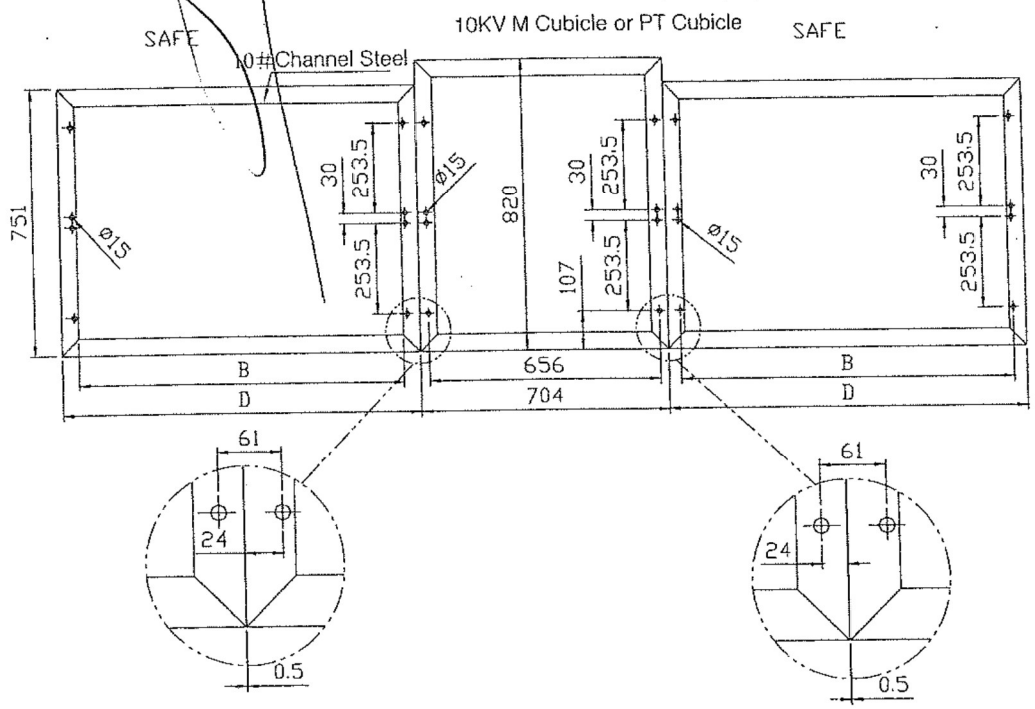
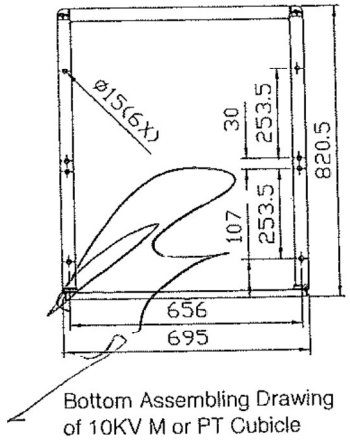


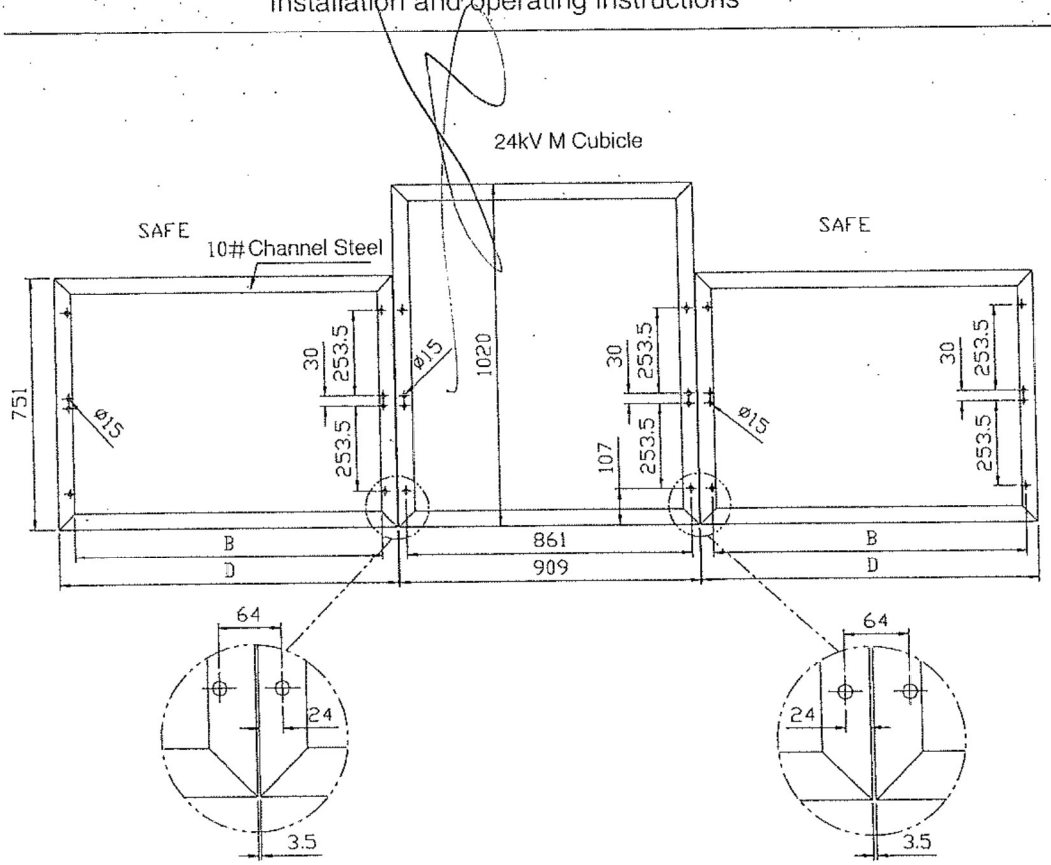
Planform of Foundation Channel Steel for Safe-Plus connected with 10KV M or PT Cubicle



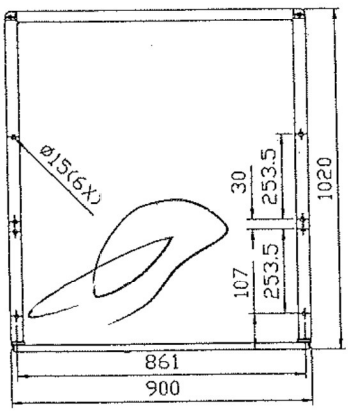
Bottom Assembling Drawing of 10KV M or PT Cubicle

Foundation of SafePlus connected with 10KV M or PT Cubicle

ВЯРНО С ОРИГИНАЛА



Planform of Foundation Channel Steel for Safe-Plus connected with 24KV M Cubicle



Bottom Assembling Drawing of
24KV M Cubicle

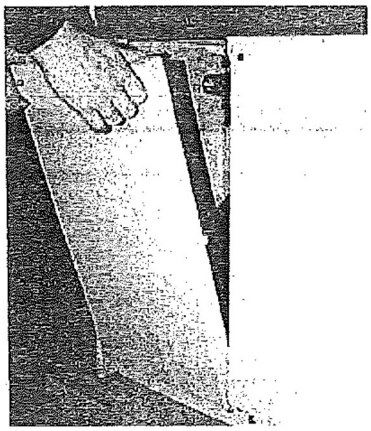
Foundation of SafePlus connected with 24KV M Cubicle

ВЯРНО С ОРИГИНАЛА

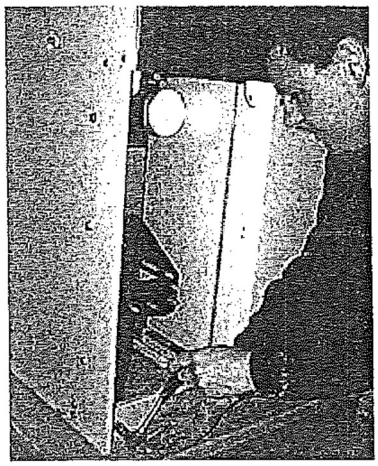
3.1 CABLE COMPARTMENT

Removal of cable cover:

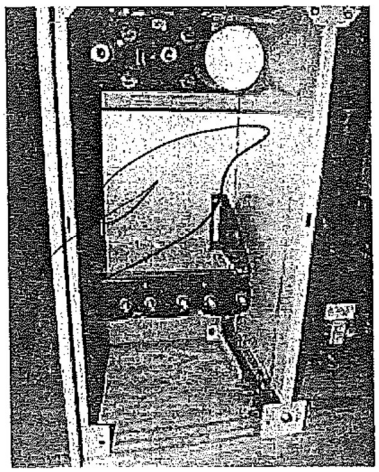
NB!
The cable cover can be supplied with interlocking to earthing switches. When interlocking is fitted, the cable cabinet can only be accessed when the earthing switch is in the closed position.



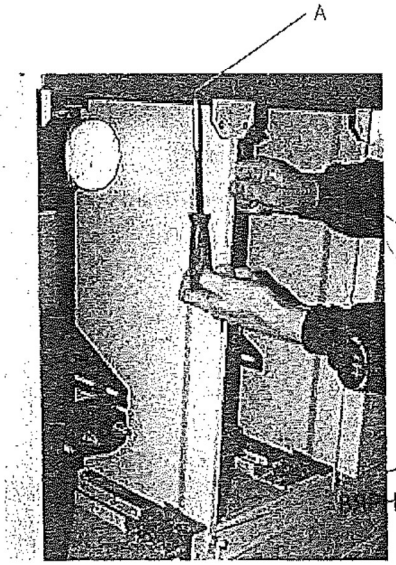
1. Loosen the screws on the cable cover, pull out and lift cover off.



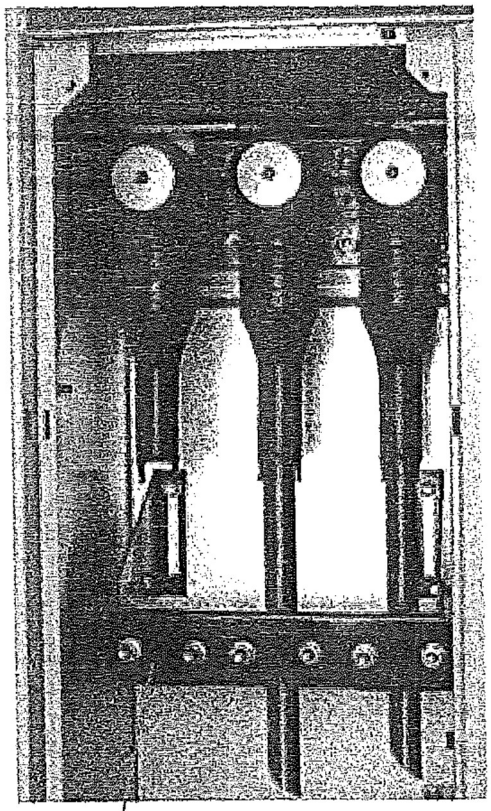
2. Removal of front section.



3. Front section removed.



4. The panel can be removed by unscrewing A and B.



Adjustable cable support beam (additional equipment).

3.2 CABLE CONNECTION

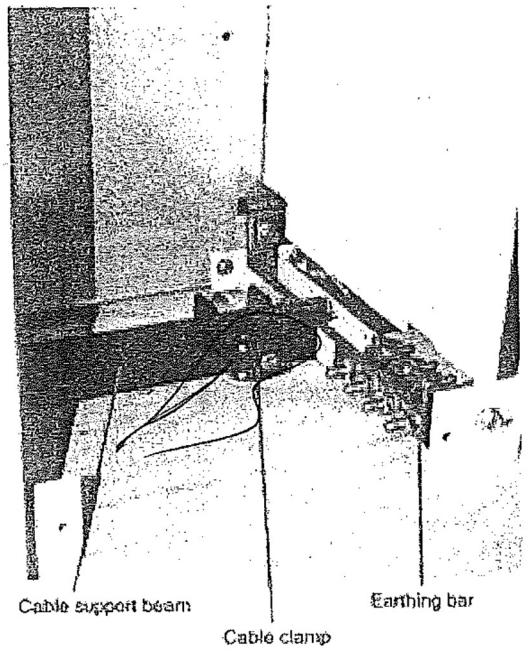
SafeRing/ SafePlus is equipped with external bushings which comply with DIN47636T1 & T2/EDF HN 525-61 for termination of cables.

All bushings are situated in the same height from the floor and are protected by the cable cover.

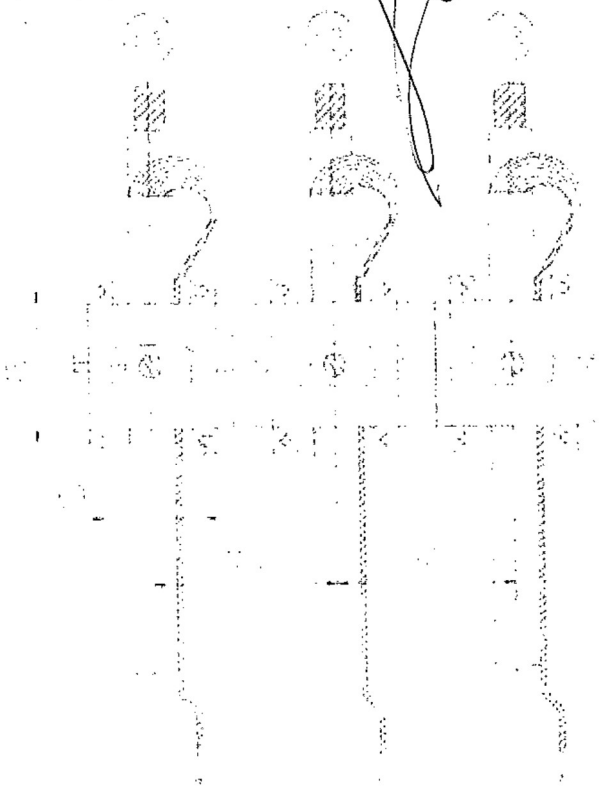
Please see supplier documentation for details.

The manufacturer's installation instructions must be followed. Be sure to lubricate the bushings thoroughly with the silicone supplied.

NB!
Where cables are not connected, the earthing switch must be locked in closed position or the bushings must be fitted with deadend recepticals before the unit is put into operation.



ВЯРНО С ОРИГИНАЛА



The cable shielding is led back through the centre hole and earthed.

3.3 CURRENT TRANSFORMERS FOR RELAY PROTECTION

Installing current transformers. The cable shielding is led back through the centre hole and earthed.

A protection relay is installed in each vacuum circuit breaker module. The cables from the protection relay to the current transformers are placed in the cable compartment, ready for connection to the three current transformers supplied.

Before installation:

- Check that the three current transformers have been delivered and that they are all of the same type.
  Check that the current transformers are of the correct type, with the correctly rated transformer ratio, for the distribution transformer's rated current and for the adjustment range on the protection relay (see protection relay manual).

Each current transformer must be mounted onto its high voltage cable before the cable termination is fitted.

The earth shield on the cable must be led back through the centre hole in the current transformer (see figure on left) and earthed on the earthing bar in the cable compartment. A mounting plate for the current transformers is fitted in the cable compartment.

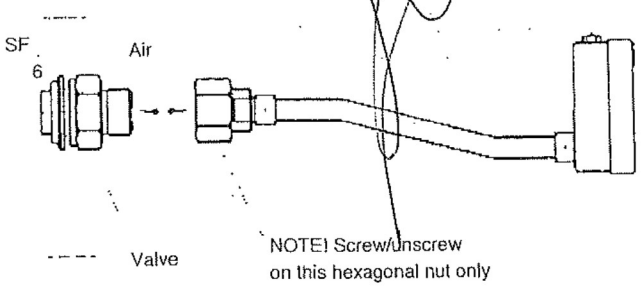
After the current transformers have been installed in the unit, the cables from the protection relay are connected. Consult the manual supplied with the protection relay for a description of the connections.

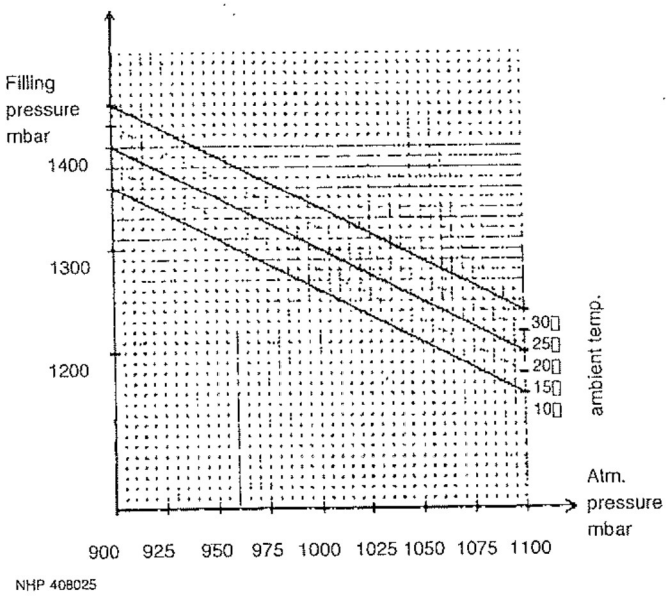
SafeRing with vacuum circuit breakers are prepared for protection relay: SEG WIC1 . It is designed so that there is no need for external auxiliary voltage for correct functioning.

Separate manuals have been prepared for each of these protection relay, with examples of adjustments.

It is essential for correct functioning that the current transformers are properly connected and that the protection relay is properly adjusted.

ВЯРНО С ОРИГИНАЛА





3.4 GAS PRESSURE

SafeRing / SafePlus contains SF6 gas with a nominal pressure of 1.4 bar at 20°C.

SafeRing/ SafePlus is sealed for life and is fitted with a temperature-compensated pressure indicator.
A temperature-compensated device that emits an electrical signal to indicate lower pressure can be supplied on request.

Pointer in green area - unit has correct pressure
Pointer in red area - pressure is too low

Refilling of SF_6 gas in SafeRing/SafePlus

Following equipment is needed gas bottle with manometer and reduction valve adapter pressure measuring device

1. Remove front cover and unscrew manometer as shown.
2. Screw (tightening the torque 45 Nm) the adapter to the valve.
3. Before connecting the hose from the gas bottle to the adapter, the air in the hose must be removed by running SF_6 gas through the hose.
4. When gas is flowing into the RMU/switchgear, the manometer on the gas bottle has to be observed. When it shows 0.4 bar at ambient temperature 20°Celsius, (14 bar absolute) the gas filling must be stopped. See table for filling pressure above.
5. Remove the filling hose and connect the pressure device to check the pressure inside the RMU/switchgear.
6. When the correct pressure of 0.4 bar (14 bar absolute) is obtained, remove the adapter and screw with tightening torque 45 Nm the manometer to the RMU/switchgear as shown above.
   Observe that the sealing between the manometer and the valve is smooth and clean.

4. OPERATION

4.1 OPERATING CONDITIONS

Normal ambient conditions
SafeRing / SafePlus is generally equipped for operation/service in normal indoor conditions in accordance with IEC 60694.
The following limitations apply:

Ambient temperature	
Max. temperature	+40°C
Max. temperature (24-hour average)	+35°C
Min. temperature	- 40°C

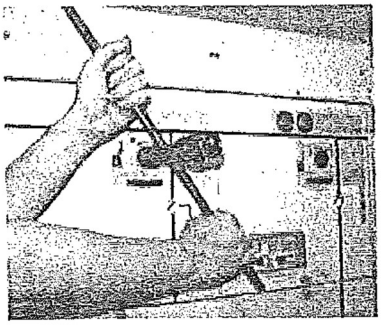
Humidity

Max. average relative humidity measured over 24 hours	95%
Max. average relative humidity measured over 1 month	90%

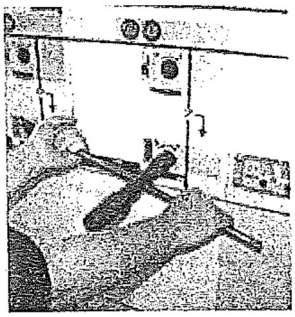
Max height above sea level for installation without reducing gas pressure	1,500 metres

Special conditions
In accordance with IEC 60694, the manufacturer and end-user must agree about special operating conditions which deviate from operation under normal conditions.
The manufacturer/supplier must be consulted in advance if especially difficult operating conditions are involved. When electrical equipment is installed at more than 1,500 metres above sea level, for example, the atmospheric pressure will be lower and the overpressure in the tank will have to be reduced.

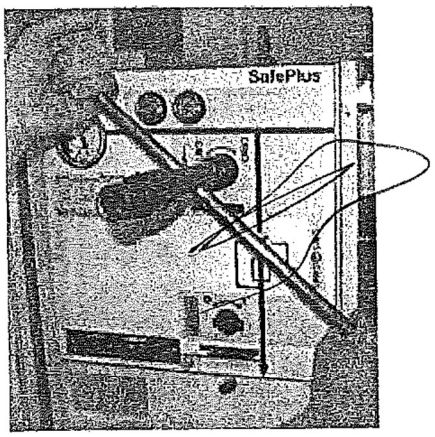
Airfreight
Units / modules delivered with reduced overpressure - see procedure for refilling.



Switch disconnector:
Close: Turn the operating handle clockwise.
Open: Turn the operating handle anti-clockwise.



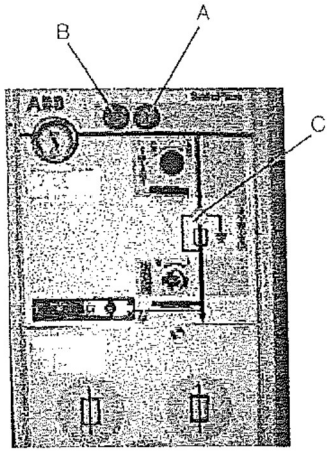
Earthing switch:
Close: Turn the operating handle clockwise.
Open: Turn the operating handle anti-clockwise.

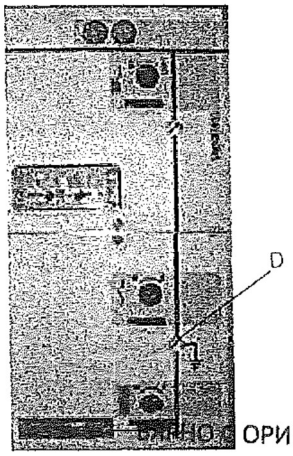


Fuse switch disconnector.
Close: Turn the operating handle clockwise to charge the close/open spring. Then push the green button. (A)
Open: Push the red button. (B)
In circuit breaker configurations, the transformer circuit breaker can be tripped by the protection relay, while in switch fuse configurations fuse switch disconnector can be triggered by the fuse striker pin if an over current or short-circuit occurs.

4.2 OPERATION

All switches can be operated with the included operating handle.
Internal mechanical interlocking between the switch disconnector/circuit breaker and the associated earthing switches prevents incorrect operation. The operation of the switch disconnector/circuit breaker and earthing switches can be further interlocked by means of a padlock. The earthing switches are operated by a snap action mechanism, which ensures fast closing.
The earthing switch is closed by turning the operating handle clockwise. Turning the operating handle anti-clockwise opens the switch.
For closing the transformer switch the spring mechanism must be charged. Turning the operating handle clockwise does this. Then the green on button must be pressed to close the switch/ breaker.
An anti-reflex system, standard on all operating handles, prevents the immediate re-operation of switches.



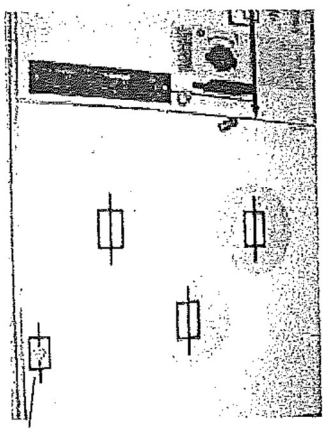


Mechanical position indicators:
C: Transformer breaker open D: Earthing switch closed

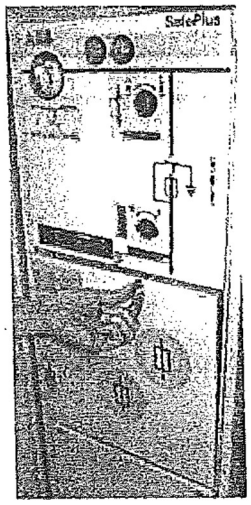
4.3 INSTALLATION AND REPLACEMENT OF FUSES

A red indicator below the fuse symbol on the lower front panel indicates a fuse trip. Fuses are replaced as shown in the sequence of illustrations. Switch fuse configurations are supplied without fuses installed.

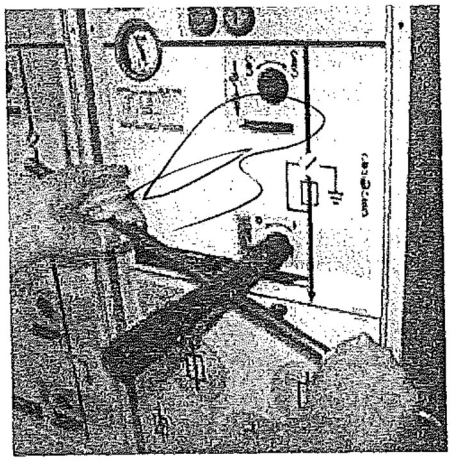
When installing fuses for the first time, follow the sequence of illustrations 1-9.



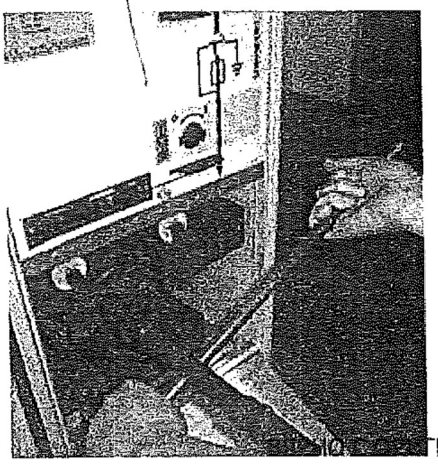
1. Fuse trip indicator.



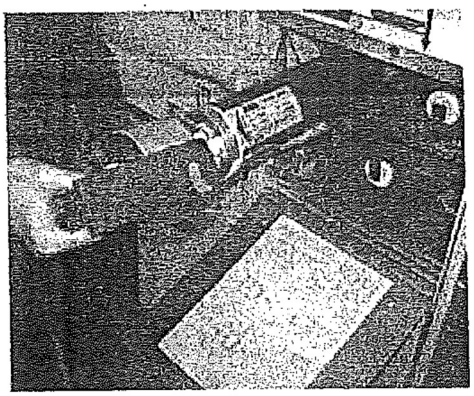
3. Unscrew fuse cover.
4. Tilt out the fusepanel to gain access to fuse canisters.



2. Close earthing switch by turning operating handle clockwise.



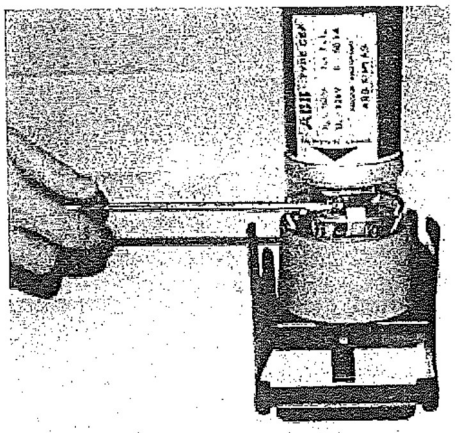
5. Applying the operating handle and turning anti-clockwise opens the fuse canisters.



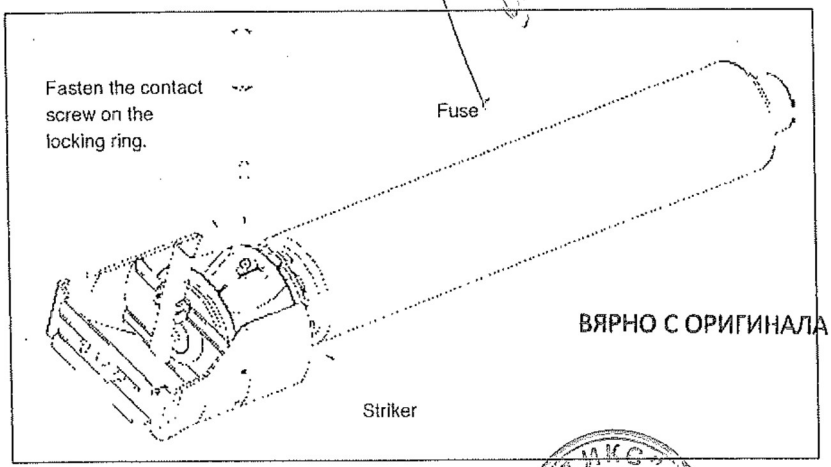
6. Pull out the fuse handle. The fuses are firmly fixed in the fuse cover.

8. Turn the handle on the fuse cover clockwise to close and seal the fuse canister. Use the operating handle.

9. Close the fuse panel.
The switches are ready for operation.



7. Fix the fuses to the fuse cover using the contact screw
   - The striker must point out from the fuse canister for the fuse to function properly.

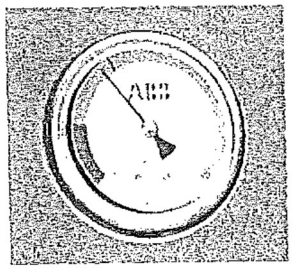


5. MAINTENANCE

All components in the SF_6 tank are maintenance-free for the declared life expectancy of the product. The tank is made of stainless steel.
If the panels substain any scratches or damage, these must be repaired with paint to prevent corrosion.

Mechanical parts are positioned outside the tank and behind the front panel. This enables easy access and replacement if required.

Mechanical parts are surface-treated to prevent corrosion. Moving parts are lubricated at the factory for the product's life expectancy. In extreme conditions (dust, sand and pollution), inspection and maintenance will be imperative, and in some cases replacements will be necessary. Check that the lubricant is not washed or wiped away from the mechanical moving parts.



5.1 CONTROL AND MONITORING THE GAS

SafeRing / SafePlus is a pressure-sealed system that normally does not require special inspections. However the gas pressure on the manometer should always be checked prior to operation.

ВЯРНО С ОРИГИНАЛА

5.2 ENVIRONMENTAL CERTIFICATION

1. LIFE EXPECTANCY OF PRODUCT

The product is developed in compliance with the requirements denoted by IEC 298. The design incorporates a life span under indoor service conditions exceeding 30 years (IEC 298 annex GG).
The switchgear is gas-tight with an expected diffusion rate of less than 0.1 % per annum. Referring to the reference-pressure of 1.4 bar, the switchgear will maintain gas-tightness and a gas-pressure better than 1.3 bar* throughout its designed life span. *) at 20°C.

2.RECYCLING CAPABILITY

Raw Material	Amount	% of total weight 320kg	Re-cycle	Environmental effects & recycle/reuse processes
Iron	132,80 kg	42,53%	Yes	Separate, utilise in favour of new source (ore)
Stainless steel	83,20 kg	24,93%	Yes	Separate, utilise in favour of new source (ore)
Copper	43,98 kg	14,09%	Yes	Separate, utilise in favour of new source (ore)
Brass	2,30 kg	0,74%	Yes	Separate, utilise in favour of new source (ore)
Aluminium	8,55 kg	2,74%	Yes	Separate, utilise in favour of new source (ore)
Zinc	3,90 kg	1,25%	Yes	Separate, utilise in favour of new source (ore)
Silver	0,075 kg	0,024	Yes	Electrolysis, utilise in favour of new source
Thermoplastic	5,07 kg	1,63%	Yes	Make granulate, re-use or apply as energy superior additive in refuse incineration
Epoxy incl. 60% quartz	26,75 kg	8,35 %	Yes	Grind to powder and use as high-grade energy additive in cement mill
Rubber	1,35 kg	0,42 %	Yes	High-grade energy additive in refuse incineration
Dielectric oil	0,21 kg	0,066 %	Yes	Reclaim or use as High-grade energy additive in refuse incineration
SF_6 gas	3,24 kg	1,04%	Yes	ABB Distribusjon in Skien reclaims used SF_6 gas.
Total for recycling	**311,44kg**	**97,25 %**		
Not specified *	9,00 kg			*Stickers, Film-foils, powder coating, screws, nuts, tiny components, grease.
Total weight **	320,00 kg	100 %		
Packing foil	0,2 kg		Yes	High-grade energy additive in refuse incineration
Wooden pallet	21,5 kg		Yes	Re-use or use as energy additive in refuse incineration

**)All figures are collected from CCF 3-way unit with arc suppresser.

3.END-OF-LIFE

ABB Distribusjon is committed to the protection of the environment and adhere to ISO 14001 standards. It is our obligation to facilitate end-of-life recycling for our products.
There exist no explicit requirements for how to handle discarded switchgears at end-of-life. ABB's recycling service is accordi ng to IEC 1634 edition 1995 section 6: *End of life of SF_6 filled equipment* and in particular 6.5.2.a: *Low decomposition: No special action is required; non-recoverable parts can be disposed of normally according to local regulations.*Ø
We also recommend ABB's website : http://www.abb.com/sf6 .
ABB Distribusjon in Skien is equipped to reclaim SF_6 gas from discarded switchgears.

ВЯРНО С ОРИГИНАЛА

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e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.1.5

Списък на проведените типови изпитвания на английски или на български език съгласно БДС EN 62271-200 или еквивалентно/и с приложени резултати.

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка и монтаж на комплектни метални трансформаторни постове"

РЕФ. № PPD 19-102

организиран от "ЧЕЗ Разпределение България" АД

ABB

Списък на на извършените типови изпитания

Declaration of Conformity to Standards

SafeRing / SafePlus 12/24.

F-Панел 12kV-17.5kV-24kV (IEC62271-105):

1. Тестове за механична устойчивост. (IEC60265-1 / IEC62271-102)

1.1 Мощностен разединител	SATS 06-B16
1.2 Заземител	

2. Диелектрични тестове (IEC62271-200 / IEC60694 / IEC62271-102)

2.1 Тестове на мълниев импулс	SATS 07-B19 (24kV) SATS 07-B18 (12/17.5kV)
2.2 Тестове с промишлена честота	
2.3 Измерване на частични разряди	

3. Тестове на късо съединение. (IEC62271-102)

3.1 Долен заземителен нож (12kV)	SATS 06-B43
3.2 Долен заземителен нож (24kV)	SATS 06-B10

4. Тестове при включване /изключване. (IEC62271-105)

4.1 TDisc	SATS 06-B37 (12kV)	SATS 06-B01 (17.5kV) SATS 05-B14 (17.5kV) PEHLA 0589Ra (17.5kV)	SATS 06-B02 (24kV) SATS 05-B15 (24kV) PEHLA 0588Ra (24kV)
4.2 TDIWmax	SATS 06-B53 (12kV)		
4.3 TDitransfer	SATS 06-B03 (12kV)		
4.4 TDito	PEHLA 06100Ra (12kV)		

5. Making Tests (IEC62271-102 / IEC60265-1)

5.1 Долен заземителен нож	SATS 06-B44 (12kV) SATS 06-B52 (12kV)	SATS 06-B11 (24kV) SATS 06-B12 (24kV)

6. Температурни тестове. (IEC62271-200)

6.1 Температура на повишаване 12kV	SATS 08-B41
6.2 Температура на повишаване 24kV	

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Българ

7. Други тестове. (IEC62271-200/IEC62271-102)

7.1 измерване на утечка след тест на мех устойчивост.	SATS 06-B16
7.2 Тестване на устроиствата указващи позиция на разединителя или заземителя	SATS 08-B02
7.3 Тест за време преди дъга на предпазителите	SATS 09-B46
7.4 Механични тестове при работа	SATS 09-B41
7.5 Блокировки	

С-Панел 12-24kV (IEC60265-1 / IEC62271-102 / IEC62271-200)

1. Тестове за механична устойчивост. (IEC60265-1 / IEC62271-102)

1.1 мощностен разединител	SATS 08-B07
1.2 Заземител	

2. Диелектрични (IEC62271-200 / IEC60694 / IEC62271-102)

2.1 Тестове на Мълниев импулс	SATS 07-B16 (12/17.5kV)
2.2 Тестове с промишлена честота	SATS 07-B17 (24kV)
2.3 Частични разряди тестове	

3. Тестове на к.с. (IEC60694 / IEC62271-102)

3.1 Главна верига / мощностен разединител (12kV)	SATS 07-B25
3.2 Заземител (12kV)	SATS 07-B25
3.3 Главна верига / мощностен разединител (24kV)	SATS 07-B25
3.4 Заземител (24kV)	SATS 07-B25

4. Тестове според (IEC60265-1)

12kV:

4.1 TD1	630A	SATS 07-B14
4.2 TD2a	630A	
4.3 TD4a	63A	
4.4 TD4b	1A	
4.5 TD4c	135A	
4.6 TD6a	200A	
4.7 TD6b	115A	

24kV:

4.1 TD1	630A	SATS 07-B15
4.2 TD2a	630A	
4.3 TD4a	50A	
4.4 TD4b	1.5A	
4.5 TD4c	135A	
4.6 TD6a	150A	

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4.7 TD6b	87A	

5. Тестове според (IEC60265-1 / IEC62271-102)

5.1 TD5 тест на к.с (12kV)		SATS 06-A10 / 06-B14
5.2 TD5 тест на к.с 12kV/21kA		Pehla 07048Ra
5.3 TD5 тест на к.с STL 24kV/16kA		Pehla 07050Ra
5.4 TD5 тест на к.с мощностен разединител 12kV/25kA		Pehla 07049Ra
5.5 TD5 тест на к.с заземител	12kV/25kA	Pehla 07085Ra
5.6 TD5 тест на к.с мощностен разединител 24kV/21kA		Pehla 07086Ra
5.7 TD5 тест на к.с мощностен разединител	24kV/21kA	Pehla 07087Ra

6. Температурен тест. (IEC60265-1 / IEC62271-102)

6.1 Главна верига / мощностен разединител	SATS 08-B34

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7. Други. (IEC62271-200/IEC62271-102)

7.1 Тестове за индикация на позициите	SATS 08-B02
7.2 Блокировки	SATS 08-B07
7.3 Други механични тестове	SATS 08-B07

Тестове на Комплектната разпределителна Уредба. (IEC62271-200):

1. Тест на утечка.

1.1 Измерване на утечка след тест на к.с	SATS 06-B19

2. Налягане - тест:

2.2 Тест за устойчивост на налягане	SATS 07-B08
2.3 Тест за устойчивост на налягане	SATS 08-B06

3. Проверка на защитата по IP:

3.1 Отделение на Кабелите. IP3X , Преден Панел IP2XC	SATS 08-B05

4. Тестове на вътрешна дъга.

4.1 IAC AFL 16kA 1sec. (обвивка) за CCF	SATS 07-B02 / SATS 07-B03
4.2 IAC AF 16kA 1sec. (кабелно отделение CCF)	SATS 07-B04
4.3 IAC AFL 16kA 1sec. (кабелно отделение CCF)	SATS 07-B05
4.4 IAC AFL 20kA 1sec. (обвивка) за CCF	SATS 07-B07
4.5 IAC AFL 16kA 1sec. (кабелно отделение) за C панел	SATS 07-B35
4.6 IAC AFL 20kA 1sec. (обвивка) за CF	SATS 07-B29
4.7 IAC AFL 20kA 1sec. (обвивка) за CCCF	SATS 07-B34
4.8 IAC AFLR 20kA 1sec. (кабелно отделение) CCF	SATS 08-B01
4.9 IAC AFLR 20kA 1sec. (със диск вътрешна дъга) CCF) CCCF	NEFI 1982
4.10 IAC AFL 16kA 1sec. (обвивка) CCF) за CCV	SATS 08-B11
4.11 IAC AFL 20kA 1sec. (кабелно отделение за CCC)	SATS 08-B10
4.12 IAC AFLR 20kA 1sec. (1-way C със арк сърпресор)	SATS 09-B26
4.13 IAC AF 20kA 1sec. (обвивка) за CV	SATS 09-B23
4.14 IAC AFL 20kA 1sec. (обвивка) за SICCV	SATS 09-B42
4.15 IAC AFL 20kA 1sec. (обвивка) за CCF	SATS 10-B17
4.16 IAC AFL 20kA 1sec. (обвивка) за CCF	SATS 10-B18
4.17 IAC AFL 21kA 1sec. (обвивка) за CVVC	SATS 10-B49
4.18 IAC AF 16kA 1sec. M-мерене	SATS 10-B41
4.19 IAC AFL 20kA 1sec. CB-Панел с прекъсвач	SATS 10-B26
4.20 IAC AFLR 20kA 1sec. CCF с диск вътрешна дъга и манометър.	

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5. Други тестове.

5.1 Ток на устойчивост на к.с при заземяване в кабелното отделение..	NEFI RoP no. 2041

5.2 Ток на устойчивост на к.с при заземяване в кабелното отделение. Връзка панел тип С със панел ТР	SATS 08-B12
5.3 Ток на устойчивост на к.с при заземяване в кабелното отделение със вертикален заземител	SATS 08-B19

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5.4 Ток на устойчивост на к.с при заземяване в кабелното отделение est. Връзка С панел с V панел..	SATS 09-B19
5.5 Тест на устойчивост при конзолно усилие на кабелните втулки(проходни изолатори)	Laborelec LBE01218156-4.0
5.6	
5.7	

V-Панел с прекъсвач 12-24kV (IEC62271-100):

1. Тестове на механична устойчивост. (IEC62271-100)

1.1 Вакуумен прекъсвач	SATS 09-B09
1.2 Заземител	SATS 09-B09

2. Диелектрични(Изолационни) тестове. (IEC 60694, IEC62271-200, IEC62271-100)

2.1 Мълниев импулс	SATS 09-B03
2.2 Честота	SATS 09-B03
2.3 Измерване частични разряди	SATS 09-B03

3. Тестове на к.с. (IEC62271-200 IEC62271-100 IEC62271-102)

4.1 Главна верига, прекъсвач и разединител	SATS 08-B08

4. Тестове на включване и изключване (IEC62271-100)

4.1 Тестове на изключвателна и вкл. способност (T10,T30,T60,T100s)	Laboratories Ratingen: XZ 113 H15 (24kV)
4.2 тест при превключване на заредена кабелна линия	Laboratories Ratingen: XZ 113 K01 (24kV)
4.3 Тестове на изключвателна и вкл. способност (T10,T30,T60,T100s,T100a)	PEHLA 0639Ra (12kV)
4.4 Тестове на к.с серии: TD 1-4.	Laboratories Ratingen: XA 113 H01 (15.2kV / 21kA)

5. Температурни тестове. (IEC 62271-100 IEC 62271-200)

5.1 Главна верига, прекъсвач и разединител	SATS 08-B52

6.Други (IEC62271-200 IEC 60694)

6.1 Проверка на защита по IP	SATS 08-B05

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6.2 Здравина на сглобката	SATS 09-B09
6.3 Механична устойчивост	SATS 09-B28

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PEHLA

GESELLSCHAFT FÜR ELEKTRISCHE HOCHLEISTUNGSPRÜFUNGEN
Member of the SHORT-CIRCUIT TESTING LIAISON (STL)

Test Report

Report No.: 07085Ra Copy No.: 1 Contents: 25 Sheets

Test object: High-voltage, metal-enclosed, gas-insulated switchgear with three-position general purpose switch-disconnector and earthing switch

Designation: SafePlus, type CGC, C3
Rated voltage: 12 kV Rated normal current: 630 A Rated frequency: 50 Hz

Manufacturer: ABB AS, Skien, Norway

Client: ABB AS, Skien, Norway
under license of ABB Technology Ltd., Zurich, Switzerland

Testing station: PEHLA-Testing Laboratory Ratingen, Germany

Date of test: 03rd December 2007

Applied test specifications:

The tests have been carried out in accordance with:
IEC 60265-1, 3rd Ed., 1998-01, clause 6.101,
IEC 62271-102, 1st Ed., 2001-12, clause 6.101.

Tests performed:

Type test 'Short-Circuit Making Tests'.
Three-phase short-circuit making tests on the three-position general purpose switch-disconnector and earthing switch comprising five making operations in the earthing position according to class E2 based on 12 kV - 25 kA at 50 Hz.
No-load operations before and after the tests.

Test results:

The test object has passed the test performed in accordance with the applied test specifications.

GESELLSCHAFT FÜR ELEKTRISCHE HOCHLEISTUNGSPRÜFUNGEN

На основание чл.36а ал.3 от ЗОП

ВЯРНО С ОРИГИНАЛА

Mannheim, 24th June 2008

03PE0712

Deutscher Akkreditierungs Rat
D-PL
България
DAT-P-032/93

Notes

Accreditation

The PEHLA-Testing Laboratory Ratingen has been approved by the DATech (German accreditation body for technology) according to EN ISO/IEC 17025 for tests in the field of high-voltage switchgear and controlgear and power engineering equipment (Registration-No. DAT-P-032/93).

STL-Member

PEHLA is founder member of the SHORT-CIRCUIT TESTING LIAISON (STL) which has been established in 1969. STL is a forum for the international cooperation of the testing organisations with the further full members ASTA (UK), CESI (IT), CPRI (IND), ESEF (FR), KEMA (NL), SATS (NO, SE, FI), STLNA (US, CA) and JSTC (JP). In the frame-work of EC, STL (EU) has been recognised in 1992 by EOTC as agreement group.

PEHLA-Documents

A Type Test Certificate

is issued for type tests which have successfully been carried out in full compliance with the relevant specifications or standards and STL Guides valid at the time of the test. For these tests the test object must be clearly identified by technical description, drawings and additional specifications.

A Test Document

is issued for parts of type tests which have successfully been carried out in full compliance with the relevant specifications or standards and STL Guides valid at the time of test. For these tests the test object must be clearly identified by technical description, drawings and additional specifications.

A Test Report

is issued for all other tests which have been carried out according to specifications, standards or "PEHLA-Richtlinien" (PEHLA Guides) and/or clients' instructions. Similarly, this test report contains all test results, details of the conditions under which the tests were carried out, also details relating to the behaviour of the test object, and its condition after the tests.

A Test Confirmation

is issued immediately after the tests. It confirms that the tests have been conducted and is valid only until publishing the detailed results in an entire document.

Uncertainty of the measurement systems

The PEHLA - Testing Laboratories apply the PEHLA Guide No. 12 for determining the uncertainties of measurement, based on ENV 13005 (Guide to the expression of uncertainly in measurement). As long as no explicit statements are made, the uncertainties required by the relevant standards have been complied with.

Addresses

Office: PEHLA-Geschäftsstelle
Hallenweg 40
68219 Mannheim
Germany
Internet: www.pehla.com

Testing Station: PEHLA-Testing Laboratory Ratingen
Oberhausener Str. 33
40472 Ratingen
Germany

Manufacturer: ABB AS
P.O. Box 108 Sentrum
N – 3701 Skien
Norway

Client: ABB AS
P.O. Box 108 Sentrum
N – 3701 Skien
Norway
under license of
ABB Technology Ltd., Zurich, Switzerland

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List of Test Participants

Representatives of Technical Committee:

Mr. Christopher Hackland	PEHLA-Testing Laboratory Ratingen, Germany
Mr. Herbert Feld	PEHLA-Testing Laboratory Berlin-Marzahn, Germany

Test Engineer / Test Operator:

Mr. Sebastian Martinek (Test Engineer)	PEHLA-Testing Laboratory Ratingen, Germany
Mr. Frank Idaszek (Measurement)	PEHLA-Testing Laboratory Ratingen, Germany
Mr. Frank Herff (Machine Operator)	PEHLA-Testing Laboratory Ratingen, Germany

Representatives of Client:

Mr. Tor Bratsberg	ABB AS, Skien, Norway
Mr. Roger Reiersen	ABB AS, Skien, Norway

Further Participants:

Mr. David Myszka	PEHLA-Testing Laboratory Ratingen, Germany

ВЯРНО С ОРИГИНАЛА

Technical Data of Test Object
Switchgear

Test object:	High-voltage, metal-enclosed, gas-insulated switchgear
Designation:	SafePlus, type CCC
Manufacturer:	ABB AS, Skien, Norway
Serial No.:	20072310640002
Year of manufacture:	2007
Drawing No.:	See sheet 7

Ratings assigned by the manufacturer:

Rated voltage	12	kV	
Rated normal current	630	A	
Rated frequency	50	Hz	
Rated lightning impulse withstand voltage	95	kV	
Rated switching impulse withstand voltage	-	kV	
Rated power-frequency withstand voltage	38	kV	
Rated peak withstand current	62.5	kA	
Rated short-time withstand current	25	kA	
Rated duration of short-circuit	1	s	
Insulating medium	SF_6		
Rated filling pressure for insulation	0.14	MPa	abs. at 20 °C
Minimum functional pressure for insulation	0.13	MPa	abs. at 20 °C

Permissible values for internal arc faults:

Peak current	50	kA
Short-circuit current	20	kA
Duration of short-circuit	1	s

Further data: -

Essential characteristics and installed devices:

SafePlus, type CCC with high-voltage three-position general purpose switch-disconnector and earthing switch type CFE-C.

Operating mechanism: Independent operating mechanism type 3PKE

ВЯРНО С ОРИГИНАЛА

Technical Data of Test Object

Three-Position Switch-Disconnector and Earthing Switch

Test object:	High-voltage three-position general purpose switch-disconnector and earthing switch
Designation:	Switch-disconnector and earthing switch type CFE-C
Manufacturer:	ABB AS, Skien, Norway
Serial No.:	1VDL020051995
Year of manufacture:	2007
Serial No. of drive:	1VDL030110823
Drawing No.:	See sheet 7

Ratings assigned by the manufacturer:

Rated voltage	12	kV	
Rated normal current	630	A	
Rated frequency	50	Hz	
Rated lightning impulse withstand voltage	95	kV	
Rated switching impulse withstand voltage	-	kV	
Rated power-frequency withstand voltage	38	kV	
Rated peak withstand current	62.5	kA	
Rated short-time withstand current	25	kA	
Rated duration of short-circuit	1	s	
Rated short-circuit breaking current	-	kA	
DC component of the rated short-circuit breaking current	-	%	
Rated short-circuit making current	62.5	kA	
Rated transient recovery voltage	20.6	kV	
Rate of rise of transient recovery voltage	0.34	kV/µs	
First-pole-to-clear factor	1.5		
Rated operating sequence	-		
Arc extinguishing medium	SF_6		
Rated filling pressure for interruption	0.14	MPa	abs. at 20 °C
Minimum functional pressure for interruption	0.13	MPa	abs. at 20 °C
Insulating medium	SF_6		
Rated filling pressure for insulation	0.14	MPa	abs. at 20 °C
Minimum functional pressure for insulation	0.13	MPa	abs. at 20 °C
Driving mechanism (type)	spring drive (independent operated)		
Number of poles	3		
Number of units per pole	-		
Rated opening time	-	ms	
Rated closing time	-	ms	
Rated supply voltage of opening device	-	V	d.c.
Rated supply voltage of closing device	-	V	d.c.
Rated supply voltage of auxiliary circuits	-	V	d.c.
Rated frequency of supply voltage	-	Hz	
Rated line-charging breaking current	1	A	
Rated cable-charging breaking current	10	A	

Further data: -

ВЯРНО С ОРИГИНАЛА

Essential characteristics:
Switch disconnector class E3, earthing switch class E2.

List of Identified Drawings

The manufacturer has submitted to the testing laboratory drawings and other data containing sufficient information to unambiguously identify by type the essential details and parts of the test object presented for test.
The drawings have been stamped and signed by the manufacturer in order to guarantee that the drawings or data schedules truly represent the test object to be tested.
Further these drawings have been stamped and signed by PEHLA representatives and are kept

☐ at the client.
☒ with the test documents at the test laboratory.

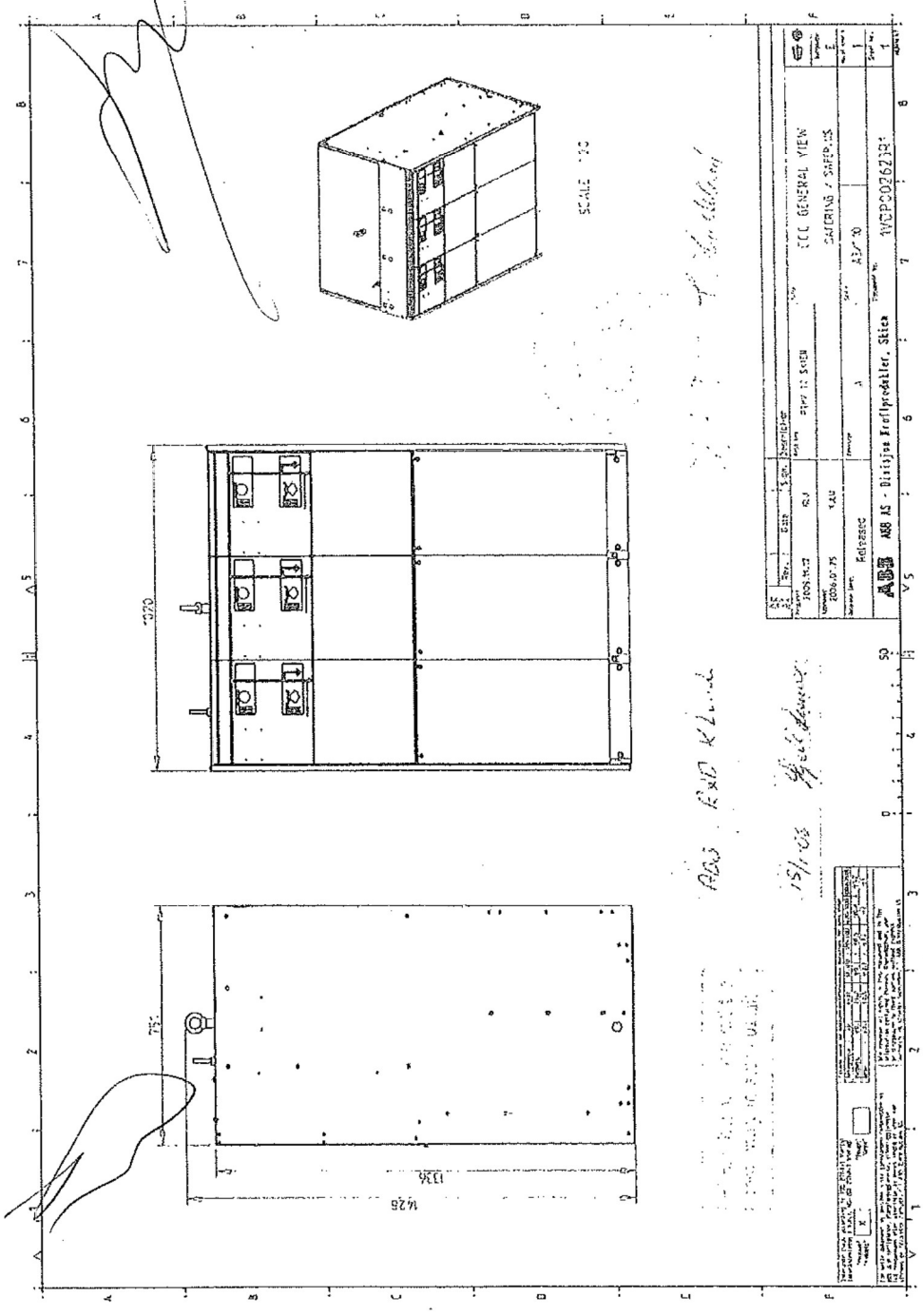
The testing laboratory has checked that drawings and data schedules adequately represent the essential details and parts of the test object to be tested, but is not responsible for the accuracy of the detailed information.
The drawing(s) contained in this document are identical with the checked, stamped and signed drawings.

Drawing No.	Rev.	P/D *)	Title	Additional remarks
1VDP002623R1 Sheet 1/1	A	D	CCC GENERAL VIEW SAFERING / SAFEPLUS	Included in this test report
NHP304318P001 Sheet 1/1	A	D	CCC SINGLE LINE DIAGRAM	-
2RAA006137A0001 Sheet 1/1	A.001	D	COMPLETE PRE-ASSEMBLED C-MODULE	Included in this test report
2RAA006135A0001 Sheet 1/1	B	D	CFE-C SAFERING/SAFEPLUS 12/24	-
2RAA003855A0001 Sheet 1/1	A	D	CFE-C SAFERING/SAFEPLUS 12/24	-
1VDP002862R001 Sheet 1/1	A	D	SWITCH KNIFE ASSEMBELED CFE-C	-
1VDP002827P001 Sheet 1/1	A	D	CONTACT KNIFE CFE-C	-
NHP304164P001 Sheet 1/1	J	D	LOWER CONTACT BLOCK CFE	-
2RAA002543P0001 Sheet 1/1	A	D	UPPER CONTACT W/STOPPER SAFERING/SAFEPLUS 12/24	-
NHP201651R001 Sheet 1/1	D	D	EARTH CONTACT ASM. 25 kA CFE	-
NHP304758P001 Sheet 1/1	D	D	EARTH BLOCK CFE-MODUL	-
NHP304734P001 Sheet 1/1	B	D	EARTHING BOLT CFE-MODULE	-
NHP101914P001 Sheet 1/1	B	D	CONNECTION L1 CFE-C	-
NHP101915P001 Sheet 1/1	D	D	CONNECTION L2 CFE-C	-
NHP101916P001 Sheet 1/1	C	D	CONNECTION L3 CFE-C	-
NHP201699R001 Sheet 1/1	B	D	400 SERIES BUSHING SAFERING/SAFEPLUS	- ВЯРНО С ОРИГИНАЛА
NHP304214P001 Sheet 1/1	B	D	BOLT THREADED 400-SERIE BUSHING	-
NHP101935R002 Sheet 1/1	A	D	3PKE MECHANISM SAFERING/SAFEPLUS	-

*) P: Parts list, D: Drawing

Remarks: -

Drawing No.
1VDP002623R1



ВЯРНО С ОРИГИНАЛА

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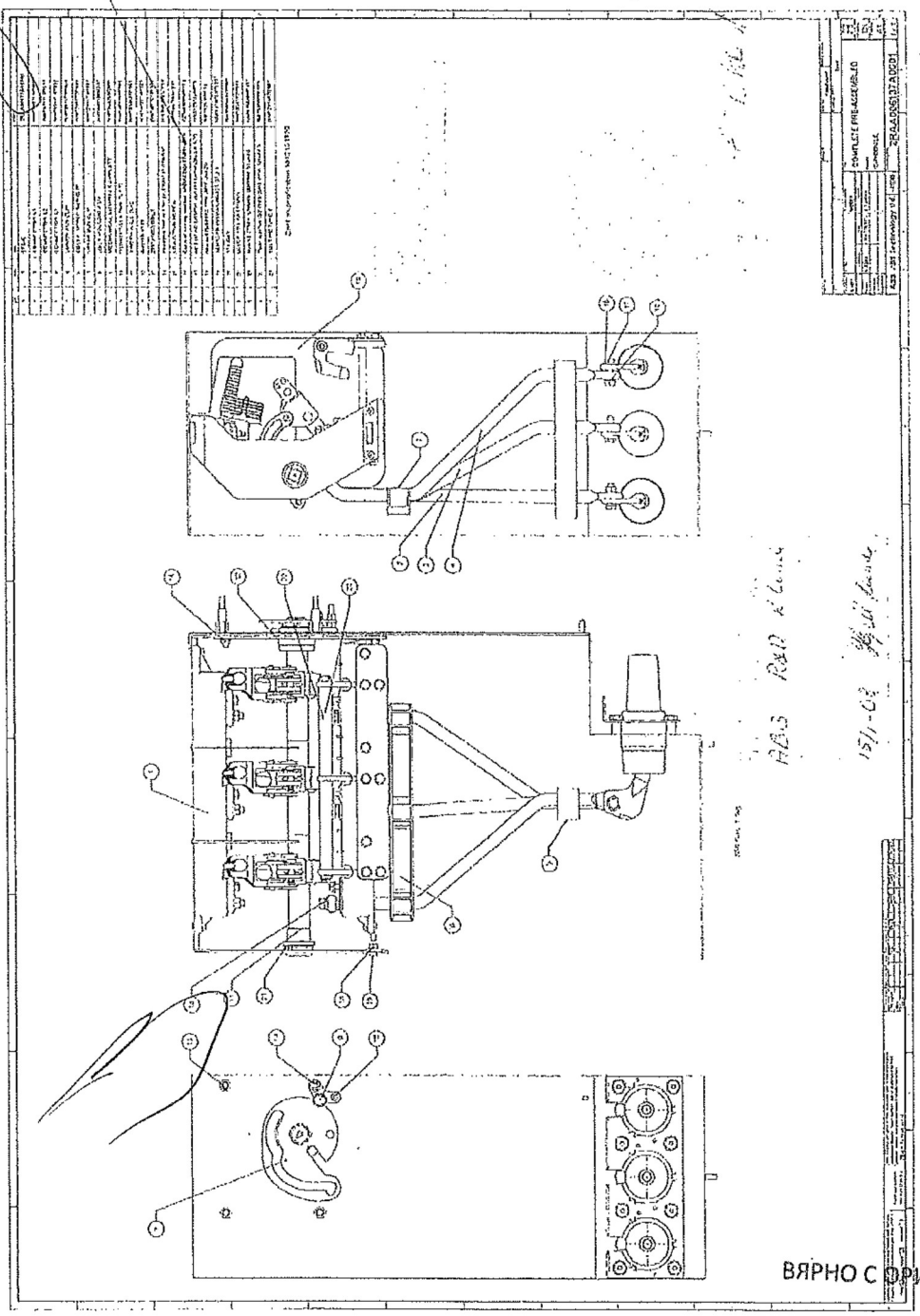


ВЯРНО С ОРИГИНАЛА

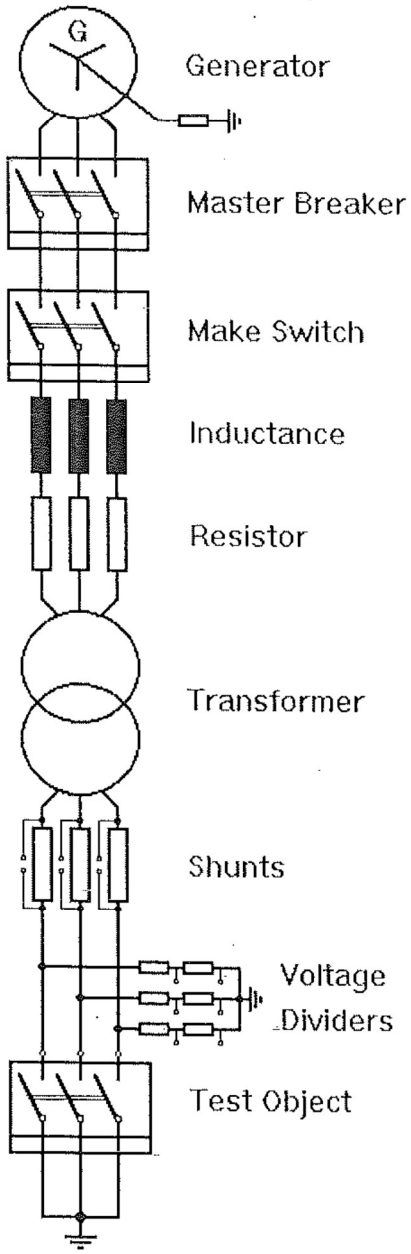
Technical Data of Test Circuit
Short-Circuit Making Tests

Test performed		Short-circuit making tests		-	
Test No.	PEHLA 07085Ra /	04 – 12		-	
Circuit diagram (test circuit)	see sheet	11		-	
Test object Rated voltage	kV	12		-	
Rated frequency	Hz	50		-	
Short-circuit breaking current	kA	-		-	
Units under test		3 (1 per phase)		-	
Voltage distribution	%	-		-	
Number of phases (test circuit)		3		-	
Power factor (test circuit)		< 0.15		-	
Frequency (test circuit)	Hz	50		-	
Earthing conditions Generator		earthed via 5 kΩ		-	
Transformer		not earthed		-	
Short-circuit point		earthed		-	
Prospective transient recovery voltage		Required values	Tested values	Required values	Tested values
Evaluation of oscillogram	No.	-	-	-	-
Crest value u_c	kV	-	-	-	-
Time t_2/t_3	µs	-	-	-	-
Time delay t_d	µs	-	-	-	-
Rate of rise u_1/t_1 or u_c/t_3	kV/µs	-	-	-	-
u_1	kV	-	-	-	-
t_1	µs	-	-	-	-

Remarks: -

ВЯРНО С ОРИГИНАЛА

Circuit Diagram
Short-Circuit Making Tests



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Test Results
Short-Circuit Making Tests

Test performed: Short-circuit making tests in earthing position, panel C3.
Date of test: 03rd December 2007
Condition of test object before test: As after 10 CO-operations with rated normal current in the disconnector position, performed in Skien, Norway.
Test arrangement: Direct test circuit, general purpose switch-disconnector and earthing switch in metal-enclosed, gas-insulated switchgear.
Connections to test object: Infeed via cables to the cable terminals of the right-hand side panel C3. Switchgear earthed via cable.
Gas pressure (abs. rel. to 20 °C): 0.13 MPa (insulation)

Test No.	PEHLA 07085Ra /		08	09	10	11	12	-
Operating sequence			C	C	C	C	C	-
Applied voltage (phase-to-phase)		kV	12.1	12.1	12.1	12.0	12.0	-
Pre-arcing voltage	L1	kV	-	-	-	-	-	-
	L2	kV	-	-	-	-	-	-
	L3	kV	-	-	-	-	-	-
Making current	L1	kA	61.9	63.3	51.4	40.4	41.6	-
	L2	kA	56.5	56.1	60.4	64.6	40.7	-
	L3	kA	42.8	42.9	46.4	60.0	62.5	-
Short-circuit current	L1	kA	25.6	25.8	25.5	25.9	26.1	-
	L2	kA	26.0	25.8	25.6	25.9	26.0	-
	L3	kA	26.0	25.9	25.8	26.0	25.9	-
	Average value	kA	25.9	25.8	25.6	25.9	26.0	-
Duration of short-circuit		ms	234	248	245	244	244	-
		MPa	0.13	0.13	0.13	0.13	0.13	-
C-Operation	Voltage of closing device	V [1)]	220	220	220	220	220	-
	Pre-arcing time	ms	-	-	-	-	-	-
Emission of flame/gas/oil			no	no	no	no	no	-
Number of valid test			1	2	3	4	5	-
Test result			P	P	P	P	P	-

Legend: P: Passed in terms of the applied standard N: Not passed in terms of the applied standard

Remarks: 1) Auxiliary voltage to trip the test object with a pneumatic cylinder

PEHLA 07085Ra / 01:	Current calibration
PEHLA 07085Ra / 02:	No-load operations
PEHLA 07085Ra / 03:	Voltage calibration
PEHLA 07085Ra / 04 to 07:	Tests with reduced values
PEHLA 07085Ra / 13 – 17:	Additional tests on another switching device

Condition of test object after test: No significant visible or functional deterioration. The torques for opening were measured between 49.7 and 53.3 Nm.

ВЯРНО С ОРИГИНАЛА

Test Results
No-Load Operations

Test performed: No-load operations
Date of test: 03rd December 2007
Condition of test object before test: As after 10 CO-operations with rated normal current in the disconnector position, performed in Skien, Norway.
Gas pressure (abs. rel. to 20 °C): 0.13 MPa (insulation)

Test No.	PEHLA 07085Ra /			02	02A	02B	02C
Operating sequence				C	C	C	C
C-Operation	Voltage of closing device		V [1)]	220	220	220	220
	Closing time	L1	ms	168	168	168	169
		L2	ms	168	167	168	168
		L3	ms	167	167	167	168
O-Operation	Voltage of opening device		V	-	-	-	-
	Opening time	L1	ms	-	-	-	-
		L2	ms	-	-	-	-
		L3	ms	-	-	-	-

Legend: -

Remarks: [1)] Auxiliary voltage to trip the test object with a pneumatic cylinder

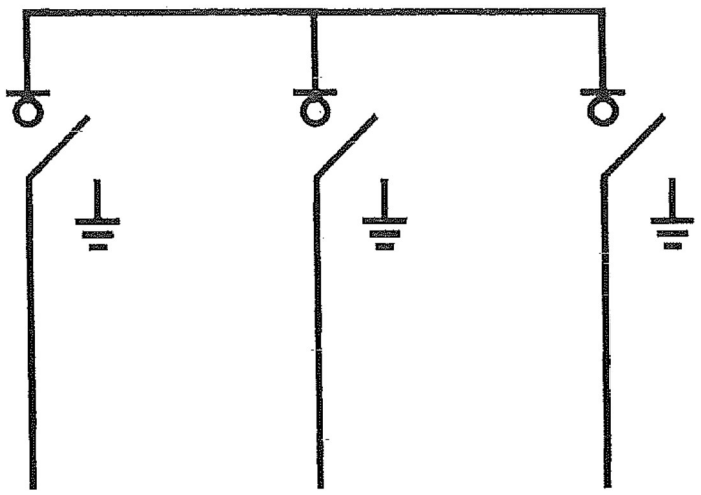
Test performed: No-load operations
Date of test: 03rd December 2007
Condition of test object before test: As after 10 CO-operations with rated normal current in the disconnector position, performed in Skien, Norway.
Gas pressure (abs. rel. to 20 °C): 0.13 MPa (insulation)

Test No.	PEHLA 07085Ra /			02D	-	-	-
Operating sequence				C	-	-	-
C-Operation	Voltage of closing device		V [1)]	220	-	-	-
	Closing time	L1	ms	169	-	-	-
		L2	ms	169	-	-	-
		L3	ms	168	-	-	-
O-Operation	Voltage of opening device		V	-	-	-	-
	Opening time	L1	ms	-	-	-	-
		L2	ms	-	-	-	-
		L3	ms	-	-	-	-

Legend: -

Remarks: [1)] Auxiliary voltage to trip the test object with a pneumatic cylinder

Linediagram



ВЯРНО С ОРИГИНАЛА

Photos

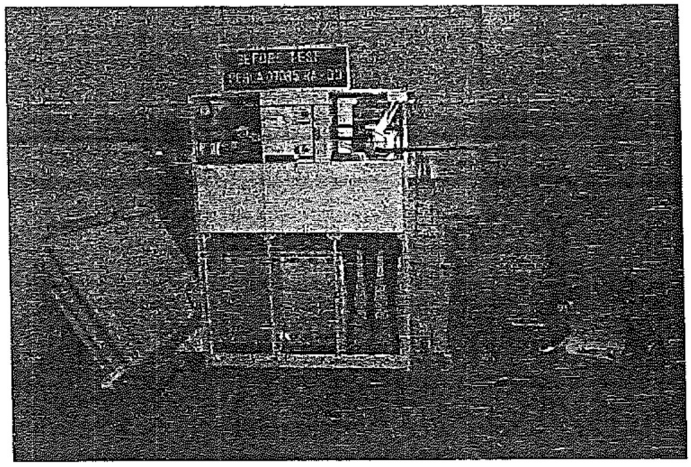


Photo No. 01
Before test PEHLA 07085Ra / 03

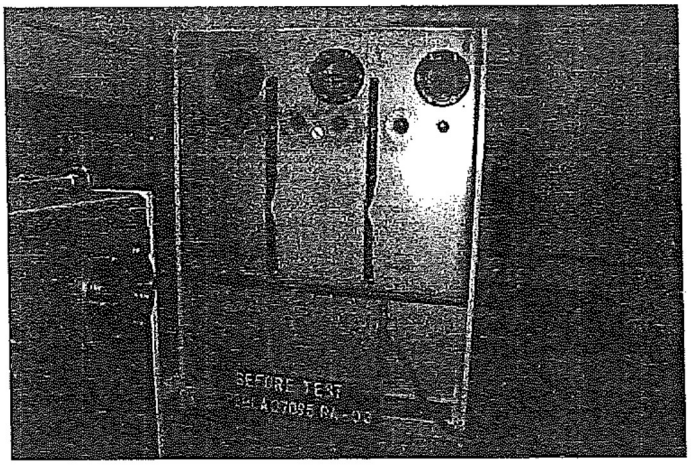


Photo No. 02
Before test PEHLA 07085Ra / 03

ВЯРНО С ОРИГИНАЛА

Photos

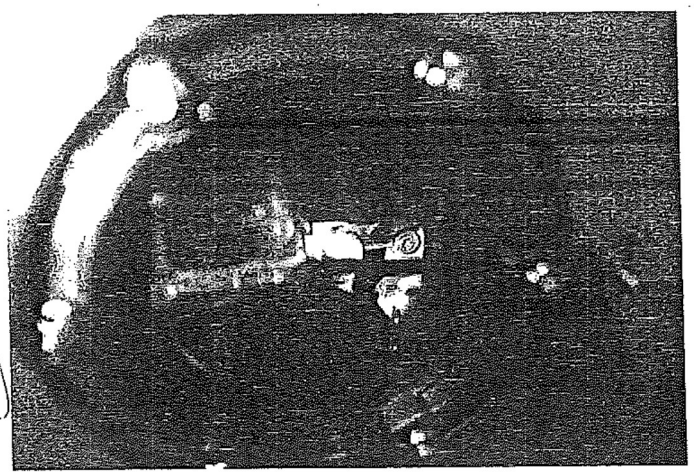


Photo No. 03
After test PEHLA 07085Ra / 08

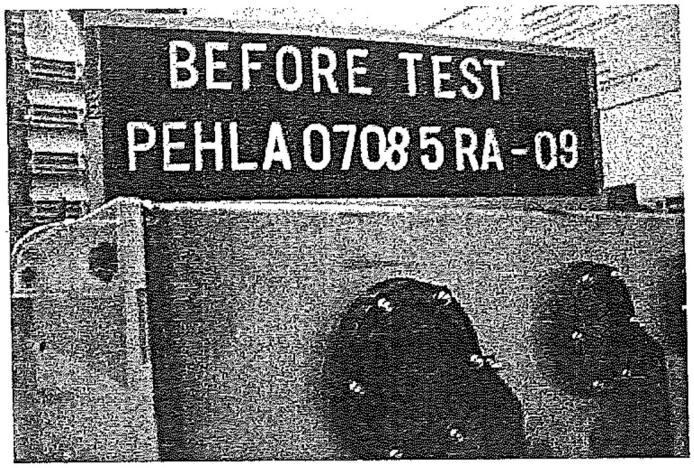


Photo No. 04
Before test PEHLA 07085Ra / 09

ВЯРНО С ОРИГИНАЛА

Photos

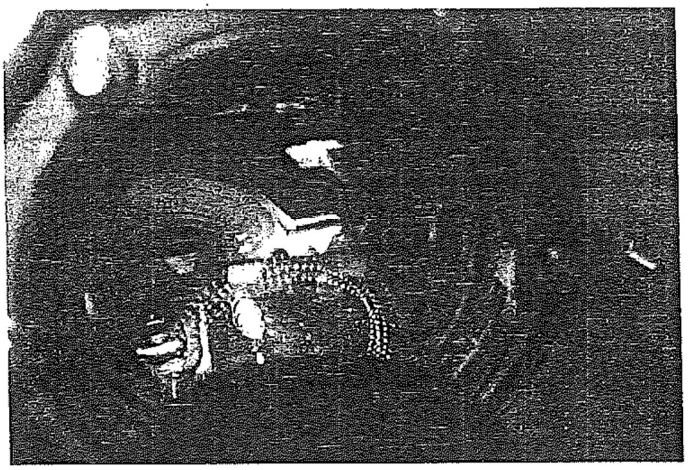


Photo No. 05
After test PEHLA 07085Ra / 09

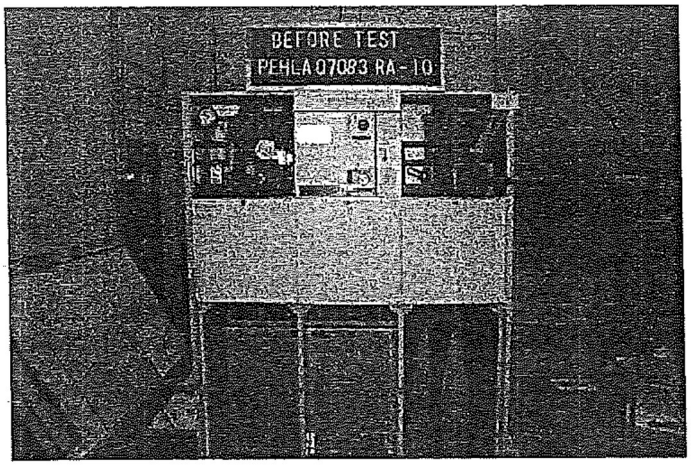


Photo No. 06
Before test PEHLA 07085Ra / 10

ВЯРНО С ОРИГИНАЛА

Photos

Photo No. 07
After test PEHLA 07085Ra / 10

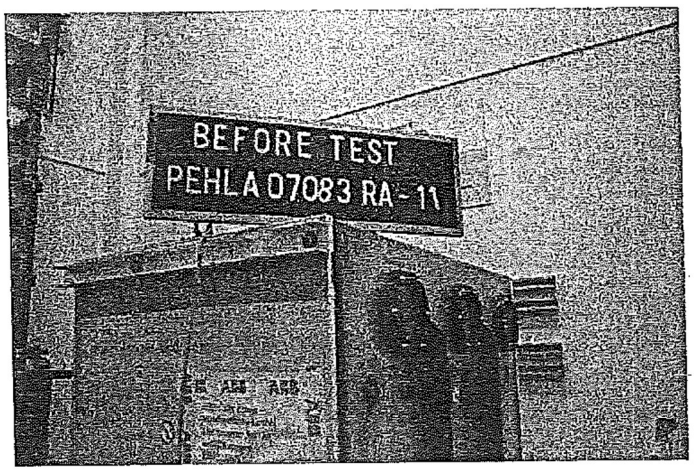


Photo No. 08
Before test PEHLA 07085Ra / 11

ВЯРНО С ОРИГИНАЛА

Photos

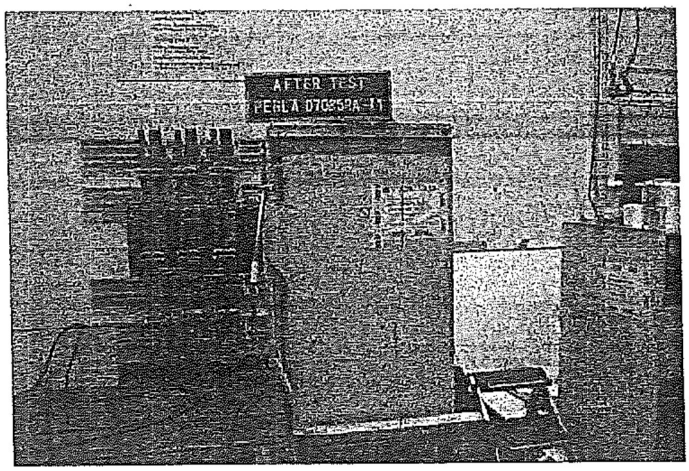


Photo No. 09
After test PEHLA 07085Ra / 11

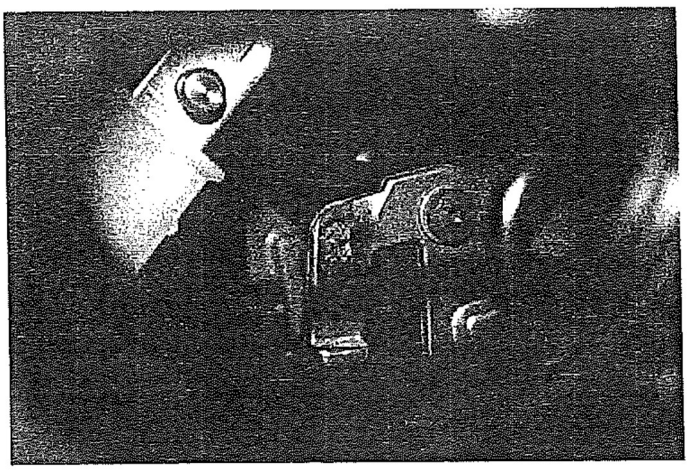


Photo No. 10
Before test PEHLA 07085Ra / 12

ВЯРНО С ОРИГИНАЛА

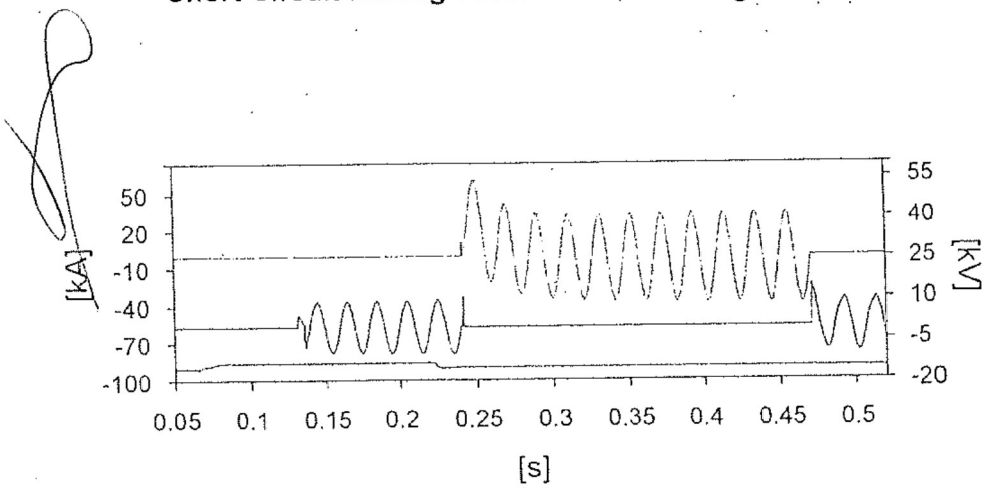
Photos

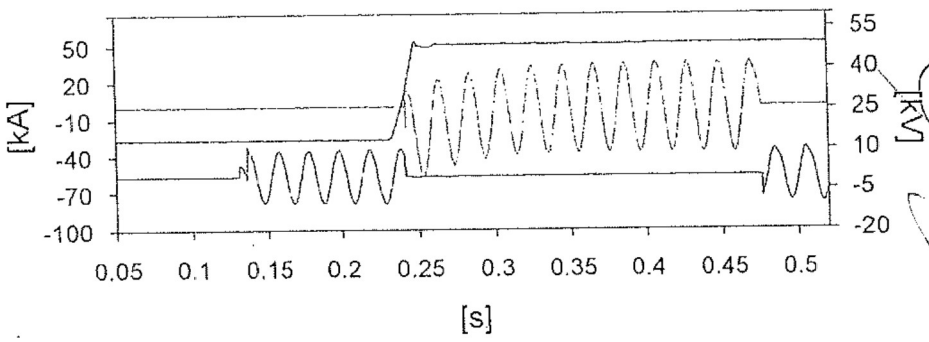
Photo No. 11
After test PEHLA 07085Ra / 12

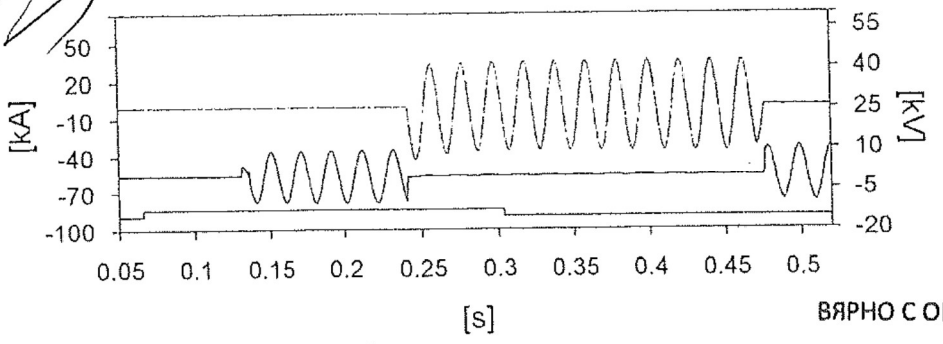
ВЯРНО С ОРИГИНАЛА

Oscillogramm No. PEHLA 07085Ra / 08

Short-Circuit Making Test No. 1 in Earthing Position



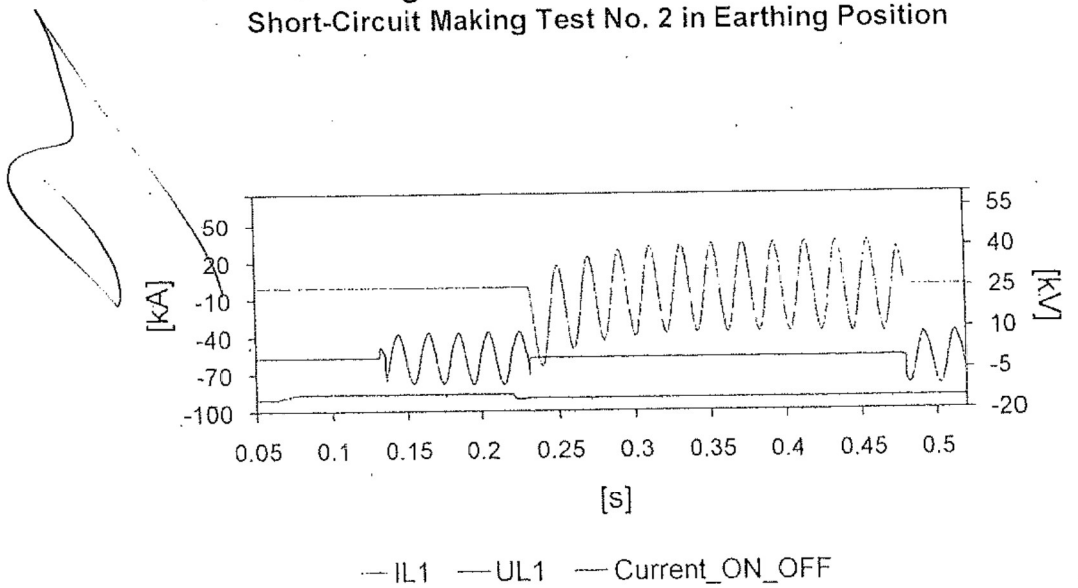


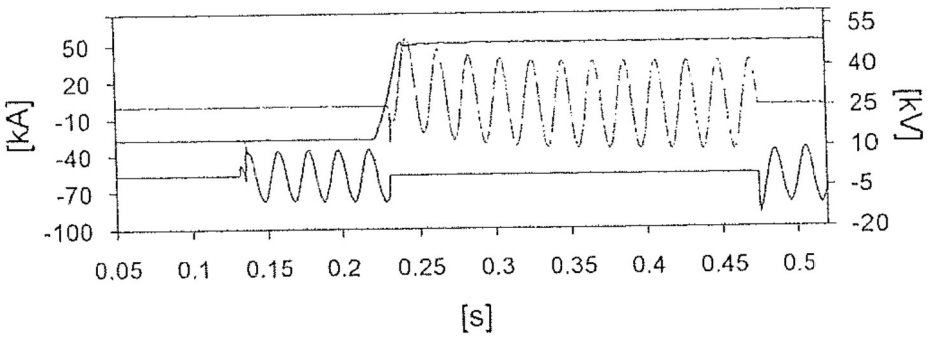


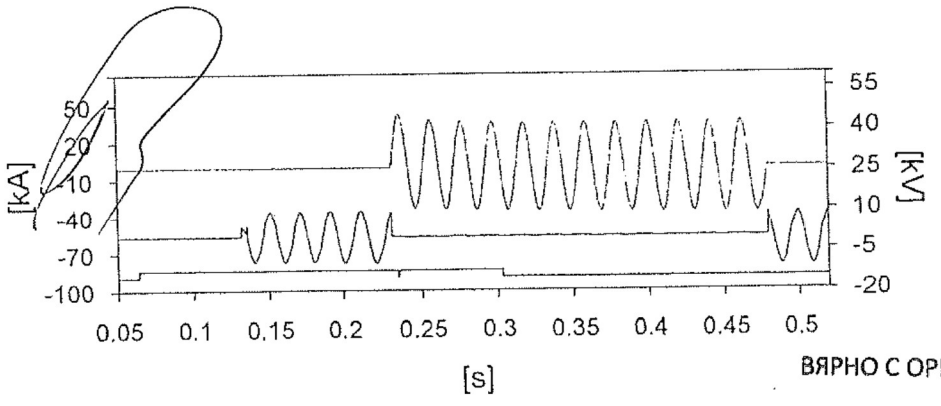
ВЯРНО С ОРИГИНАЛА

Oscillogramm No. PEHLA 07085Ra / 09

Short-Circuit Making Test No. 2 in Earthing Position



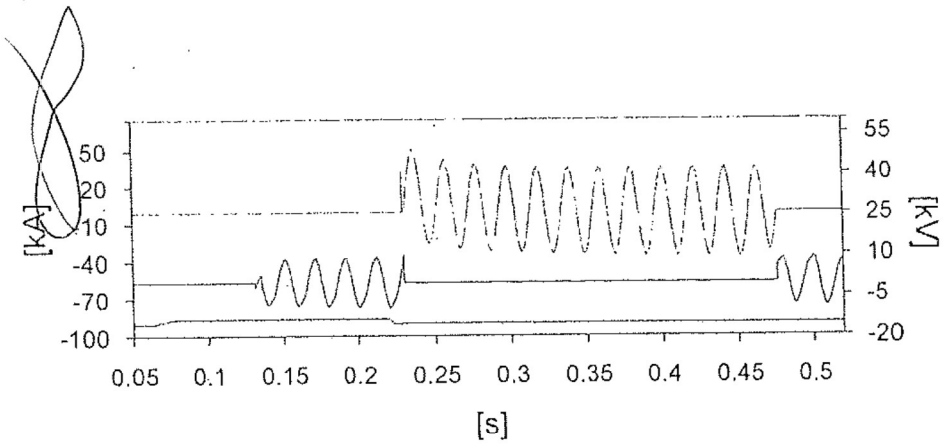




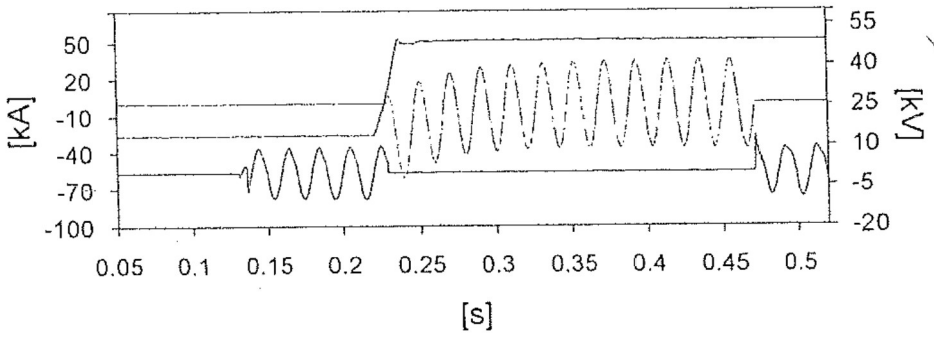
ВЯРНО С ОРИГИНАЛА

Oscillogramm No. PEHLA 07085Ra / 10

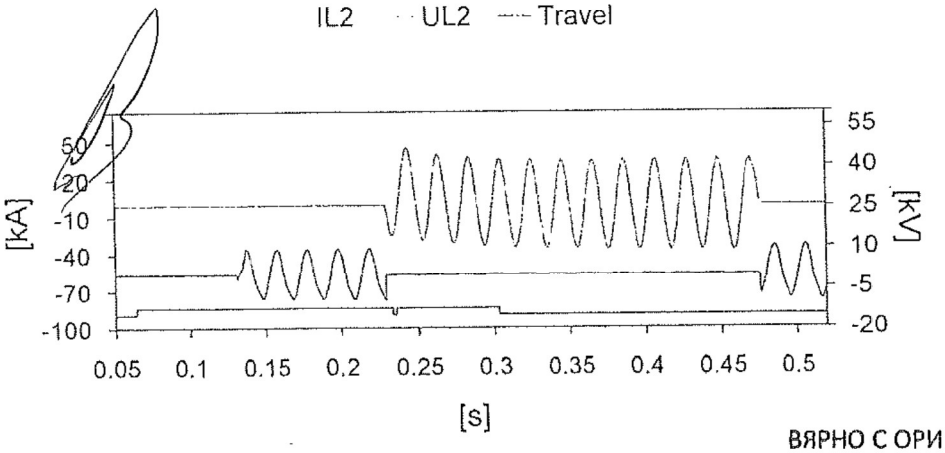
Short-Circuit Making Test No. 3 in Earthing Position



IL1 UL1 Current_ON_OFF



IL2 UL2 Travel

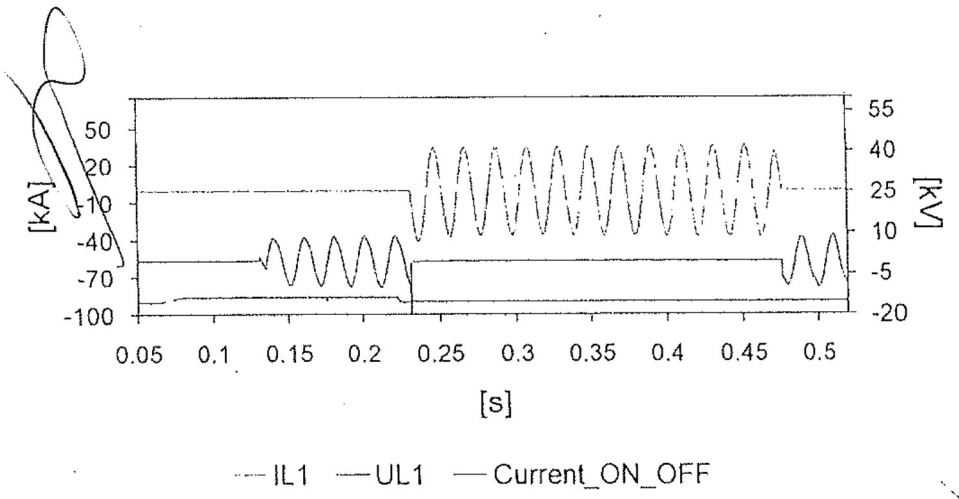


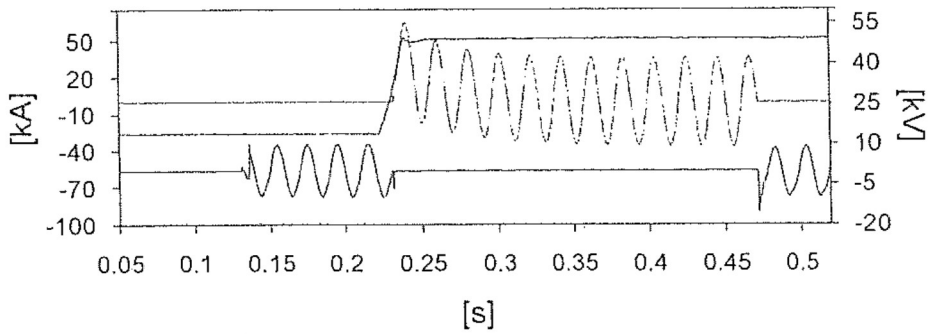
IL3 UL3 ON_OFF

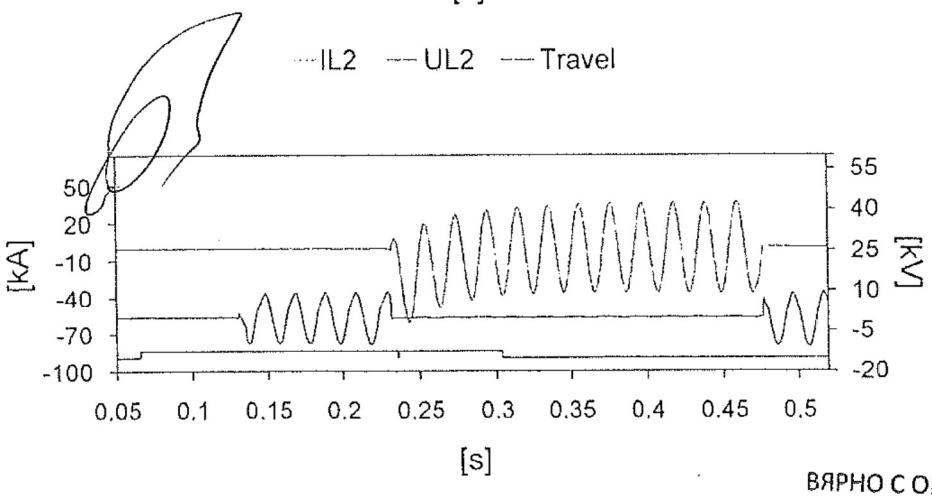
ВЯРНО С ОРИГИНАЛА

Oscillogramm No. PEHLA 07085Ra / 11

Short-Circuit Making Test No. 4 in Earthing Position



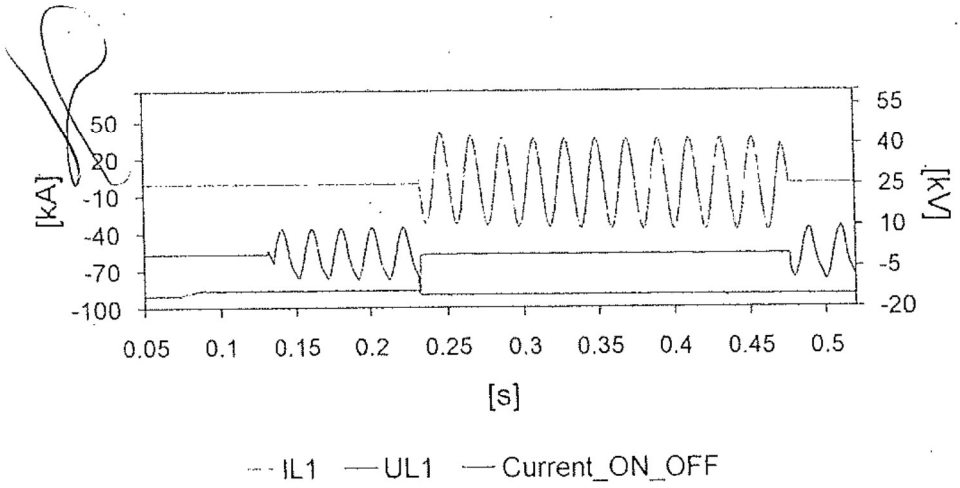


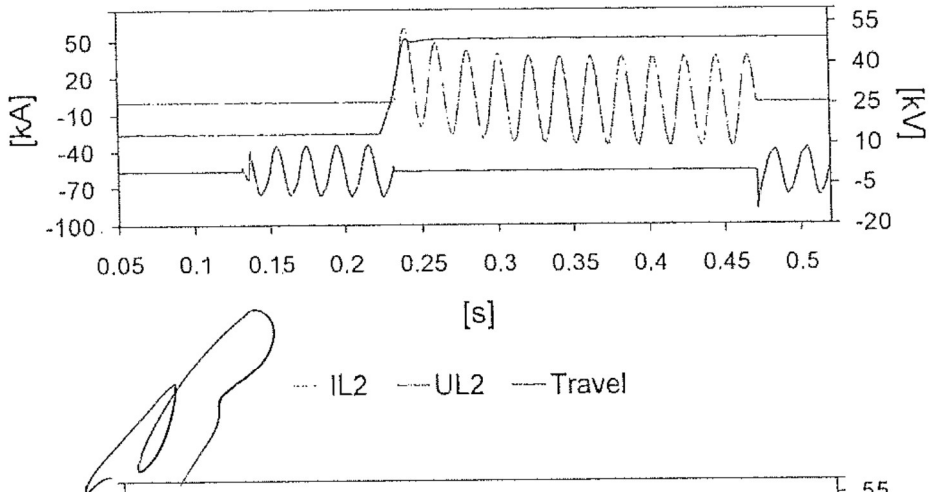


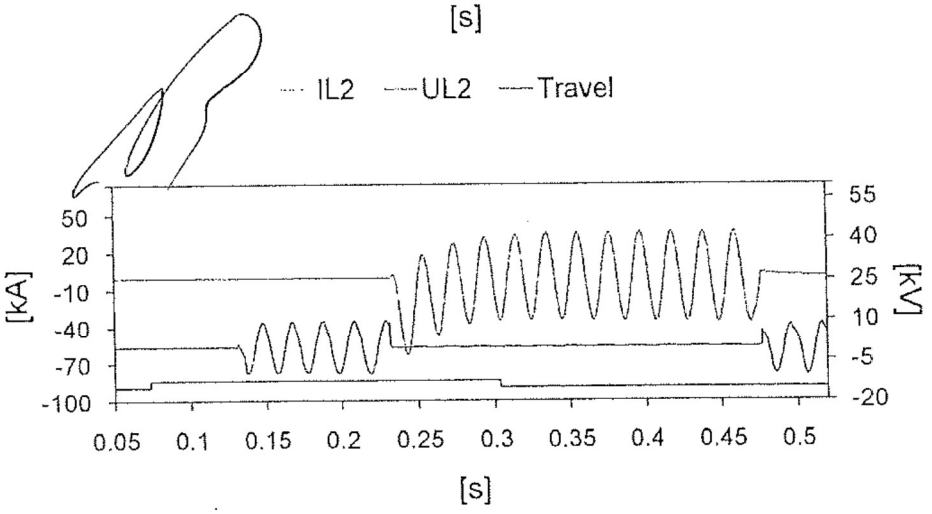
ВЯРНО С ОРИГИНАЛА

Oscillogramm No. PEHLA 07085Ra / 12

Short-Circuit Making Test No. 5 in Earthing Position







ВЯРНО С ОРИГИНАЛА

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ПРИЛОЖЕНИЕ 9.1.6

Протоколи от типови изпитвания на английски или на български език за устойчивост на вътрешна електрическа дъга за клас IAC – AB.

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка и монтаж на комплектни метални трансформаторни постове"

РЕФ. № PPD 19-102

организиран от "ЧЕЗ Разпределение България" АД

Type test verification SafeRing / SafePlus 12/24 kV Secondary Distribution Switchgear

Product: SafeRing / SafePlus 12/24 kV
Manufacturer: ABB Medium Voltage Power Products, Skien, Norway

This verification document is a statement of type tests that have been performed on the SafeRing / SafePlus 12/24kV by independent laboratories or certified by SATS/PEHLA/STL. All tests have been carried out according to relevant IEC standards and other significant specifications given in the reference.

Switchgear

Type of test	Reference	Test result	Report no.
1.0 Dielectric tests			
1.1 Lightning Impulse	IEC 62271-200	125 kV	090004 (Direct Busbar) 100006 (Arc sup.)
1.2 Power frequency 1 min.	IEC 62271-200	50 kV	090004 (Direct Busbar) 100006 (Arc sup.)
1.3 P.D. measurement	IEC 62271-200	maximum 20 pC	090004 (Direct Busbar)
1.4 Power frequency 1 min on Aux. circuits	IEC 62271-200	2 kV	110003
2.0 Internal arc fault test			
2.1 Within the gas enclosure (AFL)	IEC 62271-200	IAC AFL 16kA 1s	07-B02 07-B03 08-B11 12-B01
		IAC AFL 20kA 1s	07-B07 07-B29 07-B34 09-B42 10-B26 10-B49 11-B01 11-B37 12-B20 14-B01 14-B20 15-B13
2.2 Within the gas enclosure (AFLR)	IEC 62271-200	IAC AFLR 20 kA 1 s	12-B12 15-B16 15-B32
		IAC AFLR, 25kA 1s	13-B10
2.3 Within cable compartment (AFL)	IEC 62271-200	IAC AFL 16kA 1s	07-B05 07-B35 12-B05 13-B42
		IAC AFL, 20kA 1s	08-B10 13-B42 10-B27 11-B16 13-B13 14-B02 16-B11
2.4 Within cable compartment (AFLR)	IEC 62271-200	IAC AFLR 20kA 1s IAC AFLR 25kA 1s	12-B08 13-B11

ВЯРНО С ОРИГИНАЛА

Type test verification SafeRing / SafePlus 12/24 kV
Secondary Distribution Switchgear

2.5 With arc suppressor	IEC 62271-200	IAC AFLR 20 kA 1 sec (30 ms)	08-B01 NEFI 1982 09-B26 11-B10
2.6 Inside fuse canister	IEC 62271-200	IAC AFL 16 kA 30 ms	NEFI 2722
3.0 Miscellaneous tests			
3.1 Pressure withstand test	IEC 62271-200	Design pressure 1.82 bar with pressure relief device	07-B08 08-B06 12-B10
3.2 Verification of the protection	IEC 62271-200	Cable comp. IP3X Front panel IP2X Outdoor Enclosure IP54	08-B05 T02-1145
3.3 Tightness test	IEC 62271-200 IEC 62271-1	At 20°C At 40°C	06-B19 LBE001183905
3.4 External busbar tests (Dielectric)	IEC 62271-200	125 kV, 50 kV	090020
3.5 Cantilever load on cable bushings	IEC 60137	Interf. C 1000N Interf. A 300 N	LBE01218156
4.0 Low Voltage systems			
4.1 VPIS tests	IEC 61958		080001 07795
4.2 VDS tests	IEC 61243-5	Saline fog test	110006 110010
4.3 EMC for smartgrid during switching	IEC 62271-103		NEFI 2446 NEFI 2448
4.4 Resistance of aux. contacts	IEC 62271-1	Aux. contact class 1	15-B35
5.0 Environmental tests			
5.1 Salt mist test	IEC 60068-2-11	35°C, 5% NaCl,	MZ 113 T 01 P.50-15-0110_1-en
5.2 Vibration test	DNV Standard for Certification 2.4	5-50 Hz	20171

Switch unit C – and SI- module

Type Test	Reference	Test result	Report no.
1.0 Mechanical and Environmental tests			
1.1 Mechanical endurance Switch-disconnector	IEC 60265-1 IEC 62271-102	M1, 1000 CO	08-B07 09-B31
1.2 Mechanical endurance Earthing switch	IEC 62271-102	M1, 1000 CO	08-B07 09-B31
1.3 Mechanical operation of switching devices and test of interlocks	IEC 60265-1 IEC 62271-1	50 CO	08-B07
1.4 Function of position indicating devices	IEC 60265-1 IEC 62271-102		08-B02
1.4 Tightness test	IEC 62271-103/-102		08-B07 09-B31 PEHLA 11178 Ra PEHLA 11179 Ra
2.0 Dielectric tests			
2.1 Lightning Impulse	IEC 62271-1 IEC 62271-200	95/110kV 125/145 kV	07-B16 07-B17

ВЯРНО С ОРИГИНАЛА

Type test verification SafeRing / SafePlus 12/24 kV
Secondary Distribution Switchgear

	IEC 62271-103		13-B43
2.2 Power frequency 1 min.	IEC 62271-1	38/45kV	07-B16
	IEC 62271-200	50/60kV	07-B17
	IEC 62271-103		13-B43
2.3 P.D. measurement	IEC 62271-1	Max 5 pC	07-B16
	IEC 62271-200		07-B17
	IEC 62271-103		13-B43
2.4 Cable testing voltage	IEC 60298	96 kV DC	PEHLA 0337 Ra
	IEC 60060-1		
3.0 Short-circuit tests			
3.1 Main circuit/switch-disconnector	IEC 62271-200	52.5 kA_{penk} 21 kA 3 s	07-B25
	IEC 62271-103	62.5 kA_{peak} 25 kA 3s	13-B08
3.2 Earthing switch	IEC 62271-200	52.5 kA_{peak} 21 kA 3 s	07-B25
	IEC 62271-102	62.5k kA_{peak} 25 kA 3s	13-B08
		62.5 kApeak 25 kA 1s	15-B07
		52.5 kApeak 21 kA 3s	15-B08
3.3 Test point	IEC 62271-200	43 kA_{peak} 21 kA 3 s	08-B12
	IEC 62271-102	63 kA_{peak} 25 kA 1 s	
3.4 Tool-free test point	IEC 62271-200	43 kA_{peak} 21 kA 3 s	15-B17
	IEC 62271-102	63 kA_{peak} 25 kA 1 s	15-B18
4.0 Make-Break tests			
5.1 TD_{load2} Mainly active load	IEC 62271-103	12kV E3 100CO 650A	13-B34
		24kV E3 100CO 640A	13-B33
5.2 TD_{load1} Mainly active load	IEC 62271-103	12kV E3 20CO 34A	13-B34
		24kV E3 20CO 33A	13-B33
5.3 TD_{cc2} Cable charging	IEC 62271-103	12kV C2 10CO 65A	13-B34
		24kV C2 10CO 52A	13-B33
5.4 TD_{cc1} Cable charging	IEC 62271-103	12kV C2 10CO 21A	13-B34
		24kV C2 10CO 17A	13B-33
5.5 TD_{lc} Line-charging	IEC 62271-103	12kV C2 10CO 1A	13-B34
		24kV C2 10CO 1A	13-B33
5.6 TDsb2 Single capacitor bank	IEC 62271-103	12kV C2 10CO 140A	13-B34
		24kV C2 10CO 140A	13-B34
5.7 TD_{ef1} Earth fault	IEC 62271-103	12kV E3 10CO 205A	13-B34
		24kV E3 10CO 160A	13-B33
5.8 TD_{ef2} Earth fault	IEC 62271-103	12kV E3 10CO 117A	13-B34
		24kV E3 10CO 90A	13-B33
5.9 TD_{loop} Closed loop	IEC 62271-103	2.5kV E3 20CO 650A	13-B34
		5kV E3 20CO 660A	13-B33
5.10 Voltage test as condition check	IEC 62271-1	80% of 28/32kV	13-B34
		80% of 50/60kV	13-B33
5.0 SC Making tests			
5.1 Pre-conditioning before making test	IEC 60265-1	12 kV 640 A	07-B09
			07-B31
		24 kV 660 A	07-B10
			07-B32
5.2 TD_{ma} Switch-disconnector	IEC 60265-1	12kV E3 52.5 kA peak	PEHLA 07048Ra
			07-B09
		12kV E3 62.5 kA peak	PEHLA 07049Ra
			07-B31
		24 kV E3 40 kA peak	PEHLA 07085Ra
			07-B10
		24 kV E3 52.5 kA peak	PEHLA 07086Ra

ВЕРНО С ОРИГИНАЛА

			07-B32
5.3 TD_{me} Earthing switch	IEC 62271-102	12 kV E2 52.5 kA peak	PEHLA 07048Ra
		12 kV E2 62.5 kA peak	PEHLA 07085Ra
			PEHLA 15167Ra
		24 kV E3 40 kA peak	PEHLA 07050Ra
		24 kV E2 52.5 kA peak	PELHA 07087Ra
			PEHLA 14203Ra
6.0 Temperature-rise tests			
6.1 Main circuit/Switch-disconnector	IEC 62271-200	630A	08-B34
	IEC 62271-103		12-B17
7.0 Temperature limit test			
7.1 Low temperature limit	IEC 62271-103	-25°C	PEHLA 11178Ra
7.2 High temperature limit	IEC 62271-103	+40°C	PEHLA 11179Ra

Switch-Fuse unit F - module

Type of test	Reference.	Test result	Report no.
1.0 Mechanical operation tests			
1.1 Mechanical endurance	IEC 60265-1	M1, 1000CO	06-B16
Switch-disconnector	IEC 62271-102		
1.2 Mechanical endurance	IEC 62271-102	M1, 1000CO	06-B16
Earthing switch			
1.3 Mechanical operation of switching	IEC 62271-200		09-B41
devices, removable parts	IEC 62271-105		
and test of interlocks			
1.4 Mechanical operation tests and	IEC 62271-105		09-B41
mechanical shock tests on fuses			
1.5 Test of position-indicating device	IEC 62271-102	Independent manual	08-B02
	IEC 60265-1	operation without strain	
		limiting device	
2.0 Dielectric tests			
2.1 Lightning Impulse	IEC 62271-1	95/110 kV	06-B33
	IEC 62271-200		07-B18
	IEC 62271-105	125/145 kV	06-B08
			07-B19
2.2 Power frequency 1 min.	IEC 62271-1	38/45 kV	06-B33
	IEC 62271-200		07-B18
	IEC 62271-105	50/60 kV	06-B08
			07-B19
2.3 P.D. measurement	IEC 62271-1	Max 5 pC	06-B33
	IEC 62271-200		07-B18
	IEC 62271-105		06-B08
			07-B19
3.0 Short-circuit tests			
3.1 Downstream earthing switch	IEC62271-102	12.5 kA_{peak} 5 kA 1s	06-B10
			06-B43
3.2 Voltage test as condition check	IEC 62271-102	80% 38 kV	06-B52
	IEC 60694		
4.0 Make-Break tests			
4.1 TDisc	IEC 62271-105	12 kV 25 kA Fuse 25 A	PEHLA 06100Ra

ВЯРНО С ОРИГИНАЛА

Type test verification SafeRing / SafePlus 12/24 kV Secondary Distribution Switchgear

		17.5 kV 20kA Fuse 63 A	PEHLA 0589Ra
		24 kV 20kA Fuse 63 A	PEHLA 0588Ra
4.2 TDIWmax	IEC 62271-105	12 kV 5.5 kA Fuse 25 A	06-B37
		17.5kV 2.4kA Fuse 63A	05-B14
		24 kV 2.4 kA Fuse 63 A	05-B15
4.3 TDItransfer	IEC 62271-105	12kV 1110A	06-B37
		17.5 kV 700 A	05-B14
		24 kV 615 A	05-B15
		24 kV 700 A	15-B37
4.4 TDItake-over	IEC 62271-105	12kV 615A	06-B37
		17.5 kV 460 A	05-B14
4.10 Voltage test as condition check	IEC 62271-105	80% of 28 kV	06-B53
		80% of 38 kV	06-B01
			06-B04
		80% of 50 kV	06-B02
5.0 SC Making tests			
5.1 Downstream earthing switch	IEC 62271-102	12kV E2 12,5kApeak	06-B44
		24 kVE2 12,5kApeak	06-B11
5.2 Voltage test as condition check	IEC 62271-102	80% of 38 kV	06-B52
	IEC 60694	80% of 50kV	06-B12
6.0 Temperature-rise tests			
6.1 Switch-fuse combination	IEC 62271-105	12 kV Fuse rating 125 A	08-B41
	IEC 62271-200	loaded 102 A	
		24kV Fuse rating 63A	08-B41
		loaded 51 A	
7.0 Temperature limit test			
7.1 Low temperature limit	IEC 62271-103	-25°C	PEHLA 11178Ra
7.2 High temperature limit	IEC 62271-103	+40°C	PEHLA 11179Ra
7.3 Thermal test with long pre-arcing time of fuse	IEC 62271-105	12 kV Fuse 125 A 230 A	09-B46
		17.5 kV Fuse 80A 147 A	
		24 kV Fuse 63 A 118 A	

Vacuum circuit breaker V- and Sv - module

Type of test	Reference.	Test result	Report no.
1.0 Mechanical operation tests			
1.1 Mechanical endurance	IEC 62271-100	M1, 2000CO	
Vacuum circuit-breaker		O-3 min-CO-3 min-CO	09-B09
		O-0,3s-CO-3 min-CO	12-B18
			13-B39
1.2 Verification with current interruption	IEC 62271-100	T10	12-B15
			13-B35
1.3 Mechanical endurance	IEC 62271-102	M1, 1000CO	09-B09
Disconnector			
1.4 Mechanical endurance	IEC 62271-102	M1, 1000CO	09-B09
Earthing switch			
1.5 Mechanical operation of switching	IEC 62271-200	50CO	09-B28
devices, removable parts and test of		IK 09	12-B30
interlocks			
1.6 Verification of protection (IP)	IEC 62271-200	Front cover IP2X	13-B05
		Cable comp. IP3X	
2.0 Dielectric tests			
2.1 Lightning Impulse	IEC 62271-1	95/110 kV	12-B11

ВЯРНО С ОРИГИНАЛА

	IEC 62271-200	125/145 kV	09-B03
	IEC 62271-100		160001
2.2 Power frequency 1 min.	IEC 62271-1	38/45 kV	12-B11
	IEC 62271-200	50/60 kV	09-B03
	IEC 62271-100		160001
2.3 P.D. measurement	IEC 62271-1	maximum 5pC	12-B11
	IEC 62271-200		09-B03
	IEC 62271-100		160001
3.0 Short-circuit tests			
3.1 Main circuit, circuit-breaker and disconnector	IEC 62271-200	52.5 kA_{peak} 21 kA 3s	08-B08
	IEC 62271-100	52.5 kA_{peak} 21 kA 3s	12-B02
	IEC 62271-102	62.5 kA_{peak} 25 kA 1 s	12-B03
		62.5 kA_{peak} 25 kA 3 s	13-B08
3.2 Earthing switch	IEC 62271-200	52.5 kA_{peak} 21 kA 3s	08-B08
	IEC 60271-102	62.5 kA_{peak} 25 kA 3s	14-B06
4.0 Making breaking tests			
4.1 Make Break test (Switch tests TD1, TD2a, TD4a, TD4b, TD4c, TD6a, TD6b)	IEC 60265-1	TD1 24 kV 100CO 640A	NEFI 2154
		TD2a 4kV 20CO 630A	NEFI 2209
		TD4a 24kV 10CO 52.5A	
		TD4b 24kV 10CO 1.65A	
		TD4c 24kV 10CO 145A	
		TD6a 24kV 10CO 165A	
		TD6b 24kV 10CO 93A	
5.0 SC Making and breaking tests			
5.1 SC Make-break (T10, T30, T60, T100s/a)	IEC 62271-100	12 kV 20 kA	PEHLA 0639Ra
			XZ 113 H 01
			XZ 245 H 02
		17.5 kV 25 kA	PEHLA 12093Ra
		24 kV 16 kA	XZ 113 H 15
		24 kV 20 kA	PEHLA 12014Ra
5.6 Double-earth fault test	IEC 62271-100	12kV 17.9kA	PEHLA 0639Ra
		24 kV 14.4 kA	XZ 113 H 15
		17.5 kV 22.5 kA	PEHLA 12093Ra
		24 kV 18.2 kA	PEHLA 12014Ra
5.7 Single-phase earth fault test	IEC 62271-100	12kV 21kA	PEHLA 0639Ra
		17.5kV 25kA	PEHLA 12093Ra
		24 kV 20 kA	PEHLA 12014Ra
6.0 Capacitive current switching tests			
6.1 Cable charging current switching tests	IEC 62271-100	17.5kV 31.5A C2	PEHLA 12094Ra
		24kV 31.5A C2	XZ 113 K 01
		24kV 31.5A C2	PEHLA 12016Ra
7.0 Temperature-rise tests			
7.1 Main circuit, circuit-breaker and disconnector	IEC 62271-100	630A	08-B52
	IEC 62271-200		12-B16
8.0 Temperature limit test			
8.1 Low temperature limit	IEC 62271-100	-25°C	PEHLA 11178Ra
			PEHLA 12027Ra
8.2 High temperature limit	IEC 62271-100	+40°C	PEHLA 11178Ra
			PEHLA 12027Ra

ВЯРНО С ОРИГИНАЛА

Type test verification SafeRing / SafePlus 12/24 kV
Secondary Distribution Switchgear

Vacuum circuit breaker CB - module

Type of test	Reference.	Test result	Report no.
1.0 Dielectric tests			
1.1 Lightning Impulse	IEC 60298 IEC 62271-102 IEC 62271-100	125/145 kV	020040 (Y2002)
1.2 Power frequency 1 min.	IEC 60298 IEC 62271-102 IEC 62271-100	50/60 kV	020040 (Y2002)
1.3 P.D. measurement	IEC 62271-1 IEC 62271-200 IEC 62271-100	maximum 5pC	020040 (Y2002)
2.0 Short-circuit tests			
2.1 Main circuit, circuit-breaker and disconnector			See VD4
2.2 Earthing switch			See VD4
3.0 SC Making and breaking tests			
3.1 SC Make-break (TD4/5 or T100s/a)	IEC 60056	24 kV 20 kA	HZ 223 H 01 See VD4
4.0 Temperature-rise tests			
4.1 Main circuit, circuit-breaker and disconnector	IEC 60298 IEC 60298	630A 1250	020041 (2002) 020043 (Y2002)
5.0 Miscellaneous tests			
5.1 Pressure withstand for gas filled enclosures	IEC 60298	1.82 bar abs	020042 (Y2002)
5.2 Internal arc test (IAC)	IEC 60298 IEC 62271-200	Tank AF 20 kA 1 s Cable com. AFL 20 kA 1 s	020044 (Y2002) 10-B26

Metering Module M – and MT-module

Type of test	Reference.	Test result	Report no.
1.0 Dielectric tests			
1.1 Lightning Impulse	IEC 62271-200	125 kV	07-B01 (MT) 07-B13 (MT) 15-B33
1.2 Power frequency 1 min.	IEC 62271-200	50 kV	07-B01 (MT) 07-B13 (MT) 15-B33
1.3 P.D. measurement	IEC 62271-200	maximum 5pC	
2.0 Short-circuit tests			
2.1 Main circuit	IEC 62271-200	20 kA 1 sec. 25 kA 1 sec.	07-B20 (MT) NEFI 1413
3.0 Temperature-rise tests			
3.1 Main circuit, circuit-breaker and disconnector	IEC 62271-200	630A	
4.0 Miscellaneous tests			

ВЯРНО С ОРИГИНАЛА

Type test verification SafeRing / SafePlus 12/24 kV
Secondary Distribution Switchgear

4.1 Verification of the IP coding	IEC 60694	IP 3X	07-B13 (MT)
4.2 Internal arc test (IAC)	IEC 62271-200	IAC AF 16 kA 1 s	10-B41
		IAC AFL 20 kA 0.5 s	12-B19

SafeRing/SafePlus side extension/connection

Type of test	Reference.	Test result	Report no.
1.0 Dielectric tests			
1.1 Lightning Impulse	EDF HN 64-S-52	125 kV	04-B06
1.2 Power frequency 1 min.	EDF HN 64-S-52	50 kV	04-B06
1.3 P.D. measurement	IEC 60694 IEC 62271-200	39.6kV maximum 5pC	
2.0 Short-circuit tests			
2.1 Bus bar extension / main circuit / switch-disconnector	EDF HN 64-S-52 IEC 62271-200	54 kA_{peak} 21 kA 1s	04-B02
2.2 Busbar and direct connection	IEC 62271-200	21 kA 3 s, 25 kA 1 s	09-B19
3.0 Temperature-rise tests			
3.1 Bus bar extension / main circuit / switch-disconnector	EDF HN 64-S-52	400 A	04-B07

ВЯРНО С ОРИГИНАЛА

Instytut Elektrotechniki
Electrotechnical Institute
Zespół Certyfikacji Wyrobów Elektrotechnicznych
Certification Group of Electrotechnical Products

AC 168

04-703 Warszawa, ul. Mieczysława Pożaryskiego 28
tel.: +48 22 11 25 264, fax: +48 22 11 25 445, www.iel.waw.pl, e-mail: ncw@iel.waw.pl

CERTYFIKAT ZGODNOŚCI
CERTIFICATE OF CONFORMITY

Nr: DN/036/2015

NAZWA I ADRES POSIADACZA CERTYFIKATU: *Name and address of the certificate holder:*	**ABB Sp. z o.o., ul. Żegańska 1, 04-713 Warszawa**
NAZWA I ADRES PRODUCENTA: *Name and address of the manufacturer:*	**ABB A.S., Aallsgate 73, 3701 Skien, Telemark, Norwegia**
NAZWA WYROBU: *Product:*	**Rozdzielnice średniego napięcia 12 kV, 24 kV w izolacji SF_6** *MV Switchgears 12 kV, 24 kV SF_6 insulated*
TYP / ODMIANA KONSTRUKCYJNA: *Type / Constructional form:*	**SafeRing / SafePlus**
PARAMETRY: / *Ratings:*	VERTE
NORMY ODNIESIENIA: / *Reference standards:*	**PN-EN 62271-1:2009, PN-EN 62271-1:2009/A1:2011, PN-EN 62271-200:2012**
SPRAWOZDANIA Z BADAŃ: / *Test Reports:*	**a) 05-B15, 06-A10, 06-B02, 06-B10, 06-B11, 06-B12, 06-B14, 06-B16, 06-B19, 06-B43, 07-B07, 07-B08, 07-B14, 07-B15, 07-B18, 07-B19, 07-B25, 07-B29, 08-B01, 08-B02, 08-B05, 08-B06, 08-B07, 08-B08, 08-B10, 08-B12, 08-B19, 08-B34, 08-B41, 09-B03, 09-B09, 09-B19, 09-B23, 09-B28, 09-B42, 09-B46** **b) 0588Ra, 0639Ra, 07048Ra, 07049Ra, 07050Ra, 07085Ra, 07086Ra, 07087Ra** **c) XZ113H15, XZ113K01** **d) 1982**
NAZWY LABORATORIÓW: / *Testing laboratories:*	**a) SATS Certification, Trondheim, Norwegia** **c) ABB, LAB Ratingen, Niemcy** **b) PEHLA, Mannheim, Niemcy** **d) NEFI, Skien, Norwegia**

TERMIN WAŻNOŚCI CERTYFIKATU: / *This Certificate is valid till:* **2018-05-25**

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 sample 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).

INSTYTUT ELEKTROTECHNIKI

На основание чл.36а ал.3 от ЗОП

Warszawa: / Warsaw: 2015-05-26

dr

България

CERTYFIKAT ZGODNOŚCI Nr: DN/036/2015
CERTIFICATE OF CONFORMITY No.:

PARAMETRY ZNAMIONOWE / *RATINGS*

Napięcie znamionowe / *Rated voltage*	12 kV	24 kV
Częstotliwość znamionowa / Liczba faz *Rated frequency / Number of phases*	50 Hz / 3	
Napięcie wytrzymywane o częstotliwości sieciowej (1min) / *Power frequency withstand voltage*	38 kV	50 kV
Napięcie znamionowe udarowe wytrzymywane (1,2/50 µs) / Rated *impulse withstand voltage*	95 kV	125 kV
Prąd znamionowy ciągły / *Rated continuous current*	do / *up to* 630 A	
Prąd znamionowy krótkotrwały wytrzymywany 1s / *Rated short-time withstand current 1s*	do / *up to* 21 kA	
Prąd znamionowy szczytowy wytrzymywany / *Rated peak withstand current*	do / *up to* 53 kA	do / *up to* 40 kA
Odporność na działanie łuku wewnętrznego / *Withstand for internal arcing fault*	16 kA / 1 s	
Klasa IAC / *IAC classification*	AFL, AFLR	
Stopień ochrony IP / *Degree of protection IP*	IP3X	
Stopień ochrony przedziałów w izolacji SF_6 / *Degree of protection - filled compartments*	IP67	

INSTYTUT ELEKTROTECHNIKI ★

ВЯРНО С ОРИГИНАЛА

Management System

Certificate

To certify conformity with // Godkjent overensstemmelse med
the Management System Requirements of // Styringssystemkravene i henhold til

NS-EN ISO 9001:2015
NS-EN ISO 14001:2015
OHSAS 18001:2007

awarded // tildelt

ABB

Bergerveien 12, 1396 Billingstad

Manufacturing/supplying following products/services:
for produksjon/leveranse av følgende produkter/tjenester:

Development, sales, engineering, procurement, project management, production, site management, construction, installation, commissioning, service and training of power-, communication- and automation systems and products within marine, oil and gas, land-based industry, infrastructure, energy supply and distribution of energy.

Utvikling, salg, ingeniørtjenester, innkjøp, prosjektledelse, produksjon, anleggsledelse, konstruksjon, montasje, idriftsettelse, service og opplæring av kraft-, kommunikasjons- og automasjonssystemer og produkter innenfor marine, olje og gass, landbasert industri, infrastruktur, energiforsyning og energidistribusjon.

Certificate No // Sertifikat nr.:

1366

First issued 9001// Utstedt første gang: 1992-12-31
First issued 14001// Utstedt første gang: 1997-06-01
First issued 18001// Utstedt første gang: 2005-12-21
Valid until // Gyldig til: 2020-12-31
Issued // Utstedt: 2017-10-12
Audit: Annual // Oppfølging: Årlig

This is a multi-site certificate. The sites are located on the next page
Dette er et flerlokasjons-sertifikat. Lokasjonene er listet på neste side

ВЯРНО С ОРИГИНАЛА

На основание чл.36а ал.3 от ЗОП

На основание чл.36а ал.3 от ЗОП

Kiwa Teknologisk Institutt
Sertifisering as
Kabelgaten 2, 0580 Oslo

NORSK AKKREDITERING
I.MSYS 004

Management System

Certificate

To certify conformity with // Godkjent overensstemmelse med
the Management System Requirements of // Styringssystemkravene i henhold til

NS-EN ISO 9001:2015
NS-EN ISO 14001:2015
OHSAS 18001:2007

awarded // tildelt

ABB

Bergerveien 12, 1396 Billingstad

Følgende lokasjoner er omfattet av sertifikatet:

ABB AS	Bergerveien 12	1396 Billingstad
ABB AS	Kokstadvegen 23B	5257 Kokstad
ABB AS	Bontelabo 4	5003 Bergen
ABB AS	Nordlysvegen 7	4340 Bryne
ABB AS	Jacob Borchs gate 6	3012 Drammen
ABB AS	Hamnegata 7	9600 Hammerfest
ABB AS	Nessevegen 2B	9411 Harstad
ABB AS	Ole Deviks vei 10, 14	0666 Oslo
ABB AS	Amtmand Aalls gate 73, 93, 97	3716 Skien
ABB AS	Christian August Thorings veg 7	4033 Stavanger
ABB AS	Hamnegata 14	5411 Stord
ABB AS	Ingvald Ystgaards veg 3A	7047 Trondheim
ABB AS	Stålhaugen 5,14	6065 Ulsteinvik

Certificate No // Sertifikat nr.:

1366

ВЯРНО С ОРИГИНАЛА

На основание чл.36а ал.3 от ЗОП

На основание чл.36а ал.3 от ЗОП

Kiwa Teknologisk Institutt
Sertifisering as
Kabelgaten 2, 0580 Oslo

kiwa

NORSK AKKREDITERING
MSYS 004

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e-mail:sales@metix.bg
ЕЛЕКТРИЧЕСКИ ТАБЛА, КОМПЛЕКТНИ ТРАНСФОРМАТОРНИ ПОСТОВЕ, ЕЛЕКТРОАПАРАТУРА-НН и СрН

ПРИЛОЖЕНИЕ 9.1.7

Декларация за възможностите за рециклиране на използваните материали при производството или за начина на тяхното ликвидиране

Долуподписания инж. Николай Джамбазов - Управител на МЕТИКС ООД , град Петрич ,със седалище и адрес на управление в гр. Петрич,
ул. "Свобода" 49 , живущ в гр. Петрич , ул. "Българ На основание чл.36а ал.3 от ЗОП
На основание чл.36а ал.3 от ЗОП

ДЕКЛАРИРАМ :

Че всички материали използвани от АВВ Скиен , Норвегия при производството на КРУ SafeRing RMU могат да се рециклират.

Известно ми е ,че за неверни данни нося отговорност по чл. 313 от НК.

На основание чл.36а ал.3 от ЗОП

Гр. Петрич
Дата:08.01.2020г.

ДЕКЛАР
/ инж

Настоящото приложение се прилага във връзка с уча
търг с предмет:

„Доставка и монтаж на комплектни метални трансформаторни постове"

РЕФ. № PPD 19-102

организиран от "ЧЕЗ Разпределение България" АД

"МЕТИКС" ООД България ПЕТРИЧ

ВЯРНО С ОРИГИНАЛА

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

ПРИЛОЖЕНИЕ 9.1.8

Декларация за съответствие на предлаганото изпълнение с изискванията на стандартите, посочени по-горе в параграф „Съответствие на предложеното изпълнение със стандартизационните документи"

Настоящото приложение се прилага във връзка с участието ми в:

търг с предмет:

"Доставка и монтаж на комплектни метални трансформаторни постове"

РЕФ. № PPD 19-102

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 1000 ул."Никола Вапцаров" 6а,5
тел.:00359 2 869 0696; факс:00359 2 958 9334
e-mail: sales@metix.bg

Декларация за съответствие

на предлаганото изпълнение с изискванията на стандартите, посочени в параграф „Съответствие на предложеното изпълнение със стандартизационните документи"

Компактните КРУ 12/24 kV, с SF_6 изолация, с товарови прекъсвачи отговарят на приложимите български и международни стандарти, включително на посочените по-долу и на техните валидни изменения и поправки:

- БДС EN 60099-4:2006 Вентилни отводи. Част 4: Метало-оксидни вентилни отводи без разрядници за електрически системи за променливо напрежение (IEC 60099-4:2004, с промени)
- БДС EN 60265-1:2003 Превключватели високо напрежение. Част 1: Превключватели за обявени напрежения над 1 kV и по-ниски от 52 kV (IEC 60265-1:1998)
- БДС EN 60282-1:2010 Предпазители за високо напрежение. Част 1: Токоограничаващи предпазители (IEC 60282-1:2009)
- БДС EN 60529:1991/A1:2004 Степени на защита, осигурени от обвивката (IP код) (IEC 60529:1989 + A1:1999)
- БДС EN 62271-1:2008 Комутационни апарати за високо напрежение. Част 1: Общи технически изисквания
- БДС EN 62271-102:2007 Комутационни апарати за високо напрежение. Част 102: Разединители и заземителни разединители за променлив ток (IEC 62271-102:2001 + поправка 1, април 2002 + поправка 2, май:2003)
- БДС EN 62271-105:2003 „Комутационни апарати високо напрежение. Част 105: Комутационни апарати за променливо напрежение комбинирани с предпазител (IEC 62271-105:2002)"
- БДС EN 62271-200:2006 „Комутационни апарати за високо напрежение. Част 200: Променливотокови комутационни апарати в метална обвивка за обявени напрежения над 1 kV и по-високи, включително 52 kV (IEC 62271-200:2003)";

БДС IEC 60050 (441) „Международен електротехнически речник Глава 441: Комутационни апарати за разпределение, комутационни апарати за управление и стопяеми предпазители

Гр. Петрич

Дата:08.01.2020г.

ДЕКЛАР

/ инж. Ни

На основание чл.36а ал.3 от ЗОП

ВЯРНО С ОРИГИНАЛА

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

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

Област: Н – Електрически уредби СрН/НН

Категория: 17–Комутационни апарати НН за защита

Мерна единица: Брой

Аварийни запаси: Да

Характеристика на материала:

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

Тялото (корпусът) на автоматичните прекъсвачи НН е изработено чрез формоване на устойчив на нагряване, на огън и на механични удари изолационен материал. Използваните в конструкцията изолационни материали съответстват на изискванията на т. 7.1. от БДС EN 60947-2 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 главните разпределителни табла в трансформаторните постове и се използват за защита на силови трансформатори СрН/0,4 kV с мощност до 800 kVA.

Съответствие на предлаганото изпълнение с нормативно-техническите документи:

Триполюсните автоматични прекъсвачи НН с лят корпус трябва да отговарят на посочените по-долу стандарти или 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;
- 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	ABB SACE XT2N ABB Tmax T7 H ITALY Приложение 9.2.1
2	Техническо описание и чертежи с нанесени на тях размери	Приложение 9.2.2
3	ЕО декларация за съответствие	Приложение 9.2.3
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 9.2.4
5	Сертификат/акредитация на независимата изпитвателна лаборатория, провела типовите изпитвания по т. 4 – заверено копие	Приложение 9.2.5
6	Инструкции за обслужване и поддържане	Приложение 9.2.6

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

Технически данни:

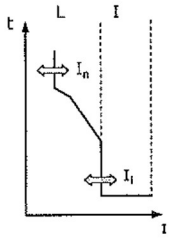
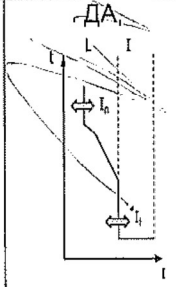
1. Характеристики на работната среда

№ по ред	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	800 V до 200 A 1000 V до 1600 A
3.6	Категория на приложение	A	A
3.7	Работна изключвателна възможност при късо съединение (I_{cs})	min 50% от I_{cu}	100% от I_{cu}
3.8	Защита от свръхтокове	-	-
3.8.1	Тип и времетокова характеристика	Защитата от свръхтокове трябва да бъде от електронен тип с времетокова характеристика от показания по-долу вид: 	ДА 
3.8.2	Защита от претоварване	а) Диапазон на настройване I_R=(min 0,5÷1)xI_n	I_R=0,4÷1xI_n
		б) Условен ток на неизключване I_{nd}=1,05xI_R във времеви интервал от 120 минути	I_{nd}=1,05xI_R във времеви интервал от 120 минути
		в) Условен ток на изключване I_d = 1,30xI_R във времеви интервал до 120 минути	I_d = 1,30xI_R във времеви интервал до 120 минути
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	1x 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

№ по ред	Технически параметър	Изискване	Гарантирано предложение
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, от 160 А ÷ 1250 А, с електронна защита, категория А

4.1 Триполюсен автоматичен прекъсвач НН с лят корпус, 160 А, с електронна защита, кат. А

Номер на стандарта		Тип/референтен номер съгласно каталога на производителя	
20 17 6000		XT2N 1SDA067058R1	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 160 А, с електронна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ел. защита, 160 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.1.1	Обявен ток (I_n)	160 А	160 А
4.1.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 12 kA / 500 V	30 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	100% от Icu
4.1.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	Токът на изключване Ii е регулируем в диапазона от 1xIn до 10xin
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 1000 бр.	8000 бр.
4.1.6b	Механична (брой к.ц.)	min 7000 бр.	25 000 бр.
4.1.7	Максимални размери ВхШхД (Дълбочината „Д" не включва лоста за управление)	185x140x100 mm	130x90x82,5 mm
4.1.8	Тегло, kg	Да се посочи	1,1 kg

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

Номер на стандарта		**Тип/референтен номер съгласно каталога на производителя**	
20 17 6004		T7H 1250D 1SDA062898R1	
Наименование на материала		Триполюсен автоматичен прекъсвач НН с лят корпус, 1250 А, с електронна защита, кат. А	
Съкратено наименование на материала		Трип. авт. прек. НН, с ел. защита, 1250 А, кат. А	
№ по ред	**Технически параметър**	**Изискване**	**Гарантирано предложение**
4.5.1	Обявен ток (I_n)	1250 А	1250 А
4.5.2	Обявена максимална изключвателна възможност при к.с. (I_{cu})	min 45 kA / 500 V	50 kA/500V
4.5.3	Работна изключвателна възможност при късо съединение (I_{cs})	Съгласно т. 3.7 и т. 4.5.2 Да се посочи	100% от I_{cu} 50 kA/500V
4.5.4	Ток на изключване на защитата от къси съединения (I_i)	Съгласно т. 3.8.3 Да се посочи	1x I_n до 10x I_n
4.5.5	Време за изключване при I_{cu}	max 0,030 s	0,01 s
4.5.6	Износоустойчивост	-	-
4.5.6a	Електрическа (брой к.ц.)	min 500 бр.	2 000
4.5.6b	Механична (брой к.ц.)	min 2500 бр.	10 000
4.5.7	Максимални размери ВхШхД (Дълбочината „Д" не включва лоста за управление)	375x210x160 mm	268x210x154
4.5.8	Тегло, kg	Да се посочи	9,7

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
e-mail: metix@metix.bg
гр.София 1000 ул."Ричард Ваканин"бл.5
тел.:00359 2 869 0698; факс:00359 2 958 9334
e-mail:sales@metix.bg

ПРИЛОЖЕНИЕ 9.2.1

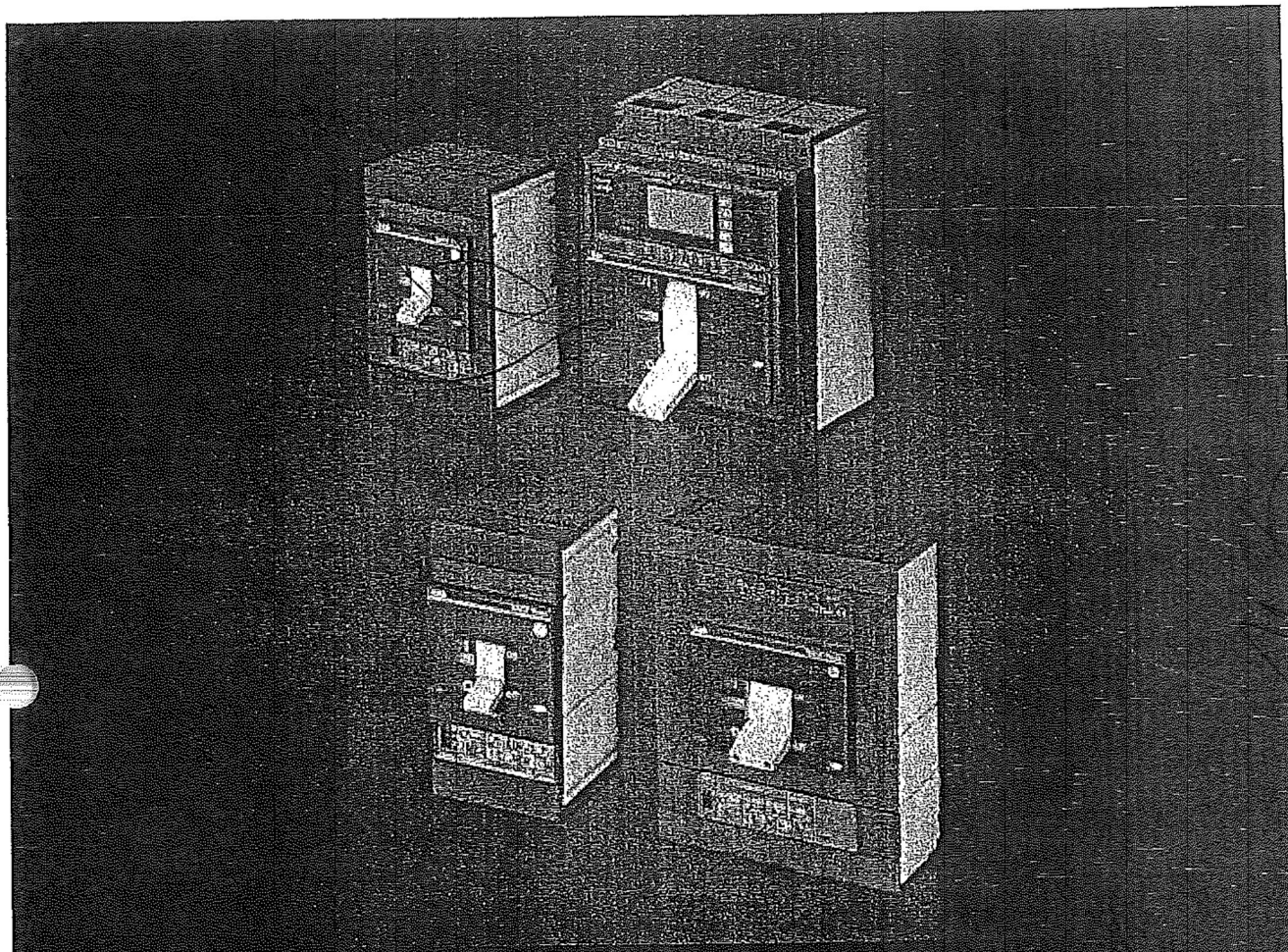
Точно означение на типа, производителя и страната на производство (произход) и последно издание на каталога на производителя

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

"Доставка и монтаж на комплектни метални трансформаторни постове"

РЕФ. № PPD 19-102

организиран от "ЧЕЗ Разпределение България" АД



Technical catalogue / May 2016

SACE Tmax. T Generation
Low voltage moulded-case circuit-breakers from 250 A up to 1600 A

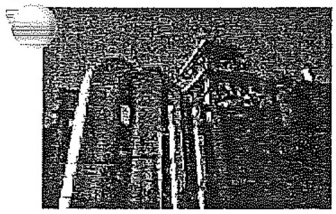
Power and productivity
for a better world™

Overview of the Tmax family

Circuit-breakers for AC-DC distribution

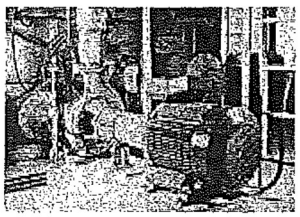
Size	[A]	
In	[A]	
Poles	[Nr]	
Ue	[V]	(AC) 50 - 60 Hz
	[V]	(DC)
Icu (380-415 V AC)	[kA]	N
	[kA]	S
	[kA]	H
	[kA]	L
	[kA]	V
	[kA]	X

(1) T4 250A L, V version; (2) T6V: 630A and 800A only; (3) T7X: 800A only



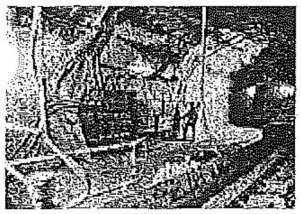
Circuit-breakers for zone selectivity

Size	[A]	
Poles	[Nr]	
Ue	[V]	(AC) 50 - 60 Hz
EFDP zone selectivity		
ZS zone selectivity		



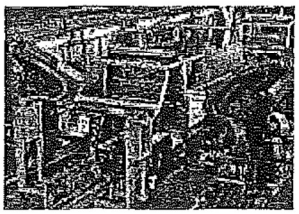
Circuit-breakers for motor protection

Size	[A]	
Poles	[Nr]	
Ue	[V]	(AC) 50 - 60 Hz
Magnetic only trip unit, IEC 60947-2		
PR221DS-I trip unit, IEC 60947-2		
Ekip M-LRIU trip unit, IEC 60947-4-1		
PR231/P-I trip unit, IEC 60947-2		



Circuit-breakers for use up to 1150 V AC and 1000 V DC

Size	[A]	
Poles	[Nr]	
Icu max	[KA]	1000 V AC
	[KA]	1150 V AC
	[KA]	1000 V DC 4 poles in series



Switch-disconnectors

Ith	[A]	
Ie	[A]	
Poles	[Nr]	
Ue	[V]	(AC) 50 - 60 Hz
	[V]	(DC)
Icm	[kA]	
Icw	[kA]	

Note: ABB SACE's moulded-case circuit-breakers are also available in the versions according to UL Standards (see catalogue "ABB SACE molded case circuit-breakers - UL 489 and CSA C22.2 Standard").

	T4	T5	T6	T7
	250[1]/320	400/630	630/800/1000	800/1000/1250/1600
	20...320	320...630	630...1000	200...1600
	3/4	3/4	3/4	3/4
	690	690	690	690
	750	750	750	
	36	36	36	
	50	50	50	50
	70	70	70	70
	120	120	100	120
	200	200	150 [2]	150
				170 [3]

	T4	T5	T6	T7
	250/320	400/630	630/800/1000	800/1000/1250/1600
	3/4	3/4	3/4	3/4
	690/1000	690/1000	690	690
	■	■	■	
				■

	T4	T5	T6	T7
	250/320	400/630	800	800/1000/1250
	3	3	3	3
	690	690	690	690
	■			
	■	■	■	
	■	■	■	
				■

	T4	T5	T6	
	250	400/630	630/800	
	3/4	3/4	3/4	
	20	20	12	
	12	12		
	40	40	40	

	T4D	T5D	T6D	T7D
	250/320	400/630	630/800/1000	1000/1250/1600
	250/320	400/630	630/800/1000	1000/1250/1600
	3/4	3/4	3/4	3/4
	690	690	690	690
	750	750	750	750
	5.3	11	30	52.2
	3.6	6	15	20

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[5]	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)[6] - 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

Electronic trip units for power distribution

2

SACE PR221DS

	PR221DS	PR221DS
Protection functions	L S / I	I

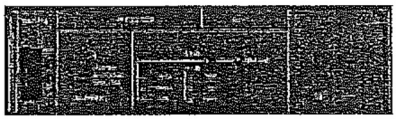
SACE PR222DS/P

	PR222DS/P	PR222DS/P
Protection functions	L S I	L S I G

SACE PR222DS/PD

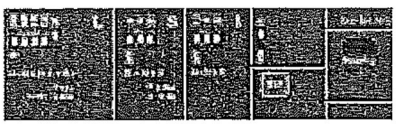
	PR222DS/PD	PR222DS/PD
Protection functions	L S I	L S I G

SACE PR223DS



	PR223DS
Protection functions	L S I G

SACE Ekip E-LSIG



	Ekip E-LSIG
Protection functions	L S I G

Accessories
Connection terminals

Front terminals for copper/aluminium cables - FC CuAl

Allow connection of bare copper or aluminium cables directly to the circuit-breaker (solid aluminium cables cannot be used).

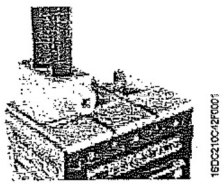
T4-T5
Standard

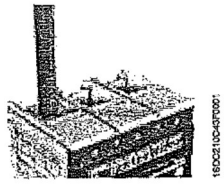
T4-T5
External

T6-T7

Type	Assembly	Version	Pieces	Cable [mm²]	Tightening [Nm]		Ø [mm]	Terminal covers			Phase separators
				rigid	A	B		high	low	fixed part	
T4	standard	F-P-W	1	6...185	9	31	18	R	R	S	R
	external	F	2	35...150	18	16	18	S	–	S	–
	external	F	1	150...240	18	40	24	S	–	–	–
	standard	F	1	2.5...50	9	5.6	9.9	R	R	R	R
T5	external	F-P-W	1	120...240	18	43	21.5	R	R	R	S
	standard	F-P-W	1	185...300	18	43	24.5	R	R	S	R
	external	F	2	95...240	18	31	24.5	S	–	S	–
	external	F	2	95...120	18	31	–	S	–	–	R
T6 630	standard	F	2	120...240	5	31	21.5	R	–	–	R
T6 800	external	F	3	70...185	9	43	19	S	–	–	–
T6 1000	external	F	4	70...150	9	43	19	S	–	–	–
T7 630	standard	F	2	185...240	18	43	21.5	–	S	–	R
T7 1250[1]	external	F	4	70...240	18	43	21.5	S	–	–	–

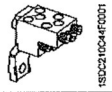
[1] up to 1250 A, not available on Tmax T7X



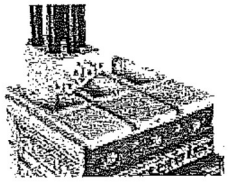


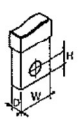
Multi-cable terminals - MC

Allow connection of cables directly to the circuit-breaker.



Type	Version	Pieces	Cable [mm²]		Tightening [Nm]		Terminal covers			Phase separators
		max	flexible	rigid	A	B	high	low	fixed part	
T4	F	6	2.5...25	2.5...35	18	7	S	–	–	–
T5	F	6	–	16...50	18	5	S	–	–	–





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

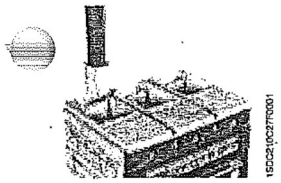
Accessories
Connection terminals

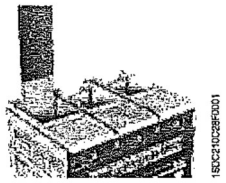
Front terminals - F

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[2]	F	2	50	20	8	2x11	18	–	R	–	R
T7 1600	F	2	50	20	10	2x11	18	–	R	–	R

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



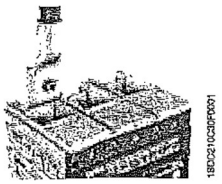


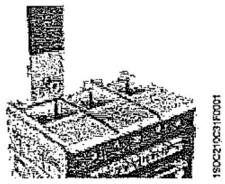
Front extended terminals - EF

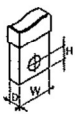
Allow connection of busbars or cables terminated with cable terminal.

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

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

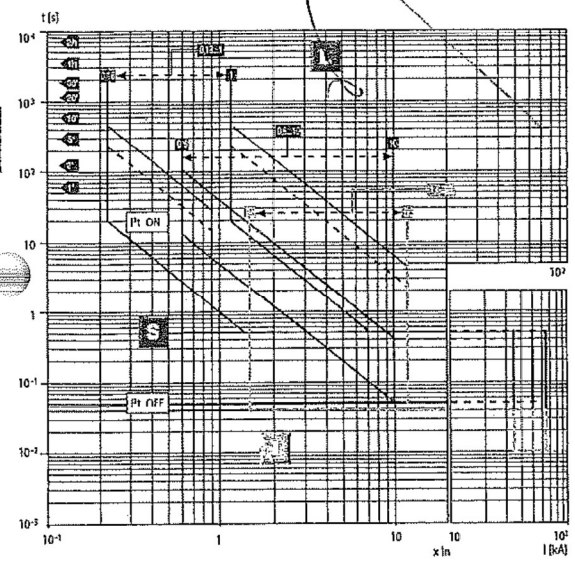
(1) Only for T7 800/1000/1250 A
(2) 75% for T5 630
(3) 50% for T5 630
(4) Only up to 630 V, Icw = 5 kA
(5) Icw = 7.6 kA (630 A) - 10 kA (800 A)
(6) Icw = 20 kA (S, H, L versions) - 15 kA (V version)
(7) For applications at 1000 V, only available in the fixed version
(8) For applications at 1000 V, only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

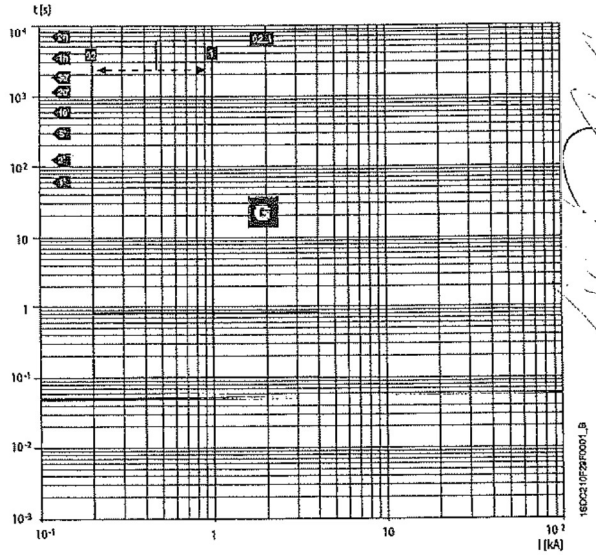
Tmax T5					Tmax T6				Tmax T7			
400/630					630/800				800/1000/1250			
320, 400, 630					630, 800				–			
3					3				3			
690					690				690			
–					–				–			
8					8				8			
1000					1000				1000			
3500					3500				3500			
N	S	H	L	V	N	S	H	L	S	H	L	V
70	85	100	200	200	70	85	100	200	85	100	200	200
36	50	70	120	200	36	50	70	100	50	70	120	150
30	40	65	100	180	30	45	50	80	50	65	100	130
25	30	50	85	150	25	35	50	65	40	50	85	100
20	25	40	70	80	20	22	25	30	30	42	50	60
100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
100%	100%	100%	100%(1)	100%(2)	100%	100%	100%	75%	100%	100%	75%	100%
100%	100%	100%(1)	100%(2)	100%(2)	75%	75%	75%	75%	100%	75%	75%	75%
154	187	220	440	660	154	187	220	440	187	220	440	440
75.6	105	154	264	440	75.6	105	154	220	105	154	264	330
63	84	143	220	396	63	94.5	105	176	105	143	220	286
52.5	63	105	187	330	52.5	73.5	105	143	84	105	187	220
40	52.5	84	154	176	40	46	52.5	63	63	88.2	105	132
6	6	6	6	6	10	9	8	7	15	10	8	8
B (400 A)(3) - A (630 A)					B(4)				B(5)			
■					■				■			
IEC 60947-2/IEC 60947-4					IEC 60947-2/IEC 60947-4				IEC 60947-2			
–					–				–			
■					■				–			
–					–				■			
■					■				–			
■					■				■			
F - P - W					F - W				F - W			
F - FC Cu - FC CuAl - EF - ES - R - HR - VR					F - FC CuAl - EF - ES - R - RC				F - EF - ES - FC CuAl - HR/VR			
EF - ES - R - FC Cu - FC CuAl - HR - VR					–				–			
EF - ES - FC Cu - FC CuAl					EF - HR - VR				EF - HR/VR - ES - RS			
–					–				–			
20000					20000				10000			
120					120				60			
7000					5000				2000 (S, H, L versions) / 3000 (V version)			
60					60				60			
140					210				210			
103.5					103.5				154 (manual) /178 (motorizable)			
205					268				268			
3.25					9.5/12				9.7/12.5 (manual) - 11/14 (motorizable)			
5.15					–				–			
5.4					12.1/15.1				29.7/39.6 (manual) - 32/42.6(motorizable)			

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

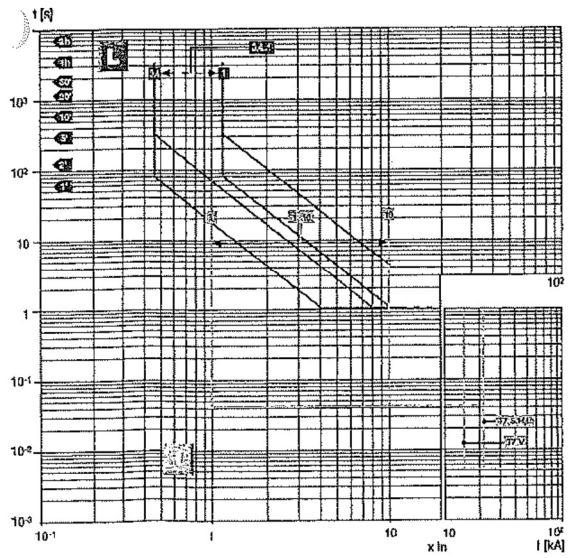
Tmax T5 Ekip E
L-S-I Functions



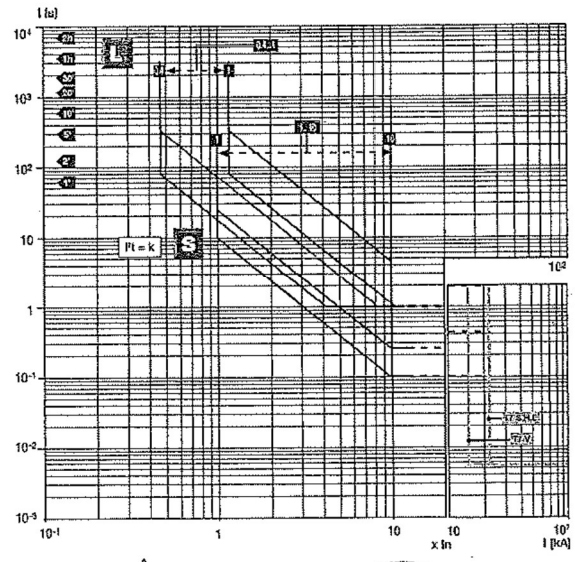
Tmax T5 Ekip E
L-S-I Functions



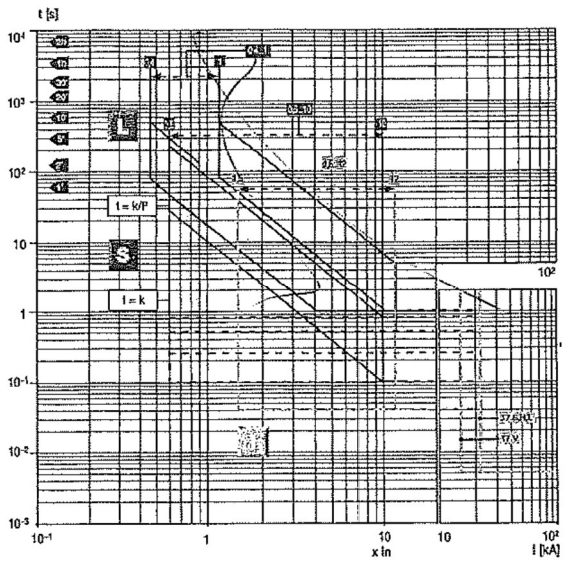
T7 800/1000/1250/1600 – PR231/P
L-I Functions



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

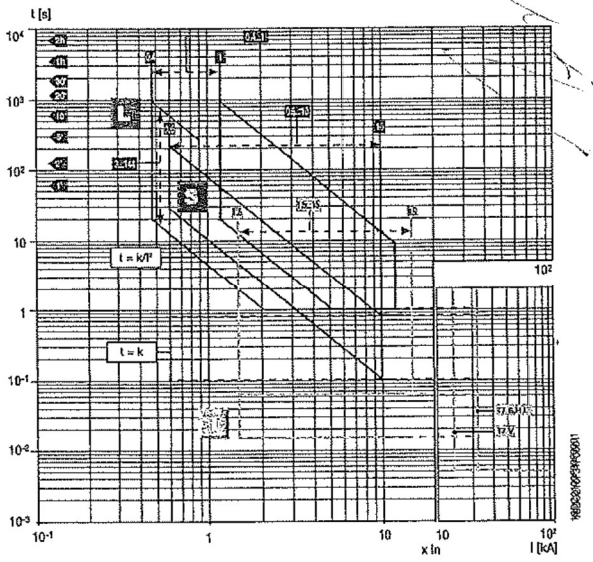


T7 800/1000/1250/1600 – PR232/P
L-S-I Functions

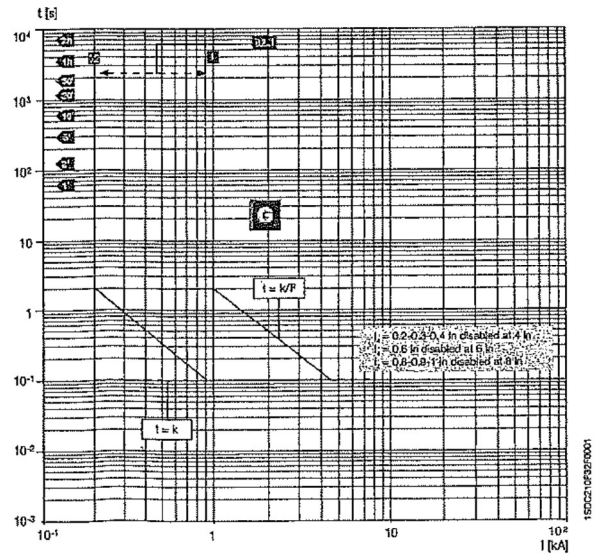


T7 800/1000/1250/1600 – PR331/P
L-S-I Functions

Note: For T7 In = 1250 A, 1600 A ⇒ I_3max = 12 x In

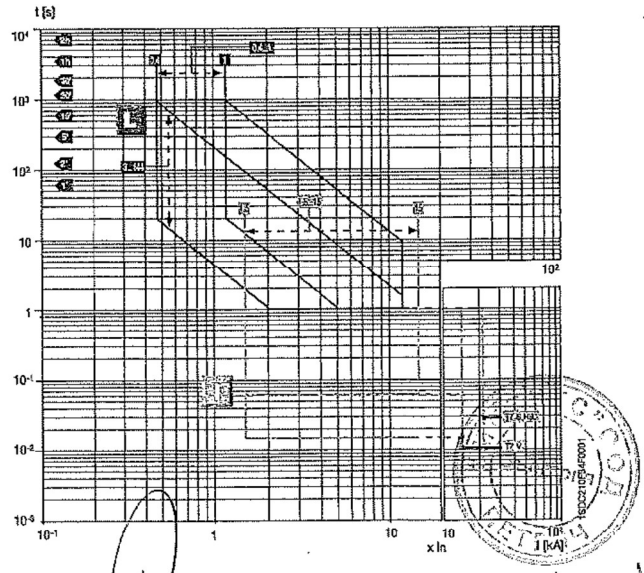


T7 800/1000/1250/1600 – PR331/P
G Function



T7 800/1000/1250/1600 – PR332/P
L-I Functions

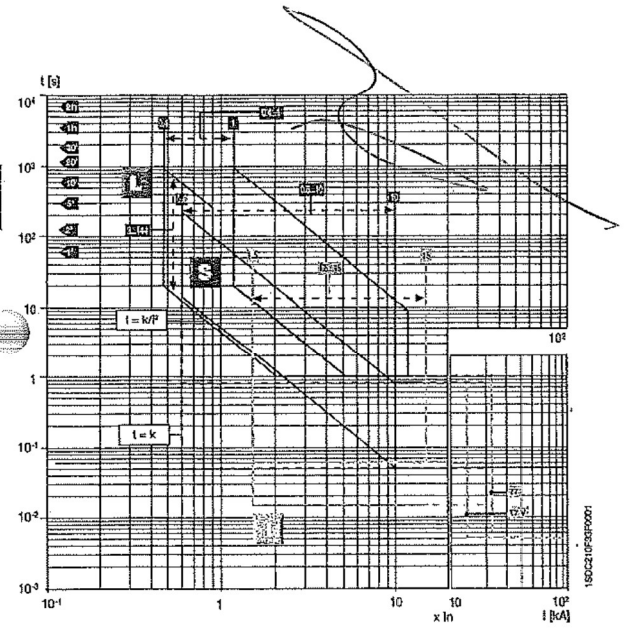
Note: For T7 In = 1250 A, 1600 A ⇒ I_3max = 12 x In



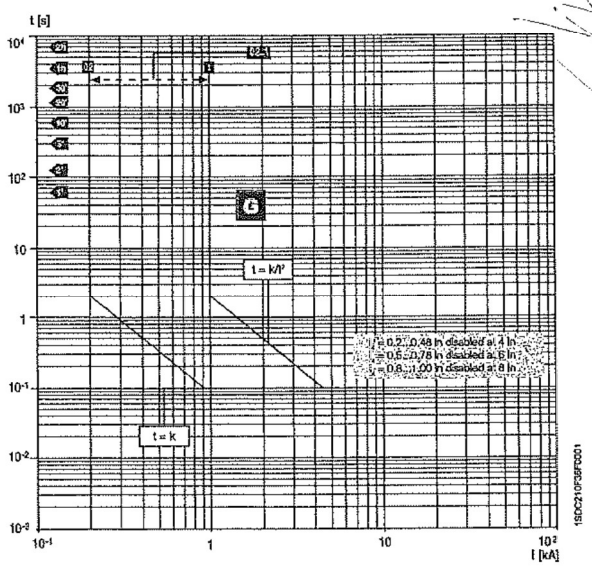
Trip curves for power distribution
Circuit-breakers with electronic trip units

T7 800/1000/1250/1600 – PR332/P
L-S-I Functions

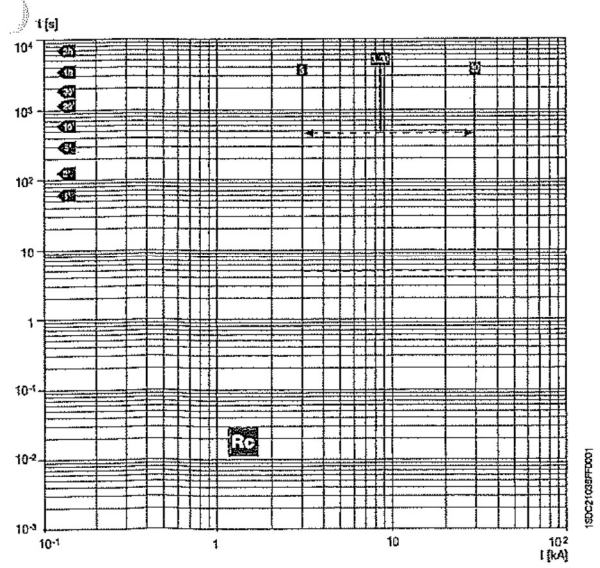
Note: For T7 In = 1250 A, 1600 A ⇒ I_3max = 12 x In



T7 800/1000/1250/1600 – PR332/P
G Function

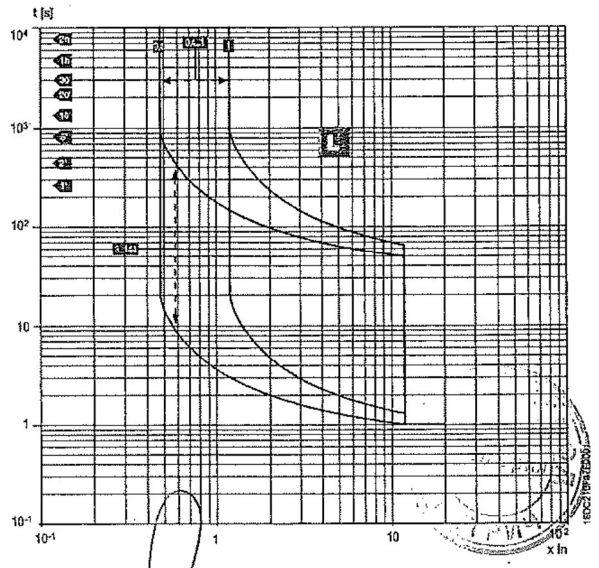


T7 800/1000/1250/1600 – PR332/P
Rc Function



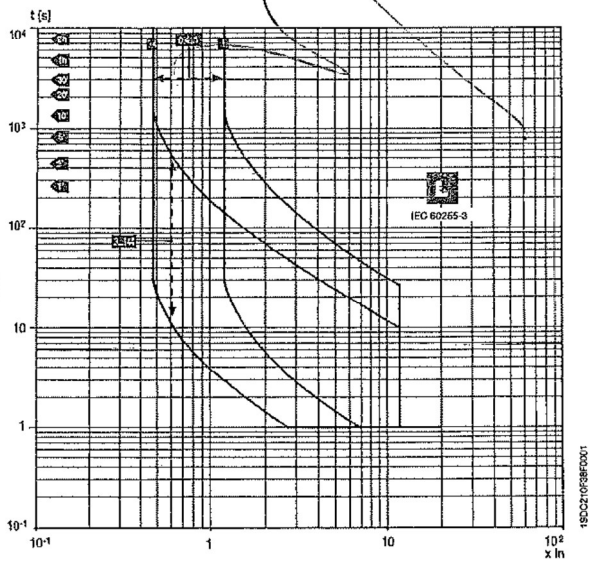
T7 800/1000/1250/1600 – PR332/P
L Function according to IEC 60255-3

k = 0,14 α = 0,02



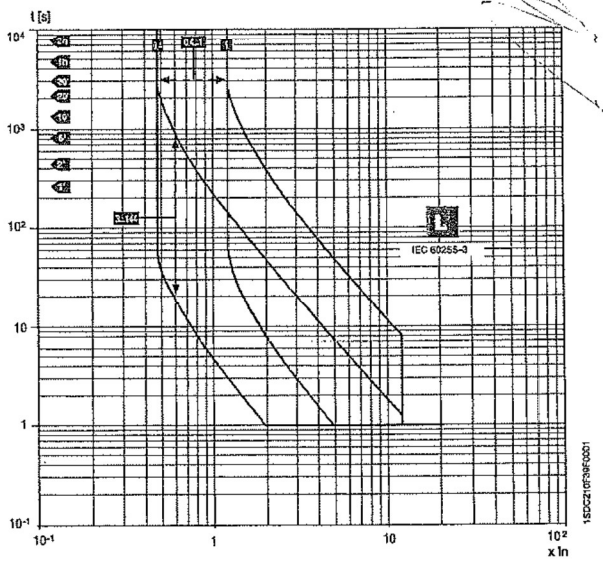
T7 800/1000/1250/1600 – PR332/P
L Function according to IEC 60255-3

k = 13,5 α = 1



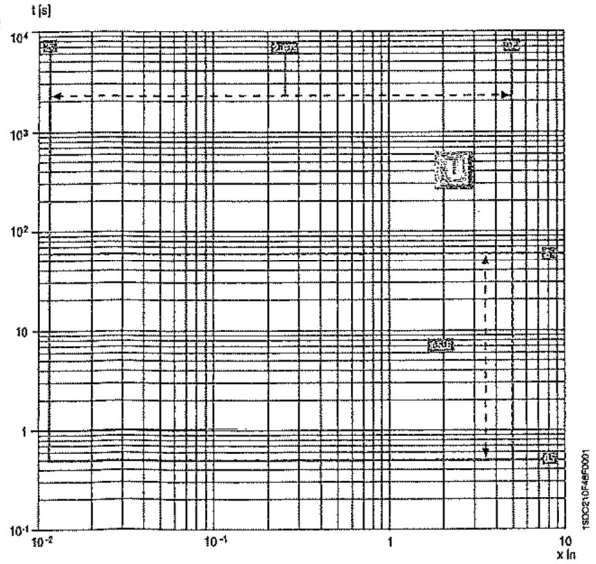
T7 800/1000/1250/1600 – PR332/P
L Function according to IEC 60255-3

k = 80 α = 2



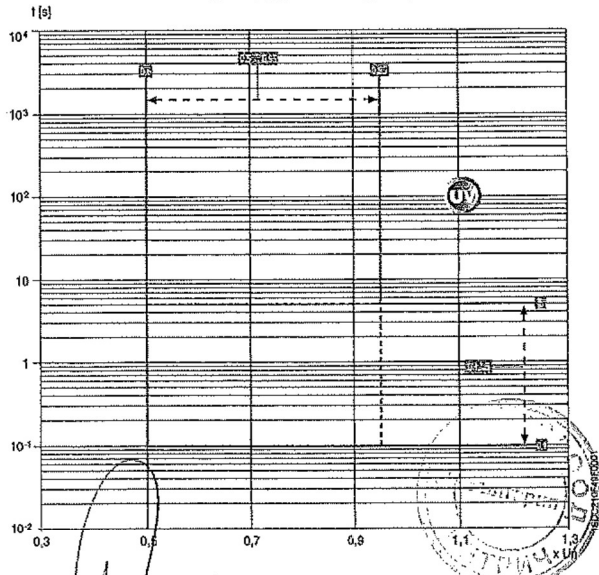
T7 800/1000/1250/1600 – PR332/P
U Function

k = 0,14 α = 0,02



T7 800/1000/1250/1600
PR332/P with PR330/V
UV Function

k = 13,5 α = 1



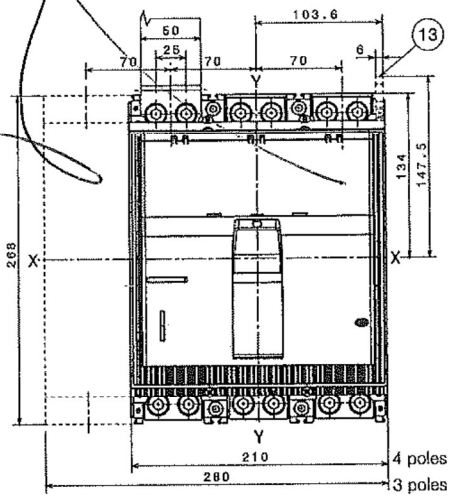
Overall dimensions
Tmax T7

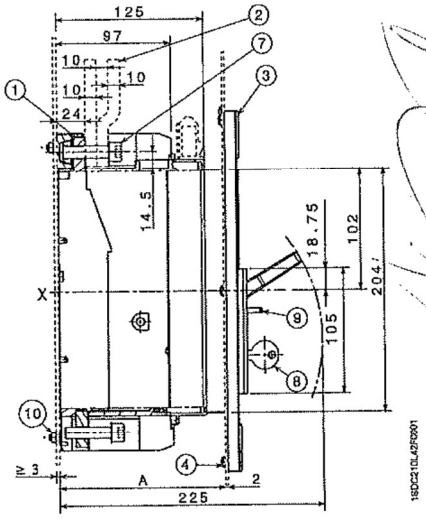
Fixed circuit-breaker

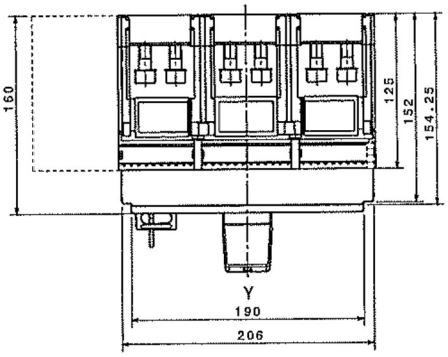
Front - F

Caption

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

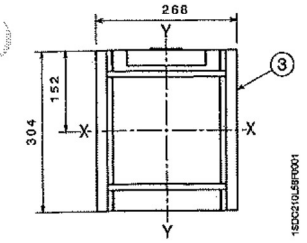


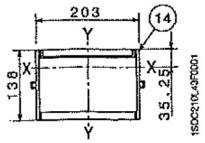


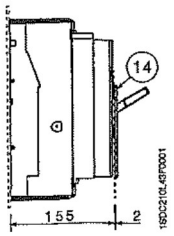


	With flange	Without flange
A	125...141	147

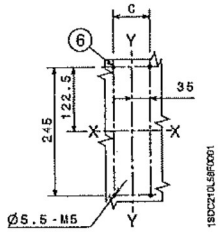
Flange for the compartment door (supplied as standard)





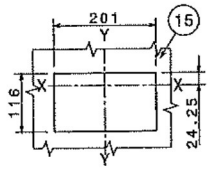


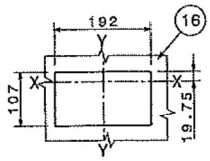
Drilling templates for support sheet

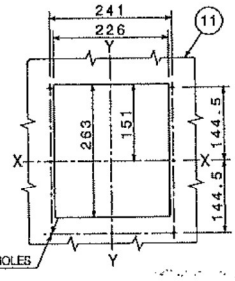


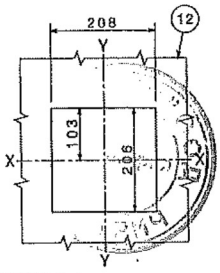
	III	IV
C	70	140

Drilling templates of the compartment door









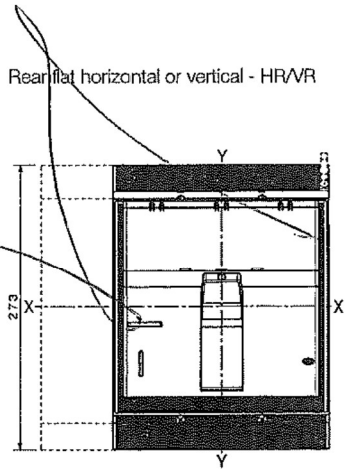
Overall dimensions
Tmax T7

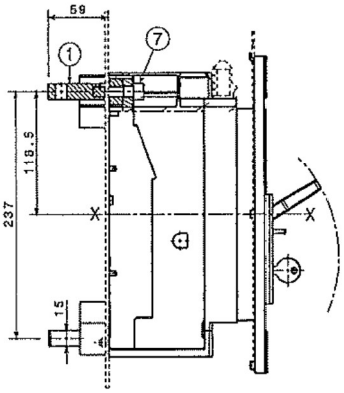
Terminals

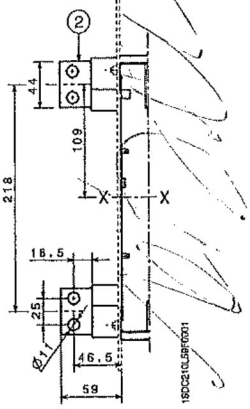
Caption

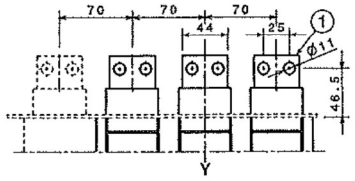
(1) Rear horizontal terminals
(2) Rear vertical terminals
(6) Support sheet drilling template
(7) Tightening torque: 20 Nm

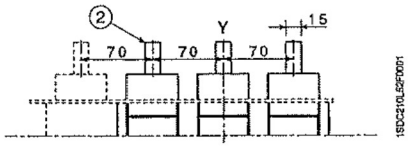
Rear flat horizontal or vertical - HR/VR



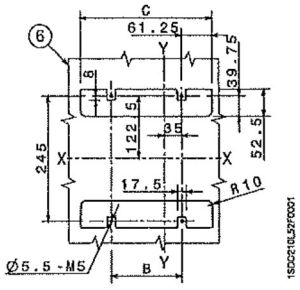








Drilling templates for support sheet



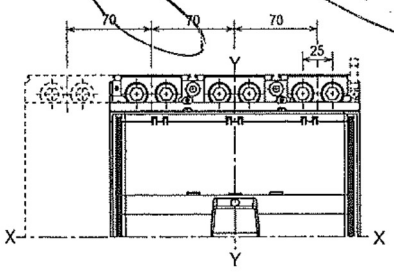
	III	IV
B	70	140
C	192.5	262.5

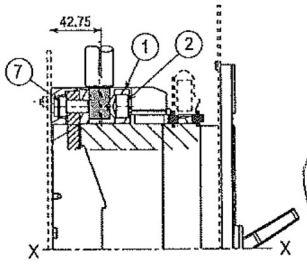
Terminals

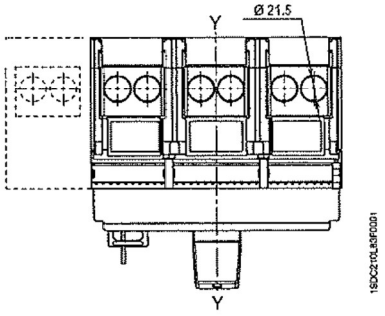
Caption

1. Front terminals for cables FC CuAl
2. Tightening torque: 43 Nm
6. Drilling template for fixing onto support sheet
7. Tightening torque: 18 Nm
8. Protection plate

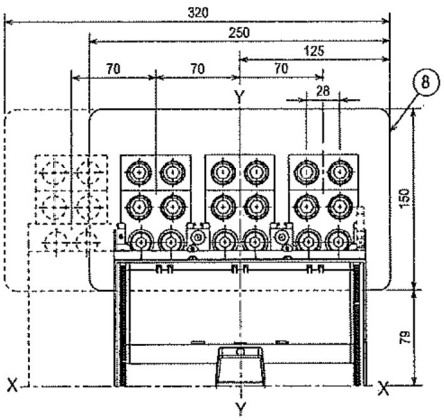
Front for copper/aluminium cables - FC CuAl 2x240 mm²

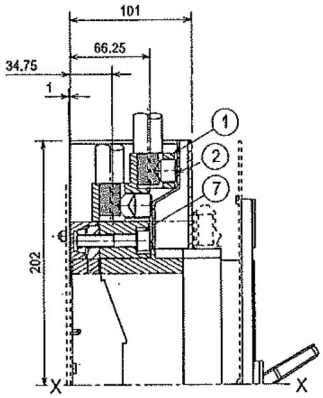


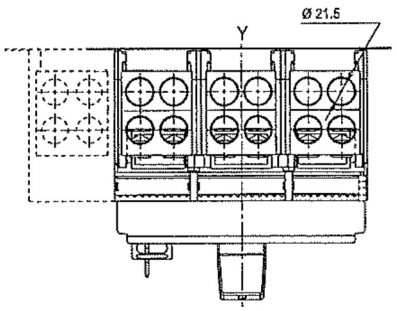




Front for copper/aluminium cables - FC CuAl 4x240 mm²







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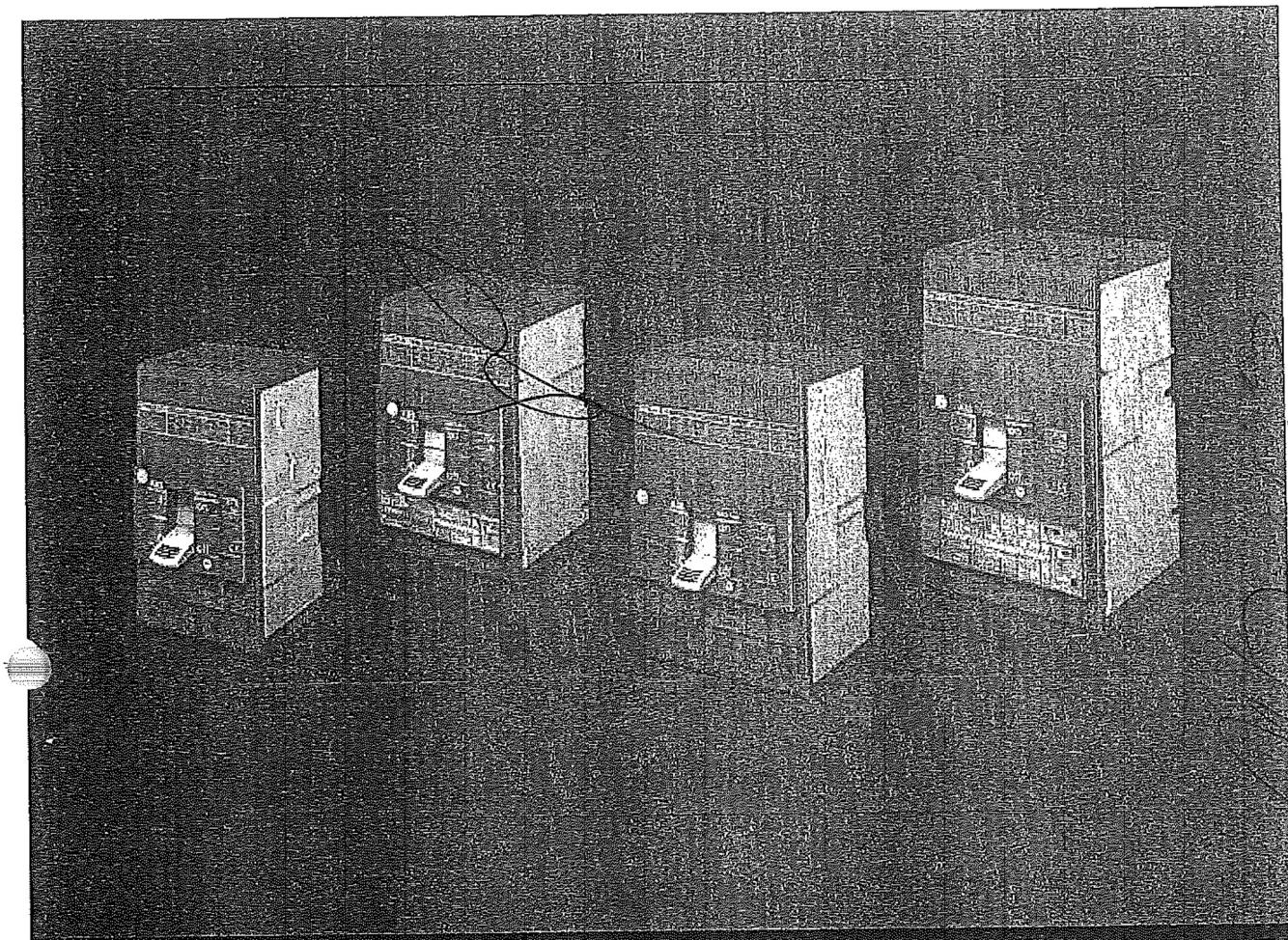

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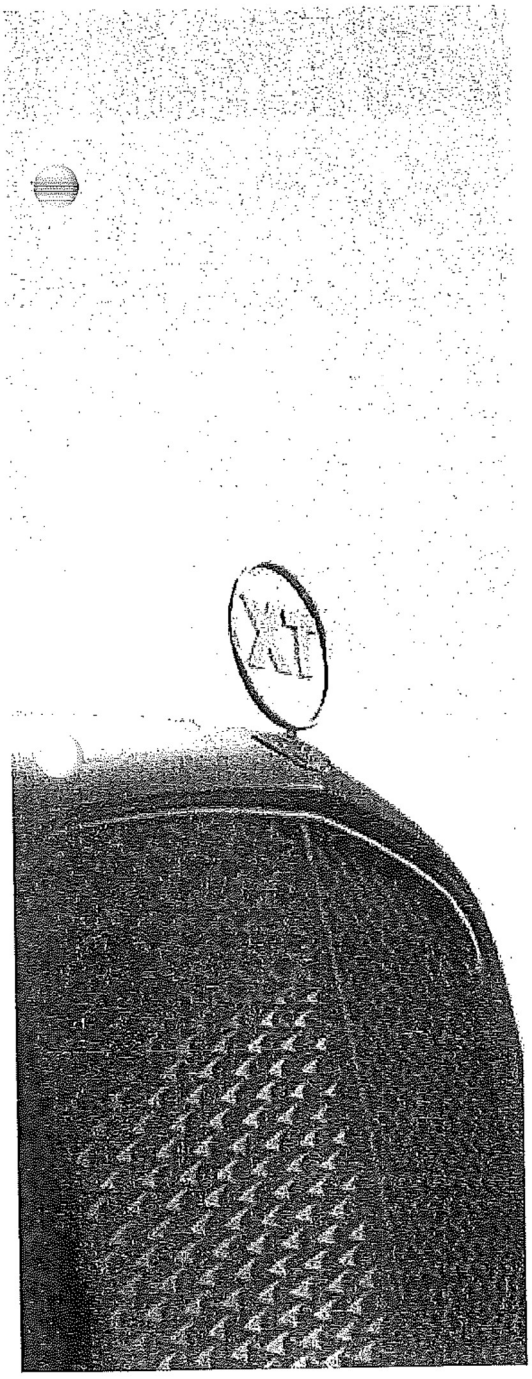
SACE Tmax XT
New low voltage moulded-case circuit-breakers up to 250 A



1SDC210033D0204

Construction Characteristics

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	500					500		500[4]				
	1000					800		1000				
	8					8		8				
	Fixed, Withdrawable, Plug-in					Fixed, Plug-in		Fixed, Withdrawable, Plug-in				
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	✓					✓		✓				
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	8000					8000		8000				
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	▲							▲				
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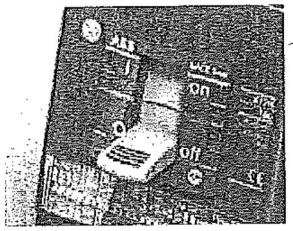
	1.2 / 1.6					1.7 / 2.1		2.5 / 3.5				
	2.54 / 3.27					3.24 / 4.1		4.19 / 5.52				
	3.32 / 4.04							5 / 6.76				

Construction characteristics

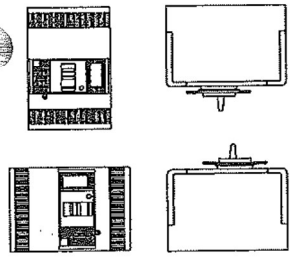
The references in round brackets (G.x.x) in the technical catalogue refer to the Glossary in the final charter of the technical catalogue.



Positive operation

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

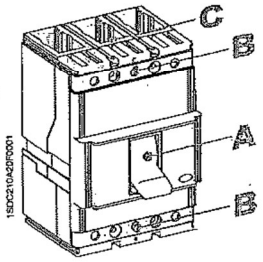
- double insulation(G1.5);
- positive operation(G1.6);
- isolation behaviour(G1.7);
- electromagnetic compatibility(G1.8);
- tropicalization(G1.9);
- impact and vibration resistance(G1.10);
- power supply from the top towards the bottom or vice versa;
- versatility of the installation. It is possible 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

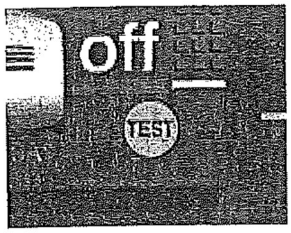
- the SACE Tmax XT circuit-breakers can be used in environments where the temperature is between -25°C and +70°C and stored in environments where the temperature is between -40°C and +70°C. To use temperatures other than 40°C, see the "Temperature Performances" paragraph of the Characteristic Curves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

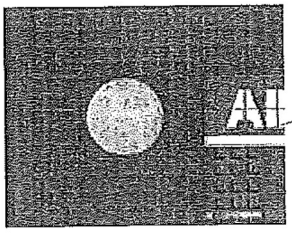


Test pushbutton

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

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

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:

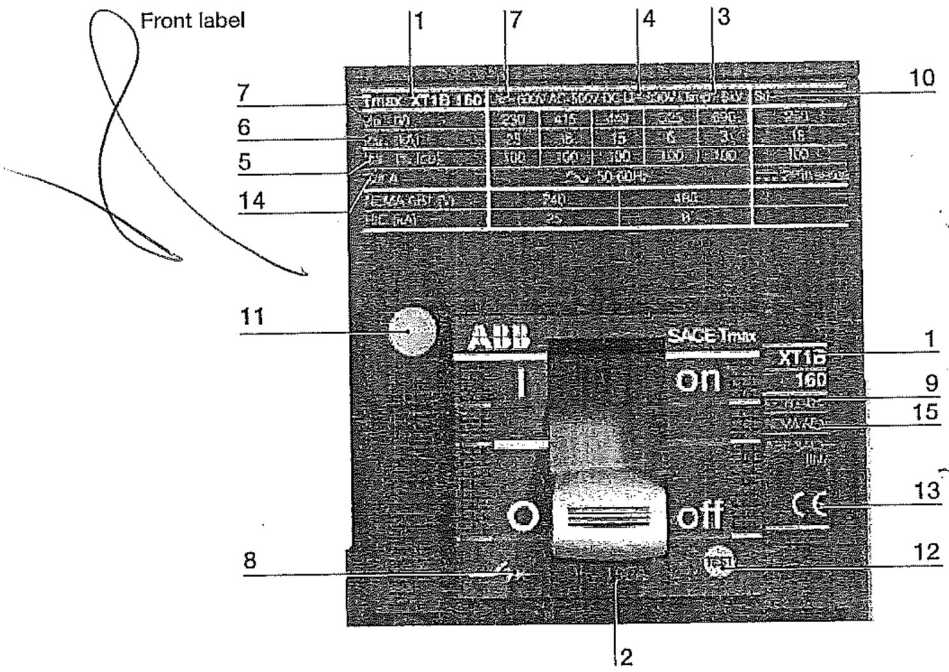
- Registration in the online tool (Extended Warranty Tool) to verify the application. Use Qr code below to access the tool
- Extended Warranty part number(s) and registration code received by email
- Place the order of the circuit breaker(s) together with:
  - Extended warranty part number(s)
  - Unique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

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

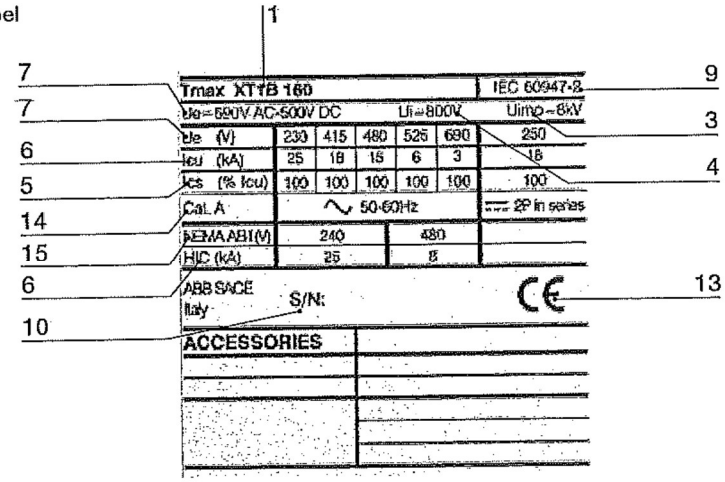
Identification of the SACE Tmax XT circuit-breakers

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-LS/I
(2) For 10A: 0.4In

Circuit-breakers for power distribution

Main characteristics

Characteristics of circuit-breakers for power distribution

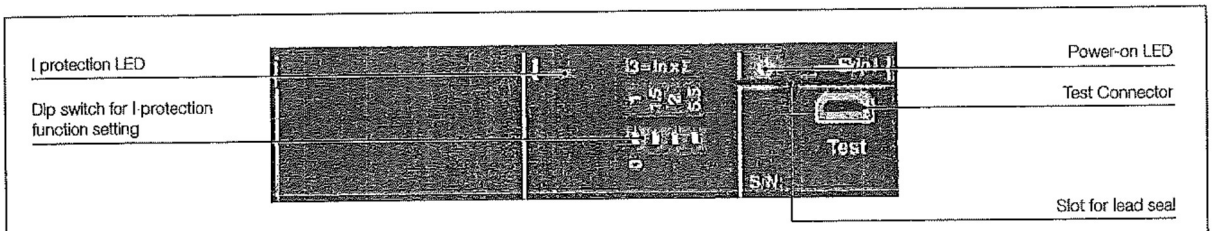
			XT1	XT2	XT3	XT4
Size[G2.1]		[A]	160	160	250	160/250
Poles		[Nr.]	3, 4	3, 4	3, 4	3, 4
Rated service voltage, Ue[G2.4]	(AC) 50-60Hz	[V]	690	690	690	690
	(DC)	[V]	500	500	500	500
Rated insulation voltage, Ui[G2.5]		[V]	800	1000	800	1000
Rated impulse withstand voltage, Uimp[G2.6]		[kV]	8	8	8	8
Versions			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	Thermomagnetic	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

Ekip I

Main characteristics:

- usable with the XT2 and XT4 circuit-breaker in the three-pole and four-pole versions;
- protections:
  - against instantaneous short-circuit (I): adjustable protection threshold from 1...10xIn, with instantaneous trip curve;
  - of the neutral in four-pole circuit-breakers:
    - for In≥100A in the OFF or ON positions, 50% and 100% of the phases can be selected;
    - for In<100A, neutral protection is fixed at 100% of the phases and disableded by user;
- manual setting using the relative dip-switches, which allow the settings to be made even when the trip unit is off;
- LED:
  - LED lit with a steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xIn;
  - LED with a steady red light, indicating that protection I has tripped; red LED light on connecting Ekip TT or Ekip T&P accessories after circuit-breaker opening for "I protection" intervention;
  - Ekip I is equipped with a trip coil disconnection protection device that detects whether the opening solenoid has disconnected. Signalling is made by the red LED flashing;
- test connector on the front of the trip unit;
  - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about latest trip happened;
  - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the I protection function test to be carried out;
- self-supply from a minimum current of 0.2xIn up.



Ekip I

Protection function		Trip threshold	Trip curve[1]	Excludability	Relation
	Against short-circuits with adjustable treshold and instantaneous trip time	Manual setting: I_3= 1, 1.5, 2, 2.5, 3, 3.5, 4.5, 5.5, 6.5, 7, 7.5, 8, 8.5, 9, 10xIn Tolerance: ±20% I>4In ±10% I≤4In	≤20ms	Yes	t=k

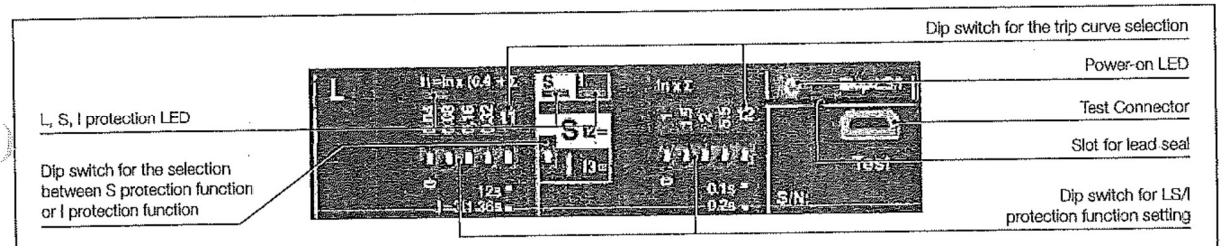
[1] Tolerances in case of:
- self-powered trip unit at full power;
- 2 or 3 phase power supply.

In conditions other than those considered, the trip time is ≤60ms.

Ekip LS/I

Main characteristics:

- available for XT2 and XT4 in the three-pole and four-pole versions;
- protections:
  - against overload (L): 0.4...1xIn adjustable protection threshold, with adjustable time trip curve;
  - against short-circuit with delay (S): 1...10xIn adjustable protection threshold, with adjustable time trip curve (as an alternative to I protection);
  - against instantaneous short-circuit (I): 1...10xIn adjustable protection threshold, with instantaneous trip curve (as an alternative to S protection);
  - of the neutral in four-pole circuit-breakers:
    - for In ≥100A can be selected in the OFF or ON positions, 50%, 100% of the phases;
    - for In <100A, neutral protection is fixed at 100% of the phases and disableded by user;
- manual setting using the relative dip-switches on the front of the trip unit, which allow the settings to be made even when the trip unit is off;
- LED:
  - LED with steady green light indicating that the trip unit is supplied correctly. The LED comes on when the current exceeds 0.2xIn;
  - red LED for each protection:
    - L: LED with steady red light, indicates pre-alarm for current exceeding $0.9xI_1$;
    - L: LED with flashing red light, indicates alarm for current exceeding setted threshold;
    - LS/I: LED with steady red light, shows that the protection has tripped. After the circuit-breaker has opened, connect the Ekip TT or Ekip T&P accessory to find out which protection function tripped the trip unit;
  - Ekip LS/I is equipped with a trip coil disconnection detection device that detects whether the opening solenoid has disconnected. Signalling is made by all the red LEDs flashing simultaneously;
- test connector on the front of the release:
  - to connect the Ekip TT trip test unit, which allows trip test, LED test and signalling about latest trip happened;
  - to connect the Ekip T&P unit, which allows the measurements to be read, the trip test to be conducted and the protection functions test to be carried out;
- thermal memory which can be activated by Ekip T&P;
- self-supply from 0.2xIn minimum current up.



Ekip LS/I

Protection function		Trip threshold	Trip curve[1]	Excludability	Relation	Thermal memory
L	Against overloads with long inverse time delay trip according to IEC 60947-2 Standard	Manual setting: I_1= 0.4...1xIn step 0.04 Tolerance: trip between 1.05...1.3 I_1 (IEC 60947-2)	Manual setting: t_1= 12-36s at I=3xI_1 Tolerance: ±10% up to 4xIn ±20% from 4xIn	–	$t = k/I^2$	Yes
S	Against short-circuits with indipendend time delay (t=k)	Manual setting: I_2= 1-1.5-2-2.5-3-3.5-4-5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	t_2= 0.1-0.2s Tolerance: ±15%	Yes	t = k	–
I	Against short-circuits with adjustable treshold and instantaneous trip time	Manual setting: I_3= 1-1.5-2-2.5-3-3.5-4-5-5.5-6.5-7-7.5-8-8.5-9-10xIn Tolerance: ±10%	≤20ms	Yes	t = k	–

[1] Tollerances in case of:
– self-powered trip unit at full power;
– 2 or 3 phase power supply.
In conditions other than those considered, the following tollerance hold:

Protection	Trip threshold	Trip time
L	release between 1.05 and 1.3 x I_1	±20%
S	±10%	±20%
I	±15%	≤60ms

Circuit-breakers for motors protection

Main characteristics

Characteristics of circuit-breakers for protecting motors

			XT1	XT2	XT3	XT4
Size[G2.1]		[A]	160	160	250	160/250
Poles		[Nr]	3	3	3	3
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]	1000	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			N[1]	N S H L V	N S	N S H L V
Trip Units			Magnetic	Magnetic, Electronic	Magnetic	Magnetic, Electronic
MF/MA			■	■	■	■
Ekip M-I				■ In = 20A, 32A, 52A, 100A		
Ekip M-LIU				▲ In = 25A, 63A, 160A		▲ In = 40A, 63A, 100A, 160A
Ekip M-LRIU				▲ In = 25A, 63A, 100A		▲ In = 40A, 63A, 100A, 160A, 200A
Interchangeability				■		■

(1) Icu@415V = 5kA In<16A

■ Complete circuit-breaker

▲ Loose trip unit

ABB Accessories

Index

"МЕТИКС" ООД България ПЕТРИЧ