33 89, fax: +48 22 615 75 35, www.iel.waw.pl, e-mail: ncw@iel.waw.pl

CERTYFIKAT ZGODNOŚCI
CERTIFICATE OF CONFORMITY

Nr: DN/023/2015

NAZWA I ADRES POSIADACZA CERTYFIKATU: *Name and address of the certificate holder*	ABB Sp. z o.o. 04-713 Warszawa, ul. Żegańska 1
NAZWA I ADRES PRODUCENTA: *Name and address of the manufacturer*	ABB Sp. z o.o. Oddział w Przemyśl, 06-300 Przasnysz ul. Leszno 59
NAZWA WYROBU *Product*	SPD- Urządzenia do ograniczania przepięć *SPD - Surge protection device*
TYP / ODMIANA KONSTRUKCYJNA. *Type / Constructional form*	LOVOS - 10 z odłącznikiem i bez odłącznika *(with disconnector and without disconnector)*
PARAMETRY: / *Ratings*	VERTE
NORMY ODNIESIENIA / *Reference standard*	PN-EN 61643-11:2013
SPRAWOZDANIA Z BADAŃ / *Test Reports*	Laboratorium Badawcze Aparatury Rozdzielczej IEL (AB 074): 7590/NBR/08, 7613/NBR/08, 7641/NBR/08, 7642/NBR/08, 7652/NBR/08,
LABORATORIA BADAWCZE: *Testing laboratories*	7717/NBR/08, 7957/NBR/08, 7651/NBR/08, 291/NBR/2007/SEM, 028/NBR/2008/SEM, 9256/NBR/14

TERMIN WAŻNOŚCI CERTYFIKATU: / *This Certificate is valid till:* 2022-01-27

NA PODSTAWIE WYŻEJ WYMIENIONYCH SPRAWOZDAŃ Z BADAŃ STWIERDZA SIĘ,
ŻE WYROBY SĄ ZGODNE Z WYMAGANIAMI POWYŻSZYCH NORM.
On the basis of the above test reports this is to certify that products fulfil the requirements of the above standards.

CERTYFIKAT JEST WAŻNY DLA WYROBÓW MAJĄCYCH IDENTYCZNE CECHY, KONFIGURACJĘ I WYPOSAŻENIE
JAK BADANE PRÓBKI.
Refers only to the products having identical characteristics and arrangement as the samples submitted for testing.

SYSTEM CERTYFIKACJI – 1a WG PKN-ISO/IEC Guide 67:2007
(BADANIE TYPU, PRZEGLĄD I OCENA DOKUMENTACJI, WYDANIE CERTYFIKATU)
Certification system – 1a acc. to ISO/IEC Guide 67:2004
(type test, evaluation of documentation, issue of certificate).

на основание чл. 36а, ал. 3 от ЗОП

Kierownik Jednostki Certyfikującej
Head of the Certification Body
Dyrektor Instytutu Elektrotechniki
Director of the Electrotechnical Institute

dr hab. Wiesław Wilczyński, prof. IEL

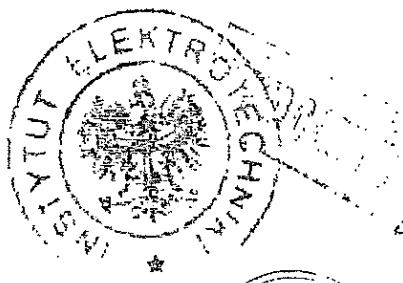
Warszawa, / *Warsaw:* 2015-01-27

CERTYFIKAT ZGODNOŚCI DN/023/2015

CERTIFICATE OF CONFORMITY

PARAMETRY ZNAMIONOWE/ *RATINGS*

Odmina	LOVOS 280	LOVOS 440	LOVOS 500	LOVOS 660
Największe napięcie trwałej pracy U_c *Maximum continuous operating voltage U_c*	280	440	500	660
Napięciowy poziom ochrony U_p / *Voltage protection level U_p*	1200 V	1800 V	2000 V	2500 V
Częstotliwość znamionowa / *Rated frequency*	40 - 60 Hz			
Klasa prób / *Class of tests*	II			
Znamionowy prąd wyładowczy I_n / *Nominal discharge current I_n*	10 kA			
Największy prąd wyładowczy I_{max} 8/20 w próbie klasy II *Maximum discharge current I_{max} 8/20 for class II test*	40kA			
Ilośc przyłączy/ *numer of ports*	Jedno/ *One*			
Typ SPD / *SPD design topology*	**Ograniczający napięcie** / *Voltage limiting type*			
Lokalizacja i sposób instalowania *Location and mounting method*	**Napowietrzna - stały** / *Outdoor - fixed*			
Dostępność / *Accessibility*	**Niedostępne (poza dotykiem)** *Inaccessible (out-of-reach)*			
Warunki pracy / *Service conditions*	**Normalne** / *Normal*			
Wytrzymałość mechaniczna / *Mechanical strength*	1 J			
Dla SPD wyposażonych w odłącznik: /*For SPDwith disconnector*				
Odporność zwarciowa *Short-circuit withstand capability*	3kA			
Odporność na przepięcia dorywcze/ *TOV fauiler capabillty*	1453 V (200 ms)			
Odporność na przepięcia doraźne /*TOV fail mode capability*	400 V (5 s)			



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гр.Петрич 2850, Промишлена зона
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e-mail: metix@metix.bg
гр.София 1000 ул."Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.16.7

Информация за провежданите рутинни изпитвания

Включени рутинни изпитания (тестове) – Routine test include

1. 2ms rectangular wave surge 180 A – 2ms с правоъгълна вълна при 180 A
2. 1mA voltage measurements – измерване на напрежението при 1 mA
3. Residual voltage at In – Остатъчно напрежение при In

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

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гр.София 1000 ул."Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

TÜVRheinland CERTIFIED

Management System
ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

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ID 9105026855

ПРИЛОЖЕНИЕ 9.16.8

Изисквания за транспортиране, складиране и манипулиране

Вентилните отводи НН трябва да се транспортират опаковани в оригинална опаковка. Вентилните отводи НН трябва да се съхраняват в сухи, закрити помещения опаковани в оригинална опаковка.

Изискване за извършване на манипулация на Вентилните отводи НН става след попадане на мълния или възникване на пренапрежение чрез оглед и евентуална подмяна на вентилния отвод ако се нуждае от такава

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

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ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

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ПРИЛОЖЕНИЕ 9.16.9

Инструкции за монтиране и за експлоатация и обслужване

Вентилният отвод НН се монтира и обслужва от правоспособен персонал в зависимост от мястото на монтаж.

Вентилният отвод НН се експлоатира в условията на нормална работа на РТ НН за МТП при спазени технически изисквания за монтаж. Да се съблюдава за навременни повреди в следствие на близки попадения от мълния или на топлинно претоварване с цел подмяната им.

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка на разпределителни табла ниско напрежение /НН/"

РЕФ. № PPD 18-073

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	SURGE ARRESTER TYPE LOVOS	Nr dok. 2GKG630007
ABB	LOW VOLTAGE SURGE ARRESTERS TYPE LOVOS INSTALLATION AND MAINTENANCE	Str. 1/3

APPLICATION OF SURGE ARRESTERS

LOVOS surge arresters with nominal discharge current either 5kA or 10kA, with continuous operating voltage Uc=280, 440, 500 or 660 V are intended for protection of low voltage power engineering equipment in AC networks with frequency from 48 to 62 Hz, against destructive effects of lightning and switching overvoltages. LOVOS can be connected to all kinds of overhead lines including overhead lines with conductors in insulation. It has indoor application as well.

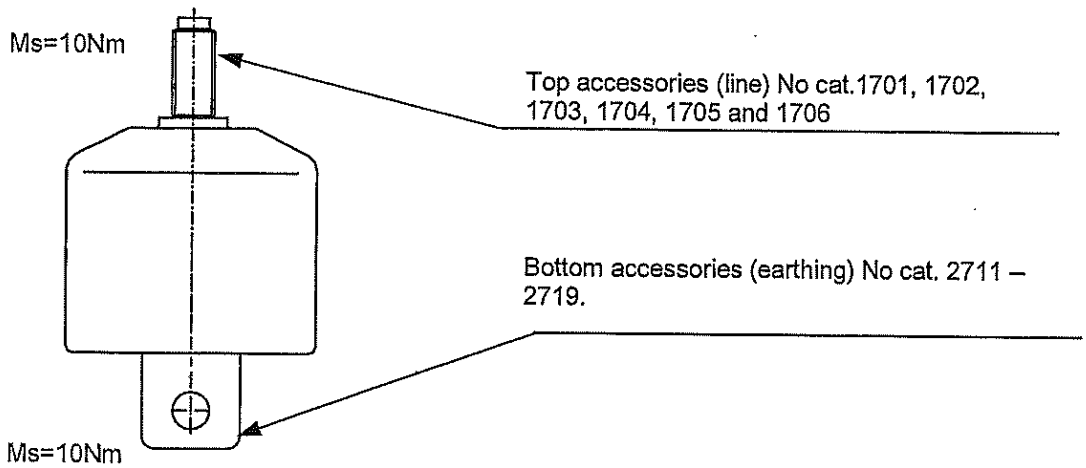
DESIGN OF SURGE ARRESTERS

It is gapless surge arrester with metal-oxide block, having screw type line outlet and earthing outlet of flat fin version with a hole. ZnO block and outlets contact parts are encapsulated, without air-gap, in UV resistant polyamide housing.
The housing ensures ZnO block protection against weather conditions, proper contact force between ZnO block and its outlets and suitable level of insulation.
Surge arrester is designed in version with or without disconnecting device.
Surge arrester has a big variety of top (line) and bottom (earthing) accessories.

INSTALLATION OF SURGE ARRESTERS

After unpacking, one should check if technical data on the rating plate of surge arrester correspond to project's specification and whether surge arrester is to be connected in between phase and earth or between phases.
The installation should be carried out with voltage switched off or under normal work of the network according to rules "Works under the voltage technology".

WARNING! It is necessary to obey local regulations in this matter in a country, where surge arresters are installed.



Opracował:	Akceptował:	Zatwierdził:

The arrester with selected accessories should be installed possibly nearest to protected device, ensuring lowest earthing impedance R_{max}=10 Ω.
Top accessories are mounted on screw outlet of surge arrester. Accessories No cat. 1701, 1702, 1704 and 1706 are mounted by screwing directly on an outlet (without any additional coupling elements), accessory No cat. 1703 – using washer and nut (included in the kit), and No cat. 1705 after screwing the sleeve (included in the kit).
Bottom accessories (earthing) are mounted to the hole of the earthing outlet of surge arrester using the kit: bolt, washer and nut. Earthing conductors of surge arresters with disconnecting device should be shaped in a form of letter "U" – they should facilitate the operation of an arrester (throwing away the earthing outlet from the housing).
The arrester should be mounted in vertical position. If project requires other (than vertical) position it is not allowed to exceed 90° inclination angle of arrester to horizon. The manufacturer recommends not to exceed 45° inclination angle. It is indispensable to leave 10 cm free space around earthing outlet in all directions – see fig. 1 & 2.

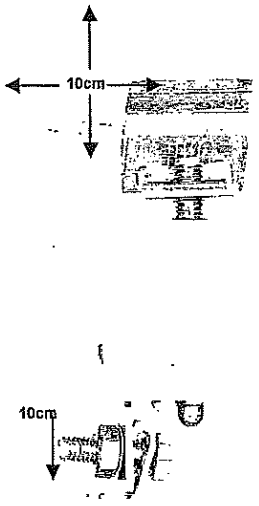


Figure 1. Normal condition

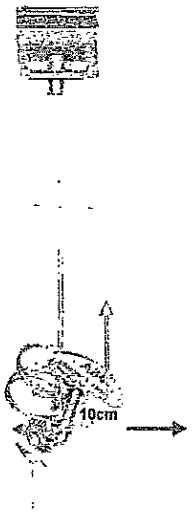


Figure 2. Damaged arrester - activated disconnecting device

MAINTENANCE

Surge arresters LOVOS do not require special maintenance. It is recommended to check surge arresters visually after big storms with atmospheric discharges. The best way to do it is to use binoculars. Damaged surge arresters and these with engaged disconnecting devices should be replaced with new ones. Engaged disconnecting devices are visible - earthing outlet is outside the housing and it is marked with red colour.

WARNING! It is necessary to obey local regulations in this matter in a country where surge arresters are installed.

RECYCLING

During normal operating conditions (routine operation, overvoltage stresses) there are no risks for health and environment.
After a normal lifetime cycle the metallic components, the metal – oxide varistor, the other inorganic and organic materials may, of course, be recycled or disposed. Please refer to the corresponding EU Safety Data Sheet for the above mentioned material. We recommend that you contact either the authorities in charge or approved waste disposal companies who will advise you on how to dispose or recycle special waste.

Any hazardous substance that constitutes a risk to health or the environment have to be considered as "toxic and dangerous waste" in accordance with the EEC Directive and dealt with accordingly. The substances of the sintered metal – oxide varistors exist in an oxidized state. A leaching test according to EPA specifications (Federal Register / vol. 45, No 98 / Rules and regulation), has shown that the sintered bodies may be disposed of without violating the EEC Directive.

PACKING, TRANSPORT AND STORAGE

Surge arresters are packed in cardboard boxes (3 arresters in a box); accessories are packed separately in foil bags (3 pieces in a bag) and next – in a bulk package. The arresters do not require special transport conditions but they should be protected against rain. Neither storage requires special conditions (ensure protection against rain).
Transport and storage issues to be considered: 1) exhaust gases emission during transport 2) card board boxes and foil bags recycling.

SPARE PARTS

Deliveries of spare parts and repairs of surge arresters are not foreseen.

CONFORMITY

Surge arresters type LOVOS conform to Polish standard PN-EN 61643-11 and to international standard IEC 61643-11 as well as to Amendment 2 to IEC 60099-4 in relevant range.

Наименование на материала: Триполюсни автоматични прекъсвачи НН с лят корпус, от 100 А до 400 А, с термомагнитна защита, категория А

Съкратено наименование на материала: Трип. авт. прек. НН, с ТМ защита, 100-400 А, кат. А

Област: Н – Електрически уредби СрН/НН

Категория: 17– Комутационни апарати НН за защита

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

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

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

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

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

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

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

Използване:

Триполюсните автоматични прекъсвачи НН с лят корпус се монтират в разпределителни табла в трансформаторните постове и се използват за защита на електропроводните линии.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

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

- **БДС EN 60947-1:2007** "Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)" или еквивалентно/и;
- **БДС EN 60947-2:2006** „Комутационни апарати за ниско напрежение. Част 2: Автоматични прекъсвачи (IEC 60947-2:2006)" или еквивалентно/и; и
- БДС EN 60529+A1:2004 Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989+A1:1999) или еквивалентно/и; и

да бъдат оценени положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението.

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № (или текст)
1	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	T5N400 TMA R400A, ABB, ITALY Приложение 9.17.1
2	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.17.2
3	ЕО декларация за съответствие	Приложение 9.17.3
4	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.17.4
5	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение 9.17.5
6	Инструкции за транспортиране, складиране, монтиране, вкл. въртящия момент на затягане на клемовите съединения, обслужване и поддържане	Приложение 9.17.6

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

Технически данни

1. Характеристики на работната среда

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

2. Параметри на електроразпределителната мрежа

№ по ред	Параметър	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Брой проводници в разпределителната мрежа	4 проводна мрежа (L_1, L_2, L_3, PEN)
2.5	Схема на разпределителната мрежа	TN-C

3. Общи технически параметри и други данни

№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.1	Брой на полюсите	3	3
3.2	Обявено работно напрежение (U_e)	min 690 V AC	690 V AC
3.3	Обявена честота	50 Hz	50 Hz
3.4	Обявено импулсно напрежение (U_{imp})	min 6 kV	8 kV
3.5	Обявено изолационно напрежение (U_i)	min 690 V	1000 V

№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.6	Категория на приложение	A	B
3.7	Работна изключвателна възможност при късо съединение (I_{cs})	min 50% от I_{cu}	100% от I_{cu}
3.8	Защита от свръхтокове	-	-
3.8.1	Тип на защитата	Защитата от свръхтокове трябва да бъде от термомагнитен тип. (Допускат се изпълнения със защита от електронен тип.)	ДА, Защитата от свръхтокове е от термомагнитен тип.
3.8.2	Защита от претоварване	а) Диапазон на настройване на тока на изключване I_R=(min 0,8÷1)xI_n	I_R=0,7÷1xI_n
		б) Условен ток на неизключване I_{nd}=1,05xI_R във времеви интервал от 120 минути	I_{nd}=1,05xI_R
		в) Условен ток на изключване I_d = 1,30xI_R във времеви интервал до 120 минути	I_d = 1,30xI_R
3.8.3	Защита от къси съединения	Токът на изключване I_i трябва да бъде фиксиран на една от стойностите или регулируем в диапазона препоръчително от min 4x I_n до 10x I_n	от 5x I_n до 10x I_n
3.9	Степен на защита от проникване на твърди тела и вода съгласно БДС EN 60529 или еквивалентно/и	-	-
3.9.1	Клемни съединения	IP 20	IP 20
3.9.2	Челна повърхност	IP 40	IP 40
3.10	Аксесоари	а) Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение	ДА, Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение
		б) Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори.	ДА, Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори.

4. Триполюсни автоматични прекъсвачи НН с лят корпус, 100 А ÷ 400 А, с термомагнитна защита, категория А

4.5 Триполюсен автоматичен прекъсвач НН с лят корпус, 400 А, с термомагнитна защита, кат. А

Номер на стандарта		**Тип/референтен номер съгласно каталога на производителя**	
20 17 5005		Да се посочи	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 400 А, с термомагнитна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ТМ защита, 400 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.5.1	Обявен ток (I_n)	400 А	400 А
4.5.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 20 kA / 500 V	25 kA/500 V
4.5.3	Работна изключвателна възможност при късо съединение (I_{cs})	Съгласно т. 3.7 и т. 4.4.2 Да се посочи	100% от I_{cu} 25 kA/500 V
4.5.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	от 5x I_n до 10x I_n
4.5.5	Време за изключване при I_{cu}	max 0,010 s	0,01 s
4.5.6	Износоустойчивост	-	-
4.5.6a	Електрическа (брой к.ц.)	min 1000 бр.	7 000
4.5.6b	Механична (брой к.ц.)	min 4000 бр.	20 000
4.5.7	Максимални размери ВхШхД (Дълбочината „Д" не включва лоста за управление)	300x195x160 mm	205x140x103,5 mm
4.5.8	Тегло, kg	Да се посочи	3,25

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ПРИЛОЖЕНИЕ 9.17.1

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

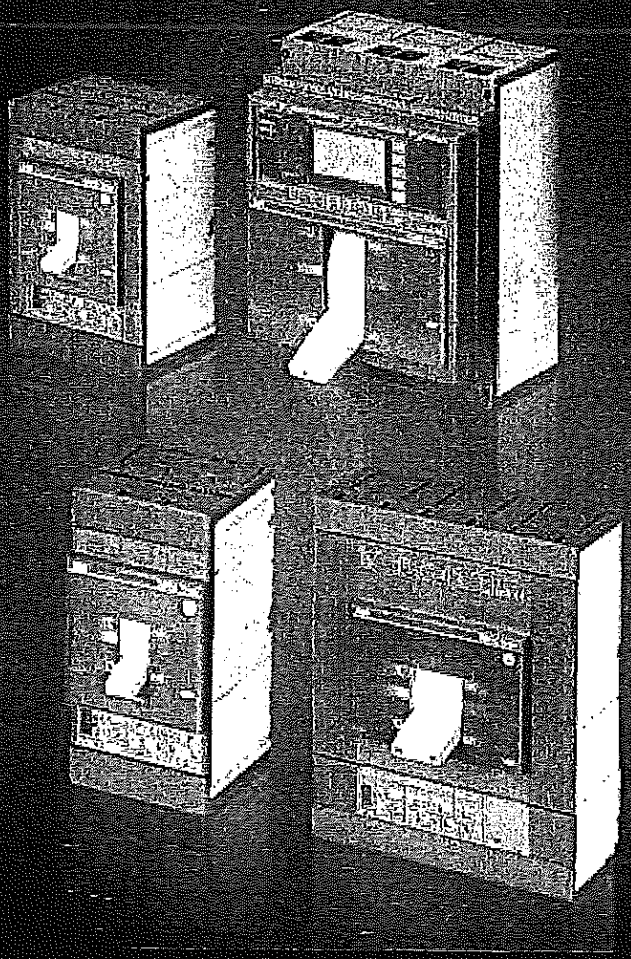

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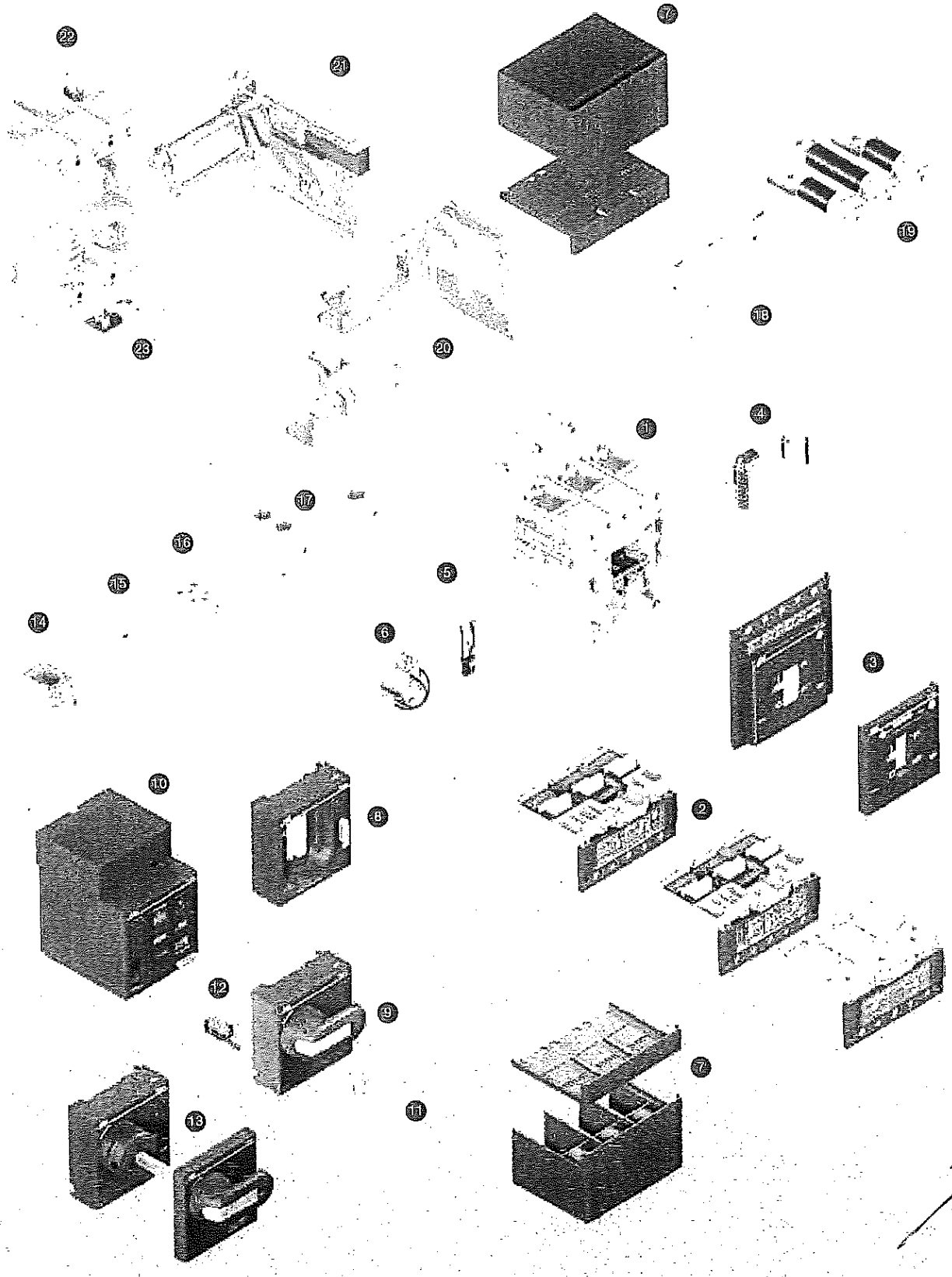
ABB

Construction characteristics
Modularity of the series



Construction characteristics
Distinguishing features of the series

Double insulation

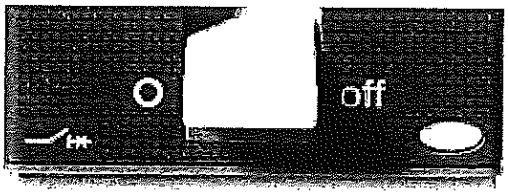
Tmax has double insulation between the live power parts (excluding the terminals) and the front parts of the apparatus where the operator works during normal operation. The seat of each electrical accessory is completely segregated from the power circuit, thereby preventing any risk of contact with live parts, and, in particular, the operating mechanism is completely insulated in relation to the powered circuits.
Furthermore, the circuit-breaker has oversized insulation, both between the live internal parts and in the area of the connection terminals. In fact, the distances exceed those required by the IEC Standards and comply with what is prescribed by the UL 489 Standard.

Positive operation

The operating lever always indicates the precise position of the moving contacts of the circuit-breaker, thereby guaranteeing safe and reliable signals, in compliance with the prescriptions of the IEC 60073 and IEC 60417-2 Standard (I = Closed; O = Open; yellow-green line = Open due to protection trip). The circuit-breaker operating mechanism has free release regardless of the pressure on the lever and the speed of the operation. Protection tripping automatically opens the moving contacts: to close them again, the operating mechanism must be reset by pushing the operating lever from the intermediate position into the lowest open position.

Isolation behaviour

In the open position, the circuit-breaker guarantees circuit in compliance with the IEC 60947-2 Standard. The oversized insulation distances guarantee there are no leakage currents and dielectric resistance to any overvoltages between input and output.



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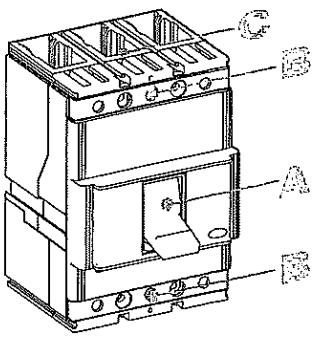

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Degrees of protection

The table indicates the degrees of protection guaranteed by Tmax circuit-breakers according to the prescriptions of the IEC 60529 Standard:

	With front	Without front[2]	Without terminal covers	With high terminal covers	With low terminal covers	With IP40 protection kit on the front
A	IP 40[3]	IP 20	–	–	–	–
B[4]	IP 20	IP 20	IP 20	IP 40	IP 40	IP 40
C	–	–	–	IP 40[1]	IP 30[1]	–

[1] After correct installation
[2] During installation of the electrical accessories
[3] Also for front for lever operating mechanism and direct rotary handle
[4] Only for T1...T6

The fixed parts are always preset with IP20 degree of protection. IP54 degree of protection can be obtained with the circuit-breaker installed in a switchboard fitted with a rotary handle operating mechanism transmitted on the compartment door and special kit (RHE – IP54).

Operating temperature

The Tmax circuit-breakers can be used in environmental conditions where the ambient air temperature varies between -25 °C and +70 °C, and stored in ambients with temperatures between -40 °C and +70 °C.
The circuit-breakers fitted with thermomagnetic trip units have their thermal element set for a reference temperature of +40 °C. For temperatures other than +40 °C, with the same setting, there is a thermal trip threshold variation as shown in the table on page 4/50 and following.
The electronic trip units do not undergo any variations in performance as the temperature varies but, in the case of temperatures exceeding +40 °C, the maximum setting for protection against overloads L must be reduced, as indicated in the derating graph on page 4/37 and following, to take into account the heating phenomena which occur in the copper parts of the circuit-breaker passed through by the phase current.
For temperatures above +70 °C the circuit-breaker performances are not guaranteed.
To ensure service continuity of the installations, the way to keep the temperature within acceptable levels for operation of the various devices and not only of the circuit-breakers must be carefully assessed, such as using forced ventilation in the switchboards and in their installation room.

Altitude

Up to an altitude of 2000 m Tmax circuit-breakers do not undergo any alterations in their rated performances. As the altitude increases, the atmospheric properties are altered in terms of composition, dielectric resistance, cooling capacity and pressure. Therefore the circuit-breaker performances undergo derating, which can basically be measured by means of the variation in significant parameters such as the maximum rated operating voltage and the rated uninterrupted current.

Altitude	[m]	2000	2600	3000	3900	4000	5000
Derating on service voltage, Ue	[%]	100	93	88	79	78	68
Derating on uninterrupted current	[%]	100	99	98	94	93	90

Construction characteristics
Distinguishing features of the series

Electromagnetic compatibility

Operation of the protections is guaranteed in the presence of interferences caused by electronic apparatus, atmospheric disturbances or electrical discharges by using the electronic trip units and the electronic residual current releases. No interference with other electronic apparatus near the place of installation is generated either. This is in compliance with the IEC 60947-2 Appendix B + Appendix F Standards and European Directive No. 89/336 regarding EMC - electromagnetic compatibility.

Tropicalisation

Circuit-breakers and accessories in the Tmax series are tested in compliance with the IEC 60068-2-30 Standard, carrying out 2 cycles at 55 °C with the "variant 1" method (clause 7.3.3). The suitability of the Tmax series for use under the most severe environmental conditions is therefore ensured with the hot-humid climate defined in the climatograph 8 of the IEC 60721-2-1 Standards thanks to:

- moulded insulating cases made of synthetic resins reinforced with glass fibres;
- anti-corrosion treatment of the main metallic parts;
- Fe/Zn 12 zinc-plating (ISO 2081) protected by a conversion layer, free from hexavalent-cromium (ROHS-compliant), with the same corrosion resistance guaranteed by ISO 4520 class 2c;
- application of anti-condensation protection for electronic overcurrent releases and relative accessories.

Resistance to shocks and vibrations

Tmax T circuit-breakers are unaffected by vibrations generated mechanically and due to electromagnetic effects, in compliance with the IEC 60068-2-6 Standards and the regulations of the major shipping registers[1] [2]:

- RINA
- Det Norske Veritas
- Bureau Veritas
- Lloyd's register of shipping
- Germanischer Lloyd
- ABS
- Russian Maritime Register of Shipping
- Nippon Kaiji Kyokai.

The T4-T7 Tmax circuit-breakers are also tested, according to the IEC 60068-2-27 Standard, to resist shocks up to 12g for 11 ms. Please ask ABB SACE for higher performances in terms of resistance to shocks.

[1] Ask ABB for specific certifications
[2] Except for T6V

Tmax T5					Tmax T6[9]					Tmax T7				
400/630					630/800/1000					800/1000/1250/1600				
3/4					3/4					3/4				
690					690					690				
750					750					–				
8					8					8				
1000					1000					1000				
3500					3500					3500				
N	S	H	L	V	N	S	H	L	V	S	H	L	V[6]	X[10]
70	85	100	200	200	70	85	100	200	200	85	100	200	200	170
36	50	70	120	200	36	50	70	100	150	50	70	120	150	170
30	40	65	100	180	30	45	50	80	120	50	65	100	130	170
25	30	50	85	150	25	35	50	65	85	40	50	85	100	170
20	25	40	70	80	20	22	25	30	40	30	42	50	60	75
36	50	70	100	150	36	50	70	100	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
25	36	50	70	100	20	35	50	65	70	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
16	25	36	50	70	16	20	36	50	50	–	–	–	–	–
100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	75%	75% (120)	100%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	75%	75% (100)	100%	100%	100%	100%	100%
100%	100%	100%	100%[1]	100%[2]	100%	100%	100%	75%	75% (65)	100%	100%	75%	100%	100%
100%	100%	100%[1]	100%[2]	100%[2]	75%	75%	75%	75%	75%	100%	75%	75%	75%	100%
154	187	220	440	660	154	187	220	440	440	187	220	440	440	374
75.6	105	154	264	440	75.6	105	154	220	330	105	154	264	330	374
63	84	143	220	396	63	94.5	105	176	264	105	143	220	286	374
52.5	63	105	187	330	52.5	73.5	105	143	187	84	105	187	220	374
40	52.5	84	154	176	40	46	52.5	63	84	63	88.2	105	132	165
6	6	6	6	6	10	9	8	7	7	15	10	8	8	8
B (400 A)[3] - A (630 A)					B (630A - 800A)[5] - A (1000A)					B[7] - A (T7X)				
IEC 60947-2					IEC 60947-2					IEC 60947-2				
■					■					■				
–					–					–				
–					–					–				
■ (up to 500 A)					■ (up to 800 A)[4]					–				
–					–					–				
■ (up to 500 A)					–					–				
–					–					–				
■					■					–				
–					–					–				
■					■					–				
■					■					■[11]				
–					–					■[11]				
–					–					■				
–					–					■				
–					–					■				
■					■					■				
F-P-W					F-W[4]					F-W [11]				
F-FC CuAl-EF-ES-R-RC					F-FC CuAl-EF-ES-R-RC					F-EF-ES [11]-FC CuAl-HR/VR				
EF-ES-HR-VR-FC Cu-FC CuAl					–					–				
EF-ES-HR-VR-FC Cu-FC CuAl					EF-HR-VR					EF-HR/VR-RS-ES				
–					–					–				
20000					20000					10000				
120					120					60				
7000 (400 A) - 5000 (630 A)					7000 (630A) - 5000 (800A) - 4000 (1000A)					2000 (S, H, L versions) / 3000 (V, X versions)				
60					60					60				
140					210					210				
186					280					280				
103.5					103.5					154 (manual) /178 (motorizable)				
205					268					268				
3.25/4.15					9.5/12					9.7/12.5 (manual) - 11/14 (motorizable)				
5.15/6.65					–					–				
5.4/6.9					12.1/15.1					29.7/39.6 (manual) - 32/42.6 (motorizable)				

[1] 75% for T5 630
[2] 50% for T5 630
[3] Icw = 5 kA
[4] W version is not available on T6 1000 A
[5] Icw = 7.6 kA (630 A) - 10 kA (800 A)
[6] Only for T7 800/1000/1250 A
[7] Icw = 20 kA (S,H,L versions) - 15 kA (V version)
[8] For availability, please ask ABB SACE
[9] T6V only for T6 630-800A
[10] T7X only for T7 800A
[11] not available on T7X
[12] T4 250 only L and V version

Notes: In the plug-in version of T5 630 and in the withdrawable version of T5 630 the maximum rated current available is derated by 10% at 40 °C

Circuit-breakers for power distribution
General characteristics

The series of Tmax moulded-case circuit-breakers - complying with the IEC 60947-2 Standard - is divided into seven basic sizes, with an application range from 20 A to 1600 A and breaking capacities from 36 kA to 200 kA (at 380/415 V AC). For protection of alternating current networks, the following are available:

- T4 (up to 50 A) circuit-breakers equipped with TMD thermomagnetic trip units with adjustable thermal threshold (I_1 = 0.7...1 x In) and fixed magnetic threshold (I_3 = 10 x In);
- T5 circuit-breakers, fitted with TMG trip units for long cables and generator protection with adjustable thermal threshold (I_1 = 0.7...1 x In) and adjustable magnetic threshold (I_3 = 2.5...5 x In) for T5;
- T4, T5 and T6 circuit-breakers with TMA thermomagnetic trip units with adjustable thermal threshold (I_1 = 0.7...1 x In) and adjustable magnetic threshold (I_3 = 5...10 x In);
- T4, T5 and T6 with PR221DS, PR222DS/P, PR222DS/PD and PR223DS electronic trip units;
- the T7 circuit-breaker, which completes the Tmax family up to 1600 A, fitted with PR231/P, PR232/P, PR331/P and PR332/P electronic trip units. The T7 circuit-breaker is available in the two versions: with manual operating mechanism or motorizable with stored energy operating mechanism(*).

The field of application in alternating current of the Tmax series varies from 20 A to 1600 A with voltages up to 690 V. The Tmax T4, T5 and T6 circuit-breakers equipped with TMF, TMD and TMA thermomagnetic trip units can also be used in direct current plants, with a range of application from 20 A to 800 A and a minimum operating voltage of 24 V DC, according to the appropriate connection diagrams.

The three-pole T4 circuit-breaker can also be fitted with MF and MA adjustable magnetic only trip units, both for applications in alternating current and in direct current, in particular for motor protection (see page 2/40 and following). For all the circuit-breakers in the series, fitted with thermomagnetic and electronic trip units, the single-phase trip current is defined (see page 4/57).

(*) For motorisation, the T7 circuit-breaker with stored energy operating mechanism must be ordered, complete with geared motor for automatic spring charging, opening coil and closing coil.

Interchangeability

The Tmax T4, T5 and T6 circuit-breakers can be equipped either with TMF, TMD, TMG or TMA thermomagnetic trip units, MA magnetic only trip units or PR221DS, PR222DS/P, PR222DS/PD, Ekip M-LRIU and PR223DS electronic trip units.
Similarly, Tmax T7 can also mount the latest generation PR231/P, PR232/P, PR331/P(1) and PR332/P(1) electronic trip units.
Thanks to their simplicity of assembly, the end customer can change the type of trip unit extremely rapidly, according to their own requirements and needs: in this case, correct assembly is the customer's responsibility. Above all, this means into increased flexibility of use of the circuit-breakers with considerable savings in terms of costs thanks to better rationalisation of stock management.

Trip units

Circuit-breakers	TMD			TMA											TMG			MA							
In [A]	20	32	50	80	100	125	160	200	250	320	400	500	630	800	320	400	500	10	25	52	80	100	125	160	200
T4 250	■	■	■	■	■	■	■	■	■									■	■	■	■	■	■	■	■
T4 320	▲	▲	▲	▲	▲	▲	▲	▲	▲									▲	▲	▲	▲	▲	▲	▲	▲
T5 400										■	■				▲	▲									
T5 630										▲	▲	■			▲	▲	▲								
T6 630													■												
T6 800														■											
T6 1000																									
T7 800																									
T7 1000																									
T7 1250																									
T7 1600																									

■ = Complete circuit-breaker already coded
▲ = Circuit-breaker to be assembled

(1) If ordered loose PR331/P and PR332/P must be completed with the "trip unit adapters" (see page 3/48)

Range of application of the circuit-breakers in alternating current and in direct current

AC	Trip unit	Range [A]
T4 250/320	TMD	20...50
	TMA	80...250
	MA	10...200
	PR221DS	100...320
	PR222DS/P-PR222DS/PD	100...320
	PR223DS	160...320
T5 400/630	TMG	320...500
	TMA	320...500
	PR221DS	320...630
	PR222DS/P-PR222DS/PD	320...630
	Ekip E-LSIG	320...630
T6 630/800/1000	TMA	630...800
	PR221DS	630...1000
	PR222DS/P-PR222DS/PD	630...1000
	PR223DS	630...1000
T7 800/1000/1250/1600	PR231/P-PR232/P	400...1600
	PR331/P-PR332/P	400...1600
DC		
T4 250/320	TMD	20...50
	TMA	80...250
	MA	10...200
T5 400/630	TMA/TMG	320...500
T6 630/800/1000	TMA	630...800

MF = magnetic only trip unit with fixed magnetic thresholds
MA = magnetic only trip unit with adjustable magnetic thresholds
TMD = thermomagnetic trip unit with adjustable thermal and fixed magnetic thresholds
TMA = thermomagnetic trip unit with adjustable thermal and magnetic thresholds
TMG = thermomagnetic trip unit for generator protection
PR22_, PR23_, PR33_ , Ekip_ = electronic trip units

	PR221DS-PR222DS/P-PR222DS/PD-PR223DS[2] -Ekip E-LSIG[4]								PR231/P[3]-PR232/P-PR331/P-PR332/P					
	100	160	250	320	400	630	800	1000	400	630	800	1000	1250	1600
	■	■	■											
	▲	▲	▲	■										
				■	■									
				▲	▲	■								
						■								
							■							
								■						
									▲	▲	■			
									▲	▲	▲	■		
									▲	▲	▲	▲	■	
									▲	▲	▲	▲	▲	■

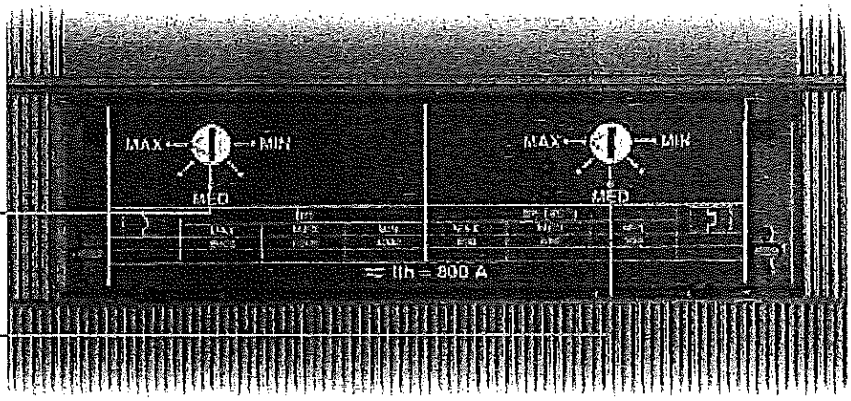
[2] PR223DS, minimum In = 160 A.
[3] Interchangeability of PR231/P can be requested by means of the dedicated ordering code 1SDA063140R1
[4] Ekip E-LSIG only on T5.

Circuit-breakers for power distribution
Thermomagnetic trip units

The Tmax T4, T5 and T6 circuit-breakers can be fitted with thermomagnetic trip units and are used in protection of alternating and direct current networks with a range of use from 20 A to 800 A. They allow the protection against overload with a thermal device realised using the bimetal technique, and protection against short-circuit with a magnetic device.

The four-pole circuit-breakers are always supplied with the neutral protected by the trip unit and with protection of the neutral at 100% of the phase setting.

Thermomagnetic trip units TMD/TMA and TMG (for T4, T5 and T6)



Thermal threshold
Adjustable

Thermal threshold
Adjustable from 0.7 to 1 x In

TMA = thermomagnetic trip unit with adjustable thermal threshold (I_1 = 0.7...1 x In) and adjustable magnetic threshold (I_3 = 5...10 x In)
TMG (for T5) = thermomagnetic trip unit with adjustable thermal threshold (I_1 = 0.7...1 x In) and adjustable magnetic threshold (I_3 = 2.5...5 x In)

TMD/TMA - T4

	In [A]	20	32	50	80	100	125	160	200	250
	Neutral [A] - 100%	20	32	50	80	100	125	160	200	250
I_1 =0.7...1 x In	Neutral [A] - 50%	–	–	–	–	–	80	100	125	160
	I_3 = 10 x In [A]	320	320	500						
	I_3 = 5...10 x In [A]				400...800	500...1000	625...1250	800...1600	1000...2000	1250...2500
I_3 = 10 x In	Neutral [A] - 100%	320	320	500	400...800	500...1000	625...1250	800...1600	1000...2000	1250...2500
I_3 = 5...10 x In	Neutral [A] - 50%	–	–	–	–	–	400...800	500...1000	625...1250	800...1600

TMA - T5

	In [A]	320	400	500
	Neutral [A] - 100%	320	400	500
I_1 = 0.7...1 x In	Neutral [A] - 50%	200	250	320
	I_3 [A]	1600...3200	2000...4000	2500...5000
	Neutral [A] - 100%	1600...3200	2000...4000	2500...5000
I_3 = 5...10 x In	Neutral [A] - 50%	1000...2000	1250...2500	1600...3200

TMG - T5

	In [A]	320	400	500
	Neutral [A] - 100%	320	400	500
I_1 = 0.7...1 x In				
	I_3 [A]	800...1600	1000...2000	1250...2500
	Neutral [A] - 100%	800...1600	1000...2000	1250...2500
I_3 = 2.5...5 x In				

TMA - T6

	In [A]	630	800
	Neutral [A] - 100%	630	800
I_1 = 0.7...1 x In	Neutral [A] - 50%	400	500
	I_3 [A]	3150...6300	4000...8000
	Neutral [A] - 100%	3150...6300	4000...8000
I_3 = 5...10 x In	Neutral [A] - 50%	2000...4000	2500...5000

Notes

- In identifies the setting current for protection of the phases (L1, L2 and L3) and of the neutral.
- The TMA and TMG thermomagnetic trip units which equip the Tmax T4, T5 and T6 circuit-breakers have the thermal element with adjustable threshold I_1 = 0.7...1 x In. The set current value which is obtained using the special selector is intended at 40 °C. The magnetic element has adjustable trip threshold (I_3 = 5...10 x In for TMA and I_3 = 2.5...5 x In for TMG) with a tolerance of ± 20% according to what is indicated in the IEC 60947-2 (par. 8.3.3.1.2) Standard. The trip thresholds of the magnetic protection I_3 are a function of the setting used both by the phase and neutral protection.

Basic protection functions

(L) Protection against overload
This protection function trips when there is an overload with inverse long-time delay trip according to the IEC 60947-2 Standard ($I^2t=k$). The protection cannot be excluded.

(S) Protection against short-circuit with time delay
This protection function trips when there is a short-circuit, with long inverse time-delay trip ($I^2t=k$ ON) or a constant trip time ($I^2t=k$ OFF). The protection can be excluded.

(I) Instantaneous protection against short-circuit
This protection function trips instantaneously in case of a short-circuit. The protection can be excluded.

(G) Protection against earth fault
The protection against earth fault trips when the vectorial sum of the currents passing through the current sensors exceeds the set threshold value, with long inverse time-delay trip ($I^2t=k$ ON) or a constant trip time ($I^2t=k$ OFF). The protection can be excluded.

Advanced protection functions

The PR332/P trip unit makes it possible to carry out highly developed protection against the most varied types of fault.

In fact, it adds the following advanced protection functions to the basic protection functions.

IEC 60255-3

(L) Protection against overload (IEC 60255-3)
This protection trips in case of an overload with inverse long-time delay according to IEC 60255-3 Standard, for the coordination with fuses and MV protections. The protection can be excluded.

(U) Protection against unbalanced phase
The protection function against unbalanced phase U can be used in those cases where a particularly precise control is needed regarding missing and/or unbalance of the phase currents. The trip time is instantaneous. The protection can be excluded.

(OT) Protection against overtemperature
The protection against overtemperature trips instantaneously when the temperature inside the trip unit exceeds 85 °C, in order to prevent any temporary or continual malfunction of the microprocessor. The protection cannot be excluded.

(Rc) Protection against residual current [1]
This integrated protection is based on current measurements made by an external toroid and is alternative to protection against earth fault G. The protection can be excluded.

(ZS) Zone selectivity [2]
ZS zone selectivity is an advanced method for carrying out coordination of the protections in order to reduce the trip times of the protection closest to the fault in relation to the time foreseen by time selectivity. Zone selectivity can be applied to the protection functions S and G, with constant time-delay trip. The protection can be excluded.

(UV, OV, RV) Protections against voltage
The three protections trip with a constant time-delay in the case of undervoltage, overvoltage and residual voltage respectively. The latter allows to detect interruptions of the neutral (or of the earthing conductor in systems with earthed neutral) and faults which cause movement of the star centre in systems with isolated neutral (e.g. large earth faults) to be identified. Movement of the star centre is calculated by vectorially summing the phase voltages. The protections can be excluded.

(RP) Protection against reversal of power
The protection against reversal power causes tripping of the breaker, with constant time-delay trip, when the flow of power reverses sign and exceeds, as an absolute value, the set threshold. It is particularly suitable for protection of large machines such as generators. The protection can be excluded.

(UF, OF) Protections of frequency
The two protections detect the variation in network frequency above or below the adjustable thresholds, opening the circuit-breaker, with constant time-delay trip. The protection can be excluded.

[1] It is not suitable for human protection.
[2] For further information about zone selectivity, please see the section "Circuit-breakers for zone selectivity".

Circuit-breaker for zone selectivity
Electrical characteristics

Zone selectivity

			T4	T5	T6	T7			
Rated uninterrupted current		[A]	250/320	400/630	630/800/1000	800/1000/1250/1600			
Poles		[No.]	3/4	3/4	3/4	3/4			
Rated service voltage, Ue	(AC) 50-60 Hz	[V]	690	690	690	690			
	(DC)	[V]	750	750	750	750			
Rated impulse withstand voltage, Uimp		[kV]	8	8	8	8			
Rated insulation voltage, Ui		[V]	1000	1000	1000	1000			
Test voltage at industrial frequency for 1 min.		[V]	3500	3500	3500	3500			
Rated ultimate short-circuit breaking capacity, Icu			L	L	L	S	H	L	V[1]
(AC) 50-60 Hz 220/230 V		[kA]	200	200	200	85	100	200	200
(AC) 50-60 Hz 380/415 V		[kA]	120	120	100	50	70	120	150
(AC) 50-60 Hz 440 V		[kA]	100	100	80	50	65	100	130
(AC) 50-60 Hz 500 V		[kA]	85	85	65	40	50	85	100
(AC) 50-60 Hz 690 V		[kA]	70	70	30	30	42	50	60
(AC) 50-60 Hz 1000 V		[kA]	16	16	–	–	–	–	–
Rated service short-circuit breaking capacity, Ics									
(AC) 50-60 Hz 220/230 V		[%Icu]	100%	100%	75%	100%	100%	100%	100%
(AC) 50-60 Hz 380/415 V		[%Icu]	100%	100%	75%	100%	100%	100%	100%
(AC) 50-60 Hz 440 V		[%Icu]	100%	100%	75%	100%	100%	100%	100%
(AC) 50-60 Hz 500 V		[%Icu]	100%	100%[2]	75%	100%	100%	75%	100%
(AC) 50-60 Hz 690 V		[%Icu]	100%	100%[3]	75%	100%	75%	75%	75%
(AC) 50-60 Hz 1000 V		[%Icu]	50%	25%	–	–	–	–	–
Rated short-circuit making capacity, Icm									
(AC) 50-60 Hz 220/230 V		[kA]	440	440	440	187	220	440	440
(AC) 50-60 Hz 380/415 V		[kA]	264	264	220	105	154	264	330
(AC) 50-60 Hz 440 V		[kA]	220	220	176	105	143	220	286
(AC) 50-60 Hz 500 V		[kA]	187	187	143	84	105	187	220
(AC) 50-60 Hz 690 V		[kA]	154	154	63	63	88.2	105	132
(AC) 50-60 Hz 1000 V		[kA]	32	32	–	–	–	–	–
Utilisation category (IEC 60947-2)			A	B (400A)[4] - A (630A)	B (630A - 800A)[5] - A (1000A)	B[6]			
Isolation behaviour			■	■	■	■			
Reference Standard			IEC 60947-2	IEC 60947-2	IEC 60947-2	IEC 60947-2			
Trip unit:	electronic PR223EF		■	■	■	–			
	PR332/P		–	–	–	■			
Versions			F-P-W[7]	F-P-W[7]	F-W	F-W			
Terminals	fixed		F-FC Cu-FC CuAl-EF-ES-R-MC[8]	F-FC Cu-FC CuAl-EF-ES-R[8]	F-FC CuAl-EF-ES-R-RC	F-EF-ES-FC CuAl-HR/VR			
	plug-in		EF-ES-HR-VR-FC Cu-FC CuAl	EF-ES-HR-VR-FC Cu-FC CuAl	–	–			
	withdrawable		EF-ES-HR-VR-FC Cu-FC CuAl	EF-ES-HR-VR-FC Cu-FC CuAl	EF-HR-VR	EF-HR/VR-ES-RS			
Mechanical life		[No. operations]	20000	20000	20000	10000			
		[No. Hourly operations]	240	120	120	60			
Electrical life @ 415 V AC		[No. operations]	8000 (250A) - 6000 (320A)	7000 (630A) - 5000 (800A)	7000 (630A) - 5000 (800A) - 4000 (1000A)	2000 (S, H, L versions) - 3000 (V version)			
		[No. Hourly operations]	120	60	60	60			
Basic dimensions - fixed version	3 poles	W [mm]	105	140	210	210			
	4 poles	W [mm]	140	184	280	280			
		D [mm]	103.5	103.5	103.5	154 (manual)/ 178 (motorizable)			
		H [mm]	205	205	268	268			
Weight	fixed	3/4 poles [kg]	2.35/3.05	3.24/4.15	9.5/12	9.7/12.5 (manual)/ 11/14 (motorizable)			
	plug-in	3/4 poles [kg]	3.6/4.65	5.15/6.65	–	–			
	withdrawable	3/4 poles [kg]	3.85/4.9	5.4/6.9	12.1/15.1	29.7/39.6 (manual)/ 32/42.6 (motorizable)			

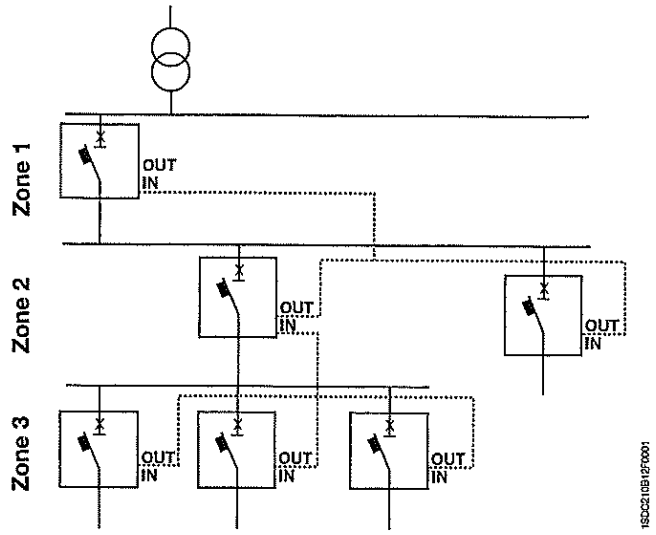
TERMINAL CAPTION
EF = Front extended
F = Front
ES = Front extended spread
R = Rear orientated
MC = Multi-cable

HR = Rear flat horizontal
VR = Rear flat vertical
HR/VR = Rear flat horientated
F = Fixed circuit-breaker
P = Plug-in circuit-breaker
W = Withdrawable circuit-breaker

[1] Only for T7 800/1000/1250 A
[2] 75% for T5 630
[3] 50% for T5 630
[4] Only up to 630 V, Icw = 5 kA
[5] Icw = 7.6 kA (630 A) - 10 kA (800 A)
[6] Icw = 20 kA (S, H, L versions) - 15 kA (V version)
[7] For applications at 1000 V, only available in the fixed version
[8] For applications at 1000 V, only available with Fc Cu terminals

Note: in the plug-in/withdrawable version of T5 630 the maximum rated current is derated by 10% at 40 °C.

Circuit-breaker for zone selectivity
General characteristics



This type of coordination, a development of time coordination, is made by means of logic connections between current measuring devices which, once the set threshold having been exceeded is detected, allow just the fault area to be identified and to have its power supply cut off.
By means of zone selectivity it is possible obtain selectivity considerably reducing the trip times and therefore the thermal stresses all the plant components are subjected to during the fault.
Making the protection is done by connecting all the zone selectivity outputs of the trip units belonging to the same zone to each other and taking this signal to the zone selectivity input of the trip unit immediately to the supply side. By means of a simple shielded twisted-pairwire (maximum length of 200 m), each circuit-breaker which detects a fault communicates this to the one on the supply side sending a timed locking signal. The circuit-breaker which does not receive any communication from those on the load side, sends the opening command within the set selectivity time.
Zone selectivity can be activated for Tmax circuit-breakers in the case where:
- there is a source of 24 V auxiliary power supply;
- the Tmax T4, T5 or T6 circuit-breaker is equipped with the PR223EF trip unit (EFDP zone selectivity) or Tmax T7 equipped with the PR332/P trip unit (ZS zone selectivity).

Current sensors

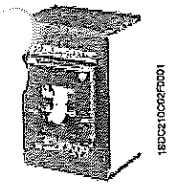
	In [A]	160	250	320	400	630	800	1000	1250	1600
PR223EF	T4 250	■	■							
	T4 320			■						
	T5 400			■	■					
	T5 630					■				
	T6 630					■				
	T6 800						■			
	T6 1000							■		
PR332/P	T7 800				▲	▲	■			
	T7 1000				▲	▲	▲	■		
	T7 1250				▲	▲	▲	▲	■	
	T7 1600				▲	▲	▲	▲	▲	■

■ = Complete circuit-breaker already coded
▲ = Circuit-breaker to be assembled

For further information on zone selectivity, please consult the section: "Characteristic curves and technical information" on page 4/74.

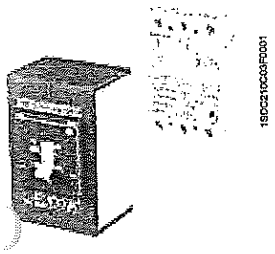
Accessories
Versions and types

Starting from the fixed version with front terminals, the Tmax circuit-breakers can be converted into the various versions (plug-in for T4 and T5; withdrawable for T4, T5, T6 and T7), using the conversion kits. This makes management of the product, its versions and stocks as a whole very flexible. In any case, it is always possible to request the circuit-breaker in the desired version completely preset in the factory, by ordering, on the same line, the fixed circuit-breaker and the conversion kit, to which must be added the fixed part.
T7 is available in two different versions: the lever operating mechanism version similar to the other sizes in the Tmax family, and the new motorizable version.



Fixed

The Tmax FIXED three-pole or four-pole version circuit-breakers foresee:
- circuit-breakers characterised by just two depths up to 1000 A: 103.5 mm for Tmax T4, T5 and T6. For T7 the depth varies according to the type of operating mechanism (with lever or spring charging motor)
- flange for compartment door
- thermomagnetic (on Tmax T4, T5 and T6) or electronic (on Tmax T4, T5, T6 and T7) trip units
- standard F type (front) on all the Tmax family sizes.



Plug-in

The PLUG-IN version of the circuit-breaker (Tmax T4 and T5) consists of:
- fixed part to be installed directly on the back plate of the unit
- moving part obtained from the fixed circuit-breaker with addition of the isolating contacts (near the connection terminals), of the rear frame (for fixing to the fixed part) and of the terminal covers.

The circuit-breaker is racked out by unscrewing the top and bottom fixing screws. A special lock prevents circuit-breaker racking in and racking out with the contacts in the closed position.
In the case where the circuit-breaker has electrical accessories mounted (SOR, UVR, MOE, MOE-E, AUX , AUX-E, AUE, RC222), the socket-plug connectors or the adapters for isolation of the relative auxiliary circuits must also be ordered (see page 3/30).

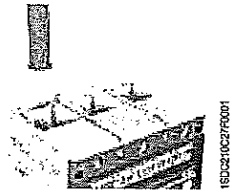
Accessories
Connection terminals

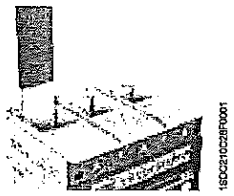
Front terminals - F

Allow connection of busbars or cables terminated with cable terminal.

Type	Version	Pieces	Busbars/cable terminal [mm]				Tightening [Nm]	Terminal covers			Phase separators
			W	H	D	Ø		high	low	fixed part	
T4	F	1	25	9.5	8	8.5	18	R	R	–	R
T5	F	1	35	11	10[1]	10.5	28	R	R	–	R
T6 630	F	2	40	12	5	2x7	9	R	R	–	R
T6 800	F	2	40	12	5	2x7	9	R	R	–	R
T7 1250[3]	F	2	50	20	8	2x11	18	–	R	–	R
T7 1600	F	2	50	20	10	2x11	18	–	R	–	R

[1] minimum 5 mm [3] up to 1250 A



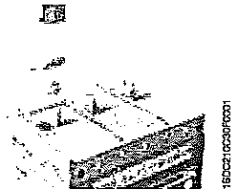


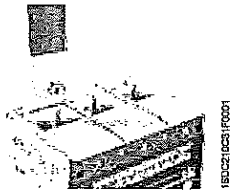
Front extended terminals - EF

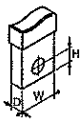
Allow connection of busbars or cables terminated with cable terminal.

Type	Version	Pieces	Busbars [mm]			Cable terminal [mm]		Tightening [Nm]		Terminal covers			Phase separators
			W	D	Ø	W	Ø	A	B[1]	high	low	fixed part	
T4	F	1	20	10	10	20	10	18	18	R	–	–	S
	P-W	1	20	10	8	20	8	–	9	–	–	R	R
T5	F	2	30	7	11	30	11	28	18	R	–	–	S
	P-W	2	30	15	10	30	10	–	18	–	–	R	R[7]
T6 630	F-W	2	40	5	11[2]	40	11[2]	9	18	R	R	R	R
T6 800	F-W	2	50	5	14	50	14	9	30	–	R	R	R
T6 1000	F	2	50	6	14	50	14	9	30	–	–	–	–
T7 1250[3]	F-W	2	50	8	4x11[4]	–	–	18[5]	40[6]	–	R	–	S
T7 1600	F-W	2	50	10	4x11[4]	–	–	18[5]	40[6]	–	R	–	S

[1] class 4.8 screws (not supplied)
[2] 14 mm for W
[3] up to 1250 A ,not available on Tmax T7X
[4] only use two holes diagonally
[5] 12 Nm onto fixed part of withdrawable circuit-breaker
[6] class 8.8 screws (not supplied)
[7] Standard for T5 630







A = Tightening the terminal onto the circuit-breaker
B = Tightening the cable/busbar onto the terminal
R = On request
S = Standard
Pieces = Number of busbars, cables or cable terminals

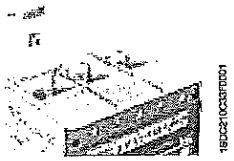
Front extended spread terminals - ES

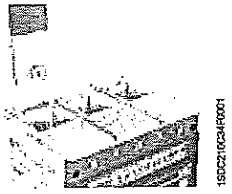
Allow connection of busbars or cables terminated with cable terminal.

Type	Version	Pieces	Busbars [mm]			Cable terminal [mm]		Tightening [Nm]		Terminal covers			Phase separators
			W	P	Ø	W	Ø	A	B[1]	high	low	fixed part	
T4	F	1	30	6	10.5	30	10.5	18	18	–	–	–	S
T5	F-P[2]-W[2]	1	40	10	11	11	11	28	18	–	–	–	S
T6	F	1	80	5	3x13	3x45	13	9	30	–	–	–	–
T7	F	2	50	10	3x13	4x45	13	18	40	–	–	–	S
	W	2	80	6	3x13	4x45	13	40	40	–	–	–	–

[1] class 4.8 screws (not supplied)

[2] for T5 630 only



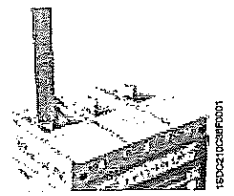


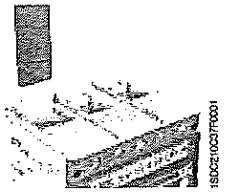
Front terminals for copper cables - FC Cu

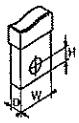
Allow connection of bare copper cables directly to the circuit-breaker.

Type	Assembly	Version	Pieces	Cable [mm²]		Flexible busbars	Tightening [Nm]		Ø [mm]	Terminal covers			Phase separators
				rigid	flexible	W x S x N[1]	A	B		high	low	fixed part	
T4	standard	F-P-W	1	2.5...185	2.5...120	15.5x0.8x10	–	10	18	R	R	S	R
	standard	F-P-W	2	–	2.5...95	–	–	10	18	R	R	S	R
T5	standard	F-P-W	1	16...300	16...240	24x1x10	–	25	28	R	R	S	R
	external	F	2	120...240	–	–	18	25	–	S	–	–	–

[1] W = width; S = thickness; N = n. of bars







A = Tightening the terminal onto the circuit-breaker
B = Tightening the cable/busbar onto the terminal
R = On request
S = Standard
Pieces = Number of busbars, cables or cable terminals

SOR - Electrical characteristics

	Inrush power consumption			
	Tmax T4, T5, T6		Tmax T7	
Version	AC [VA]	DC [W]	AC [VA]	DC [W]
12 V DC		150		
24 V AC/DC			430	430
24...30 V AC/DC	150	150		
30 V AC/DC			300	300
48 V AC/DC			300	300
48...60 V AC/DC	150	150		
60 V AC/DC			300	300
110...120 V AC/DC			300	300
120...127 V AC/DC			300	300
110...127 V AC - 110...125 V DC	150	150		
220...240 V AC/DC			300	300
220...240 V AC - 220...250 V DC	150	150		
240...250 V AC/DC			300	300
380...400 V AC			300	
380...440 V AC	150			
415...440 V AC			300	
480...525 V AC	150			
Opening times [ms]	15	15	50	50

Shunt opening release with permanent service – PS-SOR

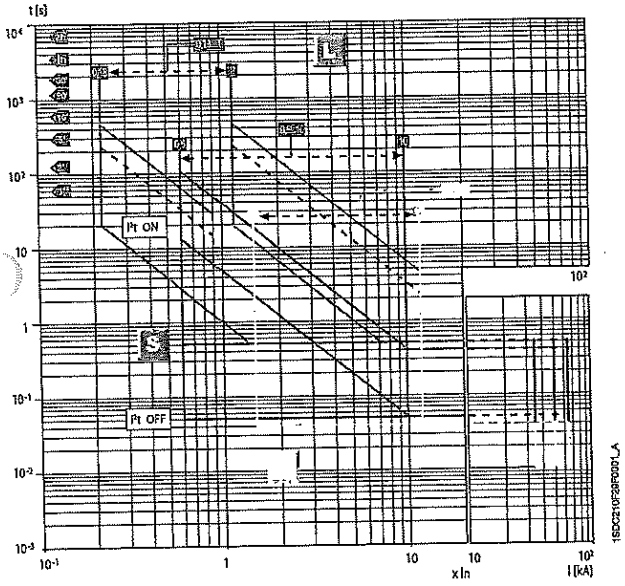
Furthermore, for T4, T5 and T6, opening coils with permanent service (PS-SOR) are available, with much lower power consumption and which can be supplied continuously: in this case, in fact, they are not fitted with auxiliary limit contact. The pre-cabled or uncabled version can be chosen for these coils as well.

PS-SOR - Electrical characteristics

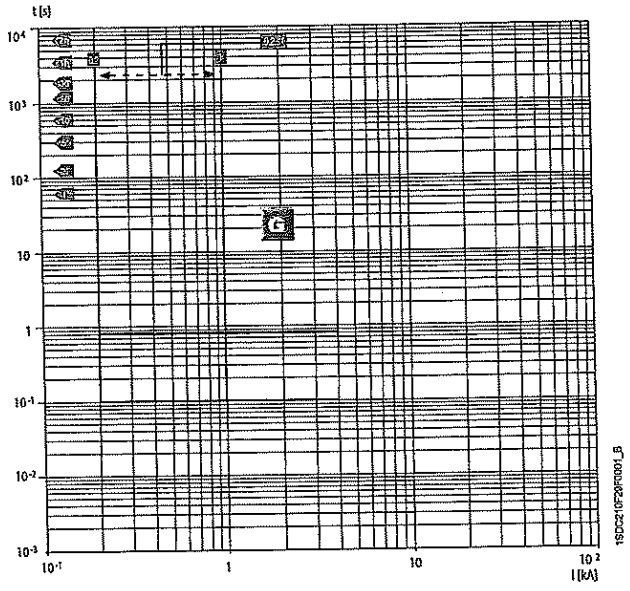
	Tmax T4, T5, T6	
Version	AC [VA]	DC [W]
24 V AC/DC	4	4
110...120 V AC	4	–

Trip curves for power distribution
Circuit-breakers with electronic trip units

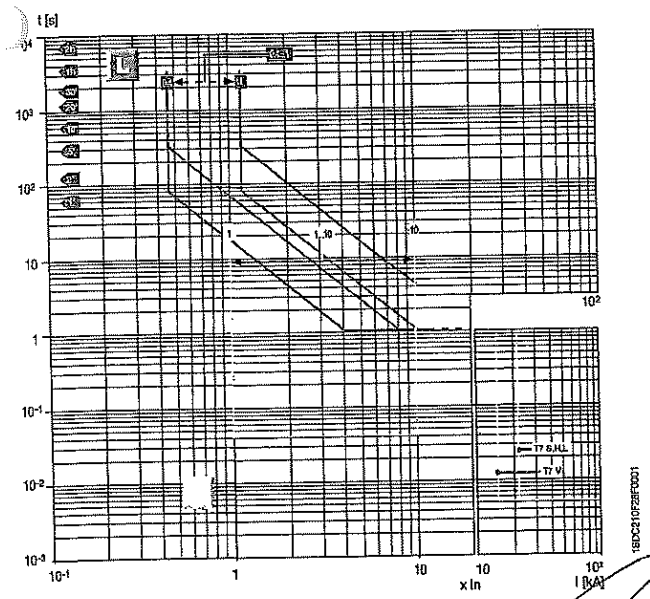
Tmax T5 Ekip E
L-S-I Functions



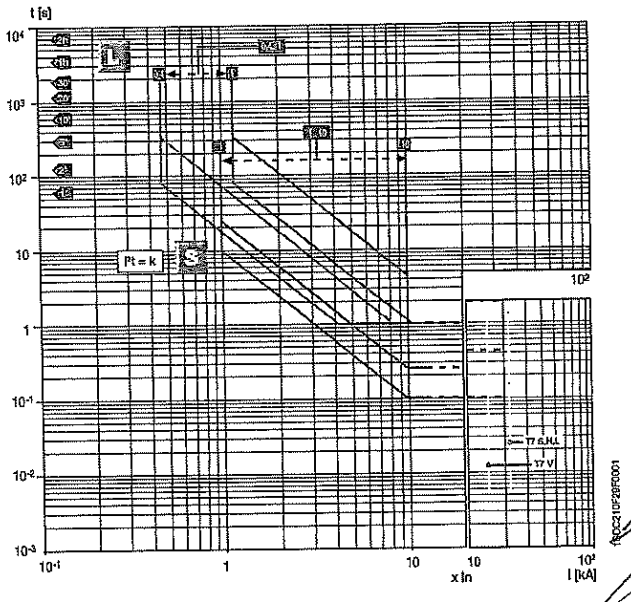
Tmax T5 Ekip E
L-S-I Functions



T7 800/1000/1250/1600 – PR231/P
L-I Functions

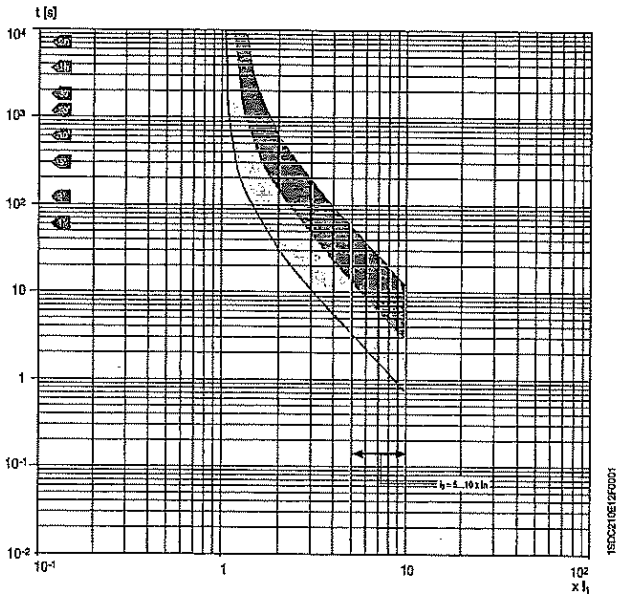


T7 800/1000/1250/1600 – PR231/P
L-S Functions

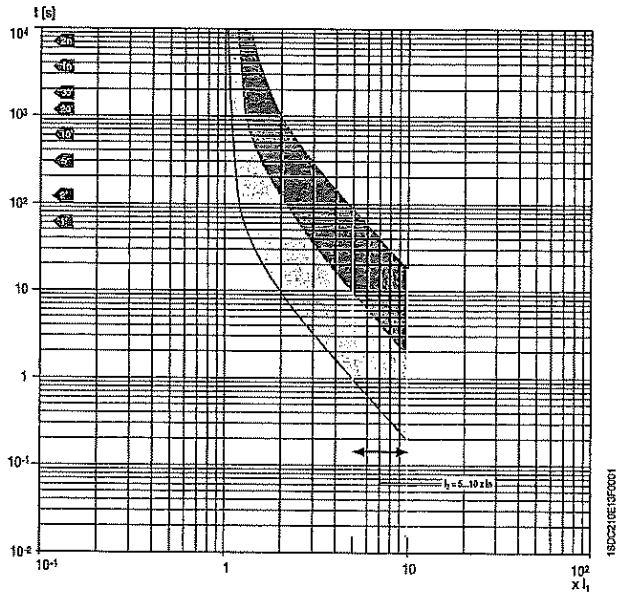


Trip curves for power distribution
Circuit-breakers with thermomagnetic trip units

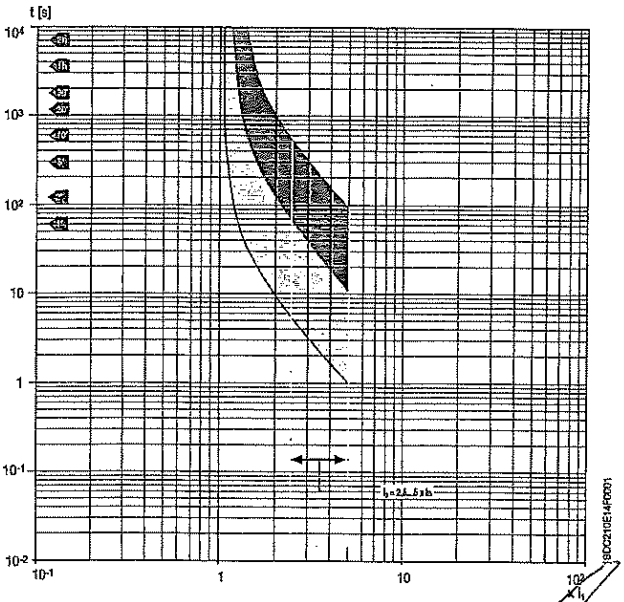
T4 250 – TMA
In = 80÷250 A



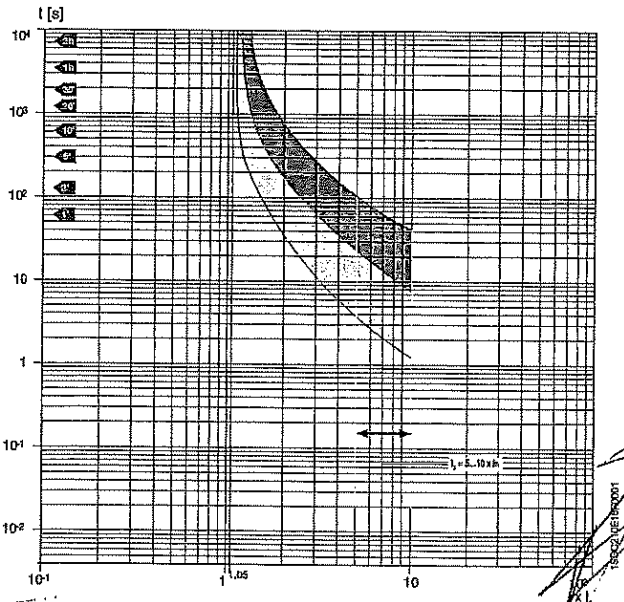
T5 400/630 – TMA
In = 320÷500 A



T5 400/630 – TMG
In = 320÷500 A



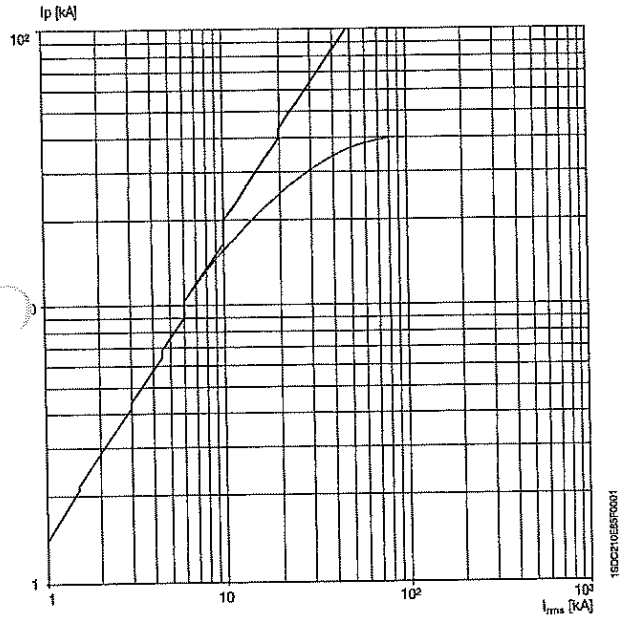
T6 630 – TMA
In = 630 A



Limitation curves

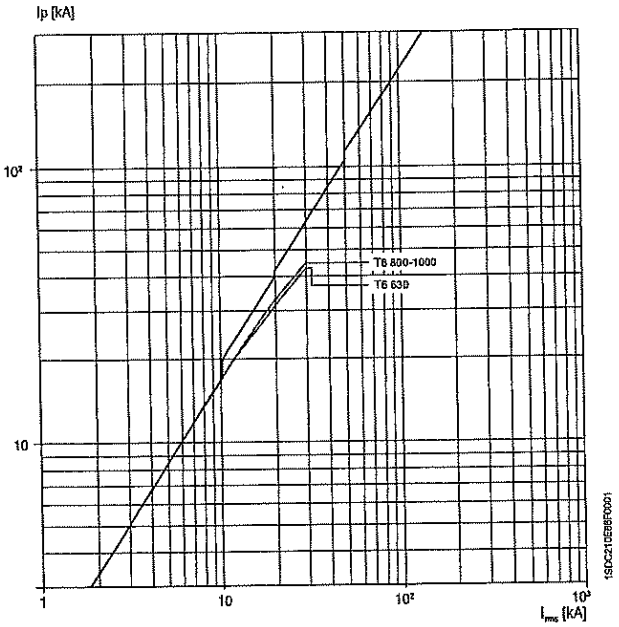
T5 400/630

690 V



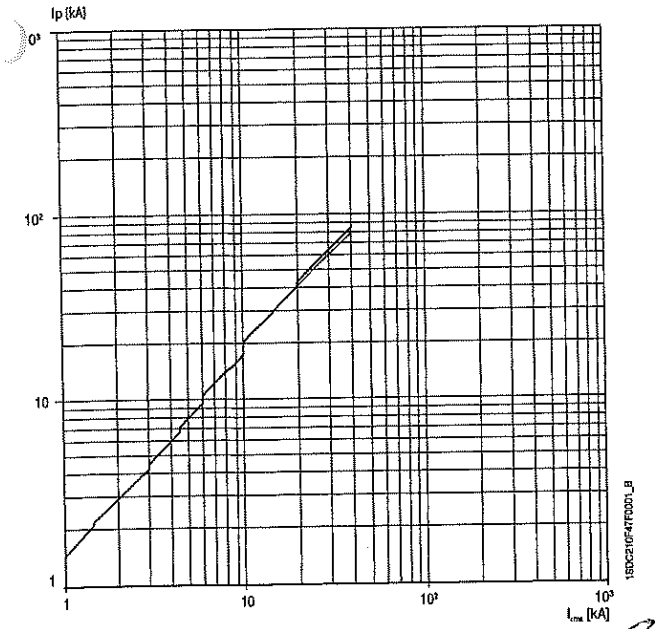
T6 630/800/1000

690 V



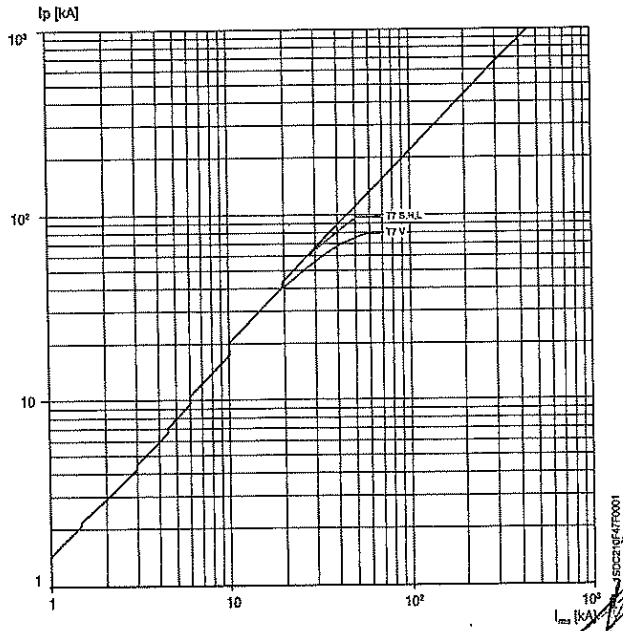
T6 V 630/800

690 V



T7 800/1000/1250/1600

690 V



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e-mail:sales@metix.bg

П Р И Л О Ж Е Н И Е 9.17.2

Техническо описание и чертежи с нанесени на тях размери

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

Overall dimensions
Tmax T5

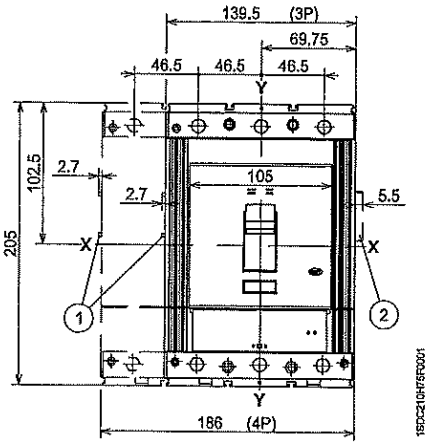
Fixed circuit-breaker

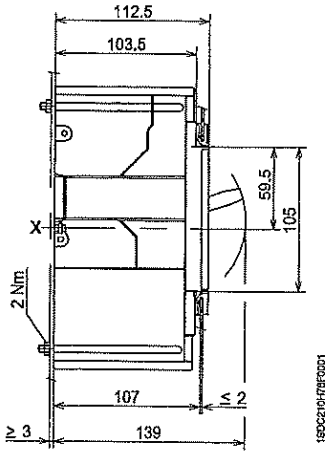
Caption

(1) Overall dimensions with cabled accessories mounted (SOR-C, UVR-C, RC222)

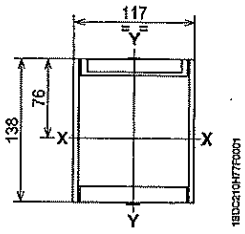
(2) Overall dimensions with cabled auxiliary contacts mounted (only 3Q 1SY)

Fixing on sheet

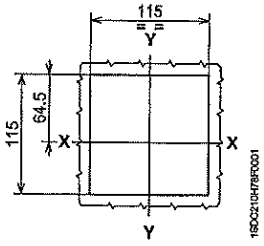




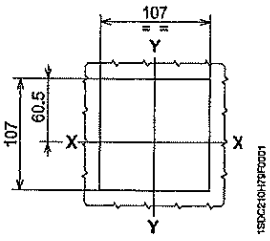
Flange for compartment door



Drilling templates of the compartment door



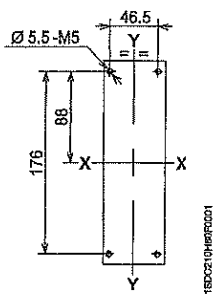
With flange
(3-4 POLES)



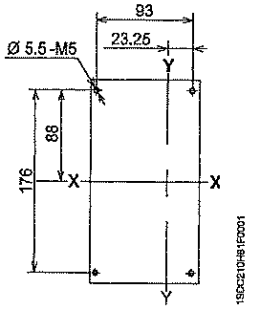
Without flange
(3-4 POLES)

Drilling templates for support sheet

For front terminals

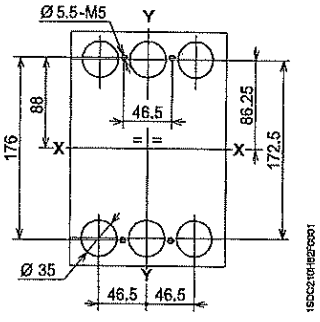


3 POLES

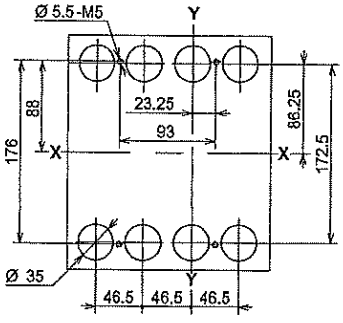


4 POLES

For rear terminals



3 POLES

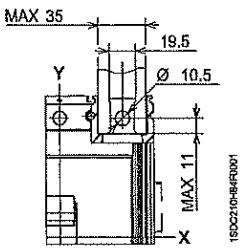


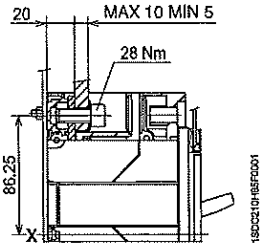
4 POLES

Overall dimensions
Tmax T5

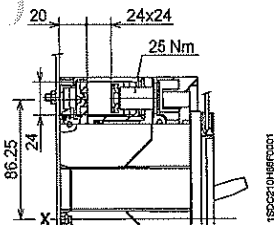
Terminals

Front - F

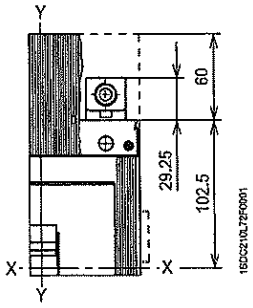


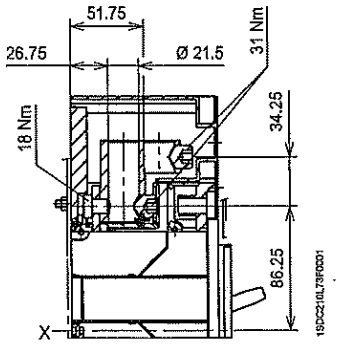


Front for copper cables - FC Cu

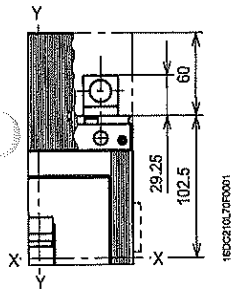


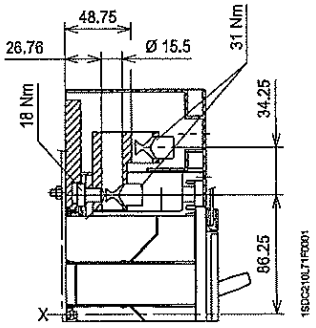
Front for copper cables - FC Cu 2x240 mm²



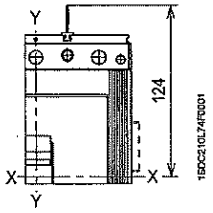


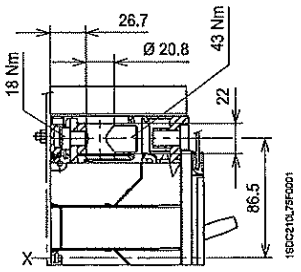
Front for copper/aluminum cables - FC CuAl 2x120 mm²





Front for copper/aluminum cables - FC CuAl 1x240 mm²

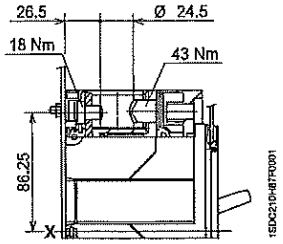




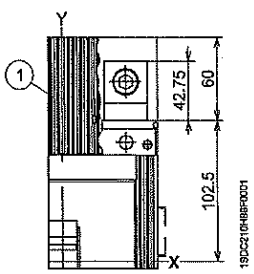
Caption

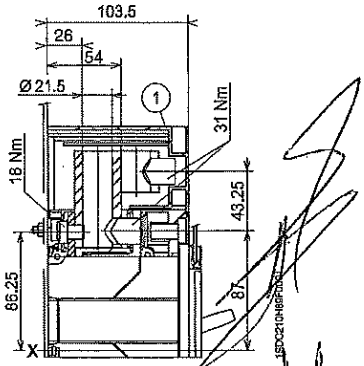
① High terminal covers with degree of protection IP40

Front for copper/aluminium cables - FC CuAl 300 mm²



Front for copper/aluminium cables - FC CuAl 2x240 mm²



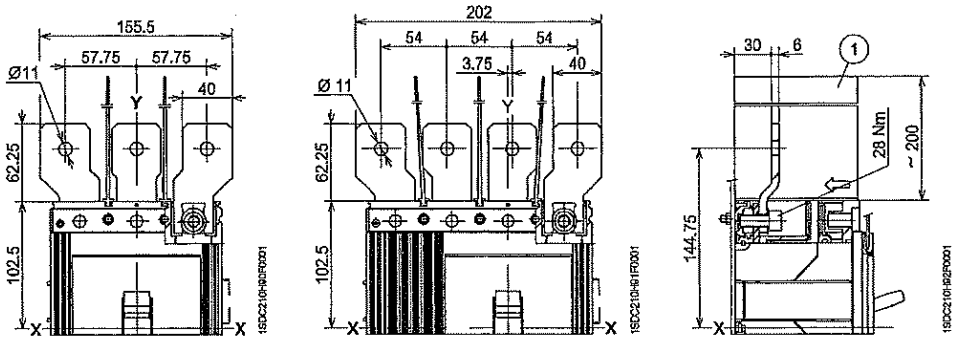


Terminals

Caption

① Insulating barriers between phases (compulsory)

Front extended spread - ES

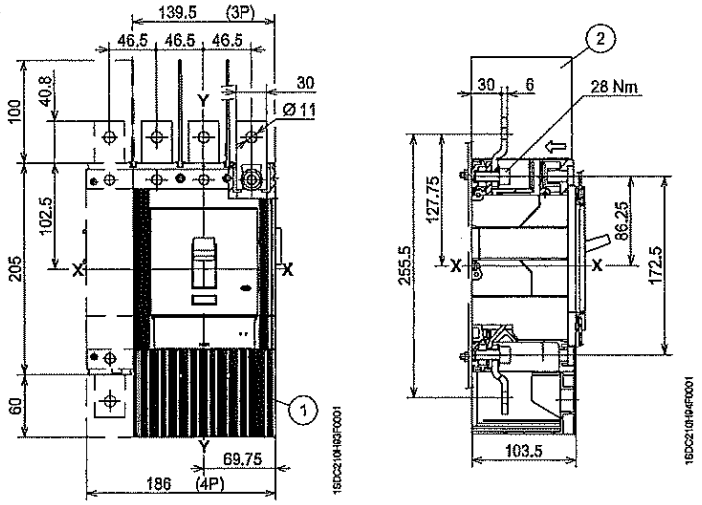


Caption

① High terminal covers with degree of protection IP40

② Insulating barriers between phases (compulsory without 1)

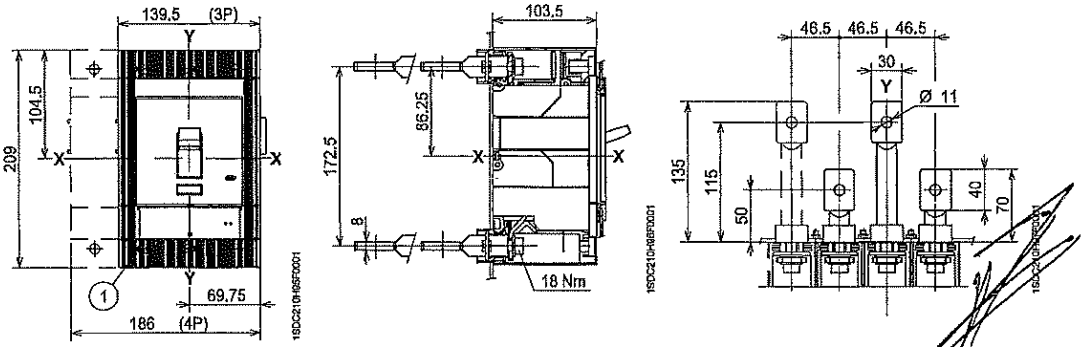
Front extended - EF



Caption

① Low terminal covers with degree of protection IP40

Rear horizontal - R



Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

гр.Петрич 2850, Промишлена зона
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тел.:00359 745 60743; факс:00359 745 60742
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гр.София 1680 ул. "Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

П Р И Л О Ж Е Н И Е 9.17.3

ЕО декларация за съответствие

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

ABB SACE

DICHIARAZIONE DI CONFORMITA'
DECLARATION OF CONFORMITY

No CE\Tmax 030R0.03

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

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

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

Identificazione del prodotto: *product identification:*	**Tmax T5N 630** ***e relativi accessori*** *and relevant accessories*

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

riferimento n.ro *reference nr.*	**titolo** *title*
73/23	**Direttiva Bassa Tensione** *Low voltage directive*
89/336	**Direttiva Compatibilità Elettromagnetica** *Electromagnetic Compatibility Directive*

e che sono state applicate tutte le norme e/o specifiche tecniche indicate sul retro.
and that the standards and/or technical specifications referenced overleaf have been applied
Ultime due cifre dell'anno in cui è stata affissa la marcatura CE: 03
Last two digits of the years in which the CE marking was affixed

Bergamo **li** 03.03.06

на основание чл. 36а, ал. 3 от ЗОП

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

ABB SACE

DICHIARAZIONE DI CONFORMITA'

DECLARATION OF CONFORMITY

No CE\Tmax 030R0.03

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

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

- norme armonizzate:

- harmonized standards:

n.ro *nr*	**edizione** *issue*	**titolo** *title*	**parti** *parts*
EN 60947	1999 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
EN 60947	1996 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers
EN 50081	1992 (and later)	EMC- Generic Emission standard	Part 1: Residential, commercial and light industry
EN 50081	1993 (and later)	EMC- Generic Emission standard	Part 2: Industrial environment
EN 50082	1997 (and later)	EMC- Generic Immunity standard	Part 1: Residential, commercial and light industry

- altre norme e/o specifiche tecniche:

- other standards and/or technical specifications

n.ro *nr*	**edizione** *issue*	**titolo** *title*	**parti** *parts*
IEC 60947	Ed.3.2 Consolidated Edition 2001-12 (and later)	Low voltage switchgear and controlgear	Part 1: General rules
IEC 60947	Ed.2.2 Consolidated Edition 2001-11 (and later)	Low voltage switchgear and controlgear	Part 2: Circuit -breakers

ABB SACE

DICHIARAZIONE DI CONFORMITA'

DECLARATION OF CONFORMITY

No CE\Tmax 030R0.03

- altre soluzioni tecniche, i cui dettagli sono inclusi nella documentazione tecnica o fascicolo tecnico:

- other technical solutions, the details of wich are included in the technical documentation or the technical construction file:

catalogo tecnico 1SDC210004D0901

technical catalogue 1SDC210004D0201

Certificato di gestione della Qualità ISO 9001-2000

ISO 9001 Quality Management System Certificate

Certificato di gestione Ambientale ISO 14001

ISO14001 Environment Management System Certificate

- altri riferimenti o informazioni richiesti dalla(e) direttiva(e) comunitaria(e) applicabile(i):

- other references or information required by the applicable EC directive(s):

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

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

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

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

Circuit Breaker / Leistungsschalter / Disjoncteur /Interruttore
Switch disconnector / Sezionatore

Type / Typ / Type / Tipo
Tmax T5
(and relative accessories)

The object of the declaration described above is in conformity with the relevant Community harmonisation legislation
Der oben beschriebene Gegenstand der Erklärung erfüllt die einschlägigen / Harmonisierungsrechtsvorschriften der Gemeinschaft /
L'objet de la déclaration décrit ci-dessus est conforme á la législation communautaire d'harmonisation applicable /
L'oggetto della dichiarazione di cui sopra è conforme alla pertinente normativa comunitaria di armonizzazione

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

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

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

EN 60947-1: 2007/A1:2011
EN 60947-2: 2006/A2:2013
EN 60947-3: 2009/A1:2012

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

2003

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

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

на основание чл. 36а, ал. 3 от ЗОП

Lucio Azz
R&D Mana

Document No.: 1SDL000165R0005 Rev: 1

Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

гр.Петрич 2850, Промишлена зона
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e-mail: metix@metix.bg
гр.София 1000 ул."Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.17.4

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

ACAE
ASSOCIAZIONE PER LA CERTIFICAZIONE
DELLE APPARECCHIATURE ELETTRICHE

Via Tito Livio, 5 - 24123 - BERGAMO (Italy)
tel. +390354175244 fax. +390354534662 e-mail: acaecert@tin.it

LOVAG

Certificate
of Conformity

LOVAG-Certificate No. **IT 04.011**

Apparatus
Moulded case Three Pole Air-break Independent operation Circuit-breakers
Frame size 400 A - 1000 V (U) - 50/60 Hz - with **microprocessor based overcurrent releases:**

I_n = 320 A to 400 A

Designation

T5N 400

Manufacturer or responsible vendor
ABB SACE S.p.A. - Via Baioni, 35 - 24123 Bergamo (Italy)

Tested for: ABB SACE S.p.A.
Tested by: ACAE Laboratory IA.01
The apparatus, constructed in accordance with the description mentioned in the Test Report listed on this Certificate has been subjected to the series of proving tests in accordance with IEC 60947-2 (1995), Corrigendum (1997) and IEC 60947-2:1995/A1:1997 EN 60947-2:1996 and EN 60947-2:1996/A1:1997

The results are shown in the Test Report in accordance to LOVAG. The values obtained and the general performance are considered to comply with the above Standard(s) and to justify the characteristic assigned by the manufacturer as stated below.
Utilization category A

Test sequence: II ($I_{cs} = I_{cu}$)

U_e = 440 V $I_{cs} = I_{cu}$ = 30 kA

This document includes Report No.: 03.084
Issue Date: 2004.02.10

Responsible Certification Body: ACAE

на основание чл. 36а, ал. 3 от ЗОП

Mauro Marchi
Authorized Signature
Date: 2004.03.18

SINCERT
PRD N°070B Rev.00
Signatory of EA and IAF Mutual Recognition Agreements

LOVAG CERTIFICATES

LOVAG	is the Low Voltage Agreement Group which is an Agreement Group registered by EOTC the European Organisation for Conformity Assessment, Registration No. 0009. LOVAG's main purpose as an Agreement Group shall be for the mutual recognition of the test reports and/or certificates of conformity by its signatories.
Membership	LOVAG presently has five signatories to the Agreement, ACAE (Italy), ALPHA (Germany), ASEFA (France), CEBEC (Belgium) and Intertek SEMKO AB (Sweden) and employs around 40 European Testing Laboratories.
Certificates	LOVAG Certificates are issued by the signatory bodies to the Agreement using test reports and certificates in a common and recognisable format in the market. They are recognised and accepted in the European Economic Area and elsewhere in the world.
Test Instructions	LOVAG uses common LOVAG Test Instructions for each of the International and European Standards covered by the Agreement and signatories to the Agreement abide by these when testing for LOVAG Certification.
Qualifications	All signatory bodies to the Agreement are accredited and/or assessed to EN 45011 (ISO/IEC Guide 65) and their laboratories are accredited and/or assessed to EN ISO/IEC 17025.

For further information contact your local certification body from the list below or contact the Secretariat of LOVAG at: ALPHA e.V., Stresemannallee 19, D-60596 Frankfurt am Main,
Phone: +49 69 9620 6343, Fax : +49 69 96206344, e-mail: secretariat@lovag.net

LIST OF LOVAG SIGNATORIES:

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e-mail: acaecert@tin.it

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B-1070-Brussels
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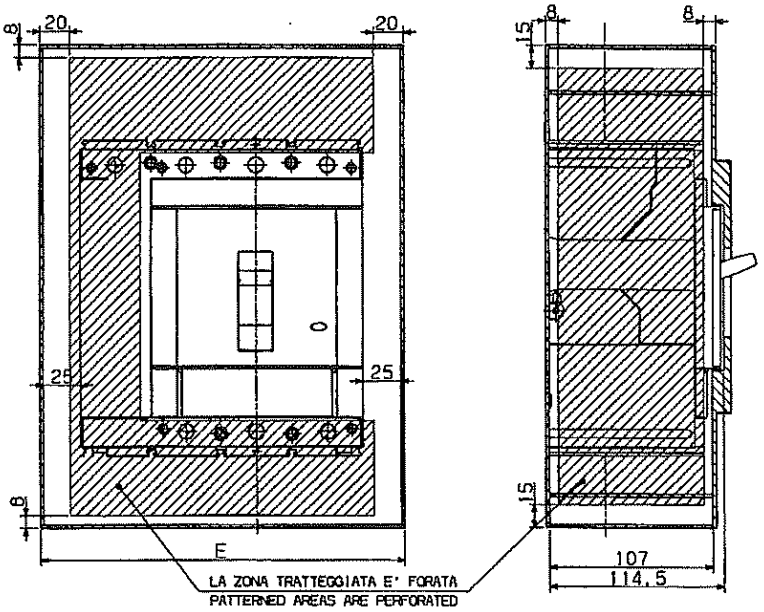
e-mail: info@cebec.be

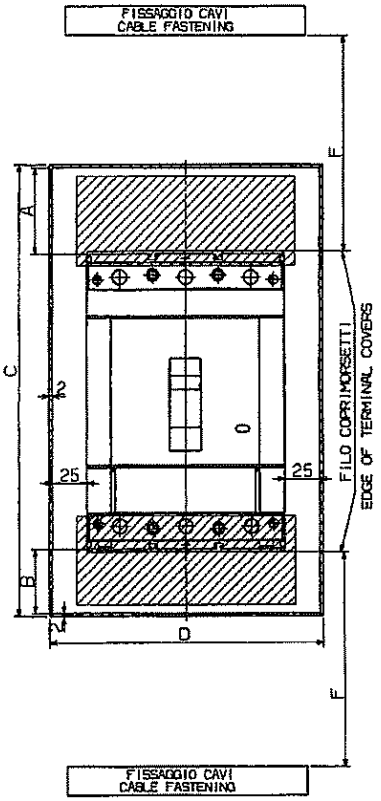
ALPHA e. V.
Stresemannallee 19
D-60596 Frankfurt am Main
GERMANY
Fax: +49 69 9620 6344
e-mail: office@alpha-cert.de

Intertek SEMKO AB
Box 1103, Torshamnsgatan 43
SE-164 22 Kista
SWEDEN
Fax: +46 8 750 6030
e-mail: lovag@semko.se

ASEFA
33 av du general leclerc
F-92260 Fontenay-aux-roses
France
Fax: +33 1 40 95 88 18
e-mail: asefa@icle.fr

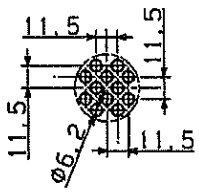
INSTALLATION INSIDE METAL SCREEN FOR SHORT-CIRCUIT TESTS





⊛ Con Un=690V
Aggiungere piastra posteriore isolante e separatore di fase
⊛ When Un=690V
Rear isolating barrier and phase separators should be added

INTER	TENSIONE VOLTAGE	A	B	C	D	E	F	N° DIS
T4 cavi 1.5-16mm² cable 1.5-16mm²	Un<440V	30	25	264	159	194	50	RG0840/000
	Un≥440V⊛	60	45	314	159	194	50	
T4	Un<440V	30	25	264	159	194	200	
	Un≥440V⊛	60	45	314	159	194	200	
T5 400A	Un<440V	30	25	264	194	240	200	RG0840/001
	Un≥440V⊛	60	45	314	194	240	200	
T5 630A	Un<440V	90	85	384	194	240	200	RG0840/500
	Un≥440V⊛	120	105	434	194	240	200	



QUOTE FORATURA
PERFORATION GAUGE
LAMIERA FORATA - RAPPORTO SUP. VUOTA/SUP. TOTALE=0,45
PERFORATED SHEET METAL HOLLOW-TOTAL SURFACE RATE=0,45

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1	Cabling characteristics			
Table 9, 10	Cable		185 mm^2	185 mm^2
and 11	Bar		- x - mm	- x - mm
	Number		1	1
	Length		2000 mm	2000 mm
	Tightening torque			25 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			22 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	-
	Current setting value		I_n	128 A
	Test current			
	either k x 2.0 x I_n		256 A	256 A
8.3.5.1	Test sequence II (I_{cs} = I_{cu})	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		- A	- A
8.3.5.4	Test sequence II (I_{cs} = I_{cu})	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Ph_1	≤ 30 s	28 s
		Ph_2	≤ 30 s	28 s
		Ph_3	≤ 30 s	29 s

Standard and clause	Kind of tests and requirements			Test values Results
8.3.4.1 8.3.8.3	**TEST OF RATED SERVICE SHORT-CIRCUIT BREAKING CAPACITY**			
Table 4	Utilization category		A	
	Rated operational voltage U_e		440 V	
	Recovery voltage		1.05 x U_e	462 V
	Rated service short-circuit breaking capacity I_{cs}		30 kA	30 kA
	Rated ultimate short-circuit breaking capacity I_{cu}		30 kA	
Table 1	Ratio between I_{cs} and I_{cu}		I_{cs}/I_{cu} = 100 %	
Table 11	Power factor		0,25	0,25
	Frequency		50 Hz	50 Hz
8.3.2.1	Control supply voltage		0.85 x U_s - V	- V
7.2.1.1.3	Maximum value of the closing time			- ms
	Sequence of operation		O - t - CO - t - CO	O - t - CO - t - CO
	Circuit diagram			Page 33 /44
	Calibration of the test circuit		Pageform 169	Page 12 / 44
	Safety area		Pageform 6	Page 7 / 44
	Installation of the material tested		Pageform 6	Page 8 / 44
	Energization direction		Top/Bottom	Top
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		185 mm²	185 mm²
	Bar		- x - mm	- x - mm
	Number		1	1
	Length	supply side	500 mm	500 mm
		load side	250 mm	250 mm
	Tightening torque			25 Nm

Type test according to: IEC 60947-2
Test sequence II (Ics = Icu)

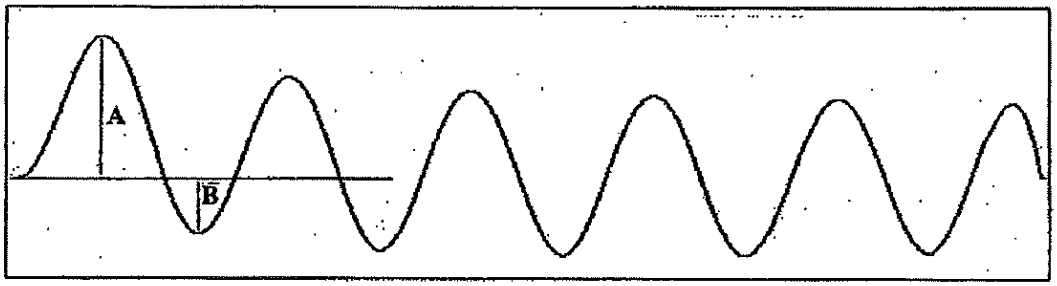
Type: T5N 400

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION „O“		
	Oscillogram		Page 37 / 44
	Peak current value	i_1	11,4 kA
		I_2	26,6 kA
		I_3	19,7 kA
	Maximum total duration		9,0 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	464 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	462 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	462 V
	Average value	U_{rm}	463 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1,05
	Joule integral	Ph_1	$478x10^3$ A^2s
		Ph_2	$1700x10^3$ A^2s
		Ph_3	$1290x10^3$ A^2s
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page - / -
	Time interval between operations	3 min	3 min
	OPERATION „CO“		
	Oscillogram		Page 38 / 44
	Applied voltage		463 V
	Peak current value	i_1	17,7 kA
		I_2	15,5 kA
		I_3	26,3 kA
	Maximum total duration		9,2 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	464 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	463 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	463 V
	Average value	U_{rm}	463 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1,05
	Joule integral	Ph_1	$894x10^3$ A^2s
		Ph_2	$635x10^3$ A^2s
		Ph_3	$1780x10^3$ A^2s
7.2.1.1.3	Closing operation time		- ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page - / -

Standard and clause	Kind of tests and requirements		Test values Results
	Time interval between operations	3 min	3 min
	OPERATION „CO“		
	Oscillogram		Page 39 / 44
	Applied voltage		462 V
	Peak current value	i_1	23,5 kA
		I_2	21,0 kA
		I_3	12,3 kA
	Maximum total duration		8,0 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	462 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	463 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	464 V
	Average value	U_{rm}	463 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1,05
	Joule integral	Ph_1	$1230x10^3$ A^2s
		Ph_2	$1420x10^3$ A^2s
		Ph_3	$390x10^3$ A^2s
7.2.1.1.3	Closing operation time		- ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page - / -

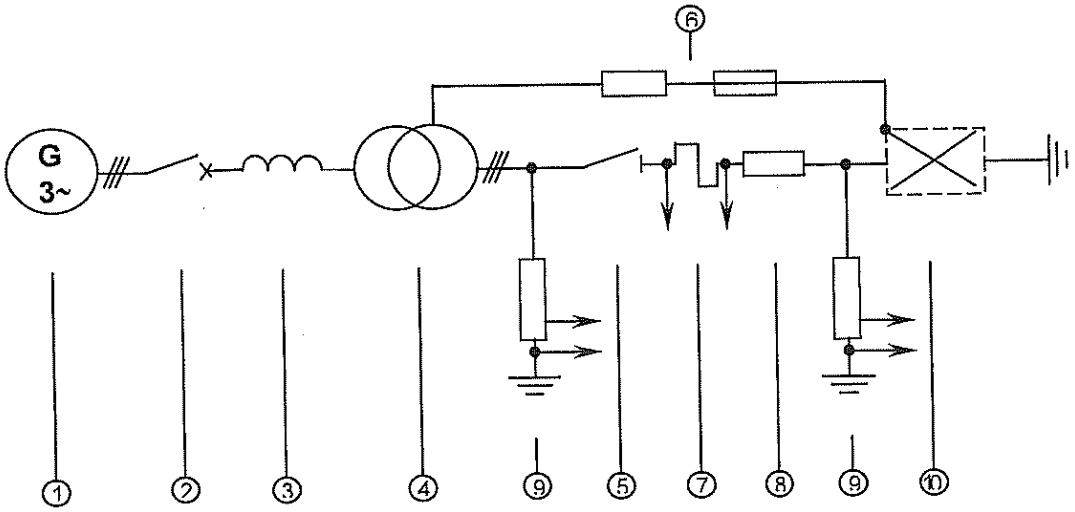
Method for determination of short-circuit power factor

The method is based on a three-phase current calibration with the maximum asymmetry on one phase. This condition is obtained by the operation of the closing device when no-load voltage wave is passing through zero value.In order to guarantee the required precision the tolerance on the closing time is ± 0.2 ms of the passing time through the zero value of this voltage.
Power factor is checked on only one phase, in according with 8.3.2.2.4 of Test Instruction LOVAG LTI IEC 947-2 rev.3.
The measurement of the power factor is performed by a digital recorder associated with a computer. The amplitude A (first positive peak) and B (first negative peak) are measured and from the formula k = [B/A] is deduced the power factor value showed in the annexed table.



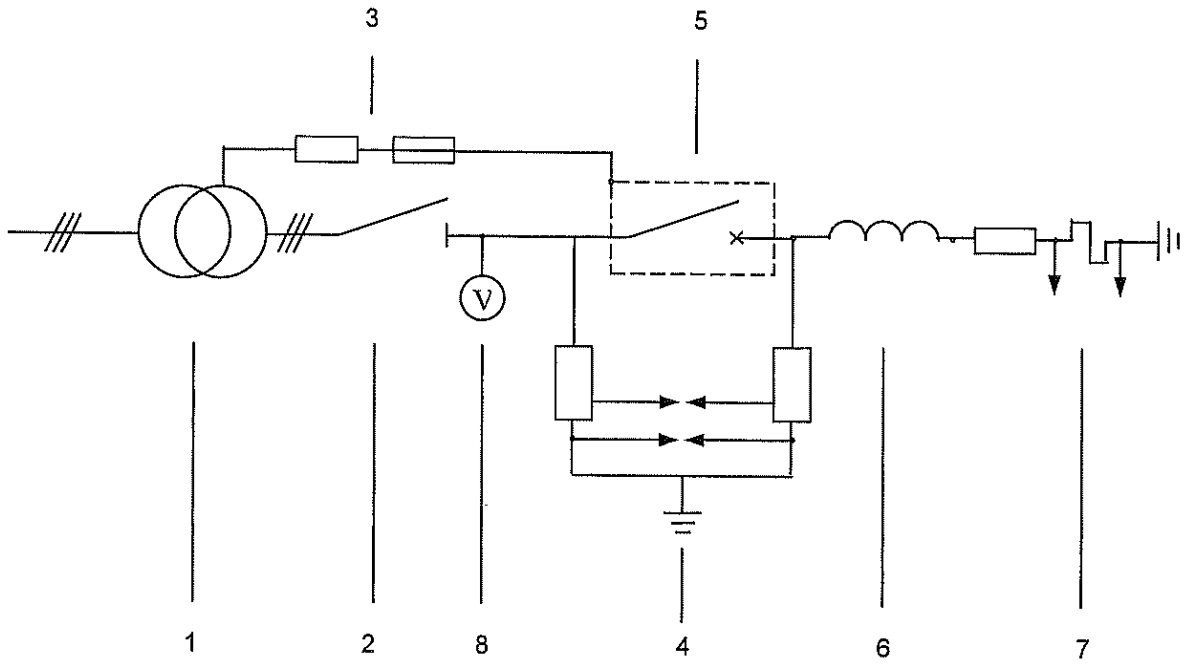
Power factor	k	Power factor	k	Power factor	k	Power factor	k	Power factor	k
0	0	0,12	0,313	0,24	0,529	0,36	0,682	0,48	0,794
0,01	0,031	0,13	0,334	0,25	0,544	0,37	0,693	0,49	0,801
0,02	0,061	0,14	0,355	0,26	0,558	0,38	0,707	0,5	0,809
0,03	0,09	0,15	0,375	0,27	0,572	0,39	0,713	0,51	0,817
0,04	0,118	0,16	0,394	0,28	0,586	0,4	0,723	0,52	0,824
0,05	0,145	0,17	0,413	0,29	0,599	0,41	0,733	0,53	0,831
0,06	0,172	0,18	0,431	0,3	0,612	0,42	0,742	0,54	0,838
0,07	0,197	0,19	0,448	0,31	0,624	0,43	0,751	0,55	0,845
0,08	0,222	0,2	0,465	0,32	0,636	0,44	0,76		
0,09	0,246	0,21	0,482	0,33	0,648	0,45	0,769		
0,1	0,269	0,22	0,498	0,34	0,66	0,46	0,777		
0,11	0,292	0,23	0,514	0,35	0,674	0,47	0,785		

CIRCUIT DIAGRAM TYPE A

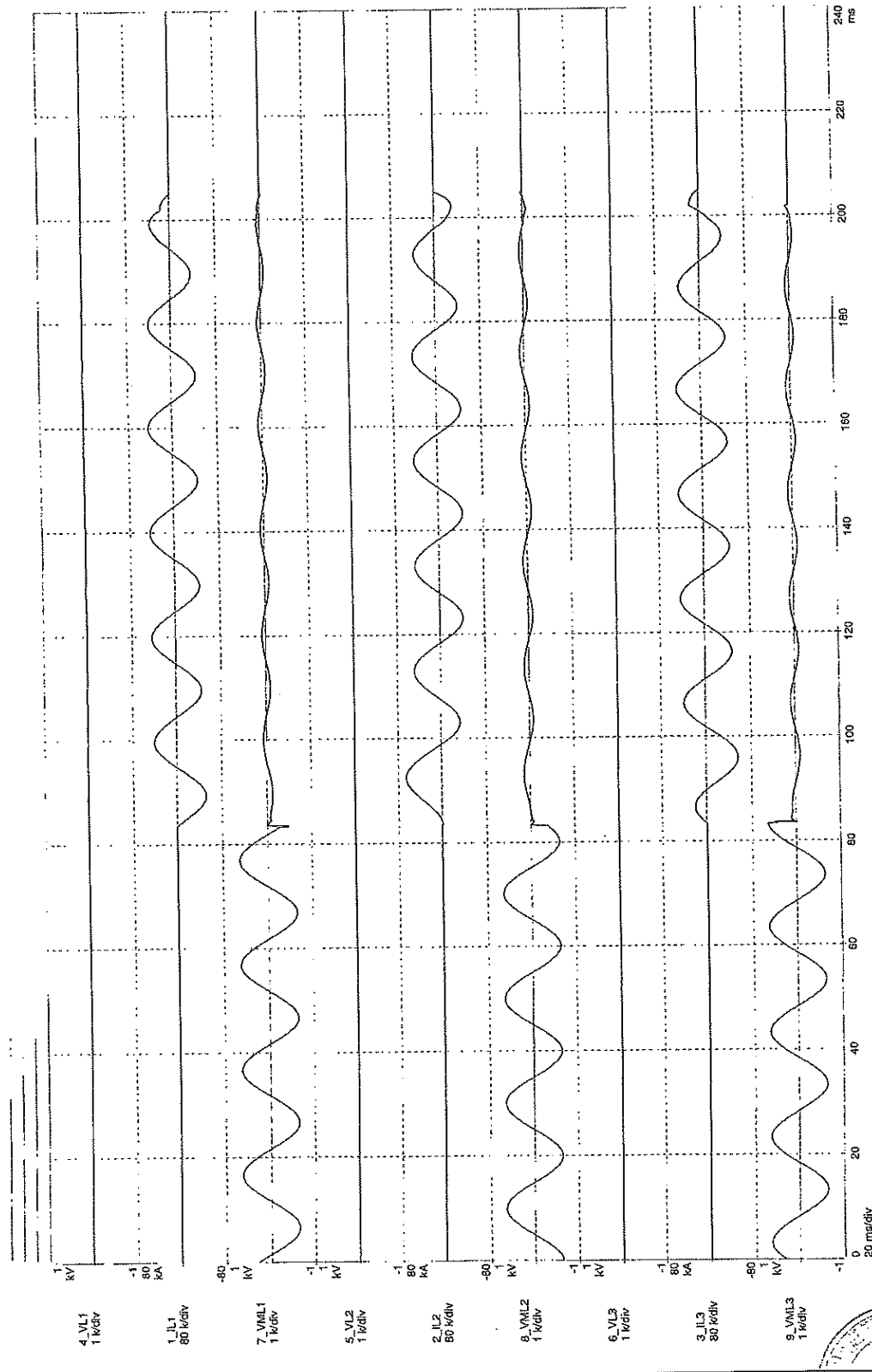


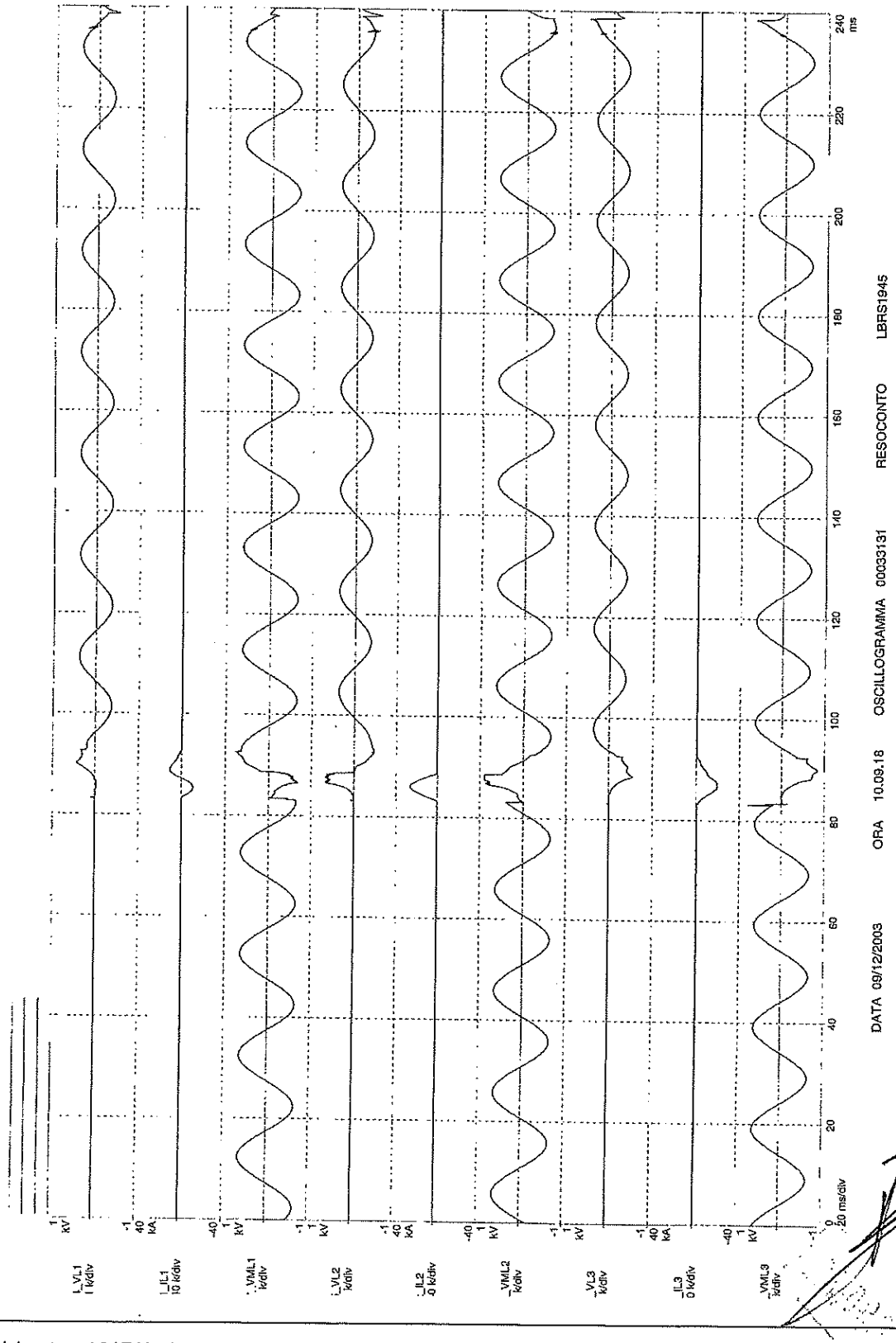
1 - Three-phase generator
2 - Back-up circuit breaker
3 - Air reactors
4 - Three-phase transformer
5 - Short-circuit making switch
6 - Device for the detection of fault current
7 - Non inductive shunts for current measurement
8 - Resistors
9 - Dividers for voltage measurement
10 - Apparatus under test

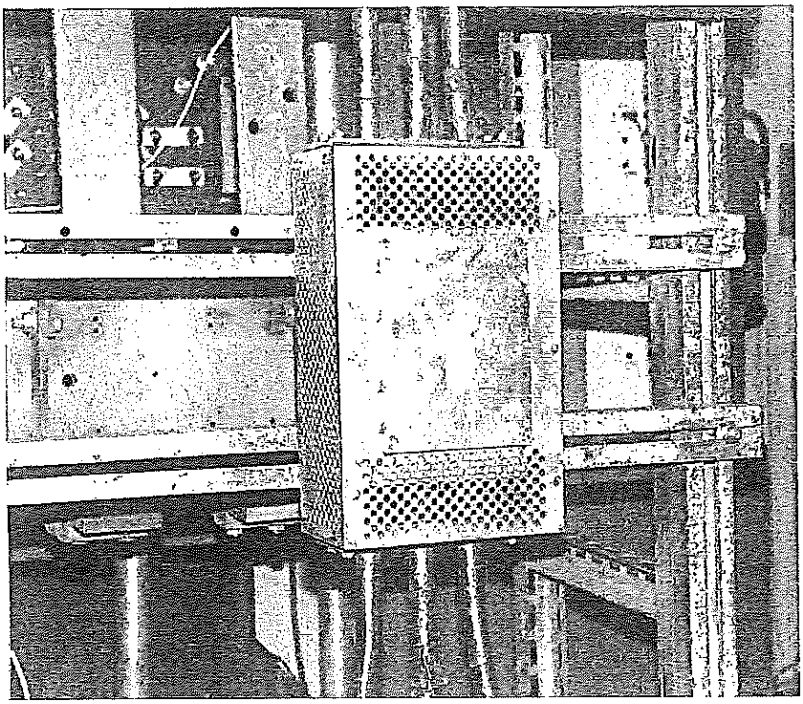
CIRCUIT DIAGRAM TYPE S

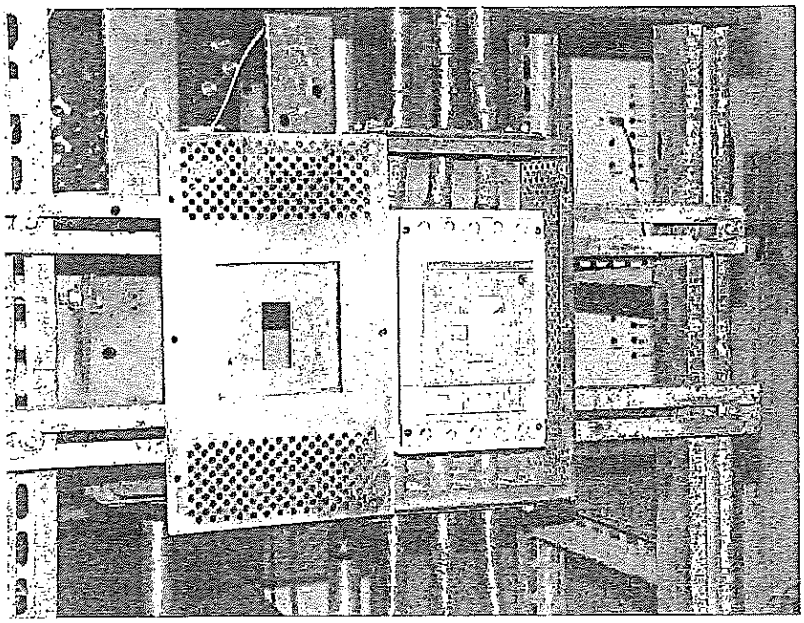


1 - Three-phase transformer
2 - Short-circuit making switch
3 - Device for the detection of fault currents
4 - Dividers for the arcing voltage measurement
5 - Apparatus under test
6 - Load (reactors and resistances)
7 - Non inductive shunts for current measurement
8 Voltmeter for voltage measurement


4_VL1 1 kV/div
1_IL1 80 kA/div
7_VNL1 1 kV/div
5_VL2 1 kV/div
2_IL2 80 kA/div
8_VNL2 1 kV/div
6_VL3 1 kV/div
3_IL3 80 kA/div
9_VNL3 1 kV/div
20 ms/div
DATA 09/12/2003 ORA 09.50.16 OSCILLOGRAMMA 00033130 RESCONTO LBRS1845

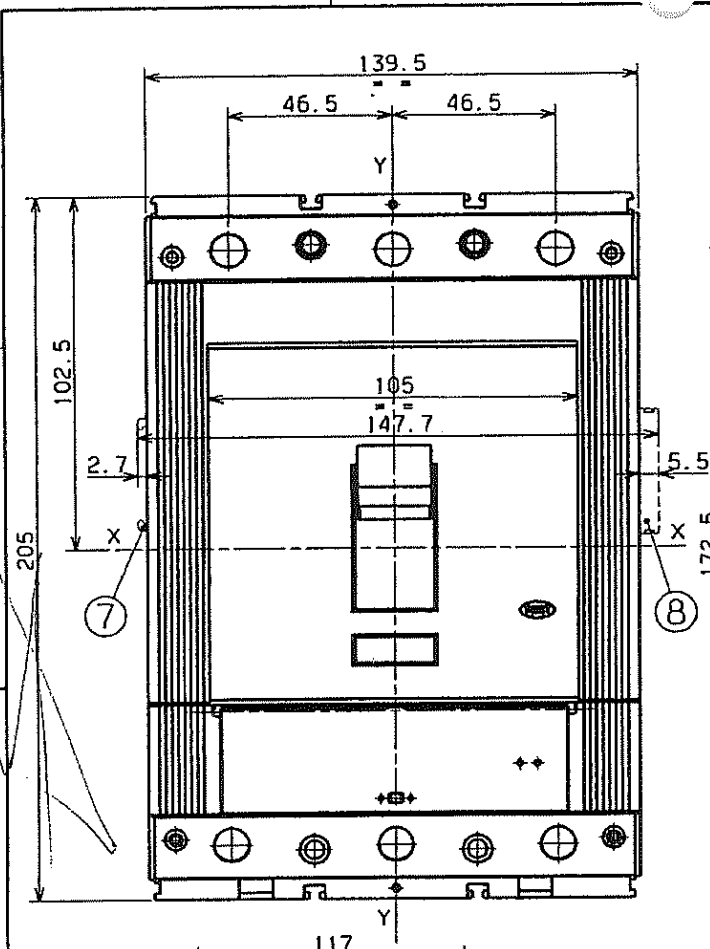

DATA 09/12/2003
ORA 10.09.18
OSCILLOGRAMMA 00033131
RESOCONTO
LBRS1945
0
20
40
60
80
100
120
140
160
180
200
220
240
ms
20 ms/div
L_VL1
1 kV/div
I_IL1
10 kA/div
VML1
kV/div
I_VL2
kV/div
IL2
0 kA/div
VML2
kV/div
VL3
kV/div
IL3
0 kA/div
VML3
kV/div

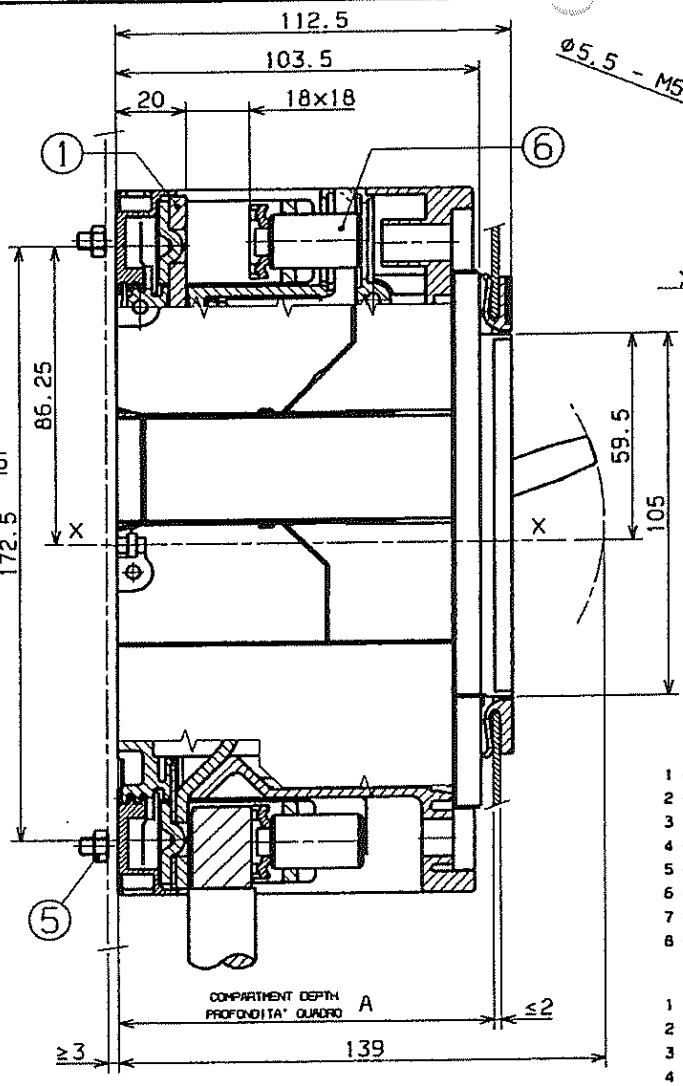


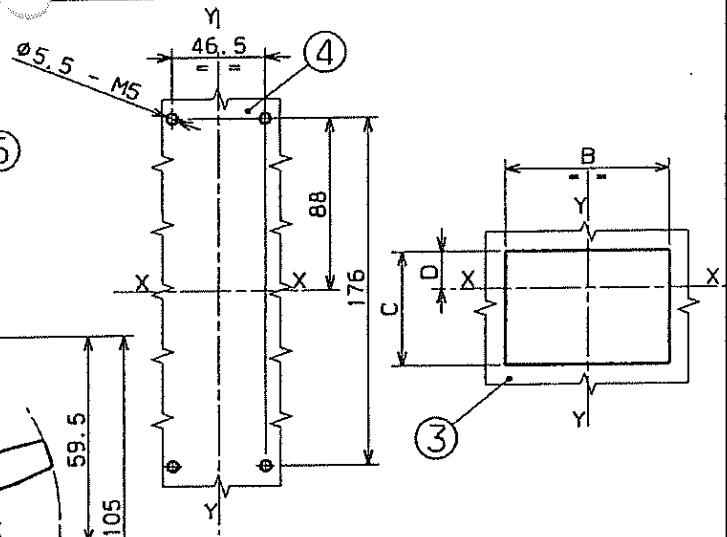


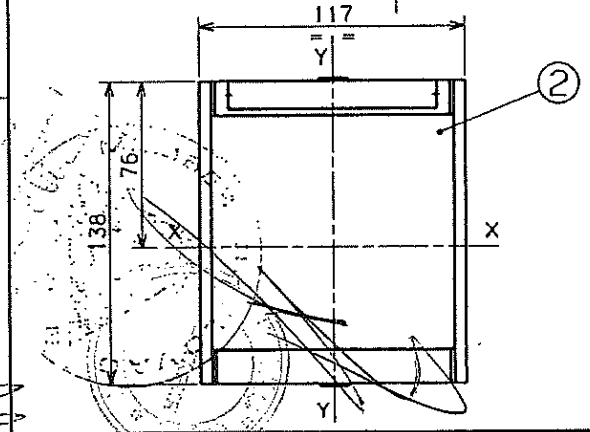
COMPLETE LIST OF DRAWINGS AND DRAWINGS CHECKED FOR THE COMPLIANCE OF THE PRODUCT

TYPE OF DOCUMENT	N° DRAWING	Index of modification	Date
Assembly drawing*	1SDH000437R0.102	N0115	03-01-22
Instruction leaflet *	1SDH000437R0.001	L0815	03-07-21
Nameplate dwg *	Allegato I	-	03-03-20
Molded case or metal frame dwgs (all components)	RA1645 RA1646 RA1722 RA1813	L0707 L0707 L0823 L0832	03-01-24 03-01-24 03-09-02 03-09-22
Material list	RA1722.801 RA1813.801	L0707 L0707	03-01-24 03-01-24
Operating handle dwg	RA1675	L0808	03-06-30
Main and arcing fixed contacts assembly dwgs	RA1623 RA1631	L0823 L0808	03-09-02 03-06-30
Material list	RA1624.802 RA1631.802	L0808 L0808	03-06-30 03-06-30
Main and arcing moving contacts assembly dwgs	RA1612 RA1613	L0823 L0707	03-09-02 03-01-24
Material list	RA1612.802 RA1613.801	L0808 L0707	03-06-30 03-01-24
Main and arcing fixed contacts dwgs	RA1628	L0808	03-06-30
Main and arcing moving contacts dwgs	RA1616	L0707	03-01-24
Operating mechanism assembly dwgs	RA1659	L0707	03-01-24
Material list	RA1659.803	L0808	03-06-30
Operating mechanism springs dwg	RA1716	L0707	03-01-24
Main contact springs dwg	RA1651	L0707	03-01-24
Arc chute assembly dwg	RA1636	L0707	03-01-24
Material list	RA1636.802	L0707	03-01-24
Overcurrent release assembly dwg	RA1810	L0707	03-01-24
Material list	RA1810.830 RA1810.831	L0707 L0707	03-01-24 03-01-24
Tripping device assembly dwg	RA2333	L0687	02-12-11
Material list	RA2333.801	L0687	02-12-11
Electronic release components dwgs	RE0374 RE0522	L0351 L0456	01-04-19 01-10-01
Material list	RE0374-1 RE0538/810 RE0538/809	L0656 L0456 L0456	02-10-25 01-10-01 01-10-01
Main terminals dwg	159486	27875	94-10-07
Tripping characteristic *	1SDH000436R0.511	-	03-01-22
Screen for SC Tests	RG0840/050	-	02-10-18









	A	B	C	D
WITH FLANGE CON MOSTRINA	107	115	115	64.5
WITHOUT FLANGE SENZA MOSTRINA	107	107	107	60.5

CAPTION

1 - FRONT TERMINALS FOR BARS CONNECTION
2 - FLANGE FOR THE COMPARTMENT DOOR
3 - COMPARTMENT DOOR SHEET STEEL DRILLING FOR FIXING THE FLANGE
4 - FIXING ON SHEET STEEL
5 - TIGHTENING TORQUE 2 Nm
6 - TIGHTENING TORQUE 25 Nm
7 - SPACING WHEN EQUIPPED WITH SOR-C, UVR-C, RC221-222)
8 - SPACING WHEN EQUIPPED WITH AUX-C (30 ISY ONLY)

LEGENDA

1 - TERMINALI ANTERIORI PER COLLEGAMENTO CON SBARRE
2 - MOSTRINA PER PORTA DELLA CELLA
3 - DIMA PER FORATURA PORTA DELLA CELLA E FISSAGGIO MOSTRINA
4 - DIMA PER FORATURA FISSAGGIO DELL'INTERRUTTORE SU LAMIERA
5 - COPPIA DI SERRAGGIO 2 Nm
6 - COPPIA DI SERRAGGIO 25 Nm
7 - INGOMBRO CON MONTATI ACC. CABLATI (SOR-C, UVR-C, RC221-222)
8 - INGOMBRO CON MONTATI CONT. AUX. CABLATI (SOLO 30 ISY)

Prep. Dis.	2002-07-11 COLLEONI M.	Resp. dep. Uff. Resp.	
App. App.		Take over dep. Uff. Utilizz.	
Rev. Mod.	N0108 02-10-07		

ABB SACE

Title / Titolo: 3POLE LOW VOLTAGE M.C.C.B SERIES "T" FIXED VERSION FRONT TERMINALS FOR Cu CABLE
INTERR.AUTOMATICO SERIE "T" TRIPOL. ESECUZIONE FISSA TERM. ANT. x CAVI IN Cu

Apparatus / Apparecchio: T5

Doc. No. / N. Doc.: 1SDH000437R0102

Lang. / Lingua

Scale / Scala

Sh. No. / N. Pag.

Lloyd's Register

Type Approval Extension Certificate

This is to certify that Certificate No. 05/00013(E2) for the undernoted products is extended and renumbered as shown.

This certificate is issued to:

PRODUCER	ABB S.p.A. Via Pescaria, 5 24123 Bergamo Italy
PLACE OF PRODUCTION	ABB S.p.A. Via Enrico Fermi 14 03100 Frosinone Italy
DESCRIPTION	Low Voltage Moulded-Case Circuit Breakers

TYPES

Tmax T4 N 250	Tmax T4 N 320	Tmax T5 N 400	Tmax T5 N 630
Tmax T4 S 250	Tmax T4 S 320	Tmax T5 S 400	Tmax T5 S 630
Tmax T4 H 250	Tmax T4 H 320	Tmax T5 H 400	Tmax T5 H 630
Tmax T4 L 250	Tmax T4 L 320	Tmax T5 L 400	Tmax T5 L 630
Tmax T4 V 250	Tmax T4 V 320	Tmax T5 V 400	Tmax T5 V 630

Equipped with:

microprocessor based over-current releases types:

PR 221 DS	PR 222 DS/PD	PR 222 MPS	PR 223 EF/DS

thermomagnetic based over-current releases types:

TMD	TMA	MA	TMG

APPLICATION	Marine, offshore and industrial applications for use in environmental categories ENV1, ENV2 and ENV3 as detailed in LR Test Specification No.1:2013.
SPECIFIED STANDARDS	IEC 60947-1:2007 + A1:2010 + A2:2014 IEC 60947-2:2006 + A1:2009 + A2:2013
Certificate No.	05/00013(E3)
Issue Date	26 June 2015
Expiry Date	3 February 2020
Sheet	1 of 4

Luigi Benedetti - Senior Specialist
на основание чл. 36а, ал. 3 от ЗОП
Lloyd's Register
Trieste Technical Support Office
Electrotechnical Systems
L. Benedetti
Trieste Technical Support Office
Lloyd's Register EMEA
Lloyd's Register EMEA

Lloyd's Register EMEA
Southampton Boldrewood Innovation Campus, Burgess Road, Southampton SO16 7QF

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ADDITIONAL TESTS Low Temperature, -25°C ±2°C for 16 hours

RATINGS

	Tmax T4	Tmax T5
Poles:	3 / 4	3 / 4
Size :	250 / 320 A	400 / 630 A
Rated Current In :	10 ÷ 320 A	320 ÷ 630 A
Rated Operational Voltage Ue :	690 V a.c.	690 V a.c.
Frequency :	50 – 60 Hz	50 – 60 Hz
Category (IEC 60947-2)	A	A (630A) ; B (400 A)

Rated Ultimate Short Circuit Breaking Capacity Icu [kA]

	N	S	H	L	V
@ 440 V a.c.	30	40	65	100	180
@690 V a.c.	20	25	40	70	80

Rated Service Short Circuit Breaking Capacity Ics [kA]

	N	S	H	L	V
@ 440 V a.c.	30	40	65	100	180
@690 V a.c.	20	25	40 (*)	70 (**)	80 (***)

for T5 630 : (*) 30 kA ; (**) 35 kA ; (***) 40 kA

Rated Short Circuit Making Capacity Im [kA]

	N	S	H	L	V
@ 440 V a.c.	63	84	143	220	396
@690 V a.c.	40	52.5	84	154	176

Power Factor

	N	S	H	L	V
@ 440 V a.c.	0.25	0.25	0.2	0.2	0.2
@690 V a.c.	0.25	0.25	0.25	0.2	0.2

Rated Short Time Withstand Current Icw [kA]

	N	S	H	L	V
T5 400	5	5	5	5	5

Certificate No. 05/00013(E3)

Issue Date 26 June 2015

Expiry Date 3 February 2020

Sheet 2 of 4

Luigi Benedetti - Senior Specialist
26 June 2015
на основание чл. 36а, ал. 3 от ЗОП
Electrotechnical Systems
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Trieste Technical Support Office
Lloyd's Register EMEA

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Southampton Boldrewood Innovation Campus, Burgess Road, Southampton SO16 7QF

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Trip Units:	
Thermomagnentic	TMD – TMA – MA - TMG
Electronic	PR221DS – PR222DS/PD – PR222 MPS – PR 223 EF/DS

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

The Design Appraisal Document No.05/00013(E3) and its supplementary Type Approval Terms and Conditions form part of this Certificate.

All other details remain as the previous Certificate No. 05/00013, 05/00010(E1) and 05/00013(E2) to which this extension should be attached.

Certificate No.	05/00013(E3)
Issue Date	26 June 2015
Expiry Date	3 February 202
Sheet	3 of 4

Luigi Benedetti - Senior Specialist
26 June 2015
Lloyd's Register
на основание чл. 36а, ал. 3 от ЗОП
Electrotechnical Systems
Lloyd's Register EMEA

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Southampton Boldrewood Innovation Campus, Burgess Road, Southampton SO16 7QF

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Certificate No.	05/00013(E3)
Issue Date	26 June 2015
Expiry Date	3 February 20
Sheet	4 of 4

Luigi Benedetti - Senior Specialist
26 June 2015
Lloyd's Register
на основание чл. 36а, ал. 3 от ЗОП
Electrotechnical Systems
Lloyd's Register EMEA

L. Benedetti
Trieste Technical Support Office
~~Lloyd's Register EMEA~~

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TYPE APPROVAL CERTIFICATE
N. ELE200211CS/001

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

Description	**Circuit breaker**
Type	**Tmax** **T5S / H / L / V/ N 400** **T5S / H / L / V/ N 630**
Applicant	**ABB SACE SpA** **Via Baioni, 35** **24123 Bergamo** **ITALY**
Manufacturer	**ABB SACE SpA** **Via Enrico Fermi, 14** **03100 Frosinone** **ITALY**
Testing Standards	**IEC 60947-2**

Issued in **Genova** on **June 10, 2011.**

This certificate is valid until **June 10, 2016**

на основание чл. 36а, ал. 3 от ЗОП

RINA

Valerio Bonanni

Genova, June 10, 2011

RINA S.p.A.
Via Corsica, 12 – 16128 Genova
Tel. +39 010 53851
Fax +39 010 5351000

TYPE APPROVAL CERTIFICATE
N. ELE200211CS/001

- **Circuit breakers type T5S 400 and T5S 630.**

Circuit breaker type	Units	T5S400	T5S400	T5S630	T5S630
Relay type		See remarks			
Rated voltage (Ue)	V	440	690	440	690
Rated Current (Iu)	A	400	400	630	630
Ambient Temperature	°C	40	40	40	40
Rated Frequency	Hz	50-60	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	40	25	40	25
Ultimate short-circuit breaking capacity (Icu)	kA	40	25	40	25
Short-circuit making capacity (Icm)	kA	84	52.5	84	52.5
Power factor		0.25	0.25	0.25	0.25
Utilization Category		B	B	A	A

- **Circuit breakers type T5H 400 and T5H 630.**

Circuit breaker type	Units	T5H400	T5H400	T5H630	T5H630
Relay type		See remarks			
Rated voltage (Ue)	V	440	690	440	690
Rated Current (Iu)	A	400	400	630	630
Ambient Temperature	°C	45	45	40	45
Rated Frequency	Hz	50-60	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	65	40	65	30
Ultimate short-circuit breaking capacity (Icu)	kA	65	40	65	40
Short-circuit making capacity (Icm)	kA	143	84	143	84
Power factor		0.2	0.25	0.2	0.25
Utilization Category		B	B	A	A

- **Circuit breakers type T5L 400 and T5L 630.**

Circuit breaker type	Units	T5L400	T5L400	T5L630	T5L630
Relay type		See remarks			
Rated voltage (Ue)	V	440	690	440	690
Rated Current (Iu)	A	400	400	630	630
Ambient Temperature	°C	45	40	45	45
Rated Frequency	Hz	50-60	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	100	70	100	35
Ultimate short-circuit breaking capacity (Icu)	kA	100	70	100	70
Short-circuit making capacity (Icm)	kA	220	154	220	154
Power factor		0.2	0.2	0.2	0.2
Utilization Category		B	B	A	A

Genova, June 10, 2011

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TYPE APPROVAL CERTIFICATE
N. ELE200211CS/001

- **Circuit breakers type T5V 400 and T5V 630**

Circuit breaker type	Units	T5V400	T5V400	T5V630	T5V630
Relay type		See remarks			
Rated voltage (Ue)	V	440	690	440	690
Rated Current (Iu)	A	400	400	630	630
Ambient Temperature	°C	45	40	40	45
Rated Frequency	Hz	50-60	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	180	80	180	40
Ultimate short-circuit breaking capacity (Icu)	kA	180	80	180	80
Short-circuit making capacity (Icm)	kA	396	176	396	176
Power factor		0.2	0.2	0.2	0.2
Utilization Category		B	B	A	A

- **Circuit breaker type T5N 400**

Circuit breaker type	Units	T5N 400		
Relay type		See remarks		
Rated voltage (Ue)	V	415	440	690
Rated Current (Iu)	A	400	400	400
Ambient Temperature	°C	45	45	45
Rated Frequency	Hz	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	36	30	20
Ultimate short-circuit breaking capacity (Icu)	kA	36	30	20
Short-circuit making capacity (Icm)	kA	75.6	63	40
Power factor		0.25	0.25	0.3
Utilization Category		B	B	B

- **Circuit breaker type T5N 630**

Circuit breaker type	Units	T5N 630		
Relay type		See remarks		
Rated voltage (Ue)	V	415	440	690
Rated Current (Iu)	A	620	620	620
Ambient Temperature	°C	45	45	45
Rated Frequency	Hz	50-60	50-60	50-60
Service short-circuit breaking capacity (Ics)	kA	36	30	20
Ultimate short-circuit breaking capacity (Icu)	kA	36	30	20
Short-circuit making capacity (Icm)	kA	75.6	63	40
Power factor		0.25	0.25	0.3
Utilization Category		A	A	A

Genova, June 10, 2011

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TYPE APPROVAL CERTIFICATE
N. ELE200211CS/001

Remarks

All the circuit breakers can be equipped with:
Thermomagnetic release:
T5. 400 (from R320 to R400) and T5. 630 (from R320 to R630);
Electronic release:
- PR221DS, PR222DS, PR223DF/EF:
T5. 400 (from R320 to R400) and T5. 630 (from R320 to R630);
- PR222MP, PR223DF/EF:
T5.400 (from R320 to R400).

Test reports / Certificates

T5S:
IT 04.014 issued on 24.02.2004
IT 04.012 issued on 24.02.2004
IT 04.120 issued on 05.09.2003
IT 04.013 issued on 24.02.2004
IT 04.019 issued on 04.03.2004

T5H:
IT 03.118 issued on 05.09.2003
IT 03.135 issued on 13.10.2003
IT 03.121 issued on 05.09.2003
IT 03.136 issued on 13.10.2003
IT 03.137 issued on 13.10.2003

T5L:
IT 03.119 issued on 05.09.2003
IT 03.150 issued on 21.10.2003
IT 03.122 issued on 05.09.2003
IT 03.138 issued on 13.10.2003
IT 03.139 issued on 13.10.2003

T5V:
IT 03.151 issued on 21.10.2003
IT 03.124 issued on 05.09.2003
IT 03.134 issued on 13.10.2003
IT 03.140 issued on 21.10.2003
IT 04.027 issued on 10.05.2004
IT 03.123 issued on 05.09.2003

T5N
IT 04.017 issued on 10.02.2004
IT 04.018 issued on 24.02.2004

Test reports for ELECTRONIC RELEASE PR223DS/EF
ABB SACE LBRP 6702/00, ABB PT n° 21369, ABB PT n° 21364 ,IMQ n° 80SE00622/1, IMQ n° 80SE00622/2.

Genova, June 10, 2011

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Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

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тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.17.5

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ "

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

asi accredited

ASI-ACC-048

Certificate of Accreditation

certification against voluntary sustainability standards

ASI - Accreditation Services International GmbH hereby affirms that

Rina Services S.p.A.

Via Corsica, 12
Genova 16128 Italy

meets the ASI accreditation program requirements and those set forth in the accreditation standards listed in the annex to this certificate, for the following programs:

Forest Stewardship Council® (FSC®)
Marine Stewardship Council (MSC)

Accreditation Code ASI-ACC-048

на основание чл. 36а, ал. 3 от ЗОП

Digitally signed by
GUNTARS LAGŪNS
Date: 10/08/2017

ASI Managing Director

asi accreditation services international

ASI - Accreditation Services International GmbH
Friedrich-Ebert-Allee 69
53113 Bonn, Germany

Please see the scope and validity of accreditation in the certificate annex on the ASI website: www.accreditation-services.com

asi • Friedrich-Ebert-Allee 69 • 53113 Bonn • Germany

accreditation services international

ASI Certificate of Accreditation - Annex

CAB Name	Rina Services S.p.A.
CAB Shortcode	RINA
Accreditation Code	ASI-ACC-048
Accredited Activities	Certification against voluntary sustainability standards - as indicated below
Last updated on	02 October 2017

Forest Stewardship Council® (FSC®) Accreditation	
Date of original accreditation	24 September 2012
Current accreditation granted on	29 September 2017
Current accreditation valid until	24 September 2022
Technical Scope(s)	FSC COC
Geographical Scope(s)	Worldwide (excluding China).
Standard(s) to which CAB is accredited:	FSC-STD-20-001 v4-0 FSC-STD-20-011 V2-0 FSC-STD-40-003 V2-1 FSC-STD-40-004 V3-0 FSC-STD-40-005 V2-1 FSC-STD-40-006 V1-0 FSC-STD-40-007 V2-0
Standard(s) which CAB can certify against:	

Marine Stewardship Council (MSC) Accreditation	
Date of original accreditation	26 September 2013
Current accreditation granted on	26 September 2013
Current accreditation valid until	25 September 2018
Technical Scope(s)	MSC COC
Geographical Scope(s)	Worldwide
Standard(s) to which CAB is accredited:	MSC General Certification Requirements v2.1 MSC Chain of Custody Certification Requirements v2.0
Standard(s) which CAB can certify against:	MSC Chain of Custody Standard – Default v4.0 MSC Chain of Custody Standard – Group v1.0 MSC Chain of Custody Standard – Consumer-Facing Organisation v1.0

Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

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ПРИЛОЖЕНИЕ 9.17.6

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

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

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

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

Наименование на материала: Триполюсни автоматични прекъсвачи НН с лят корпус, от 100 А до 400 А, с термомагнитна защита, категория А

Съкратено наименование на материала: Трип. авт. прек. НН, с ТМ защита, 100-400 А, кат. А

Област: Н – Електрически уредби СрН/НН

Категория: 17– Комутационни апарати НН за защита

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

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

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

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

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

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

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

Използване:

Триполюсните автоматични прекъсвачи НН с лят корпус се монтират в разпределителни табла в трансформаторните постове и се използват за защита на електропроводните линии.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

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

- **БДС EN 60947-1:2007** "Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)" или еквивалентно/и;
- **БДС EN 60947-2:2006** „Комутационни апарати за ниско напрежение. Част 2: Автоматични прекъсвачи (IEC 60947-2:2006)" или еквивалентно/и; и
- БДС EN 60529+A1:2004 Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989+A1:1999) или еквивалентно/и; и

да бъдат оценени положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението..

Изисквания към документацията и изпитванията:

№ по ред	Документ	Приложение № (или текст)
1	Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя	XT1C160 R100A XT3N250 R250A ABB, Italy, Приложение 9.18.1
2	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.18.2
3	ЕО декларация за съответствие	Приложение 9.18.3
4	Протоколи от типови изпитвания на английски или български език, проведени от независима изпитвателна лаборатория – заверени копия, с приложен списък на отделните изпитвания на български език	Приложение 9.18.4
5	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение 9.18.5
6	Инструкции за транспортиране, складиране, монтиране, вкл. въртящия момент на затягане на клемовите съединения, обслужване и поддържане	Приложение 9.18.6

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

Технически данни

1. Характеристики на работната среда

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

2. Параметри на електроразпределителната мрежа

№ по ред	Параметър	Стойност
2.1	Номинално напрежение	400 / 230 V
2.2	Максимално напрежение	440 / 253 V
2.3	Номинална честота	50 Hz
2.4	Брой проводници в разпределителната мрежа	4 проводна мрежа (L_1, L_2, L_3, PEN)
2.5	Схема на разпределителната мрежа	TN-C

3. Общи технически параметри и други данни

№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.1	Брой на полюсите	3	3
3.2	Обявено работно напрежение (U_e)	min 690 V AC	690 V AC
3.3	Обявена честота	50 Hz	50 Hz
3.4	Обявено импулсно напрежение (U_{imp})	min 6 kV	8 kV

№ по ред	Технически параметър	Изискване	Гарантирано предложение
3.5	Обявено изолационно напрежение (U_i)	min 690 V	800 V
3.6	Категория на приложение	A	A
3.7	Работна изключвателна възможност при късо съединение (I_{cs})	min 50% от I_{cu}	50% от I_{cu} 75% от I_{cu}
3.8	Защита от свръхтокове	-	-
3.8.1	Тип на защитата	Защитата от свръхтокове трябва да бъде от термомагнитен тип. (Допускат се изпълнения със защита от електронен тип.)	ДА, Защитата от свръхтокове е от термомагнитен тип.
3.8.2	Защита от претоварване	а) Диапазон на настройване на тока на изключване I_R=(min 0,8÷1)xI_n	I_R=(0,7÷1)xI_n
		б) Условен ток на неизключване I_{nd}=1,05xI_R във времеви интервал от 120 минути	I_{nd}=1,05xI_R
		в) Условен ток на изключване I_d = 1,30xI_R във времеви интервал до 120 минути	I_d = 1,30xI_R
3.8.3	Защита от къси съединения	Токът на изключване I_i трябва да бъде фиксиран на една от стойностите или регулируем в диапазона препоръчително от min 4x I_n до 10x I_n	Токът на изключване е фиксиран 10xI_n
3.9	Степен на защита от проникване на твърди тела и вода съгласно БДС EN 60529 или еквивалентно/и	-	-
3.9.1	Клемни съединения	IP 20	IP 20
3.9.2	Челна повърхност	IP 40	IP 40
3.10	Аксесоари	а) Два комплекта разширители и удължител за свързване към шинна система от алуминиева шина с правоъгълно сечение	ДА
		б) Два комплекта предпазни клемови капаци и изолиращи фазови сепаратори.	ДА

4. Триполюсни автоматични прекъсвачи НН с лят корпус, 100 А ÷ 400 А, с термомагнитна защита, категория А

4.1 Триполюсен автоматичен прекъсвач НН с лят корпус, 100 А, с термомагнитна защита, кат. А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 5001		Да се посочи	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 100 А, с термомагнитна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ТМ защита, 100 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.1.1	Обявен ток (I_n)	100 А	100 А
4.1.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 12 kA / 500 V	18 kA / 500 V
4.1.3	Работна изключвателна възможност при късо съединение (I_{cs})	Съгласно т. 3.7 и т. 4.1.2 Да се посочи	50% от I_{cu}

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 5001		Да се посочи	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 100 А, с термомагнитна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ТМ защита, 100 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.1.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	Токът на изключване е фиксиран $10xI_n$
4.1.5	Време за изключване при I_{cu}	max 0,010 s	0,010 s
4.1.6	Износоустойчивост	-	-
4.1.6a	Електрическа (брой к.ц.)	min 1500 бр.	8 000 бр.
4.1.6b	Механична (брой к.ц.)	min 8500 бр.	25 000 бр.
4.1.7	Максимални размери ВхШхД (Дълбочината „Д" не включва лоста за управление)	165x110x125 mm	130x76,2x70 mm
4.1.8	Тегло, kg	Да се посочи	1,1 kg

4.3 Триполюсен автоматичен прекъсвач НН с лят корпус, 250 А, с термомагнитна защита, кат. А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 5003		Да се посочи	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 250 А, с термомагнитна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ТМ защита, 250 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.3.1	Обявен ток (I_n)	250 А	250 А
4.3.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 16 kA / 500 V	20 kA / 500 V
4.3.3	Работна изключвателна възможност при късо съединение (I_{cs})	Съгласно т. 3.7 и т. 4.3.2 Да се посочи	75% от I_{cu}
4.3.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	Токът на изключване е фиксиран $10xI_n$
4.3.5	Време за изключване при I_{cu}	max 0,010 s	0,010 s
4.3.6	Износоустойчивост	-	-
4.3.6a	Електрическа (брой к.ц.)	min 1000 бр.	8 000 бр.
4.3.6b	Механична (брой к.ц.)	min 7000 бр.	25 000 бр.
4.3.7	Максимални размери ВхШхД (Дълбочината „Д" не включва лоста за управление)	225x140x130 mm	150x105x70 mm
4.3.8	Тегло, kg	Да се посочи	1,7

Метикс
www.metix.bg
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П Р И Л О Ж Е Н И Е 9.18.1

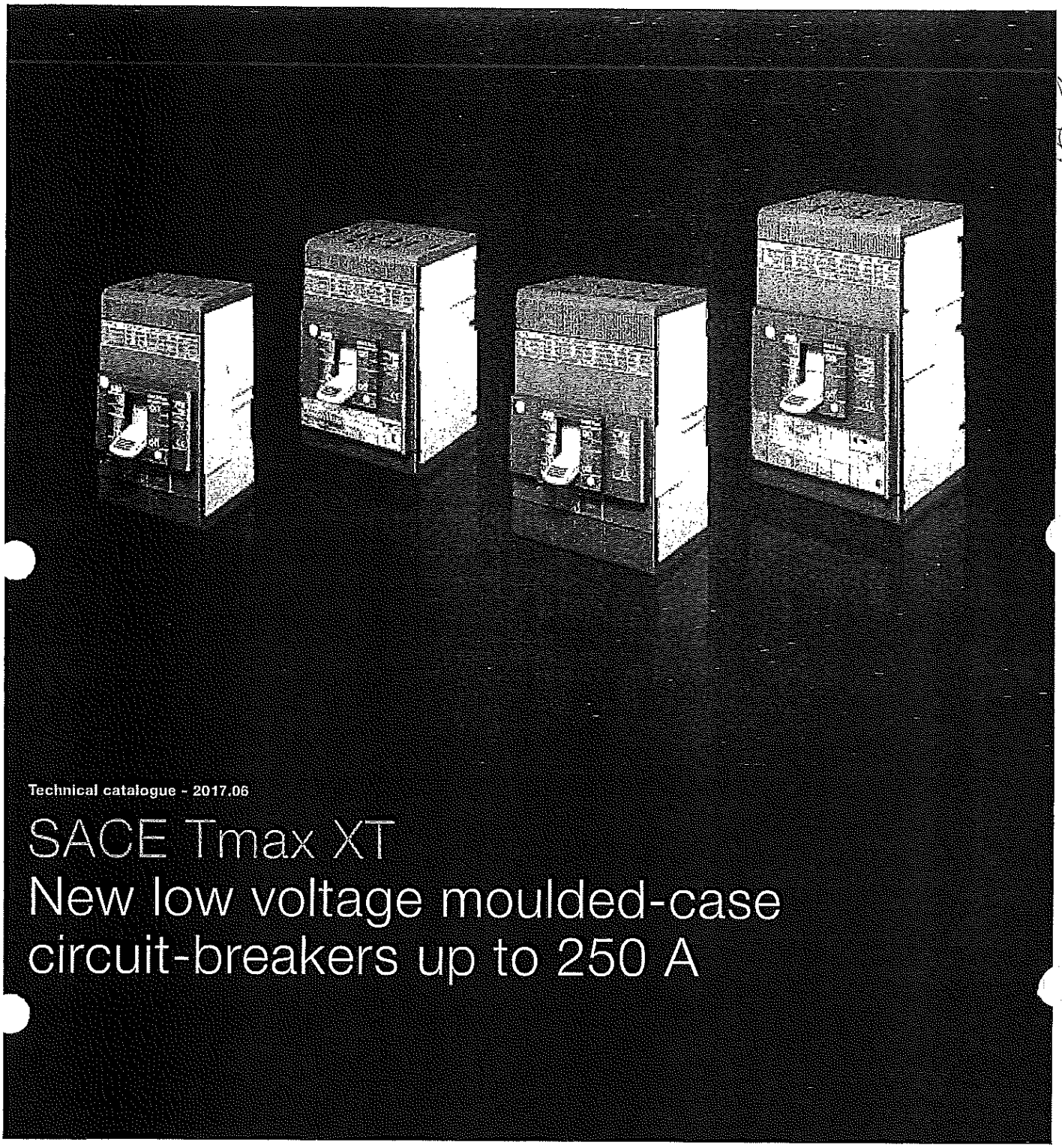
Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД



Technical catalogue - 2017.06

SACE Tmax XT
New low voltage moulded-case circuit-breakers up to 250 A

Construction characteristics

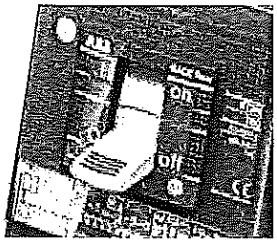
			XT1				
Size[G2.1]		[A]	160				
Poles		[No.]	3, 4				
Rated service voltage, Ue[G2.4]	(AC) 50-60Hz	[V]	690				
	(DC)	[V]	500				
Rated insulation voltage, Ui[G2.5]		[V]	800				
Rated impulse withstand voltage, Uimp[G2.5]		[kV]	8				
Versions			Fixed, Plug-in[2]				
Breaking capacities according to IEC 60947-2			B	C	N	S	H
Rated ultimate short-circuit breaking capacity, Icu[G2.7]							
Icu @ 220-230-240V 50-60Hz (AC)		[kA]	25	40	65	85	100
Icu @ 380V 50-60Hz (AC)		[kA]	18	25	36	50	70
Icu @ 415V 50-60Hz (AC)		[kA]	18	25	36	50	70
Icu @ 440V 50-60Hz (AC)		[kA]	15	25	36	50	65
Icu @ 500V 50-60Hz (AC)		[kA]	8	18	30	36	50
Icu @ 525V 50-60Hz (AC)		[kA]	6	8	22	35	35
Icu @ 690V 50-60Hz (AC)		[kA]	3	4	6	8	10
Icu @ 250V (DC) 2 poles in series		[kA]	18	25	36	50	70
Icu @ 500V (DC) 2 poles in series		[kA]	–	–	–	–	–
Icu @ 500V (DC) 3 poles in series[3]		[kA]	18	25	36	50	70
Rated service short-circuit breaking capacity, Ics[G2.8]							
Ics @ 220-230-240V 50-60Hz (AC)		[kA]	100%	100%	75% (50)	75%	75%
Ics @ 380V 50-60Hz (AC)		[kA]	100%	100%	100%	100%	75%
Ics @ 415V 50-60Hz (AC)		[kA]	100%	100%	100%	75%	50% (37.5)
Ics @ 440V 50-60Hz (AC)		[kA]	75%	50%	50%	50%	50%
Ics @ 500V 50-60Hz (AC)		[kA]	100%	50%	50%	50%	50%
Ics @ 525V 50-60Hz (AC)		[kA]	100%	100%	50%	50%	50%
Ics @ 690V 50-60Hz (AC)		[kA]	100%	100%	75% (6)	50% (5)	50%
Ics @ 250V (DC) 2 poles in series		[kA]	100%	100%	100%	100%	75%
Ics @ 500V (DC) 2 poles in series		[kA]	–	–	–	–	–
Ics @ 500V (DC) 3 poles in series[3]		[kA]	100%	100%	100%	100%	75%
Rated short-circuit making capacity, Icm[G2.10]							
Icm @ 220-230-240V 50-60Hz (AC)		[kA]	52.5	84	143	187	220
Icm @ 380V 50-60Hz (AC)		[kA]	36	52.5	75.6	105	154
Icm @ 415V 50-60Hz (AC)		[kA]	36	52.5	75.6	105	154
Icm @ 440V 50-60Hz (AC)		[kA]	30	52.5	75.6	105	143
Icm @ 500V 50-60Hz (AC)		[kA]	13.6	36	63	75.6	105
Icm @ 525V 50-60Hz (AC)		[kA]	9.18	13.6	46.2	73.5	73.5
Icm @ 690V 50-60Hz (AC)		[kA]	4.26	5.88	9.18	13.6	17
Breaking capacities according to NEMA-AB1							
@ 240V 50-60Hz (AC)		[kA]	25	40	65	85	100
@ 480V 50-60Hz (AC)		[kA]	8	18	30	36	65
Utilisation Category (IEC 60947-2)			A				
Reference Standard			IEC 60947-2				
Isolation behaviour			✓				
Mounted on DIN rail			DIN EN 50022				
Mechanical life[G2.14]		[No. Operations]	25000				
		[No. Hourly operations]	240				
Electrical life @ 415 V (AC)[G2.13]		[No. Operations]	8000				
		[No. Hourly operations]	120				
Dimensions - Fixed (Width x Depth x Height)	3 poles	[mm]	76.2 x 70 x 130				
	4 poles	[mm]	101.6 x 70 x 130				
Total opening time							
Circuit-breaker with shunt opening release		[ms]	15				
Circuit-breaker with undervoltage release		[ms]	15				
Trip units for power distribution							
TMD/TMA			⊡				
TMD/TMF							
Ekip LS/I							
Ekip I							
Ekip LSI							
Ekip LSIG							
Ekip E							
Trip units for motor protection			⊡				
MF/MA							
Ekip M-I							
Ekip M-LIU							
Ekip M-LRIU							
Trip units for generator protection							
TMG							
Ekip G-LS/I							
Trip units for oversized Neutral Protection							
Ekip N-LS/I							
Interchangeable protection trip units							
Weight Fixed	3/4 poles	[kg]	1.1 / 1.4				
Plug in (EF terminals)	3/4 poles	[kg]	2.21 / 2.82				
Withdrawable (EF terminals)	3/4 poles	[kg]					

(1) Icu=100kA and Ics=100%Icu @690V only for XT4 160. Please ask ABB SACE about availability
(2) XT1 plug-in In max=125A
(3) XT1 500V DC 4 poles in series
(4) XT4 750V DC please ask ABB SACE for availability

⊡ Complete circuit-breaker
▲ Loose trip unit

Construction characteristics

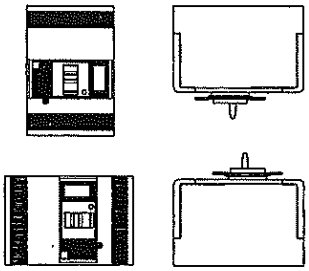
The references in round brackets [G1.x] in the technical catalogue refer to the Glossary in the final charter of the technical catalogue.



Positive operation

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

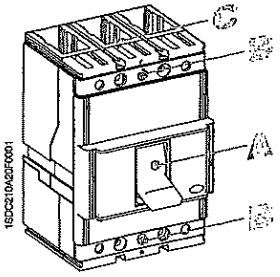
- double insulation[G1.5];
- positive operation[G1.6];
- isolation behaviour[G1.7];
- electromagnetic compatibility[G1.8];
- tropicalization[G1.9];
- impact and vibration resistance[G1.10];
- power supply from the top towards the bottom or vice versa;
- versatility of the installation. It is possible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



Installation positions

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

- the SACE Tmax XT circuit-breakers can be used in environments where the temperature is between -25°C and +70°C and stored in environments where the temperature is between -40°C and +70°C. To use temperatures other than 40°C, see the "Temperature Performances" paragraph of the Characteristic Curves and the technical information chapter;
- different degrees of protection IP (International Protection)[G 1.11];

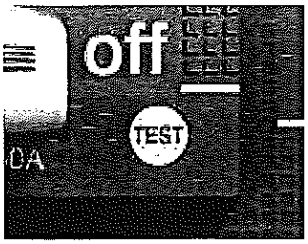


Protection degrees

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

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

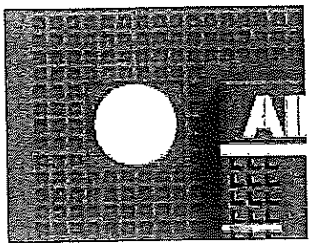
Accessories				
	Motor operator MOD, MOE or MOE-E	Residual current devices	Residual current from switchboard RCQ020	Automatic Transfer Switch ATS021 and ATS022
On Front	IP30	IP40	IP41	IP40



Test pushbutton

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

Regulations and Reference Standards



Hologram

Conformity with Standards

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

- Standard[G6.1]:
  - IEC 60947-2;
- Directives[G6.2]:
  - EC "Low Voltage Directive" (LVD) nr. 2014/35/EC;
  - EC "Electromagnetic Compatibility Directive" (EMC) 2014/30/EC;
- Naval Registers[G6.3] (ask ABB SACE for the versions available):
  - Lloyd's Register of Shipping, Germanischer Lloyd, Bureau Veritas, Rina, Det Norske Veritas, Russian Maritime Register of Shipping, ABS.

Certification of conformity with the product Standards is carried out in the ABB SACE tests laboratory (accredited by SINAL) in respect of the EN 45011 European Standard, by the Italian certification body ACAE (Association for Certification of Electrical Apparatus), member of the European LOVAG organisation (Low Voltage Agreement Group) and by the Swedish certification body SEMKO belonging to the international IECEE organisation.
The SACE Tmax XT series has a hologram on the front, obtained using special anti-forgery techniques, a guarantee of the quality and genuineness of the circuit-breaker as an ABB SACE product.

Naval Registers

Company Quality System

The ABB SACE Quality System conforms with the following Standards:

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

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

Environmental Management System, Social Responsibility and Ethics

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

- selection of materials, processes and packaging which optimise the true environmental impact of the product;
- use of recyclable materials;
- voluntary respect of the RoHS directive[G6.4].

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

Warranty

Standard warranty for ABB Low Voltage circuit breakers is 1-year standard, but it can be extended up to 5 years. Extended warranty activation can be requested after the online registration in the Extended Warranty tool. This web-tool verifies that the application of the circuit breaker is within the recommended guidelines, and grant the registration of the circuit breaker. When end users details are registered, one year of extra warranty is offered free-of-charge.
Extended Warranty can be ordered by following the steps:

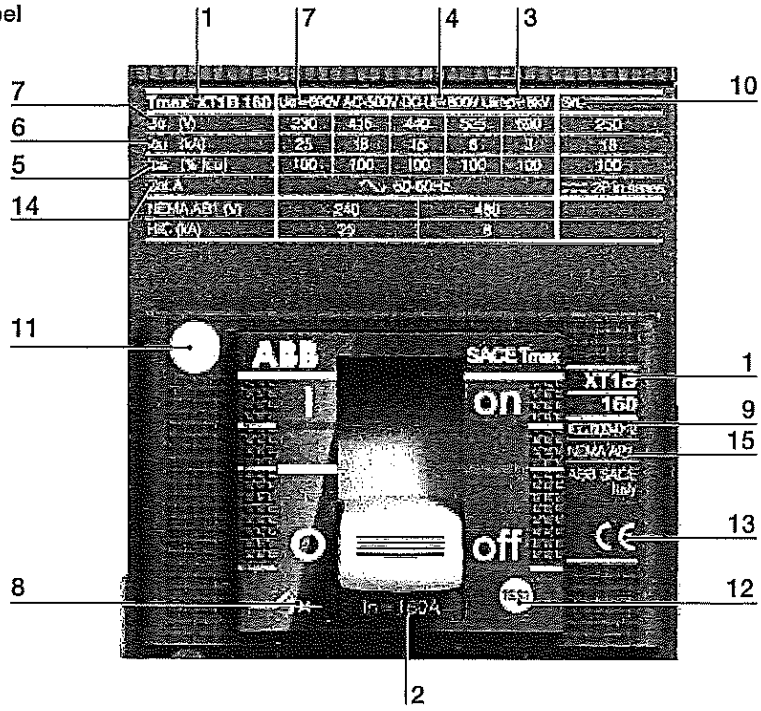
- Registration in the online tool (Extended Warranty Tool) to verify the application. Use Qr code below to access the tool
- Extended Warranty part number(s) and registration code received by email
- Place the order of the circuit breaker(s) together with:
  - Extended warranty part number(s)
  - Unique registration code.

Warranty coverage:
- Any possible issues related to circuit breaker quality for the complete extra warranty time
- Accessories mounted by the factory only.

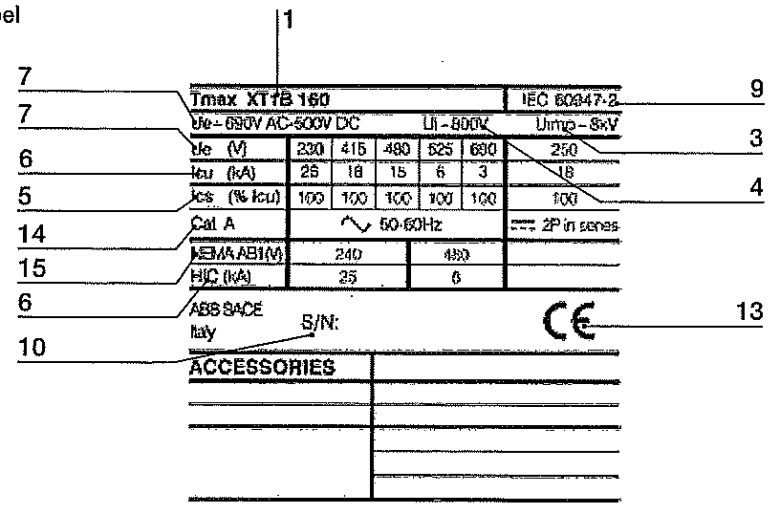
Identification of the SACE Tmax XT circuit-breakers

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

Front label



Side label



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

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

Nomenclature of the trip units and residual current protection devices

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

Magnetic trip units

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

Thermomagnetic trip units

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

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

Electronic trip units

Family Name		Application		Protection	Circuit-breaker[1]
Ekip	+	....: Distribution M: Motor protection G: Generator protection N: Neutral E: Energy measurements	+	I LS/I LSI LSIG LIU LRIU	XT2 XT4

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

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

Residual Current Protection Devices

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

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

The SACE Tmax XT family ranges

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

In = Rated uninterrupted current[G2.2]	XT1 160	XT2 160	XT3 250	XT4 250
Power distribution				
Thermomagnetic trip units				
TMD/TMF	16...160		63...250	
TMD/TMA		1.6...160		16...250
Electronic trip units				
Ekip LS/I		10...160		40...250
Ekip I		10...160		40...250
Ekip LSI		10...160		40...250
Ekip LSIG		10...160		40...250
Ekip E-LSIG				40...250
Motor protection				
Magnetic trip units				
MF/MA	3.2...125	1...160[1]	100...200[1]	10...200[1]
Electronic trip units				
Ekip M-I		20...100[1]		
Ekip M-LIU		25...160[1]		40...160[1]
Ekip M-LRIU		25...100[1]		40...200[1]
Generator Protection				
Thermomagnetic trip units				
TMG		16...160	63...250	
Electronic trip units				
Ekip G-LSI		10...160		40...250
Oversized Neutral Protection 160%				
Electronic trip units				
Ekip N-LS/I		10...100[2]		40...160[2]
Switch-disconnectors	■		■	■
Special applications				
400Hz	■	■	■	■
Communication		■		■

[1] Only 3 poles version
[2] Only 4 poles version

Circuit-breakers for power distribution

Main characteristics

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

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

- thermomagnetic trip units[G3.2], for direct and alternating current network protection, using the physical properties of a bimetal and an electromagnet to detect the overloads and short-circuits;
- electronic trip units[G3.4], for alternating current network protection. Releases with microprocessor technology obtain protection functions that make the operations extremely reliable and accurate. The power required for operating them correctly is supplied straight from the current sensors of the releases. This ensures that they trip even in single-phase conditions and on a level with the minimum setting.
  The electronic protection trip unit consists of:
  - 3 or 4 current sensors (current transformers);
  - a protection unit;
  - an opening solenoid (built into the electronic trip unit).

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

(1) 0.32 x In for Ekip N-LSI
(2) For 10A: 0.4In

Circuit-breakers for power distribution

Main characteristics

Characteristics of circuit-breakers for power distribution

			XT1	XT2	XT3	XT4
Size(G2.1)		[A]	160	160	250	160/250
Poles		[Nr.]	3, 4	3, 4	3, 4	3, 4
Rated service voltage, Ue(G2.4)	(AC) 50-60Hz	[V]	690	690	690	690
	(DC)	[V]	500	500	500	500
Rated insulation voltage, Ui(G2.5)		[V]	800	1000	800	1000
Rated impulse withstand voltage, Uimp(G2.6)		[kV]	8	8	8	8
Versions			Fixed, Plug-in	Fixed, Withdrawable, Plug-in	Fixed, Plug-in	Fixed, Withdrawable, Plug-in
Breaking capacities			B C N S H	N S H L V	N S	N S H L V
Trip units			Thermomagnetic	Thermomagnetic, Electronic	Thermomag-netic	Thermomagnetic, Electronic
TMD/TMA				■		□
TMD/TMF			■		■	
Ekip LS/I				□ In = 10A, 25A, 63A, 100A, 160A		■ In = 40A, 63A, 100A, 160A, 250A
Ekip I				■ In = 10A, 25A, 63A, 100A, 160A		□ In = 40A, 63A, 100A, 160A, 250A
Ekip LSI				□ In = 10A, 25A, 63A, 100A, 160A		■ In = 40A, 63A, 100A, 160A, 250A
Ekip LSIG				■ In = 10A, 25A, 63A, 100A, 160A		■ In = 40A, 63A, 100A, 160A, 250A
Ekip E-LSIG						□ In = 40A, 63A, 100A, 160A, 250A
Interchangeability				■		□

□ Complete circuit-breaker

TMD/TMF

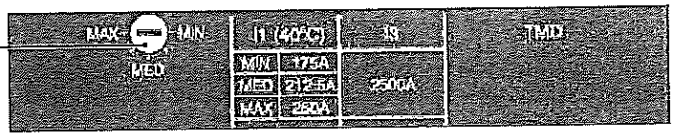
Main characteristics:

- available for XT1 and XT3 in the three-pole and four-pole versions;
- protections:
  - against overload (L): adjustable protection threshold from 0.7...1xIn, with inverse long-time trip curve (TMD)*;
  - against instantaneous short-circuits (I): fixed 10xIn protection threshold, with instantaneous trip curve;
- 100% neutral protection in four-pole circuit-breakers. 50% neutral protection is only available for In≥125A;
- the thermal protection setting is made by turning the relative cursor on the front of the release.

* fixed protection at 1xIn (TMF)

Example with XT3 250A

Rotary switch for thermal protection setting



XT1

TMD/TMF

Breaking capacity		TMD/TMF		TMD	TMD	TMD	TMD	TMD	TMD	TMD	TMD	TMD
	In [A]	16*	20*	25	32	40	50	63	80	100	125	160
I_1 = 1xIn (TMF)	Neutral [A] - 100%	16	20	25	32	40	50	63	80	100	125	160
I_1 = 0.7...1xIn (TMD)	Neutral [A] - 50%	–	–	–	–	–	–	–	–	–	80	100
	I_3 [A]	450	450	450	450	450	500	630	800	1000	1250	1600
	Neutral [A] - 100%	450	450	450	450	450	500	630	800	1000	1250	1600
I_3 = 10xIn	Neutral [A] - 50%	–	–	–	–	–	–	–	–	–	800	1000

* 16A and 20A for N, S, H have the TMF trip unit

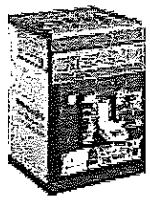
XT3

TMD

	In [A]	63	80	100	125	160	200	250
	Neutral [A] - 100%	63	80	100	125	160	200	250
I_1 = 0.7...1xIn	Neutral [A] - 50%	–	–	–	80	100	125	160
	I_3 [A]	630	800	1000	1250	1600	2000	2500
	Neutral [A] - 100%	630	800	1000	1250	1600	2000	2500
I_3 = 10xIn	Neutral [A] - 50%	–	–	–	800	1000	1250	1600

Accessories

Versions and types

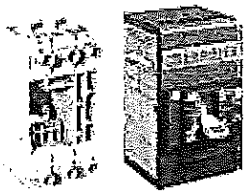


Fixed circuit-breaker

Tmax XT automatic circuit-breakers are available in the following versions:

- FIXED. Fixed circuit-breakers consist of a current-interrupting part connected to the trip unit, to be installed on the back plate of the cubicle or on a DIN rail;
- PLUG-IN. Plug-in circuit-breakers consist of a fixed part that must be installed on the back plate of the cubicle, and of a moving part, obtained from the fixed circuit-breaker plus the relative kit that converts it from the fixed version into the moving part of the plug-in version;
- WITHDRAWABLE. Withdrawable circuit-breakers consist of a fixed part that must be installed on the back plate of the cubicle equipped with side runners to allow the moving part to be easily racked out and in, winch is obtained from the fixed circuit-breaker plus the relative kit that converts it from the fixed version into the withdrawable moving part. To obtain the withdrawable version, a front accessory to be applied onto the front of the circuit-breaker must be ordered so as to maintain the IP40 degree of protection over the entire isolation run of the circuit-breaker.

If the plug-in circuit-breaker is fitted with electrical accessories, the appropriate connectors for isolation of the relative auxiliary circuits must also be ordered on the other hand, for the withdrawable version there are dedicated accessories, fitted with connectors which allow automatic disconnection in the case of racking-out (consult the "connection of electrical accessories" section in the Accessories chapter).



Plug-in circuit-breaker

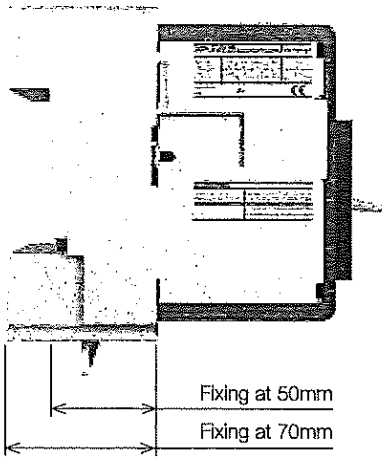
Starting from the fixed version, SACE Tmax XT circuit-breakers can easily be converted into the plug-in and withdrawable versions using the relative conversion kits.
The moving part can always be obtained in the required version, fully pre-engineered in the factory, by ordering the fixed circuit-breaker and the conversion kit at the same time.

	Version		
	Fixed	Plug-in	Withdrawable
XT1	☐	■	
XT2	■	■	■
XT3	☐	■	
XT4	☐	■	■

Fixed part of plug-in and withdrawable versions

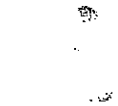
Withdrawable circuit-breaker

The fixed parts of the plug-in/withdrawable versions are available with front terminals (F) or with horizontal or vertical rear terminals (HR/VR). The terminals are factory-mounted in the horizontal position. In case of need, the Customer can easily rotate the terminals into the vertical position. These fixed parts can be equipped with the same terminal, terminal-cover and phase separator kits used for the fixed circuit-breakers, using the proper adapter.
The fixed parts of a plug-in/withdrawable circuit-breaker can be installed at a distance of 50mm from the back of the panel or at 70mm as shown in the picture. Installation at 50mm is only compulsory in the case where rear vertical or horizontal terminals (HR/VR) are used.

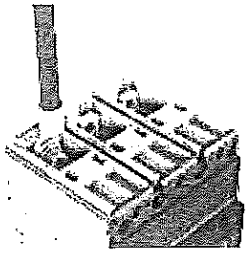


Front terminals - F

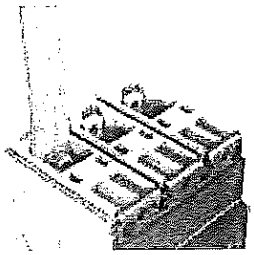
CB.	Vers.	Busbar dimensions [mm]						Cable terminals [mm]		Tightening		H Terminal covers [mm]			H Separators [mm]		
		W min	W max	H	Ø	D min	D max	W	Ø	Cable or busbar /Terminal		2	50	60	25	100	200
XT1	F	13	16	7.5	6.5	3.5	5	16	6.5	M6	6Nm	–	R	–	S	R	R
XT2	F	13	20	7.5	6.5	2.5	5	20	6.5	M6	6Nm	–	R	–	S	R	R
XT3	F	17	24	9.5	8.5	5	8	24	8.5	M8	8Nm	–	–	R	S	R	R
XT4	F	17	25	10	8.5	5	8	25	8.5	M8	8Nm	–	–	R	S	R	R



Front terminal - F



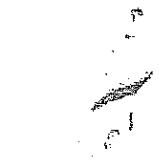
F terminal with cable lug



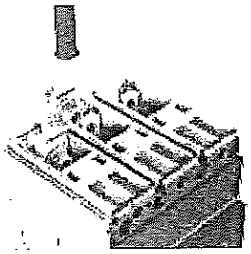
F terminal with busbar

Front extended terminals - EF

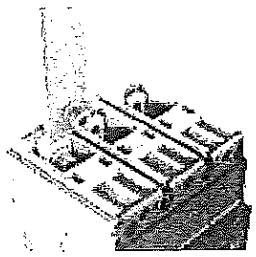
CB	Vers.	Busbar dimensions MAX [mm]			Cable terminals [mm]		Tightening				H Terminal covers [mm]			H Separators [mm]		
		W	D	Ø	W	Ø	Terminal /CB		Cable or busbar /Terminal		2	50	60	25	100	200
XT1	F	20	4	8.5	20	8.5	M6	6Nm	M8	9Nm	–	R	–	–	S	R
XT2	F	20	4	8.5	20	8.5	M6	6Nm	M8	9Nm	–	S	–	–	S	R
XT3	F	20	6	10	20	10	M8	8Nm	M10	18Nm	–	–	R	–	S	R
XT4	F	20	10	10	20	10	M8	8Nm	M10	18Nm	–	–	S	–	S	R



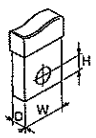
Front extended terminal - EF



EF terminal with cable lug



EF terminal with busbar



W Width
H Hole Heigth
D Depth

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

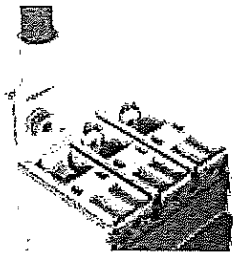
Accessories

Mechanical Accessories

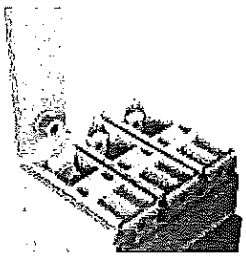
Front extended spread terminals - ES

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

Front extended spread terminal - ES



ES terminal with cable lug



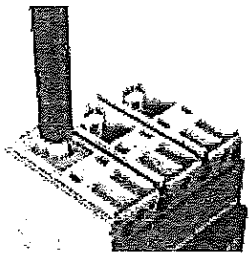
ES terminal with busbar

Terminals for copper cables - FCCu

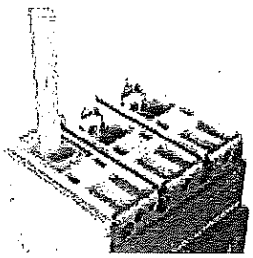
CB	Type of terminal	Vers.	Cable [mm²]		Tightening		L cable stripping [mm]	H Terminal covers [mm]			H Separators [mm]		
			Rigid	Flexible	Cable or busbar /Terminal			2	50	60	25	100	200
XT1	Internal	F-P	1x2,5...70	1x2.5...50	12x12mm	7Nm	12	–	R	–	S(1)	R	R
	Internal	F-P	–	2x2.5...35				–	R	–	S(1)	R	R
XT2	Internal	F-P-W	1x1...95	1x4...70	14x14mm	≤ 50mm²: 7Nm >50mm²: 8,5Nm	14	–	R	–	S(1)	R	R
	Internal	F-P-W	–	2x2.5...50				–	R	–	S(1)	R	R
XT3	Internal	F-P	1x6...185	1x6...150	20x18mm	14Nm	20	–	–	R	S(1)	R	R
	Internal	F-P	–	2x6...70				–	–	R	S(1)	R	R
XT4	Internal	F-P-W	1x6...185	1x6...150	20x18mm	14Nm	20	–	–	R	S(1)	R	R
	Internal	F-P-W	–	2x6...70				–	–	R	S(1)	R	R

(1) Phase separators supplied as standard with basic version circuit-breaker

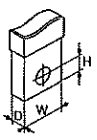
FCCu terminal



FCCu terminal with cable



FCCu terminal with busbar



W Width
H Hole Heigth
D Depth

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

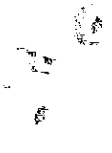
Terminals for copper/aluminium cables - FC CuAl

CB	Type of terminal	Vers.	Cable [mm²]		Tightening				L cable stripping [mm]	H Terminal covers [mm]			H Separators [mm]		
			Rigid	Flexible	Terminal /CB		Cable or busbar /Terminal			2	50	60	25	100	200
XT1	internal	F-P	1x1.5...70	1x 1.5...50	M5	3Nm	Ø 9.5mm	≤10mm² 2,5 Nm >10mm² 5 Nm	16	–	R	–	S	R	R
	external	F-P	1x35...95	NO	M6	6Nm	Ø 14mm	13.5Nm	16	–	S	–	–	–	–
	external[1]	F-P	1x120...240	NO	M6	6Nm	Ø 24mm	31Nm	24	ADAPTER					
XT2	Internal	F-P-W	1x1...95	1x2.5...70	–	–	Ø 14mm	≤ 25mm² 4 Nm >25mm² 6 Nm	14	–	R	–	S	R	R
	external[1]	F-P-W	1x120...240	NO	M6	6Nm	Ø 24mm	31Nm	24	ADAPTER					
	external[1]	F-P-W	1x70...185	NO	M6	6Nm	Ø 18mm	31Nm	20	–	S	–	–	–	–
	external[1]	F-P-W	2x35...70	NO	M6	6Nm	Ø 16mm	12Nm	18/33	–	–	S	–	–	–
XT3	internal[1]	F-P-W	1x35...150	NO	M9	9Nm	Ø 17mm	22.6Nm	20	–	–	R	S	R	R
	Internal	F-P	1x95...185	NO	–	–	Ø 17mm	16Nm	20	–	–	R	S	R	R
	external[1]	F-P	1x120...240	NO	M8	8Nm	Ø 24mm	31Nm	24	ADAPTER					
	external[1]	F-P	2x35...120	NO	M8	8Nm	Ø 18mm	16Nm	22/42	–	–	S	–	–	–
XT4	Internal	F-P-W	1x1...150	NO	–	–	Ø 17mm	10Nm	20	–	–	R	S	R	R
	external[1]	F-P-W	1x120...240	NO	M8	8Nm	Ø 24mm	31Nm	24	ADAPTER					
	external[1]	F-P-W	2x35...120	NO	M8	8Nm	Ø 18mm	16Nm	22/42	–	–	S	–	–	–

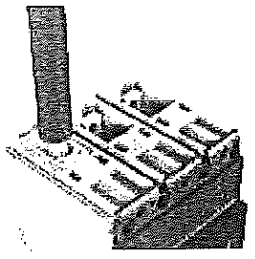
[1] Take-up auxiliary voltage device included

Internal FCCuAl terminal for copper/aluminium cables

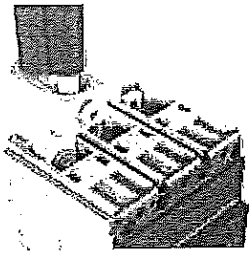
Internal FCCuAl terminal for copper and aluminium cable with take-up of auxiliary voltage



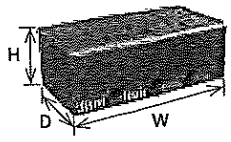
External FCCuAl terminal for copper/aluminium cables



FCCuAl internal terminal with cable



FCCuAl external terminal with cables

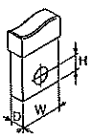


Pitch adapter

Adaptor for FCCuAl terminals up to 240mm²

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

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



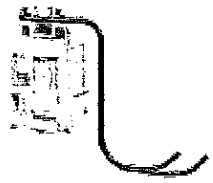
W Width
H Hole Heigth
D Depth

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

Accessories

Electrical Accessories

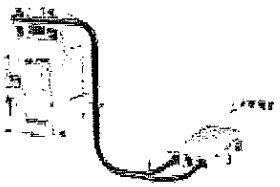
Electrical Accessories		XT1	XT2	XT3	XT4
Shunt opening release	SOR	■	■	■	■
Undervoltage release	UVR	■	■	■	■
Time-delay device for undervoltage release	UVD	■	■	■	■
Auxiliary contacts Q: open/close signalling contact SY: trip signalling contact S51: electronic trip signalling contact	1Q 1SY 24V DC	■	■	■	■
	3Q 1SY 24V DC	–	■	■	■
	1S51 24V DC	–	■	–	■
	1Q 1SY 250V AC/DC	■	■	■	■
	2Q 2SY 1S51 250V AC/DC	–	■	–	■
	3Q 2SY 250V AC/DC	–	■	–	■
	3Q 1SY 250V AC/DC	–	■	■	■
	1S51 250V AC/DC	–	■	–	■
	2Q 1SY 250V AC/DC	■	■	■	■
	3Q on left 250V AC/DC	■	■	■	■
	400V 1Q 1SY 400V AC	–	■	–	■
	400V 2Q 400V AC	–	■	–	■
Position contacts	AUP-Racked-in	■	■	■	■
	AUP-Racked-out	–	■	–	■
Early auxiliary contacts	AUE-In handle	■	■	■	■
Motor operator	MOD	■	–	■	–
	MOE	–	■	–	■
	MOE-E	–	■	–	■
Residual current devices	RC Inst	■	–	■	–
	RC Sel 200	■	–	–	–
	RC Sel for XT1 XT3	■	–	■	–
	RC Sel for XT2 XT4	–	■	–	■
	RC Sel B Type	–	–	■	–



Cabled SOR - UVR

Service releases

Shunt opening release (SOR). Allows the circuit-breaker to be opened by means of a non-permanent electrical control. Release operation is guaranteed for voltage between 70% and 110% of the rated power supply voltage Un, in both alternating and direct current. SOR is equipped with a built-in limit contact to shut-off the power supply in the open position with the relay tripped.
A remote controlled emergency opening command can be created by connecting an opening button to the SOR.



Cabled SOR - UVR
for withdrawable circuit-breaker

Undervoltage release (UVR). Allows the circuit-breaker to open when the release is subjected to either a power failure or voltage drop. Opening, as prescribed in the Standard, is guaranteed when the voltage is between 70% to 35% of Un. After tripping, the circuit-breaker can be closed again if the voltage exceeds the 85% of Un. When the undervoltage release is nor energized, neither the circuit-breaker nor the main contacts can be closed. A remote controlled emergency opening command can be created by connecting an opening button to the UVR.

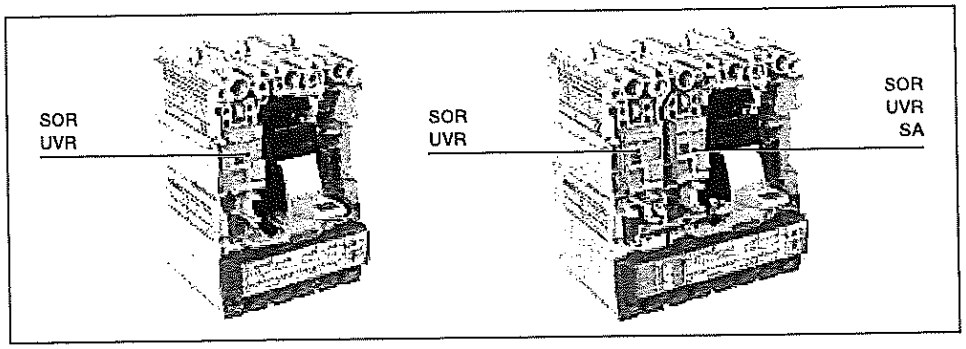
None of the service releases in the Tmax XT series require screws for installation. They are extremely easy to fit. Just use slight pressure in the appropriate place. All service releases are available in two versions:

- ■ cabled (AWG20 cable section - 0.5mm² up to 300V, AWG17 - 1mm² up to 525V):
  - for fixed/plug-in circuit-breakers with 1m long cables;
  - for withdrawable circuit-breakers with fixed part and moving part connector;
- ▫ not cabled:
  - for fixed/plug-in circuit-breakers with cables from 1.5 mm² in section.

Uncabled
SOR - UVR

In circuit-breakers:

- three-pole: as an alternative, SOR or UVR can be installed in the slot on the left of the operating lever;
- four-pole: SOR or UVR can be housed at the same time in the slot of the third and fourth pole. If the circuit-breaker is the withdrawable type, the connector for the fourth pole must be ordered to be able to install SOR and UVR in the fourth pole. If there is a residual current release, the opening solenoid (SA) of the residual current device must be installed in the slot of the third pole on the left of the operating lever.

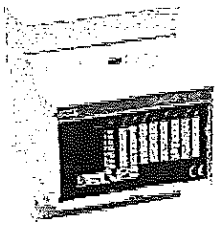


SOR Electrical specifications

Version	Max power absorbed on inrush		Resistance	
	AC [VA]	DC [W]	Internal [ohm]	External [ohm]
12V DC		50	2,67	0
24-30V AC/DC	50	50	11	0
48-60V AC/DC	60	60	62	0
110...127V AC-110...125V DC	50	50	248	0
220...240V AC-220...250V DC	50	50	930	0
380-440V AC	55		2300	0
480-525V AC	55		5830	0

UVR Electrical specification

Version	Power absorbed during normal operation		Resistance	
	AC [VA]	DC [W]	Internal [ohm]	External [ohm]
24-30V AC/DC	1.5	1.5	399	0
48V AC/DC	1	1	1447	100
60V AC/DC	1	1	2405	100
110...127V AC-110...125V DC	2	2	8351	390
220...240V AC-220...250V DC	2.5	2.5	20502	9000
380-440V AC	3		20502	39000
480-525V AC	4		20502	59000



Time delay device for undervoltage release

Time delay device for undervoltage release (UVD)

The undervoltage release (UVD) can be combined with an external electronic power supply time delay which allows circuit-breaker opening to be delayed with preset and adjustable timing if the power supply voltage of the release either drops or fails, thus preventing untimely tripping caused by temporary faults. The time delay must be used with the undervoltage release (UVR) of the corresponding voltage.
A remote control positive safety opening command can be created by connecting an opening pushbutton to the UVR combined with the UVD.

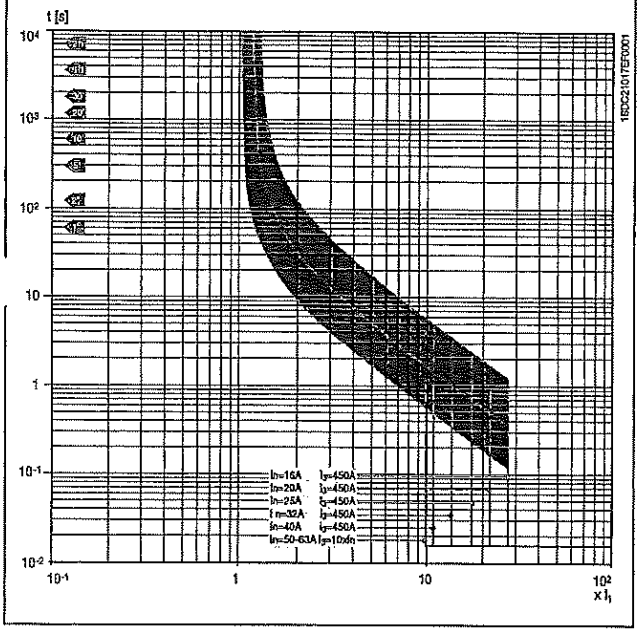
UVD - Electrical specifications

Power supply Voltage [V]	24...30V AC/DC
	48...60V AC/DC
	110...125V AC/DC
	220...250V AC/DC
Settable delay [s]	0.25 - 0.5 - 0.75 - 1 - 1.25 - 2 - 2.5 - 3
Opening time tolerance	±15%

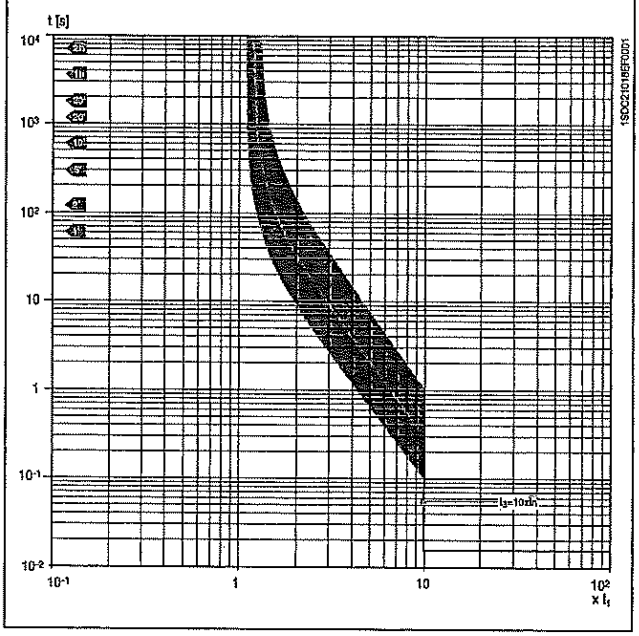
Trip curves with thermomagnetic trip unit

Trip curves for distribution

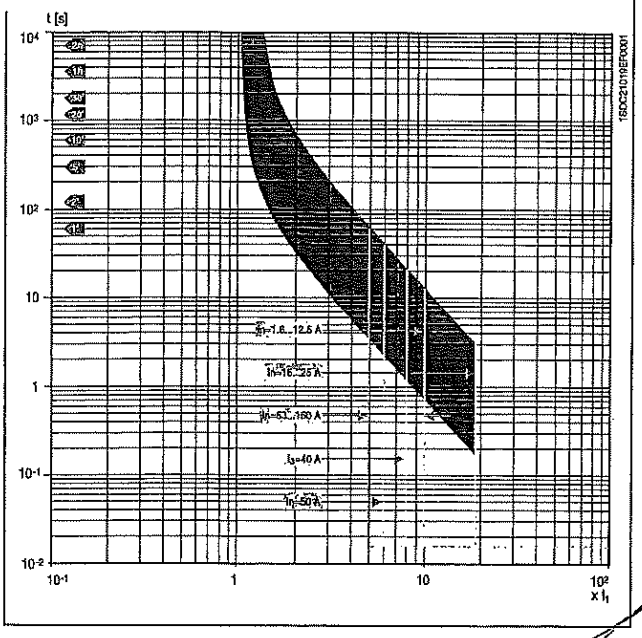
XT1 160 TMD In=16...63A



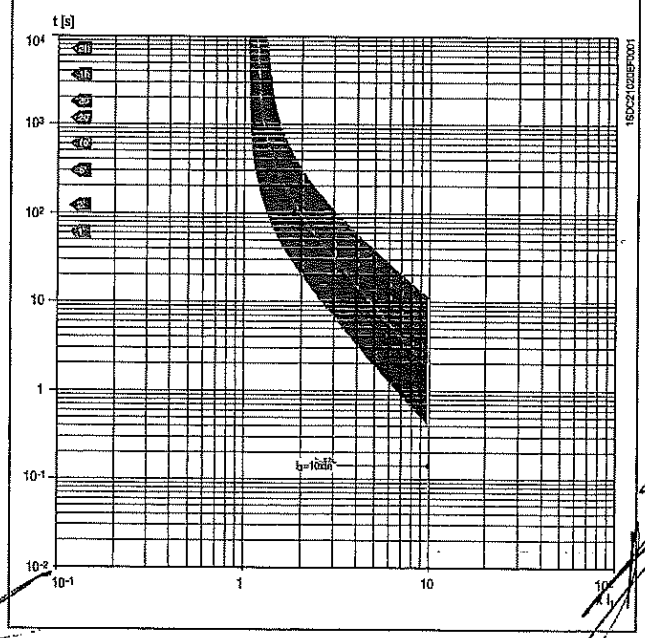
XT1 160 TMD In=80...160A



XT2 160 TMA In=1.6...160A



XT3 250 TMD In=63...250A

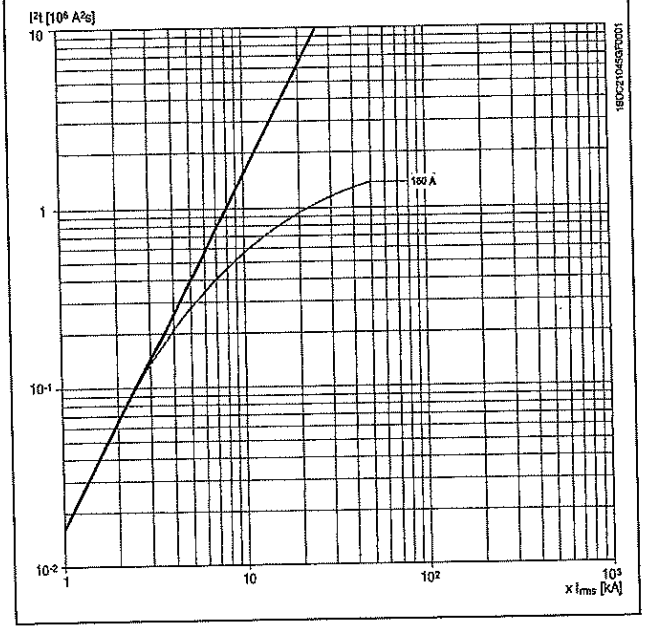


Specific let-through energy curves

500V

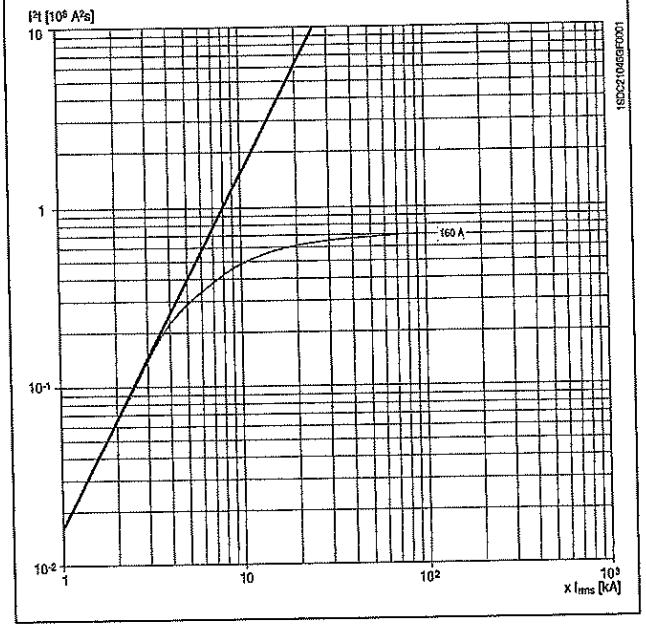
XT1

500V



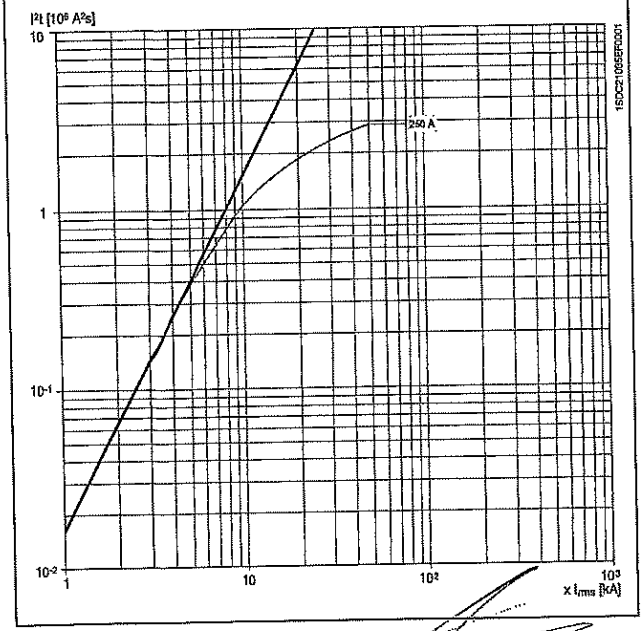
XT2

500V



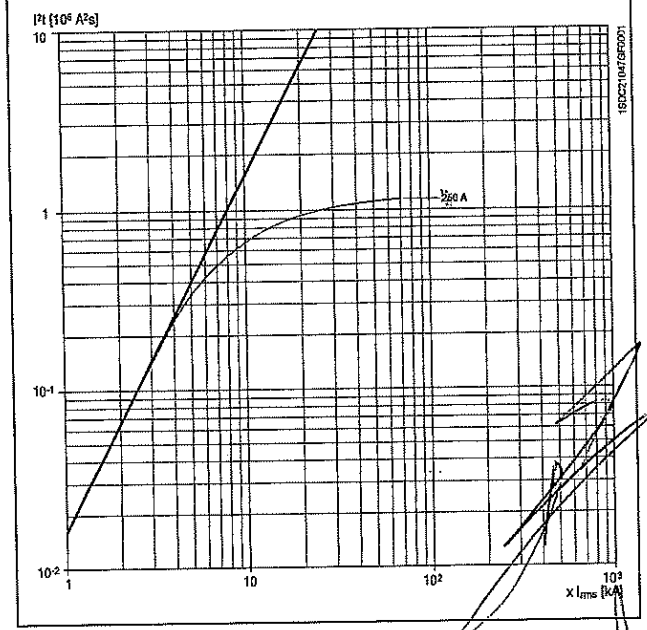
XT3

500V



XT4

500V



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тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

П Р И Л О Ж Е Н И Е 9.18.2

Техническо описание и чертежи с нанесени на тях размери

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

Overall dimensions

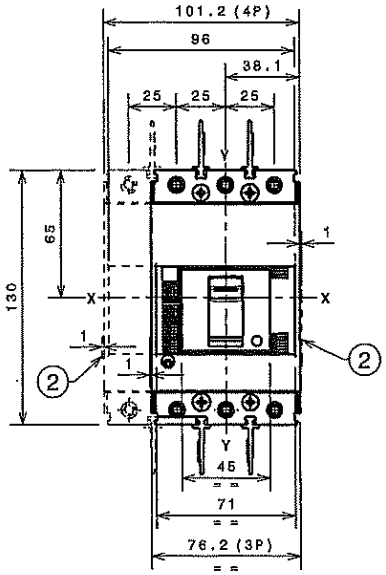
Tmax XT1 - Installation for fixed circuit-breaker

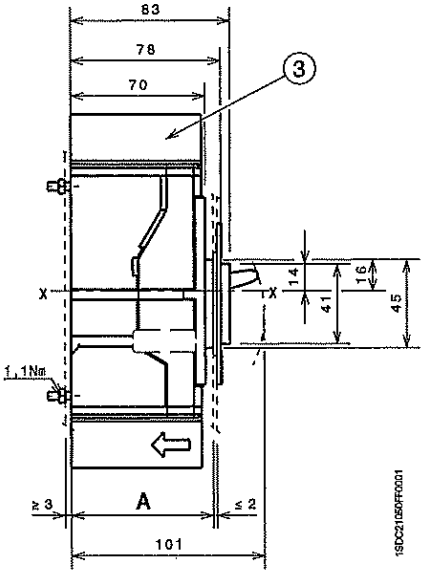
Fixing on support sheet

Caption

(2) Overall dimension of optional wiring ducts

(3) 25mm insulating barriers between phases (compulsory) provided





		A
With standard flange	III - IV	74
Without flange	III - IV	71
	III - IV	79

Fixing on DIN 50022 rail

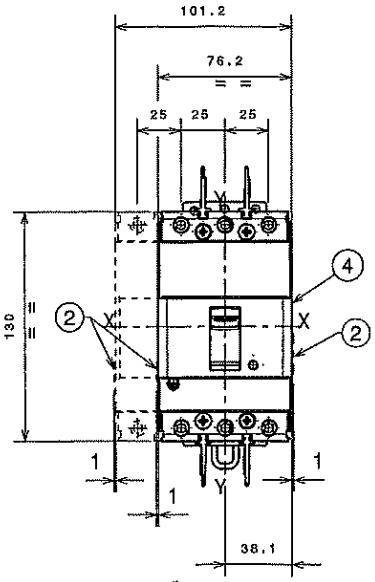
Caption

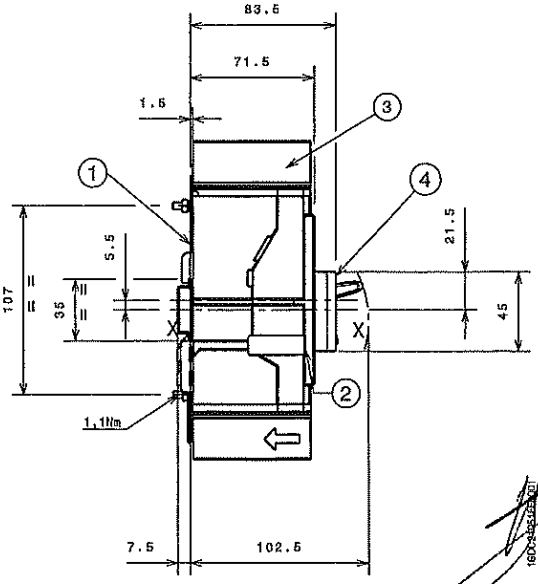
(1) Bracket for fixing

(2) Overall dimension of optional wiring ducts

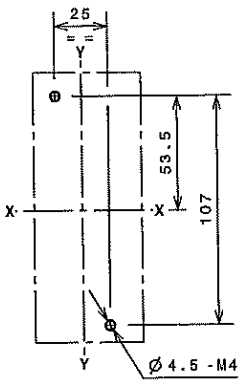
(3) 25mm insulating barriers between phases (compulsory) provided

(4) Optional front cover for DIN rail

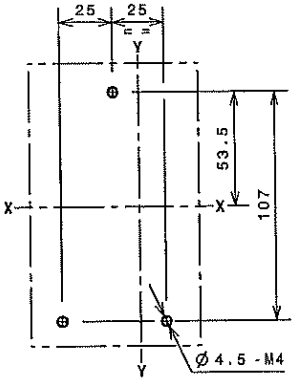




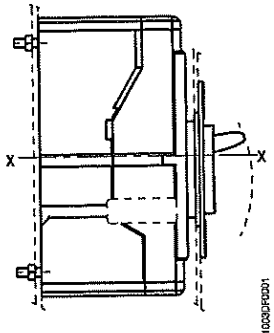
Drilling template for circuit-breaker fixing



3 POLES



4 POLES



Flanges

Caption

(1) Flange for circuit-breaker III

(2) Flange for circuit-breaker IV

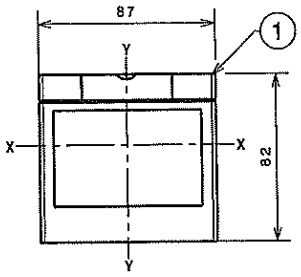
(3) Flange for circuit-breaker III with RC Sel - RC Inst residual current release

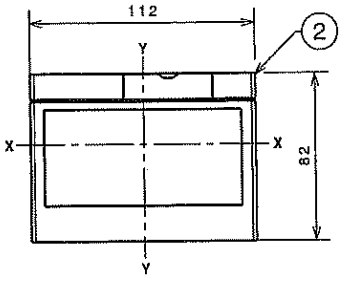
(4) Flange for circuit-breaker IV with RC Sel - RC Inst residual current release

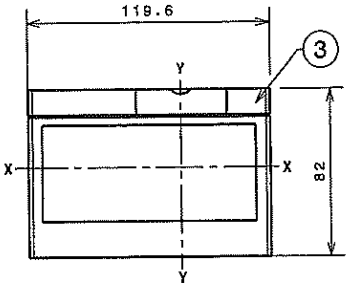
(5) Flange for fixed circuit-breaker III-IV with direct motor operator (MOD)

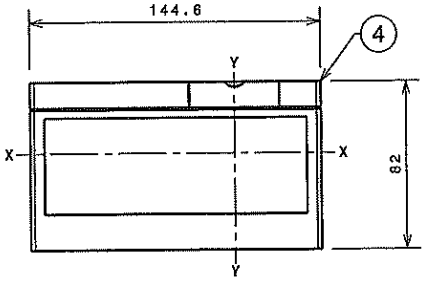
(6) Flange for circuit-breaker III-IV with direct rotary handle (RHD)

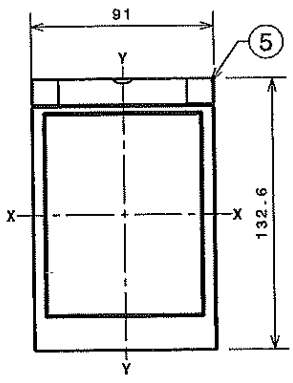
(7) Optional flange

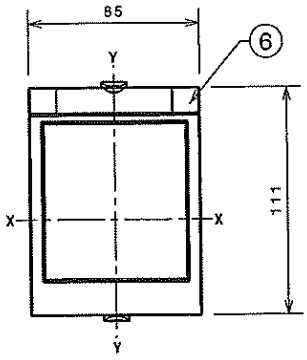


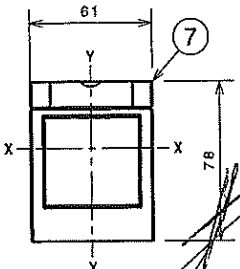










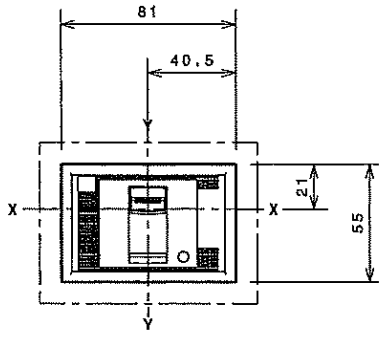


Overall dimensions

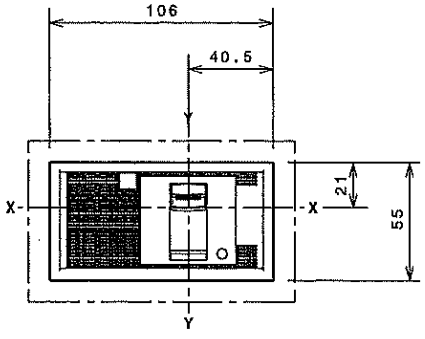
Tmax XT1 - Installation for fixed circuit-breaker

Drilling templates compartment door

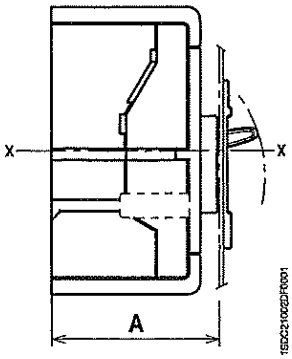
With standard flange



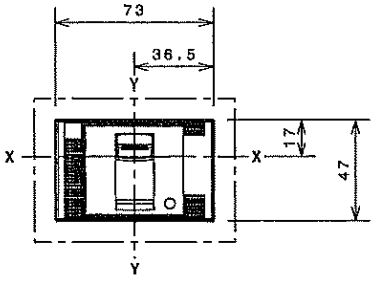
A=74
3 POLES



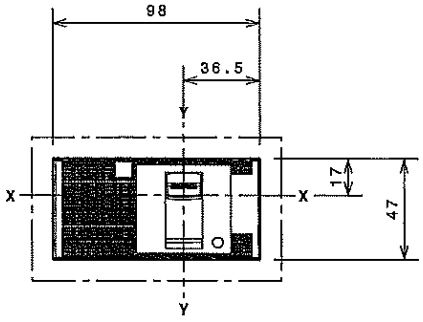
A=74
4 POLES



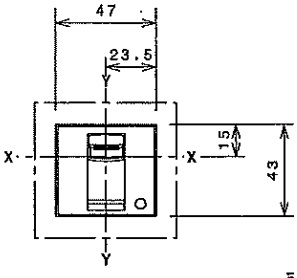
Without flange



A=71
3 POLES

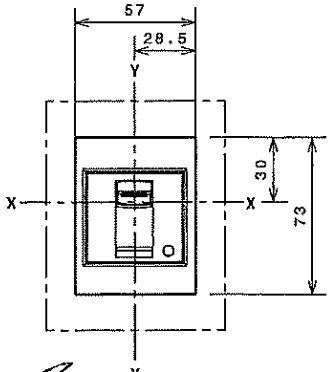


A=71
4 POLES

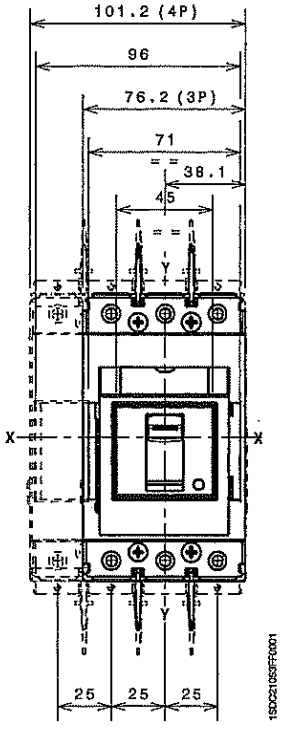


A=79
3-4 POLES

With optional flange



A=79
3-4 POLES



Overall dimensions

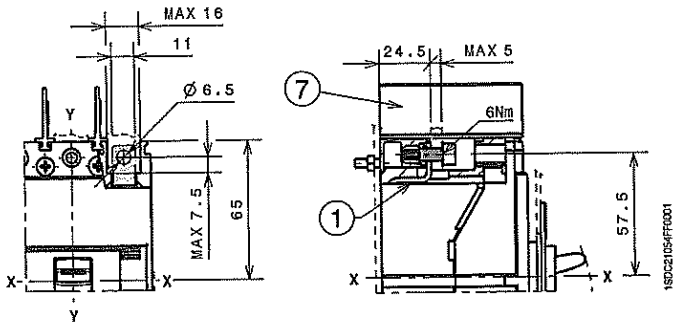
Tmax XT1 - Terminals for fixed circuit-breaker

Terminals F

Caption

(1) Front terminals for busbars connection

(7) 25mm insulating barriers between phases (compulsory) provided



Terminals EF

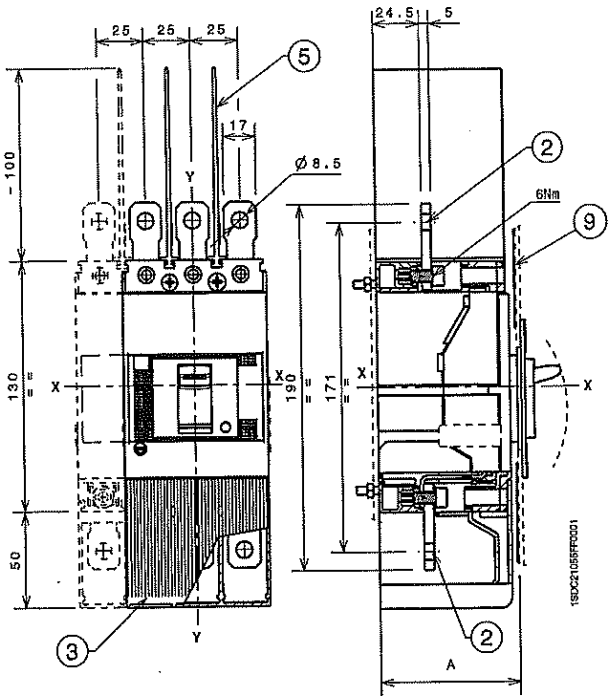
Caption

(2) Front extended terminals

(3) High terminal covers with degree of protection IP40 (optional) not provided

(5) 100mm insulating barriers between phases (compulsory) provided

(9) Internal insulating plate compulsory with phase barriers (customer attention)

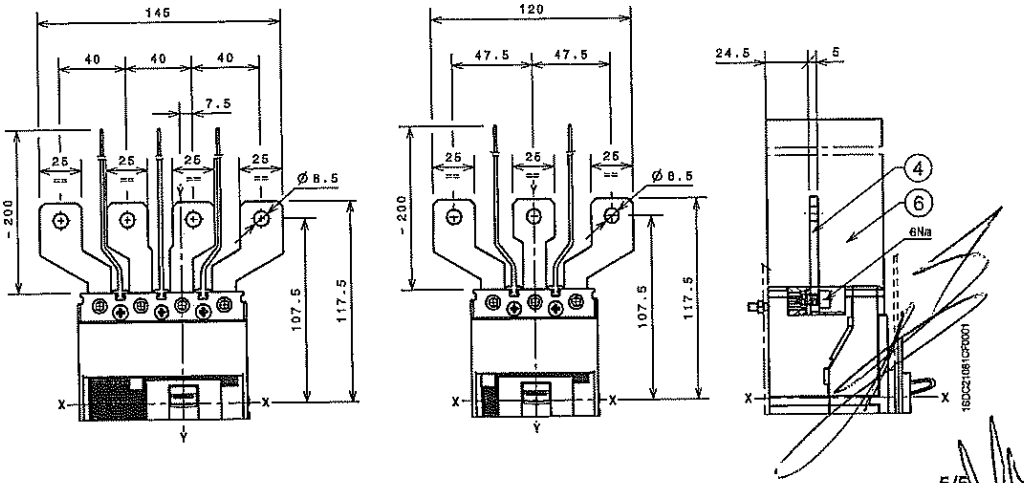


Terminals ES

Caption

(4) Front extended spread terminals for busbar connection

(6) 200mm insulating barriers between phases (compulsory) provided



Overall dimensions

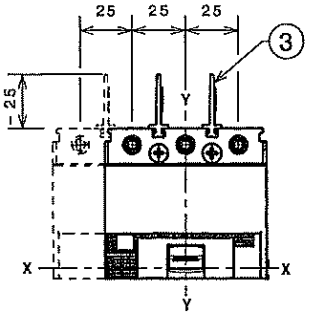
Tmax XT1 - Terminals for fixed circuit-breaker

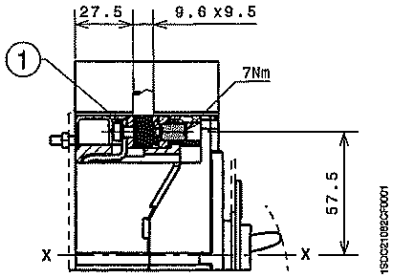
1x1.5...50mm² terminals FCCuAl

Caption

(1) 1x1.5...50mm² front terminal FCCuAl

(3) 25mm insulating barriers between phases (compulsory) provided



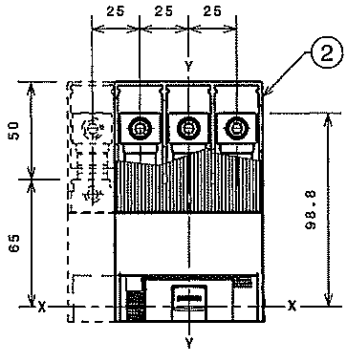


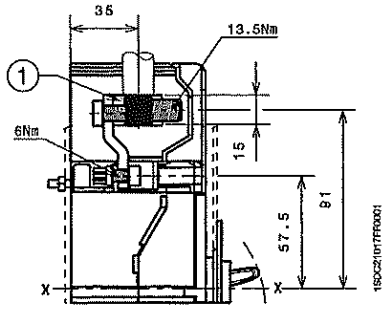
1x35...95mm² terminals FCCuAl

Caption

(1) External terminal FCCuAl

(2) High terminal covers with degree of protection IP40 (optional) provided

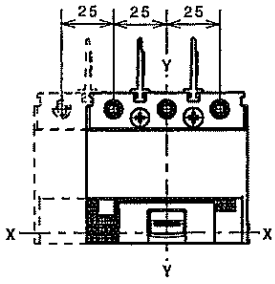


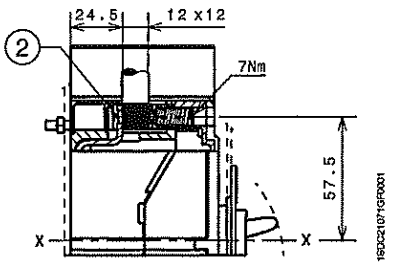


Terminals FCCu

Caption

(2) Front terminal FCCu



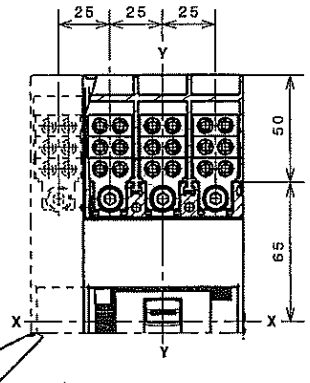


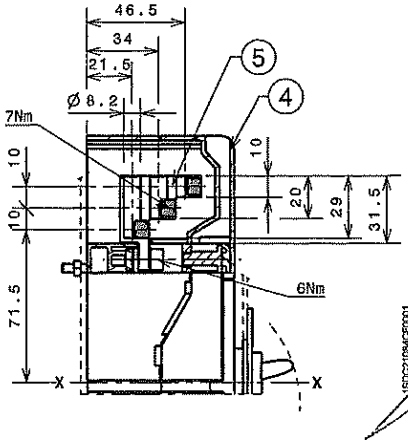
Terminals MC

Caption

(4) Terminal covers with degree of protection IP40 (compulsory) provided

(5) Front terminal for multicable connection





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гр.Петрич 2850, Промишлена зона
ул."Свобода"49
тел.:00359 745 60743; факс:00359 745 68742
e-mail: metix@metix.bg
гр.София 1000 ул."Рикардо Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

П Р И Л О Ж Е Н И Е 9.18.3

ЕО декларация за съответствие

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

ABB SpA ABB Sace Division

DICHIARAZIONE DI CONFORMITA'

DECLARATION OF CONFORMITY

No CE\TMAX 037 R1.10

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

costruttore: *manufacturer:*	**ABB SPA – ABB SACE DIVISION**
indirizzo: *address:*	**via Baioni 35** **I 24123 Bergamo**

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

Identificazione del prodotto: *product identification:*	TMAX XT1B 160 – XT1C 160 – XT1N 160 – XT1S 160 – XT1H 160 ***e relativi accessori*** *and relevant accessories*

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

riferimento n.ro *reference nr.*	**titolo** *title*
2006/95	**Direttiva Bassa Tensione** *Low voltage directive*
2004/108/CE	**Direttiva Compatibilità Elettromagnetica** *Electromagnetic Compatibility Directive*

e che sono state applicate tutte le norme e/o specifiche tecniche indicate sul retro.
and that the standards and/or technical specifications referenced overleaf have been applied
Ultime due cifre dell'anno in cui è stata affissa la marcatura CE: 09
Last two digits of the years in which the CE marking was affixed

Bergamo li 31.05.10

на основание чл. 36а, ал. 3 от ЗОП

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

ABB SpA

ABB Sace Division

DICHIARAZIONE DI CONFORMITA'

DECLARATION OF CONFORMITY

No CE\TMAX 037 R1.10

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

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

- norme armonizzate:

- harmonized standards:

n.ro *nr*	**edizione** *Issue*	**titolo** *title*	**parti** *parts*
EN 60947	2007	Low voltage switchgear and controlgear	Part 1: General rules
EN 60947	2006	Low voltage switchgear and controlgear	Part 2:Circuit Breakers

- altre norme e/o specifiche tecniche:

- other standards and/or technical specifications

n.ro *nr*	**edizione** *Issue*	**titolo** *title*	**parti** *parts*
IEC 60947	Ed.5.0	Low voltage switchgear and controlgear	Part 1: General rules
IEC 60947	Ed.4	Low voltage switchgear and controlgear	Part 2:Circuit Breakers

ABB SpA

ABB Sace Division

DICHIARAZIONE DI CONFORMITA'

DECLARATION OF CONFORMITY

No CE\TMAX 037 R1.10

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

catalogo tecnico 1SDC210033D0201 03/2010

technical catalogue 1SDC210033D0201 March 2010

Certificato di gestione della Qualità ISO 9001-2000

ISO 9001 Quality Management System Certificate

Certificato di gestione Ambientale ISO 14001

ISO14001 Environment Management System Certificate

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

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гр.Петрич 2850, Промишлена зона
ул."Свобода"49
тел.:00359 745 69743; факс:00359 745 69742
e-mail: metix@metix.bg
гр.София 1000 ул."Ричард Вакарини"бл.5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail:sales@metix.bg

П Р И Л О Ж Е Н И Е 9.18.4

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

TYPE APPROVAL CERTIFICATE
N. ELE389411CS

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

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

Issued in Genova on May 24, 2012. This certificate is valid until May 23, 2022

на основание чл. 36а, ал. 3 от ЗОП

Valerio Bonanni

Genova, May 24, 2012

RINA
Via Corsica, 12 16128 Genova

БЪЛГАРИЯ

1/3

TYPE APPROVAL CERTIFICATE
N. ELE389411CS

Tmax XT

Product Description

- **Circuit Breaker type Tmax XT1**

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

- **Circuit Breaker type Tmax XT2**

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

- **Circuit Breaker type Tmax XT3**

Version	XT3N			XT3S		
Rated current In [A]	250			250		
Release type	TMD, MA R63÷R250					
Voltage [V]	240	440	690	240	[redacted]	690
Icu [kA]	50	25	5	85	40	8
Ics [kA]	38	19	[redacted]	[redacted]	20	[redacted]
Icm [kA]	105	52.5	8.5	187	84	13.5
Frequency [Hz]	50-60			50-60		
T amb [°C]	40			40		

Genova, May 24, 2012

RINA
Via Corsica, 12 - 16128 Genova

TYPE APPROVAL CERTIFICATE
N. ELE389411CS

Tmax XT

- **Circuit Breaker type Tmax XT4**

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

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

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

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

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

Genova, May 24, 2012

RINA
Via Corsica, 12 · 16128 Genova

DNV·GL

Certificate No:
E-14114
File No:
823.10
Job Id:
262.1-010828-2

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Circuit Breaker

with type designation(s)
Tmax XT1, XT2, XT3 and XT4

Issued to
ABB S.P.A. - ABB Sace Division
Bergamo, Italy

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Application :

Rated Voltage (V)	690
Rated Current (A)	160 - 250
Frequency (Hz)	50-60

This Certificate is valid until 2022-06-30
Issued at Høvik on 2015-03-31

DNV GL local station: Milan

Approval Engineer: Nicolay Horn

for DNV GL

Digitally Signed By: Laumann, Marit
Location: DNV GL Høvik, Norway
Signing Date: 2015-04-21

Marit Laumann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Certificate No: **E-14114**
File No: **823.10**
Job Id: **262.1-010828-2**

Name and place of manufacturer

ABB SpA – ABB Sace Division
Frosinone, ITALY

Product description

Moulded –case circuit breaker

	XT1				
	B	C	N	S	H
Rated insulation voltage **Ui** (V)	1000	1000	1000	1000	1000
Rated impulse withstand voltage **Uimp** (kV)	8	8	8	8	8
Rated current **Iu** (A) at 40 °C (See application/limitation)	160	160	160	160	160
Rated service voltage **Ue** (V)	690 AC	690 AC	690 AC	690 AC	690 AC
Rated frequency AC (Hz)	50-60	50-60	50-60	50-60	50-60
Rated ultimate short-circuit breaking capacity (kA) $\mathbf{I_{CU}}$					
230 V AC (kA)	25	40	65	85	100
440 V AC (kA)	15	25	36	50	65
690 V AC (kA)	3	4	6	8	10
Rated service short-circuit breaking capacity $\mathbf{I_{CS}}$ (%Icu)					
230 V AC (kA)	100 %	100 %	75 (50) %	75 %	75 %
440 V AC (kA)	75 %	50 %	50 %	50 %	50 %
690 V AC (kA)	100 %	100 %	75 %	50 %	50 %
Utilisation category	A	A	A	A	A
Rated short-circuit making capacity **Icm**					
230 V AC (kA)	52.5	84	143	187	220
440 V AC (kA)	30	52.5	75.6	105	143
690 V AC (kA)	4.5	6	9	13.6	17

	XT2				
	N	S	H	L	V
Rated insulation voltage **Ui** (V)	1000	1000	1000	1000	1000
Rated impulse withstand voltage **Uimp** (kV)	8	8	8	8	8
Rated current **Iu** (A) at 40 °C (See application/limitation)	160	160	160	160	160
Rated service voltage **Ue** (V)	690 AC	690 AC	690 AC	690 AC	690 AC
Rated frequency AC (Hz)	50-60	50-60	50-60	50-60	50-60
Rated ultimate short-circuit breaking capacity (kA) $\mathbf{I_{CU}}$					
230 V AC (kA)	65	85	100	150	200
440 V AC (kA)	36	50	65	100	150
480 V AC (kA)*	NA	NA	NA	NA	75*
690 V AC (kA)	10	12	15	18	20
Rated service short-circuit breaking capacity $\mathbf{I_{CS}}$ (%Icu)					
230 V AC (kA)	100 %	100 %	100 %	100 %	100 %
440 V AC (kA)	100 %	100 %	100 %	100 %	100 %
690 V AC (kA)	100 %	100 %	100 %	100 %	75 %
Utilisation category	A	A	A	A	A
Rated short-circuit making capacity **Icm**					
230 V AC (kA)	143	187	220	330	440
440 V AC (kA)	75.6	105	143	220	440
480 V AC (kA)	NA	NA	NA	NA	165
690 V AC (kA)	17	24	30	36	40

	XT3	
	N	S
Rated insulation voltage **Ui** (V)	1000	1000
Rated impulse withstand voltage **Uimp** (kV)	8	8
Rated current **Iu** (A) at 40 °C (See application/limitation)	250	250
Rated service voltage **Ue** (V)	690 AC	690 AC
Rated frequency AC (Hz)	50-60	50-60
Rated ultimate short-circuit breaking capacity (kA) $\mathbf{I_{cu}}$		
230 V AC (kA)	50	85
440 V AC (kA)	25	40
690 V AC (kA)	5	8
Rated service short-circuit breaking capacity $\mathbf{I_{cs}}$ (%Icu)		
230 V AC (kA)	75 %	50 %
440 V AC (kA)	75 %	50 %
690 V AC (kA)	75 %	50 %
Utilisation category	A	A
Rated short-circuit making capacity **Icm**		
230 V AC (kA)	105	187
440 V AC (kA)	52.5	84
690 V AC (kA)	8.5	13.6

	XT4				
	N	S	H	L	V
Rated insulation voltage **Ui** (V)	1000	1000	1000	1000	1000
Rated impulse withstand voltage **Uimp** (kV)	8	8	8	8	8
Rated current **Iu** (A) at 40 °C (See application/limitation)	160/250	160/250	160/250	160/250	160/250
Rated service voltage **Ue** (V)	690 AC	690 AC	690 AC	690 AC	690 AC
Rated frequency AC (Hz)	50-60	50-60	50-60	50-60	50-60
Rated ultimate short-circuit breaking capacity (kA) $\mathbf{I_{cu}}$					
230 V AC (kA)	65	85	100	150	200
440 V AC (kA)	36	50	65	100	150
690 V AC (kA)	10	12	15	20	25
Rated service short-circuit breaking capacity $\mathbf{I_{cs}}$ (%Icu)					
230 V AC (kA)	100 %	100 %	100 %	100 %	100 %
440 V AC (kA)	100 %	100 %	100 %	100 %	100 %
690 V AC (kA)	100 %	100 %	100 %	100 %	75 %
Utilisation category	A	A	A	A	A
Rated short-circuit making capacity **Icm**					
230 V AC (kA)	143	187	220	330	440
440 V AC (kA)	75.6	105	143	220	330
690 V AC (kA)	17	24	30	40	52.5

* See application limitation

Application/Limitation

TXT1 and TX3 only equipped with thermal-magnetic release, TXT2 and TXT4 is equipped with both Electronic and thermal-magnetic release.

The breaker type XT2V for 480 V is only applicable for use when the Ics value is not relevant.

Release data is given for 40 ^{0}C. For ship application thermal magnetic releases to be derated in accordance with following table (electronic releases need no deration):

XT1		XT2		XT3		XT4	
40 °C	45 °C	40 °C	45 °C	40 °C	45 °C	40 °C	45 °C
In	In	In	In	In max	In max	In	In max
160	154	160	154	160	154	160	154
-	-	-	-	250	240	250	240

Type Approval documentation

Technical Info :
" SACE Tmax XT New low voltage moulded-case circuit-breakers up to 250A."

Type tests:
CD "TEST REPORTS ABB SACE Tmax XT – DNV APPROVAL"
ABB Test Report LBRP 11955/03 rev 01. Issued 2013-02-02

Tests carried out

Type tests according to IEC 60947-2 sequence I, II, III and Annex H. Vibration & shock, inclination, EMC, dry heat, damp heat and low temperature test. UL 489 (ed.11, 2009) for breaker type XT2V for 480V /icu.

Marking of product

ABB SACE – Type designation – Electrical data

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is complied with and that no alterations are made to the product design or choice of materials.

The main elements of the survey are:
- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Production Sample Tests (PST) and Routines (RT) checked (if not available tests according to PST and RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Survey to be performed at least every second year.

END OF CERTIFICATE

		Ref. Certif. No.
IEC IECEE CB SCHEME		SE-72324A1/M1

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE

CERTIFICAT D'ESSAI OC

Product Produit	Circuit breakers
Name and address of the applicant Nom et adresse du demandeur	ABB S.p.A. ABB Sace Division, Via Pescaria 5, IT-24123 Bergamo. ITALY
Name and address of the manufacturer Nom et adresse du fabricant	Same as applicant
Name and address of the factory Nom et adresse de l'usine Note: *When more than one factory, please report on page 2* Note: *Lorsque il y plus d'une usine, veuillez utiliser la 2ème*	ABB S.p.A. ABB Sace Division, Via Enrico Fermi 14, 03100 Frosinone, ITALY
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	U_e = 690VAC, I_e = 16-160A, 50-60Hz, U_i = 800V, U_{imp} = 8kV, Pattern no. 3 and 4. See also page 2 and 3.
Trademark (if any) Marque de fabrique (si elle existe)	ABB
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	CTF Stage 3
Model / Type Ref. Ref. De type	Tmax XT1B 160, Tmax XT1C 160, Tmax XT1N 160, Tmax XT1S 160, Tmax XT1H 160
Additional information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2ème page)	This certificate replaces certificate SE-72324A1 dated18 July 2013, a new certificate have been issued due additional current ratings.
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60947-2:2006+A1+A2
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	1212698 and 1510090STO-001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

на основание чл. 36а, ал. 3 от ЗОП

Intertek Semko AB
Box 1103
SE-164 22 Kista, Sweden
Int +46 8 750 00 00

Intertek

Signature:

Date: 13 May 2015

Bo Berglöf

Additional information (if necessary)
Information complémentaire (si nécessaire)

Tmax XT1B 160

U_e (V)	I_{cu} (kA)	I_{cs} (% of I_{cu})	I_{IT} (kA)
220/230 AC	25	100	1,92
380 AC	18	100	1,92
400/415 AC	18	100	1,92
440 AC	15	75	1,92
500 AC	8	100	1,92
525 AC	6	100	1,92
690 AC	3	100	1,92
250 DC*	18	100	-
500 DC**	18	100	-

*= 2P in series
**= 3P in series

Tmax XT1C 160

U_e (V)	I_{cu} (kA)	I_{cs} (% of I_{cu})	I_{IT} (kA)
220/230 AC	40	100	1,92
380 AC	25	100	1,92
400/415 AC	25	100	1,92
440 AC	25	50	1,92
500 AC	18	50	1,92
525 AC	8	100	1,92
690 AC	4	100	1,92
250 DC*	25	100	-
500 DC**	25	100	-

*= 2P in series
**= 3P in series

Tmax XT1N 160

U_e (V)	I_{cu} (kA)	I_{cs} (% of I_{cu})	I_{IT} (kA)
220/230 AC	65	75 (50kA)	1,92
380 AC	36	100	1,92
400/415 AC	36	100	1,92
440 AC	36	50	1,92
500 AC	30	50	1,92
525 AC	22	50	1,92
690 AC	6	75	1,92
250 DC*	36	100	-
500 DC**	36	100	-

*= 2P in series
**= 3P in series

на основание чл. 36а, ал. 3 от ЗОП

Date: 13 May 2015

Signature:

Additional information (if necessary)
Information complémentaire (si nécessaire)

Tmax XT1S 160

U_e (V)	I_{cu} (kA)	I_{cs} (% of I_{cu})	I_{IT} (kA)
220/230 AC	85	75	1,92
380 AC	50	100	1,92
400/415 AC	50	75	1,92
440 AC	50	50	1,92
500 AC	36	50	1,92
525 AC	35	50	1,92
690 AC	8	50	1,92
250 DC*	50	100	-
500 DC**	50	100	-

*= 2P in series
**= 3P in series

Tmax XT1H 160

U_e (V)	I_{cu} (kA)	I_{cs} (% of I_{cu})	I_{IT} (kA)
220/230 AC	100	75	1,92
380 AC	70	75	1,92
400/415 AC	70	50 (37,5kA)	1,92
440 AC	65	50	1,92
500 AC	50	50	1,92
525 AC	35	50	1,92
690 AC	10	50	1,92
250 DC*	70	75	-
500 DC**	70	75	-

*= 2P in series
**= 3P in series

на основание чл. 36а, ал. 3 от ЗОП

Date: 13 May 2015

Signature:

RRL

Метикс
www.metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

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e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.18.5

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД

asi accredited

ASI-ACC-048

Certificate of Accreditation

certification against voluntary sustainability standards

ASI - Accreditation Services International GmbH hereby affirms that

Rina Services S.p.A.

Via Corsica, 12
Genova 16128 Italy

meets the ASI accreditation program requirements and those set forth in the accreditation standards listed in the annex to this certificate, for the following programs:

Forest Stewardship Council® (FSC®)
Marine Stewardship Council (MSC)

Accreditation Code ASI-ACC-048

На основание чл. 36а, ал. 3 от ЗОП

Digitally signed by
GUNTARS LAGŪNS
Date: 10/08/2017

ASI Managing Director

Please see the scope and validity of accreditation in the certificate annex on the ASI website: www.accreditation-services.com

asi accreditation services international

ASI - Accreditation Services International GmbH
Friedrich-Ebert-Allee 69
53113 Bonn, Germany

asi • Friedrich-Ebert-Allee 69 • 53113 Bonn • Germany

accreditation services international

ASI Certificate of Accreditation - Annex

CAB Name	Rina Services S.p.A.
CAB Shortcode	RINA
Accreditation Code	ASI-ACC-048
Accredited Activities	Certification against voluntary sustainability standards - as indicated below
Last updated on	02 October 2017

Forest Stewardship Council® (FSC®) Accreditation	
Date of original accreditation	24 September 2012
Current accreditation granted on	29 September 2017
Current accreditation valid until	24 September 2022
Technical Scope(s)	FSC COC
Geographical Scope(s)	Worldwide (excluding China).
Standard(s) to which CAB is accredited:	FSC-STD-20-001 v4-0 FSC-STD-20-011 V2-0 FSC-STD-40-003 V2-1 FSC-STD-40-004 V3-0 FSC-STD-40-005 V2-1 FSC-STD-40-006 V1-0 FSC-STD-40-007 V2-0
Standard(s) which CAB can certify against:	

Marine Stewardship Council (MSC) Accreditation	
Date of original accreditation	26 September 2013
Current accreditation granted on	26 September 2013
Current accreditation valid until	25 September 2018
Technical Scope(s)	MSC COC
Geographical Scope(s)	Worldwide
Standard(s) to which CAB is accredited:	MSC General Certification Requirements v2.1 MSC Chain of Custody Certification Requirements v2.0
Standard(s) which CAB can certify against:	MSC Chain of Custody Standard – Default v4.0 MSC Chain of Custody Standard – Group v1.0 MSC Chain of Custody Standard – Consumer-Facing Organisation v1.0

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ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА НН и СрН

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ПРИЛОЖЕНИЕ 9.18.6

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

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

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

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

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

„ ДОСТАВКА НА РАЗПРЕДЕЛИТЕЛНИ ТАБЛА НИСКО НАПРЕЖЕНИЕ /НН/ “

РЕФ. № PPD 18-073

организиран от "ЧЕЗ Разпределение България" АД