Intercomplex Ltd.®
4002 Пловдив, бул. "Пещерско шосе" № 201, тел. (032) 241 415, тел./факс: (032) 241 414, e-mail: office@intercomplex.bg
1113 София, ул. "Акад. Г. Бончев" № 20, тел. (02) 971 70 41, факс: (02) 971 71 41, e-mail: office.sf@intercomplex.bg

Приложение ТС 8
към Технически спецификации
от процедура PPD 15-031

ДЕКЛАРАЦИЯ

относно период на функционалност и необслужваемост

Долуподписаният *Ехиязар Гарабед Узунян*, в качеството ми на *управител* на *ИНТЕРКОМПЛЕКС ООД*, със седалище и адрес на управление: *гр. Пловдив бул. Пещерско шосе 201*, вписано в Търговския регистър към Агенцията по вписванията с ЕИК *115096057*, във връзка с обявената процедура за възлагане на обществена поръчка от *ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ АД*.

Наименование на обекта на обществената поръчка:
„Доставка на товарови прекъсвачи СрН /ТПМЗ/“, реф № *PPD 15-031*

ДЕКЛАРИРАМ:

1. Предлаганите мощностни разединители, производство на „АВВ" – Полша, изпълняват изискването за минимум 4 - годишен период на пълна функционалност и необслужваемост по отношение на контактните системи, лостовите механизми и пружинните задвижвания.

2. Правя настоящата декларация на основание предоставените ми документи от производителя - „АВВ" – Полша, приложени към настоящата документация.

Известно ми е, че при деклариране на неверни данни, нося наказателна отговорност по чл. 313 от НК.

07.08.2015 година

Декларатор: .....

Ехиязар Узунян

37

Превод от английски език

Мощност и производителност
за един по-добър свят

Варшава, дата: 2015-06-16

Декларация на производител

До: АББ България ЕООД
бул. Христофор Колумб № 9, ет. 3
1592 София, България

Ние, ABB Sp.z.o.o., разположени на адрес: ул. Зеганска № 1, 04-713 Варшава, производител на товарови прекъсвачи за вътрешен монтаж, тип NAL(F), с настоящото потвърждаваме гаранцията за пълна функционелност и необслужваемост за период от най-малко 4 години, считано от датата на доставка по отношение на лостовите механизми, контактните системи и пружинните механизми, при условие, че с тях е работено провилно, в съответствие с ръководството за експлоатация и при стандартни условия. Механичните натоварвания по време на гаранционния период не бива да бъдат превишавани, в противен случай гаранцията е невалидна.

Фирма: фирмен печат на АББ - Полша
Име:
В качеството на:
Подпис: не се чете

ABB Sp. z o.o.
Siedziba spółki
ul. Żegańska 1
04-713 Warszawa
tel.: 22 22 02 000, 22 02 001
fax: 22 22 02 031, 22 02 231

Sąd Rejonowy dla m.st. Warszawy
w Warszawie, XIII Wydział
Gospodarczy Krajowego Rejestru
Sądowego, nr KRS: 0000004745

NIP: 526-030-44-54, PL 5260304484
Nr GIOŚ: E0008536WDW
Kapitał zakładowy: 350 655 734,00 zł

www.abb.pl

Power and productivity
for a better world™ ABB

Warszawa, date: 2015-06-16

Manufacturer's Declaration

To: ABB Bulgaria EOOD
9 Christofor Columbus Blvd.fl.3
1592,Sofia,Bulgaria

We, ABB Sp.z.o.o., located in 1 Zeganska St. 04-713 Warszawa, producer of indoor switch disconnectors NAL(F) type do hereby confirm warranty for full functionality and maintenance free for minimum 4 years period from the delivery date for the lever mechanisms, contact systems and spring mechanisms in case they are operated properly in accordance with operation manual and under standard conditions. Mechanical endurance during the warranty period should not be exceeded, otherwise warranty is void.

The warranty repairs are handed by ABB Sp.z.o.o

Company:
Name:
In the Capacity of:
Signed:

ABB
ABB Sp. z o.o.
ul. Bitwy Warszawskiej 1920 r. nr 18
02-366 Warszawa
NIP 526-030-44-84, REGON 010017168
ODDZIAŁ W WARSZAWIE
ul. Żegańska ... Warszawa
tel.(022) 51 ... 5152689

ABB Sp. z o.o.
Siedziba spółki
ul. Żegańska 1
04-713 Warszawa
tel.: 22 22 02 000, 22 02 001
fax: 22 22 02 031, 22 02 231

Sąd Rejonowy dla m.st. Warszawy
w Warszawie, XIII Wydział
Gospodarczy Krajowego Rejestru
Sądowego, Nr KRS: 0000004745

NIP: 526-030-44-84, PL 5260304484
Nr GIOS: E0008536WBW
Kapitał zakładowy: 350 655 734,00 zł

www.abb.pl

ИНТЕРКОМПЛЕКС ООД * ПЛОВДИВ

ВЯРНО С
ОРИГИНАЛА

ABB	INSTRUKCJA KONTROLI PRODUKCYJNEJ /*PRODUCTION CONTROL INSTRUCTION*	
Stanowisko/Stand:	**POMIAR REZYSTANCJI STYKÓW** / ***ИЗМЕРВАНЕ НА СЪПРОТИВЛЕНИЕТО RESISTANCE MEASUREMENT***	
Numer/Number	**IT 04-03-013**	**Strona 5 z 5**

Dopuszczalne wartosci rezystancji przedstawia ponizsza tabelka (wartosci rezystancji podane w μΩ)

/For permissible values see chart below (values in μΩ*)*

За граничните стойности виж таблицата по-долу (стойностите са в μΩ)

NAL – NALF		L1		L2		L3	
[V]	[A]	Nom.	Max.	Nom.	Max.	Nom.	Max.
12kV	630	**66**	**75**	**66**	**75**	**66**	**75**
	1250	**25**	**35**	**25**	**35**	**25**	**35**
17,5kV - 24kV	630	**85**	**105**	**85**	**105**	**85**	**105**
	1250	**35**	**45**	**35**	**45**	**35**	**45**
36 kV	630-800	**52**	**60**	**52**	**60**	**52**	**60**

Revision	EC No. / Date		Responsible: PL-ABB	Title	Language
	Location	**Date**	**Name**	Pomiar rezystancji styków	PL/EN
Made	PL-ABB	19-02-10	A. Poplawska	/*Resistance measurement*	Format
Checked	PL-ABB	19-02-10	P. Skwiot	***(Измерване на съпротивление)***	A4
Approved	PL-ABB	19-02-10	W. Pankratjew		
ABB	ABB Technology Ltd.			No. IT 04-03-013	

ТЕРКОМПЛЕКС ООД * ПЛОВДИВ *

ВЯРНО С ОРИГИНАЛА

Intercomplex Ltd.®
4002 Пловдив, бул. "Пещерско шосе" № 201, тел. (032) 241 415, тел./факс: (032) 241 414, e-mail: office@intercomplex.bg
1113 София, ул. "Акад. Г. Бончев" № 20, тел. (02) 971 70 41, факс: (02) 971 71 41, e-mail: office.sf@intercomplex.bg

Приложение ТС 11
към Технически спецификации
от процедура PPD 15-031

РЕЗЕРВНИ ЧАСТИ - NAL / NALF

№	№ по каталог	Описание	Тип на товаровия прекъсвач
1		Адаптор, от стар към нов тип изкл. механизъм при изгорял предпазител	*NALF12, NALF24*
2	1YMX301114M0001	Дъгогасителна камера 12/17/24kV	*NAL12, NAL24, NALF12, NALF24*
4	1YMX028906M0001	Дъгогасителни контакти 12/17/24/36/40,5 kV (2 psc.)	*NAL12, NAL24, NALF12, NALF24*
7	1YMX240709M0001	Контактен нож с зацепващо у-во 12-630A	*NAL12, NALF12*
9	1YMX200143M0001	Контактен нож с зацепващо у-во 17/24-630A	*NAL24, NALF24*
14	1YMX241266M0009	Механизъм за изключване при изгорял предпазител F3 12/210 от страната на завъртане на подвижните контакти	*NALF12*
20	1YMX241266M0010	Механизъм за изключване при изгорял предпазител F3 24/275 от страната на завъртане на подвижните контакти	*NALF24*
23	1YMX343858M0003	Механизъм за изключване при изгорял предпазител, общи пластмасови части 12-36kV	*NALF12, NALF24*
24	1YMX138662M0001	Изолатор NAL 12kV	*NAL12, NALF12*
25	1YMX138702M0001	Изолатор NAL 17/24kV	*NAL24, NALF24*
28	1YMX240717M0001	Изолатор с дъгогасителна камера 12-630A	*NAL12, NALF12*
30	1YMX240718M0001	Изолатор с дъгогасителна камера 17/24-630A	*NAL24, NALF24*
33	1YMX304763M0002	Главен контакт, от страната на отваряне 12/17/24-630A	*NAL12, NAL24, NALF12, NALF24*
36	1YMX400019M0002	Главен контакт, от страната на завъртане на подвижните контакти 12-630A	*NAL12, NALF12*
38	1YMX342853M0002	Главен контакт, от страната на завъртане на подвижните контакти 17/24-630A	*NAL24, NALF24*
40	1YMX400094M0002	Бутало с бутален прът 12kV	*NAL12, NALF12*
41	1YMX400096M0002	Бутало с бутален прът 17/24kV	*NAL24, NALF24*
43	1YMX023837M0001	Натягаща пружина, дъгогасителен контакт	*NAL12, NAL24, NALF12, NALF24*
44	1YMX138661M0001	Подпорен изолатор 12kV	*NAL12, NALF12*
45	1YMX138701M0001	Подпорен изолатор 17/24kV	*NAL24, NALF24*
47	1YMX241253M0001	Подпорен изолатор за основа за предпазители F 12kV	*NALF12*

Срок на доставка: до 30 дни след поръчка.

07.08.2015 г.

Кандидат: ИНТЕРКОМПЛЕКС ООД

.....

Ехнязар Узунян - управител

intercomplex Ltd.®
4002 Пловдив, бул. "Пещерско шосе" № 201, тел. (032) 241 415, тел./факс: (032) 241 414, e-mail: office@intercomplex.bg
1113 София, ул. "Акад. Г. Бончев" № 20, тел. (02) 971 70 41, факс: (02) 971 71 41, e-mail: office.sf@intercomplex.bg

Приложение ТС 12
към Технически спецификации
от процедура PPD 15-031

ТИПОВЕ ИЗКЛЮЧВАТЕЛНИ БОБИНИ И СПОМАГАТЕНИ ПРЕВКЛЮЧВАТЕЛИ

Таблица 1

Изключвателна бобина за А-механизъм без помощни контакти	220 VAC	1YMX054740M0001
Изключвателна бобина за А-механизъм без помощни контакти	125 VAC	1YMX054741M0002
Изключвателна бобина за А-механизъм без помощни контакти	110 VAC	1YMX054741M0001
Изключвателна бобина за А-механизъм без помощни контакти	220 VDC	1YMX054742M0001
Изключвателна бобина за А-механизъм без помощни контакти	125 VDC	1YMX054743M0002
Изключвателна бобина за А-механизъм без помощни контакти	110 VDC	1YMX054743M0001
Изключвателна бобина за А-механизъм без помощни контакти	4S V DC	1YMX054744M0001
Изключвателна бобина за А-механизъм без помощни контакти	24 V DC	1YMX054745M0001
Резервна изключвателна бобина за А-механизъм	220 VAC	1YMX054250M0001
Резервна изключвателна бобина за А-механизъм	125 VAC	1YMX054251M0002
Резервна изключвателна бобина за А-механизъм	110 VAC	1YMX054251M0001
Резервна изключвателна бобина за А-механизъм	220 VDC	1YMX054252M0001
Резервна изключвателна бобина за А-механизъм	125 VDC	1YMX054253M0002
Резервна изключвателна бобина за А-механизъм	110 VDC	1YMX054253M0001
Резервна изключвателна бобина за А-механизъм	4S V DC	1YMX054254M0001
Резервна изключвателна бобина за А-механизъм	24 V DC	1YMX054255M0001

Таблица 2

Помощни контакти		
за NAL(F) 12-24	2NO+2NC	1YMX054713M0001
за NAL(F) 12-24	4NO+4NC	1YMX054714M0002
за NAL(F) 12-24	8NO+8NC	1YMX054715M0001
за E/EB 12-24	2NO+2NC	1YMX054716M0001
за E/EB 12-24	4NO+4NC	1YMX054717M0001
за прекъсване от предпазител		1YMX053390M0001

Изключвателните бобини се използват винаги в комплект с помощни контакти, посочени в таблица 2.

07.08.2015 г.

Кандидат ИНТЕРКОМПЛЕКС ООД

.....

Ехиязар Узунян - управител

Приложение ТС 13

Instytut Elektrotechniki
Electrotechnical Institute

Certyfikat Systemu Jakości / Certificate of Quality System: PCBC 978/3/2009
Jednostka Notyfikowana przez UE Nr / EU Notified body No: 1460

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

CERTYFIKAT WN
CERTIFICATE HV

Nr/No. 0257/NBR/2013

Wydany na podstawie § 4 ust.4 p.2 Statutu Instytutu Elektrotechniki o badaniach, atestowaniu i certyfikacji aparatów i urządzeń elektrycznych oraz w oparciu o pismo Ministerstwa Gospodarki, Pracy i Polityki Społecznej Nr DIN-V/RK/62/2004 z dnia 8.04.2004 r. uprawniające Instytut Elektrotechniki do wydawania opinii o jakości aparatury i urządzeń elektrycznych wysokiego i niskiego napięcia, prądu przemiennego i stałego oraz wszelkiego sprzętu, oprzyrządowania i komponentów zasilanych energią elektryczną lub przeznaczonych do pracy pod napięciem a także z upoważnienia Short-Circuit Testing Liaison (STL) do wydawania Certyfikatów Badania Typu.

Issued on the basis of § 4 clause 4 p.2 of the Electrotechnical Institute Statute connected with testing attestation and certification of electrical apparatus and the Ministry of Economy, Labour and Social Policy disposition No. DIN-V/RK/62/2004 of 8.04.2004 relating to the authorisation of the Electrotechnical Institute to issue the opinions on the quality of high and low voltage, alternating and direct current electrical apparatus, devices and every equipment, instrumentation and components supplied by electrical energy or designated for live working and according to the Short-Circuit Testing Liaison (STL) authorization for issue Type Test Certificates

Dla: / For:

ABB Sp. z o.o.

Ul. Żegańska 1

04 – 713 Warszawa

Dotyczy wyrobu: / Applies to the product:

Rozłączniki SN MV Switches

Typu / Type NAL 12; NALF 12 i / and NAL 17,5; NALF 17,5

z Uziemnikami typu / with Earthing Switches types E 12; EB 12 i / and E 17,5 i / and EB 17,5

Certyfikat stanowi podstawę przyjmowania do eksploatacji, wyżej wymienionych wyrobów, dla Zakładów Energetycznych, Elektrowni, Zakładów Przemysłowych oraz innych Przedsiębiorstw wytwarzających, przesyłających lub użytkujących energię elektryczną.

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

ВЯРНО С ОРИГИНАЛА

CERTYFIKAT WN/CERTIFICATE HV Nr/No. 0257/NBR/2013

STWIERDZENIE DANYCH ZNAMIONOWYCH / STATEMENT OF RATING

Rozłączniki SN / MV Switches

Typu / Type NAL 12; NALF 12 i / and NAL 17,5; NALF 17,5
z Uziemnikami typu / with Earthing Switches types E 12; EB 12 i / and E 17,5 i / and EB 17,5

Na podstawie wyników badań przeprowadzonych w Laboratoriach IEI/LAR – Cert. Akr. AB074, SATS, KEMA, NEFI, NEBB zawartych w Sprawozdaniach Nr: / On the basis of results of the tests carried out at the Laboratories IEI/LAR- Acer. Cert. AB074, SATS, KEMA, NEFI, NEBB included in the test Reports No:

IEL: 6452/LAR/03; 6855/LAR/05; 6671/LAR/04 6955/LAR/05; 7126/NBR/06; SATS: 95-B01; 96-B03 NEBB: 790185; 790117; 790155; 790182; KEMA: 810176 820031; NEFI: 950077; 950078; 910279; 1336; 1337

można przypisać następujące dane znamionowe: / it is assigned the following rating:

Napięcie znamionowe / *Rated voltage*	**12 kV**	**17,5 kV**
Częstotliwość znamionowa / *Rated frequency*	**50 Hz**	
Napięcie wytrzymywane o częstotliwości sieciowej *Power frequency withstand voltage*	**42 kV / 48 kV (1min)**	**45 kV / 60 kV (1min)**
Napięcie wytrzymywane udarowe piorunowe *Lightning impulse withstand voltage*	**75 kV / 85 kV (1,2/50μs)**	**95 kV / 110 kV (1,2/50μs)**
Prąd znamionowy ciągły /*Rated continuous current*	**400 A; 630 A; 1250 A**	
Prąd wyłączeniowy w obwodzie o małej indukcyjności *Mainly active load breaking current*	**400 A; 630 A; 1250 A**	
Prąd znamionowy krótkotrwały wytrzymywany *Rated short-time withstand current*	**31,5 kA(1s); 25 kA(2s) 20 kA(3s)**	**31,5 kA(1s); 25 kA(2s)**
Prąd znamionowy szczytowy wytrzymywany *Rated peak withstand current*	**82 kA**	
Znamionowy prąd załączeniowy / *Rated making current*	**67 kA**	**50 kA**
Znamionowy prąd wyłączeniowy ładowania kabli i linii *Cables charging and lines breaking current*	**150 A**	**45 A**
Znamionowy prąd zwarcia doziemnego *Earth fault breaking current*	**150 A**	**70 A**
Prąd wył. ładowania kabli i linii w war. zwarcia doziemn. *Cables charging switching current under earth fault condition*	**90 A**	**40 A**
Znamionowy prąd przechodni / *Rated transfer current*	**1 600 A**	
Trwałość mechaniczna ZW / *Mechanical* endurance *CO*	**2 000 cykli** / *cycles*	
Klasa / *Class*	**E 3**	

Niniejszy Certyfikat odnosi się tylko do przedmiotu badanego. Producent ponosi odpowiedzialność za każdy inny wyrób oznaczony tak samo jak wyrób badany. This Certificate applies to the tested object only. The responsibility for conformity of any objects having the same designations as the tested one rests with the Manufacturer.

Termin ważności Certyfikatu: / This Certificate is valid till: **19.08.2016**

Przedmiot badania został poddany sprawdzeniom i uznany, w zakresie określonym w Sprawozdaniach za zgodny z normami:
A sample of the product has been tested and found, in a scope specified in the Test Reports, to be in conformity with the standards:

PN-EN 62271-1:2009 „Wysokonapięciową aparatura rozdzielcza i sterownicza. Część 1: Postanowienia wspólne "
IEC 62271-1:2007 „High-voltage switchgear and controlgear. Part 1: Common specifications"
PN-EN 62271-102:2005 "Wysokonapięciowa aparatura rozdzielcza i sterownicza. Część 102:Odłączniki i uziemniki wysokiego napięcia prądu przemiennego"
IEC 62271-102:2001 „High-voltage switchgear and controlgear. Part 102: High-voltage alternating current disconnectors and earthing switches"
PN-EN 60265-1:2001 „Rozłączniki wysokonapięciowe. Część 1: Rozłączniki na napięcie wyższe niż 1 kV i niższe niż 52 kV"
IEC 60265-1:2001 „High-voltage switches Part 1: Switches for rated voltage above 1 kV and less than 52 kV"
PN-EN 62271-105:2005 "Wysokonapięciowa aparatura rozdzielcza i sterownicza. Część 105: Zestawy rozłączników z bezpieczn. prądu przemiennego"
IEC 62271-105:2002 „ High-voltage switchgear and controlgear. Part 105: Alternating current switch-fuse combinations"
i normy związane / *and related standards*

W oparciu o powyższe stwierdza się, że wyrób spełnia wymagania stawiane urządzeniom przeznaczonym do stosowania w elektroenergetyce.
On the basis of above this is to certify that product fulfils requirements stated for the equipment designated to power engineering application.

Laboratorium Badawcze Aparatury Rozdzielczej
High Voltage & Short-Circuit Testing Laboratory

dr inż. Albert Gmitrzak

Dyrektor Instytutu Elektrotechniki
Director of Electrotechnical Institute

doc. dr hab. Wiesław Wilczyński

WARSZAWA / Warsaw, 2013-08-19

ВЯРНО С ОРИГИНАЛА

Instytut Elektrotechniki
Electrotechnical Institute

Certyfikat Systemu Jakości / Certificate of Quality System: PCBC 976/1/2003
Jednostka Notyfikowana Nr / Notified body No: 1460

04-703 WARSZAWA ul. M. Pożaryskiego 28

CERTYFIKAT WN
CERTIFICATE HV

Nr/No. 0683/NBR/2014

Wydany na podstawie § 7 punkt 9 Statutu Instytutu Elektrotechniki o atestowaniu wyrobów oraz zgodnie z pismem Ministerstwa Gospodarki, Pracy i Polityki Społecznej Nr DIN-V/RK/62/2004 z dnia 8.04.2004 r. dotyczącym uprawnienia Instytutu Elektrotechniki do wydawania opinii o jakości aparatury i urządzeń elektrycznych wysokiego i niskiego napięcia, prądu przemiennego i stałego oraz wszelkiego sprzętu, oprzyrządowania i komponentów zasilanych energią elektryczną lub przeznaczonych do pracy pod napięciem a także z upoważnienia Short-Circuit Testing Liaison (STL) do wydawania Certyfikatów Badania Typu.

Issued on the basis of § 7 clause 9 of the Electrotechnical Institute Statute and the Ministry of Economy, Labour and Social Policy disposition No. DIN-V/RK/62/2004 of 8.04.2004 relating to the authorisation of the Electrotechnical Institute to issue the opinions on the quality of high and low voltage, alternating and direct current electrical apparatus, devices and every equipment, instrumentation and components supplied by electrical energy or designated for live working and according to the Short-Circuit Testing Liaison (STL) authorization for issue Type Test Certificates.

Dla / For,

ABB Sp. z o.o.

UL. ŻEGAŃSKA 1
04 – 713 WARSZAWA

Dotyczy wyrobu / Applies to the product.

ROZŁĄCZNIKI SN
Typ NAL 24 i NALF 24
z Uziemnikami typ E 24 i EB 24

MV SWITCHES
Types NAL 24 and NALF 24
with Earthing Switches type E 24 and EB 24

Certyfikat stanowi podstawę przyjmowania do eksploatacji, wyżej wymienionych wyrobów, dla Zakładów Energetycznych, Elektrowni, Zakładów Przemysłowych oraz innych Przedsiębiorstw wytwarzających, przesyłających lub użytkujących energię elektryczną.

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

ВЯРНО С ОРИГИНАЛА

CERTYFIKAT WN / CERTIFICATE HV Nr/No. 0683/NBR/2014

STWIERDZENIE DANYCH ZNAMIONOWYCH / STATEMENT OF RATING

Rozłączniki SN typ NAL 24 i NALF 24
z Uziemnikami typ E 24 I EB 24

MV Switches type NAL 24 and NALF 24
with Earthing Switches type E 24 and EB 24

Na podstawie wyników badań przeprowadzonych w Laboratorium IEL/LAR Certyfikat Akredytacji AB 071 i SATS zawartych w Sprawozdaniach Nr: / On the basis of results of the tests carried out at the IEL/LAR and SATS Laboratories included in the Test Reports No:

6975/LAR/05; 6956/LAR/05; 6671/LAR/04
NEFI 95-B04; 1143; 95-B05; 95-B08; 1176; 96-B03
96-B04; 960006; 67; XB 113 H 63; XB 113 H 64

można przypisać następujące dane znamionowe: / it is assigned the following rating:

Napięcie znamionowe / *Rated voltage*	24 kV		
Częstotliwość znamionowa-Liczba faz / *Rated frequency-Number of phases*	50 Hz - 3		
Napięcie wytrzymywane o częstotliwości sieciowej (1 min) *Power frequency withstand voltage (1 min)*	55 kV / 70 kV		
Napięcie udarowe piorunowe wytrzymywane (1,2/50 µs) *Lightning impulse withstand voltage (1,2/50 µs)*	125 kV / 145 kV		
Prąd znamionowy ciągły / *Rated continuous current*	400 A;	630 A;	1250 A
Prąd wyłączalny w obwodzie przeważnie indukcyjnym *Mainly active load breaking current*	400 A;	630 A;	1250 A
Prąd wyłączalny ładowania kabli i linii *Cable and lines charging breaking current*	80 A		
Prąd wyłączalny zwarcia doziemnego / *Earth fault breaking current*	55 A		
Prąd wyłączalny ładowania kabli i linii w warunkach zwarcia doziemnego *Cables and lines charging breaking current under earth fault conditions*	31,5 A		
Prąd przechodni znamionowy / *Rated transfer current*	900 A		
Prąd znamionowy krótkotrwały wytrzymywany *Rated short-time withstand current*	31,5 kA (1s); 20 kA (2s); 16 kA (3s)	31,5 kA (1s); 20 kA (2s); 16 kA (3s)	31,5 kA (1s); 25 kA (2s) 16 kA (3s)
Prąd znamionowy szczytowy wytrzymywany / *Rated peak withstand current*	82 kA		
Prąd załączany zwarciowy / *Short-circuit making current*	50 kA (2 x)		
Trwałość mechaniczna ZW / *Mechanical endurance CO*	2 000 cykli/cycles		
Klasa / *Class*	E 3		

Niniejszy Certyfikat odnosi się tylko do obiektu badanego. Producent ponosi odpowiedzialność za każdy inny wyrób oznaczony tak samo jak obiekt badany. This Certificate applies to the tested object only. The responsibility for conformity of any object having the same designations as the tested one rests with the Manufacturer.

Termin ważności Certyfikatu: / This Certificate is valid till: **01.09.2017**

Na podstawie wyników przeprowadzonych badań uznaje się zgodność obiektu, w zakresie określonym w Sprawozdaniach, z załączonymi normi: / A sample of the product has been tested and found, in a scope specified in the Test Reports, to be in conformity with the standards:

PN-EN 60265-1:2001„Rozłączniki wysokonapięciowe. Część 1. Rozłączniki na napięcie znamionowe wyższe niż 1 kV i niższe niż 52 kV"
IEC 60265-1:2001 „High voltage switches – Part 1: Switches for rated voltage above 1 kV and less than 52 kV"
PN-EN 62271-102:2003 "Aparatura wysokiego napięcia. Część 102: Odłączniki i uziemniki"
IEC 62271-102:2003 „High voltage switchgear and controlgear. Part 102: High-voltage alternating current disconnectors and earthing switches

W oparciu o powyższe stwierdza się, że wyrób spełnia wymagania stawiane urządzeniom przeznaczonym do stosowania w elektroenergetyce. / On the basis of above this is to certify that product fulfils requirements stated for the equipment designated to power engineering application.

Kierownik
Laboratorium Badawczego
Aparatury Rozdzielczej
Head of High Voltage and Short-Circuit Testing Laboratory

dr inż. Albert Gmitrzuk

Dyrektor
Instytutu Elektrotechniki
Director of Electrotechnical Institute

dr inż. Stefan Paradowski

Warszawa / Warsaw, 2014.09.01

ВЯРНО С ОРИГИНАЛА

Report Nr 6671/LAR/07

High Voltage & Short-Circuit Testing Laboratory
Laboratorium Badawcze Aparatury Rozdzielczej
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax (48-22) 812 04 07, tel.: (48-22) 812 23 38, e-mail: lar@iel.waw.pl
Certificate PCBC ISO 9001 Nr 976/1/2003; Notyfied body Nr 1460

AB 074

TEST REPORT of type test

Tested apparatus — **MV Switches with Earthing Switches**

Type — **NAL 12 and NAL 17,5; E 12 and E 17,5**

Rated voltage: 12kV/17,5 kV *Rated current:* 400 A / 600 A / 1 250 A *Frequency:* 50 Hz

Manufacturer

ABB Sp. z o.o.
Oddział w Przasnyszu
Ul. Leszno 59; 06-300 Przasnysz

Orderer

ABB Sp. z o.o.
Ul. Bitwy Warszawskiej 1920 r. Nr 18; 02-366 Warszawa

Date of the test

April 2004

Tested by

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

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the standards
IEC 60265 – 1; IEC 62271 - 102

The results are shown in the record of Proving Tests. The values obtained and the general performance are considered to comply with the above Standards and to justify the ratings assigned by the manufacturer

The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

This Test Report comprises 10 sheets and 5 oscillograms.

Head of Laboratory

Ph. D. eng. Albert Gmitrzak

Warsaw 26.04.2004

1. Tested objects

1a. Curent Switch type NAL 12 with Earthing Switch type E 12 - pole distance 150 mm.

1b. Curent Switch type NAL 17,5 with Earthing Switch type E 17,5 - pole distance 170 mm.

Technical parameters declared by manufacturer

Rated voltage	12 kV	17,5 kV
Rated frequency	50 Hz	
Power frequency withstand voltage 1 min		
To earth and between poles	28 kV	38 kV
Between opened contacts	32 kV	45 kV
Lightning impulse withstand voltage 1,2/50 µs		
To earth and between poles	85 kV	38 kV
Between opened contacts	95 kV	110 kV
Rated current	400 A; 600 A; 1250 A	
Rated short-time withstand voltage	31,5 kA (1s)	
Rated peak withstand voltage	82 kA	
Rated making current	50 kA	
Rated breaking current of overhead lines and cables	45 A	
Rated breaking current to earth short-circuit	70 A	
Mechanical durability	2000 C-O cycles	
Class	E3	

Tests were witnessed by ABB representative – mgr eng. Piotr Piekarski

2. Test results

Tests performed according to:

IEC 60265 -1 - High voltage switches.

Part 1: Switches on rated voltage above 1 kV and less than 52 kV

IEC 62271 -102 High volage switchgear and controlgear . Part 102: Disconnectors and earthing switches.

Tests performed in circuit with parameters presented on page 5 in testing circuit presented on page 6.

Expected rms value of current – 31,5 kA

Peak value – 82 kA

Duration – 1 s

View of tested switch NAL 12 prepared to the test demonstrates photo 1.

View from earthing switch E 12 side demonstrates photo 2.

View of tested switch NAL 17.5 prepared to the test demonstrates photo 3.

View from earthing switch E 17.5 side demonstrates photo 4.

Real values of currents during NAL 12 kV switch shows oscillogram No 78694 but for earthing switch E 12 oscillogram No 78696.

Real values of currents during NAL 17.5 kV switch shows oscillogram No 78697 but for earthing switch E 17.5 oscillograms No 78690 and 78695.

Results presented at Table 1

Hazard do not cause any damages of current busses or insulation elements.

<u>Object pass the test</u>

ИНТЕРКОМПЛЕКС * ПЛОВДИВ * ООД

ВЯРНО С ОРИГИНАЛА

48

Table 1.

No	No of oscill.	Phase	Current			Time
			peak I_{sr} [kA]	RMS (3 halfperiods) [kA]	interim 1s I_{cw} [kA]	[s]
1	78694	L1	-	34	31,8	1,02
		L2	-	34,7	33,2	
		L3	82	36,2	33,3	
2	78696	L1	-	33,6	31,5	1,02
		L2	-	35	33,0	
		L3	82,2	37,0	32,0	
3	78697	L1	-	34,4	31,4	1,02
		L2	-	35,1	32,8	
		L3	82,0	37,5	32,0	
4	78690	L1	-	-	31,3	1,2
		L2	-	-	32,5	
		L3	-	-	32	
5	78695	L1	-	-	-	0,11
		L2	-	-	-	
		L3	89,9	-	-	

TEST CONDITIONS
Of short-time and peak withstand current test

Tested object: MV Switches NAL

Test circuit: according to the diagram

GENERATOR: TJ 25

Configuration : star

Neutral : earthed by resistor 700 Ω

TRANSFORMER: TWP

Configuration of supplied windings : triangle

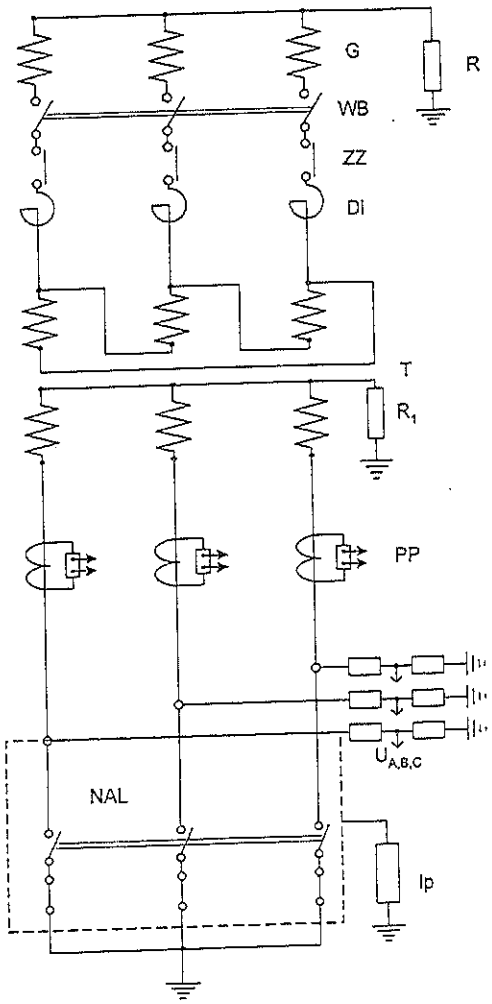
Configuration of supplying windings : star

Neutral : earthed

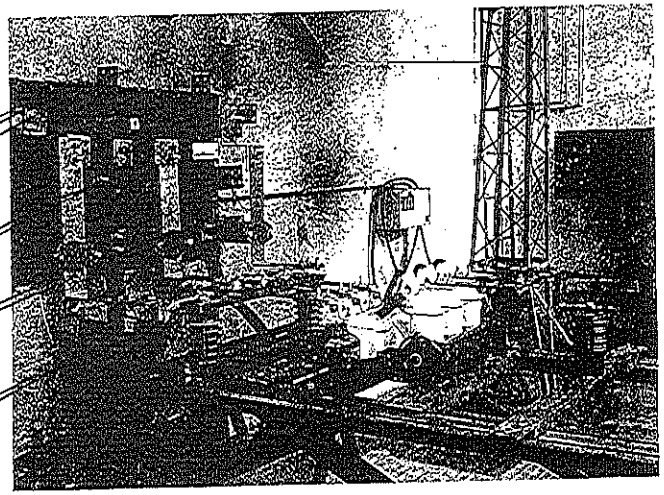
ratio = $\frac{\text{supplying}}{\text{supplied}} = \frac{10\ \text{kV}}{0.25 \times \sqrt{3}\ \text{kV}}$

Schort-circuit place: insulated

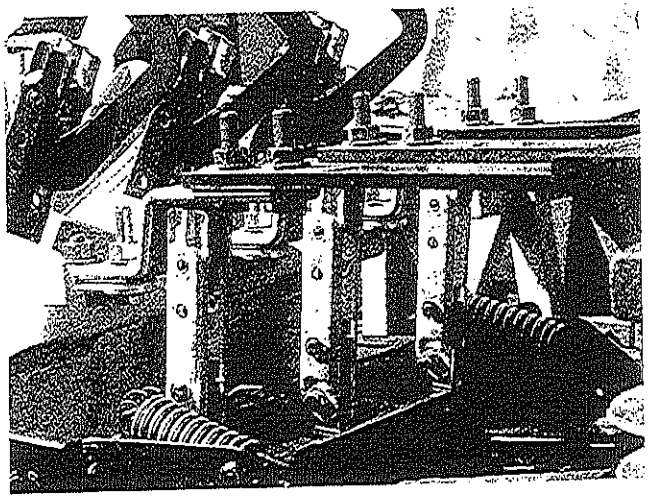
Testing chamber: No 1



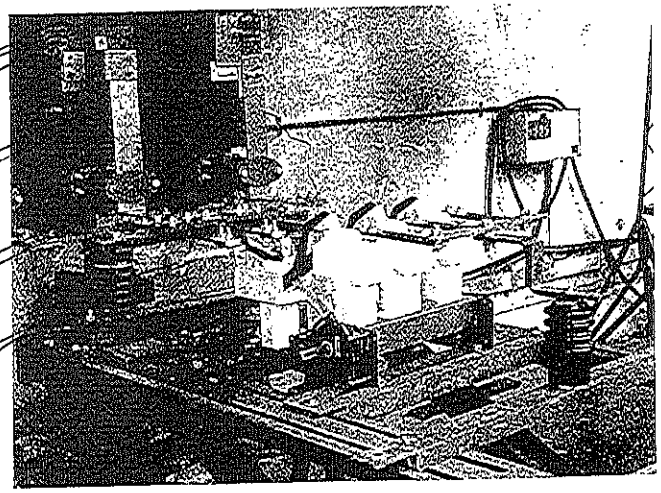
Testing diagram



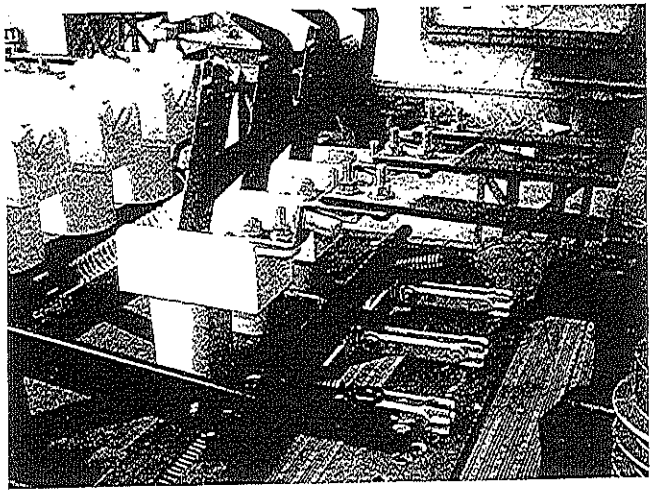
View of Switch NAL 12 before the test inside testing chamber



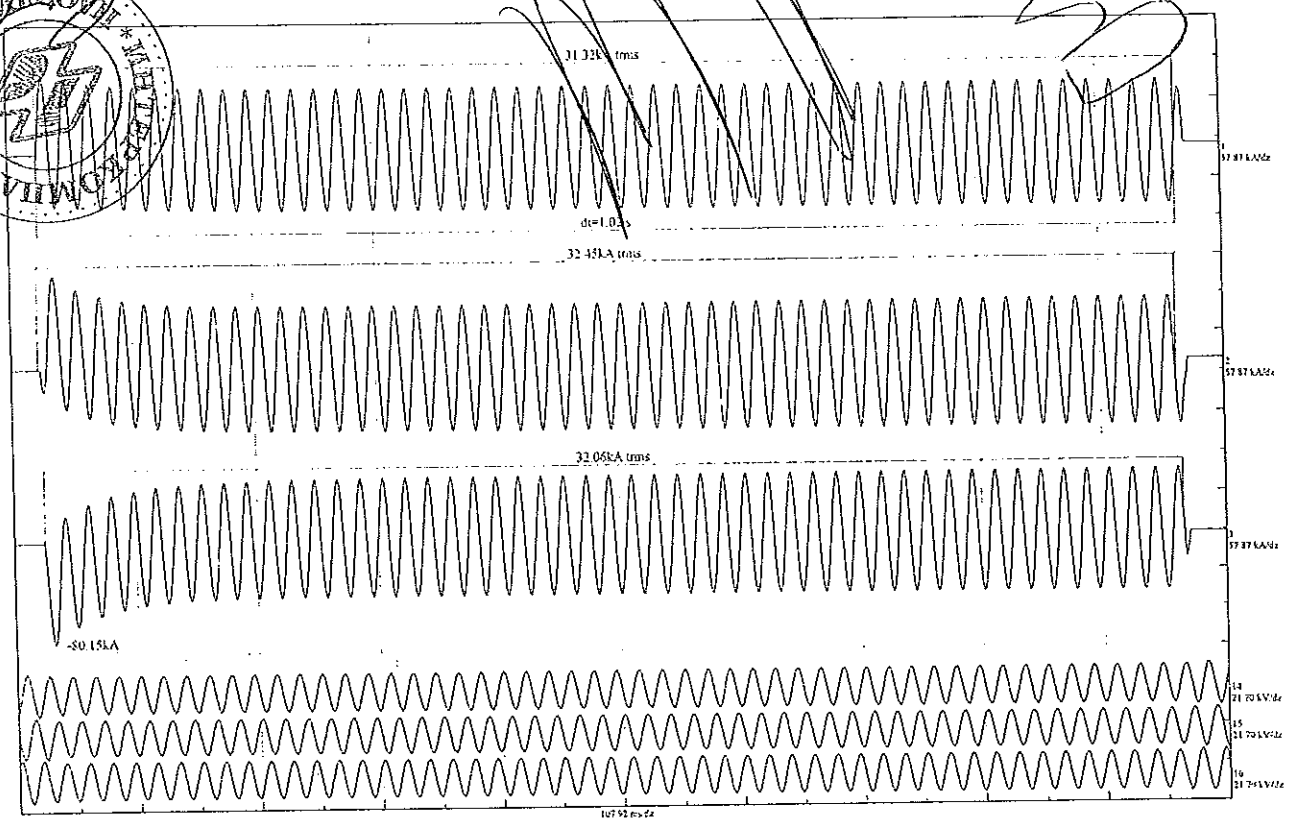
View of tested apparatus from earthing switch E 12 side



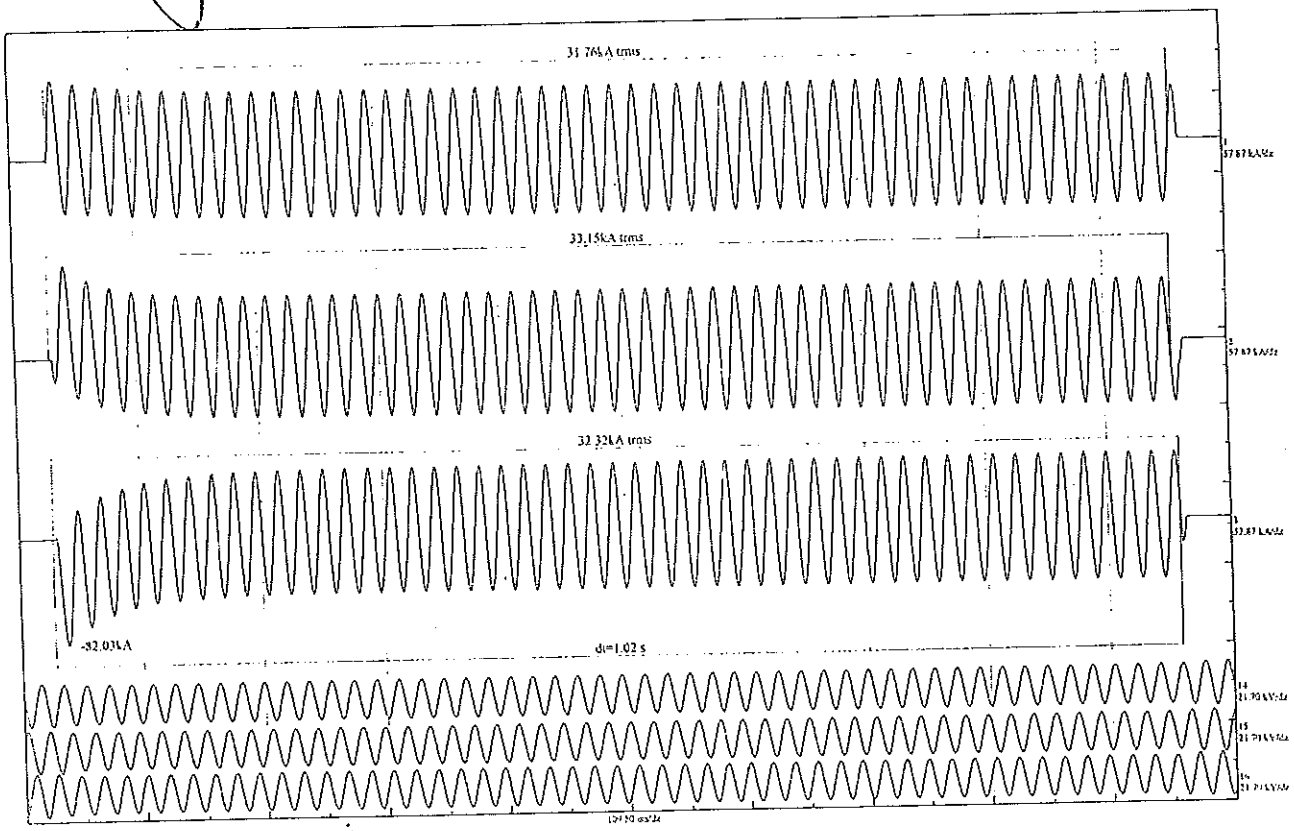
View of Switch NAL 17,5 before the test inside testing chamber



View of tested apparatus from earthing switch E 17,5 side

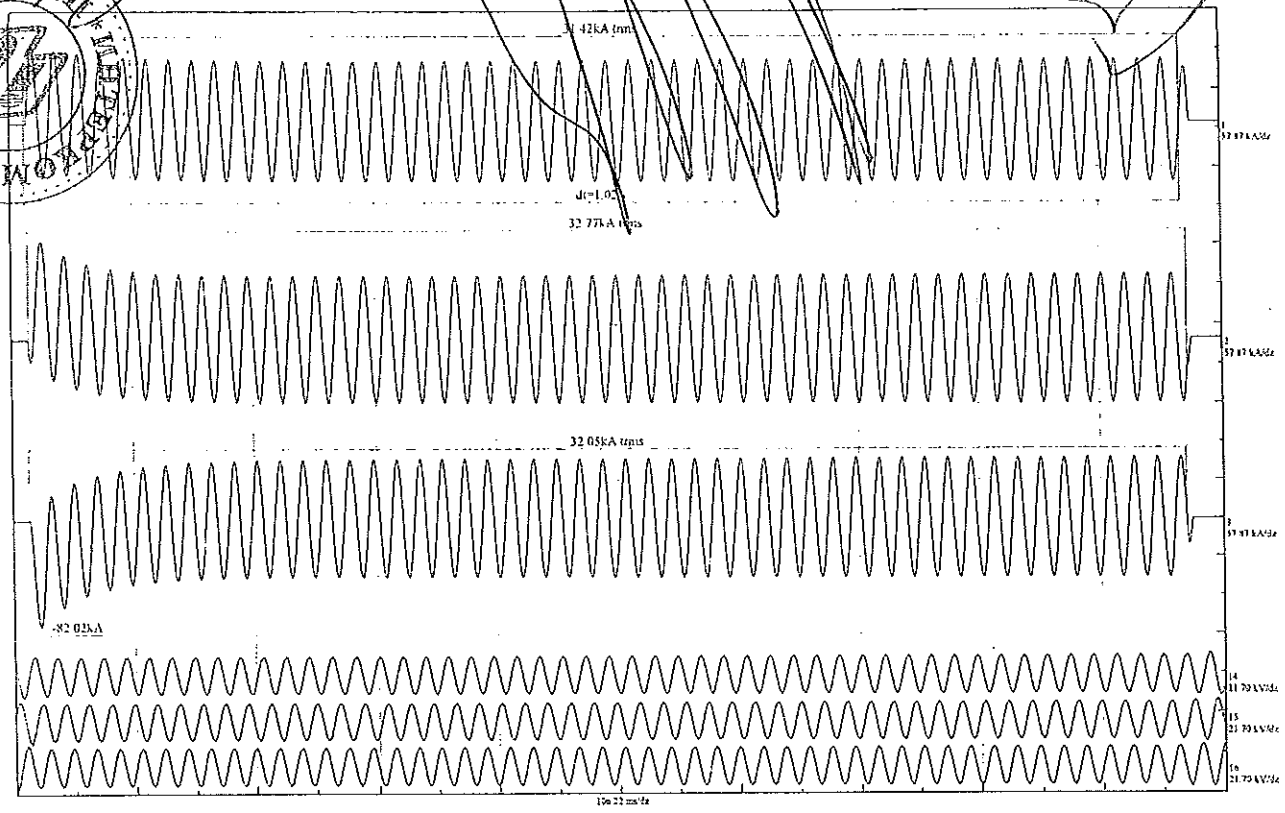


LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA Data: 2004-04-20 09:54:41 Oscylogram Nr: 78690



LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA Data: 2004-04-23 12:28:00 Oscylogram Nr: 78694

ВЯРНО С ОРИГИНАЛА



LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA

Data: 2004-04-23 14:07:17 Oscylogram Nr: 78697

SPRAWOZDANIE Nr / TEST REPORT No. 6957/LAR/05

ZAKŁAD WIELKICH MOCY
HIGH POWER DEPARTMENT

INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA, ul. M. Pożaryskiego 28
tel./fax.: (0-22) 812 04 07; tel.: (0-22) 812 23 38; e-mail: nwr@iel.waw.pl
Certyfikat Akredytacji / Certificate Accreditation PCA Nr AB 074

SPRAWOZDANIE Z PRÓB W WARUNKACH ZWARCIA DOZIEMNEGO
TEST REPORT OF TESTS UNDER EARTH FAULT CONDITIONS

BADANY APARAT / APPARATUS: **ROZŁĄCZNIK / SWICH DISCONNECTOR**

TYP / DESIGNATION: **NAL 24-6** Nr seryjny / Serial No.: **14667/205**

Napięcie znamionowe / Rated Voltage: 24 kV Częstotliwość / Rated Frequency: 50 Hz

PRODUCENT / MANUFACTURER: **ABB Sp. z o.o.**
ul. Bitwy Warszawskiej 1920 r. nr 18, 02-366 Warszawa
Oddział w Przasnyszu, ul. Leszno 59, 06-300 Przasnysz

ZLECENIODAWCA / TESTED FOR: **ABB Sp. z o.o.**

DATA BADAŃ / DATE(S) OF TESTS: **25.05.2005, 31.05.2005**

WYKONAWCA BADAŃ / TESTED BY: **Laboratorium Badawcze Aparatury Rozdzielczej**
Switchgear and Controlgear Testing Laboratory
04-703 Warszawa; ul. Pożaryskiego 28, Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with
PN-EN 60265-1:2001

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

Sprawozdanie zawiera ogółem 28 stron i może być powielane wyłącznie w całości.
Powielanie częściowe dozwolone jest po uzyskaniu pisemnej zgody Laboratorium LAR.
This Test Report comprises 28 sheets in total.
Only integral reproduction of this Test Report is permitted without written permission from LAR Laboratory

Kierownik Laboratorium / Head of Laboratory

Ph. D. Eng. Albert Gmitrzak

Warszawa 07.06.2005

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

Napięcie znamionowe Voltage	24 kV
Prąd wyłączeniowy zwarcia doziemnego Earth fault current	55 A
Prąd wyłączeniowy ładowania kabli i linii napowietrznych w warunkach zwarcia doziemnego Cable charging switching current under earth fault conditions	31,5 A
Częstotliwość Frequency	50 Hz

WYKAZ PRÓB / SUMMARY OF TESTS

PN-EN 60265-1:2001 Rozłączniki wysokonapięciowe.
Część 1: Rozłączniki na napięcia znamionowe wyższe niż 1 kV i niższe niż 52 kV.

W badaniach uczestniczył / The tests were observed by:

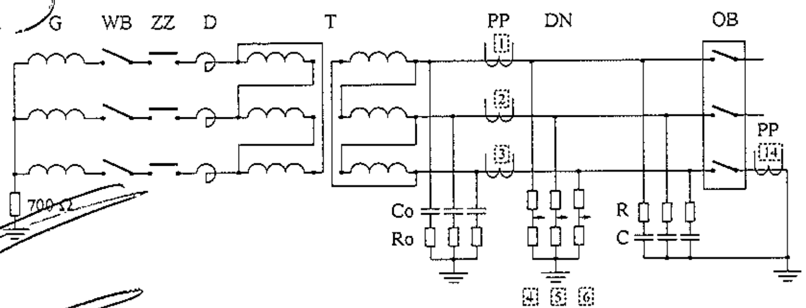
mgr inż. Tomasz Sinkiewicz — ABB Sp. z o. o.
Oddział w Przasnyszu, ul. Leszno 59, 06-300 Przasnysz

Dokumenty identyfikacyjne / Identification of the apparatus

Wymiary obiektu są zgodne z dołączonymi rysunkami wymiarowymi.
The apparatus is constructed in accordance with the drawings incorporated in this report.

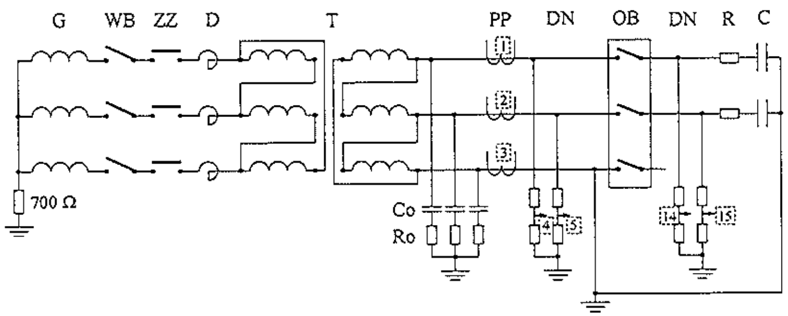
Rysunek / Drawing: NHP 343070

RODZAJ PRÓBY TYPE OF TEST	**Łączenie prądu zwarcia doziemnego** **(szereg probierczy 6a)** Earth fault off-load switching current test (test duty 6a)	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP1



G	**Generator TJ 100**
WB	**Wyłącznik bezpieczeństwa** Master breaker
ZZ	**Załącznik zwarciowy** Making switch
D	**Dławiki** Inductance
T	**Transformator** Transformer
DN	**Dzielnik napięcia** Voltage divider
PP	**Przekładnik prądowy** Current transformer
OB	**Obiekt badany** Tested object

RODZAJ PRÓBY TYPE OF TEST	**Łączenie prądów ładowania kabli i linii napowietrznych w warunkach zwarcia doziemnego** **(szereg probierczy 6b)** Cable charging switching current under earth fault conditions (test duty 6b)	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP2



G	**Generator TJ 100**
WB	**Wyłącznik bezpieczeństwa** Master breaker
ZZ	**Załącznik zwarciowy** Making switch
D	**Dławiki** Inductance
T	**Transformator** Transformer
DN	**Dzielnik napięcia** Voltage divider
PP	**Przekładnik prądowy** Current transformer
OB	**Obiekt badany** Tested object

ВЯРНО С ОРИГИНАЛА

TESTS RESULTS

RODZAJ PRÓBY TYPE OF TEST	**Łączenie prądu zwarcia doziemnego (szereg probierczy 6a)** Earth fault off-load switching current test (test duty 6a)	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP1

Typ napędu / Operating mechanism:
Typ: NMMD1 220V AC/DC
Art: 5DLN 527601-F

Numer oscylogramu Oscillogram no.	**Napięcie probiercze** Test voltage (kV)	**Prąd probierczy I_{6a}** Test current I_{6a} (A)	**Uwagi** Remarks
80719	24.0	55.0	
80722	24.4	58.6	
80723	24.4	58.5	
80724	24.3	57.9	
80725	24.5	58.8	
80726	24.5	58.8	
80727	24.3	57.6	
80728	24.3	57.8	
80729	24.3	57.6	
80730	24.5	58.8	

RODZAJ PRÓBY TYPE OF TEST	**Łączenie prądów ładowania kabli i linii napowietrznych w warunkach zwarcia doziemnego (szereg probierczy 6b)** Cable charging switching current under earth fault conditions (test duty 6b)	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP2

Wartości prądów i napięć są podawane kolejno dla fazy L1 i L2
Current and voltage values are given for L1 and L2.

Typ napędu / Operating mechanism:
Typ: NMMD1 220V AC/DC
Art: 5DLN 527601-F

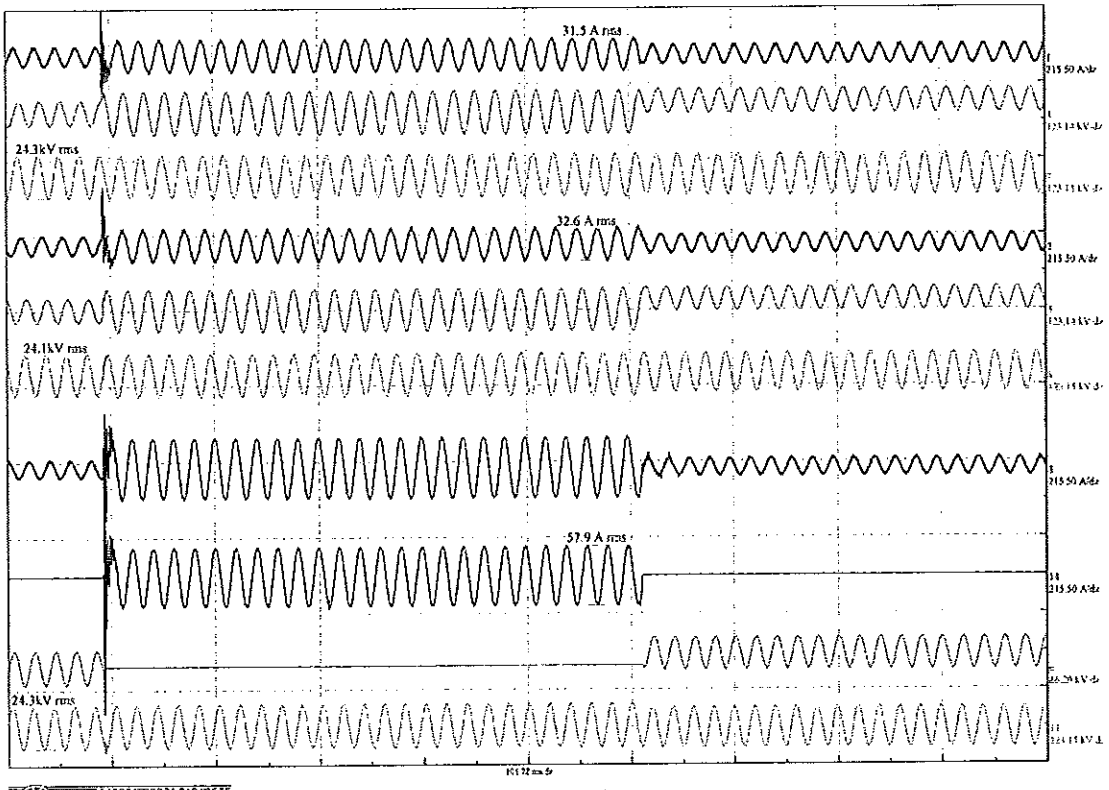
Numer oscylogramu Oscillogram no.	**Napięcie probiercze** Test voltage (kV)	**Prąd probierczy I_{6b}** Test current I_{6b} (A)	**Uwagi** Remarks
80704	24.9 24.6	33.2 31.5	
80709	25.3 24.7	32.4 32.9	
80710	25.3 24.8	32.4 32.5	
80711	24.7 24.2	31.7 31.5	
80712	25.0 24.7	32.4 32.3	
80713	24.6 24.3	32.1 32.1	
80714	25.1 24.8	32.5 33.1	
80715	24.5 24.1	32.3 32.4	
80717	24.9 24.7	32.7 32.5	
80718	25.0 24.5	32.3 31.9	

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

ВЕРНО С ОРИГИНАЛА

Data: 2005-05-31 10:23:43 Oscylogram Nr. 80723

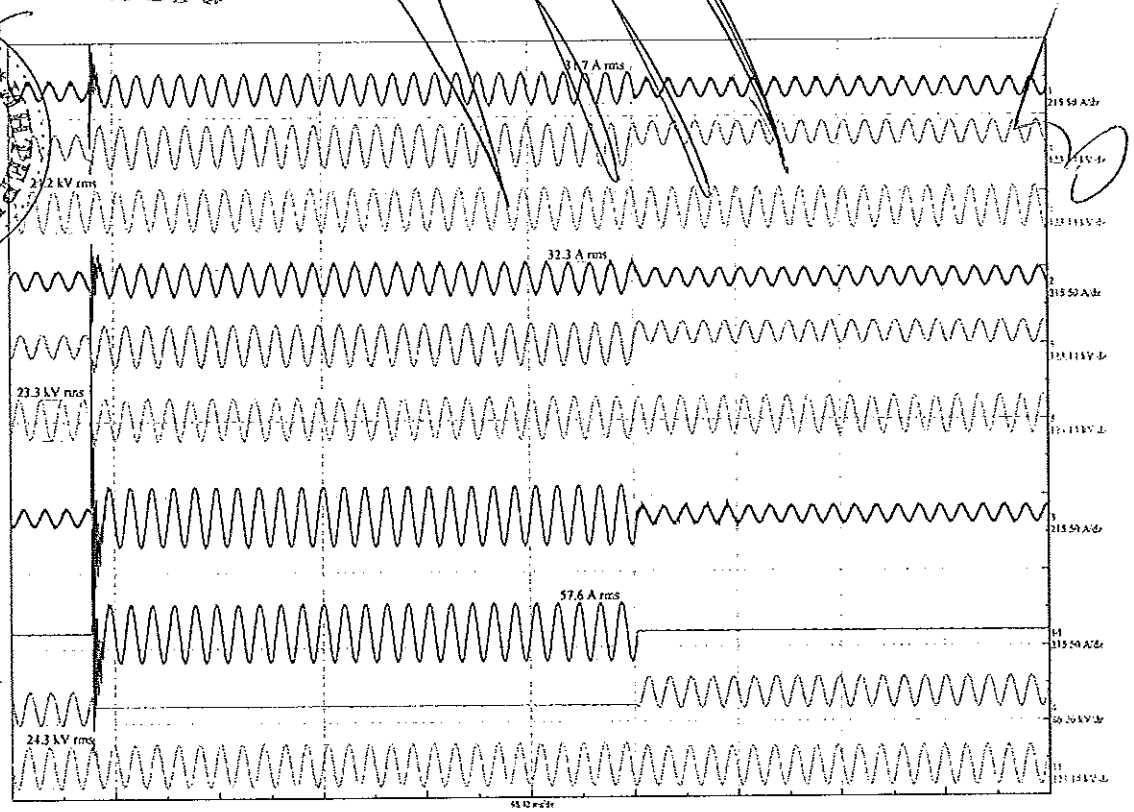


Data: 2005-05-31 10:29:35 Oscylogram Nr. 80724

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

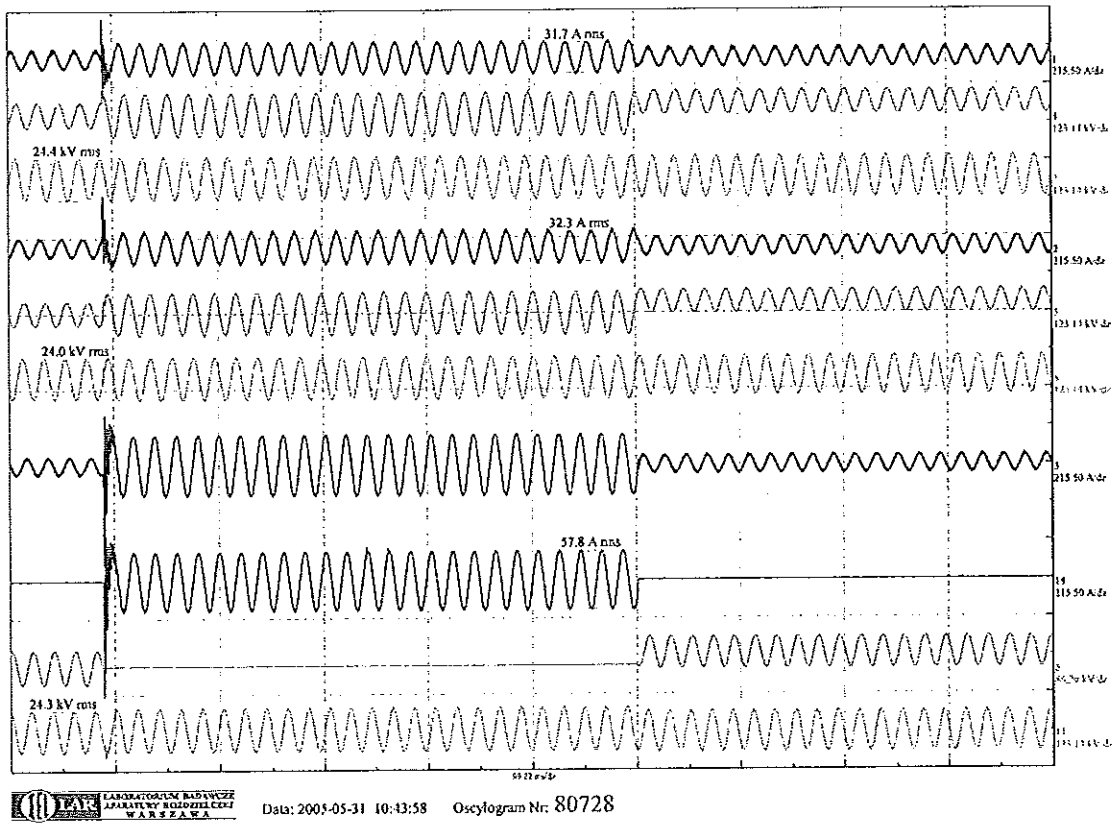
ВЯРНО С ОРИГИНАЛА



Data: 2005-05-31 10:40:19 Oscylogram Nr: 80727

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Sprawozdanie z Badań Nr
Test Report No.
6957/LAR/05
Strona/Page 13/28



Data: 2005-05-31 10:43:58 Oscylogram Nr: 80728

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Sprawozdanie z Badań Nr
Test Report No.
6957/LAR/05
Strona/Page 14/28

Sprawozdanie z Badań Nr
Test Report No. 6957/LAR/05
Strona/Page 16/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Oscylogram Nr. 80730 Data: 2005-05-31 10:50:44

Sprawozdanie z Badań Nr
Test Report No. 6957/LAR/05
Strona/Page 15/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Oscylogram Nr. 80729 Data: 2005-05-31 10:47:26

ВЯРНО С ОРИГИНАЛА

02

Sprawozdanie z Badań Nr
Test Report No. 6957/LAR/05
Strona/Page 18/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Date: 2005-05-30 13:33:38 Oscylogram Nr. 80709

Sprawozdanie z Badań Nr
Test Report No. 6957/LAR/05
Strona/Page 17/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

Date: 2005-05-25 13:01:15 Oscylogram Nr. 80704

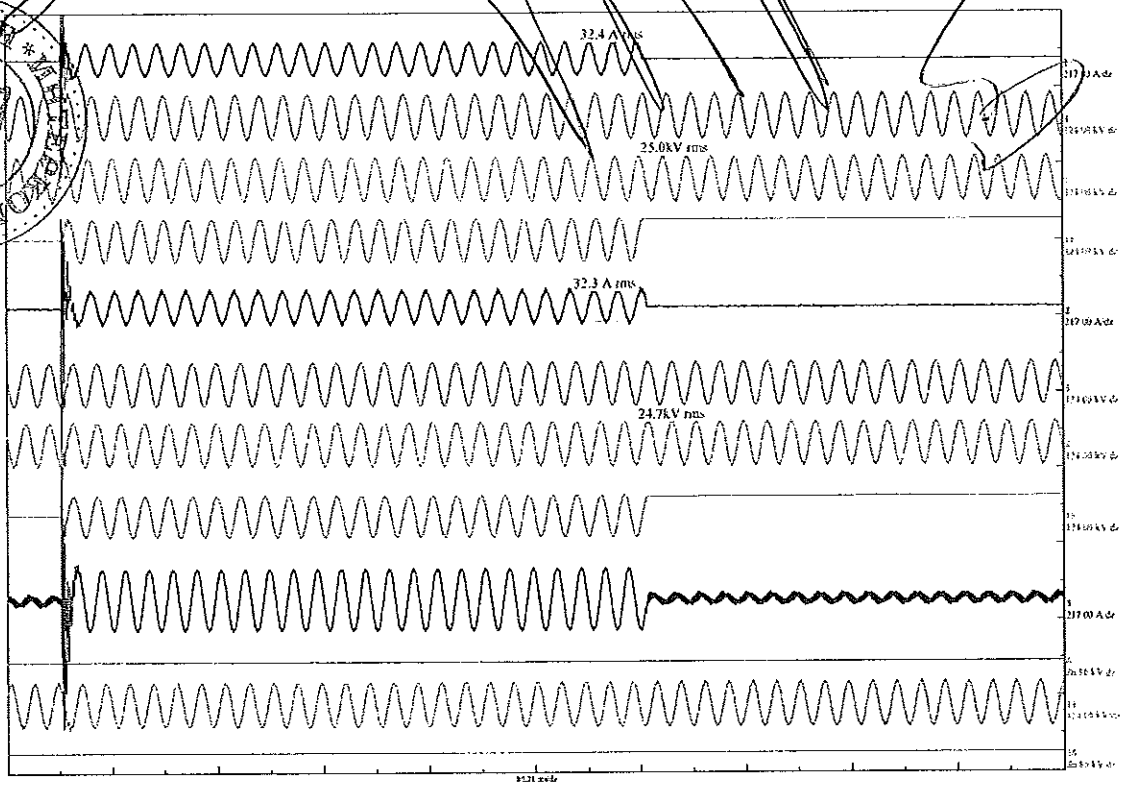
ВЯРНО С ОРИГИНАЛА

63

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

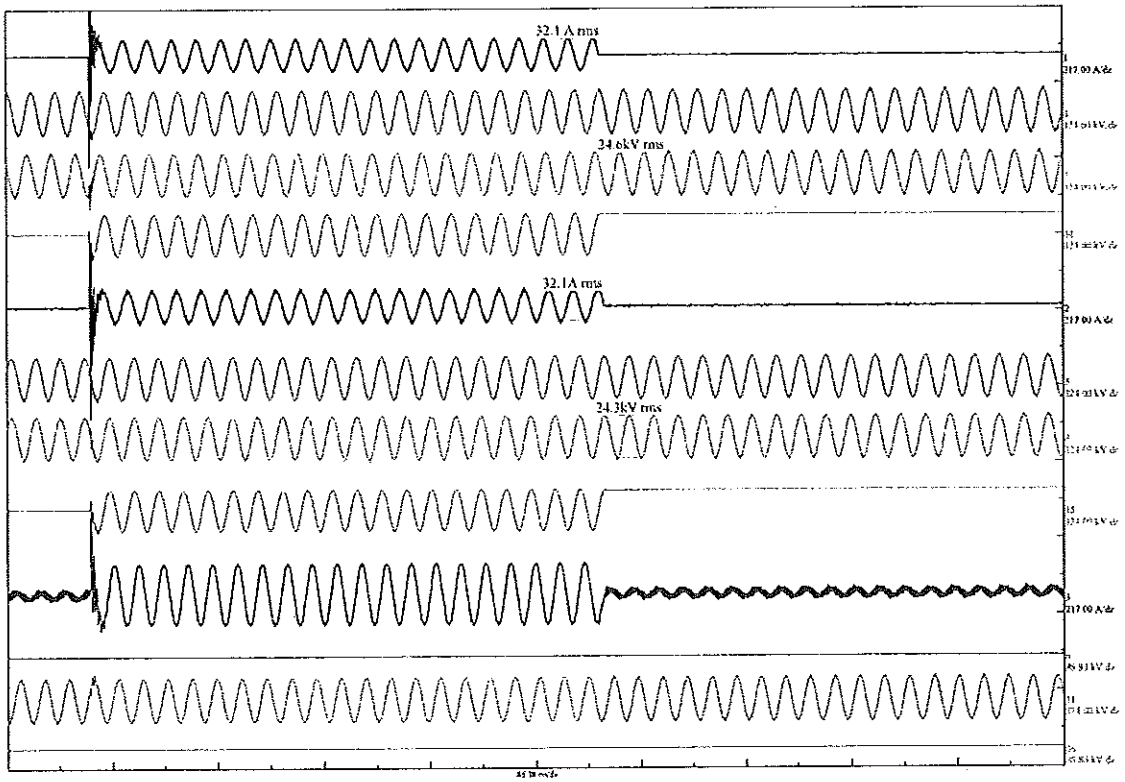
INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

ВЯРНО С ОРИГИНАЛА



Data: 2005-05-30 13:44:35 Oscylogram Nr: 80712

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY



Data: 2005-05-30 13:47:37 Oscylogram Nr: 80713

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

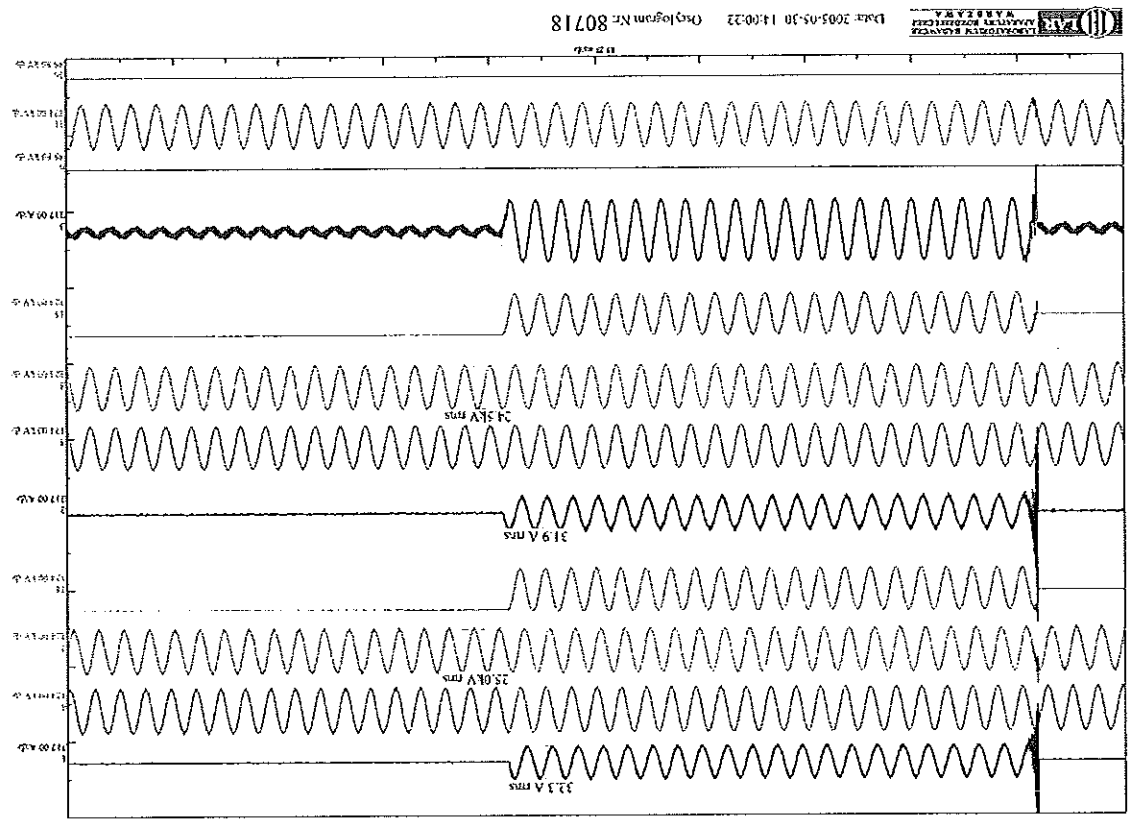
INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

ВЯРНО С ОРИГИНАЛА

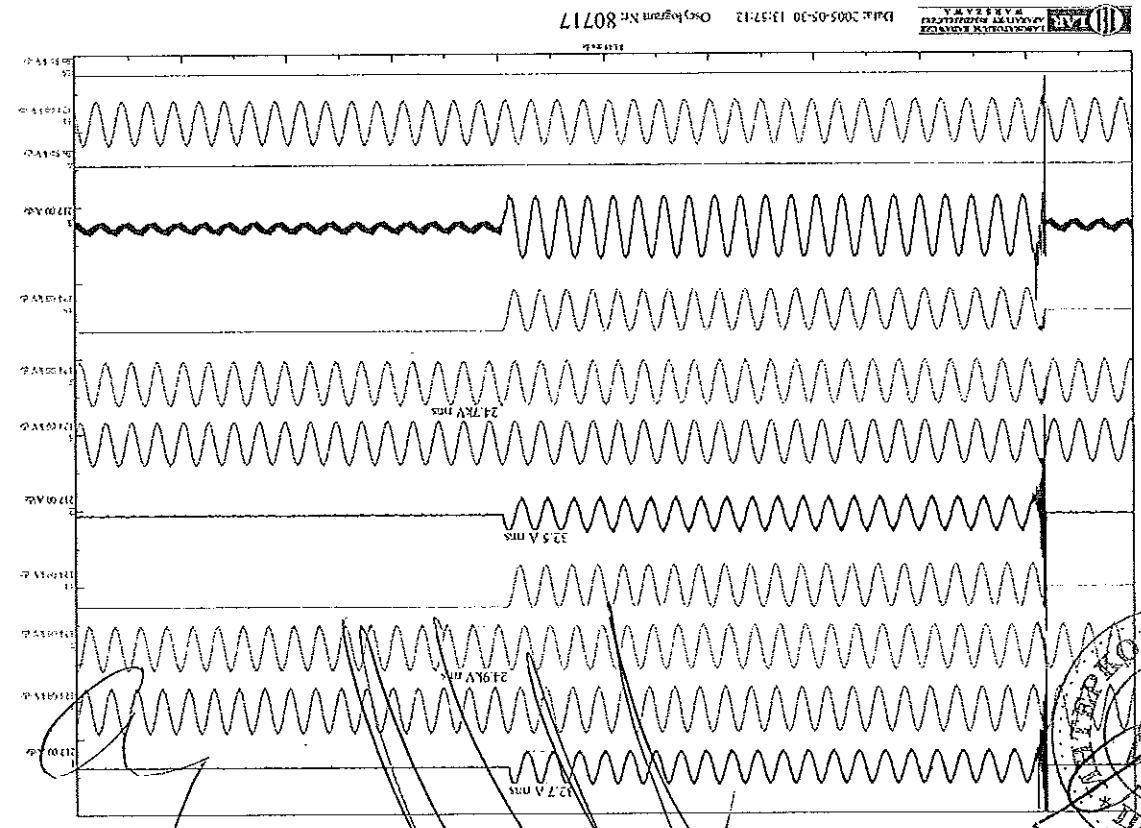
Sprawozdanie
z Badań Nr
Test Report No.
6957/LAR/05
Strona/Page 26/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY



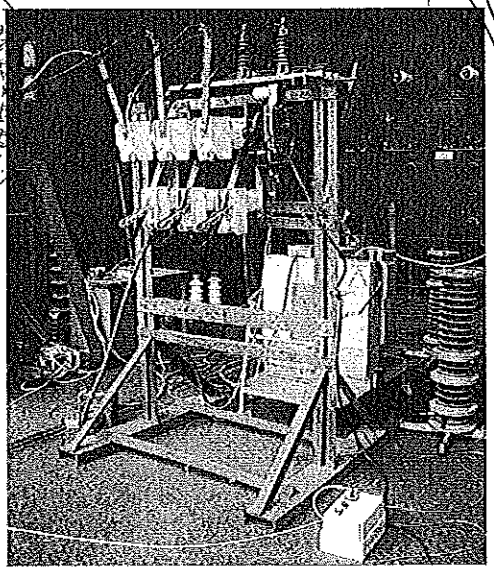
Sprawozdanie
z Badań Nr
Test Report No.
6957/LAR/05
Strona/Page 25/28

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

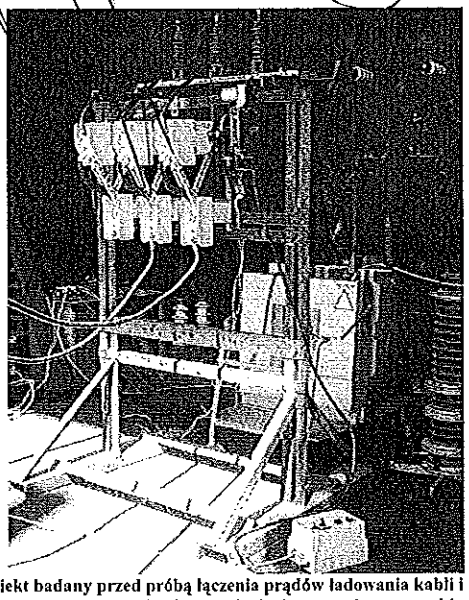


ВЯРНО С ОРИГИНАЛА

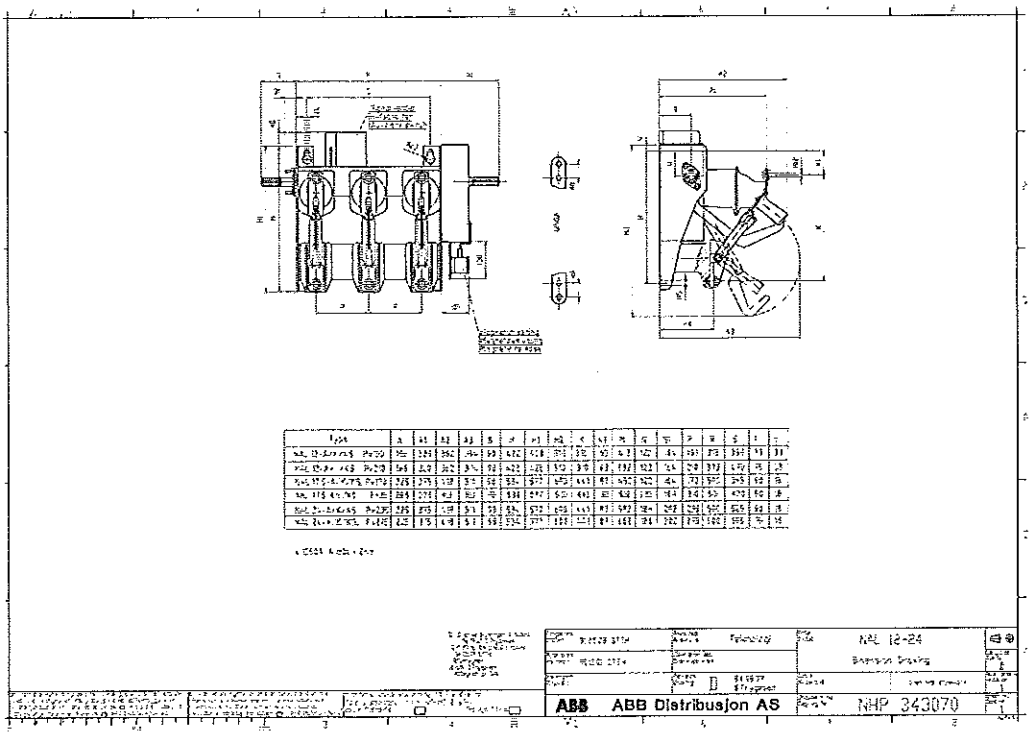
67



Obiekt badany przed próbą łączenia prądu zwarcia doziemnego (szereg probierczy 6a)
Test object before Earth fault off-load switching current test (test duty 6a)



Obiekt badany przed próbą łączenia prądów ładowania kabli i linii napowietrznych w warunkach zwarcia doziemnego (szereg probierczy 6b)
Test object before cable charging switching current under earth fault conditions (test duty 6b)



Report Nr 7484a/LAR/07

LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
High Voltage & Short-Circuit Testing Laboratory
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (48-22) 812 04 07; tel.: (48-22) 812 23 38; e-mail: lnwr@sel.waw.pl
Certyfikat PCBC ISO 9001 Nr 976/1/2003; EU Notified body Nr 1468
AB 074

TEST REPORT of short-circuit performance

TESTED APPARATUS **MV Fuse Switch combination**

TYPE NALF 12-6A 150R version KL; Fuses: CEF 12-125A

RATED VOLTAGE 12 kV Rated current 125 A Frequency 50 Hz

MANUFACTURER **ABB Sp. z o.o.**
Oddział w Przasnyszu
Ul. Leszno 59; 06 – 300 Przasnysz

ORDERER **ABB Sp. z o.o.**
Ul. Żegańska 1; 04-713 Warszawa

DATE of the TEST 19.06.2007

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

The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with the standards
IEC60694:2002; PN-EN60694:2004; IEC62271- 105; PN-EN62271-105:2004(U); PN-EN60265-1:2001

The results are shown in the record of Proving Tests. The values obtained and the general performance are considered to comply with the above Standards and to justify the ratings assigned by the manufacturer.

The Test Report applies only to the apparatus tested. The responsibility for conformity of any apparatus having the same designators with that tested rests with the Manufacturer.

This Test Report comprises 11 sheets in total, 3 oscillograms included.
Only integral reproduction of this Test Report, or reproductions of this page accompanied by any page on which are stated the endorsed ratings of the apparatus tested, are permitted without permission from Laboratory.

Head of Laboratory
Dr eng. Albert Gmitrzak

Warsaw 28.06.2007

Tests performed

	Standard's PN-EN 60694 item
Short-time and peak withstand current	6.6

Appearance of tested apparatus shows drawings on pages 3 - 5

Tests were performed according to:

PN-EN 60694:2004 „Postanowienia wspólne dotyczące norm na wysokonapięciową aparaturę rozdzielczą i sterowniczą"

IEC 60694:2002 „Common specifications for high-voltage switchgear and controlgear standards"

PN-EN 62271-105:2004(U) „Wysokonapięciowa aparatura rozdzielcza i sterownicza. Część 102: Wysokonapięciowe zestawy rozłączników z bezpiecznikami"

IEC 62271- 105 „High-voltage alternating current fuse switch combinations"

PN-EN 60265-1:2001 "Rozłączniki wyskonapięciowe. Część 1: Rozłączniki na napięcie znamionowe wyższe niż 1 kV i niższe niz 52 kV"

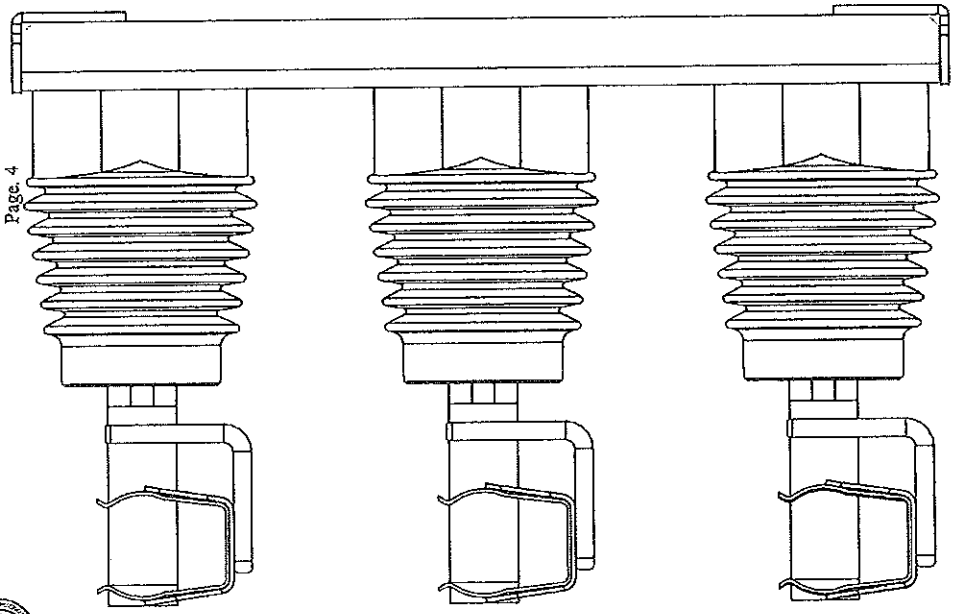
Tests were witnessed by ABB representative
mgr inż. Wojciech Pankratiew

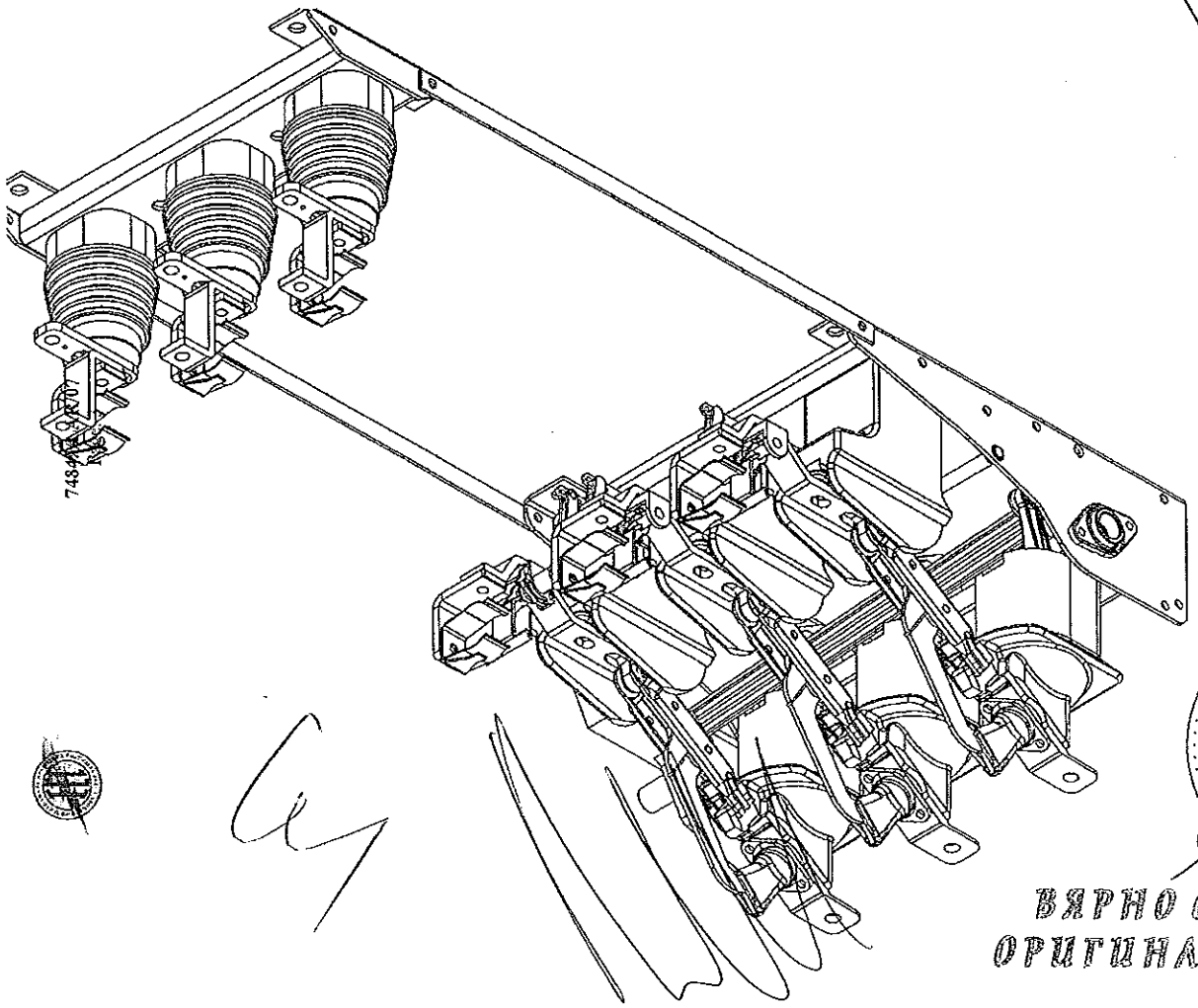
Schort-circuit test result

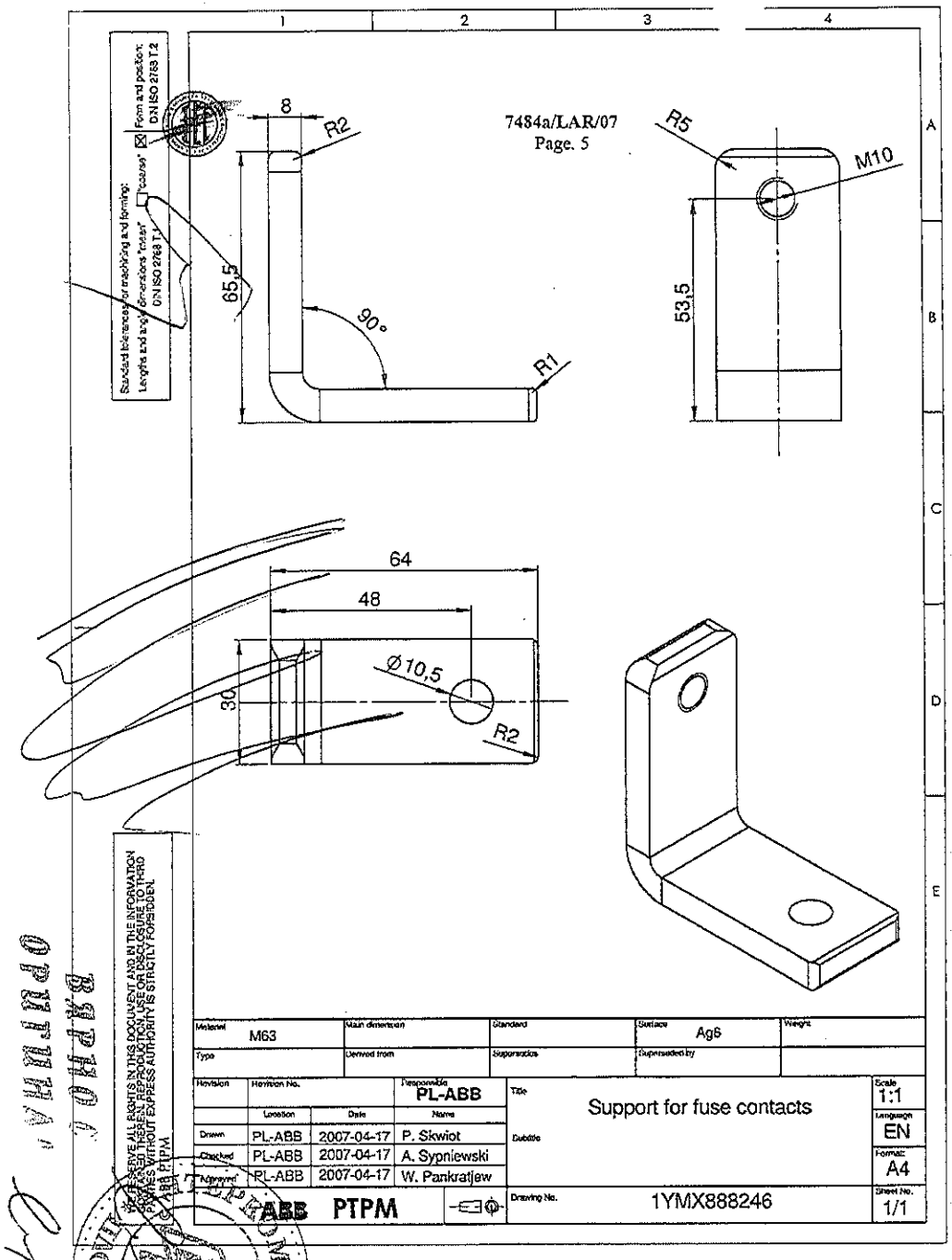
No	No of oscill.		Phaze	Current			Time
				Peak value	RMS expected value [kA]	Limited value [kA]	[ms]
1	83832	With fuses	L1	-	16	6,02	-
			L2	-	16	3,8	
			L3	-	16	3,8	
2	83833	With fuses	L1	-	25	7,2	-
			L2	-	25	4,1	
			L3	-	25	4,0	
3	83834	With Short-circuiter	L1	-	10	-	58
			L2	-	10	-	
			L3	18	10	-	

Any deformations of current busses and supporting insulation elements were observed.
Fuse links don't changes positions.
Oscillograms enclosed.

Tested apparatus pass the test







Material: M63	Main dimension	Standard	Surface: Ag6	Weight	
Type	Derived from	Superseded by	Superseded by		

Revision	Revision No.		Responsible: PL-ABB	Title: Support for fuse contacts	Scale: 1:1
	Location	Date	Name	Subtitle	Language: EN
Drawn	PL-ABB	2007-04-17	P. Skwiot		Format: A4
Checked	PL-ABB	2007-04-17	A. Sypniewski		
Approved	PL-ABB	2007-04-17	W. Pankratjew		
ABB PTPM				Drawing No. 1YMX888246	Sheet No. 1/1

TEST CONDITIONS
Of short-time and peak withstand current test

Tested object: **NALF 12-6A 150R**

Test circuit: according to the diagram

GENERATOR: TJ 25

Configuration : star

Neutral : earthed by resistor 700 Ω

TRANSFORMER: TWP

Configuration of supplied windings : triangle

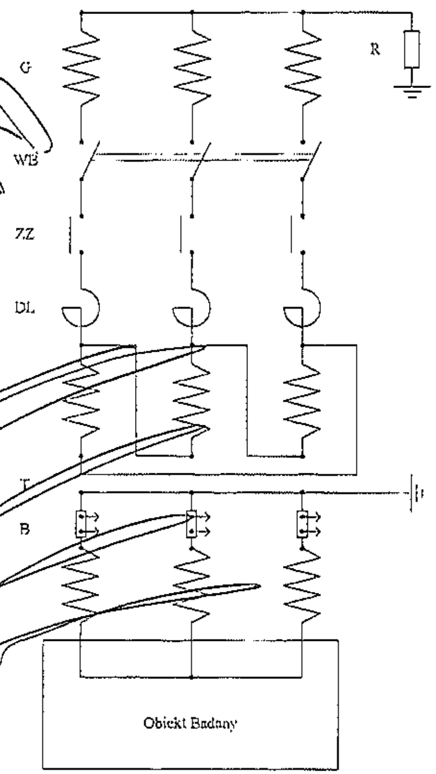
Configuration of supplying windings : star

Neutral : earthed

$$\text{transmision} = \frac{\text{supplying}}{\text{supplied}} = \frac{10\ \text{kV}}{0{,}25 \times \sqrt{3}\ \text{kV}}$$

Schort-circuit place: insulated

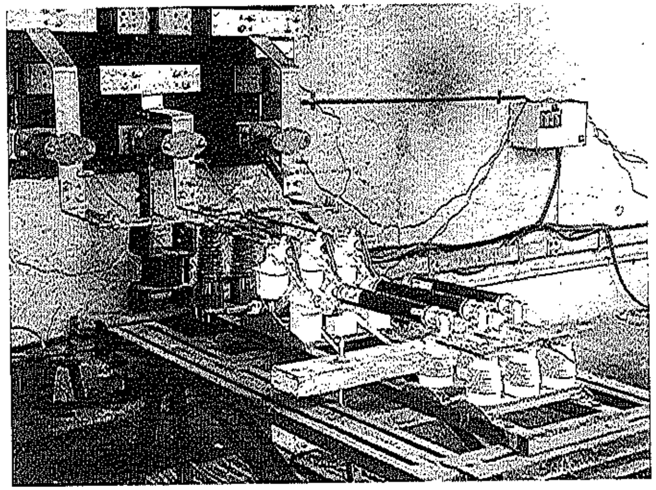
Testing chamber: No 1



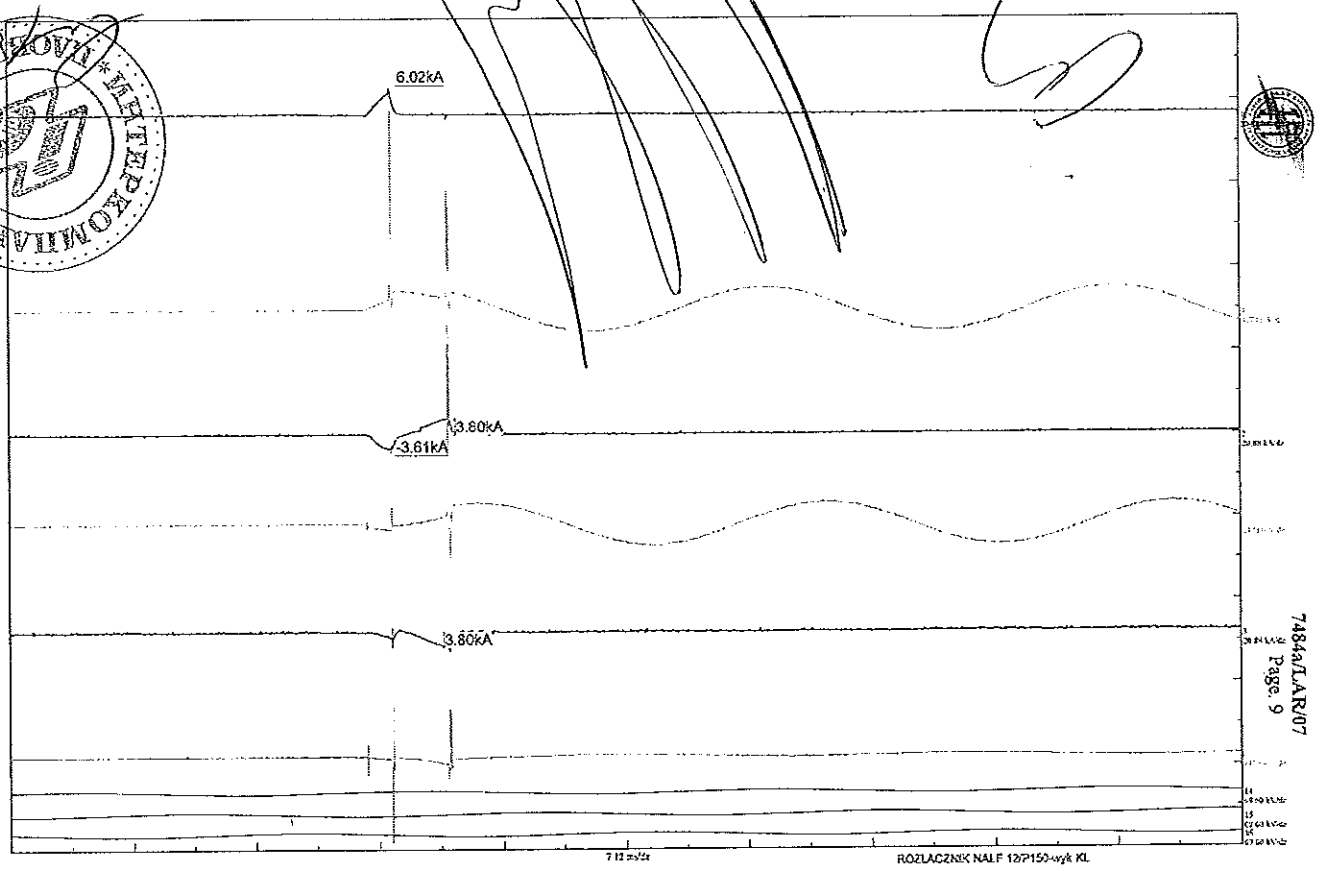
Sign:

G - Generator TJ – 25
R - Resistor
WB - Circuit breaker
ZZ - Making switch
DL - Reactors
T - Transformer TWP
B - Shunts

Diagram of short-time and peak withstand current test



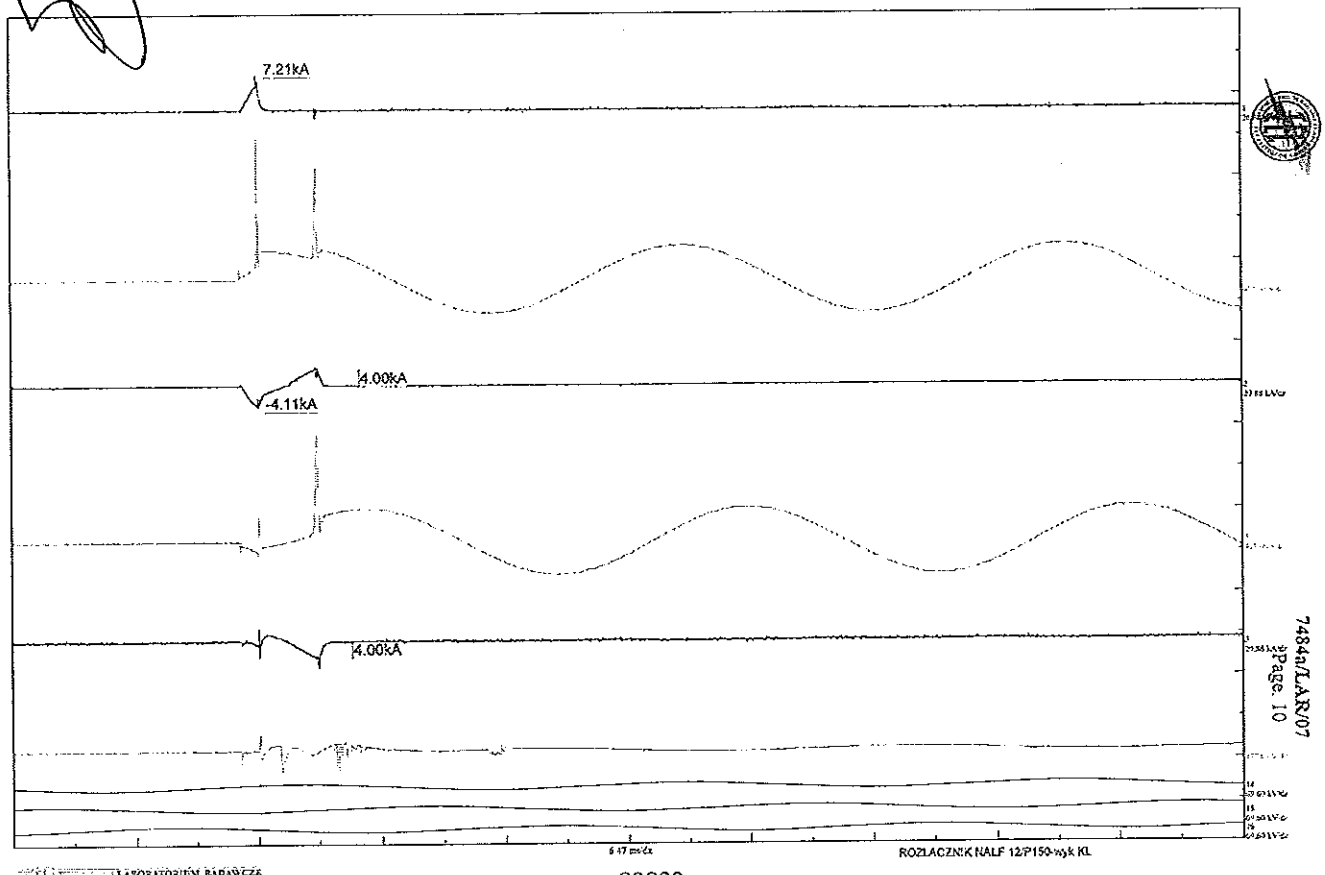
Tested apparatus on the short-circuit testing stand



7484a/LAR/07
Page. 9

LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA

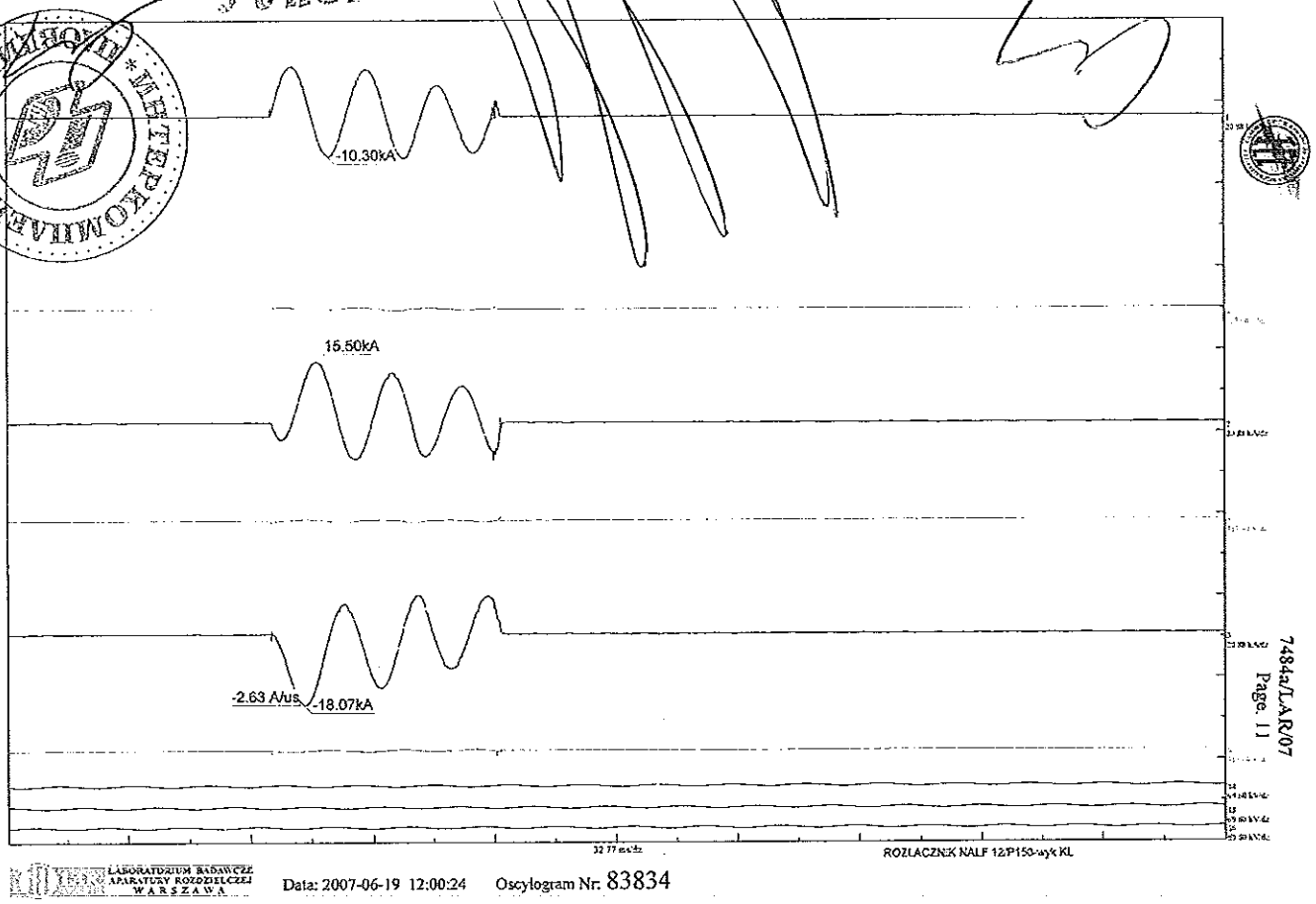
Data: 2007-06-19 11:29:13 Oscylogram Nr: 83832



7484a/LAR/07
Page. 10

LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA

Data: 2007-06-19 11:48:52 Oscylogram Nr: 83833



LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ WARSZAWA

Data: 2007-06-19 12:00:24 Oscylogram Nr: 83834

7484a/LAR/07
Page. 11

SPRAWOZDANIE Nr / TEST REPORT No. 6956/LAR/05

ZAKŁAD WIELKICH MOCY
HIGH POWER DEPARTMENT
INSTYTUT ELEKTROTECHNIKI – ELECTROTECHNICAL INSTITUTE
04-703 WARSZAWA; ul. M. Pożaryskiego 28
tel./fax.: (0-22) 812 04 07; tel.: (0-22) 812 23 38; e-mail. nwr@iel.waw.pl
Certyfikat Akredytacji / Certificate Accreditation PCA Nr AB 074

SPRAWOZDANIE Z BADANIA PRĄDU PRZECHODNIEGO
TEST REPORT OF BREAKING TESTS AT THE TRANSFER CURRENT

BADANY APARAT / APPARATUS: **ZESTAW ROZŁĄCZNIKA Z BEZPIECZNIKAMI / SWICH-FUSE COMBINATION**

TYP / DESIGNATION: **NALF 24** Nr seryjny / Serial No. **14665/2005**

Napięcie znamionowe / Rated Voltage: 24 kV Częstotliwość / Rated Frequency: 50 Hz

PRODUCENT / MANUFACTURER: **ABB Sp. z o.o.**
ul. Bitwy Warszawskiej 1920 r. nr 18, 02-366 Warszawa
Oddział w Przasnyszu, ul. Leszno 59, 06-300 Przasnysz

ZLECENIODAWCA / TESTED FOR: **ABB Sp. z o.o.**

DATA BADAŃ / DATE(S) OF TESTS: **18.05.2005**

WYKONAWCA BADAŃ / TESTED BY: **Laboratorium Badawcze Aparatury Rozdzielczej**
Switchgear and Controlgear Testing Laboratory
04-703 Warszawa; ul. Pożaryskiego 28, Certyfikat Akredytacji PCA Nr AB 074

Przedmiot badań, wykonany zgodnie z dokumentacją, rysunkami konstrukcyjnymi i fotografiami, stanowiącymi załącznik do niniejszego sprawozdania, poddany został próbom zgodnie z normą
The apparatus, constructed in accordance with the description, drawings and photographs incorporated in this report has been subjected to the series of proving tests in accordance with
PN-EN 62271-105:2004 (U)

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

Sprawozdanie zawiera ogółem 13 stron i może być powielane wyłącznie w całości.
Powielanie częściowe dozwolone jest po uzyskaniu pisemnej zgody Laboratorium LAR.
This Test Report comprises 13 sheets in total.
Only integral reproduction of this Test Report is permitted without written permission from LAR Laboratory

Kierownik Laboratorium / Head of Laboratory

Ph. D. Eng. Albert Gmitrzak

Warszawa 07.06.2005

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

Napięcie znamionowe Voltage	24 kV
Prąd przechodni znamionowy Rated transfer current	900 A
Częstotliwość Frequency	50 Hz

WYKAZ PRÓB / SUMMARY OF TESTS

PN-EN 62271-105:2004 (U) Wysokonapięciowa aparatura rozdzielcza i sterownicza.
Część 105: Wysokonapięciowe zestawy rozłączników z bezpiecznikami.

W badaniach uczestniczył / The tests were observed by:

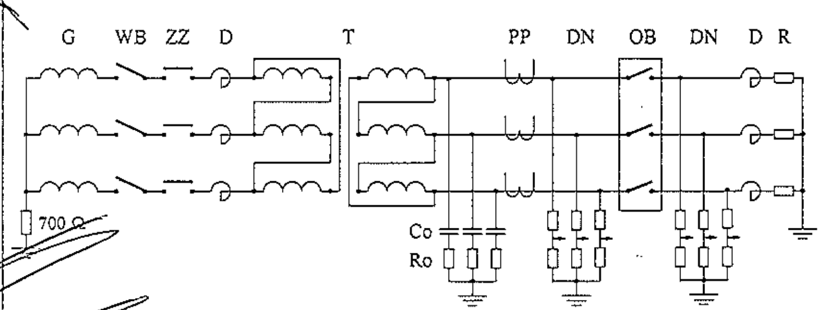
mgr inż. Tomasz Sinkiewicz — ABB Sp. z o. o.
Oddział w Przasnyszu, ul. Leszno 59, 06-300 Przasnysz

Dokumenty identyfikacyjne / Identification of the apparatus

Wymiary obiektu są zgodne z dołączonymi rysunkami wymiarowymi.
The apparatus is constructed in accordance with the drawings incorporated in this report.

Rysunek / Drawing: 343379

RODZAJ PRÓBY TYPE OF TEST	**Próba wyłączania prądu znamionowego przechodniego** Breaking test at the rated transfer current	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP1



G	**Generator TJ 100**
WB	**Wyłącznik bezpieczeństwa** Master breaker
ZZ	**Załącznik zwarciowy** Making switch
D	**Dławiki** Inductance
T	**Transformator** Transformer
DN	**Dzielnik napięcia** Voltage divider
PP	**Przekładnik prądowy** Current transformer
OB	**Obiekt badany** Tested object

ВЯРНО С ОРИГИНАЛА

TESTS RESULTS

RODZAJ PRÓBY TYPE OF TEST	**Próba wyłączania prądu znamionowego przechodniego 1250 A** Breaking test at the rated transfer current 900 A	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP1

Wartości prądów i napięć są podawane kolejno dla fazy L1, L2 i L3.
Current and voltage values are given for L1, L2 and L3.

Typ bezpiecznika / Fuse type: CEF 24 kV - 100 A

Numer oscylogramu Oscillogram no.	**Napięcie probiercze** Test voltage (kV)	**Prąd probierczy wyłączany przez rozłącznik** Test current interrupted by the switch (kA)	**Uwagi** Remarks
80671	24.0	1.13 1.12 -	**Rozłącznik nie wyłączył prądu** Switch failed to break the current

RODZAJ PRÓBY TYPE OF TEST	**Próba wyłączania prądu znamionowego przechodniego 900 A** Breaking test at the rated transfer current 900 A	**OBWÓD PROBIERCZY** TEST CIRCUIT	OP1

Wartości prądów i napięć są podawane kolejno dla fazy L1, L2 i L3.
Current and voltage values are given for L1, L2 and L3.

Typ bezpiecznika / Fuse type: CEF 24 kV - 80 A

Numer oscylogramu Oscillogram no.	**Napięcie probiercze** Test voltage (kV)	**Prąd probierczy wyłączany przez rozłącznik** Test current interrupted by the switch (A)	**Uwagi** Remarks
80674	23.9 23.9 24.1	784 784 -	
80675	23.3 23.3 24.5	784 - 784	
80679	23.3 23.3 24.3	- 783 784	

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

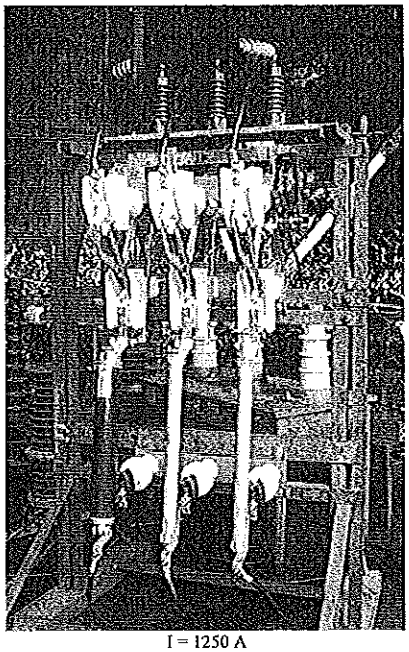
ВЯРНО С ОРИГИНАЛА

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

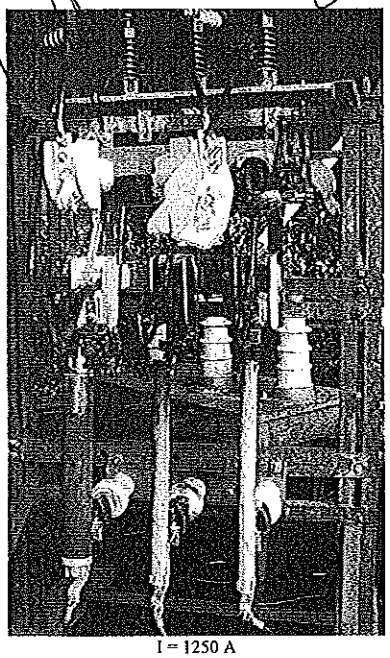
INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ
ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY

ВЯРНО С ОРИГИНАЛА

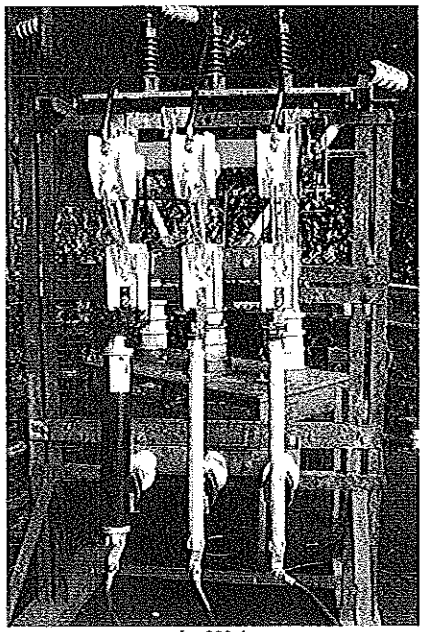


I = 1250 A
Obiekt badany z bezpiecznikiem w fazie L3 przed próbą
Test object before test with the fuse in phase L3

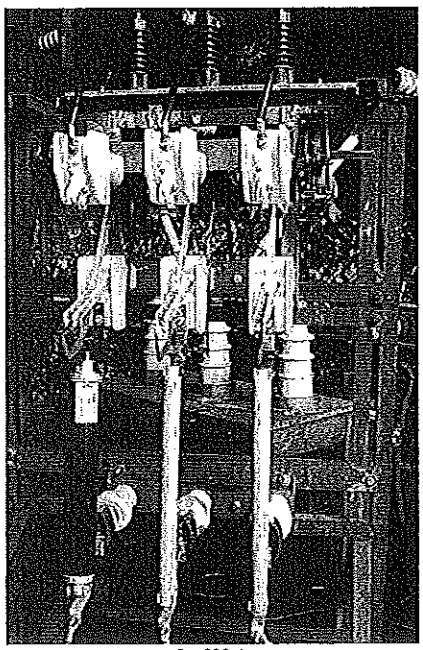


I = 1250 A
Obiekt badany z bezpiecznikiem w fazie L3 po próbie
Test object after test with the fuse in phase L3

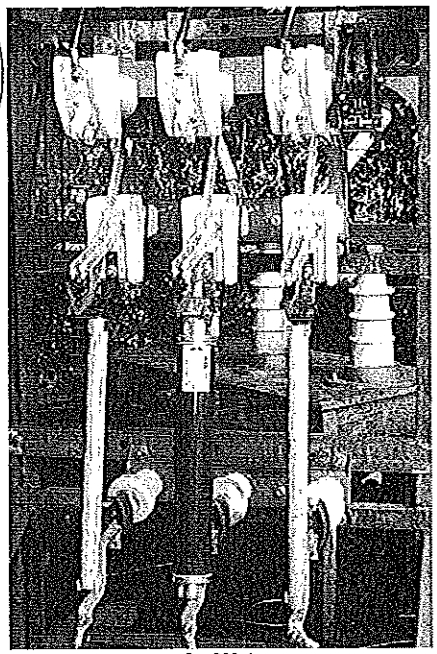
INSTYTUT ELEKTROTECHNIKI
LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ ELECTROTECHNICAL INSTITUTE
SWITCHGEAR AND CONTROLGEAR TESTING LABORATORY



I = 900 A
Obiekt badany z bezpiecznikiem w fazie L3 przed próbą
Test object before test with the fuse in phase L3

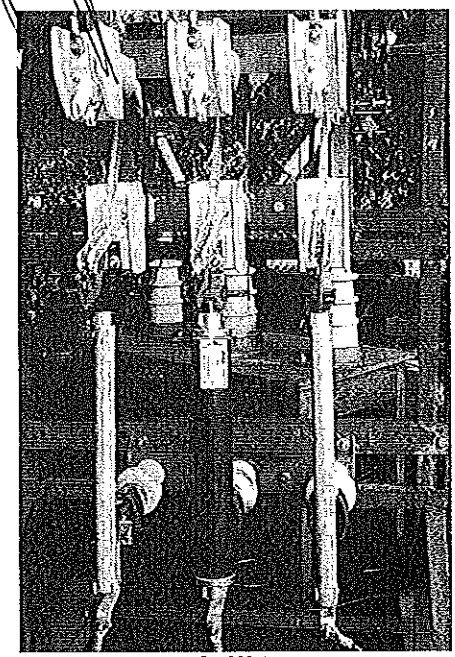


I = 900 A
Obiekt badany z bezpiecznikiem w fazie L3 po próbie
Test object after test with the fuse in phase L3



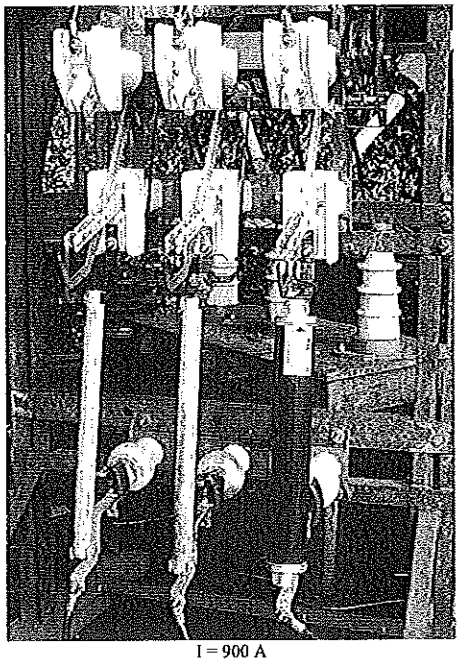
I = 900 A

Obiekt badany z bezpiecznikiem w fazie L2 przed próbą
Test object before test with the fuse in phase L2



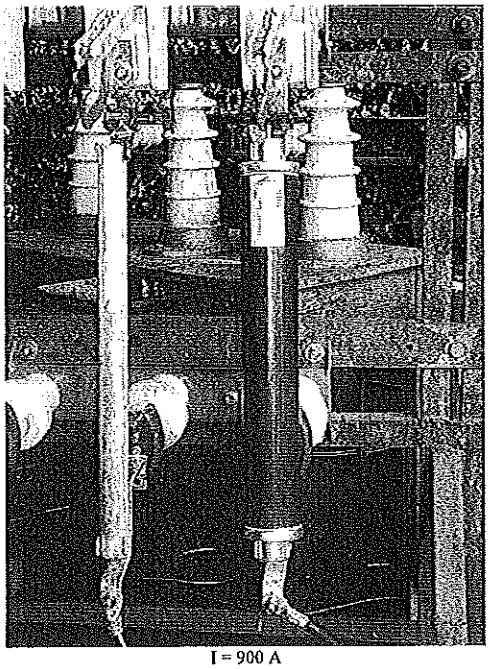
I = 900 A

Obiekt badany z bezpiecznikiem w fazie L2 po próbie
Test object after test with the fuse in phase L2



I = 900 A

Obiekt badany z bezpiecznikiem w fazie L1 przed próbą
Test object before test with the fuse in phase L1



I = 900 A

Obiekt badany z bezpiecznikiem w fazie L1 po próbie
Test object after test with the fuse in phase L1

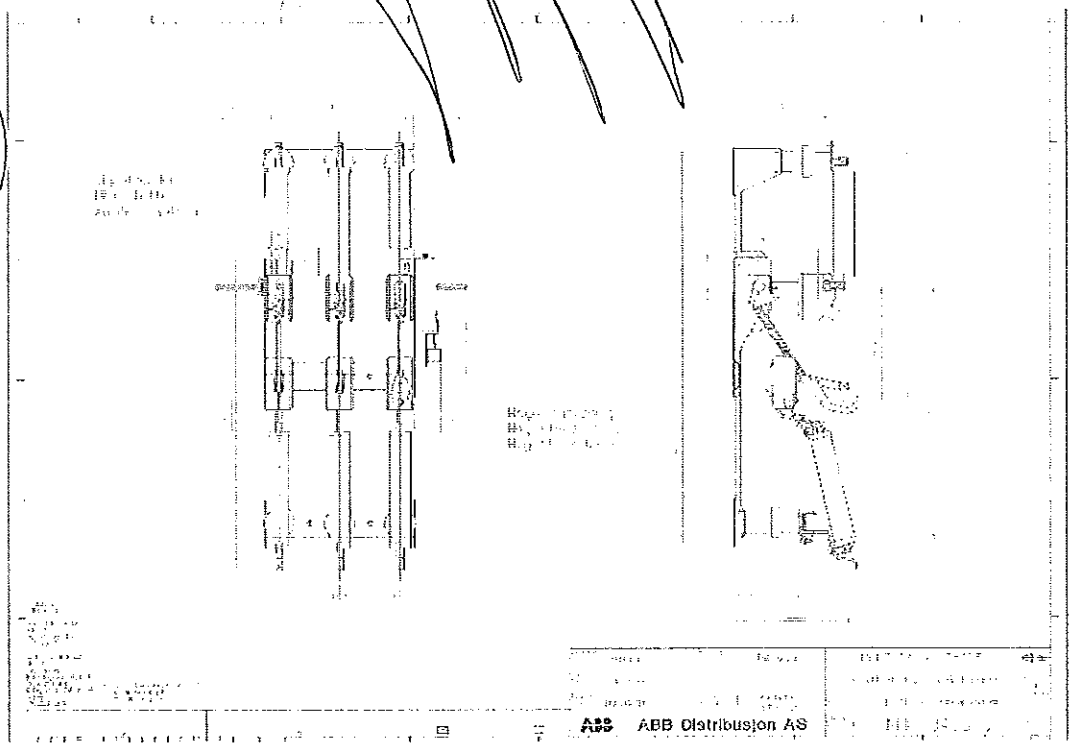


ABB Distribusjon AS

REPORT OF PERFORMANCE

Apparatus: High-voltage switch disconnector

Designation: NAL 24 with type A mechanism

Client: ABB Distribusjon AS, Skien, Norway

Manufacturer: ABB Distribusjon AS, Skien, Norway

Date(s) of test: 20. and 23. of October 1995

The test has been in accordance with:

The clients instruction based on IEC Publication 265-1, Second edition 1983, § 6.101. Making and breaking tests. Test duty no. 4.

The performance of the apparatus tested and the observations made during the test have been recorded in tables with test results and hardcopies from data acquisition system. The documents of this report are:

Ratings of the test object:	Page No.:
Technical Data of Test Circuit:	Page No.: 8
Test result(s) / Conclusion:	Page No.: 3
Table(s) with test results:	Page No.: 4 to 7
Circuit diagram(s):	Page No.: 9
Drawing(s):	Page No.: 10 and 11
Photo(s):	Page No.: 12
Client's observer(s)	Page No.:
Data acquisition (Oscillograms)	Rec. No.: 18871, 34971 and 34972, 34974 to 34993, 34996 to 35007

Skien, 25. of Oct. 1995

Björn Kamperhaug
(Test Engineer)

Tor Bratsberg
(Technical Manager)

NEFI Kortslutningslaboratorium (High Power Laboratory)
P. O. Box 108, Sentrum, 3701 SKIEN | Stulenvegen 71, 3721 SKIEN, Norway - Tel.:+47 35590338 - Fax.: +47 35590615

Test object

The test object was a high-voltage switch disconnector type NAL 24 with a stored energy, independent manually spring operated mechanism type A.

The test object was marked with serial no. N 27720.

Publication

The client's instruction based on IEC Publication 265-1, Second edition 1983, § 6.101, Test duty no. 4.

Test procedure

The purpose of the test was to verify a breaking capacity with a capacitive load of 80 A at a test voltage of 24 kV.

The test was performed with breaking operations only. The switch disconnector was operated by means of the 220 V DC trip coil.

The switch disconnector was mounted in a test rack in vertical position.

A rotating potmeter was fastened to the rotating centre of the main contact knife in phase R, in order to control the condition of the switch disconnector and to calculate the arcing times.

Tests performed

A No load test, closing operation, rec no. 34971

B No load test, opening operation, rec no. 34972

C Resistance measurement at 100 A DC, between the termination contacts of each pole

D 20 breaking operations with capacitive load, with the supply circuit connected to the upper side of the switch disconnector, rec. no. 34974 to 34993

E 10 breaking operations with capacitive load, with the supply circuit connected to the lower side of the switch disconnector, rec. no. 34996 to 35005

F No load test, closing operation, rec no. 35006

G No load test, opening operation, rec no. 35007

H Resistance measurement at 100 A DC, between the termination contacts of each pole

Test result

The values obtained during the test are listed in tables on page no. 4 to 7.

The test object fulfilled the requirement for the test. It was no sign of any burning marks on the main contacts.

No reignitions or restrikes occurred during the breaking operations.

The over-voltages during the breaking operations were far below the permitted limit.

P. O. Box 108, Sentrum, 3701 SKIEN Stulenvegen 71, 3721 SKIEN, Norway - Tel.: +47 35590338 - Fax.: +47 35590615

Performance under No-Load condition

Values recorded

Type of apparatus: High-voltage switch disconnector with a two spring mechanism

Travel recorder: Rotating potmeter linear to the rotation of the main contact knife in phase R

Closing device: Manually by means of the handle

Opening device: By means of the 220 V DC trip coil

Total travel closing contacts: 334 mm (circle sector) — Total travel opening contacts: 406 mm (circle sector)

		A	B	C	F	G	H
Test Number		3497 1	34972	None	3500 kA	35007	None
Oscillogram, Record Number		C	O	None	C	O	None
Operation		-	-		-	-	
Time from current initiation closing coil to contact touch		-	-		-	-	
Time from current initiation opening coil to contact sep.		-	-		-	-	
Travel after contact touch (Last phase to touch)		31 mm	-		32,7 mm	-	
Travel to contact separation (First phase to separate)		-	10,4 mm		-	80,4 mm	
Speed during closing	Closing speed	2,5 m/s	-		6,0 m/s	-	
	First cursor reference (before contact touch)	10,3 mm	-		10,3 mm	-	
	Last cursor reference (after first cursor ref.)	6,0 m/s	-		6,0 m/s	-	
Speed during opening	Opening speed	-	6,0 m/s		-	5,8 m/s	
	First cursor (after contact sep.)	-	0 ms		-	0 ms	
	Last cursor reference (after first cursor ref.)	-	16,1 mm		-	16,3 mm	
Resistance measurement between termination contacts at 100 A DC. (micro ohm)				R phase: 76 S phase: 80 T phase: 77			R phase: 81 S phase: 84 T phase: 81
Ambient temperature		22,5 Deg. C	21,5 Deg. C	22,5 Deg. C	21,5 Deg. C	21,5 deg. C	21,5 deg. C
Signature		BKA	BKA	BKA	BKA	BKA	BKA
Date		19.10. 95	19.10.95.	19.10.95.	23.10. 95.	23.10.95	23.10.95
Remarks							

NOLOAD

P. O. Box 108, Sentrum, 3701 SKIEN Stulenvegen 71, 3721 SKIEN, Norway - Tel.: +47 35590338 - Fax.: +47 35590615

Test D — Testing of Making- and Breaking-Capacity
Values recorded

Ambient temperature: 22 Deg. C
Test date: 20.10.95.
Signature: ØKA

Test requirement: IEC 265-1 TD 1
Operating sequence: 20 x Open
Condition of apparatus before test: New and clean

Type of test circuit:
Connections to apparatus tested:
Supply from the upper side

Test-No.		TIV	1	2	3	4	5	6	7	8	9	10	
Oscillogram No.		1087	34974	34975	34976	34977	34978	34979	34980	34981	34982	34983	
Operation			0	0	0	0	0	0	0	0	0	0	
Voltage before test	kV												
Making current (Max. value)	A												
Breaking current	R		81,5										
	A S		79,8										
	T		81,0										
	Average		80,7										
Recovery voltage	R		24,2										
	kV S		24,2										
	T		24,2										
	Average between phases		24,2										
Closing-/Opening time	ms												
Arcing time	R		8,0					8,0					
	ms S		8,0					8,0					
	T		3,0					3,0					

Remarks: Cont. next page

Condition of apparatus after Test:

Test D — Testing of Making- and Breaking-Capacity
Values recorded

Ambient temperature: 22 Deg.C
Test date: 20.10.95.
Signature: ØKA

Test requirement: Cont. from previous page
Operating sequence:
Condition of apparatus before test:

Type of test circuit:
Connections to apparatus tested:
Supply from the upper side

Test-No.		11	12	13	14	15	16	17	18	19	20		
Oscillogram No.		34984	34985	34986	34987	34988	34989	34990	34991	34992	34993		
Operation		0	0	0	0	0	0	0	0	0	0		
Voltage before test	kV												
Making current (Max. value)	A												
Breaking current	R										80,3		
	A S										79,1		
	T										80,1		
	Average										80,2		
Recovery voltage	R										24,1		
	kV S										24,1		
	T										24,1		
	Average between phases										24,1		
Closing-/Opening time	ms												
Arcing time	R	8,0					7,5				7,5		
	ms S	8,0					7,5				7,5		
	T	3,0					3,0				2,5		

Remarks: Cont. next page

Condition of apparatus after Test:

NEFI Kortslutningslaboratorium

Test E

Testing of Making- and Breaking-Capacity

Values recorded

Ambient temperature: 21,5 Deg. C
Test date: 23.10.95
Signature: IOKA

Test requirement: IEC 265-1 TD 4

Type of test circuit:

Operating sequence: 10 x Open

Connections to apparatus tested: Supply from the lower side

Condition og apparatus before test: Pretested during test D

Test-No.		21	22	23	24	25	26	27	28	29	30		
Oscillogram No.		34996	34997	34998	34999	35000	35001	35002	35003	35004	35005		
Operation		0	0	0	0	0	0	0	0	0	0		
Voltage before test	kV												
Making current (Max. value) A													
Breaking current	R	81,6									80,9		
	A S	80,1									79,8		
	T	81,1									80,7		
	Average	80,9									80,5		
Recovery voltage	R	24,2									24,2		
	kV S	24,3									24,1		
	T	24,3									24,2		
Average between phases		24,3									24,2		
Closing-/Opening time	ms												
Arcing time	R	8,5					7,5				8,5		
	ms S	8,5					7,5				8,5		
	T	3,5					3,0				3,5		

Remarks:

Condition of apparatus after Test: See page no. 3.

NEFI Kortslutningslaboratorium

Report No.: 1143

Technical Data of Test Circuit

Test Number		1 - 20	21 - 30		
Record Number		34974-34993	34996-35005		
Number of phases	(test circuit)	3	3		
Operating frequency	(Hz)	50	50		
Power factor source side		0,1 1)	0,1 1)		
Power factor load side		0,088 2)	0,088 2)		
Load before test object	(% of total)				
Transformer connection symbol		Dyn	Dyn		
Transformer star point		Earthed	Earthed		
Short circuit point		Isolated	Isolated		
TRV Source side	Uc/t3 (kV/uS)	44/86,6	44/86,6		
TRV Load side	Uc/t3 (kV/uS)				
Res. frequency load side	(kHz)				
Damping factor	(j)				
Circuit diagram	(Page No.)	o	o		
Supply side		Upper	Lower		

Remarks:

1) The supply circuit is, according to the IEC 265-1 publication, as during a test with the mainly active load
2) Capacitive load

TEC-DAT

NEFI Kortslutningslaboratorium

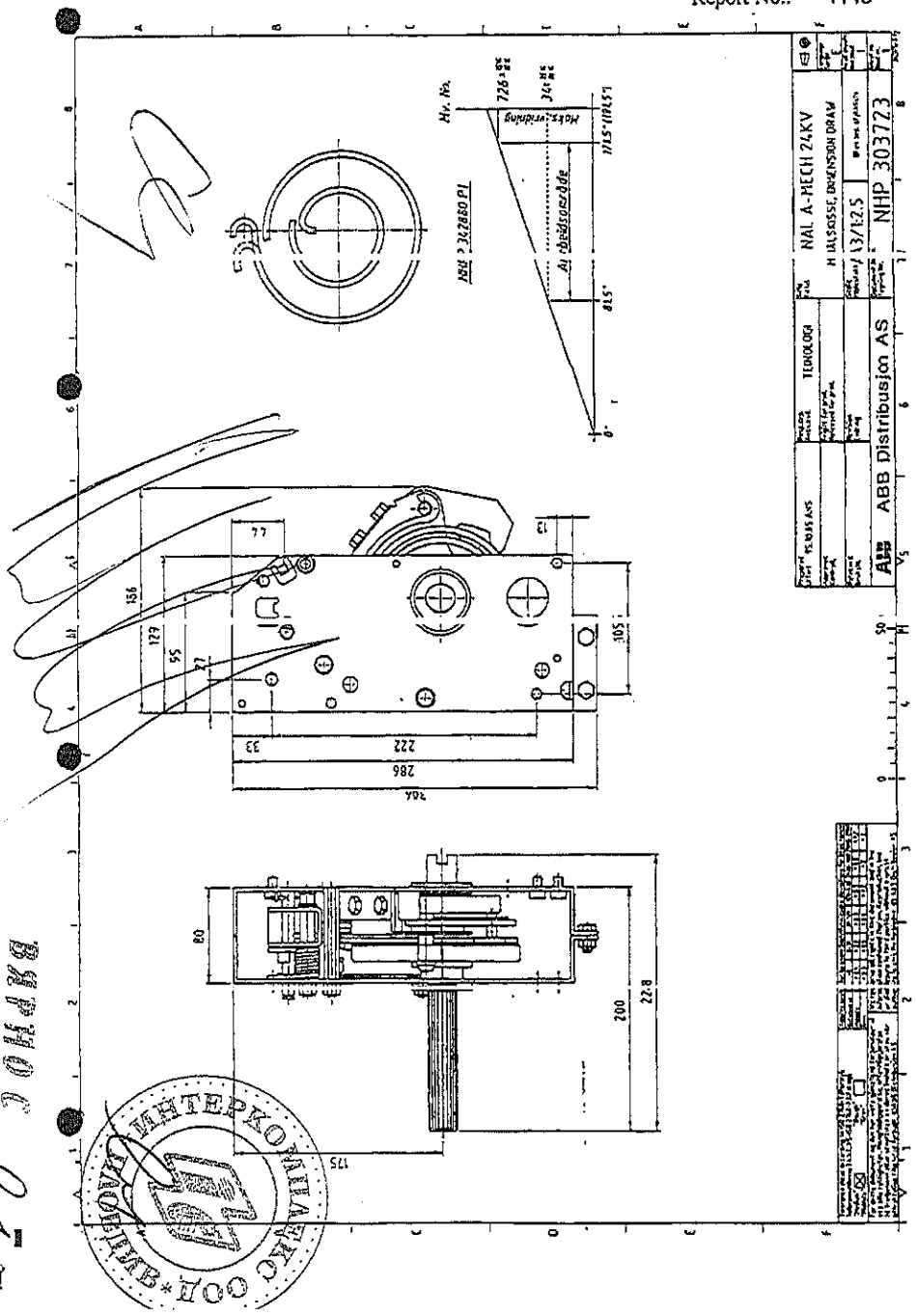
NEFI Kortslutningslaboratorium

Make / Break test, IEC 265-1, Test duty 4

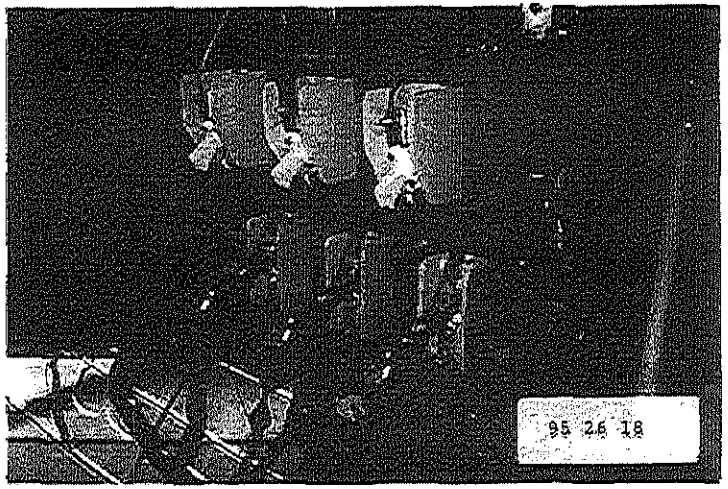
S = 17 kV/ supply voltage
El= Safetiy switch
R = Resistance
X = Reactance
TR= Transisformer
I = Current measuring
Ij= Current meas. to earth (option)
U = Phase? voltage
Uj= Voltoige measuring
C = Capacitive load

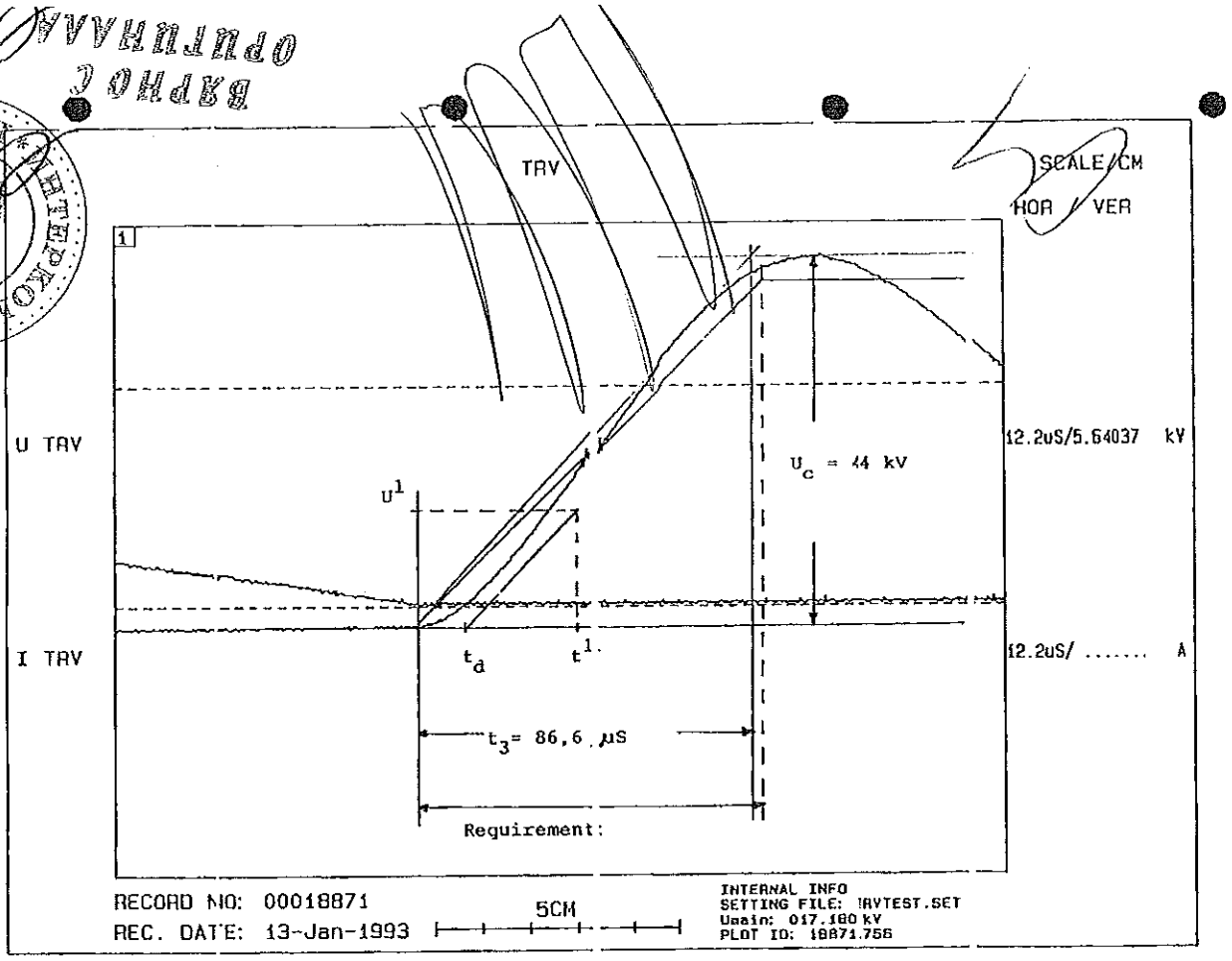
K = Making switch
TO= Test object
SC= Short circuit point
J = Earth connection
F = Protection fuses
Cs/Rs= Resonance freq. adj.

FILE:CAPLOAD

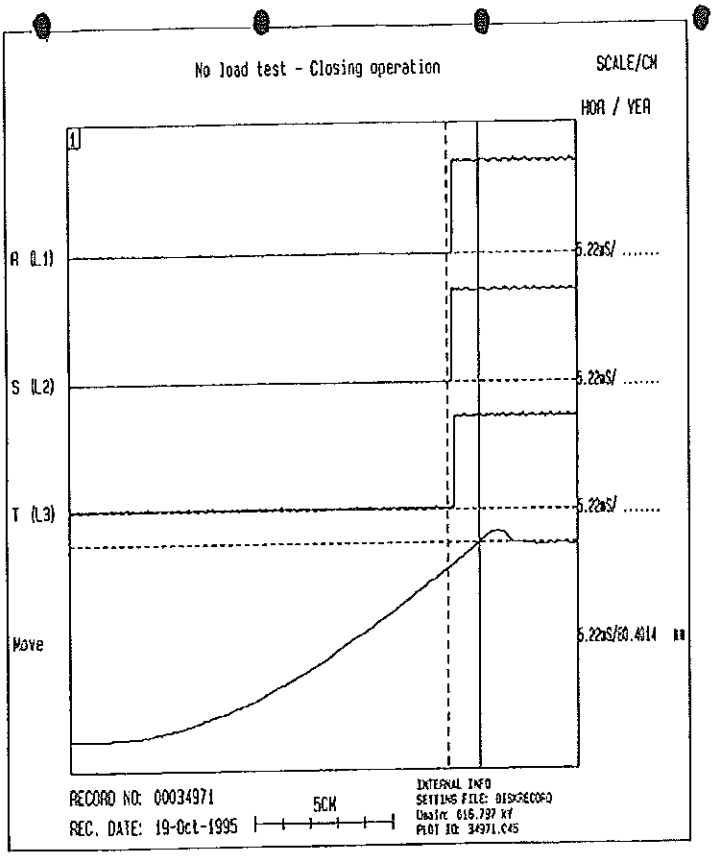


Test object

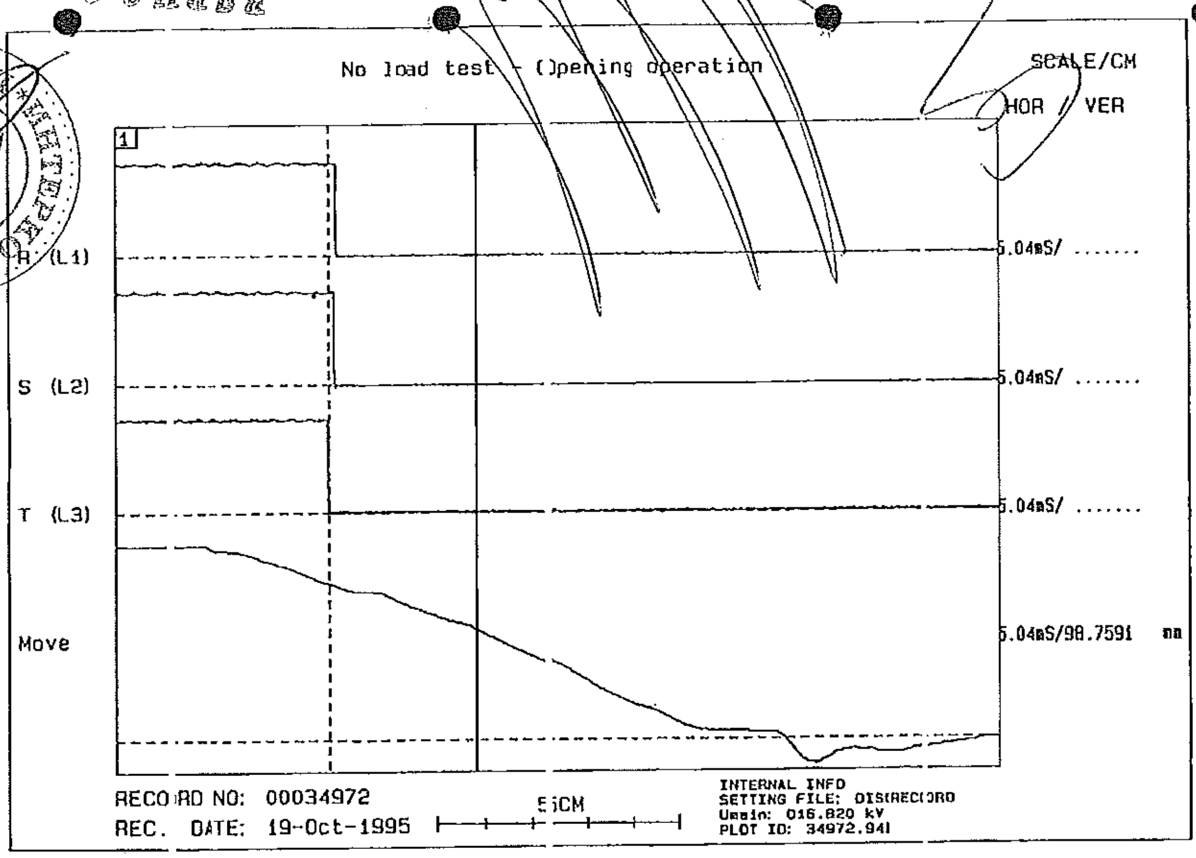




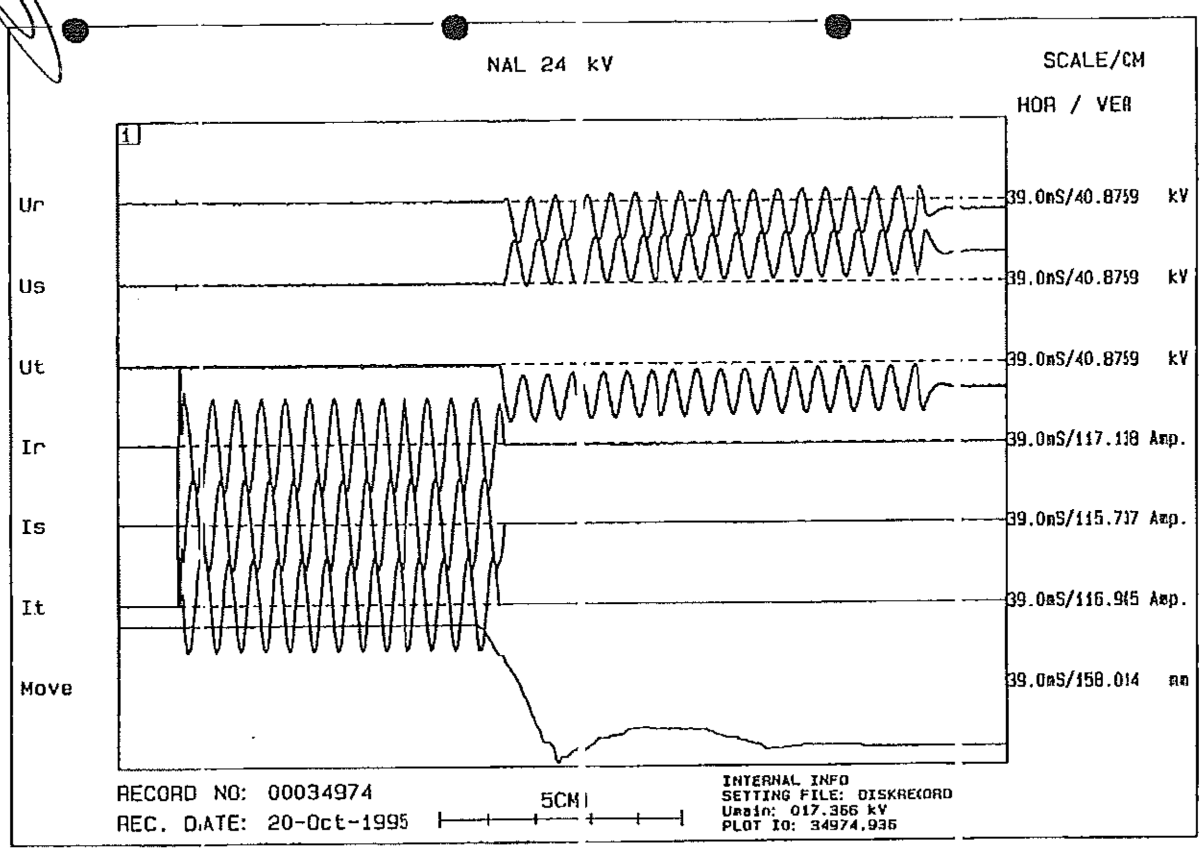
NEFI Kortslutningslaboratorium



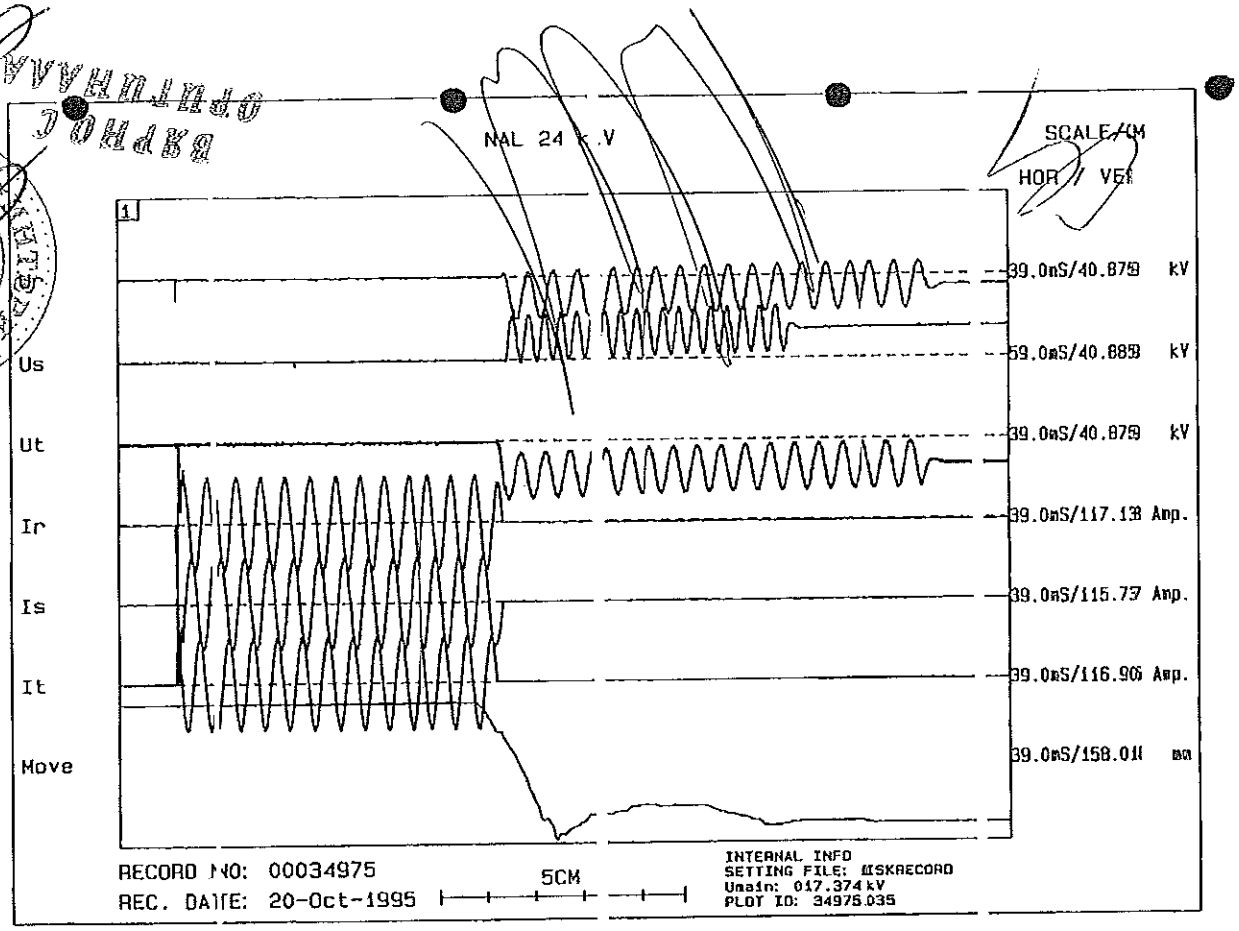
NEFI Kortslutningslaboratorium



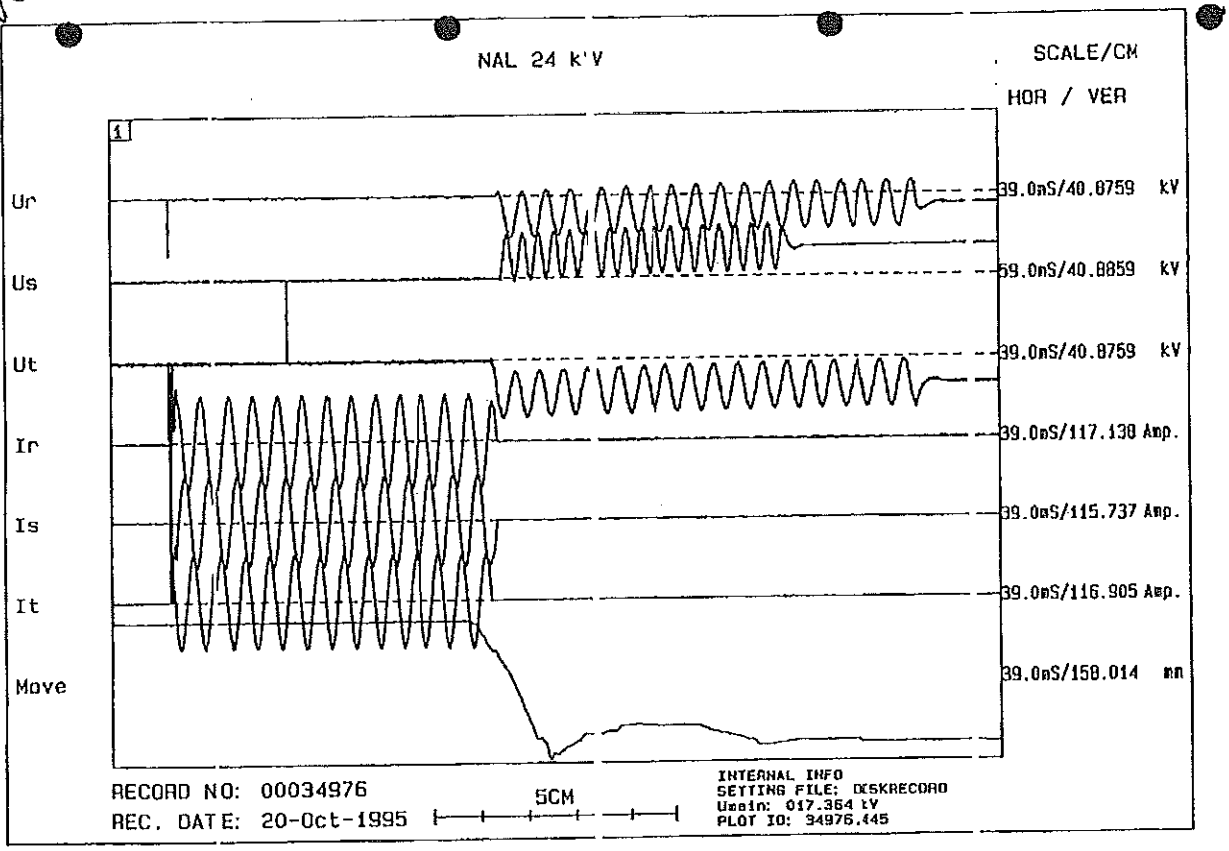
NEFI Kortslutningslaboratorium



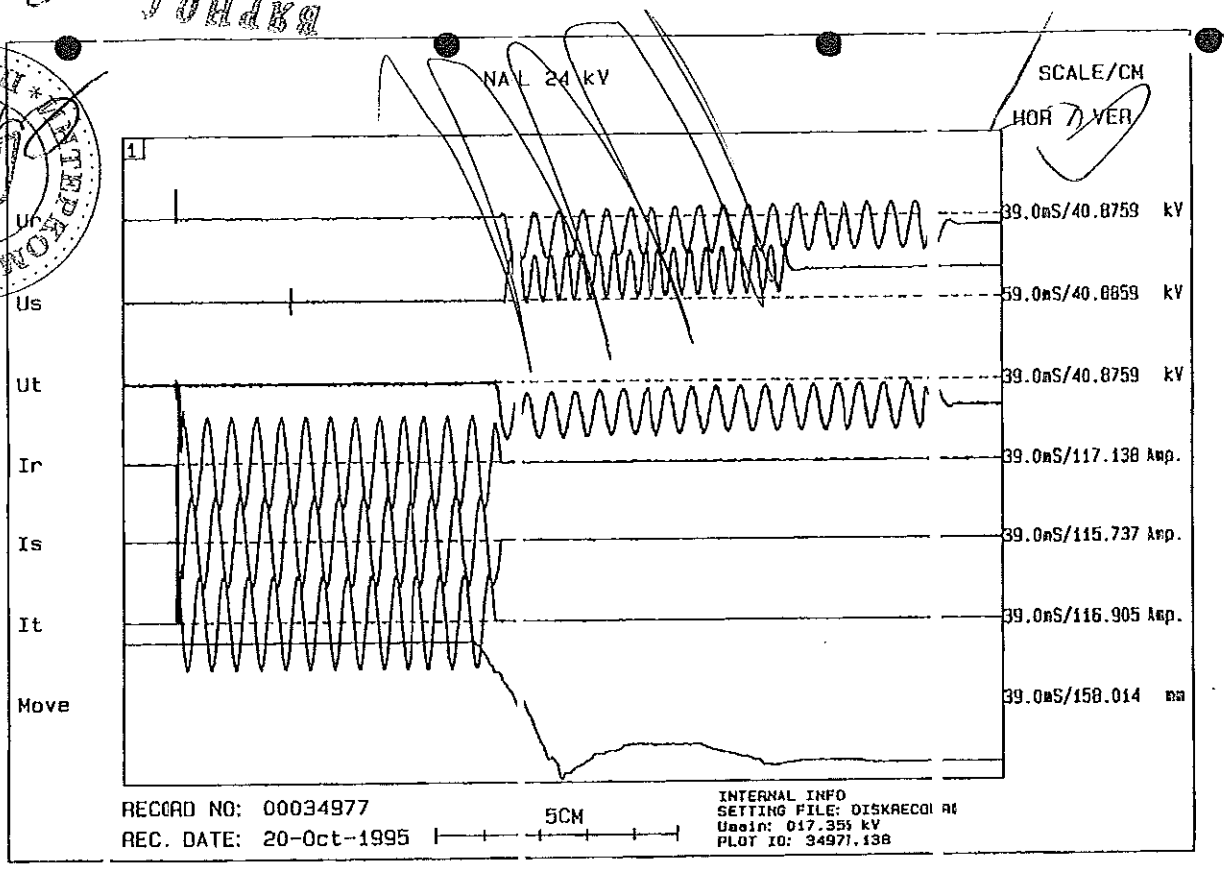
NEFI Kortslutningslaboratorium



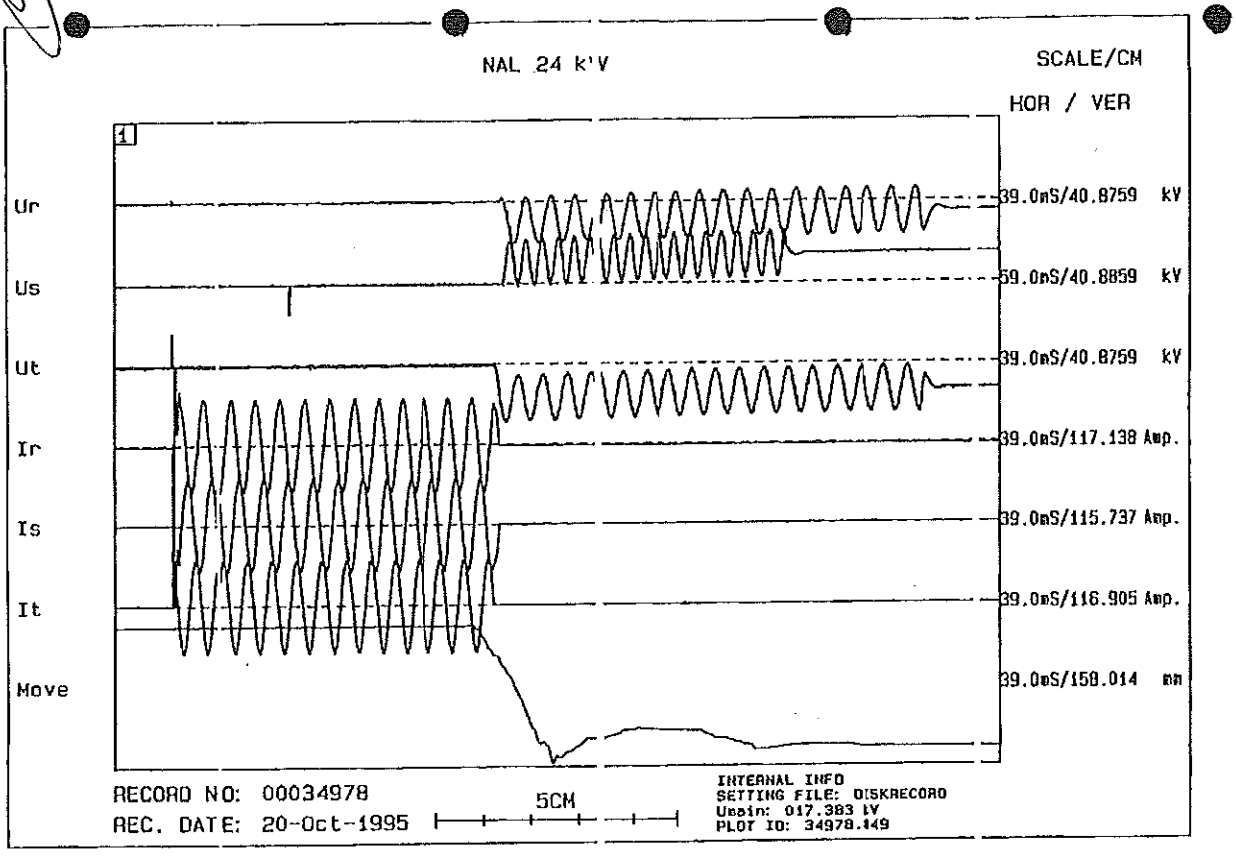
NEFI Kortslutningslaboratorium



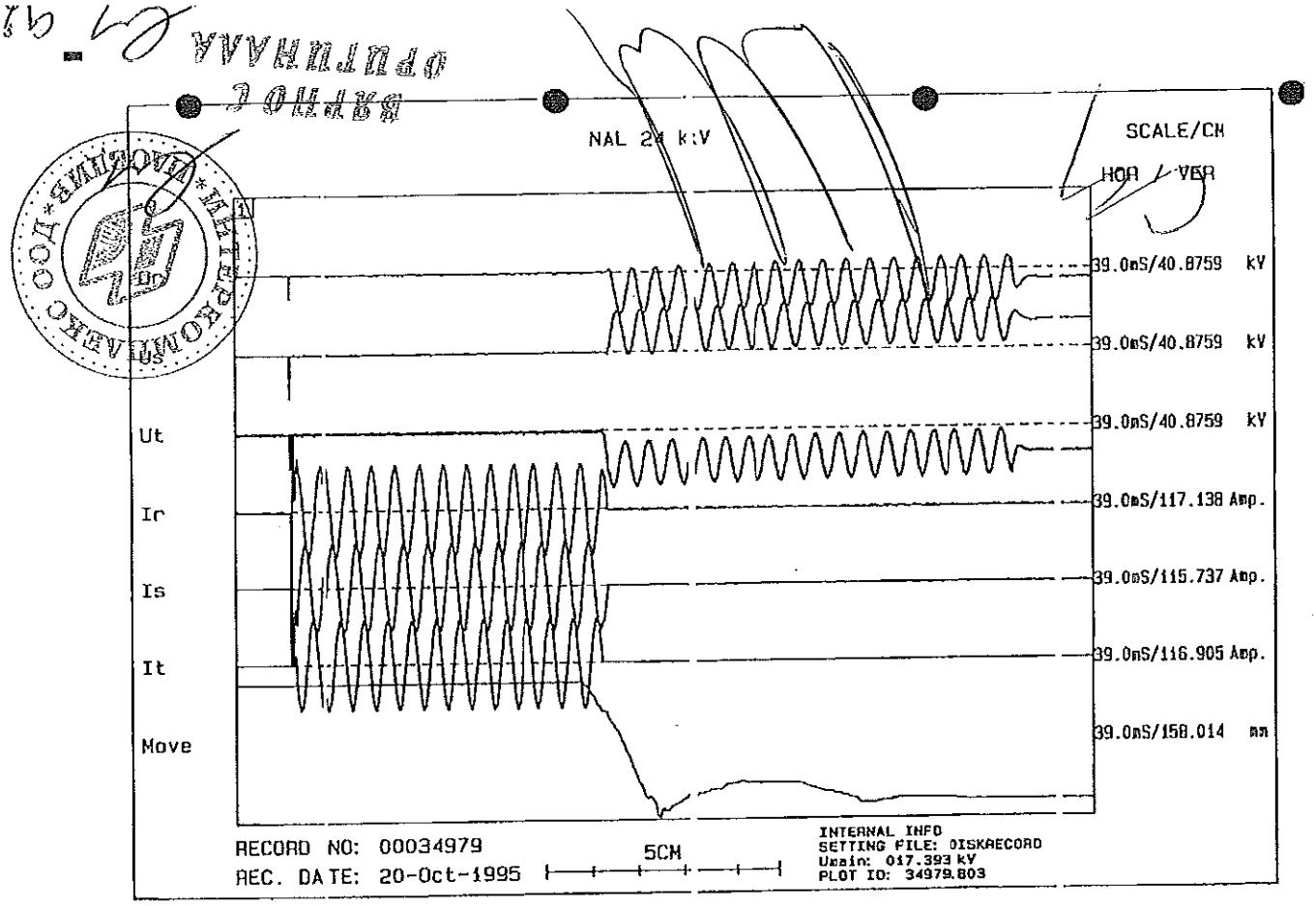
NEFI Kortslutningslaboratorium



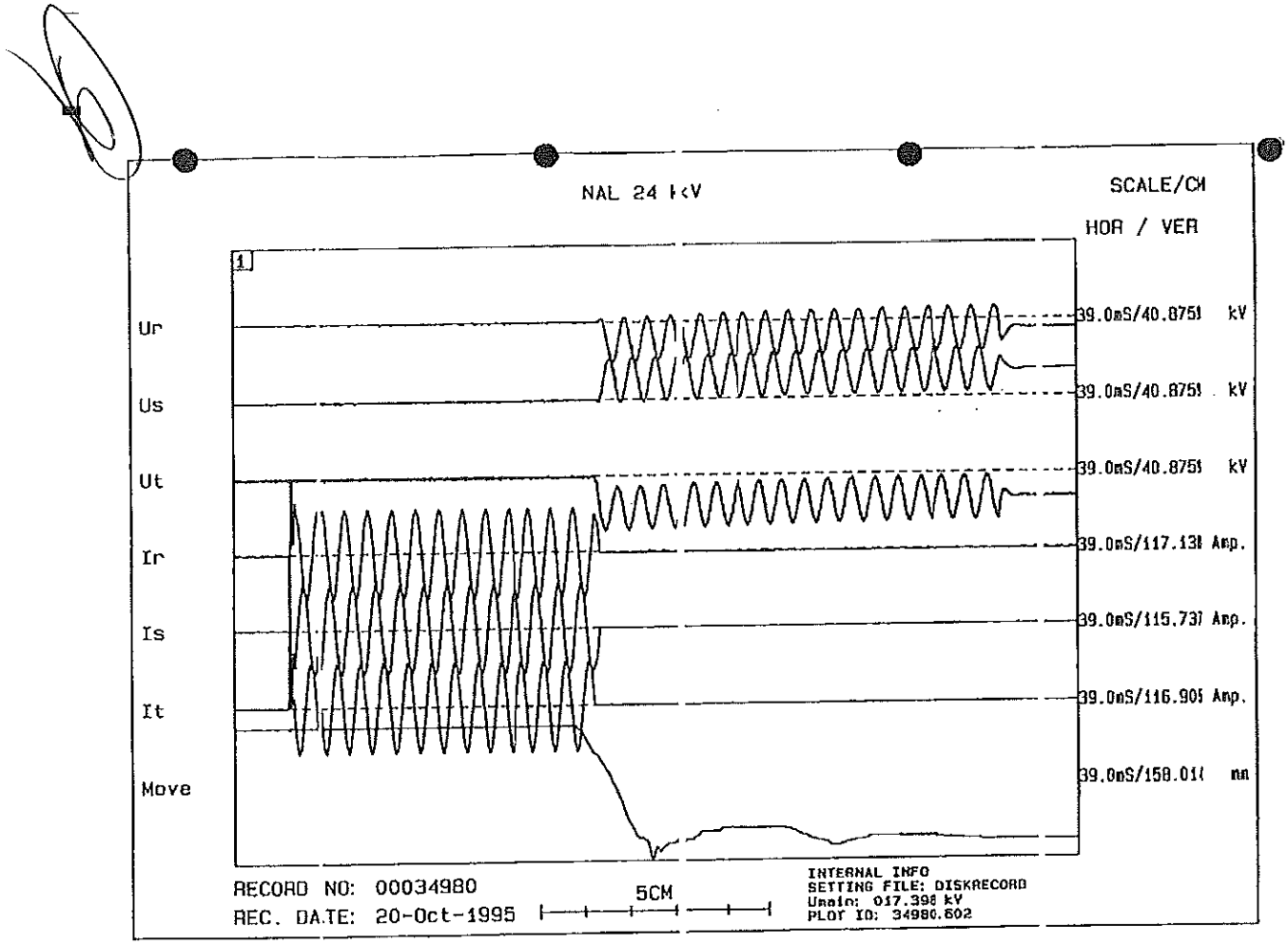
NEFI Kortslutningslaboratorium



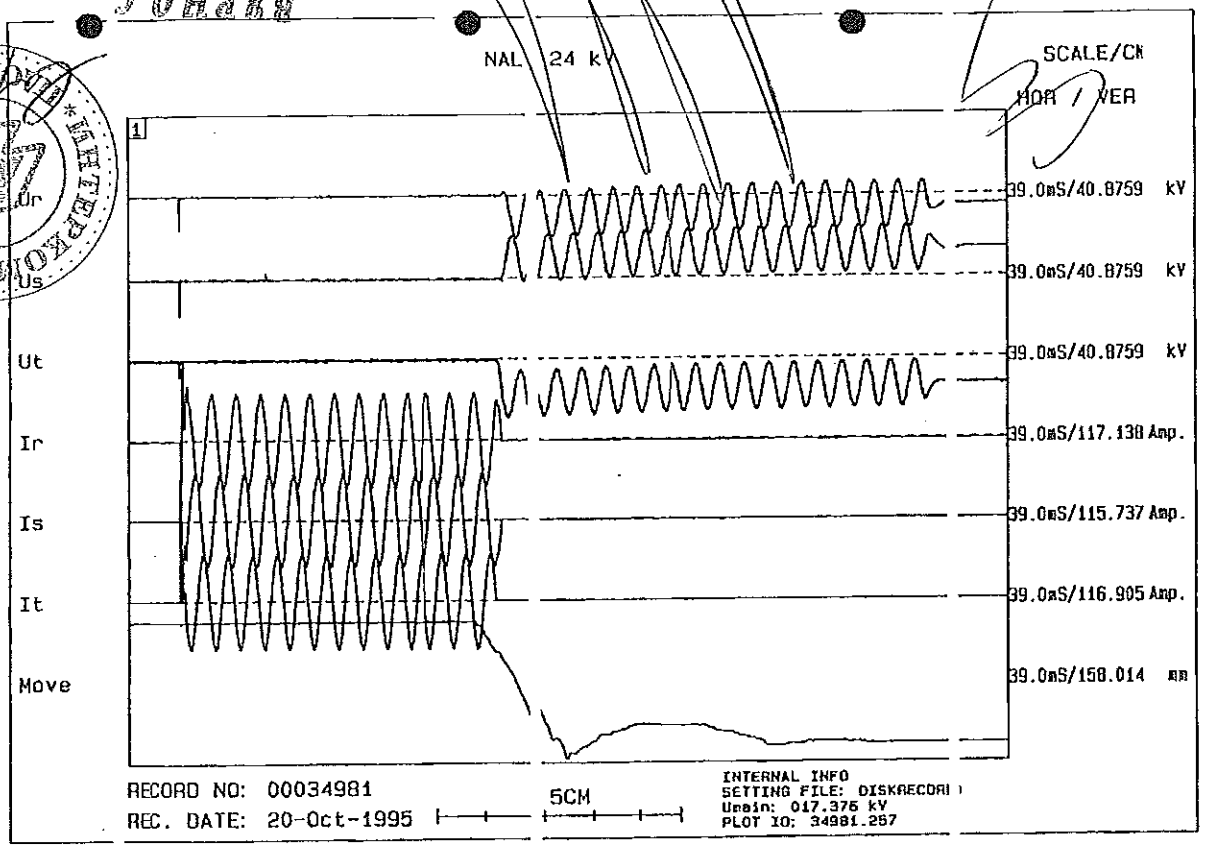
NEFI Kortslutningslaboratorium



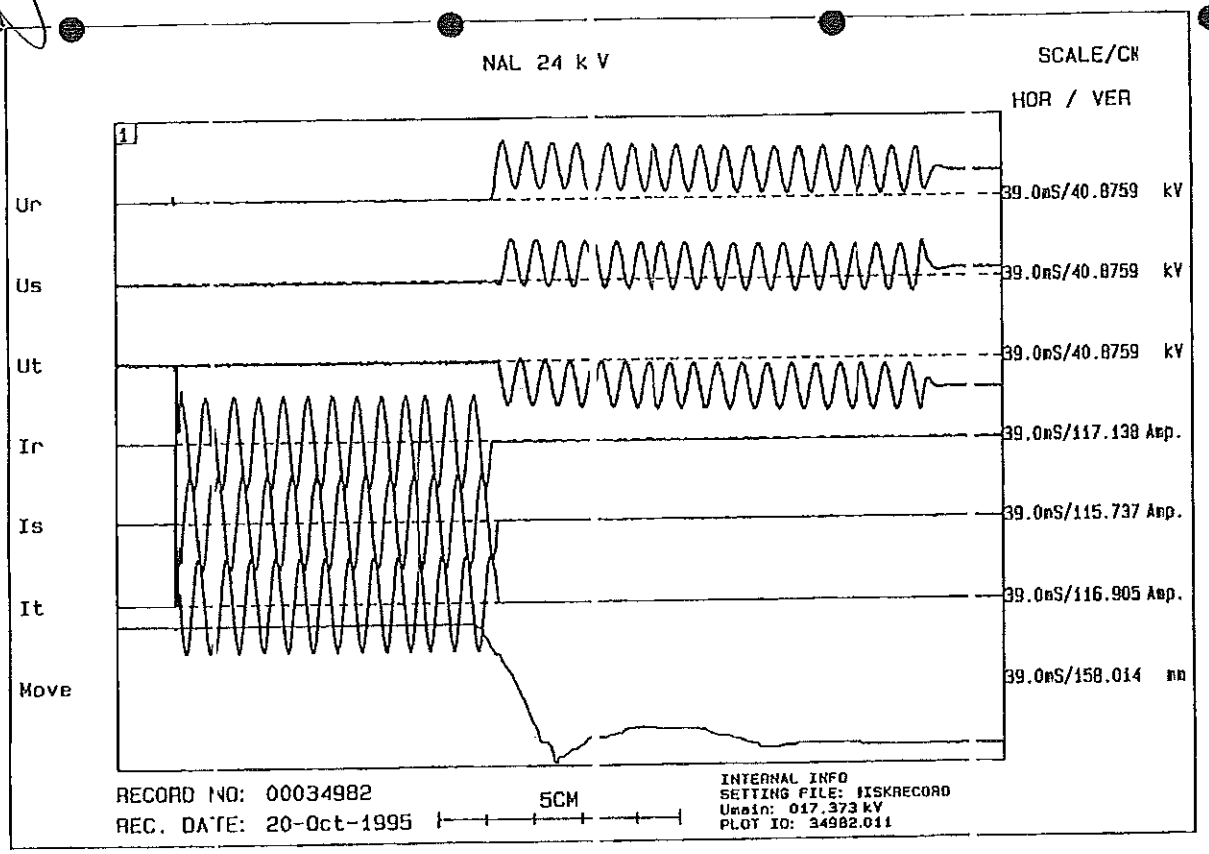
NEFI Kortslutningslaboratorium



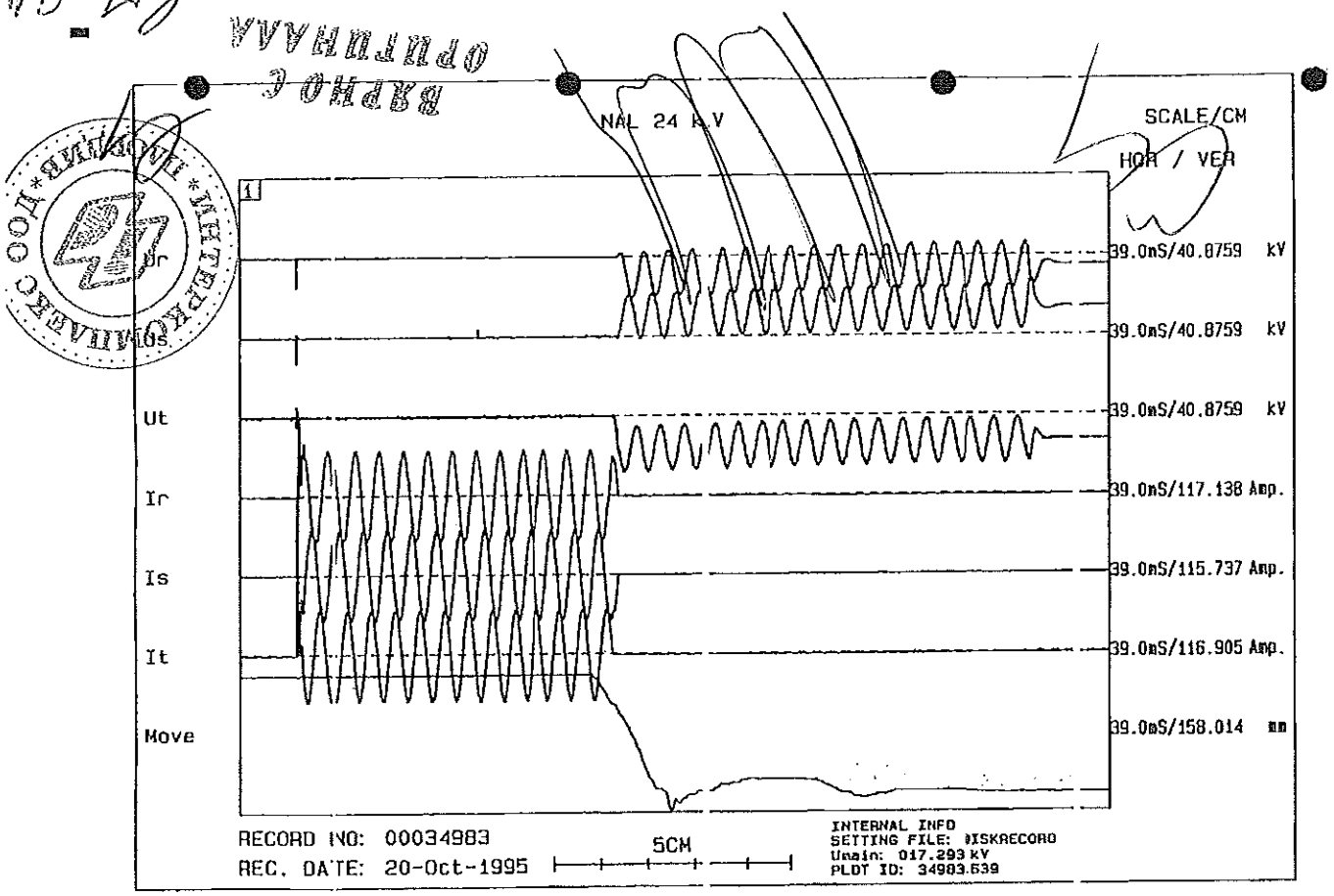
NEFI Kortslutningslaboratorium



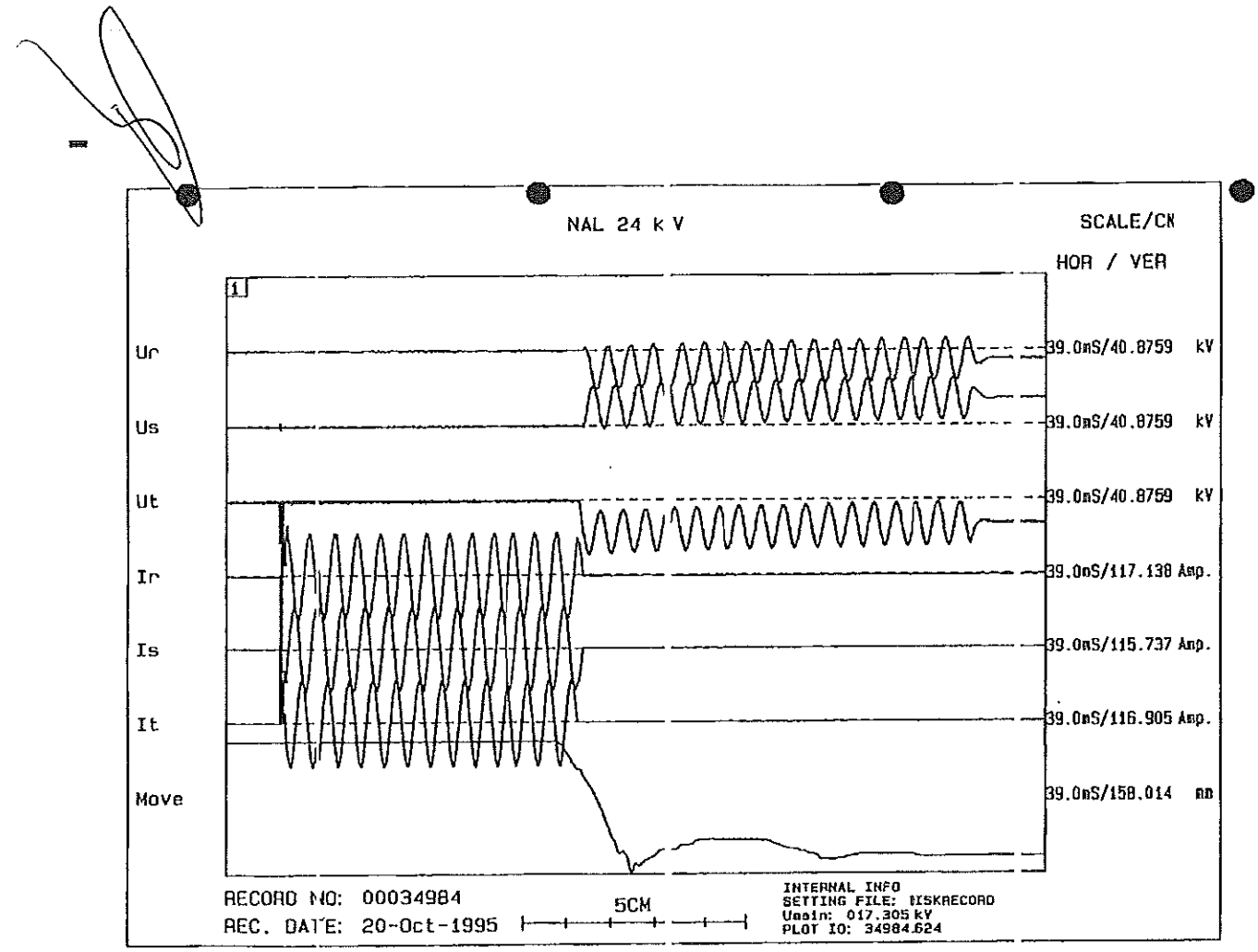
NEFI Kortslutningslaboratorium



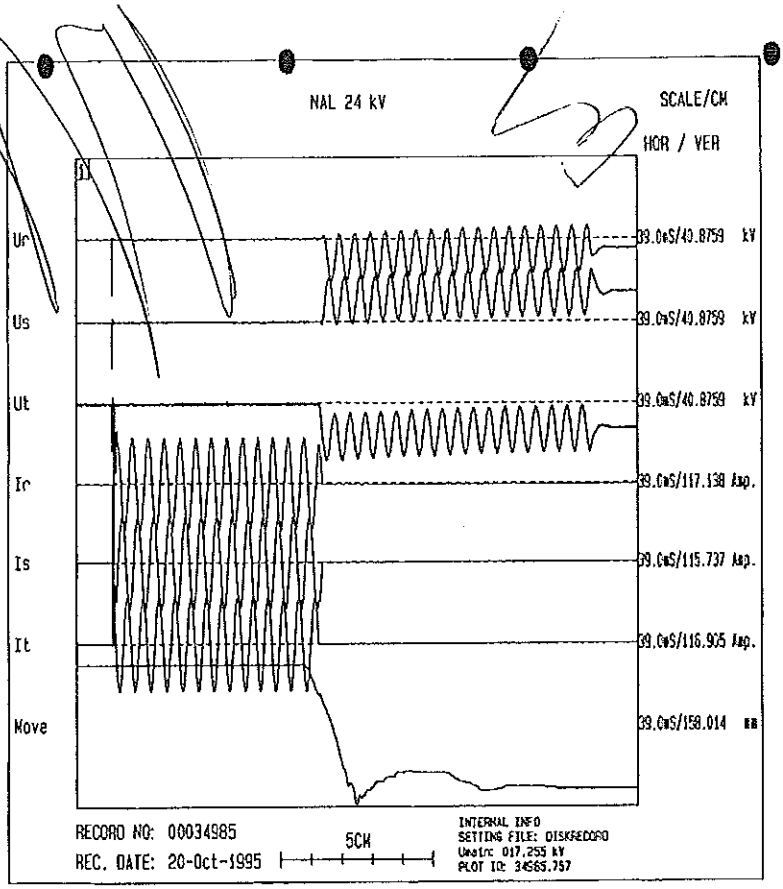
NEFI Kortslutningslaboratorium



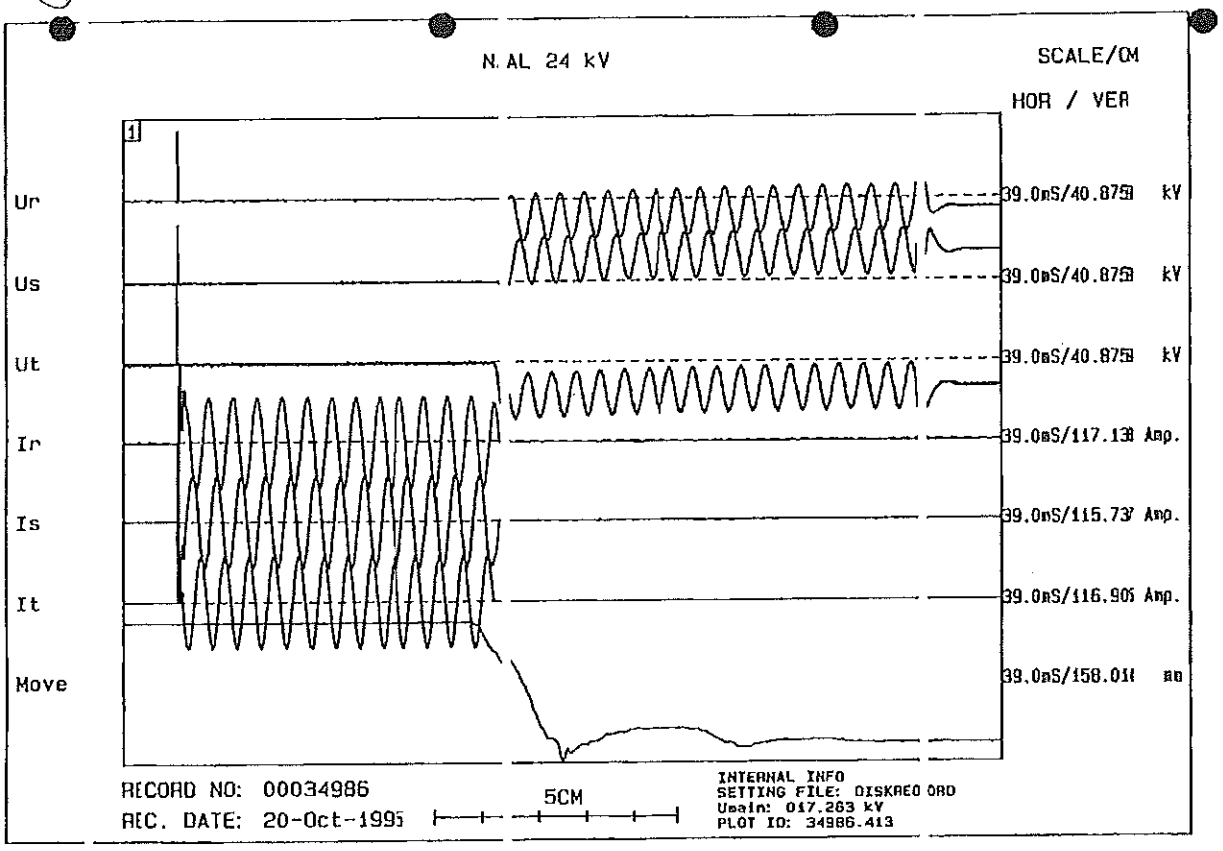
NEFI Kortslutningslaboratorium



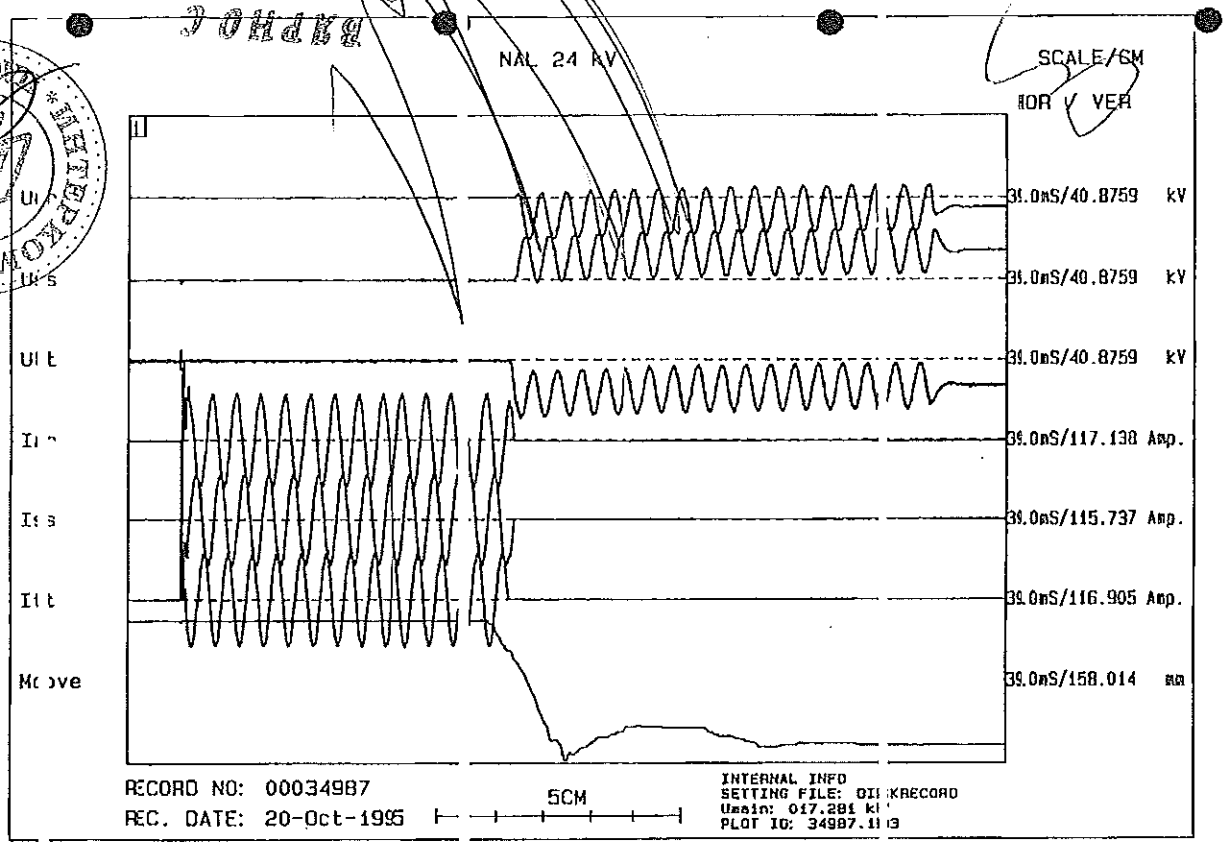
NEFI Kortslutningslaboratorium



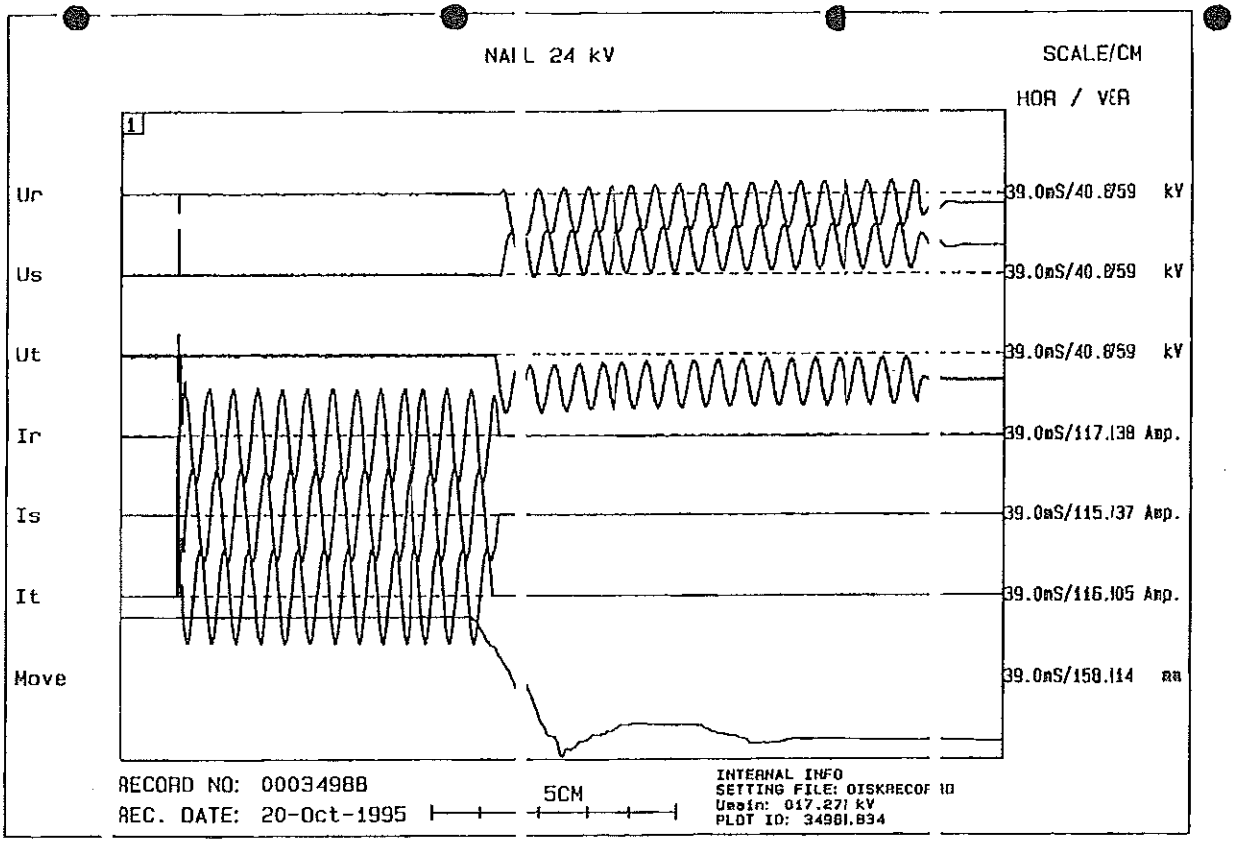
NEFI Kortslutningslaboratorium



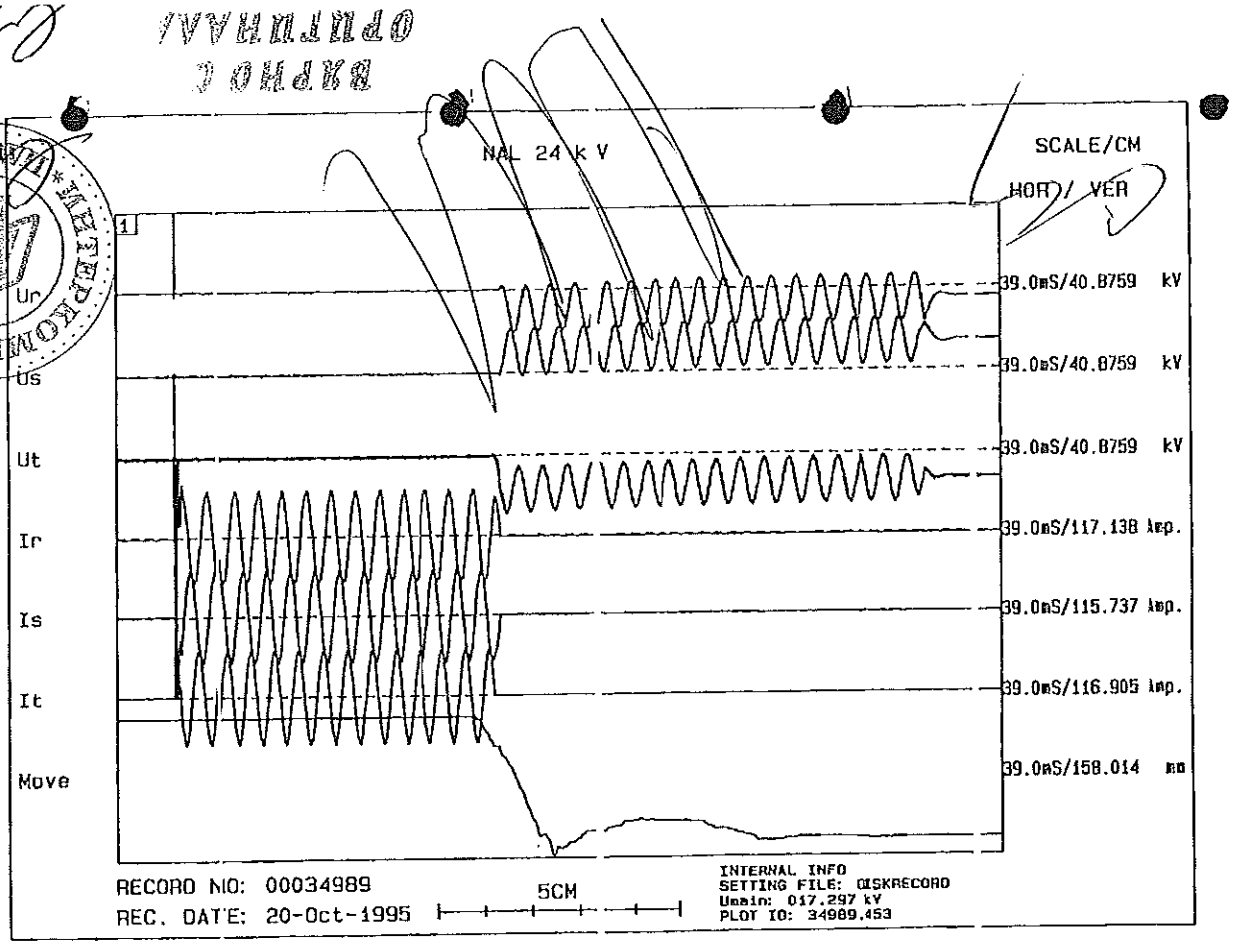
NEFI Kortslutningslaboratorium



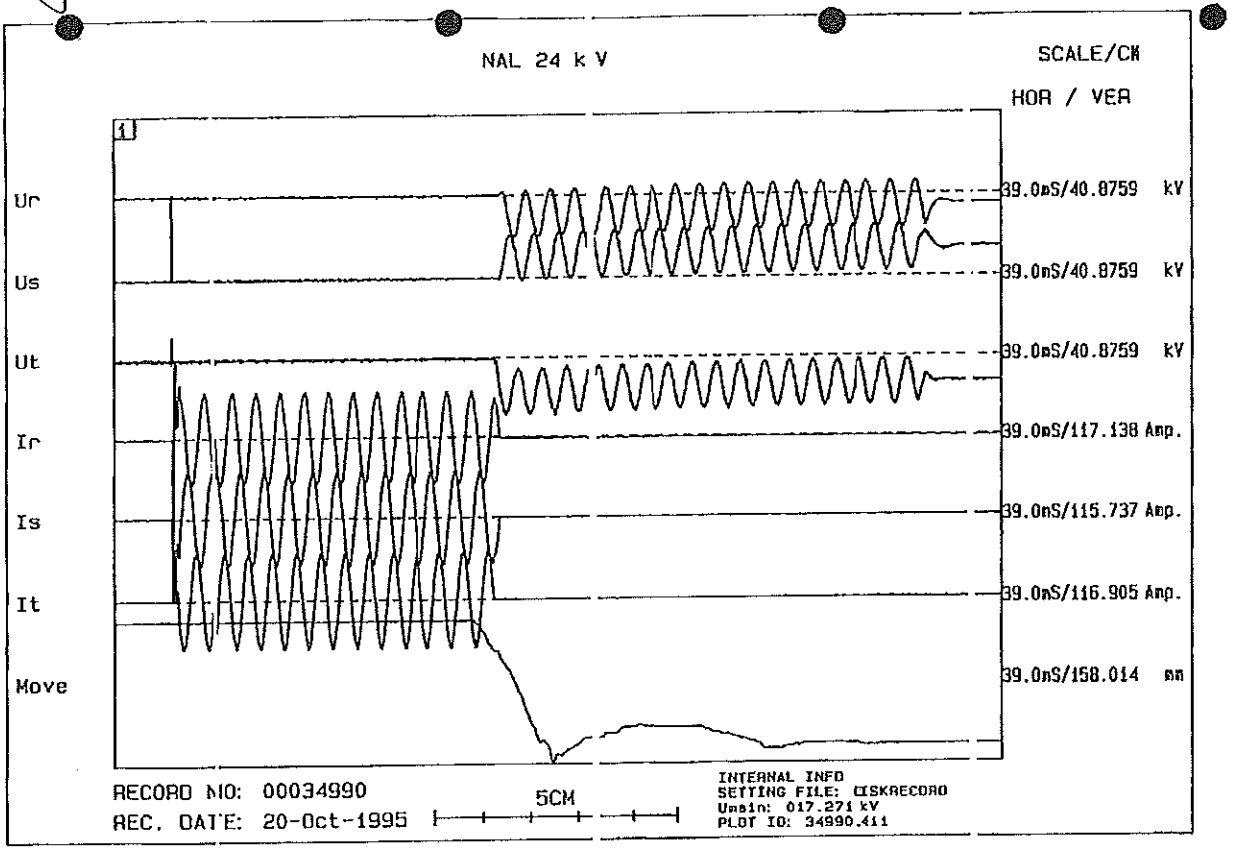
NEFI Kortslutningslaboratorium



NEFI Kortslutningslaboratorium

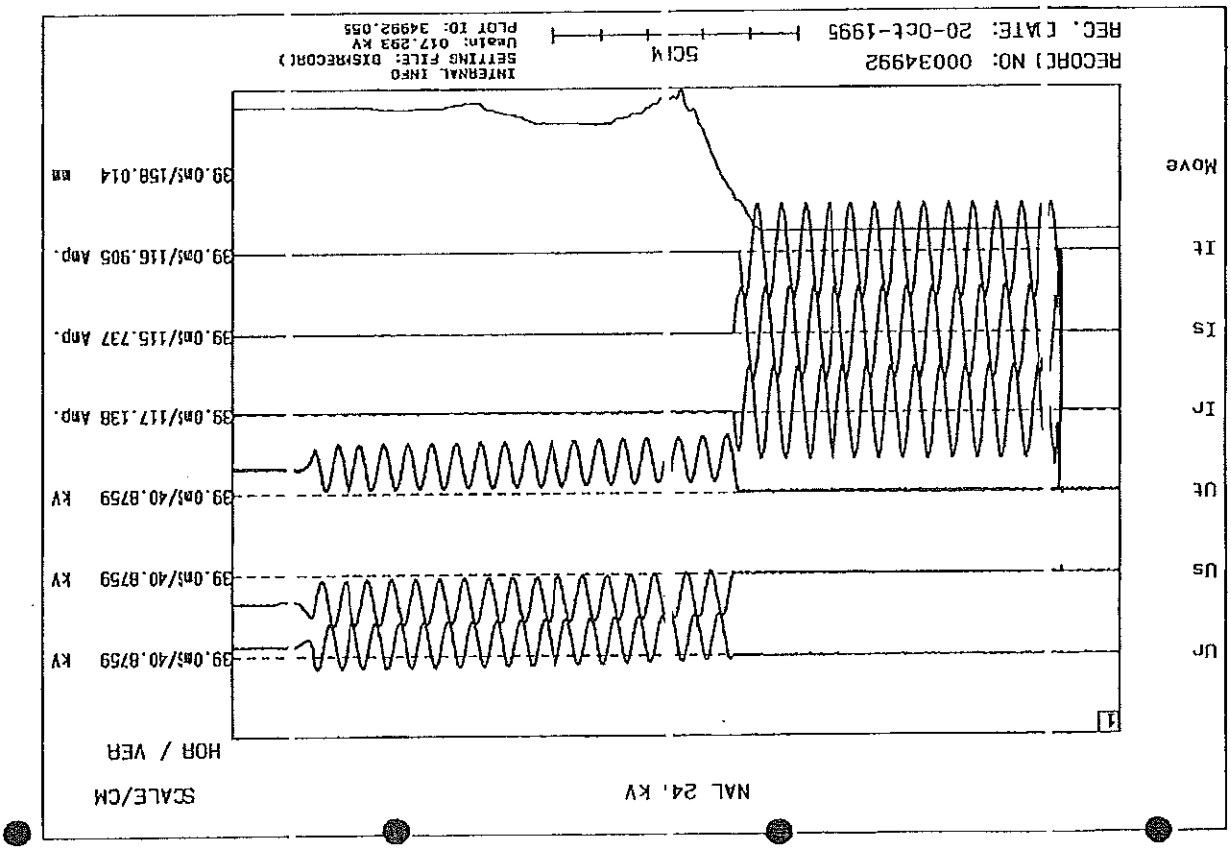


NEFI Kortslutningslaboratorium

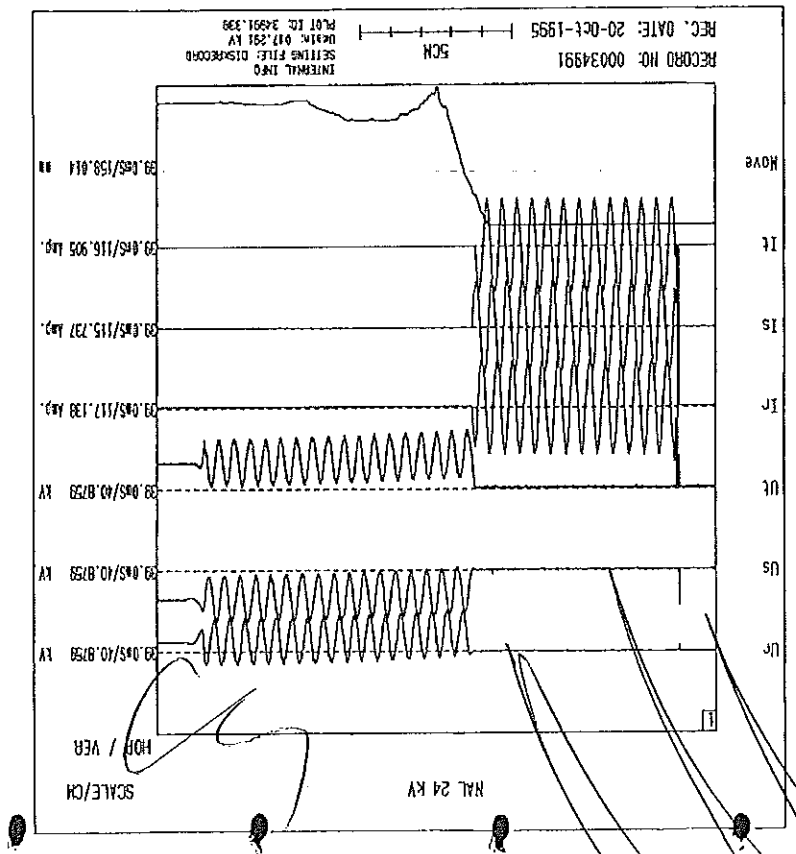


NEFI Kortslutningslaboratorium

NEFI Kortslutningslaboratorium

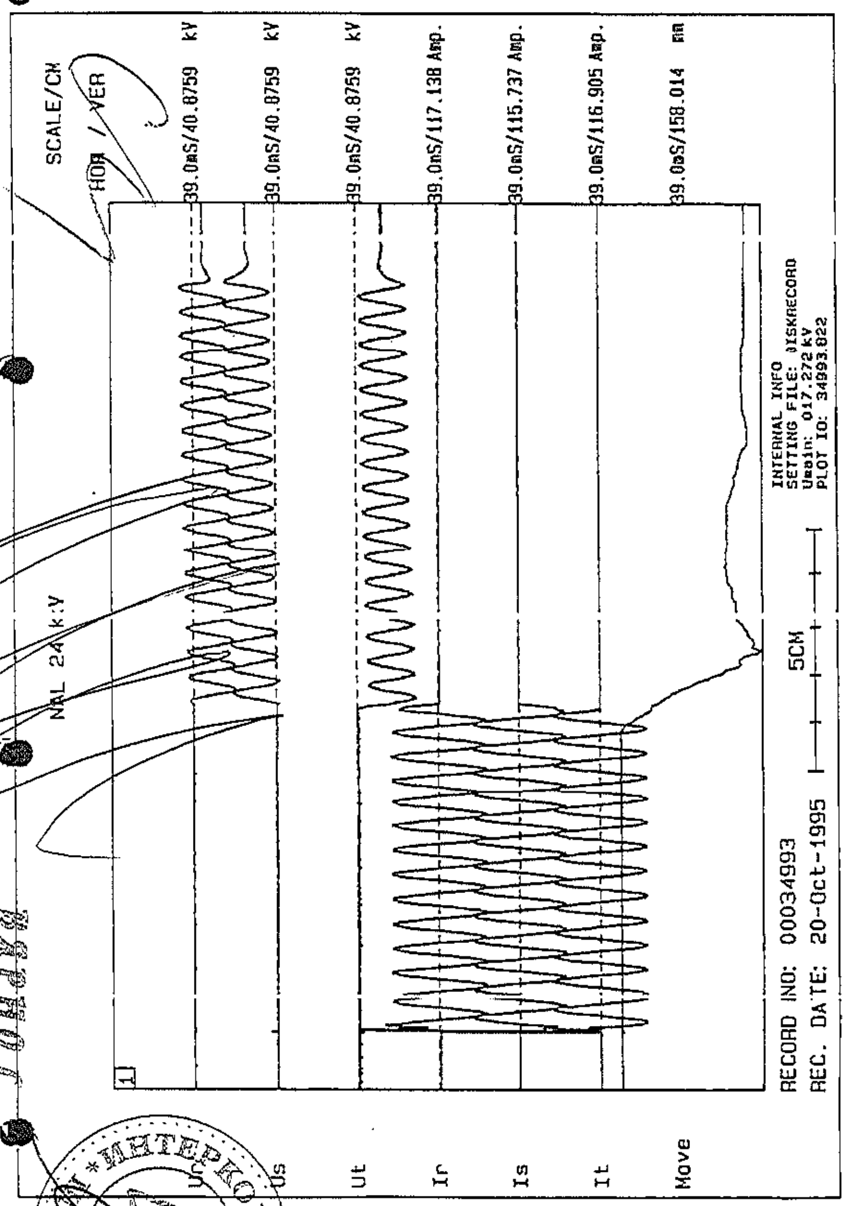


NEFI Kortslutningslaboratorium

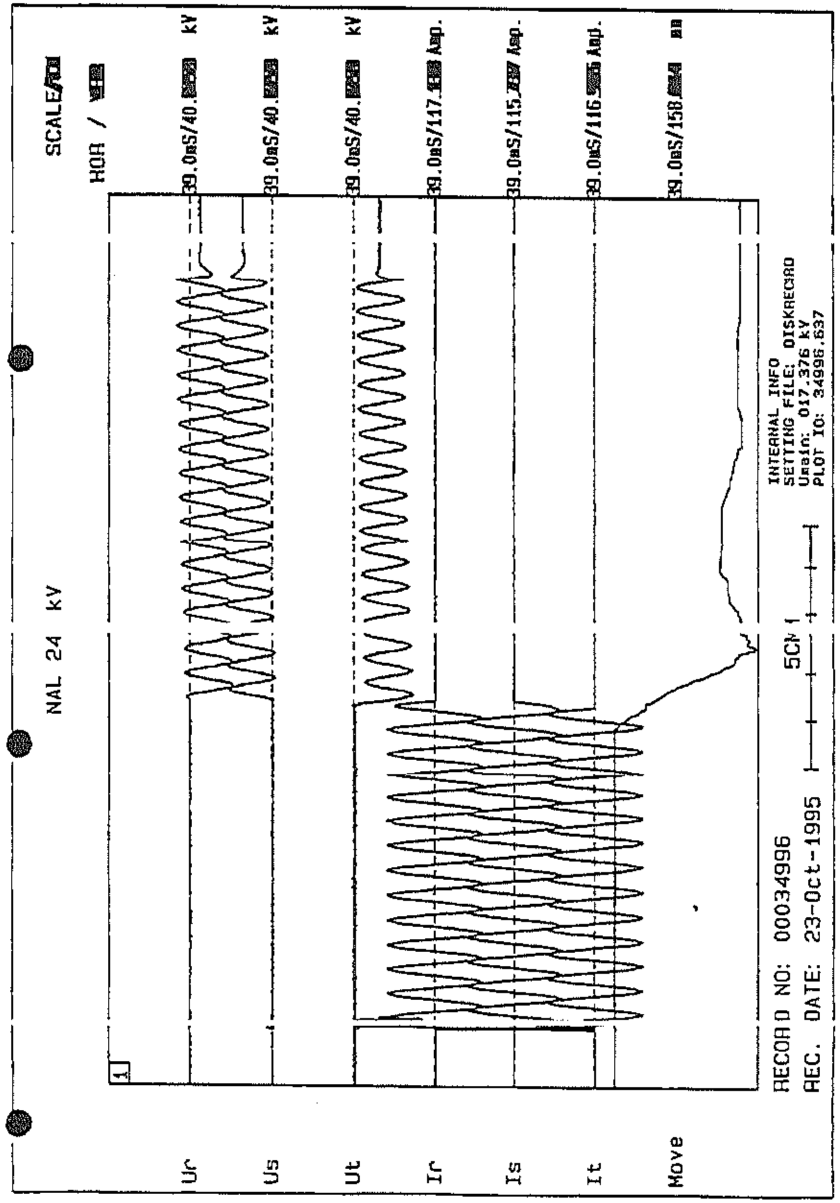


ВЯРНО С ОРИГИНАЛА

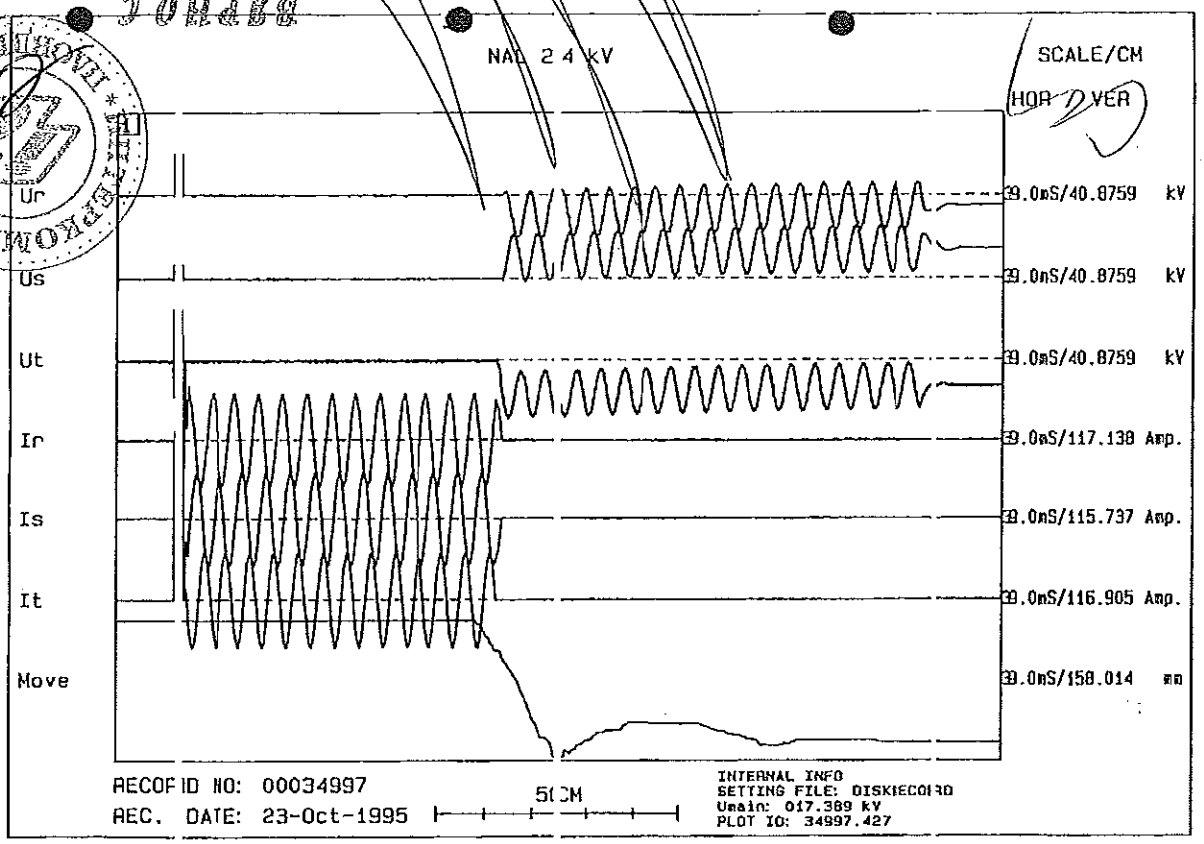
NEFI Kortslutningslaboratorium



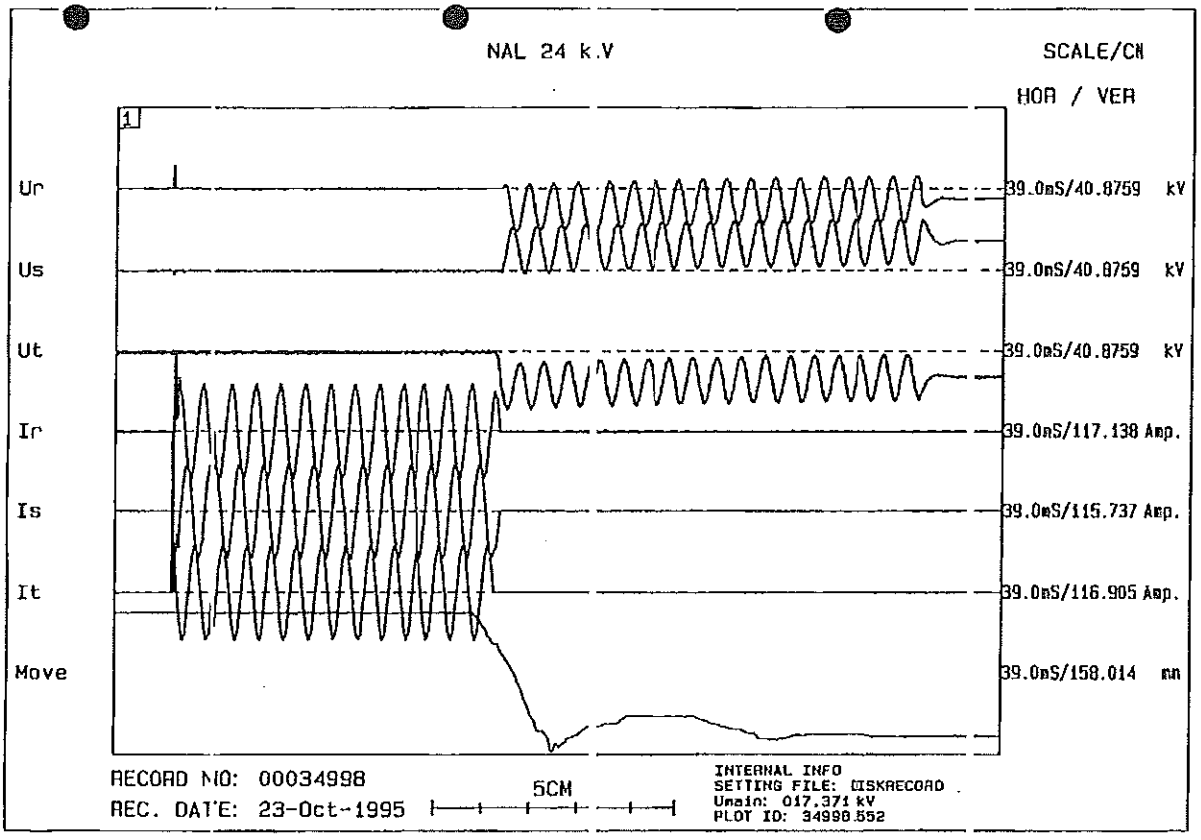
NEFI Kortslutningslaboratorium



ВЯРНО С ОРИГИНАЛА

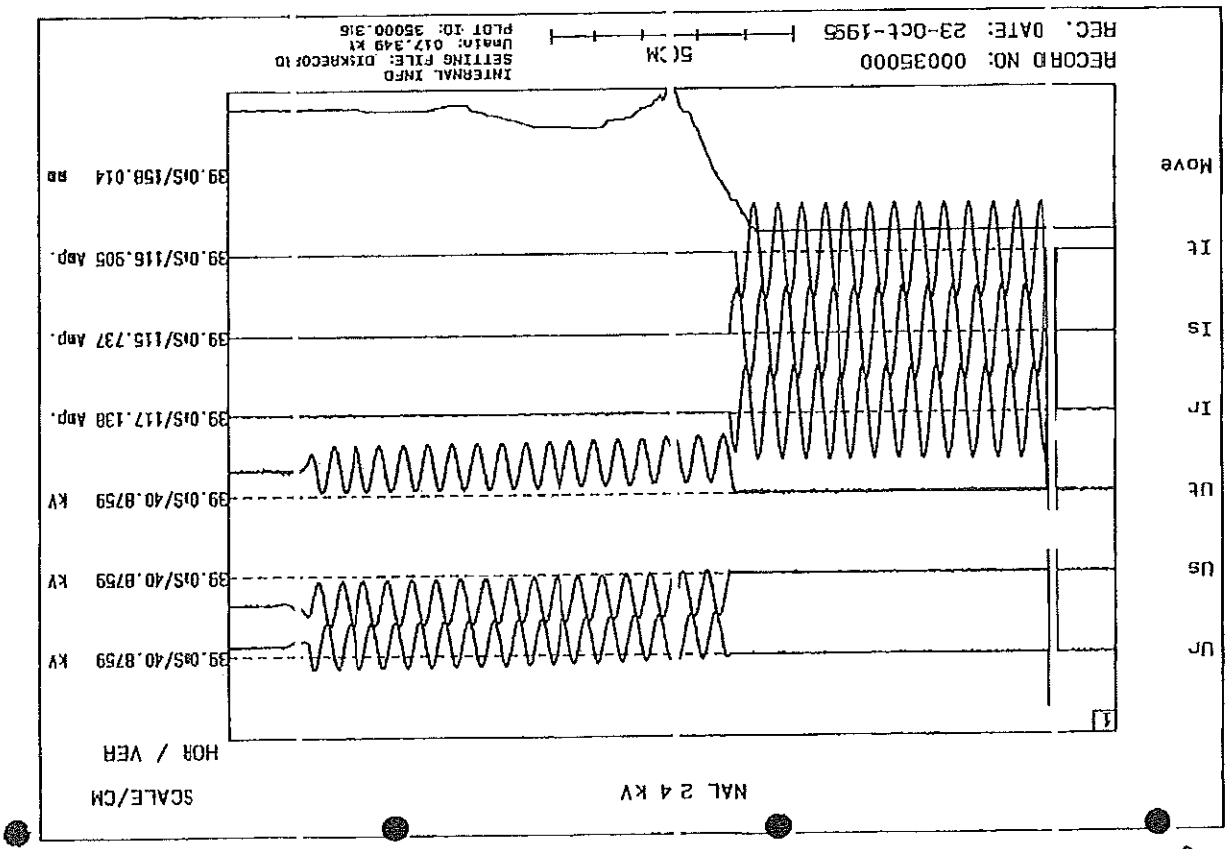


NEFI Kortslutningslaboratorium

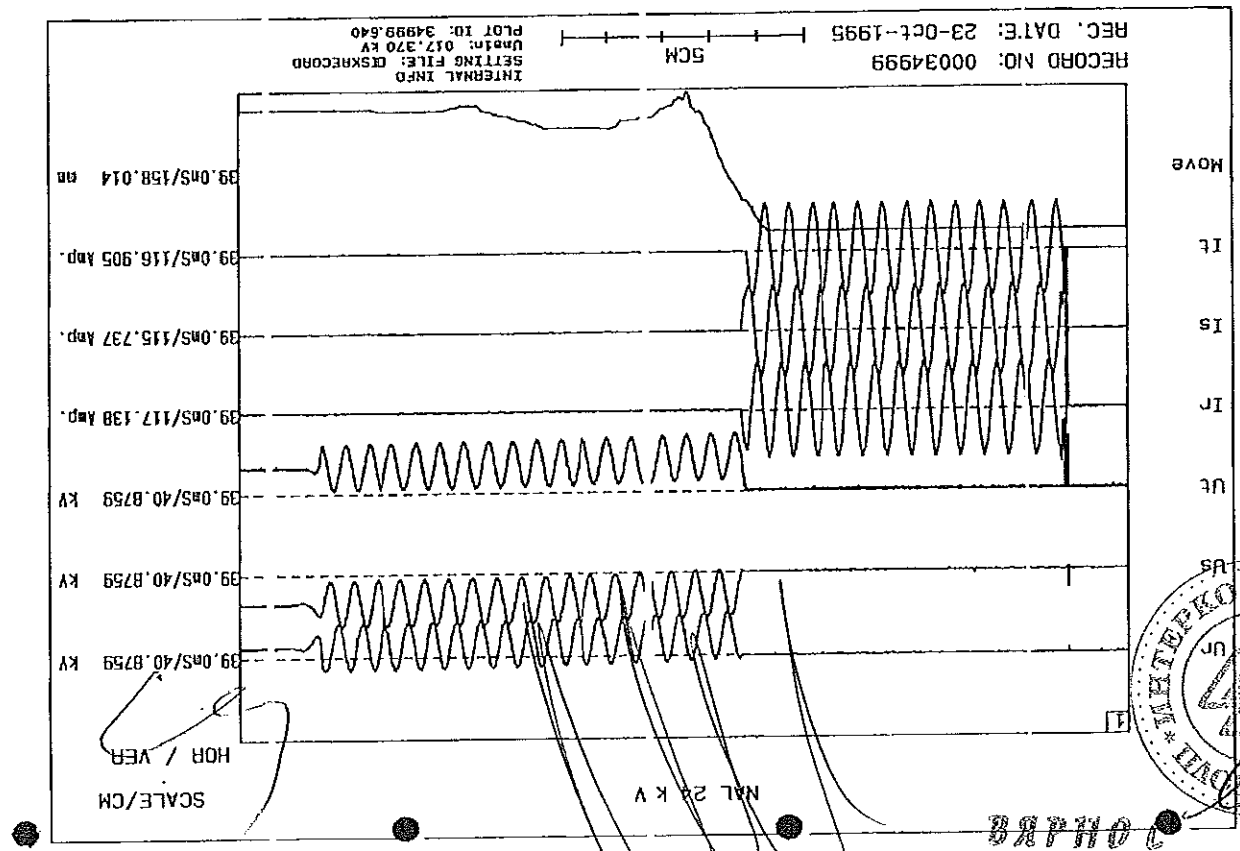


NEFI Kortslutningslaboratorium

NEF Kortslutningslaboratorium

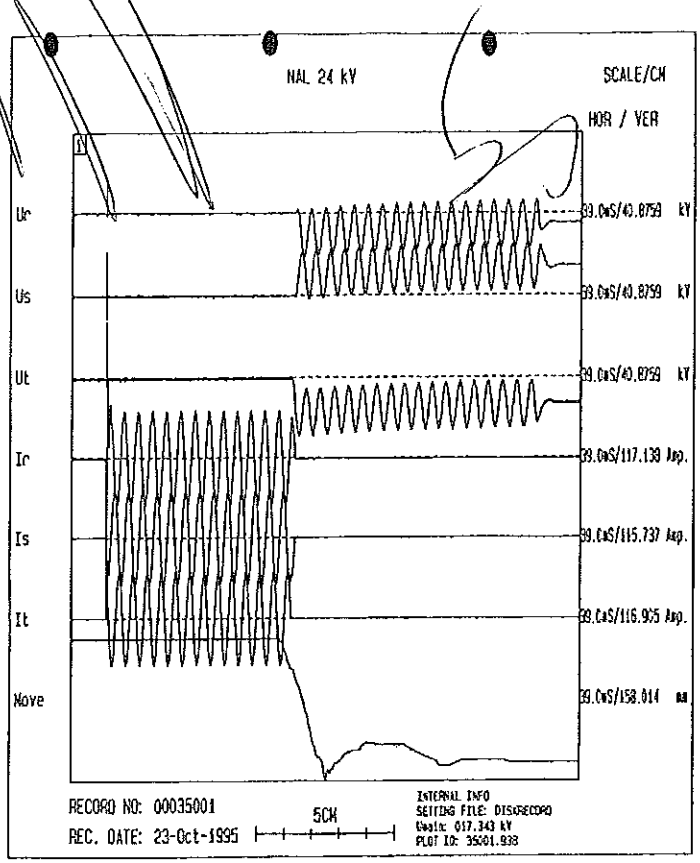


NEF Kortslutningslaboratorium

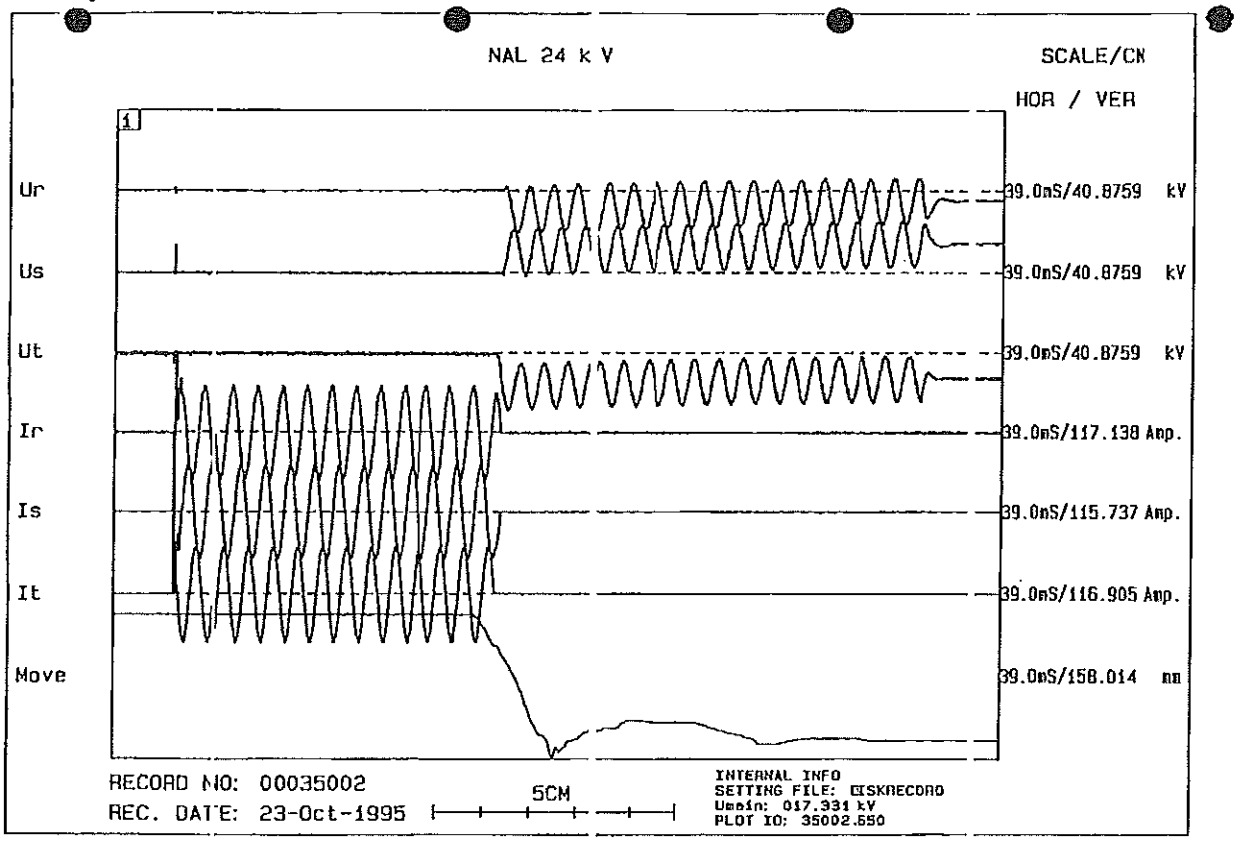


ВЯРНО С ОРИГИНАЛА

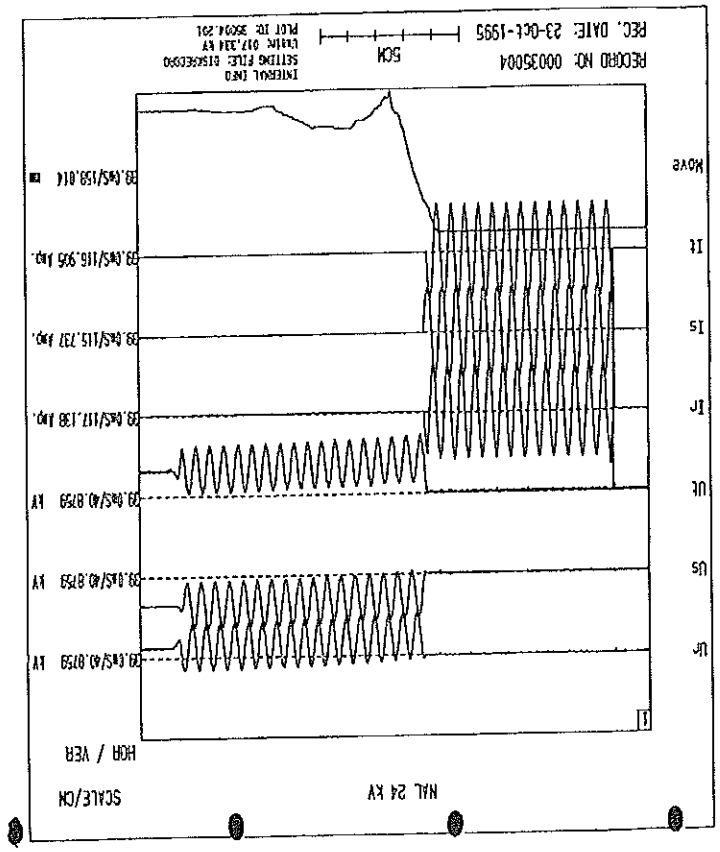
101

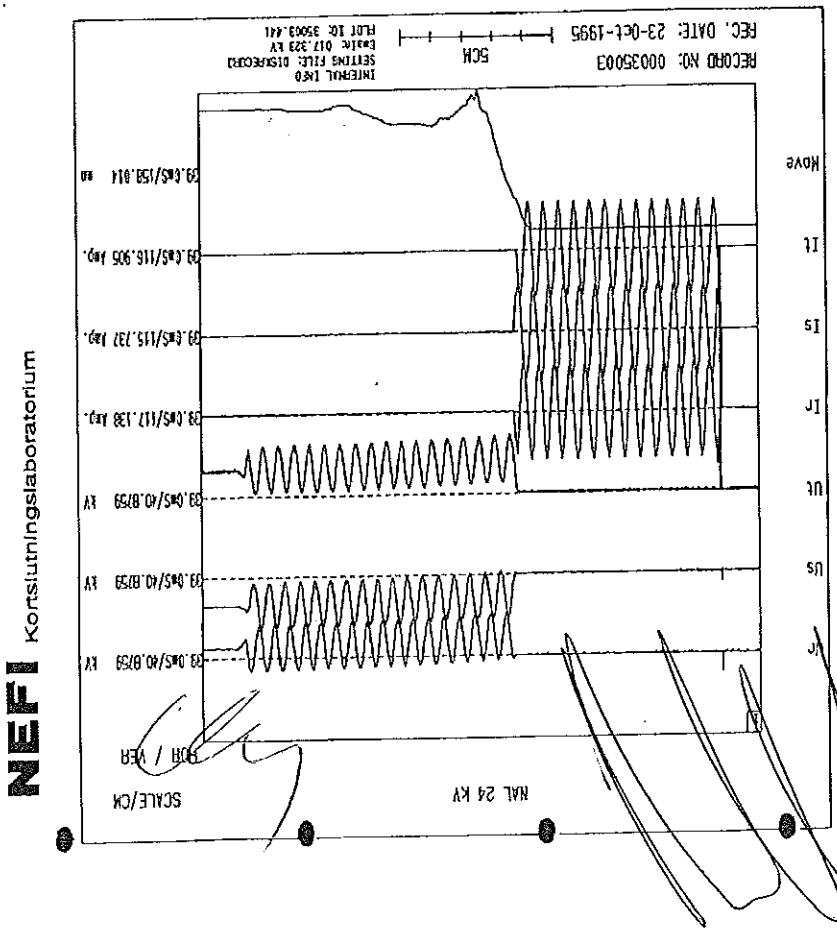


NEFI Kortslutningslaboratorium

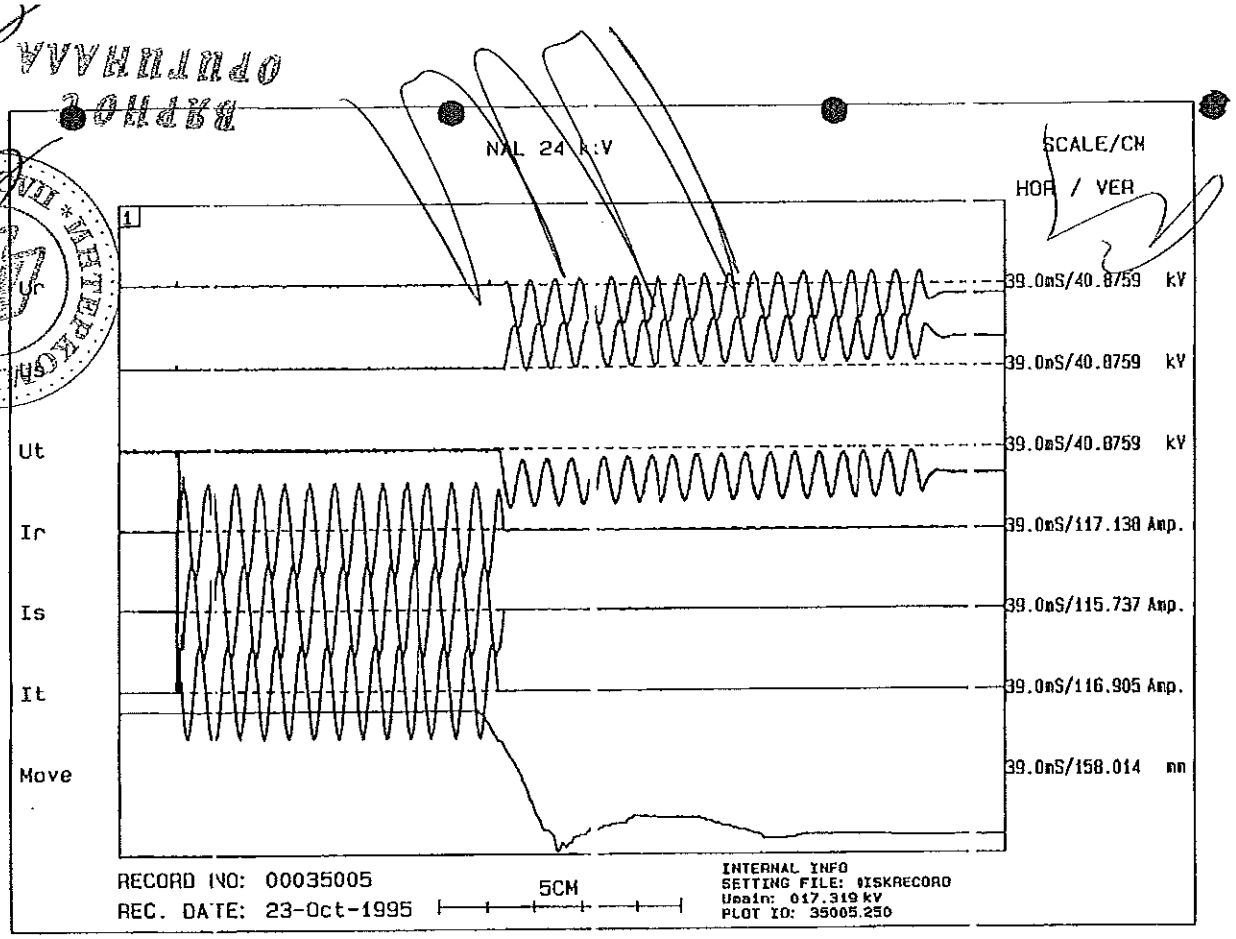


NEFI Kortslutningslaboratorium

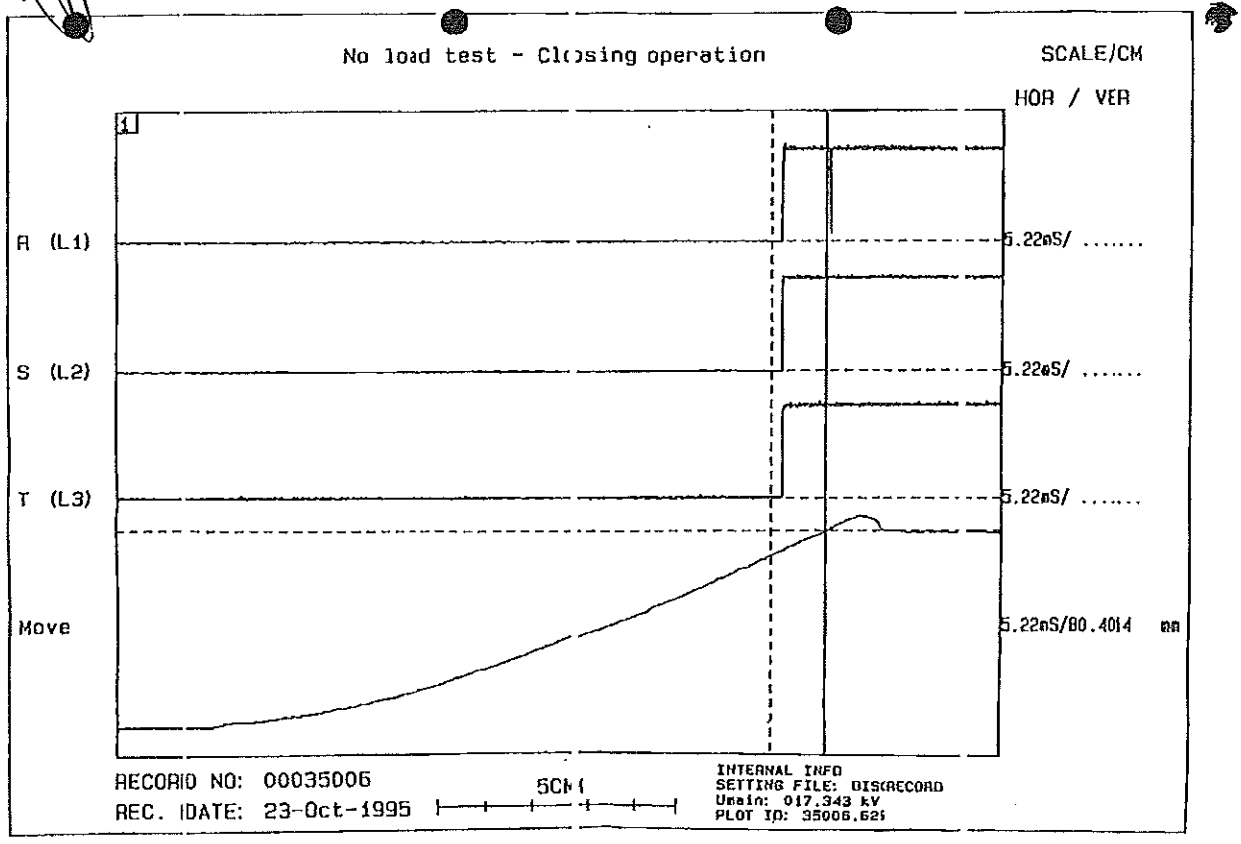




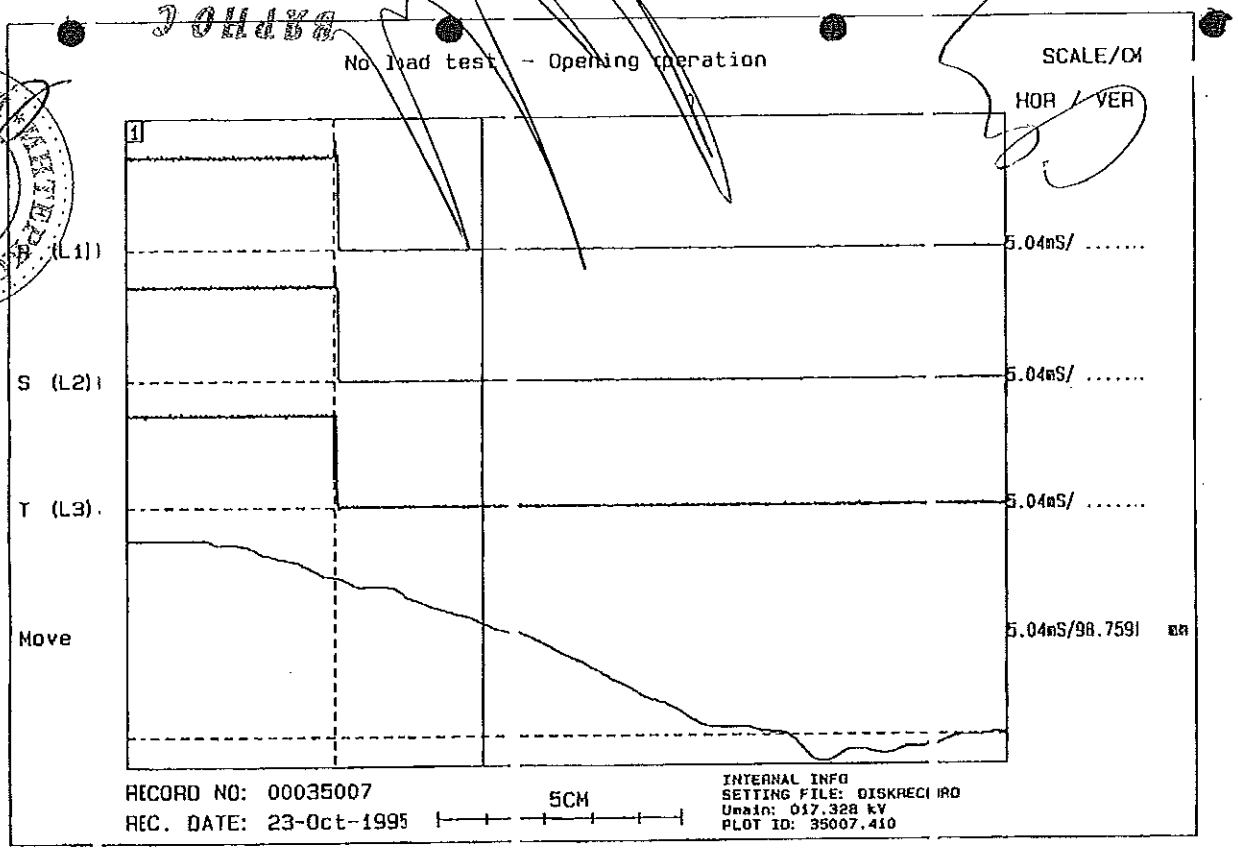
ВЯРНО С ОРИГИНАЛА



NEFI Kortslutningslaboratorium



NEFI Kortslutningslaboratorium



NEFI Kortslutningslaboratorium

SATS

Scandinavian Association for Testing Switchgear

c/o EFI - Norwegian Electric Power Research Institute
Sem Sælandsv. 11 7034 Trondheim NORWAY
Telephone: + 47-7-597200 Telex: 55 510 efi n Telefax: + 47-7-597250

REPORT OF PERFORMANCE No. 96-B04

TITLE:

Dielectric tests on high-voltage switch disconnector with integrated earthing switch type NALE 24 and switch-fuse combination type NALF 24.

Trondheim 1996-01-09
Place and Date

SATS Secretariat Approval

SATS Scandinavian Association for Testing Switchgear

c/o EFI – The Norwegian Research Institute of Electricity Supply
Sem Sælandsv. 11 7034 Trondheim–NTH NORWAY
Tel. (07)597200 Telex 55513 efi n

REPORT OF PERFORMANCE No. 96-B04

APPARATUS: High-voltage switch disconnector with integrated earthing switch and high-voltage switch-fuse combination
DESIGNATION: NALE 24 and NALF 24
MANUFACTURER: ABB Distribusjon AS, Skien, Norway
DATE(S) OF TESTS: 3. to 6. of November 1992

RATINGS ASSIGNED BY THE MANUFACTURER

Rated 1 min. power-frequency withstand voltage; (rms value):
50 kV to earth, between poles and across open switching device
60 kV across isolating distance

Rated lightning impulse withstand voltage; (peak value):
125 kV to earth, between poles and across open switching device
145 kV across isolating distance

THE TESTS HAVE BEEN MADE IN ACCORDANCE WITH
See page no. 5.

The performance of the apparatus tested and the observations made during the tests have been recorded in the tables with test results and oscillograms.

THE DOCUMENTS FORMING PART OF THIS REPORT ARE

Table with test results	Nos.:	Page No.: 7 to 14
Oscillogram	Nos.:	Page No.: 20
Drawing	Nos.:	Page No.: 15 to 19
Diagram	Nos.:	
Photograph	Nos.:	

Skien, 4. of January 1996
Place and Date

SATS Observer

Laboratory manager

Contents

1. Preface

The tests were witnessed by SATS observer, Mr. Arne Nesse, EFI (Norwegian Electric Power Research Institute).

Parts of the tests were also witnessed by:

Mr. Sten Thygesen, ABB Distribusjon, Skien, Norway

The tests have been performed at ABB Distribusjon AS, Electrotechnical and Mechanical Laboratory, Skien, Norway.

2. Test objects

- High-voltage switch disconnector type NAL 24.
- High-voltage earthing switch type E 24.
- High-voltage switch-fuse combination type NALF 24.

The high-voltage earthing switch type 24 was mounted on the lower side, (hinge side), of the high-voltage switch type NAL 24. The high-voltage earthing switch is then an integrated part of the high-voltage switch and in this combination called NALE 24.

The test objects were manufactured by ABB Distribusjon AS, Skien, Norway.

All fuses used during tests were manufactured by ABB Distribusjon AS, Skien, Norway.

3. Conclusion

The test objects passed the lighting impulse withstand voltage and the power-frequency withstand voltage tests successfully according to IEC Publication 265-1 (1983), IEC Publication 420 (1990-11), IEC Publication 60-1 (1989-11) and IEC Publication 694 (1980).

4. Dielectric tests

4.1 Test objects

- High-voltage switch disconnector (with earthing switch) type NALE 24, with type K-mechanism, serial no. 238222.
  High-voltage switch-fuse combination type NALF 24, equipped with fuses type CEF 24 kV, 40 A, serial no. 238221.

4.2 Lightning impulse withstand voltage tests

4.2.1 Publication

IEC Publication 265-1, Second edition 1983, IEC Publication 420, Second edition 1990-11, IEC Publication 60-1, Second edition 1989-11 and IEC Publication 694, First edition 1980, § 6.1.6. Lightning impulse voltage tests.

4.2.2 Test procedure

15 consecutive lightning impulses with both polarities applied on each configuration from 1 to 9, on all phases in succession.
Configuration no. is equal to test condition no. as given in table VIII,
IEC Publication 694 (1980).

4.2.3 Technical data of test equipment

Lightning impulse generator:
Voltage range: 0 - 400 kV
Max energy: 10 kJ

Wave form: 1,2/50 10^{-6} s.

4.2.4 Test result

The number of disruptive discharges on self-restoring insulation did not excees twa for each series of 15 impulses and no disruptive discharges on non-self-restoring insulation occured.
The test voltage was 125 kV to earth, between poles and across open switching device and 145 kV across isolating distance.
For detailed test results, ref. to page no. 7, 8, 9 and 11, 12 and 13.

4.3 Power frequency voltage tests

4.3.1 Publication

IEC Publication 265-1, Second edition 1983, IEC Publication 420, Second edition 1990-11, IEC Publication 60-1, Second edition 1989-11 and IEC Publication 694, First edition 1980, § 6.1.7. Power frequency voltage withstand tests.

4.3.2 Test procedure

Voltage applied on each configuration from 1 to 9, on all phases in succession.
Configuration no. is equal to test condition no. as given in table VIII,
IEC Publication 694 (1980).
Duration of each test was 1 minute.

4.3.3 Technical data of test equipment

Power frequency transformer, single phase:
Voltage range: 0 - 60 kV, 50 Hz
Output short-time: 50 kVA
Short-circuit current, load side: 1A

4.3.4 Test result

No disruptive discharges occurred, on the test.

The test voltage was 50 kV to earth, between poles and across open switching device, and 60 kV across the isolating distance.

For detailed test results, ref. to page no. 10 and 14.

LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 1 of 3
Test object : Switch-fuse com. NALF 24		Date: 05.11.92

Climatic conditions
Temperature: 22 °C
Humidity: 11 g/m³
Atmospheric pressure: 760 mm Hg

Applied correction factor: 0.994
Tank filling pressure :

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses		Wave-form T_r/T_n [µs]	Record no.	Remarks
				Total	No. of discharges			
1	L1	-	90	5	0	1.2 / 50		
1	L1	-	126	15	0	1.2 / 50		
1	L1	+	90	5	0	1.2 / 50		
1	L1	+	126.5	15	0	1.2 / 50		
2	L2	-	90	5	0	1.2 / 50		
2	L2	-	126	15	0	1.2 / 50		
2	L2	+	90	5	0	1.2 / 50		
2	L2	+	126	15	0	1.2 / 50		
3	L3	-	90	5	0	1.2 / 50		
3	L3	-	126	15	0	1.2 / 50		
3	L3	+	90	5	0	1.2 / 50		
3	L3	+	126	15	1	1.2 / 50		
4	L1	-	90	5	0	1.2 / 50		
4	L1	-	126	15	0	1.2 / 50		
4	L1	+	90	5	0	1.2 / 50		
4	L1	+	126	15	0	1.2 / 50		
5	L2	-	90	5	0	1.2 / 50		
5	L2	-	126	15	0	1.2 / 50		
5	L2	+	90	5	0	1.2 / 50		
5	L2	+	126	15	1	1.2 / 50		
6	L3	-	90	5	0	1.2 / 50		
6	L3	-	126	15	0	1.2 / 50		
6	L3	+	90	5	0	1.2 / 50		
6	L3	+	126	15	0	1.2 / 50		

Notes:

LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 2 of 3
Test object : Switch-fuse comb. NALF 24		Date: 05.11.92

Climatic conditions
Temperature: 22 °C
Humidity: 11 g/m³
Atmospheric pressure: 760 mm Hg

Applied correction factor: 0.994
Tank filling pressure :

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses		Wave-form T_r/T_n [µs]	Record no.	Remarks
				Total	No. of discharges			
7	L1	-	90	5	0	1.2 / 50		
7	L1	-	126	15	0	1.2 / 50		
7	L1	+	90	5	0	1.2 / 50		
7	L1	+	126	15	0	1.2 / 50		
8	L2	-	90	5	0	1.2 / 50		
8	L2	-	126	15	0	1.2 / 50		
8	L2	+	90	5	0	1.2 / 50		
8	L2	+	126	15	0	1.2 / 50		
9	L3	-	90	5	0	1.2 / 50		
9	L3	-	126	15	0	1.2 / 50		
9	L3	+	90	5	0	1.2 / 50		
9	L3	+	126	15	0	1.2 / 50		

Notes:

LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 3 of 3
Test object : Switch-fuse comb. NALF 24		Date: 06.11.92

Climatic conditions
Temperature: 21.5 °C
Humidity: 11 g/m³
Atmospheric pressure: 754 mm Hg

Applied correction factor: 0.988
Tank filling pressure :

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses		Wave-form T_f/T_h [µs]	Record no.	Remarks
				Total	No. of discharges			
4*	L1	-	112	5	0	1.2 / 50		
4*	L1	-	146	15	0	1.2 / 50		
4*	L1	+	111	5	0	1.2 / 50		
4*	L1	+	146	15	0	1.2 / 50		
5*	L2	-	111	5	0	1.2 / 50		
5*	L2	-	146	15	0	1.2 / 50		
5*	L2	+	111	5	0	1.2 / 50		
5*	L2	+	146	15	0	1.2 / 50		
6*	L3	-	111	5	0	1.2 / 50		
6*	L3	-	146	15	0	1.2 / 50		
6*	L3	+	111	5	0	1.2 / 50		
6*	L3	+	146	15	0	1.2 / 50		
7*	L1	-	111	5	0	1.2 / 50		
7*	L1	-	146	15	0	1.2 / 50		
7*	L1	+	111	5	0	1.2 / 50		
7*	L1	+	146	15	0	1.2 / 50		
8*	L2	-	111	5	0	1.2 / 50		
8*	L2	-	146	15	0	1.2 / 50		
8*	L2	+	111	5	0	1.2 / 50		
8*	L2	+	146	15	0	1.2 / 50		
9*	L3	-	111	5	0	1.2 / 50		
9*	L3	-	146	15	0	1.2 / 50		
9*	L3	+	111	5	0	1.2 / 50		
9*	L3	+	145	15	0	1.2 / 50		

Notes:
Ref. to note table VIII, IEC Publication 694 (1980). The base F and the terminals of the switching device except the terminal opposite the energized terminals were insulated from earth.

POWER FREQUENCY VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 1 of 1
Test object : Switch-fuse comb. NALF 24		Date: 05.11.92

Climatic conditions
Temperature: 22 °C
Humidity: 11 g/m³
Atmospheric pressure: 760 mm Hg

Applied correction factor: 0.994
Tank filling pressure :

Configuration	Phase (s)	Freq. [Hz]	Voltage [kV]	Duration [min]	Disruptive discharge after time [min:sec]	Remarks
1	L1	50	50	1	-	
2	L2	50	50	1	-	
3	L3	50	50	1	-	
					-	
7	L1	50	50	1	-	
8	L2	50	50	1	-	
9	L3	50	50	1	-	
					-	
4	L1	50	50	1	-	
5	L2	50	50	1	-	
6	L3	50	50	1	-	
					-	
4*	L1	50	60	1	-	
5*	L2	50	60	1	-	
6*	L3	50	60	1	-	
					-	
7*	L1	50	60	1	-	
8*	L2	50	60	1	-	
9*	L3	50	60	1	-	

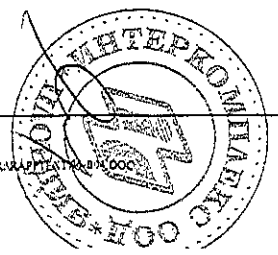
Notes:
Ref. to note table VIII, IEC Publication 694 (1980). The base F and the terminals of the switching device except the terminal opposite the energized terminals were insulated from earth.

LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 1 of 3
Test object : NALE 24		Date: 03.11.92
Climatic conditions Temperature: 21 °C Humidity: 11 g/m³ Atmospheric pressure: 735 mm Hg		Applied correction factor: 0.965 Tank filling pressure :

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses: Total	No. of impulses: No. of discharges	Wave-form T_r/T_n [µs]	Record no.	Remarks
1	L1	-	90	5	0	1.2 / 50		
1	L1	-	126	15	0	1.2 / 50		
1	L1	+	90	5	0	1.2 / 50		
1	L1	+	126	15	0	1.2 / 50		
2	L2	-	90	5	0	1.2 / 50		
2	L2	-	125	15	0	1.2 / 50		
2	L2	+	90	5	0	1.2 / 50		
2	L2	+	126	15	0	1.2 / 50		
3	L3	-	90	5	0	1.2 / 50		
3	L3	-	126	15	0	1.2 / 50		
3	L3	+	90	5	0	1.2 / 50		
3	L1	+	126	15	0	1.2 / 50		
4	L1	-	90	5	0	1.2 / 50		
4	L1	-	126	15	0	1.2 / 50		
4	L1	+	90	5	0	1.2 / 50		
4	L1	+	126	15	0	1.2 / 50		
5	L2	-	90	5	0	1.2 / 50		
5	L2	-	126	15	0	1.2 / 50		
5	L2	+	90	5	0	1.2 / 50		
5	L2	+	126	15	0	1.2 / 50		
6	L3	-	90	5	0	1.2 / 50		
6	L3	-	126	15	0	1.2 / 50		
6	L3	+	90	5	0	1.2 / 50		
6	L3	+	125	15	0	1.2 / 50		

Notes:



LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 2 of 3
Test object : NALE 24		Date: 03.11.92
Climatic conditions Temperature: 21 °C Humidity: 11 g/m³ Atmospheric pressure: 735 mm Hg		Applied correction factor: 0.965 Tank filling pressure :

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses: Total	No. of impulses: No. of discharges	Wave-form T_r/T_n [µs]	Record no.	Remarks
7	L1	-	90	5	0	1.2 / 50		
7	L1	-	126	15	0	1.2 / 50		
7	L1	+	90	5	0	1.2 / 50		
7	L1	+	126	15	0	1.2 / 50		
8	L2	-	90	5	0	1.2 / 50		
8	L2	-	126	15	0	1.2 / 50		
8	L2	+	90	5	0	1.2 / 50		
8	L2	+	126	15	0	1.2 / 50		
9	L3	-	90	5	0	1.2 / 50		
9	L3	-	126	15	0	1.2 / 50		
9	L3	+	90	5	0	1.2 / 50		
9	L3	+	126	15	0	1.2 / 50		

Notes:

LIGHTNING IMPULSE VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 3 of 3
Test object : NALE 24		Date: 03.11.92
Climatic conditions		Applied correction factor: 0.965
Temperature: 21 °C		Tank filling pressure :
Humidity: 11 g/m³		
Atmospheric pressure: 735 mm Hg		

Configuration	Phase(s)	Polarity +/-	Minimum applied Voltage U [kV]	No. of impulses		Wave-form T_r/T_h [µs]	Record no.	Remarks
				Total	No. of discharges			
4*	L1	-	110	5	0	1.2 / 50		
4*	L1	-	146	15	0	1.2 / 50		
4*	L1	+	110	5	0	1.2 / 50		
4*	L1	+	145.5	15	0	1.2 / 50		
5*	L2	-	110	5	0	1.2 / 50		
5*	L2	-	146	15	0	1.2 / 50		
5*	L2	+	110	5	0	1.2 / 50		
5*	L2	+	145.5	15	0	1.2 / 50		
6*	L3	-	110	5	0	1.2 / 50		
6*	L3	-	146	15	0	1.2 / 50		
6*	L3	+	110	5	0	1.2 / 50		
6*	L3	+	145.5	15	0	1.2 / 50		
7*	L1	-	110	5	0	1.2 / 50		
7*	L1	-	146	15	0	1.2 / 50		
7*	L1	+	110	5	0	1.2 / 50		
7*	L1	+	146	15	1	1.2 / 50		
8*	L2	-	110	5	0	1.2 / 50		
8*	L2	-	146	1	0	1.2 / 50		
8*	L2	+	110	5	0	1.2 / 50		
8*	L2	+	145.3	15	1	1.2 / 50		
9*	L3	-	112	5	0	1.2 / 50		
9*	L3	-	148	15	0	1.2 / 50		
9*	L3	+	110	5	0	1.2 / 50		
9*	L3	+	146	15	0	1.2 / 50		
9*	L3	+	145.2	15	0	1.2 / 50		

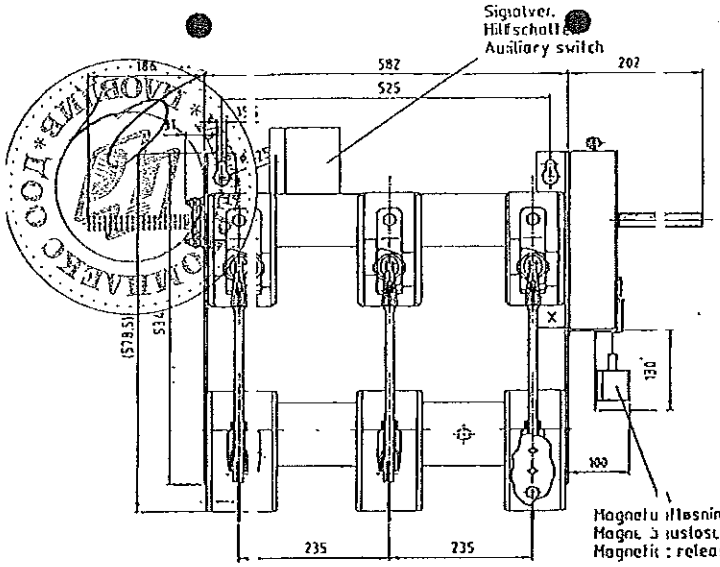
Notes:
Ref. to note table VIII, IEC Publication 694 (1980). The base F and the terminals of the switching device except the terminal opposite the energized terminals were insulated from earth.

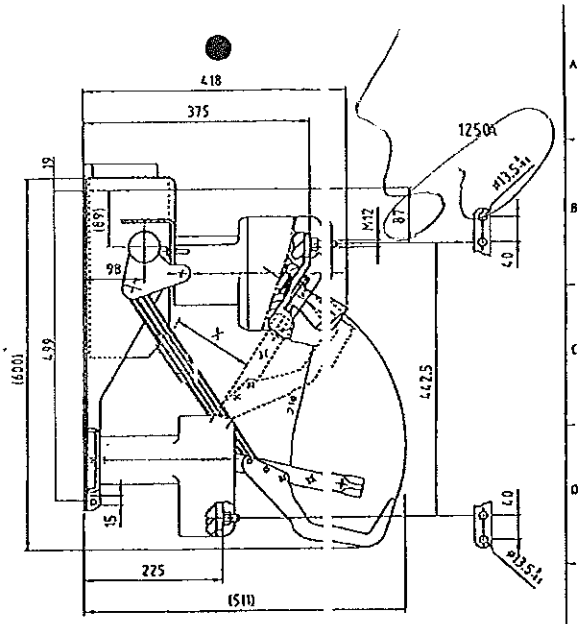
POWER FREQUENCY VOLTAGE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B04	Test no.:	Sheet no.: 1 of 1
Test object : NALE 24		Date: 05.11.92
Climatic conditions		Applied correction factor: 0.965
Temperature: 21 °C		Tank filling pressure :
Humidity: 11 g/m³		
Atmospheric pressure: 735 mm Hg		

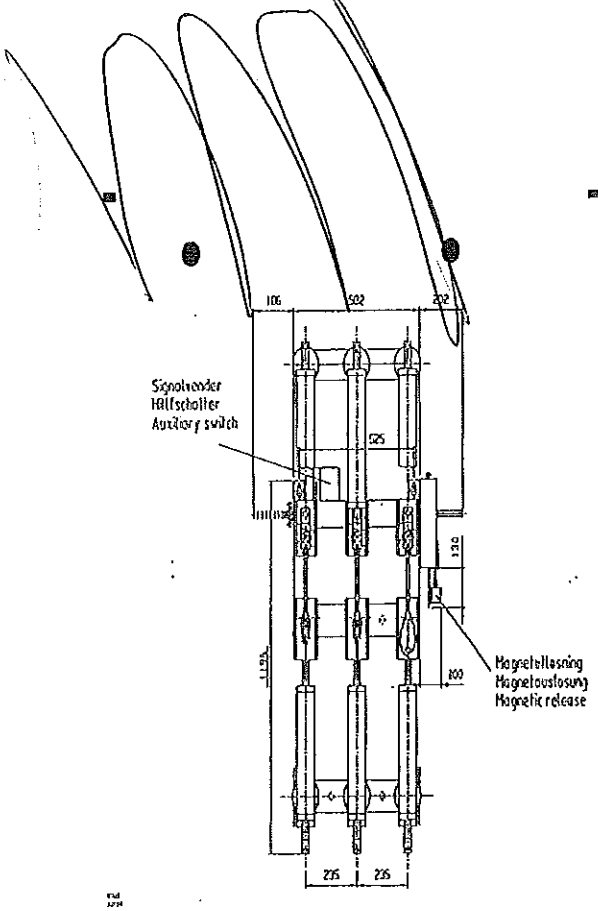
Configuration	Phase (s)	Freq. [Hz]	Voltage [kV]	Duration [min]	Disruptive discharge after time [min:sec]	Remarks
1	L1	50	60	1	-	
2	L2	50	60	1	-	
3	L3	50	60	1	-	
7	L1	50	60	1	-	
8	L2	50	60	1	-	
9	L3	50	60	1	-	
4	L1	50	60	1	-	
5	L2	50	60	1	-	
6	L3	50	60	1	-	
4*	L1	50	60	1	-	
5*	L2	50	60	1	-	
6*	L3	50	60	1	-	
7*	L1	50	60	1	-	
8*	L2	50	60	1	-	
9*	L3	50	60	1	-	

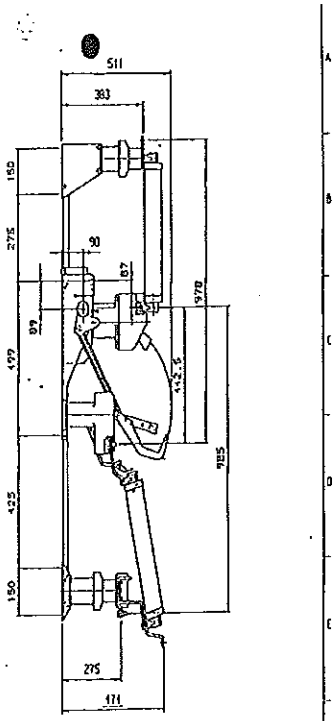
Notes:
Ref. to note table VIII, IEC Publication 694 (1980). The base F and the terminals of the switching device except the terminal opposite the energized terminals were insulated from earth.



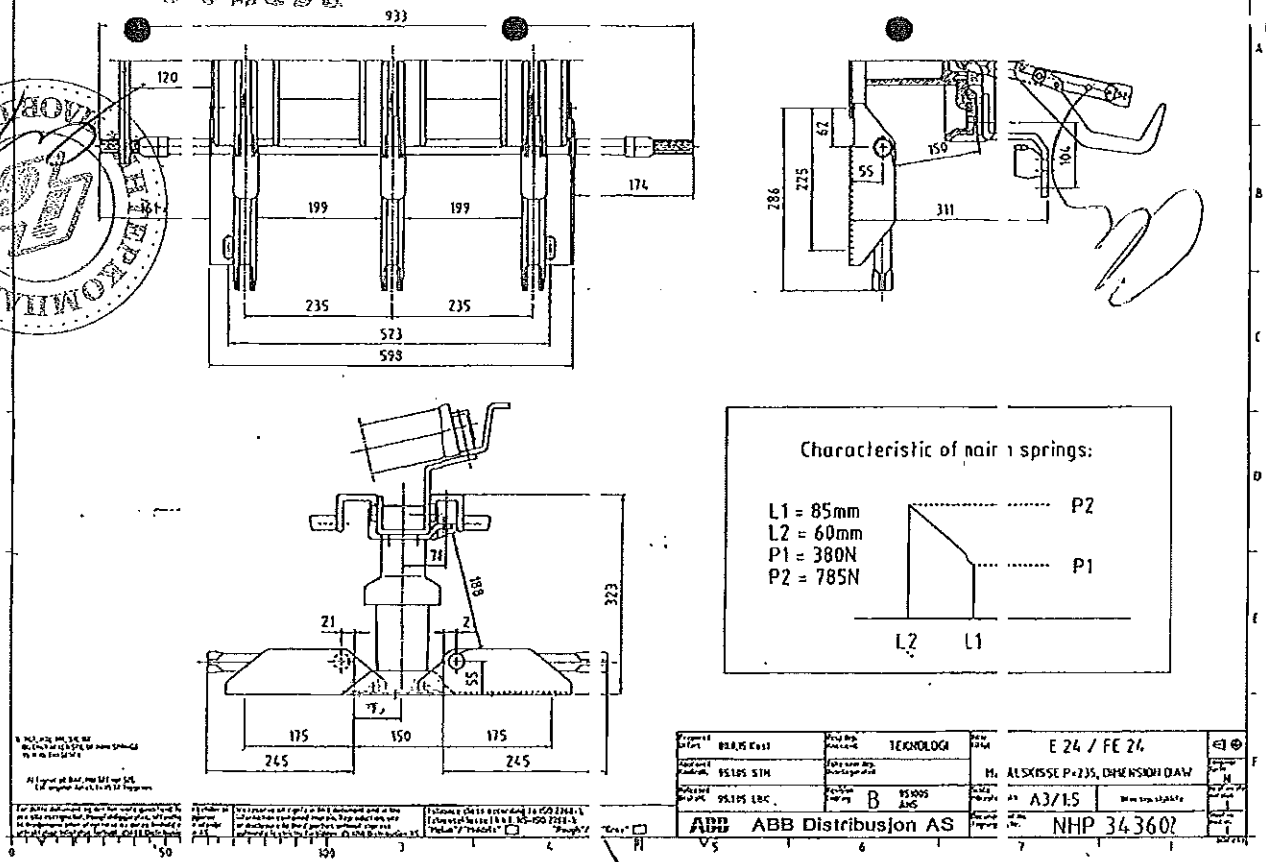


	TEKNOLOGI		NAL 24KV
			HALSKISSE P=235
			A3/1:5
ABB	ABB Distribusjon AS		NHP 343378

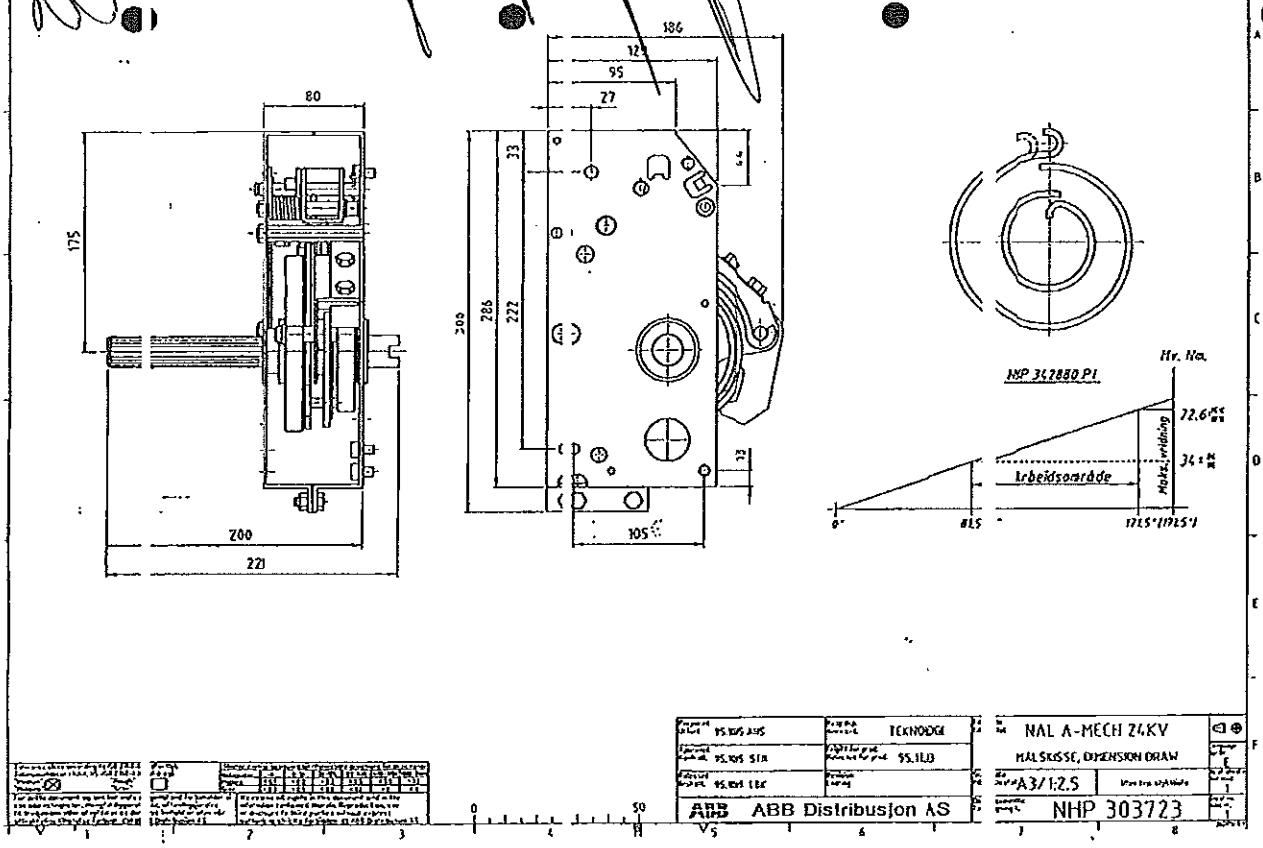




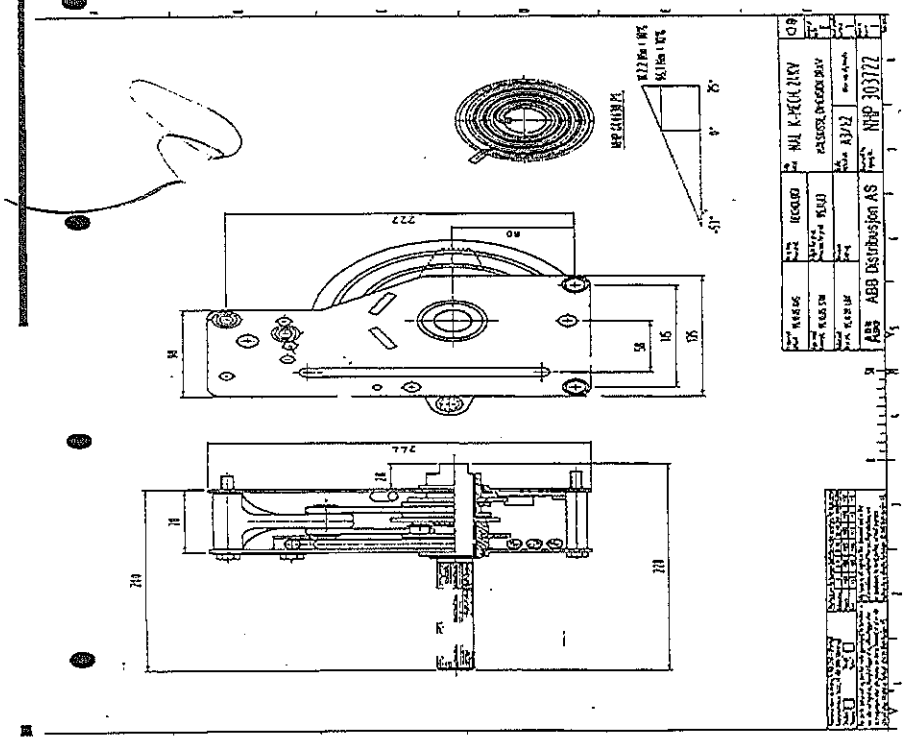
	Teknologi		NALF 24KV P=235
			1/10
ABB	ABB Distribusjon AS		NHP 343379

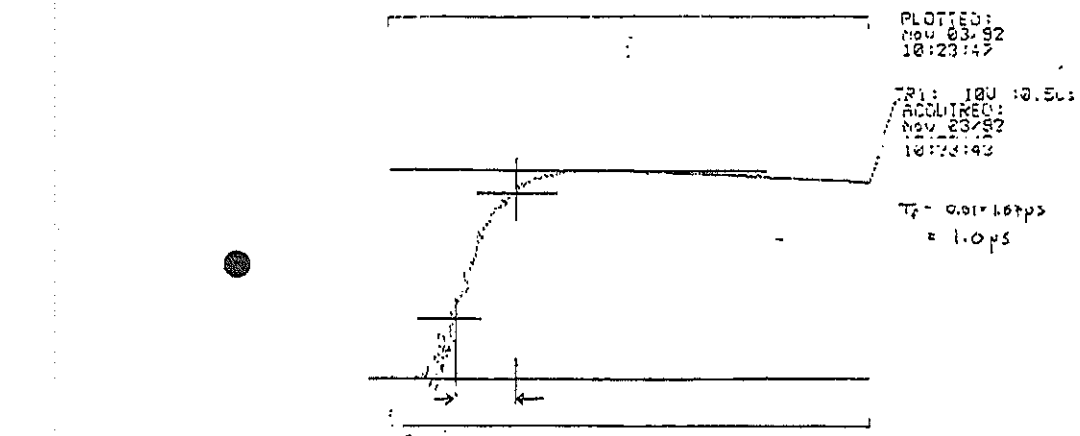


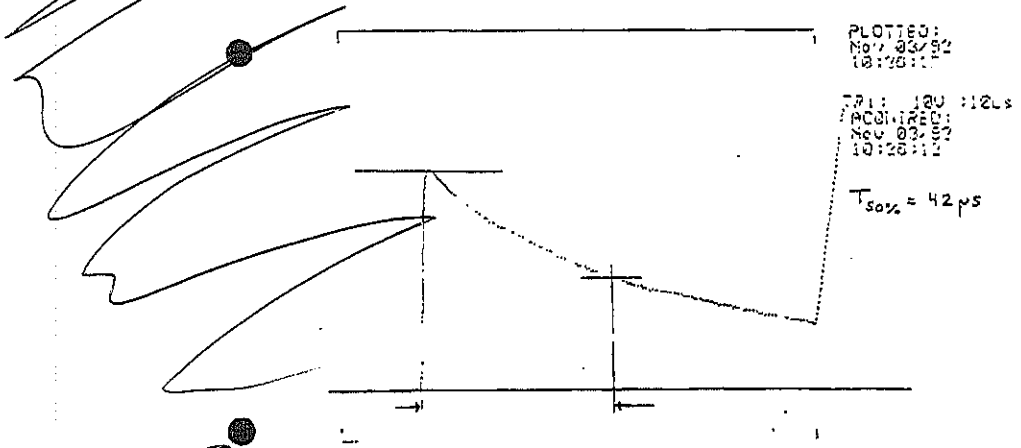
	TEKNOLOGI	E 24 / FE 24
	B	A3/1:5
ABB Distribusjon AS		NHP 343602



	TEKNOLOGI	NAL A-MECH 24KV
		MALSKISSE, DIMENSJON DRAW
		A3/1:2.5
ABB Distribusjon AS		NHP 303723







ВЕРНО С ОРИГИНАЛА

SATS Scandinavian Association for Testing Switchgear

c/o EFI – The Norwegian Research Institute of Electricity Supply
Sem Sælandsv. 11 7034 Trondheim–NTH NORWAY
Tel. (07)597200 Telex 55513 efi n

REPORT OF PERFORMANCE No. **96-B03**

APPARATUS: High-voltage switch disconnector and high-voltage switch-fuse combination
DESIGNATION: NAL 24 and NALF 24
MANUFACTURER: ABB Distribusjon AS, Skien, Norway
DATE(S) OF TESTS: 24. of November to 3. of December 1992

RATINGS ASSIGNED BY THE MANUFACTURER

NAL 24 : rated current : 630 A
NALF 24 : rated current with CEF 63 A
h.v.fuse : 63 A.

THE TESTS HAVE BEEN MADE IN ACCORDANCE WITH
See page no. 5 and 7.

The performance of the apparatus tested and the observations made during the tests have been recorded in the tables with test results and oscillograms.

THE DOCUMENTS FORMING PART OF THIS REPORT ARE

Table with test results	Nos.:	Page No.: 8 to 11
Oscillogram	Nos.:	
Drawing	Nos.:	Page No.: 12 to 16
Diagram	Nos.:	Page No.: 17 to 20
Photograph	Nos.:	

Skien, 4. of January 1996
Place and Date

SATS Observer

Laboratory manager

ИНТЕРКОМПАКТ ООД

ВЯРНО С ОРИГИНАЛА

SATS

Scandinavian Association for Testing Switchgear
c/o EFI - Norwegian Electric Power Research Institute
Sem Sælandsv. 11 7034 Trondheim NORWAY
Telephone: + 47-7-597200 Telex: 55 513 efi n Telefax: + 47-7-597250

REPORT OF PERFORMANCE No. **96-B03**

TITLE:

Temperature rise test on high-voltage switch disconnector type NAL 24 and switch-fuse combination type NALF 24.

Trondheim 1996-01-09
Place and Date

SATS Secretariat Approval

Contents

1. Preface

The tests were witnessed by SATS observer, Mr. Arne Nesse, EFI (Norwegian Electric Power Research Institute).

Parts of the tests were also witnessed by:

Mr. Sten Thygesen, ABB Distribusjon, Skien, Norway

The tests have been performed at ABB Distribusjon AS, Electrotechnical and Mechanical Laboratory, Skien, Norway.

2. Test objects

- High-voltage switch disconnector type NAL 24, serial no. 238222.
- High-voltage earthing switch type E 24, serial no. 238222.
- High-voltage switch-fuse combination type NALF 24, serial no. 238218.

The high-voltage earthing switch type E 24 was mounted on the lower side, (hinge side), of the high-voltage switch type NAL 24. The high-voltage earthing switch is then an integrated part of the high-voltage switch and in this combination called NALE 24. However the temperature rise test is not relevant for earthing switches and no temperature rise test has been carried out on the E 24.

The test objects were manufactured by ABB Distribusjon AS, Skien, Norway.

All fuses used during tests are manufactured by ABB Distribusjon AS, Skien, Norway.

3. Conclusion

The test object passed the temperature rise tests successfully according to the IEC Publication 265-1 (1983), IEC Publication 420 (1990-11) and IEC Publication 694 (1980).

4. Temperature-rise tests

4.1 Test object

The test object was a high-voltage switch disconnector type NAL 24. See Chapter 5.4 for serial numbers.

4.1.1 Publication

IEC Publication 265-1, Second edition 1983, § 6.3, with reference to
IEC Publication 694, First edition 1980, § 6.3.

4.1.2 Test procedure

The test object was mounted in vertical (normal service) position in the test rack.
The three phases of the test object were connected in series with an AC single phase power supply.
The connections were made by means of Cu bars 2 // 5 x 40 mm.
The test was running until the steady state of the temperature was achieved, i.e. temperature less than 1 K per hour.
The test was performed with a test current of 630 A.
The ambient temperature was measured at the same height as the test object, and 1 meter from the test object with three equally distributed TC's type K.

4.1.3 Test results

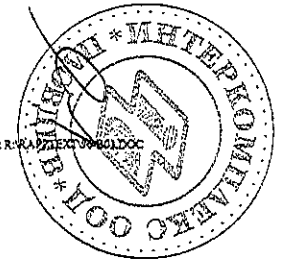
The test object passed the test successfully with temperature rise below the limit given in table V of IEC Publication 694, see page no. 8 and 9.

4.2 Test object

The test object was a high-voltage switch-fuse combination type NALF 24, with fuses type CEF 24 kV, 63 A inserted.

4.2.1 Publication

IEC Publication 420, Second edition 1990-11, § 6.3, with reference to
IEC Publication 694, First edition 1980, § 6.3.

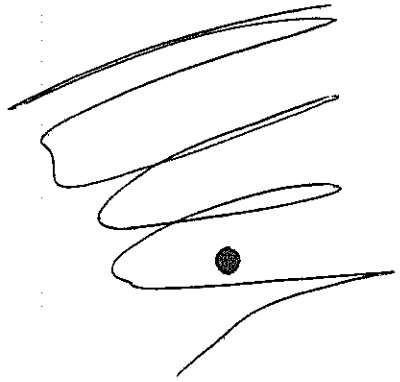


4.2.2 Test procedure

The test object was mounted in vertical (normal service) position in the test rack.
The three phases of the test object were connected in series with an AC single phase power supply.
The connections were made by means of 50 mm² Copper uninsulated PN cable.The test was carried out with a test current of 63 A, corresponding to a nominal power loss of 147 W in each of the fuses according to the datasheet from the manufacturer.

4.2.3 Test results

The test object passed the test successfully with temperature rise below the limit given in table V of IEC Publication 694, see page no. 10 and 11.



5. Measurement of the resistance of the main circuit

5.1 Test objects

The test objects were a high-voltage switch disconnector type NAL 24 and a high-voltage switch-fuse combination type NALF 24, with fuses CEF 24 kV, 63 A inserted. The test objects were mounted in vertical position in the test rack.

5.2 Publication

IEC Publication 694, First edition 1980. § 6.4.

5.3 Test procedure

The resistance was measured between terminals of each phase before and after the temperature rise test, see Chapter 4.
Voltage drop was measured at 50 A DC.
The measurement of NALF 24 also includes a measurement of the resistance of the fuse in each phase.
Measuring point, see page no. 19 and 20.

5.4 Test results

After the test objects had cooled down to the ambient temperature, the differences between the measurements were negligible:

Test object	Resistance in mΩ before temperature rise test			Resistance in mΩ after temperature rise test		
	Phase L1	Phase L2	Phase L3	Phase L1	Phase L2	Phase L3
NAL 24 No. 238222 See page no. 19 (c)	0.07	0.09	0.10	0.08	0.09	0.10
NALF 24 No. 238218 See page no. 20 (a)	24.0	25.0	25.0	24.0	25.0	24.0
Fuses only See page no. 20 (b)	23.9	24.9	24.9	23.9	24.9	24.9

TEMPERATURE RISE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B03	Test no.:	Sheet no.: 1 of 2
Test object : Switch-disconnector NAL 24		Date: 24.11.92
Temporary connections		Fuse type:
Type : 2 // Cu Bars 5 x 40 mm		Power loss: W (At rated current)
Length between terminals : 2 m		Total test duration: 5 hrs
Length of source connections : 1.2 m		Amb. temperature Before test: 22.7 °C
Location of measuring points: See page no. 17		After test: 22.8 °C
Test current: 630 A		

Measuring Point no.:	Identification of measuring point		Temp. rise limit acc. to standard [K]	Temp. rise at steady state cond. [K]	Remarks
1	Conn.terminal	L1	65	42.5	
2	Hinge, cont. knife	L1	65	44.8	
3	Contact knife	L1	65	46.3	
4	Peak contact	L1	65	45.2	
5	Conn.terminal	L1		40.8	
6	Conn.bars	L2	+/- 5	40.6	
7	1 m from terminal	L2	65	37.1	
8	Conn.terminal	L2	65	42.2	
9	Hinge, cont. knife	L2	65	47.9	
10	Cont.knife	L2	65	44.6	
11	Peak contact	L2		45.6	
12	Conn.terminal	L2	65	44.2	
13	Conn.terminal	L3	65	44.1	
14	Hinge, cont. knife	L3	65	48.1	
15	Cont.knife	L3	65	45.9	
16	Peak contact	L3		45.7	
17	Conn.terminal	L3		40.4	
18	Conn.bar	L3		38.0	
19	1 m from terminal	L3	+/- 5	41.9	
20	Conn.bar	L1		41.4	

Notes:

TC ; Type K

119

TEMPERATURE RISE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B03	Test no.:	Sheet no.: 2 of 2
Test object : Switch disconnector		Date: 24.11.92

Temporary connections	Fuse type:
Type : 2 // Cu Bars 5 x 40 mm	Power loss: W (At rated current)
Length between terminals : 2 m	Total test duration: 5 hrs
Length of source connections : 1.2 m	Amb. temperature Before test: 22.7 °C
Location of measuring points: See page no. 17	After test: 22.8 °C

Test current: 630 A

Measuring Point no.:	Identification of measuring point		Temp. rise limit acc. to standard [K]	Temp. rise at steady state cond. [K]	Remarks
21	1 m from terminal	L1	+/- 5	38.0	
22	Conn.bar	L2		41.5	
23	1 m out on conn.bar	L2	+/- 5	40.0	
24	Conn.bar	L3		42.5	
25	1 m out on conn.bar	L3	+/- 5	41.1	
26	Conn.bar	L1		39.3	
27	1 m out on conn.bar	L1	+/- 5	37.6	

Notes:

TC : Type K

File: R:\RAPPTEXT\96-B03.DOC

ОРИГИНАЛА

TEMPERATURE RISE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B03	Test no.:	Sheet no.: 1 of 2
Test object : Switch-fuse comb. NALF 24		Date: 03.12.92

Temporary connections	Fuse type: CEF 24, 63 A
Type : 50 mm2 Cu PN	Power loss: 147 W (At rated current)
Length between terminals : 2 m	Total test duration: 6 hrs
Length of source connections : 1.2 m	Amb. temperature Before test: 23.8 °C
Location of measuring points: See page no. 18	After test: 24.0 °C

Test current: 63 A

Measuring Point no.:	Identification of measuring point		Temp. rise limit acc. to standard [K]	Temp. rise at steady state cond. [K]	Remarks
1	Conn.terminal	L1	65	15.0	
2	Spring cont.	L1	65	37.4	
3	Spring cont.	L1	65	59.7	
4	Conn.bar	L1		25.4	
5	Hinge, cont. knife	L1	65	11.6	
6	Cont.knife	L1	65	8.5	
7	Conn.terminal	L1	65	8.4	
8	Conn.terminal	L2	65	16.1	
9	Spring cont.	L2	65	38.2	
10	Spring cont.	L2	65	61.2	
11	Conn.bar	L2		26.2	
12	Hinge, cont. knife	L2	65	12.5	
13	Cont.knife	L2	65	10.0	
14	Conn.terminal	L2	65	8.8	
15	Conn.terminal	L3	65	15.6	
16	Spring cont.	L3	65	32.1	
17	Spring cont.	L3	65	60.9	
18	Conn.bar	L3		25.8	
19	Hinge, cont. knife	L3	65	13.1	
20	Cont.knife	L3	65	11.1	

Notes:

TC : Type K

File: R:\RAPPTEXT\96-B03.DOC

120

TEMPERATURE RISE TEST
TABLE WITH TEST RESULTS

Report no.: 96-B03	Test no.:	Sheet no.: 2 of 2
Test object : Switch-fuse comb. NALF 24		Date: 03.12.92

Temporary connections
Type : 50 mm2 Cu PN
Length between terminals : 2 m
Length of source connections : 1.2 m

Fuse type: CEF 24, 63 A
Power loss: 147 W (At rated current)
Total test duration: 6 hrs
Amb. temperature Before test: 23.8 °C
After test: 24.0 °C

Location of measuring points: See page no. 18

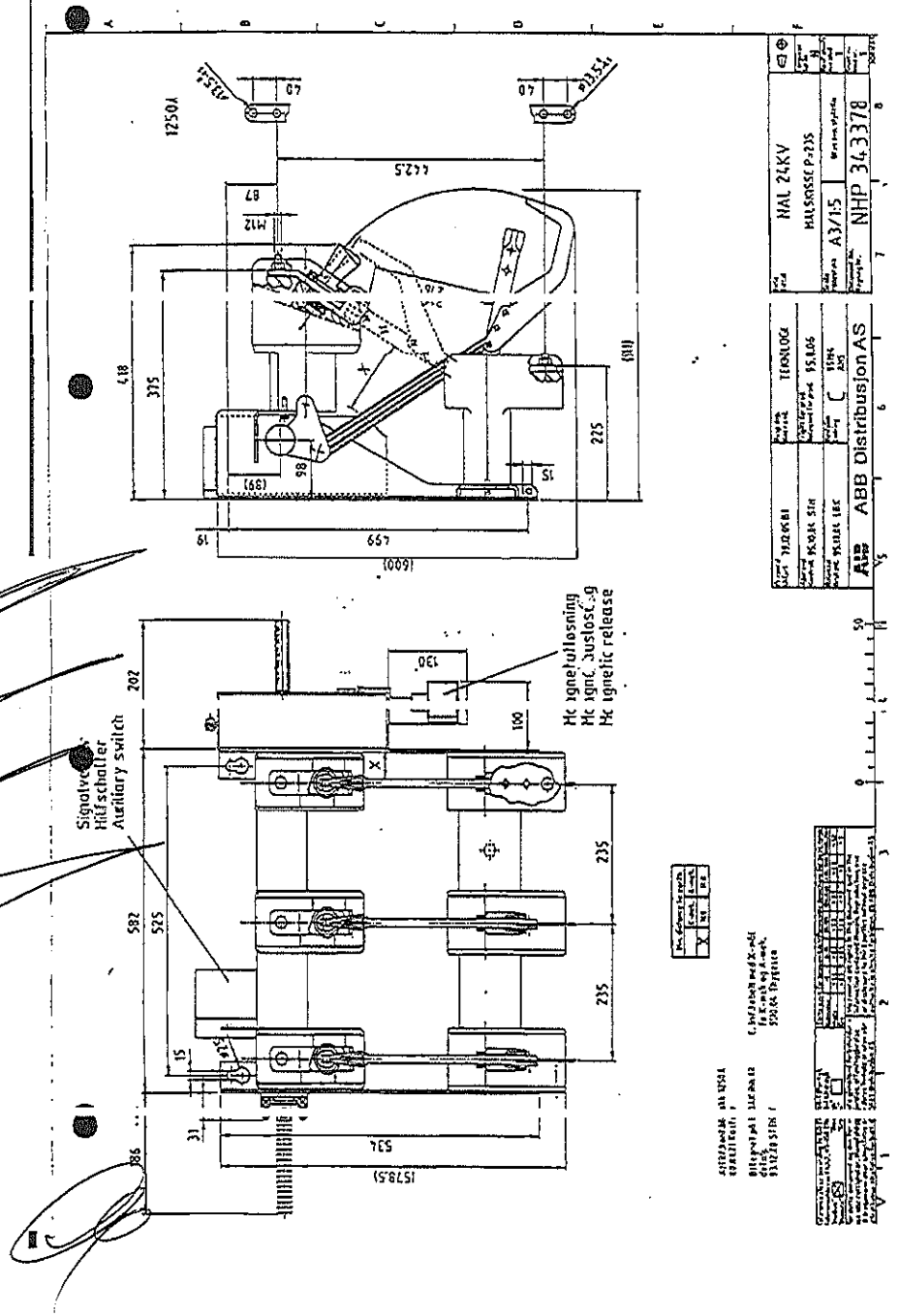
Test current: 53 A

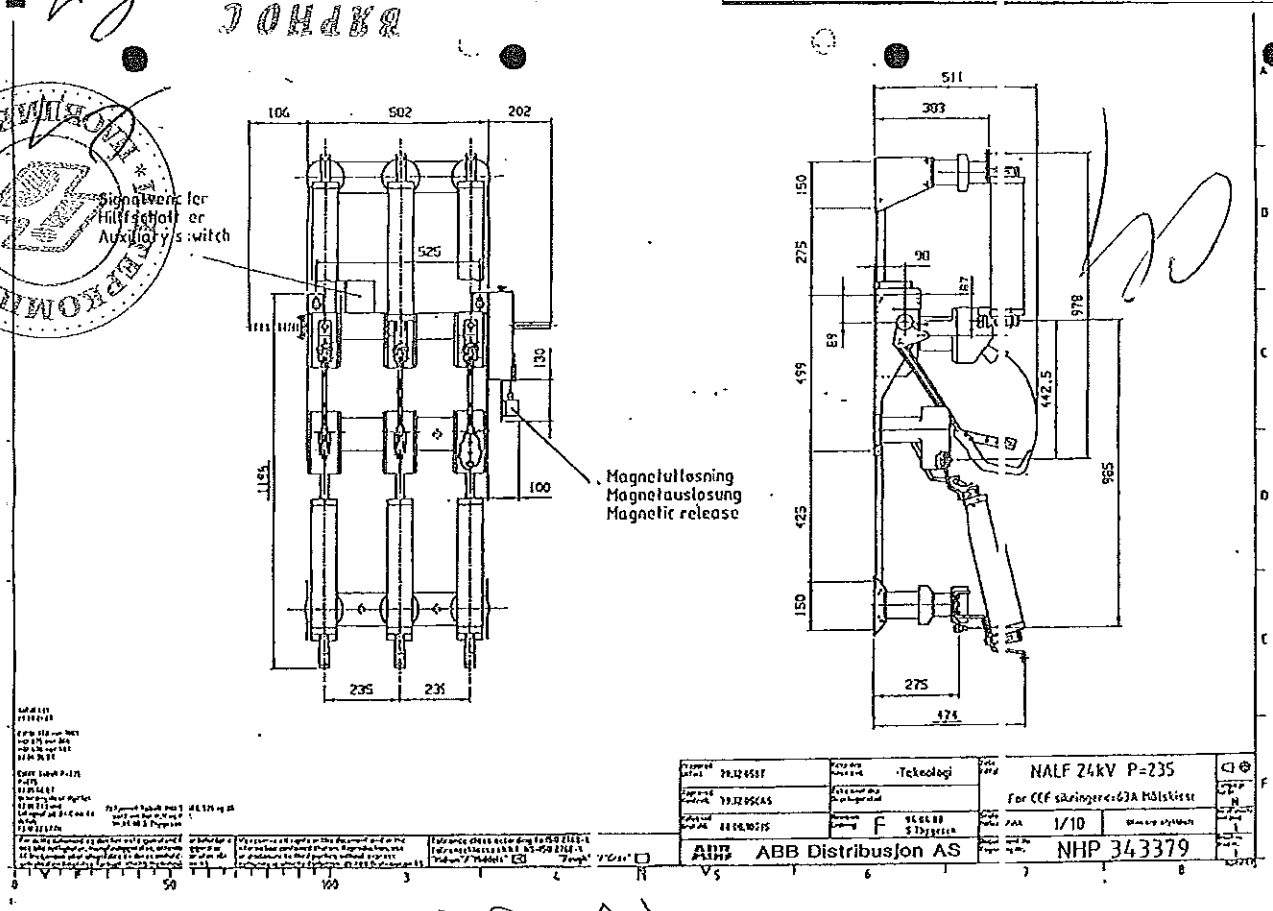
Measuring Point no.:	Identification of measuring point		Temp. rise limit acc. to standard [K]	Temp. rise at steady state cond. [K]	Remarks
21	Conn.terminal	L3	65	10.3	
22	1 m from terminal	L3	+/- 5	6.8	
23	1 m from terminal	L1	+/- 5	9.5	
24	1 m from terminal	L2/L3	+/- 5	11.2	
25	1 m from terminal	L1/L2	+/- 5	9.1	
26	Fuse	L1		90.2	
27	Fuse	L2		96.9	

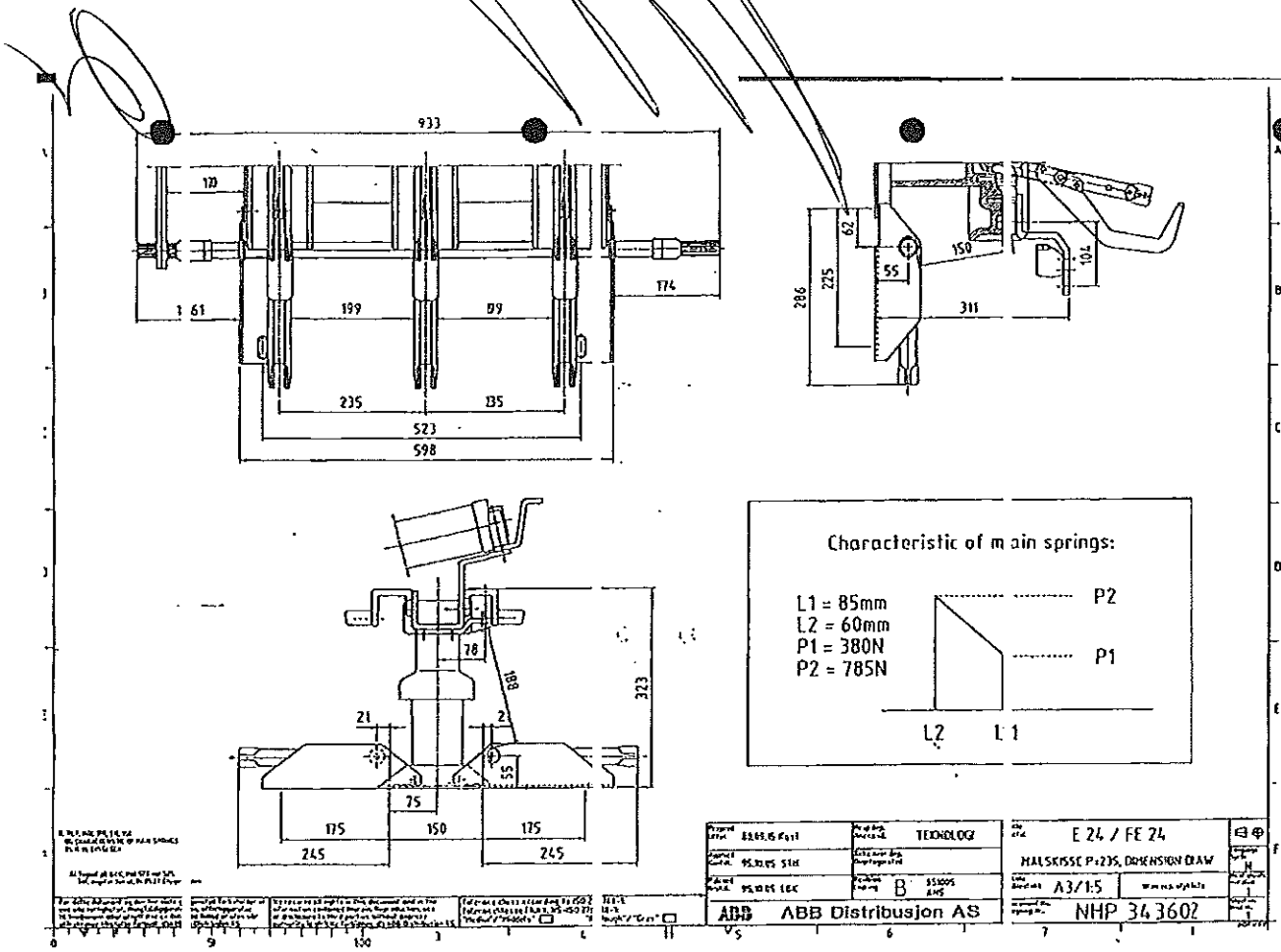
Notes:

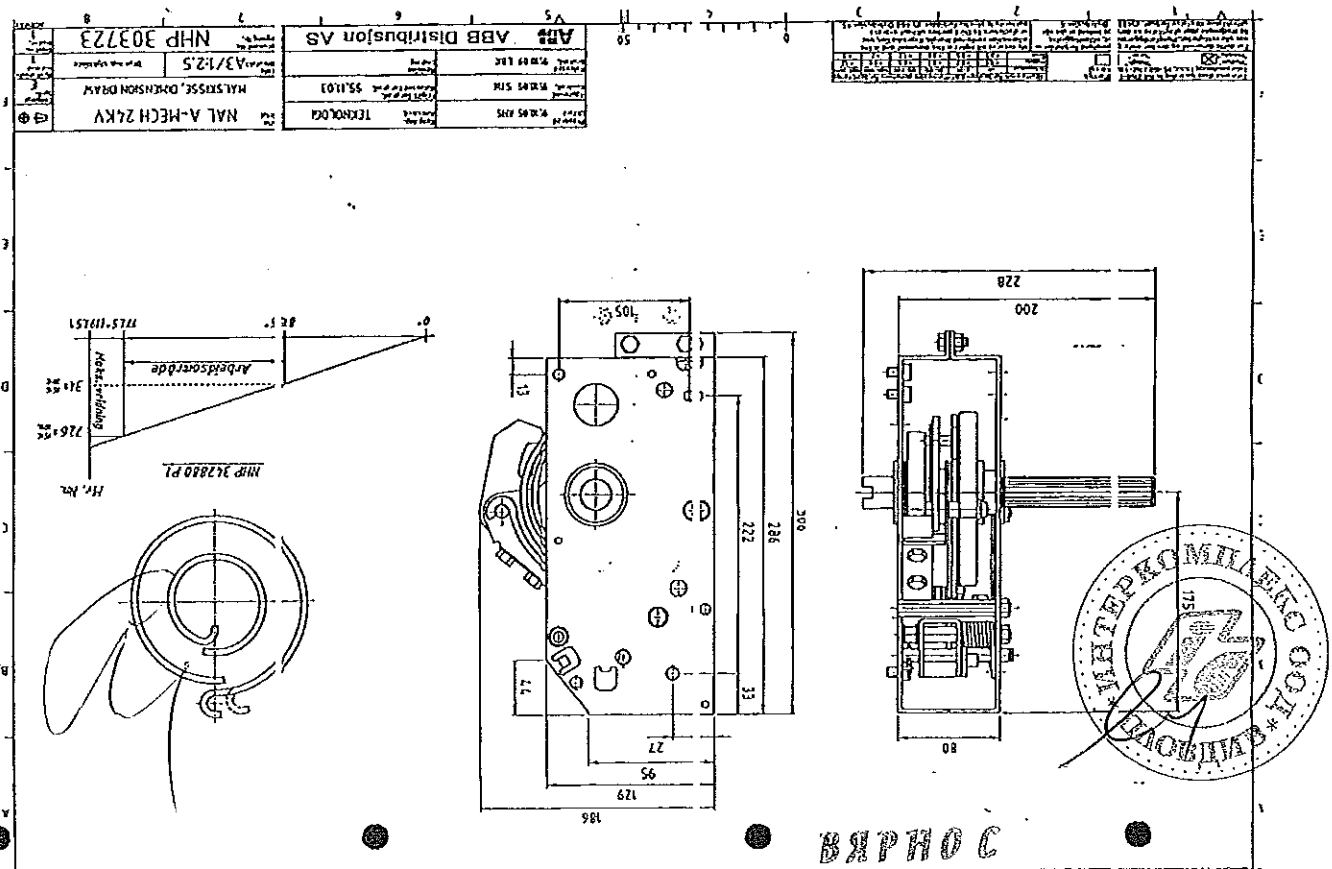
TC : Type K

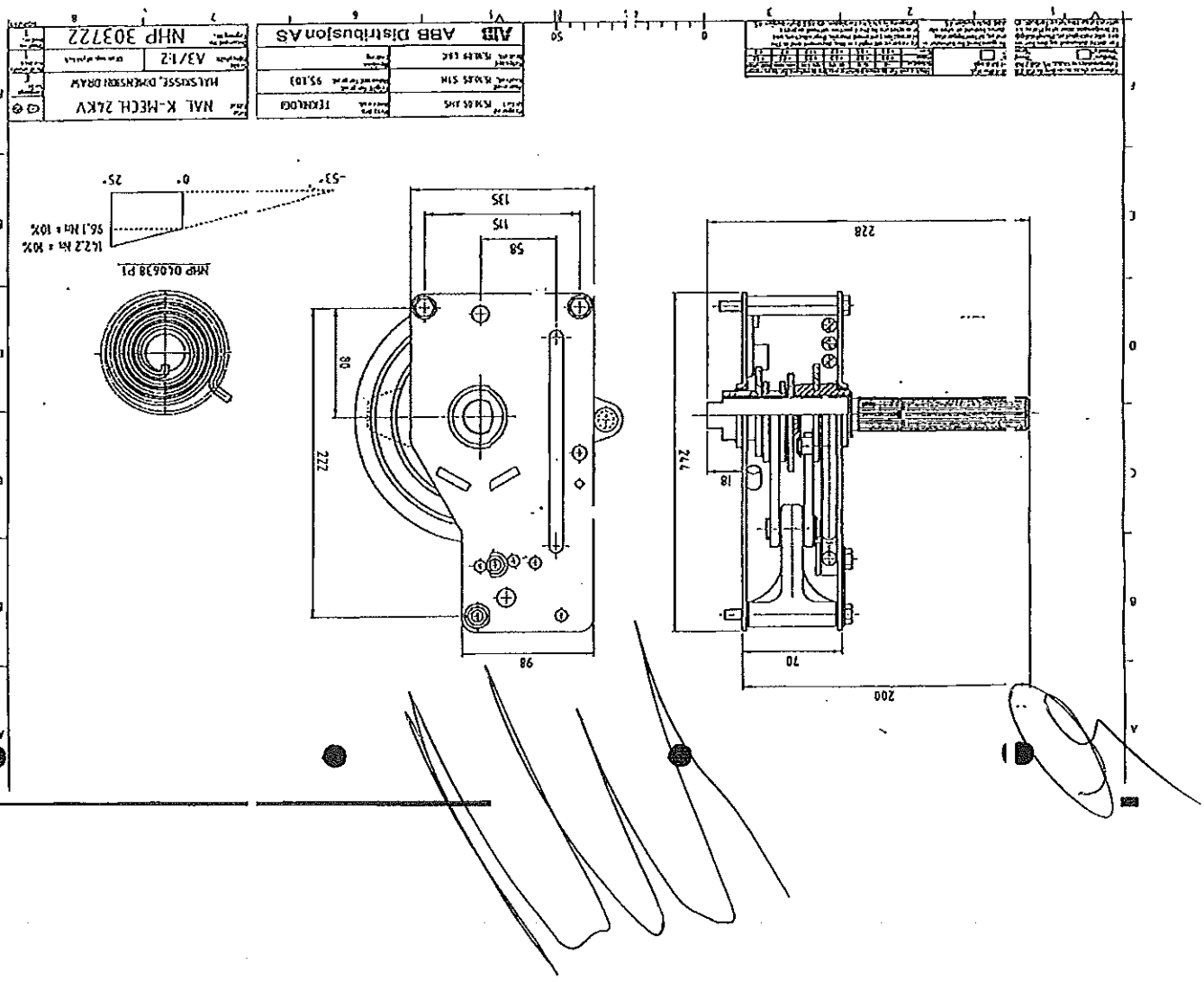
File: K:\REPORTS\TEXT\96-B03.DOC




Signalvern for Hilfsschalter
Auxiliary switch
Magnetutløsning
Magnetauslösung
Magnetic release
106
502
202
525
130
100
1195
235
235
511
303
150
275
425
150
90
187
89
499
878
442.5
556
275
475
NALF 24kV P=235
For CEF sikringer c63A Hälskrist
1/10
NHP 343379
ABB Distribusjon AS
Teknologi


933
120
174
161
199
89
235
135
523
598
62
150
55
104
225
286
311
78
188
323
21
2
55
75
175
150
175
245
245
Characteristic of main springs:
L1 = 85mm
L2 = 60mm
P1 = 380N
P2 = 785N
P2
P1
L2
L1
E 24 / FE 24
HALSKISSE P=235, DIMENSION DRAW
A3/1:5
NHP 343602
ABB Distribusjon AS
TEKNOLOGI

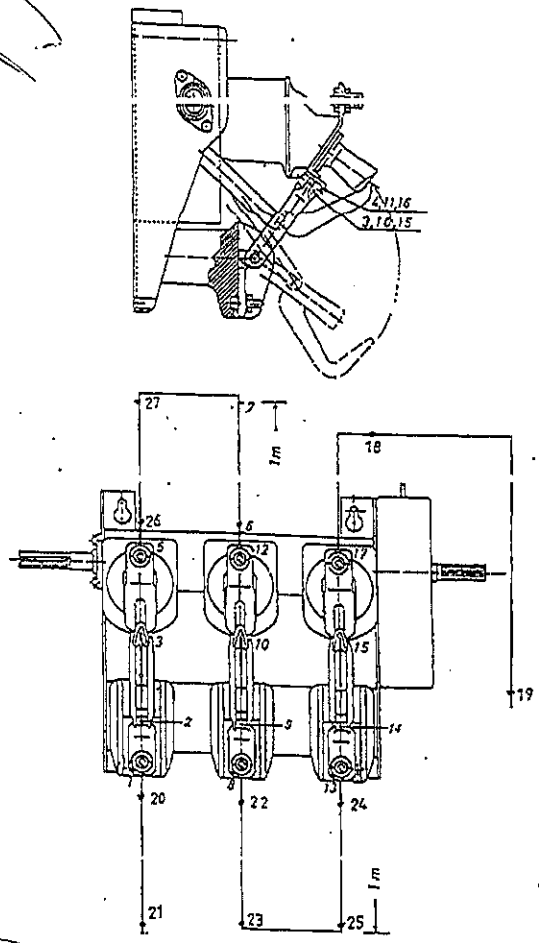




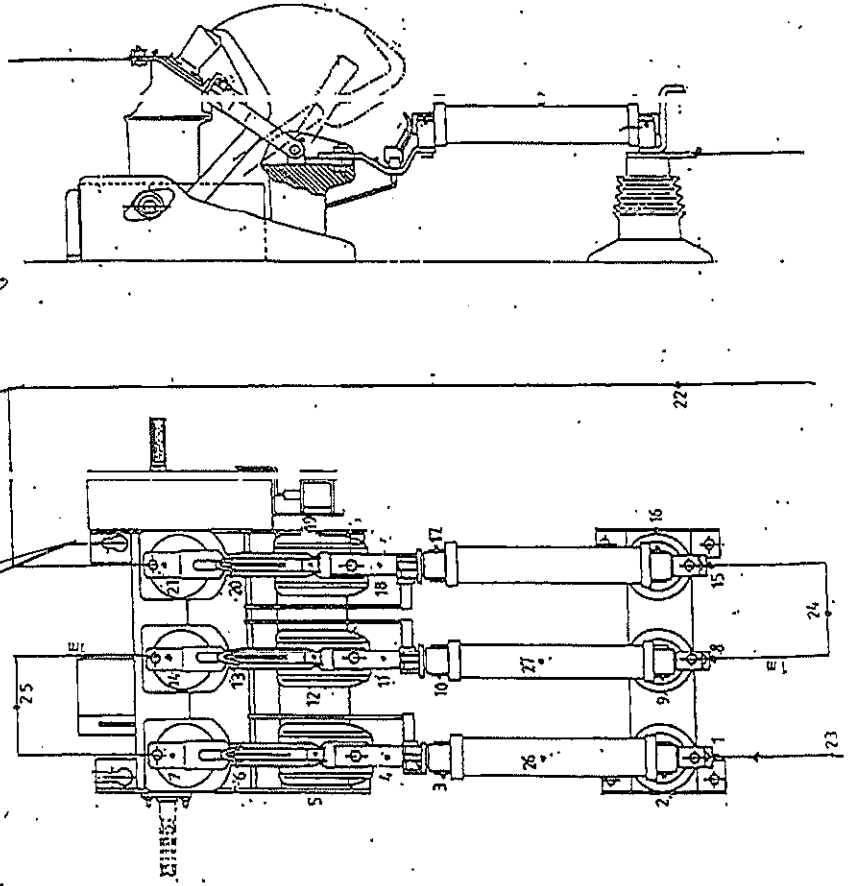
ВЯРНО С ОРИГИНАЛА

123

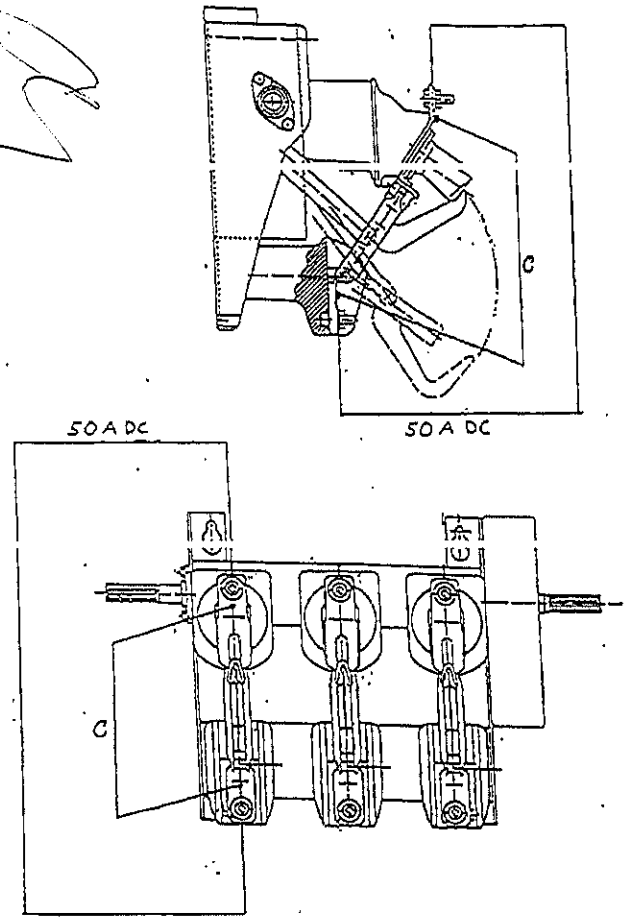
Location of measuring points



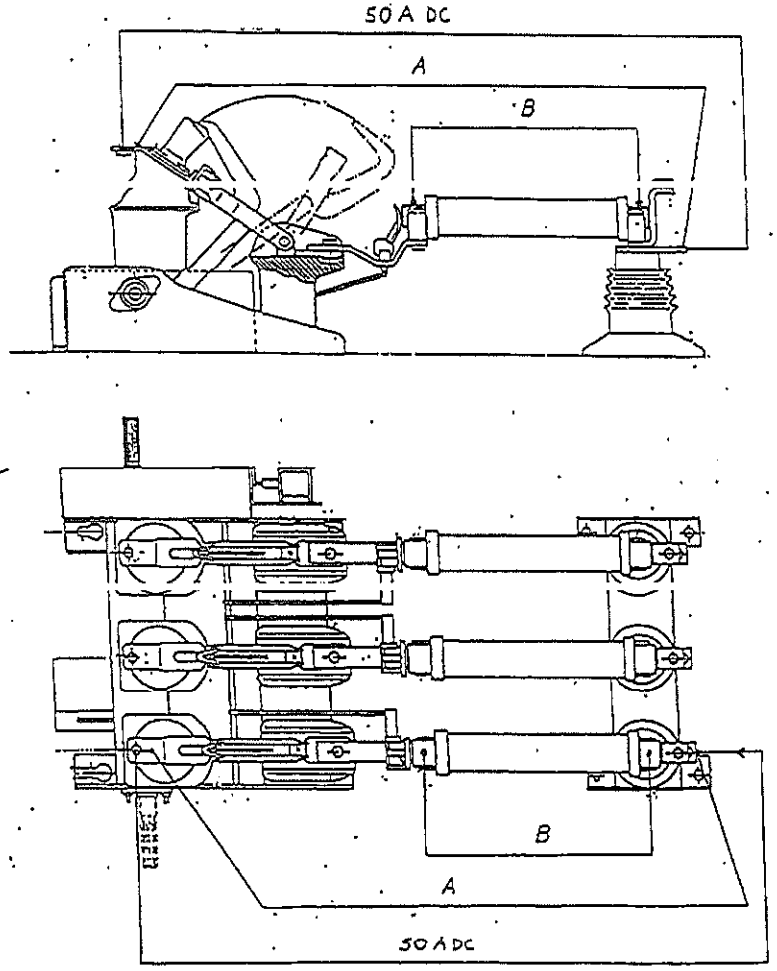
Location of measuring point



124



Measurement of the resistance (NALE)



Measurement of the resistance (NALF)

Приложение ТС 14

polski english

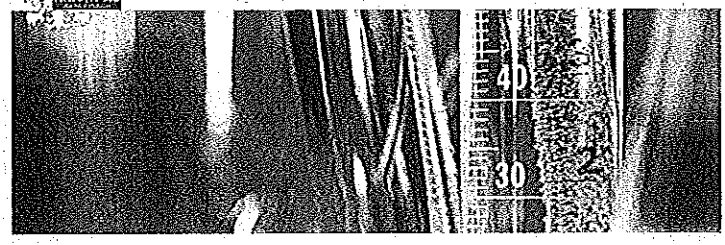
Instytut Elektrotechniki
Electrotechnical Institute

About Institute | Structure | Activity | Offer | Conferences | Publications | Projects | Partners | News | Contact

Home > Activity > Laboratory testing >

- About PCA
- Accreditation
- Accredited Organizations
- International Cooperation
- Links

PCA Polskie Centrum Akredytacji PL | EN



- Library
- Doctoral studies
- UE Directives
- MCZT
- Information
- MCUPdII
- Foundation New Electrotechnics

Details

PCA
AB 074

certificate validity: **21.11.2018 r.** accreditation from: **17.09.1996 r.**

Name of organization: Instytut Elektrotechniki
ul. Pożaryskiego 28; 04-703 Warszawa

Name laboratorium: Laboratorium Badawcze Aparatury Rozdzielczej

Address: ul. Pożaryskiego 28

Place: 04-703 Warszawa

(22) 112-53-01
(22) 112-53-10
zwarcia@iel.waw.pl

---
www.iel.waw.pl

CE

CREATED BY VISUALTEAM

ВЯРНО С ОРИГИНАЛА

12 G

ZAKRES AKREDYTACJI LABORATORIUM BADAWCZEGO Nr AB 074

wydany przez
POLSKIE CENTRUM AKREDYTACJI
01-382 Warszawa, ul. Szczotkarska 42

Wydanie nr 9, Data wydania: 6 grudnia 2011 r.

PCA Polskie Centrum Akredytacji BADANIA AB 074	Nazwa i adres **INSTYTUT ELEKTROTECHNIKI** **LABORATORIUM BADAWCZE APARATURY ROZDZIELCZEJ** **ul. Pożaryskiego 28** **04-703 Warszawa**
Kod identyfikacji dziedzina/obiektu badań:	Dziedzina/obiekt badań:
E/6; E/19	Badania elektryczne wyrobów i wyposażenia elektrycznego i elektronicznego, środków ochrony osobistej
H/6	Badania ogniowe wyrobów i wyposażenia elektrycznego i elektronicznego
J/6	Badania mechaniczne wyrobów i wyposażenia elektrycznego i elektronicznego
N/6	Badania właściwości fizycznych wyrobów i wyposażenia elektrycznego i elektronicznego

Wersja strony: A

KIEROWNIK
DZIAŁU AKREDYTACJI
LABORATORIÓW BADAWCZYCH

TADEUSZ MATRAS

ВЯРНО С ОРИГИНАЛ

127

Laboratorium Badawcze Aparatury Rozdzielczej ul. Pożaryskiego 28; 04-703 Warszawa		
Osoby autoryzujące sprawozdania z badań: mgr inż. Robert Franaszek – Kierownik Zespołu Laboratoriów IEL mgr inż. Michał Babiuch – Kierownik ds. Technicznych mgr inż. Janusz Domański – Kierownik Sekcji Aparatury Niskonapięciowej		
Badane obiekty / Grupa obiektów	**Badane cechy i metody badawcze/ pomiarowe**	**Normy i/lub udokumentowane procedury badawcze**
Wyłączniki wysokonapięciowe prądu przemiennego	Wytrzymałość elektryczna izolacji	PN-EN 62271-100:2009 pkt 6.2 PN-EN 62271-1:2009
	Graniczne przyrosty temperatury	PN-EN 62271-100:2009 pkt 6.5
	Rezystancja obwodu głównego	PN-EN 62271-100:2009 pkt 6.4
	Obciążalność zwarciowa	PN-EN 62271-100:2009 pkt 6.6
	Niezawodność działania i trwałość mechaniczna	PN-EN 62271-100:2009 pkt 6.101
	Zdolność łączeniowa	PN-EN 62271-101:2010, pkt 6.102 ÷ pkt 6.107 PN-EN 62271-101:2010/A1:2011 PN-EN 62271-100:2009 pkt 6.102 ÷ 6.107
	Zdolność łączenia zwarć 1-fazowych	PN-EN 62271-100:2009 pkt 6.108
	Zdolność łączeniowa w warunkach zwarć pobliskich	PN-EN 62271-101:2010 pkt 6.109 PN-EN 62271-101:2010/ A1:2011 PN-EN 62271-100:2009, pkt 6.109
	Zdolność łączeniowa przy niezgodności faz	PN-EN 62271-100:2009 pkt 6.110
	Zdolność łączenia prądu pojemnościowego	PN-EN 62271-101:2010, pkt 6.111 PN-EN 62271-101:2010/A1:2011 PN-EN 62271-100:2009 pkt 6.111
	Zdolność łączenia małego prądu indukcyjnego Zdolność łączenia obciążenia indukcyjnego	PN-EN 62271-110:2009 pkt 6.114 pkt 6.115
Odłączniki i uziemniki wysokonapięciowe	Wytrzymałość elektryczna izolacji	PN-EN 62271-102:2005+AC:2005 pkt 6.2
	Rezystancja obwodu głównego	pkt 6.4
	Graniczne przyrosty temperatury	pkt 6.5
	Obciążalność zwarciowa	pkt 6.6
	Niezawodność działania i trwałość mechaniczna	pkt 6.102
	Zdolność załączania uziemników	pkt 6.101
Rozłączniki wysokonapięciowe prądu przemiennego do 52 kV	Wytrzymałość elektryczna izolacji	PN-EN 60265-1:2001, pkt 6.2
	Rezystancja obwodu głównego	pkt 6.4
	Graniczne przyrosty temperatury	pkt 6.5
	Obciążalność zwarciowa	pkt 6.6
	Stopnie ochrony IP	pkt 6.7
	Zdolność łączeniowa	pkt 6.101
	Działanie mechaniczne, trwałość mechaniczna	pkt 6.102

Wersja strony: A

Badane obiekty / Grupa obiektów	Badane cechy i metody badawcze/ pomiarowe	Normy i/lub udokumentowane procedury badawcze
Wysokonapięciowe zestawy rozłączników z bezpiecznikami	Wytrzymałość elektryczna izolacji	PN-EN 62271-105:2005, pkt 6.2
	Graniczne przyrosty temperatury	pkt 6.5
	Rezystancja obwodu głównego	pkt 6.4
	Obciążalność zwarciowa	pkt 6.6
	Zdolność łączeniowa	pkt 6.101
	Działanie mechaniczne	pkt 6.102
	Odporność bezpieczników na wstrząsy	pkt 6.103
Bezpieczniki wysokonapięciowe	Wytrzymałość elektryczna izolacji	PN-EN 60282-1:2010, pkt 6.4 PN-IEC 60282-2:1999, pkt 8.4
	Graniczne przyrosty temperatury	PN-EN 60282-1:2010, pkt 6.5 PN-IEC 60282-2:1999, pkt 8.5
	Zdolność wyłączeniowa	PN-EN 60282-1:2010, pkt 6.6 PN-IEC 60282-2:1999, pkt 8.6
	Charakterystyki czasowo-prądowe	PN-EN 60282-1:2010, pkt 6.7 PN-IEC 60282-2:1999, pkt 8.7
	Działanie wybijaków	PN-EN 60282-1:2010, pkt 6.8
Wkładki bezpiecznikowe wysokiego napięcia do zabezpieczania obwodów silników	Wytrzymałość elektryczna izolacji	PN-EN 60282-1:2010, pkt 6.4
	Graniczne przyrosty temperatury	pkt 6.5
	Zdolność wyłączeniowa	pkt 6.6
	Charakterystyki czasowo-prądowe	pkt 6.7
	Odporność na impulsy przeciążeniowe w szeregu 1 i 2	PN-EN 60644:2010, pkt 6
Styczniki wysokonapięciowe prądu przemiennego	Wytrzymałość elektryczna izolacji	PN-EN 60470:2002, pkt 6.2
	Graniczne przyrosty temperatury	pkt 6.5
	Rezystancja obwodu głównego	pkt 6.4
	Obciążalność zwarciowa	pkt 6.6
	Stopnie ochrony IP	pkt 6.7
Rozdzielnice prądu przemiennego w osłonach metalowych na napięcia znamionowe powyżej 1 kV do 52 kV i w osłonach izolacyjnych na napięcia znamionowe wyższe niż 1 kV do 38 kV	Wytrzymałość elektryczna izolacji	PN-EN 62271-200:2007 PN-EN 62271-201:2010 PN-EN 62271-1:2009 pkt 6.2
	Graniczne przyrosty temperatury	pkt 6.5
	Rezystancja obwodu głównego	pkt 6.4
	Obciążalność zwarciowa	pkt 6.6
	Zdolność łączeniowa	pkt 6.101
	Działanie mechaniczne	pkt 6.102
	Stopnie ochrony IP	pkt 6.7
	Zdolność do izolowania, prąd upływowy	pkt 6.104.2
	Odporność na działanie łuku przy zwarciach wewnętrznych	pkt 6.106, Załącznik A

Wersja strony: A

ВЯРНО С ОРИГИНАЛА

Badane obiekty / Grupa obiektów	Badane cechy i metody badawcze/ pomiarowe	Normy i/lub udokumentowane procedury badawcze
Rozdzielnice z izolacją gazową w osłonach metalowych na napięcia znamionowe wyższe niż 52 kV	Wytrzymałość elektryczna izolacji	PN-EN 62271-203:2007 pkt 6.2
	Graniczne przyrosty temperatury	pkt 6.5
	Rezystancja obwodu głównego	pkt 6.4
	Obciążalność zwarciowa	pkt 6.6
	Zdolność łączeniowa	pkt 6.101
	Działanie mechaniczne	pkt 6.102
	Stopnie ochrony IP	pkt 6.7
	Odporność na działanie łuku przy zwarciach wewnętrznych	pkt 6.105
Izolatory różnych typów wysokiego i niskiego napięcia	Wymiary liniowe i tolerancje	PN-EN 60383-1:2005 pkt 5 PN-IEC 61109:2010 PN-E-91062-1/-2:1998 pkt 5.5.1
	Wytrzymałość elektryczna izolacji	PN-EN 60137:2010 pkt 7.1-7.3 PN-EN 60383-1:2005 pkt 13 ÷15 PN-IEC 61109:2010 PN-E-91062-1:1998, pkt 5.5.7 PN-E-91062-2:1998 pkt 5.5.7
	Graniczne przyrosty temperatury	PN-EN 60137:2010, pkt 7.5 PN-IEC 61109:2010
	Wytrzymałość zwarciowa	PN-EN 60137:2010 pkt 7.6 PN-IEC 61109:2010 PN-E-91062-2:1998 pkt 5.5.9
Stacje transformatorowe wysokiego napięcia na niskie napięcie	Wytrzymałość elektryczna izolacji	PN-EN 62271-202:2010 PN-G-42021:1997 pkt 6.2
	Graniczne przyrosty temperatury	pkt 6.3
	Wytrzymałość zwarciowa	pkt 6.4
	Funkcjonalność	pkt 6.5
	Stopnie ochrony IP	pkt 6.6
	Odporność na działanie łuku przy zwarciach wewnętrznych	pkt 6.8, Załącznik A
Transformatory	Rezystancja uzwojeń	PN-EN 60076-11:2006 PN-EN 60076-1:2001+A1:2007 pkt 10.2
	Przekładnia i grupa połączeń	pkt 10.3
	Impedancja zwarciowa i straty obciążeniowe	pkt 10.4
	Straty i prąd stanu jałowego	pkt 10.5
	Harmoniczne prądu stanu jałowego	pkt 10.6
	Impedancja składowej zerowej	pkt 10.7
	Skuteczność działania przełącznika zaczepów	PN-EN 60076-1:2001+A1:2007 PN-EN 60214:2001 PN-EN 60214-1:2007
	Graniczne przyrosty temperatury	PN-EN 60076-2:-2011
	Wytrzymałość elektryczna izolacji	PN-EN 60076-3:2002 PN-EN 60076-3:2002/Ap1:2004 PN-EN 60076-4:2004

Wersja strony: A

NORSK
AKKREDITERING

ACCREDITATION DOCUMENT

Accreditation no PROD 016

SINTEF Energi AS, SATS Certification

Sem Sælands vei 11
7465 Trondheim

The accreditation includes certification of products within the scope specified on the following page(s) in this document.

Accreditation in accordance with NS-EN ISO/IEC 17065 (2012) is granted with the reference to Parlamentary Proposition no. 106 (1989/90) and Norwegian Accreditation's statues laid down in Royal Decree of 7 october 1993. The accreditation was initially granted 05.11.2004.

The accreditation requires regular surveillance, and is valid until 27.10.2019.

The decision of accreditation made by Norwegian Accreditation implies that the organisation fulfils the requirements for accreditation within the scope. The certification body itself is responsible for certifications performed.

NORWEGIAN ACCREDITATION

27/10-14
Date

Norwegian Accreditation

ВЯРНО С ОРИГИНАЛА

Accreditation document
Accreditation no. PROD 016
Scope of accreditation

The administrative/geographic unit:

SINTEF Energy AS
Sem Sælands vei 11
7465 Trondheim

is accredited for certification of the following products,

Products/ Normative doc.	Area of competence / description	Cert system ISO Guide 67	Remarks
STL General Guide	Short-Circuit Testing Liaison General Guide		QA SATS 011 Type Test Certification Procedure, QA SATS 030 Type Conformity Certification Procedure. Accreditation scope: Version 7 of the STL-Guide regarding pe forming reports and certificates listed in paragraph 5.

The accreditation is limited to product certification of high voltage electrical tranmission and distnbution power equipment.
SATS Certification is a member of STL (Short-Circuit Testing Liason)

27/10-14
Date

Norwegian Accreditation

ВЯРНО С ОРИГИНАЛА

132

NORSK
AKKREDITERING

ACCREDITATION DOCUMENT

TEST 040

ABB Laboratories, Skien, ABB AS, NEFI High Power Laboratory
Stulenvegen 71
N-3721 SKIEN
Norway

The scope of accreditation is in accordance with the specifications on the following pages in this document.

The accreditation was initially granted 10.07.1995. The accreditation is given according to "Law on the free exchange of goods in the European Economic Area" of 14.04.2013.
The organisation complies with the requirements in NS-EN ISO/IEC 17025 (2005)

The accreditation requires regular surveillance, and is valid until 01.03.2017.

The decision of accreditation made by Norwegian Accreditation implies that the organisation has been found to fulfil the requirements for accreditation within the scope.
The organisation itself is responsible for the results of performed measurements.

NORWEGIAN ACCREDITATION

16.01.2015
Date

Norwegian Accreditation

ТЕСТЕРКОМПЛЕКС ООД * ПЛОВДИВ

ВЯРНО С
ОРИГИНАЛА

133

NORSK AKKREDITERING

Accreditation document
Accreditation no. TEST 040

Administrative/geographical unit:
NEFI High Power Laboratory
Stulenvegen 71
N-3721 SKIEN; Norway

Permanent facility

P05 Electrical testing

Object	Parameter	Reference standard	Identity of internal method	Comments
Electrical equipment	Current-measurement RMS: 1A - 100kA Peak: 2,5A - 300 kA	Internal method	NEFI Dok. 8-21	
Electrical equipment	Voltage measurement AC: 10V-100kV peak DC: 10V-100kV	Internal method	NEFI Dok. 8-22	
High-voltages fuses: Current limiting fuses	Breaking tests	IEC 60282-1	NEFI Dok. 8-61	§ 6.6
Low-voltage switchgear and controlgear: General rules	General rules for IEC 60947 series. See IEC 60947-3 for testing parameters.	IEC 60947-1	NEFI Dok. 8-62	
Low-voltage switchgear and controlgear: Switches, disconnectors, switch-disconnectors and fuse-combination units	Testing of dielectric properties. Making and breaking capacities Dielectric verification. Leakage current. Operational performance test. Short-time withstand current test. Short-circuit making capacity test. Fuse protected short-circuit withstand.	IEC 60947-3	NEFI Dok. 8-63	8.3.3.2, 8.3.3.3, 8.3.3.4, 8.3.3.5, 8.3.4.1, 8.3.5.1, 8.3.5.2, 8.3.6.2
Low-voltage switchgear and controlgear assemblies: General rules	General rules for IEC 61439 series. Power-frequency withstand voltage. Testing of main circuit. Testing of the protective circuit	IEC 61439-1	NEFI Dok. 8-64	§10.9.2, §10.11.5.3, §10.11.5.6
Low-voltage switchgear and controlgear assemblies: Power switchgear and controlgear assemblies	See IEC 61439-1 for testing parameters.	IEC 61439-2	NEFI Dok. 8-65	

16.01.2015
Date

Norwegian Accreditation

ТЕРКОМПАЕКС ООД * ПЛОВДИВ *

ВЯРНО С ОРИГИНАЛА

154

Accreditation document
Accreditation no. TEST 040

Administrative/geographical unit:
NEFI High Power Laboratory
Stulenvegen 71
N-3721 SKIEN; Norway

Permanent facility

P05 Electrical testing

Object	Parameter	Reference standard	Identity of internal method	Comments
High-voltage switchgear and controlgear: Common specifications	Common specifications for IEC 62271 series. Power-frequency voltage tests. Voltage test as condition check. Measuring of the resistance of circuits. Short-time withstand current and peak withstand current tests.	IEC 62271-1	NEFI Dok. 8-67	§6.2.6.1 §6.2.11 §6.4 §6.6
High-voltage switchgear and controlgear: High-voltage alternating-current circuit-breakers	Dielectric tests. (See IEC 62271-1 for testing parameters). Measurement of the resistance of the main circuit. Short-time withstand current and peak withstand current tests.	IEC 62271-100	NEFI Dok. 8-68	§6.2 §6.4 §6.6
High-voltage switchgear and controlgear: Alternating current disconnectors and earthing switches	Dielectric tests. (See IEC 62271-1 for testing parameters). Measuring of the resistance of circuits. Short-time withstand current and peak withstand current tests. Tests to prove the short-circuit making performance of earthing switches. (Limited to 250 MVA)	IEC 62271-102	NEFI Dok. 8-69	§6.2 §6.4 §6.6 §6.101
High-voltage switchgear and controlgear: Switches for rated voltages above 1 kV up to and including 52 kV	Dielectric tests. (See IEC 62271-1 for testing parameters). Measurement of the resistance of circuits Short- time withstand current and peak withstand current tests. Making and breaking tests.	IEC 62271-103	NEFI Dok. 8-70	§6.2 §6.4, §6.6, §6.101

16.01.2015
Date

Norweglan Accreditation

ВЯРНО С ОРИГИНАЛА

135

NORSK AKKREDITERING

Accreditation document
Accreditation no. TEST 040

Administrative/geographical unit:
NEFI High Power Laboratory
Stulenvegen 71
N-3721 SKIEN; Norway

Permanent facility

P05 Electrical testing

Object	Parameter	Reference standard	Identity of internal method	Comments
High-voltage switchgear and controlgear: High-voltage alternating current switch-fuse combinations for rated voltages above 1kV and up to and including 52kV	Dielectric tests. (See IEC 62271-1 for testing parameters). Measurement of the resistance of circuits. Making and breaking tests. Thermal test with long prearcing time of fuse	IEC 62271-105	NEFI Dok. 8-71	§6.2 §6.4, §6.101, §6.104
High-voltage switchgear and controlgear: AC metal-enclosed switchgear and controlgear for rated voltage above 1 kV and up to and including 52 kV	Dielectric tests. (See IEC 62271-1 for testing parameters). Measuring of the resistance of circuits. Short-time withstand current and peak withstand current tests. Verification of making and breaking capacities. Internal arcing test Annex AA: Method for verify the internal arc classification	IEC 62271-200	NEFI Dok. 8-72	§6.2 §6.4, §6.6, §6.101, §6.106
High-voltage switchgear and controlgear: High-voltage / low-voltage prefabricated substations	Short-time withstand current and peak withstand current tests. Internal arcing test Annex AA: Internal arc fault - Method to verify the internal arc classification (IAC)	IEC 62271-202	NEFI Dok. 8-73	§6.6 §6.102

16.01.2015
Date

Norwegian Accreditation

ТЕРКОМПЛЕКС ООД

ВЯРНО С ОРИГИНАЛА

136

intercomplex Ltd.®
4002 Пловдив, бул. "Пещерско шосе" № 201, тел. (032) 241 415, тел./факс: (032) 241 414, e-mail: office@intercomplex.bg
1113 София, ул. "Акад. Г. Бончев" № 20, тел. (02) 971 70 41, факс: (02) 971 71 41, e-mail: office.sf@intercomplex.bg

Приложение ТС 15
към Технически спецификации
за от процедура PPD 15-031

ДЕКЛАРАЦИЯ
за доставка на резервни части

Долуподписаният *Ехиязар Гарабед Узунян*, в качеството ми на *управител* на *ИНТЕРКОМПЛЕКС ООД*, със седалище и адрес на управление: *гр. Пловдив бул. Пещерско шосе 201*, вписано в Търговския регистър към Агенцията по вписванията с ЕИК *115096057*, във връзка с обявената процедура за възлагане на обществена поръчка от *ЧЕЗ РАЗПРЕДЕЛЕНИЕ БЪЛГАРИЯ АД*

Наименование на обекта на обществената поръчка:
„Доставка на товарови прекъсвачи СрН /ТПМЗ/“, реф № *PPD 15-051*

ДЕКЛАРИРАМ:

1. Производителят, „АВВ" – Полша, гарантира, че ще осигурява резервни части за товаровите прекъсвачи, съгласно приложения списък за период не по-малък от 20 години.

2. Правя настоящата декларация на основание предоставените ми документи от производителя - „АВВ" – Полша, приложени към настоящата документация.

Известно ми е, че при деклариране на неверни данни, нося наказателна отговорност по чл. 313 от НК.

07.08.2015 година

Декларатор: .....

Ехиязар Узунян

ИНТЕРКОМПЛЕКС ООД * ПЛОВДИВ *

137

Power and productivity
for a better world™

Warszawa, date: 2015-06-16

Manufacturer's Declaration

To: ABB Bulgaria EOOD
9 Christofor Columbus Blvd.fl.3
1592,Sofia,Bulgaria

We, ABB Sp.z.o.o., located in 1 Zeganska St. 04-713 Warszawa, producer of indoor switch disconnectors NAL(F) type do hereby confirm guaranteed delivery of the spare parts for period of 20 years.

Company:
Name:
In the Capacity of:
Signed:

ABB Sp. z o.o.
ul. Bitwy Warszawskiej 1920 r. nr 18
02-366 Warszawa
NIP 526-030-44-84 REGON 010017168
ODDZIAŁ W WARSZAWIE
ul. Żegańska 1 04-713 Warszawa
tel.(022)51 52689

ABB Sp. z o.o.
Siedziba spółki
ul. Żegańska 1
04-713 Warszawa
tel.: 22 22 02 000, 22 02 001
fax: 22 22 02 031, 22 02 231

Sąd Rejonowy dla m.st. Warszawy
w Warszawie, XIII Wydział
Gospodarczy Krajowego Rejestru
Sądowego, nr KRS: 0000004745

NIP: 526-030-44-84, PL 5260304484
Nr GIOŚ: E0008536WBW
Kapitał zakładowy: 350 655 734,00 zł

www.abb.pl

ТЕРКОМПЛЕКС

ВЯРНО С
ОРИГИНАЛА

139

Превод от английски език

Мощност и производителност
за един по-добър свят

ABB

Варшава, дата: 2015-06-16

Декларация на производител

До: АББ България ЕООД
бул. Христофор Колумб № 9, ет. 3
1592 София, България

Ние, ABB Sp.z.o.o., разположени на адрес: ул. Зеганска № 1, 04-713 Варшава, производител на товарови прекъсвачи за вътрешен монтаж тип NAL(F), с настоящото потвърждаваме, че гарантираме доставката на резервни части за периодд от 20 години.

Фирма: фирмен печат на АББ - Полша
Име:
В качеството на:
Подпис: не се чете

ABB Sp. z o.o.
Siedziba spółki
ul. Żegańska 1
04-713 Warszawa
tel.: 22 22 02 000, 22 02 001
fax: 22 22 02 031, 22 02 231

Sąd Rejonowy dla m.st. Warszawy
w Warszawie, XIII Wydział
Gospodarczy Krajowego Rejestru
Sądowego, nr KRS: 0000004745

NIP: 526-030-44-84, PL 5260304484
Nr GIOŚ: E0008536WBW
Kapitał zakładowy: 350 655 734,00 zł

www.abb.pl