

AC21B

Temperatura ambiente: 25 °C

Nº Termopar	Punto de medida	Temperatura (°C)	Calentamiento (K)	Límite (K)
1	Terminal acometida	44	19	80
2	Terminal salida	45	20	80
3	Asa de extracción	28	3	35
4	Envolvente (frontal)	31	6	50
5	Envolvente (lateral)	38	13	60

Resultado: **CORRECTO**, los calentamientos medidos no superan los límites indicados en la norma.

4.8. Robustez del mecanismo del elemento de mando

Inicialmente es medida la fuerza, F, necesaria para la apertura.

Estando el equipo cerrado se bloquean los contactos fijos y móviles y se aplica la fuerza de ensayo, durante 10 s, intentando abrir el interruptor.

La fuerza de ensayo es la indicada en la norma para mando de maniobra con un dedo:

Fuerza de ensayo	Fuerza mínima de ensayo (N)	Fuerza máxima de ensayo (N)
3 F	50	150

Fuerza, F, medida: 11 N (AC-22B)
13 N (AC-21B)

Fuerza aplicada en el ensayo: 50 N

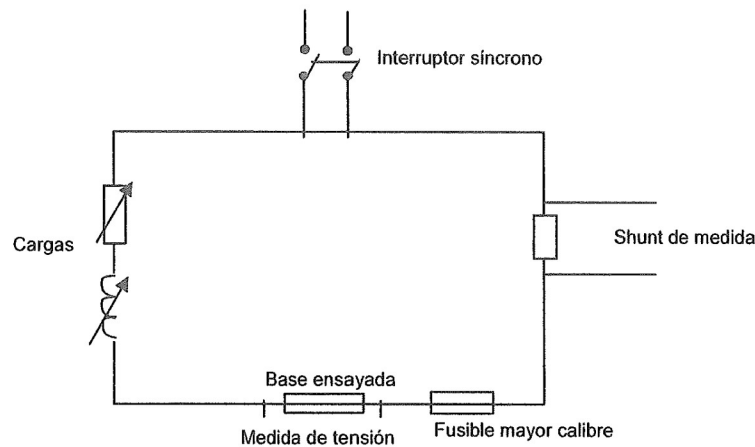
Resultado: **CORRECTO**, el mecanismo del elemento de mando soporta la fuerza aplicada.

5. VERIFICACIÓN DEL VALOR DE CRESTA DE LA CORRIENTE ADMISIBLE

5.1. Disposición de ensayo

La base ensayada se monta en posición vertical en condiciones similares a las de servicio. En serie con la base portafusibles ensayada se monta otra base con un fusible de mayor tamaño e intensidad nominal.

El circuito de ensayo es el siguiente:



5.2. Método de ensayo

Con objeto de conseguir el valor de corriente de cresta exigido se ha colocado una barra de neutro en la base ensayada y se ha montado otra base en serie con un fusible de mayor corriente asignada.

Para una base de tamaño 10 x 38 mm el valor de cresta de la corriente de ensayo debe estar entre los límites 5 a 6 kA.

El comienzo del arco deberá presentarse entre 65° y 90° después del paso por cero de la tensión.

Durante el ensayo no deberán producirse ni arco, ni soldado de los contactos, ni cualquier otro daño que impida el uso posterior de la base. La barra de neutro no deberá ser expulsada.



5.3. Resultados

Los valores registrados han sido los siguientes (Véase oscilograma en el anexo):

Nº Oscilograma	30
Intensidad máxima de corte (kA)	6,3
Tiempo de paso de corriente (ms)	4,3
Energía total ($A^2 \cdot s \cdot 10^4$)	2,80

Resultado: **CORRECTO**

No se observan signos de arco ni cebado durante el ensayo.

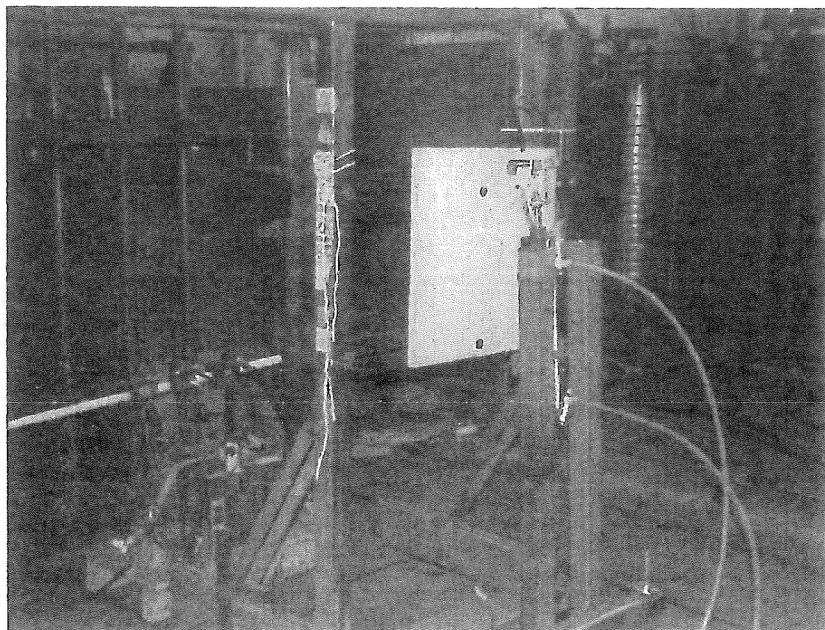
La barra de neutro no es expulsada durante el ensayo.

ВЯРНО С ОРИГИНАЛА

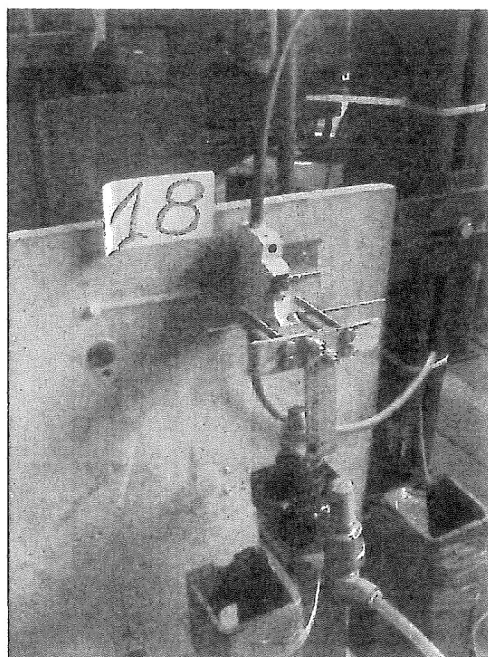
ПЪЛНОМОЩНОСТНО СЪДИЩЕ
ПЛОДИВ
178

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6. ANEXO 1. FOTOGRAFÍAS



Disposición de ensayo de poder de corte



Objeto de ensayo tras poder de corte (AC-22B)

179

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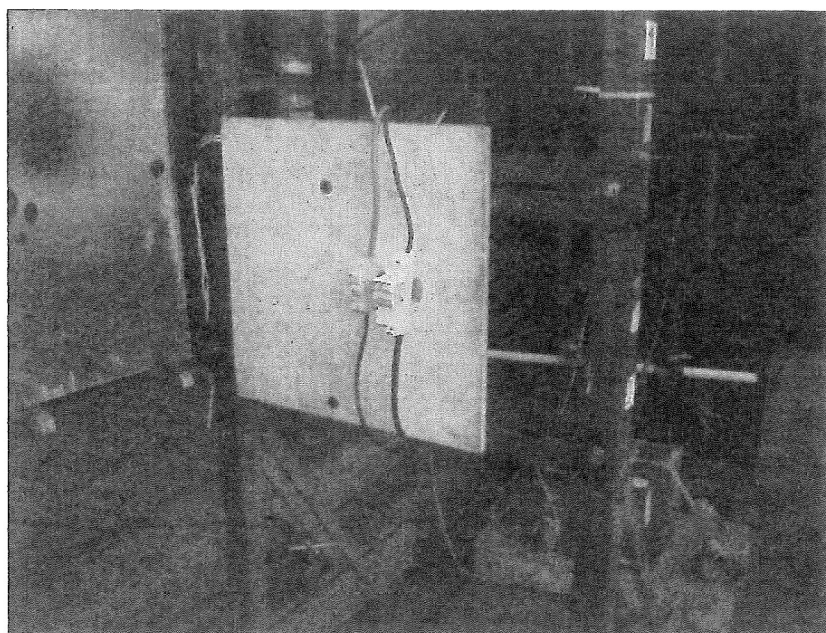
ВЯРНО С ОРИГИНАЛА

179

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Objeto de ensayo tras poder de corte (AC-21B)

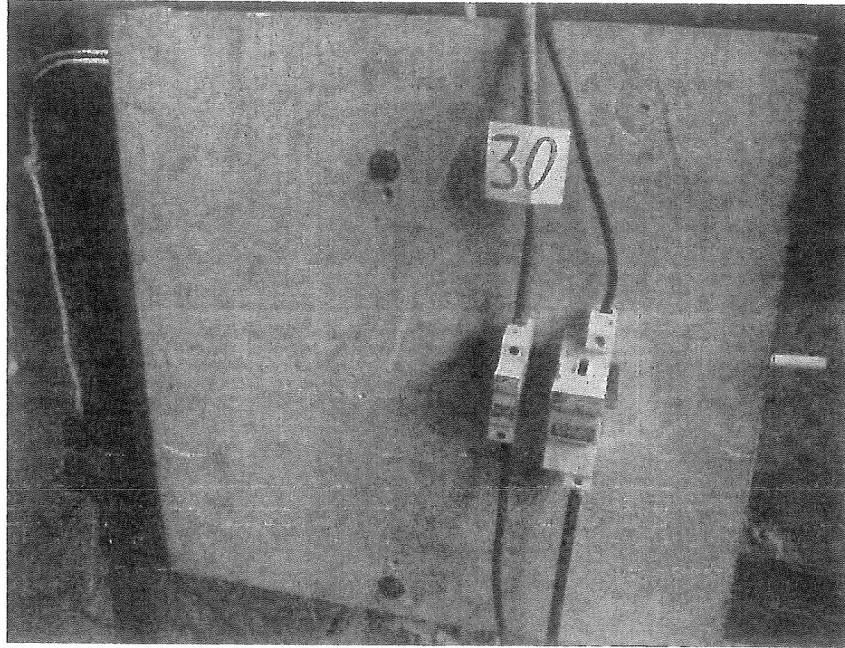


Disposición de ensayo de verificación del valor de cresta

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060



Objeto de ensayo tras la verificación del valor de cresta

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ВЯРНО С ОРИГИНАЛА

ИНЖЕНЕРИ
И
МЕДИЦИНСКИ
СЪВЕЩАТЕЛИ
С
СЕРТИФИКАЦИЯ
И
СЕРТИФИКАЦИЯ
И
СЕРТИФИКАЦИЯ

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ЕАД

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7. ANEXO 2. OSCILOGRAMAS

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ВЯРНО С ОРИГИНАЛА
ПРОСТАВ
СЕАА

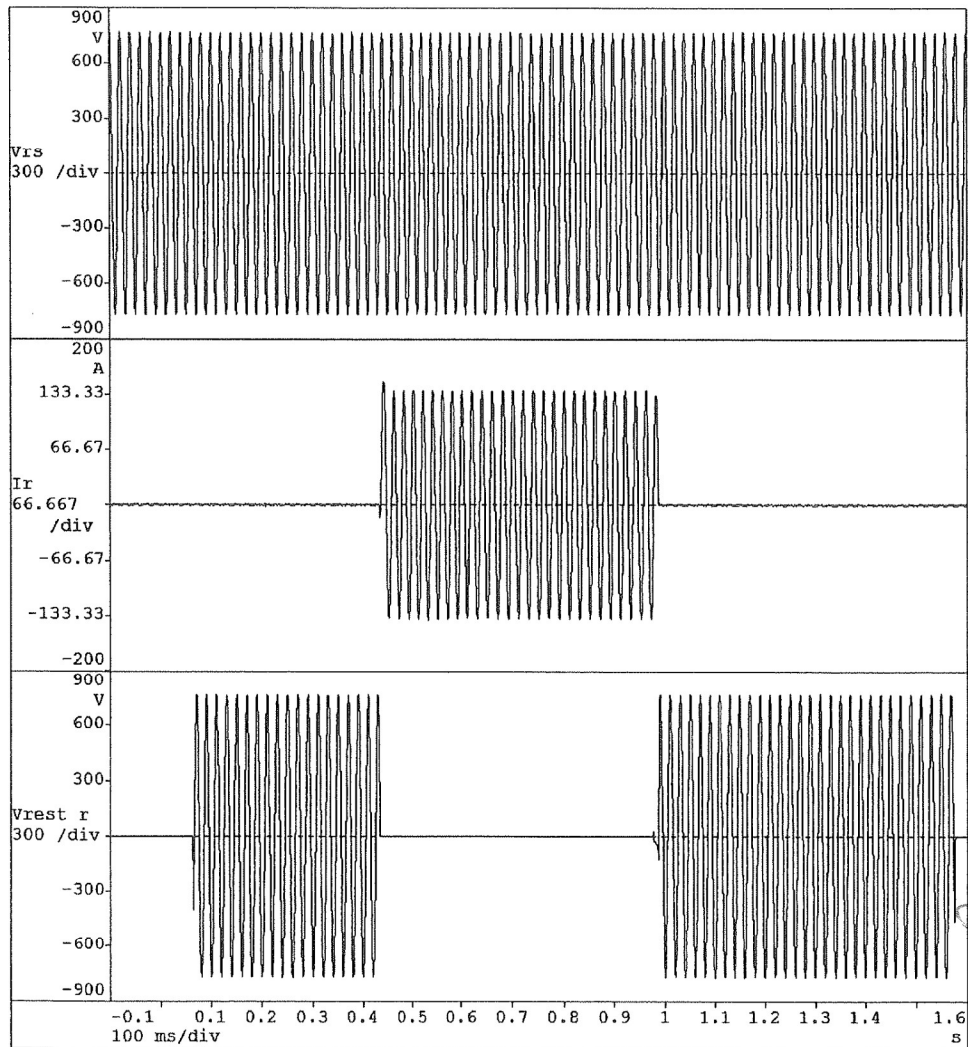
10

Vrs (eficaz/RMS)	538.3 V
VRest/Recov R (eficaz/RMS)	538.1 V
Ir (eficaz/RMS)	97.46 A

Fecha / Date: 28/05/12

N° EXPEDIENTE: B125-12-BB

N° OSCILOGRAMA: 14



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ВЯРНО С ОРИГИНАЛА



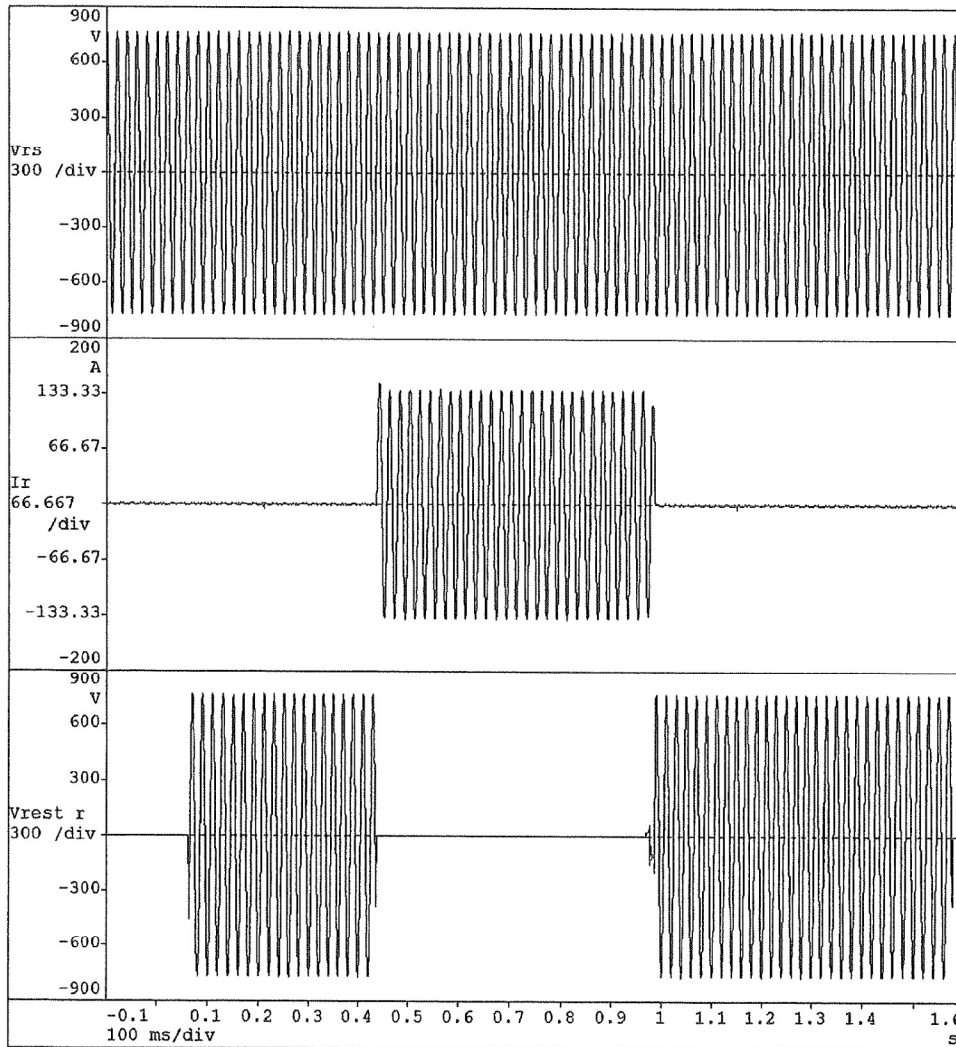
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Vrs (eficaz/RMS)	540.6 V
V _{Rest/Recov R} (eficaz/RMS)	540.5 V
I _R (eficaz/RMS)	97.30 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 15



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ВЯРНО С ОРИГИНАЛА



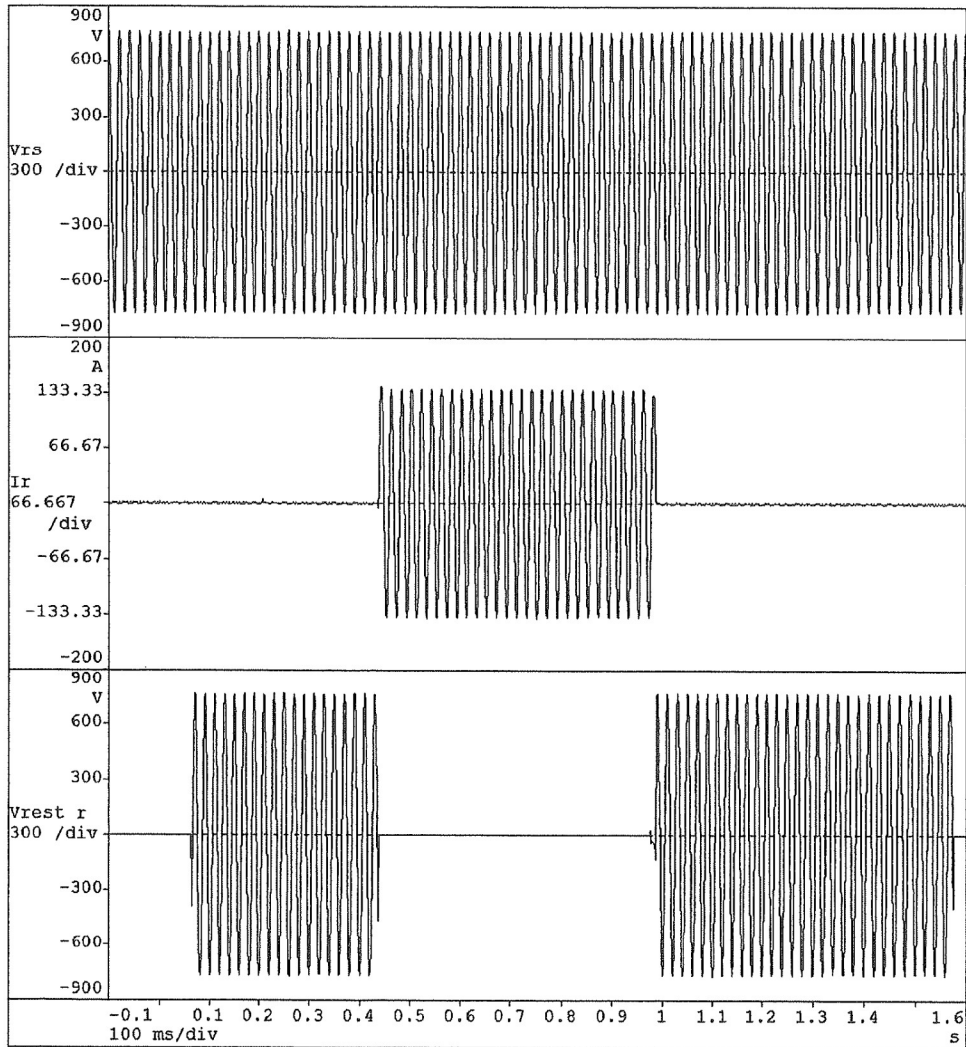
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V _{RS} (eficaz/RMS)	538.0 V
V _{Rest/Recov R} (eficaz/RMS)	537.9 V
I _R (eficaz/RMS)	97.22 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 16



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ВЕРНО С ОРИГИНАЛОМ

ИНЖЕНЕРИ
МОБИЛ

PAGINA 19/27

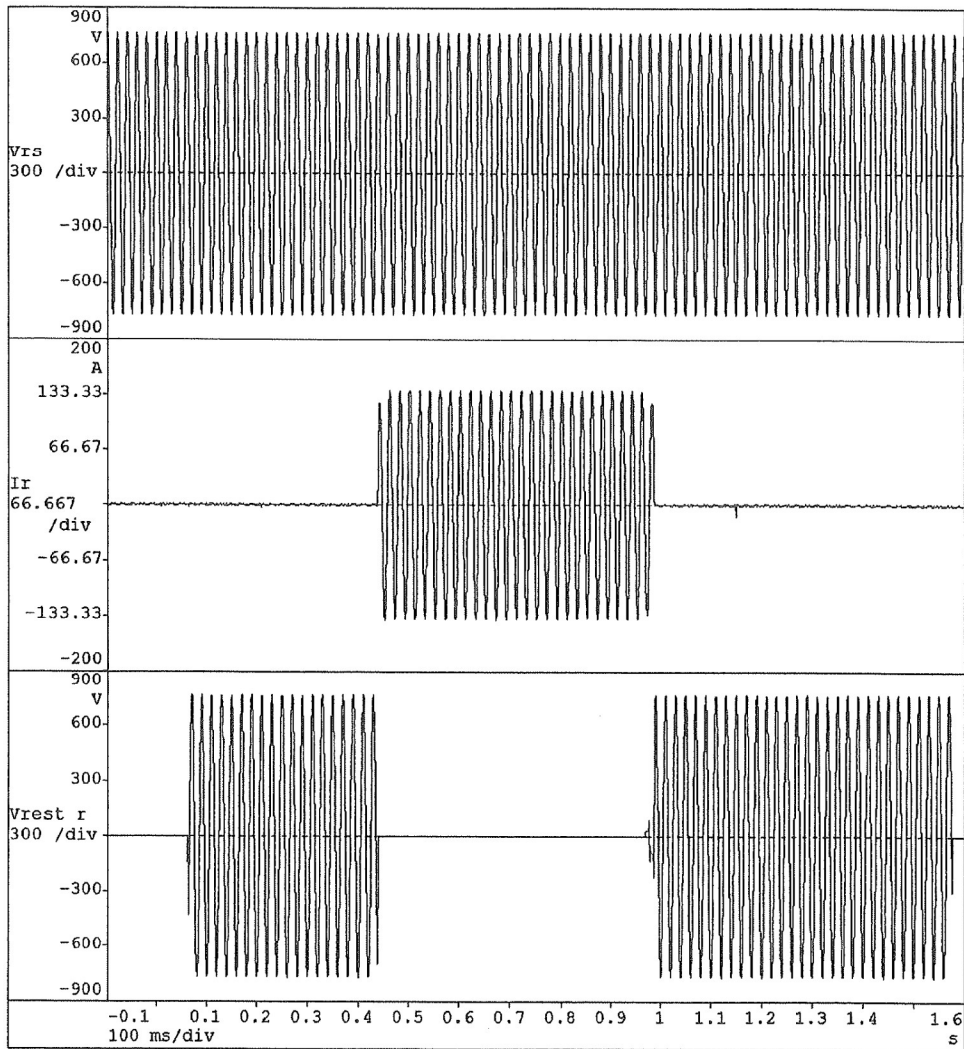
hy

V _{RS} (eficaz/RMS)	539.5 V
V _{Rest/Recov R} (eficaz/RMS)	539.3 V
I _R (eficaz/RMS)	97.47 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 17



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ВЯРНО С ОРИГИНАЛА

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ПЛОДОВ
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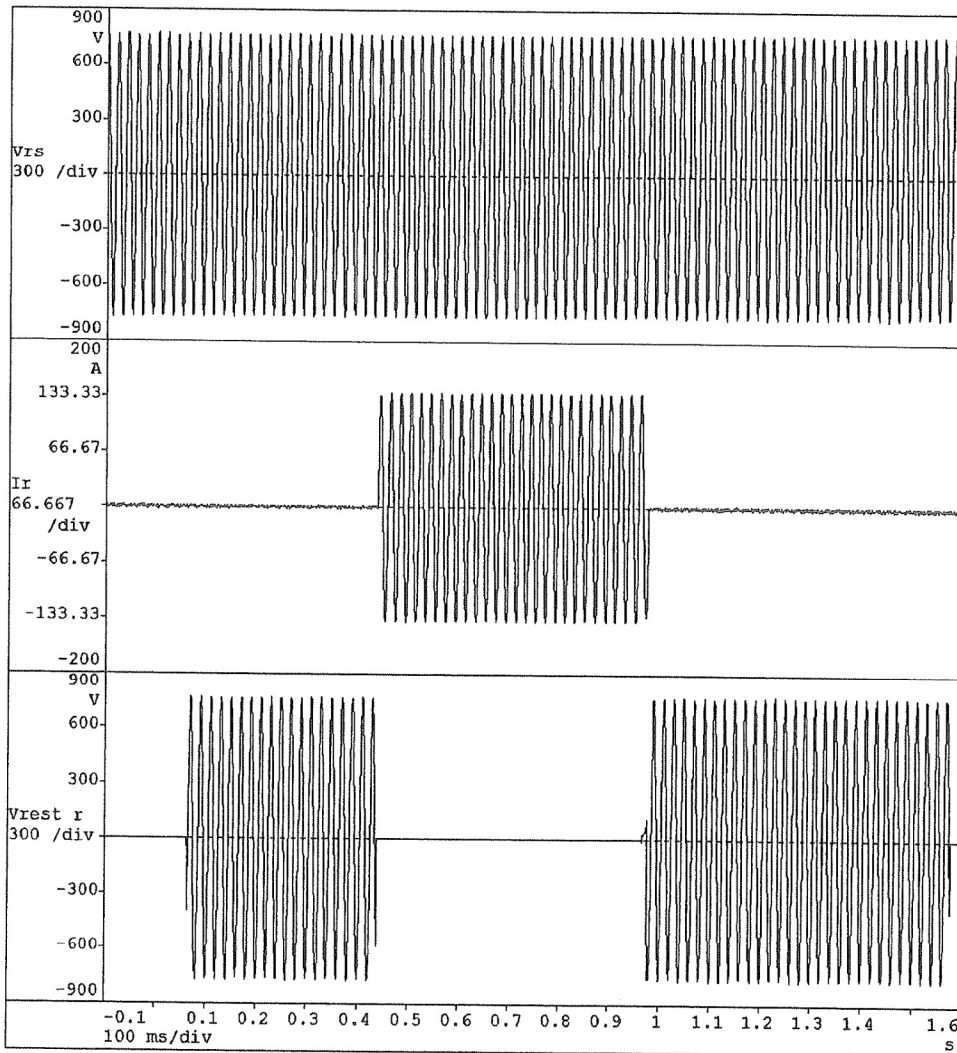
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V_{RS} (eficaz/RMS)	533.7 V
$V_{Rest/Recov R}$ (eficaz/RMS)	533.5 V
I_R (eficaz/RMS)	97.47 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 18



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ВЯРНО С ОРИГИНАЛА

Stamp: МАШИНАРИЯТА НА ПЛОВДИВ

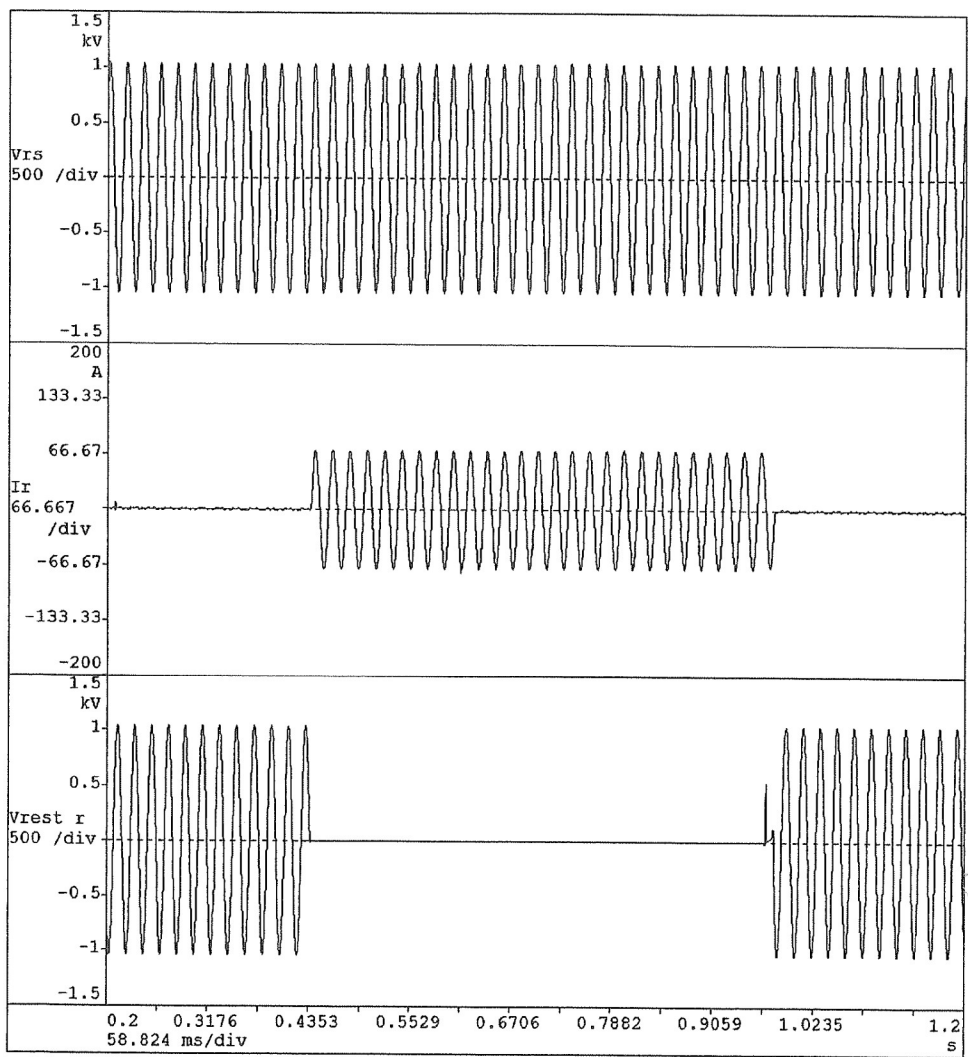
PÁGINA 21 / 27

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V _{RS} (eficaz/RMS)	737.4 V
V _{Rest/Recov R} (eficaz/RMS)	737.8 V
I _R (eficaz/RMS)	50.1 A

Fecha / Date: 28/05/12
 N° EXPEDIENTE: B125-12-BB
 N° OSCILOGRAMA: 21



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ВЯРНО С ОРИГИНАЛА

ИНЖЕНЕРНИ
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 *
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 ДИПЛОМ
 *
 ПАСИЖА

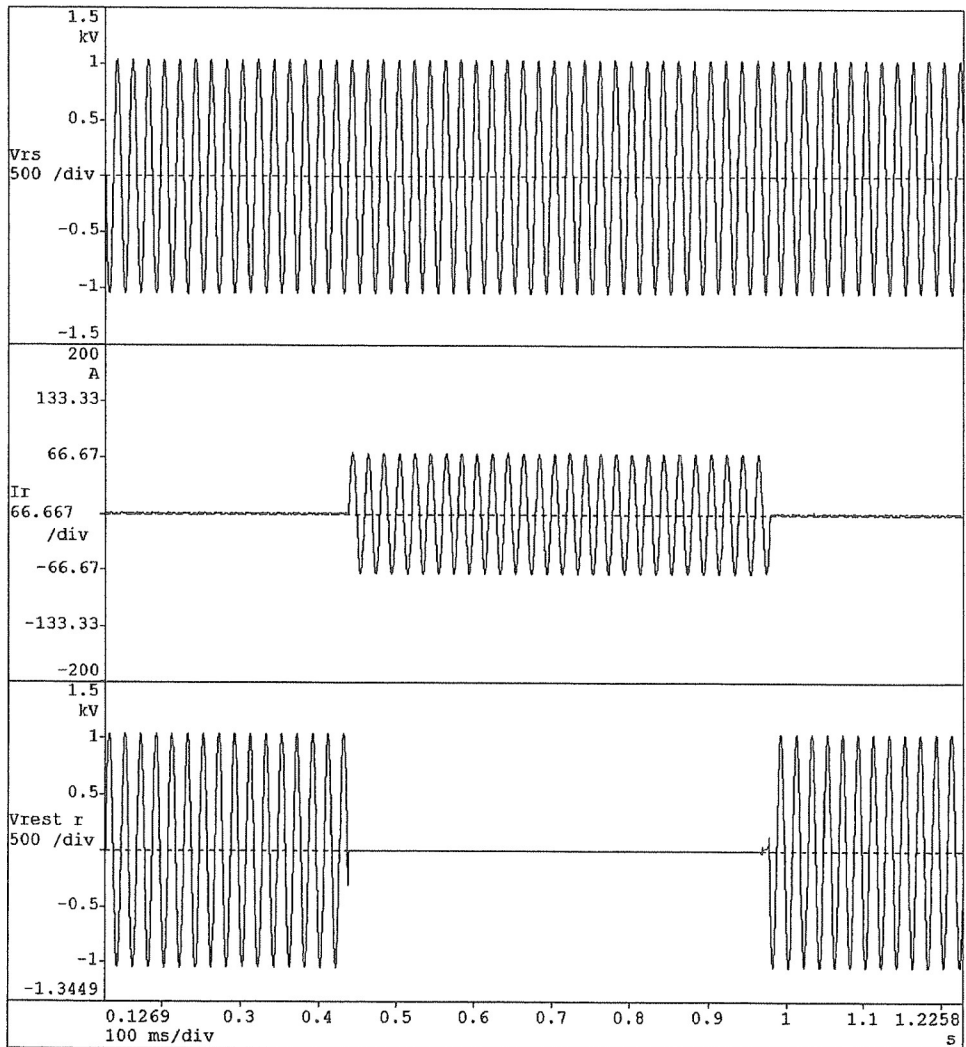
h

Vrs (eficaz/RMS)	735.5 V
V _{Rest/Recov R} (eficaz/RMS)	735.7 V
I _R (eficaz/RMS)	50.30 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 22



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ВЯРНО С ОРИГИНАЛА

МАЖЕНЕТИЧЕ
МАШИНОСТРОИТЕЛЕН
ИНСТИТУТ
СООБЩАВА
НА 28.05.2012
Г. ВАРНА

ПÁGINA 23/27

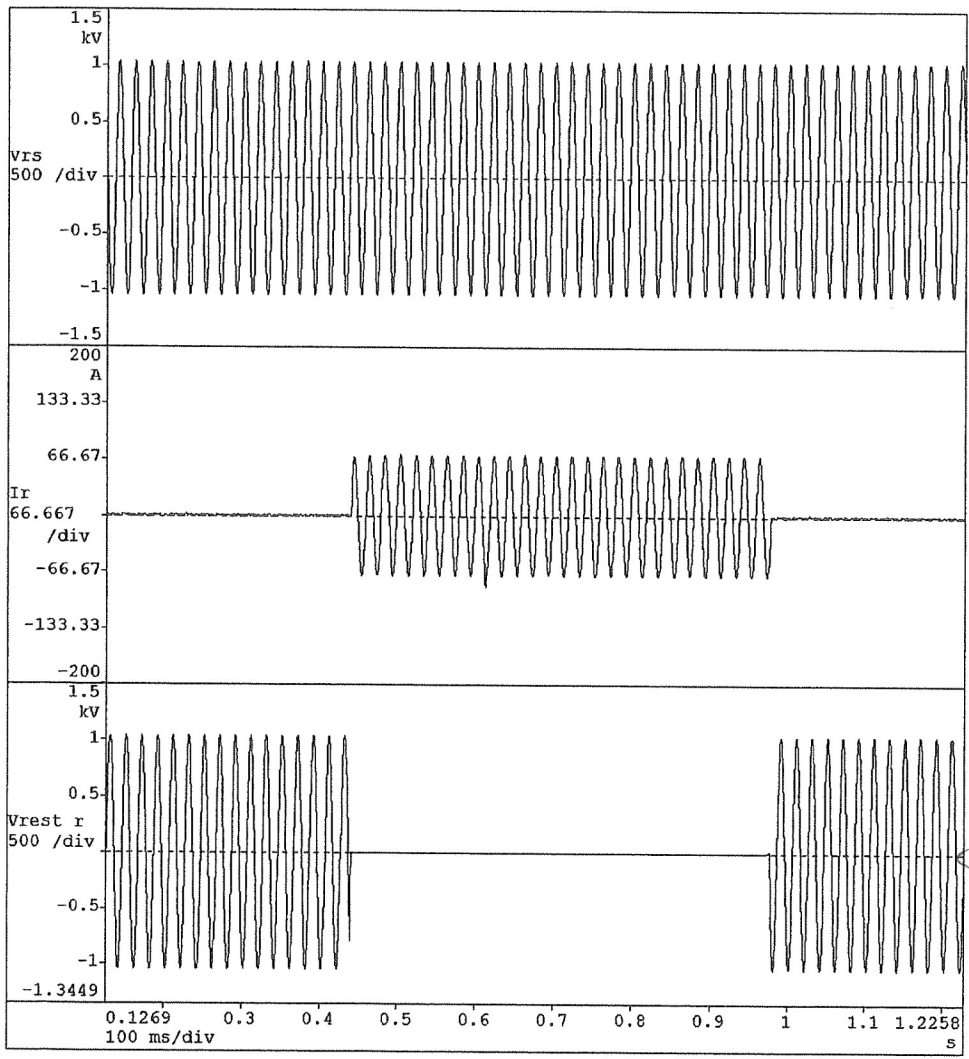
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V _{RS} (eficaz/RMS)	733.1 V
V _{Rest/Recov R} (eficaz/RMS)	733.3 V
I _R (eficaz/RMS)	50.12 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

Nº OSCILOGRAMA: 23



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ВЯРНО С ОРИГИНАЛА

ИНЖЕНЕРИ ИТ
ПЛОДБИВ

PAGINA 24 / 27

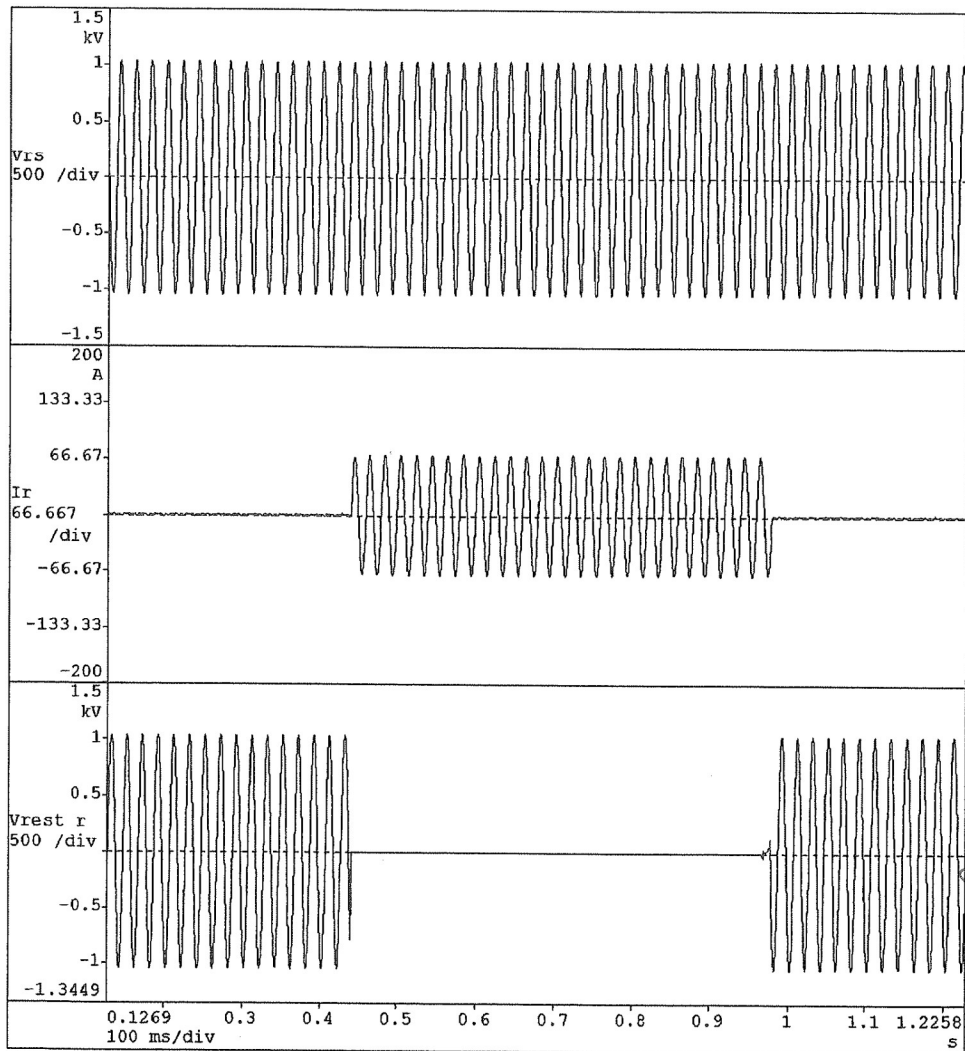
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V_{RS} (eficaz/RMS)	733.0 V
$V_{Rest/Recov R}$ (eficaz/RMS)	733.2 V
I_R (eficaz/RMS)	50.26 A

Fecha / Date: 28/05/12

N° EXPEDIENTE: B125-12-BB

N° OSCILOGRAMA: 24



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ВЯРНО С ОРИГИНАЛА



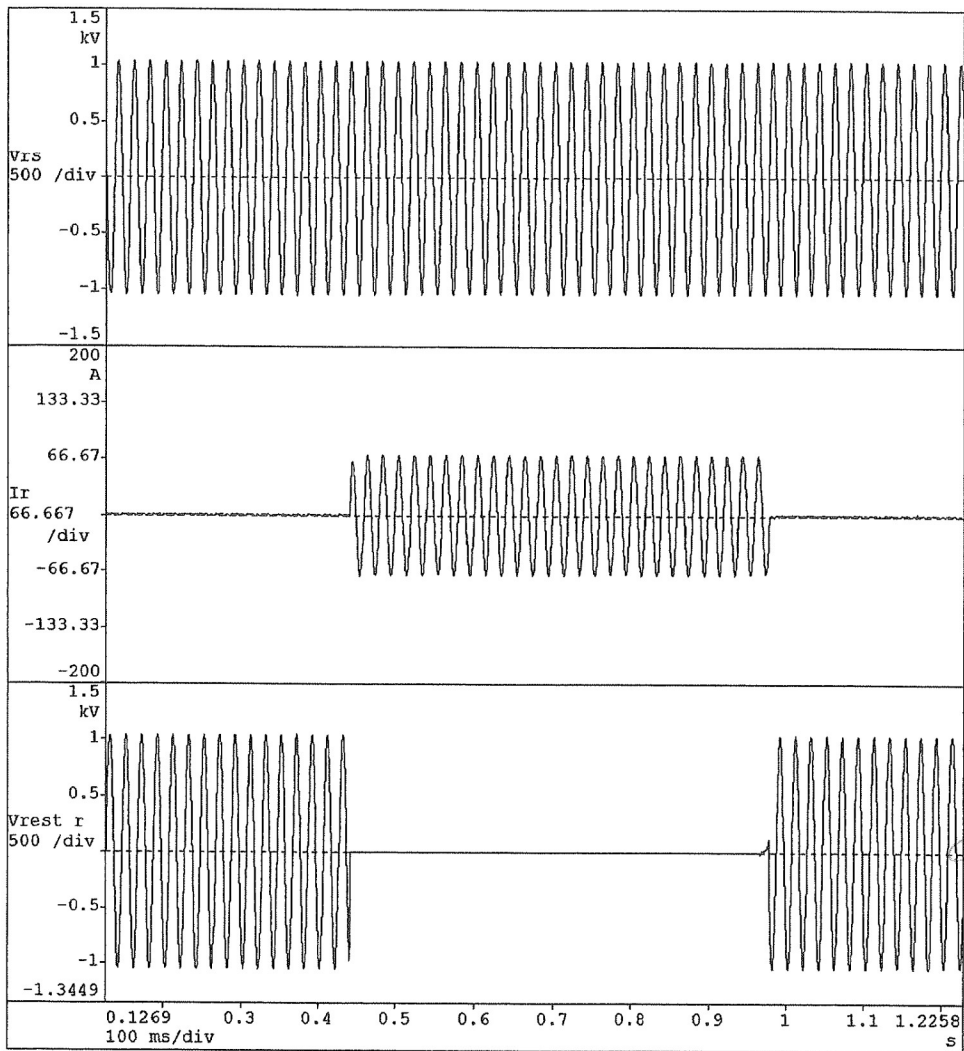
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V _{RS} (eficaz/RMS)	736.0 V
V _{Rest/Recov R} (eficaz/RMS)	736.2 V
I _R (eficaz/RMS)	50.06 A

Fecha / Date: 28/05/12

Nº EXPEDIENTE: B125-12-BB

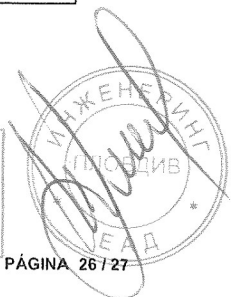
Nº OSCILOGRAMA: 25



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ВЯРНО С ОРИГИНАЛА



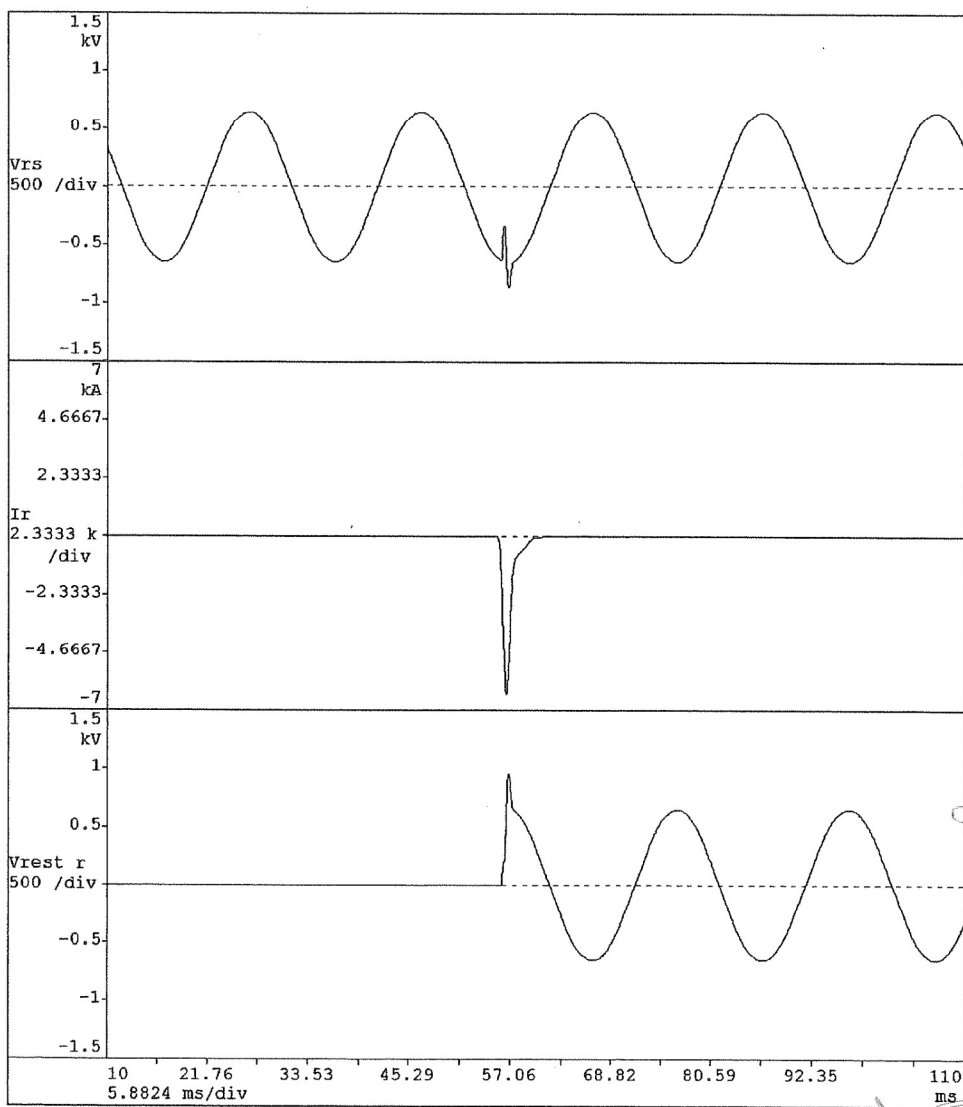
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V _{RS} (eficaz/RMS)	455.8 V
V _{Rest/Recov R} (eficaz/RMS)	459.4 V
I _R (eficaz/RMS)	-
I _R (cresta)	6347.36 A
t _{Ir}	0.0043 s
E _R	27957.76A

Fecha / Date: 29/05/12

Nº EXPEDIENTE: B125-12-BB

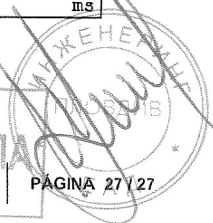
Nº OSCILOGRAMA: 30



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ВЯРНО С ОРИГИНАЛА



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Логи на ТЕКНАЛИА вдъхновен бизнес

ДОКЛАД ЗА ИЗПИТВАНЕ
NO. B125-12-BB-02

Силов тест и проверка на пиковия ток

Тест обект	База модулен държач предпазител за цилиндрични предпазител 10 x 38
Означение	PMX 10x38
Производител	DF Electric
Клиент	DF Electric Силици 67-69, 08940 Корнела де Лобрегат-Барселона
Действащата нормативна уредба	IEC 60947-3: 2008 / IEC 60269-2: 2010
Датата на получаване	18 май 2012 г.
Дата на изпитания	28 май до 05 юни, 2012
Дата на издаване	11 юни 2012

Този документ е копие в PDF формат на оригиналния доклад, по искане на заявителя

Отговорен за тестването: Подпис: (не се чете) Агустин Рамос БУКВЕН печат на ТЕКНАЛИА	Ръководител на Лабораторията по Електротехника: Подпис: (не се чете) Луис Мартинес
---	--

- Докладът засяга тестването единствено пробите и времето и условията, при които е било извършено измерването
- Този доклад не може да бъде възпроизвеждана частично, без изричното писмено разрешение на TECNALIA Research & Innovation

Адресна информация на ТЕКНАЛИА
TECNALIA RESEARCH & ИНОВАЦИИ
Сан Себастиан технологичен парк Mikeletegi Pasealekua, 2 E-20009 Доносия-Сан Себастиан
Т 902760000, Т + 34946430850 (Международни разговори)
Лаборатория Електротехника в / Vega Tapia S / N E-48903 Burtzeña-Barakaldo

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ВЯРНО С ОРИГИНАЛА



1. Идентификация тествания обект

База модулен държач предпазител за цилиндрични предпазител 10 x 38 mm.

Производител:	DF
Обозначение:	PMX-10x38
Размер:	10 x 38 мм
Номинално напрежение:	500 V 690 V
Номинален ток:	32 A
Категория на работа:	AC-22B (500 V) AC-21B (690 V)
Задвижване:	ръчно
Изключвателна способност:	5 изключвания 96 A cos φ 0.65 5 изключвания 48 A cos φ 0.95

2. Мястото на изпитване

Изпитването на късо съединение се провежда в помещенията на TECNALIA в Burtzeña (Barakaldo).



ВЯРНО С ОРИГИНАЛА



3. Изпитване и действащата нормативна уредба

- Силов тест и обвивка
- Диелектрична проверка
- Ток на утечка
- Проверка на загряванеотопление
- Устойчивост на механизма на контролния елемент

Посочените по-горе тестове са извършени чрез прилагане на изискванията на следните стандарти:

IEC 60947-3: 2008, Комутационни апарати за ниско напрежение. Част 3: : Товарови прекъсвачи, разединители, товарови прекъсвач-разединители и апарати, комбинирани със стопяеми предпазители "

- Проверка на пиковата стойност на допустимия ток на база.

Горният тест се извършва чрез прилагане на изискванията на следните стандарти:

IEC 60269-2: 2010, Стопяеми предпазители за ниско напрежение. Част 2: Допълнителни изисквания за стопяеми предпазители, предназначени да се използват от квалифицирани лица (стопяеми предпазители предимно за индустриално приложение) – примери на стандартизирани системи предпазители А до J "

Регламенти, посочени по-горе:

IEC 60269-1: 2009, Стопяеми предпазители за ниско напрежение. Част 1: Общи изисквания

Се прилага за изчисляване на неясноти при измерванията.

ВЯРНО С ОРИГИНАЛА



4. Силов тест и обвивка

4.1. Организиране на теста

Тестовите се извършват върху нови и чисти продукти. Продуктът се монтира върху метална платформа с точки за закрепване при нормални условия за монтаж.

Всички части на продукта са заземени, чрез предпазителен елемент от 0,8 mm в диаметър.

За анализи неутрален бар се използва вместо предпазител.

4.2. Метод за изпитване

Тест стойности в зависимост от категорията на работа и интензивността на работата както следва:

Ue: 500 V

Категория на работа: AC 22B

Ie: 32 A

тестови стойности	Затравяне	Отваряне
Брой цикли	5	5
Тест напрежение (V)	525	525
Тест ток (A)	96	96
cos φ	0.65	0.65

Ue: 690 V

Категория на работа: AC 21B

Ie: 32 A

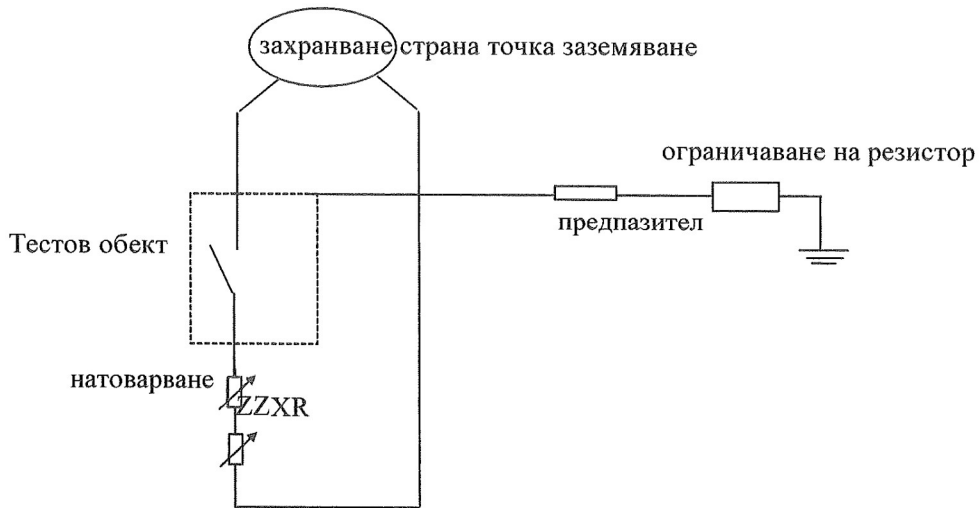
тестови стойности	Затравяне	Отваряне
Брой цикли	5	5
Тест напрежение (V)	725	725
Тест ток (A)	48	48
cos φ	0.95	0.95

В посочения брой работни цикли събитията се извършват с интервал от време между циклите на 30 сек.

По време на всеки цикъл, оборудването е затворено достатъчно дълго за ток, за да се стабилизира и напрежението да се нулиране за да остане по-голяма от 0.05 и период от време.

4.3. Тестваща верига

Измервателната схема е показана:



Товарите са коригирани, за да се получи стойността на ток, напрежение и фактор на мощността както са специфицирани.

ВЯРНО С ОРИГИНАЛА



4.4. Резултати

Стойностите, получени по време на изпитването са следните:

Ue: 500 V (AC 22В)

Брой на цикъла (отваряне затваряне)	Брой на осцилограмата	напрежение (V)	Ток (A)
1	14	538	98
2	15	541	97
3	16	538	97
4	17	540	98
5	18	534	98

Резултат: **ПРЕМИНАТ.** По време на теста искрене на предпазителя не се наблюдава, няма откриване на повреди, не се топи. Веднага след тестване няколко цикъла на затваряне и отваряне на вакуум със удовлетворителни резултати са извършени.

Ue: 690 V (AC 21В)

Брой на цикъла (отваряне затваряне)	Брой на осцилограмата	Напрежение (V)	Ток (A)
1	21	738	50
2	22	736	50
3	23	733	50
4	24	733	50
5	25	736	50

Резултат: **ПРЕМИНАТ.** По време на теста искрене на предпазителя не се наблюдава, няма откриване на повреди, не се топи. Веднага след тестване няколко цикъла на затваряне и отваряне на вакуум със удовлетворителни резултати са извършени.

ВЯРНО С ОРИГИНАЛА

4.5. Диелектрична проверка

Тестова конфигурация:

На базата в затворено положение

Между главната верига и металните части на обвивката.

Въз основа на позиция OPEN

Между всяка клема и другите части свързани към корпуса и земята.

Напрежението на изпитване се прилага в продължение на 5сек.

AC22B

Номинално напрежение (UE):	500 V
Тестово напрежение	1000 V
честота:	50 Hz

AC21B

Номинално напрежение (UE):	690 V
Тестово напрежение	1380 V
честота:	50 Hz

Резултат: **ПРЕМИНАТ**, няма дъга или повреда по време на изпълнението на изпитвателно напрежение.

4.6. Ток на утечка

Продуктите, подходящи за секционирание на ток на утечка, като се измерва между контактите и между всеки терминал и обвивката.

Тестови Параметри:

AC22B

Номинално напрежение (UE):	500 V
Тестово напрежение (1,1xUe):	550 V

I утечка = < 0.5 mA

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AC21BНоминално напрежение (U_e): 690 VТестово напрежение (1,1xU_e): 759 V

I утечка = < 0.5 mA

Резултат: ПРЕМИНАТ, измерената ст-ст на тока на утечка е по-малко от 0.5 mA като лимитната граница е 2 mA за категорията AC-22B A и AC-21B.

4.7. Проверка за нагряване

За тестването се използва се 6 мм² Меден проводник

Измерването на температурата на различните части се измерва от термодвойки. Стайната температура е измерена от две термодвойки разположени приблизително 1 m от изделието.

Параметрите на изпитанието бяха както следва:

Тестващ ток: 32 A

предпазител: DF неутрален бар 10x 38 mm

AC22B

Температура: 24 ° C

№. Термо-двойка	Точка на измерване	Температура (° C)	Нагряване (K)	Лимит (K)
1	Входна клема	46	22	80
2	Изходна клема	47	23	80
3	Екстракция	30	6	35
4	Около (Фронт)	32	8	50
5	Обвивка (странична)	39	15	60

Резултат: ПРЕМИНАТ, измерените загрявания не превишават границите, посочени в стандарта.

ВЯРНО С ОРИГИНАЛА



AC21B

Температура: 25 °C

Но. Термо-двойка	Точка на измерване	Температура (°C)	Нагряване (K)	Лимит (K)
1	Входна клемма	44	19	80
2	Изходна клемма	45	20	80
3	Екстракция	28	3	35
4	Около (Фронт)	31	6	50
5	Обвивка (странична)	38	13	60

Резултат: **ПРЕМИНАТ**, измерените загрявания не превишават границите, посочени в стандарта.

4.8. Устойчивост на механизма на контролния елемент

Първоначално се измерва сила, F, необходима за отваряне.

Изделието е затворено фиксирани и движещи контакти са блокирани и се прилага силата на изпитване за 10 сек, опитвайки се да отвори предпазителя.

Силата за изпитване е посочена в стандартната норма за операция с един пръст:

Тест сила	минимална тест сила (N)	максимална тест сила (N)
3F	50	150

Сила F мярка: 11 N (AC-22B)

13 N (AC-21B)

приложен тест сила: 50 N

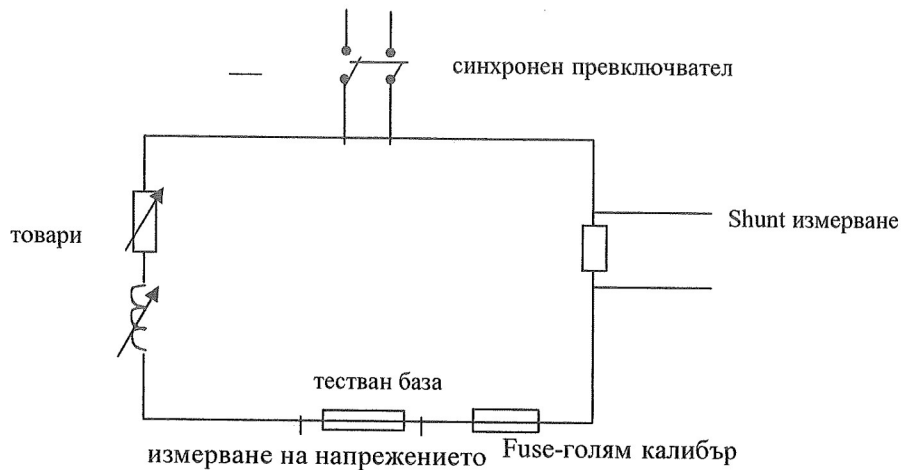
Резултат: **ПРЕМИНАТ**, механизма на контролния елемент поддържа приложената сила.

5. Проверка на допустим пиков ток

5.1. Организиране на теста

Изпитваната база се монтира във вертикално положение при условия, подобни на тези на обслужване. Последователно с изпитваната основа на предпазителя се монтира друга основа с по-голям и по-здрав предпазител от номиналната.

веригата на изпитването е както следва:



5.2. Метод за изпитване

За да се постигне необходимата пикова стойност на тока, е поставен неутрален бар за тестваната базата и друга база, монтирана последователно с предпазител с по-висок номинален ток.

За основен размер от 10 x 38 mm пиковата стойност на изпитвателния ток трябва да бъде между граници от 5 до 6 kA.

Началото на дъгата трябва да бъде между 65° и 90° след пресичането на напрежението на нулата.

По време на изпитването не трябва да се произвежда нито дъгова, нито контактна заварка, нито други повреди предотвратяващо по-късното използване на базата. Неутралният бар не трябва да се изхвърля.

5.3. Резултати

Стойностите, записани са както следва (виж осцилограмата в приложение):

Но. осцилограмата	30
Максимален ток (кА)	6.3
Текущо време поток (ms)	4.3
Общо енергия ($A^2s * 10^4$)	2.80

Резултат: ПРЕМИНАТ

Не се наблюдават признаци дъга или заваряване по време на изпитването. Неутрално бар не се изхвърля по време на изпитването.

СЛЕДВАТ СТРАНИЦИ ОТ 13 ДО 27, ВКЛЮЧВАЩИ:

ПРИЛОЖЕНИЕ 1. Снимки

ПРИЛОЖЕНИЕ 1. Осцилограми

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СПИСЪК НА ИЗПИТАНИЯТА /с Доклад за изпитване NO. В125-12-ВВ-02/

На продукт: РМХ База модулен държач предпазител за цилиндрични предпазител 10 x 38

Производител: DF Electric, Испания

Съгласно IEC 60947-3: 2008 / IEC 60269-2: 2010

Съгласно IEC 60947-3: 2008, Комутационни апарати за ниско напрежение. Част 3: :
Товарови прекъсвачи, разединители, товарови прекъсвач-разединители и апарати,
комбинирани със стояеми предпазител ":

- Силов тест и обвивка
- Диелектрична проверка
- Ток на утечка
- Проверка на загряванеотопление
- Устойчивост на механизма на контролния елемент

Съгласно IEC 60269-2: 2010, Стояеми предпазител за ниско напрежение. Част 2:
Допълнителни изисквания за стояеми предпазител, предназначени да се използват от
квалифицирани лица (стояеми предпазител предимно за индустриално приложение) – примери
на стандартизирани системи предпазител А до J ":

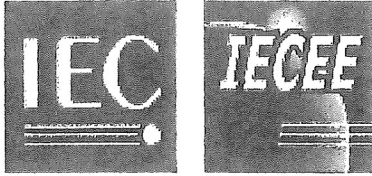
- Проверка на пиковата стойност на допустимия ток на база.

~~_____~~

~~_____~~

ВЯРНО С ОРИГИНАЛА





Test Report issued under the responsibility of:



TEST REPORT
IEC 60269-1
Low-voltage fuses
Part 1: General requirements

Report Number: 2.03.02619.1.0/DF-S.A/60269-1/PMX-10
Date of issue: 16.01.2014
Total number of pages: 36

Applicant's name: DF S.A
Address: Silici, 67-69
08940 CORNELLA DE LLOBREGAT (Barcelona)
SPAIN

Test specification:
Standard: IEC 60269-1:2006 (Fourth edition)+ A1:2009
Test procedure.....: CB Scheme
Non-standard test method.....: N/A


Test Report Form No......: IEC60269_1B
Test Report Form(s) Originator.....: EZU
Master TRF: Dated 2010-08

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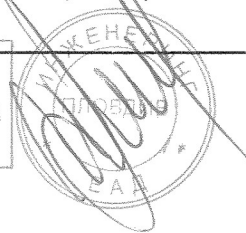
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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description: Low-voltage fuse-holders for cylindrical fuse-links
Trade Mark: 
Manufacturer.....: DF S.A
Model/Type reference: PMX-10 (For 10x38 fuse-links)
Ratings: 690V a.c. and 24V d.c./ 32A/ 50Hz and DC/
1-pole; N-pole; 1+N-pole; 2-pole; 3-pole; 3+N-pole; 4-pole

ВЯРНО С ОРИГИНАЛА



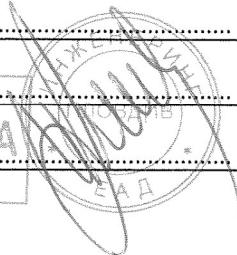
Handwritten mark

Testing procedure and testing location:	
<input checked="" type="checkbox"/>	CB Testing Laboratory:
Testing location/ address: AIT Austrian Institute of Technology GmbH, A-1210, Vienna, Giefinggase 2	
<input type="checkbox"/>	Associated CB Laboratory:
Testing location/ address: ---	
Tested by (name + signature): Raheb Hanna, MSc	
Approved by (name + signature): Ing.J.Ainetter	
<div style="border: 1px solid red; padding: 5px; display: inline-block;"> на основание чл. 36а, ал. 3 от ЗОП </div>	
<input type="checkbox"/>	Testing procedure: TMP
Testing location/ address: ---	
Tested by (name + signature): ---	
Approved by (name + signature): ---	
<input type="checkbox"/>	Testing procedure: WMT
Testing location/ address: ---	
Tested by (name + signature): ---	
Witnessed by (name + signature): ---	
Approved by (name + signature): ---	
<input type="checkbox"/>	Testing procedure: SMT
Testing location/ address: ---	
Tested by (name + signature): ---	
Approved by (name + signature): ---	
Supervised by (name + signature): ---	
<input type="checkbox"/>	Testing procedure: RMT
Testing location/ address: ---	
Tested by (name + signature): ---	
Approved by (name + signature): ---	
Supervised by (name + signature): ---	



на основание чл. 36а, ал. 3 от ЗОП

ВАРНО С ОРИГИНАЛА



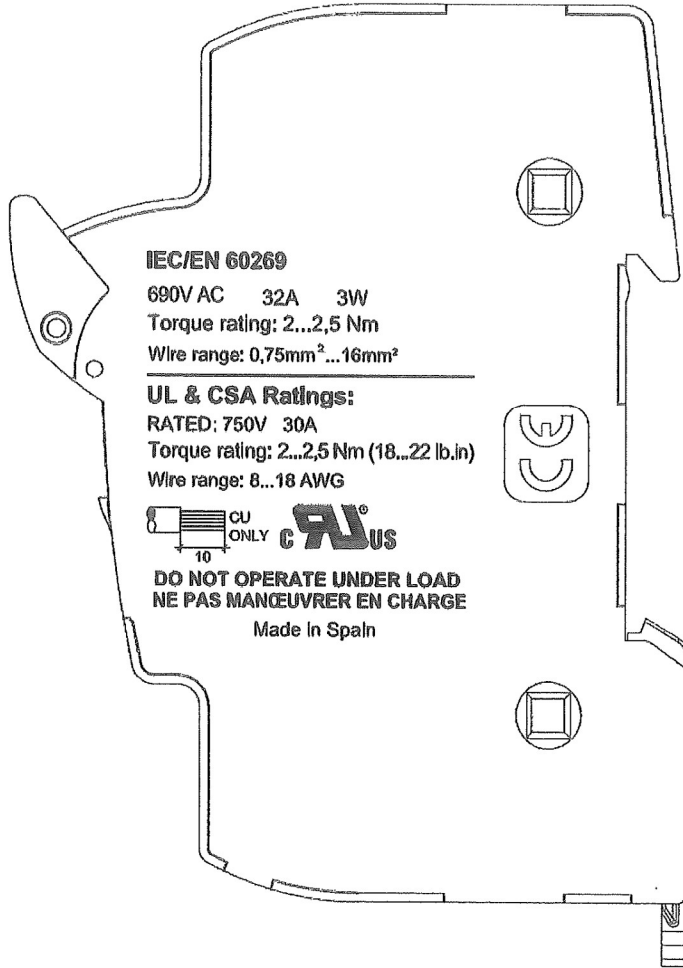
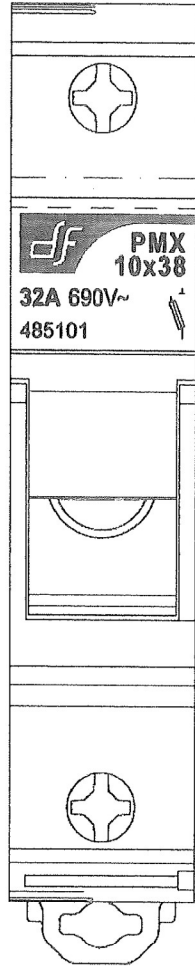
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List of Attachments (including a total number of pages in each attachment): ---	
Summary of testing:	
Tests performed (name of test and test clause): A type test was performed according to <ul style="list-style-type: none">Table 14 and according to <ul style="list-style-type: none">IEC 60269-1:2009, Edition 4.1 The low-voltage fuse-holders for cylindrical fuse-links <ul style="list-style-type: none">PMX-10 have passed the type test successfully.	Testing location: AIT Austrian Institute of Technology GmbH Business Unit Electric Energy Systems Power Service Center Giefinggasse 2 1210 Vienna The AIT Austrian Institute of Technology GmbH is a recognized CB Testing Laboratory under the responsibility of OVE as the National Certification Body.
Summary of compliance with National Differences ---	

ВЯРНО С ОРИГИНАЛА



Copy of marking plate:



The catalogue number (and voltage as appropriate) changes according to the specific version.

ВЯРНО С ОРИГИНАЛА



Remark for use of the fuse-holders:

The maximum power dissipation of the fuse-links suitable for use with the fuse-holders is 3W. Fuse-links with rated voltage 690V of the appropriate size (10x38) may have a power dissipation exceeding this value.

It has to be taken into consideration that the maximum power dissipation of

3W

will not be exceeded for use in uninterrupted duty.

ВЕРНО С ОРИГИНАЛА

ИНЖЕНЕР
Е.А.Д.

Remark to test performance:

The low-voltage fuse-holders for cylindrical fuse-links PMX-10 single phase and multi-pole are identical in the type of construction, dimensions and in any other manner, except marking.
(Multi-pole units can be made of connection accessories)

Some tests are covered by performing the appropriate tests under more severe conditions.

Catalogue number		485101	485102	485103	485104	485105	485106	485107
Test according to subclause		1-pole	N-pole	1+N-pole	2-pole	3-pole	3+N-pole	4-pole
8.1.4	Dimesions	Covered	Covered	Covered	Covered	Covered	Covered	Tested
8.2	Insulating properties	Tested	Covered	Covered	Covered	Covered	Covered	Tested
8.3	Temperature rise and acceptable power dissipation	Covered	Covered	Covered	Tested	Covered	Tested	Covered
8.5	Peak withstand current	Tested	Covered	Covered	Tested	Covered	Covered	Tested
8.8	Degree of Protection	Covered	Covered	Covered	Covered	Covered	Covered	Tested
8.9	Resistance to heat	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10	Covered acc. sub clause 8.3,8.4, 8.5, 8.10
8.10	Non-deterioration of contacts	Covered	Tested	Covered	Tested	Covered	Tested	Covered
8.11.1	Mechanical strength	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5	Covered acc. sub clause 8.5
8.11.2.1	Freedom from season cracking	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8.11.2.2	Resistance to abnormal heat and fire	Covered	Covered	Tested	Covered	Covered	Covered	Covered
8.11.2.3	Resistance to rusting	Covered	Covered	Covered	Tested	Covered	Covered	Covered

Auxiliary components:

Cat. No.	485108	485109	485110	485111	485112	485113	485114	485116
	1-pole with indicator	1+N-pole with indicator	2-pole with indicator	3-pole with indicator	3+N-pole with indicator	4-pole with indicator	1-pole with 24 VDC indicator	2-pole with 24 VDC indicator

Auxiliary components are not part of the type test but PMX10 with indicator for 690V_{a.c} and 24V_{d.c} were tested of functioning. Furthermore they were tested 1h at 1,05*U_n to check, if the diode or the resistor of the indicator were still working over a longer time.



Test item particulars:	
Classification of installation and use.....	Acc. to IEC/EN 60269-1 and IEC/HD 60269-2
Supply Connection	Acc. to IEC/HD 60269-2
Possible test case verdicts:	
- test case does not apply to the test object	: N/A
- test object does meet the requirement.....	: P (Pass)
- test object does not meet the requirement.....	: F (Fail)
Testing:	
Date of receipt of test item	: 04/2013
Date (s) of performance of tests.....	: 04/2013 to 10/2013
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p>	
Manufacturer's Declaration per sub-clause 6.2.5 of IEC/EN 60269-1:	
<p>The application for obtaining a CB Test Certificate <input type="checkbox"/> Yes includes more than one factory location and a <input checked="" type="checkbox"/> Not applicable declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided</p>	
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)	DF S.A Silici, 67-69 08940 CORNELLA DE LLOBREGAT (Barcelona) SPAIN
General product information:	
<p>Low-voltage fuse-holders for cylindrical fuse-links for use by authorized persons type PMX-10</p>	

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IEC 60269-1

Clause	Requirement + Test	Result - Remark	Verdict
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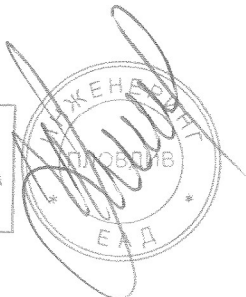
5	CHARACTERISTICS OF FUSES		
5.2	Rated voltage (V) as specified	690Va.c. or 24Vd.c.	P
5.3.1	Rated current (A) of the fuse-link in accordance with specified values	-	N/A
5.3.2	Rated current (A) of the fuse-holder	32A	P
5.4	Rated frequency (Hz)	50Hz or DC	P
5.5	Max. rated power dissipation (VA) of fuse-link	-	N/A
	Rated acceptable power dissipation (VA) of fuse-holder	3W	P
5.6	Limits of time-current characteristics based on reference ambient air temperature Ta of +20°C		N/A
5.6.1	Time-current zones deviated from standardized, or available in manufacturers documentation (with tolerances)	-	N/A
5.6.2	Conventional times and currents see Table 2	-	N/A
5.6.3	Gates.....	-	N/A
5.7	Breaking range and breaking capacity		N/A
5.7.1	Breaking range and utilization category	-	N/A
5.7.2	Rated breaking capacity (A) of fuse-link corresponds to the rated voltage (V), and is equal or higher than given minimum (A) in subsequent part of this standard	-	N/A
5.8	Cut-off current and I ² t characteristics are referred to the values of voltage, frequency and power factor		N/A
5.8.1	Cut-off current characteristics, if required, given by the manufacturer according to Figure 4	-	N/A
5.8.2	Pre-arcing I ² t characteristics for pre-arcing times of less than 0,1 s down to a time corresponding to the rated breaking capacity given by the manufacturer :	-	N/A
	The operating I ² t characteristics with specified voltages as parameter for pre-arcing times less than 0,1 s given by the manufacturer	-	N/A

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TRF No. IEC60 269_1B

ВЯРНО С ОРИГИНАЛА



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IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict

6	MARKINGS		
	Markings are durable and easily legible		P
6.1	Fuse-holders marked by:		P
	- name of manufacturer or trade mark which enable identification of fuse-holder		P
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.1	PMX-10x38	P
	- rated voltage (V)	690Va.c. or 24Vd.c.	P
	- rated current (A)	32A	P
	- kind of current and rated frequency (Hz)	50Hz or DC	P
6.2	Fuse-link(s) except small fuse-link(s) marked by:		N/A
	- name of manufacturer or trade mark which enable identification of fuse-links	-	N/A
	- manufacturer's identification reference enabling to find all characteristics listed in 5.1.2	-	N/A
	- rated voltage (V)	-	N/A
	- rated current (A)	-	N/A
	- breaking range and utilization category (if applicable) (5.7.1)	-	N/A
	- kind of current	-	N/A
	- rated frequency (Hz), if applicable (5.4)		N/A
	Small fuse-links marked by:		N/A
	- trademark	-	N/A
	- list reference of manufacturer	-	N/A
	- rated voltage (V)	-	N/A
	- rated current (A)	-	N/A
6.3	Symbols for the kind of current and frequency in accordance with IEC 60417		P

TRF No. IEC60 269_1B

ВЯРНО С ОРИГИНАЛА

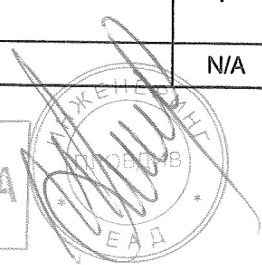


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IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
7	STANDARD CONDITIONS FOR CONSTRUCTION		
7.1	Mechanical design		P
7.1.1	Replacement of fuse-links easily and safely		P
7.1.2	Connections, including terminals		P
	Contact force is not transmitted through insulating material other than ceramic or other material with characteristics not less suitable, unless		P
	there is sufficient resilience in the metallic parts to compensate any possible shrinkage or other deformation of the insulating material		P
	Terminals cannot turn or be displaced when the connecting screws are tightened		P
	Terminals shall be such, that the conductors cannot be displaced		P
	Parts gripping the conductors are of metal		P
	Gripping parts cannot unduly damage conductors		P
	Terminals readily accessible under the intended conditions of installation		P
7.1.3	Fuse-contacts		P
	Fuse-contacts are such that necessary contact force is maintained under the conditions of service and operation		P
	Contact is such that electromagnetic forces occurring during operation under conditions in accordance with 7.5 not impair electrical connections between		P
	a) fuse-base and fuse-carrier		P
	b) fuse-carrier and fuse-link		P
	c) fuse-link and fuse-base		P
	Fuse contacts are so constructed and of such material that, when fuse is properly installed and service conditions are normal, adequate contact is maintained		P
	a) after repeated engagement and disengagement		P
	b) after being left undisturbed in service for long period		P
7.1.4	Construction of a gauge-piece		P
	Gauge-piece is so designed that it withstands normal stresses occurring during use		P
7.1.5	Mechanical strength of fuse-link		N/A

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ВЯРНО С ОРИГИНАЛА



IEC 60269-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Fuse-link have adequate mechanical strength and its contacts are securely fixed		N/A
7.2	Insulating properties and suitability for isolation		P
	Fuses are such that they do not lose insulating properties at voltages to which they are subjected in normal service		P
	Fuse passes the tests for verification of insulating properties and suitability for isolation in accordance with 8.2		P
7.3	Temperature rise, power dissipation of the fuse-link and acceptable power dissipation of the fuse-holder	Tested with 32A	P
	See Table 5 : Requirements are verified by tests according to 8.3	Terminals (Silver-plated)	P
7.4	Operation		N/A
	Fuse-link is so designed and proportioned that, when tested in its appropriate test arrangement at rated frequency and ambient air temperature of (20±5)°C		N/A
	- is able to carry continuously any current not exceeding its rated current		N/A
	- is able to withstand overload conditions as they may occur in normal service (see 8.4.3.4)		N/A
	Fuse-link satisfy these conditions if it passes the tests prescribed in 8.4		N/A
7.5	Breaking capacity		N/A
	Fuse is capable of breaking, at rated frequency and at voltage not exceeding the recovery voltage specified in 8.5, any circuit having prospective current between		N/A
	- current I_f (for "g" fuse-links) : -		N/A
	- current $k_2 I_n$ (for "a" fuse-links) : -		N/A
	- for a.c., rated breaking capacity at power factors not lower than those in Table 20 : -		N/A
	- for d.c., rated breaking capacity at time constants not greater than those limits in Table 21 : -		N/A
	Arc voltage not exceed values given in Table 6..... : -		N/A
	Fuse satisfy these conditions if it passes the tests prescribed in 8.5		N/A
7.6	Cut-off current characteristic		N/A



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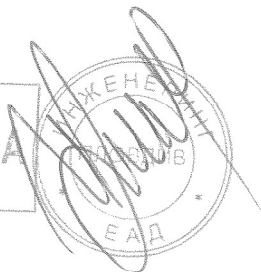
Clause	Requirement + Test	Result - Remark	Verdict
	Values of cut-off current measured as specified in 8.6 are less than, or equal to, the values corresponding to cut-off current characteristics assigned by the manufacturer		N/A
7.7	I ² t characteristics		N/A
	Pre-arcing I ² t values verified according to 8.7 (Table 7)	-	N/A
	Operating I ² t values verified according to 8.7	-	N/A
7.8	Overcurrent discrimination of fuse-links	-	N/A
7.9	Protection against electric shock		P
	The degree of protection when the fuse is under normal service conditions:	IP 20	P
	The degree of protection when replacing the fuse-link:	IP 20	P
	The degree of protection when the fuse-link and fuse-carrier is removed:	IP 20	P
7.9.1	Clearances and creepage distances		P
	Clearances are not less than the values given in Table 9	> 5,5mm	P
	Creepage distances correspond to material group, as defined in 2.7.1.3 of IEC 60664-1, corresponding with rated voltage given in Table 10	Overvoltage category: III Pollution degree: 3 > 10mm	P
7.9.2	Leakage currents of fuses suitable for isolation		P
	Value of leakage current (mA) not exceed		P
	- 0,5 mA per pole for fuses in new conditions	<0,1	P
	- 2 mA per pole for fuses having been submitted to test according to 8.5	<1	P
7.9.3	Additional constructional requirements for fuses for linked fuse-carriers, suitable for isolation		P
	Fuse-holder are marked with the symbol IEC 60617-S00369		P
	When fuse is in open position, with fuse-link remaining inside the fuse-carrier, isolating distance between the fuse contacts in accordance with the isolating function are provided		P
	Indication of this position is provided by the position of the fuse-carrier		P



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Clause	Requirement + Test	Result - Remark	Verdict
	There exists a locking means in order to lock the fuses in the isolated position, locking is possible only in this position		N/A
	Fuses are designed so that the fuse-carrier remains attached to the fuse-base giving correct indication of the open position, and of locking		P
7.10	Resistance to heat		P
	All components are sufficiently resistant to heat which may occur in normal use (see 8.9 and 8.10)		P
7.11	Mechanical strength		P
	All components of fuse are sufficiently resistant to mechanical stresses which may occur in normal use (see 8.3 to 8.5 and 8.11.1)		P
7.12	Resistance to corrosion		P
	All metallic components of fuse are resistant to corrosive influences which may occur in normal use		P
7.12.1	Resistance to rusting		P
	Ferrous components are so protected that they meet relevant tests (see 8.2.2.3.2 and 8.11.2.3)		P
7.12.2	Resistance to season cracking		N/A
	Current-carrying parts are sufficiently resistant to season cracking (see 8.2.2.3.2 and 8.11.2.1)		N/A
7.13	Resistance to abnormal heat and fire		P
	All components of fuse are sufficiently resistant to abnormal heat and fire (see 8.11.2.2)		P
7.14	Electromagnetic compatibility		P
	Fuses within the scope of this standard are not sensitive to normal electromagnetic disturbances		N/A
	No immunity tests are required		P

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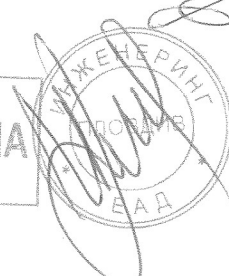
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Clause	Requirement + Test	Result - Remark	Verdict
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8	TESTS		
8.1.2	At the beginning of each test, the fuse is approximately at the ambient temperature		N/A
8.1.3	Tests made on fuses in clean and dry condition		N/A
8.1.4	Arrangement of the fuse and dimensions		P
	Except for degree of protection test (see 8.8), fuse are mounted in free air in draught-free surroundings in the normal operation position and on insulating material of sufficient rigidity		P
	Before tests are started, specified external dimensions are measured and results compared with dimensions specified in the relevant data sheet of the manufacturer or specified in subsequent parts	Part 2	P
8.1.5	Testing of fuse-links		N/A
	Fuse-links tested with the kind(s) of current for which they are rated		N/A
	Fuse-links tested for a.c. with frequency for which they are rated		N/A
8.1.5.1	Complete tests		N/A
	Internal resistance R measured by a current $\leq 0,1 I_n$		N/A
	Measuring current (A) : -		N/A
	Ambient air temperature in range of 20 ± 5 °C		N/A
	The values of resistance		N/A
8.1.5.2	Testing of fuse-links of a homogeneous series		N/A
	Fuse-links tested like a homogeneous series : -		N/A
	If yes: fuse-links have identical enclosures in form and construction (except of fuse-elements and contacts)		N/A
	- the same arc-extinguishing medium and same completeness of filling		N/A
	- fuse-elements of identical materials		N/A
	- their cross-section of fuse-elements not exceed the cross-section of fuse-links having the highest rated current		N/A
	- number of fuse-elements do not exceed number of fuse-elements of fuse-links with the highest rated current		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- minimum distances between adjacent fuse-elements and between the fuse-elements and the inner surface of the cartridge is not less than those in the fuse-link with the highest rated current		N/A
	- fuse-links used with a given fuse-holder, or		N/A
	- fuse-links intended to be used in an arrangement identical for all rated currents of the homogeneous series		N/A
	- value of $RI_n^{3/2}$ does not exceed the value for the fuse-link with largest rated current of the homogeneous series (R measured as indicated in 8.1.5.1)		N/A
	the rated breaking capacity of fuse-links not greater than that of the fuse-link with the largest rated current within the homogeneous series		N/A
	- if not, the fuse-links with greater breaking capacity subjected to tests no. 1 and no. 2		N/A
	The fuse-link having the largest rated current tested completely according to Table 11		N/A
	The fuse-link having the smallest rated current tested only according to Table 12		N/A
	The fuse-links between the largest and smallest rated current tested according to Table 13		N/A
8.1.6	Testing of fuse-holders		N/A
	The fuse-holders are subjected to the tests according to Table 14		N/A
8.2	Verification of the insulating properties and of the suitability for isolation		P
8.2.1	Arrangement of the fuse-holder		P
	The fuse-holder fitted with a fuse-links of the largest dimensions for the type of fuse-holder concerned		P
	The fuse-base fixed to a metal plate, unless otherwise specified		P
	Fuse-link is replace a while live - surfaces of fuse-link, of device for replacing it or of fuse-carrier, if of insulating material, are provided with metal coverings connected during tests to the frame of the apparatus; if of metal, they are connected direct to the frame		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.2.2	Verification of the insulating properties		P
	Points of application of the test voltage		P
	The test voltage is applied between:		P
	a) live parts and the frame with the fuse-link and the device for replacing it, or		P
	the fuse-carrier, if any, in position		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	b) the terminals without fuse-link, device for replacing or the fuse-carrier		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	c) live parts of different polarity in the case of multipole fuse-holder with fuse-links, fuse-carrier(s) or device(s) for replacing the fuse-links		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	d) live parts which in the case of a multipole fuse-holder reach different potential after the fuse-link operates (equipped by fuse-carrier or device for replacing without fuse-link)		P
	no breakdown of insulation or flashover during 1 min of the applying test voltage		P
	The values of test voltage (V) as specified in Table 15	1890	P
8.2.2.3.2	Fuse-holder is subjected to humid atmospheric conditions		P
	Relative humidity of ambient air (%)	92	P
	Ambient air temperature (°C)	23	P
	Duration of treatment (h)	48	P
	Insulation resistance is measured between the points prescribed in 8.2.2.1 by applying d.c. voltage of approximately 500 V		P
	Points of measuring:		P
	a) min. measured value (MΩ)	> 100	P
	b) min. measured value (MΩ)	> 100	P
	c) min. measured value (MΩ)	> 100	P
	d) min. measured value (MΩ)	> 100	P
	The insulation resistance not less than MΩ	Yes	P

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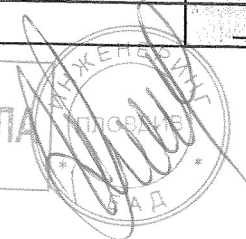


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Clause	Requirement + Test	Result - Remark	Verdict
8.2.3	Verification of the suitability for isolation		P
	Clearances and creepage distances are verified by dimensional measurement and by voltage test		P
	Points of application of the test voltage		P
	The test voltage is applied between:		P
	- terminals when the fuse-link and device for replacing it, are removed		P
	Test voltage (kV) for verification of the rated impulse withstand voltage is given in Table 16	9,8	P
	The 1,2/50 μ s impulse voltage applied 5 times for each polarity at intervals of 1 s minimum		P
	no breakdown of insulation or flashover during of the applying test voltage		P
	no disruptive discharge during the test		P
8.2.4.2	Fuse-holder is subjected to humid atmospheric conditions		P
	Relative humidity of ambient air (%)	92	P
	Ambient air temperature (°C)	23	P
	Duration of treatment (h)	48	P
	Insulation resistance is measured between the points prescribed in 8.2.2.1 by applying d.c. voltage of approximately 500 V		P
	Points of measuring:		P
	a) min. measured value (M Ω)	> 100	P
	b) min. measured value (M Ω)	> 100	P
	c) min. measured value (M Ω)	> 100	P
	d) min. measured value (M Ω)	> 100	P
	The insulation resistance not less than 1 M Ω	Yes	P
8.3	Verification of temperature rise and power dissipation		P
8.3.1	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		N/A
	Test performed at an ambient air temperature of (20 \pm 5) °C		P
	Ambient air temperature during the test (°C)	20	P
	Cross-sectional area (see Table17) (mm ² or mm x mm)	6mm ²	-
	Tightened by torque; torque (Nm)	2,5	-

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.2	The temperature of the fuse measured by method of measuring	thermocouples	P
8.3.3	Measurement of the power dissipation of the fuse-link		N/A
	One fuse used for test (unless otherwise stated by the manufacturer) mounted in free air		N/A
	Test performed at an ambient air temperature of (20±5) °C		N/A
	Ambient air temperature during the test (°C)	-	N/A
	Cross-sectional area (see Table17) (mm ² or mm x mm)	-	-
	Tightened by torque; torque (Nm)	-	-
8.3.4.1	Temperature rise of the fuse-holder		P
	Applied a.c. current (A) for test equal to the rated current of the fuse-holder	32	P
	Test made with fuse-link (A), or	Dummy fuse	P
	with a dummy fuse-link specified in subsequent parts	Part 2	P
	Temperature rise limits T for contacts and terminals (Table 5):		P
	spring loaded contacts; limit (K)	Limited only by the necessity of not causing any damage to adjacent parts Silver-plated un enclosed / enclosed	P
	bolted contacts; limit (K)	-	N/A
	terminals; limit (K)	Upper = 63K _{max.} ; limit 70K Lower = 65K _{max.} ; limit 70K Silver-plated un enclosed / enclosed	P
8.3.4.2	Power dissipation of a fuse-link		P
	The test made with a.c. at the current (A) equal to the rated current of the fuse-link	32	P
	The points of measuring	S	P
	Measured value of power (W) dissipation in limits (W) specified in subsequent parts	Part 2	P
8.3.5	The acceptable power dissipation (W) of fuse-holder not less than the rated power dissipation of the corresponding fuse-links	3	P

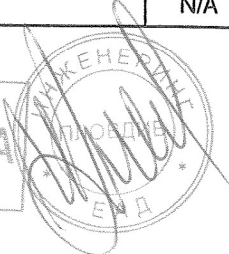


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Clause	Requirement + Test	Result - Remark	Verdict
	After the tests prescribed in 8.3, the insulating parts of the fuse-holders cooled down to ambient temperature withstood the test voltage according to 8.2	Yes	P
	No deformation after tests of 8.3		P
8.4	Verification of operation		N/A
8.4.1	The test arrangement as specified in 8.1.4		N/A
	Length (m) of conductors (see 8.3.1)	-	N/A
	their cross-sectional area (mm ²) as specified in Table 17	-	N/A
8.4.2	Ambient air temperature during test within (20±5) °C		N/A
8.4.3.1	Verification of conventional non-fusing and fusing current		N/A
	a) the fuse-link subjected to the conventional non-fusing current (I _{nf}) (see Table 2)	-	-
	the fuse-link did not operate within the conventional time of (h) (Table 2)	-	N/A
	b) the same fuse-link, after cooled down to ambient temperature, subjected to the conventional fusing current (I _f) (see Table 2)	-	-
	the fuse-link operated within the conventional time of (minutes) (Table 2)	-	N/A
8.4.3.2	Verification of rated current of "g" fuse-links		N/A
	One fuse-link submitted to a pulse test for 100 h		N/A
	On-period equal to conventional time (h)	-	N/A
	Off-period of 0,1 of the conventional time	-	N/A
	Test current (A) equal to 1,05 of the rated current . :	-	N/A
	After the test, the fuse-link not have changed its characteristics		N/A
8.4.3.1	a) the fuse-link subjected to the conventional non-fusing current (I _{nf}) (see Table 2)	-	-
	the fuse-link did not operate within the conventional time of (h) (Table 2)	-	N/A
8.4.3.3	Verification of time-current characteristics and gates		N/A
8.4.3.3.1	The time-current characteristics verified on the basis of the test according to 8.5		N/A
	Values of pre-arcing and operating times within the time-current zones:		N/A
	- indicated by the manufacturer		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- specified in subsequent parts	-	N/A
	Verification for smaller current ratings, if only one largest rated current fuse-link is subjected to the test according to 8.5 (in case of homogeneous series):		N/A
	"g" fuse-links (except "gD", "gG" and "gM")		N/A
	Tests made in connection with verification of the gates (see 8.4.3.3.2)		N/A
	Ambient air temperature within (20±5) °C		N/A
	rated current I _n (A) of the fuse-link		-
	test performed at voltage (V)		-
	test 3a) prospective current (A) equal to kI _n (10 ≤ k ≤ 20)		N/A
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
	test 4a) prospective current (A) equal to kI _n (5 ≤ k ≤ 8)		N/A
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
	test 5a) prospective current (A) equal to kI _n (2,5 ≤ k ≤ 4)		N/A
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
	Verification for smaller current ratings, if only one largest rated current fuse-link is subjected to the test according to 8.5 (in case of homogeneous series):		N/A
	"a" fuse-links		N/A
	Ambient air temperature within (20±5) °C		N/A
	rated current I _n (A) of the fuse-link		-
	test performed at voltage (V)		-
	test 3a) prospective current (A) equal to nk ₂ I _n (5 ≤ n ≤ 8)		N/A
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
	test 4a) prospective current (A) equal to nk ₂ I _n (2 ≤ n ≤ 3)		N/A
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
	test 5a) prospective current (A) equal to nk ₂ I _n (1 ≤ n ≤ 1,5)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	pre-arcing time (s)	-	-
	specified pre-arcing time (s) max./min.	-	N/A
8.4.3.3.2	Verification of gates		N/A
	"gG" and "gM" fuse-links		N/A
	rated current of the fuse-link (A).....	-	-
	test performed at voltage (V)	-	-
	a) testing current (A); pre-arcing time (s) higher than 10 s	-	N/A
	b) testing current (A); pre-arcing time (s) less than 5 s	-	N/A
	c) testing current (A); pre-arcing time (s) higher than 0,1 s	-	N/A
	d) testing current (A); pre-arcing time (s) less than 0,1 s	-	N/A
	"aM" fuse-links		N/A
	rated current of the fuse-link (A).....	-	-
	test performed at voltage (V)	-	-
	Cross-sectional area (see Table18) (mm ² or mm x mm)	-	-
	e) testing current (A); pre-arcing time (s) higher than 60 s	-	N/A
	f) testing current (A); pre-arcing time (s) less than 60 s	-	N/A
	g) testing current (A); pre-arcing time (s) higher than 0,2 s	-	N/A
	h) testing current (A); pre-arcing time (s) less than 0,10 s	-	N/A
8.4.3.4	Overload		N/A
	The test arrangement is same as that for the temperature rise test (see 8.3.1)		N/A
	Three fuse-links submitted to 50 pulses having the same duration and test current	-	N/A
	test performed at voltage (V)	-	-
	"g" fuse-links:		N/A
	test current (A) equal to 0,8 times the current stated for a pre-arcing time of 5 s	-	N/A
	duration of each pulse 5 s		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	time (s) interval between pulses equal to 20 % of the conventional time (s) specified in Table 2	-	N/A
	"a" fuse-links:		N/A
	rated current I_n (A) of fuse-link	-	N/A
	test current (A) equal to $k_1 I_n \pm 2\%$	-	N/A
	the pulse duration (s) corresponds to that indicated on the overload curve for $k_1 I_n$ stated by manufacturer	-	N/A
	time (s) intervals between pulses equal to 30 times the pulse duration	-	N/A
	fuse-links having ambient air temperature subjected to a current (A) equal to current for the overload test		N/A
	pre-arcing time (s) of sample lies within the manufacturers time-current zone	-	N/A
8.4.3.5	Conventional cable overload protection test (for "gG" fuse-links only)		N/A
	fuse-link mounted as specified in 8.4.1		N/A
	provided with PVC insulated copper conductors of cross-sectional area (mm^2) (see Table 19)	-	N/A
	fuse and conductor connected to it, preheated with rated current (A) of fuse-link	-	N/A
	for a time (h) equal to the conventional time	-	N/A
	test current increased to $1,45 I_z$ (A) (I_z specified in Table 19)	-	N/A
	the fuse-link operated in time (s) less than the conventional time (s)	-	N/A
8.4.3.6	Operation of indicating devices and strikers, if any		N/A
	Operation of indicating device verified in combination with the verification of breaking capacity (see 8.5.5)		N/A
	The verification of striker operation:		N/A
	"g" fuse-link tested at current (A) equal to current I_4 (see Table 20 and 21)	-	N/A
	recovery voltage (V)	-	N/A
	stated recovery voltage (V)	-	N/A
	"a" fuse-link tested at current (A) equal to current $2k_1 I_n$ (A) (see Figure 2)	-	N/A
	recovery voltage (V)	-	N/A
	stated recovery voltage (V)	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Striker operate during all tests made at recovery voltage of at least 20 V		N/A
	No failure of indicating device or striker		N/A
8.5	Verification of the breaking capacity		P
8.5.1	The test arrangements as specified in 8.1.4		P
8.5.2	Characteristics of the test circuit as specified		P
	Scheme of test circuit (see Figure 5)		P
	Deviations form specified characteristics of test circuit	-	N/A
8.5.3	Measuring instruments		P
8.5.4	Calibration of test circuit		P
	Calibration oscillograms and their evaluation		P
8.5.6	The breaking-capacity tests made at an ambient air temperature of (20 ± 5) °C	23°C	P
	Breaking-capacity tests on a.c. fuses		P
8.5.5.1	Table 20, test No. 1 for "g" and "a" fuse-links	acc. 8.5.5.1 only peak withstand current of a fuse-holder, test no. 1 shall be made. NH fuse-link connected in series to achieve 5kA ... 6kA cut-off current acc. IEC 60269-2 table 614. Test specimen equipped with dummy fuse-links correspond to the dimension given in Figure 601 acc. IEC 60269-2 (Fuse System F)	P
	Rated breaking capacity of the fuse-links (kA), at voltage (V)	65kA at 690V (only 50kA are required IEC 60269-2)	-
	Rated current (A) of the fuse-links	100A	P
	Prospective current I _p (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0%	65850	P
	Power factor	0,18	P
	Initiation of arcing after voltage zero: within 40° - 65° for sample 1 and within 65° - 90° for sample 2 and 3, or	for fuse-holder only 65° - 90° is required	P
	for sample 1) arcing after voltage zero within 0° + 10°, - 0°	-	N/A

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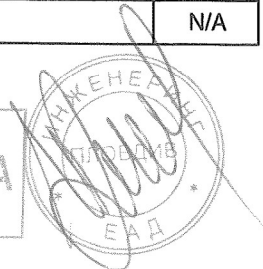
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Clause	Requirement + Test	Result - Remark			Verdict
	Power-frequency recovery voltage: voltage (V) i.e (%) of rated voltage within 105% + 5%, - 0% of the rated voltage or 110% + 5%, - 0% of the rated voltage	725V			P
	Cut-off current (A)	PMX-10 1P 6,52kA _{max}	PMX-10 2P 7,20kA _{max}	PMX-10 4P 10,29kA _{max}	P
8.5.8	Acceptability of No. 1 test results	The fuse-links are not ejected. There is no sign of arcing or welding or other damage likely to prevent further use of the fuse-base			P
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	dummy fuse-links			N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse	dummy fuse-links			N/A
	c) no permanent arcing, flashover or ejection of dangerous flames	dummy fuse-links			N/A
	d) no damage of fuse components hindering from their further use	dummy fuse-links			N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them	dummy fuse-links			N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier	dummy fuse-links			N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	dummy fuse-links			N/A
8.5.5.1	Table 20, test No. 2 for "g" and "a" fuse-links				N/A
	Prospective current I ₂ (kA)	-			N/A
	Test made under conditions which approximate those giving maximum arc energy				N/A
	Power factor	-			N/A
	Making angle after voltage zero: within tolerance 0° + 20°, - 0°	-			N/A
	Power-frequency recovery voltage: voltage (V) i.e (%) of rated voltage within 105% + 5%, - 0% of the rated voltage or 110% + 5%, - 0% of the rated voltage	-			N/A
	Recovery voltage maintained at a value (V); duration (s) for sample (No.)	-			N/A
	For other samples duration 15 s (8.5.5.2)				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.5.8	Acceptability of No. 2 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
8.5.5.1	Table 20, test No. 2* for "g" and "a" fuse-links, for $I_2 \geq I_1$		N/A
	Prospective current I_2 (kA) for test No. 2 greater than the rated breaking capacity (kA)	-	N/A
	Test made on six samples replacing tests of Nos. 1 and 2. Test made with current I_1 (kA)	-	N/A
	Making angels differ approximately 30° between each test		N/A
	Power factor	-	N/A
8.5.8	Acceptability of No. 2 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A

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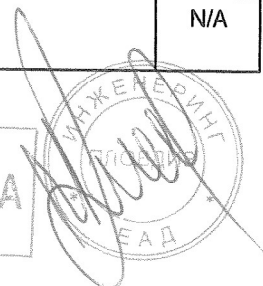
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Clause	Requirement + Test	Result - Remark	Verdict
8.5.5.1	Table 20, test No. 3 for "g" and "a" fuse-links		N/A
	Prospective current for "g" fuse-link I_3 (A) equal to $3,2 I_f$		N/A
	Prospective current for "a" fuse-link I_3 (A) equal to $2,5 k_2 I_n$		N/A
	Power factor		N/A
	Tolerance on current $\pm 20\%$		N/A
	Recovery voltage (V) maintained for 15 s (8.5.5.2)		N/A
8.5.8	Acceptability of No. 3 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (M Ω) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :		N/A
8.5.5.1	Table 20, test No. 4 for "g" and "a" fuse-links		N/A
	Prospective current for "g" fuse-link I_4 (A) equal to $2,0 I_f$		N/A
	Prospective current for "a" fuse-link I_4 (A) equal to $1,6 k_2 I_n$		N/A
	Power factor		N/A
	Tolerance on current + 20%, - 0%		N/A
	Recovery voltage (V) maintained for 15 s (8.5.5.2) :		N/A
8.5.8	Acceptability of No. 4 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)		N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
8.5.5.1	Table 20, test No. 5 for "g" and "a" fuse-links		N/A
	Prospective current for "g" fuse-link I _g (A) equal to 1,25 I _f	-	N/A
	Prospective current for "a" fuse-link I _a (A) equal to k ₂ I _n	-	N/A
	Power factor	-	N/A
	Tolerance on current + 20%, - 0%		N/A
	Recovery voltage (V) maintained for 15 s (8.5.5.2) :	-	N/A
8.5.8	Acceptability of No. 5 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
	Breaking-capacity tests on d.c. fuses	DC covered by ac tests because acc. 8.5.5.1 only peak withstand current of a fuse-holder, test no. 1 shall be made.	P

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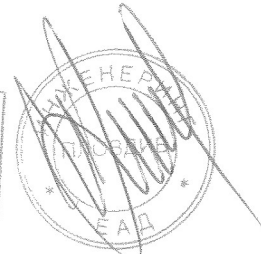
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Clause	Requirement + Test	Result - Remark	Verdict
8.5.5.1	Table 21, d.c.test No. 1 for "g" and "a" fuse-links		N/A
	Rated breaking d.c. capacity of the fuse-links (kA), at voltage (V) :	-	-
	Rated current (A) of the fuse-links :	-	N/A
	Rated voltage (V) of the fuse-links :	-	N/A
	Prospective current I ₁ (kA) equal to rated breaking capacity within a tolerance of + 10%, - 0% :	-	N/A
	Time constant :	-	N/A
	Arcing commences at current (A) :	-	-
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	-	N/A
8.5.8	Acceptability of No. 1 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) :	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases : -		N/A
8.5.5.1	Table 21, d.c.test No. 2 for "g" and "a" fuse-links		N/A
	a) During test No. 1 arcing commences at a current ≥ 0,5 I ₁ , test No. 2 was not performed		N/A
	b) Prospective current I ₂ (A). Test made under conditions which approximate those giving maximum arc energy :	-	N/A
	Time constant :	-	N/A
	Arcing commences at current (A) :	-	-
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage :	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.5.8	Acceptability of No. 2 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
8.5.5.1	Table 21, d.c.test No. 3 for "g" and "a" fuse-links		N/A
	Conventional fusing current (A)	-	-
	Prospective current I ₃ (A) equal to 3,2 I _f	-	N/A
	Tolerance on current (%) ± 20%	-	N/A
	Time constant	-	N/A
	Arcing commences at current (A)	-	-
	Value of recovery voltage: voltage (V) within tolerances 115 + 5%, - 9% of the rated voltage	-	N/A
8.5.8	Acceptability of No. 3 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6)	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A

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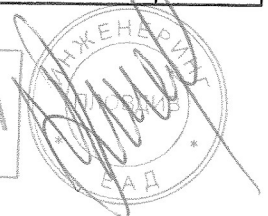
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Clause	Requirement + Test	Result - Remark	Verdict
8.5.5.1	Table 21, d.c.test No. 4 for "g" and "a" fuse-links		N/A
	Conventional fusing current (A) :	-	-
	Prospective current I_4 (A) equal to $2,0 I_f$:	-	N/A
	Tolerance on current (%) + 20%, - 0% :	-	N/A
	Time constant :	-	N/A
	Arcing commences at current (A) :	-	-
	Value of recovery voltage: voltage (V) within tolerances $115 + 5\%$, - 9% of the rated voltage :	-	N/A
8.5.8	Acceptability of No. 4 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) :	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (M Ω) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
8.5.5.1	Table 21, d.c.test No. 5 for "g" and "a" fuse-links		N/A
	Conventional fusing current (A) :	-	-
	Prospective current I_5 (A) equal to $1,25 I_f$:	-	N/A
	Tolerance on current (%) + 20%, - 0% :	-	N/A
	Time constant :	-	N/A
	Arcing commences at current (A) :	-	-
	Value of recovery voltage: voltage (V) within tolerances $115 + 5\%$, - 9% of the rated voltage :	-	N/A
8.5.8	Acceptability of No. 5 test results		N/A
	a) max. arc voltage (V) did not exceed stated values of 7.5 (Table 6) :	-	N/A
	b) fuse-links operated without external effects or damage to the components of the complete fuse		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) no permanent arcing, flashover or ejection of dangerous flames		N/A
	d) no damage of fuse components hindering from their further use		N/A
	e) no damage of fuse-link such, that it is difficult or dangerous to replace them		N/A
	f) fuse-link remains in one piece before its removal from the fuse- carrier		N/A
	g) resistance (MΩ) between contacts of fuse-links after test not less than 50 000 Ω for the rated voltage of fuse-links to 250 V, 100 000 Ω in all other cases :	-	N/A
8.6	Verification of the cut-off current characteristics		N/A
8.6.2	The values measured did not exceed cut-off characteristics indicated by the manufacturer (see 5.8.1)		N/A
8.7	Verification of I ² t characteristics and overcurrent discrimination		N/A
8.7.2	The operating I ² t values measured not exceed the values indicated by the manufacturer, or those specified in subsequent parts		N/A
	The pre-arcing I ² t values not less than minimum pre-arcing values given by the manufacturer, or they lie within the limits indicated in Table 7		N/A
8.7.3	Verification of compliance for fuse-links at 0,01 s		N/A
	"gG" and "gM" fuse-links at 0,01 s comply with Table 7		N/A
8.7.4	Verification of overcurrent discrimination		N/A
	The discrimination of the fuse-links verified by means of the time-current characteristics and the pre-arcing and operating I ² t values		N/A
8.8	Verification of the degree of protection of enclosures		P
	Degree of protection IP : IP 20		P
	Verification by test under conditions specified in IEC 60529 : Yes		P
8.9	Verification of resistance to heat		P
	No damage impaired by heat during the previous tests (in particular with respect to 8.3, 8.4, 8.5 and 8.10)		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.10	Verification of non-deterioration of contacts	The measurement was made at the terminals.	P
8.10.1	Three samples provided with standardized dummy fuse-links of the highest current rating (A) intended to be used in the fuse-holder (see subsequent parts) :	Part 2 fuse system F	P
8.10.2	Test current (A) for load period	40A	P
	Duration (s) of load period	1h * 0,25 = 15min = 900s	P
	Duration (s) of no-load period	1h * 0,10 = 6min = 360s	P
	a) Test of 250 cycles, measured values not exceed the limits given in subsequent parts		P
	b) Test of 750 cycles, measured values not exceed the limits given in subsequent parts		N/A
8.11	Mechanical and miscellaneous tests		P
8.11.1	Mechanical strength		P
	Mechanical characteristics of fuse and its parts judged in the context of normal handling and mounting as well as with results shown after breaking-capacity test (see 8.5), if not otherwise specified in the subsequent parts		P
8.11.2	Miscellaneous tests		P
8.11.2.1	Verification of freedom from season cracking		N/A
	Current-carrying parts made of rolled copper alloy with less than 83% copper content and with all grease removed, placed for 4 h in test cabinet having temperature of (30 ± 10) °C		N/A
	After this, samples placed for 8 h in test cabinet, on the bottom of which is ammonium chloride solution having pH value 10 - 11		N/A
	After test no cracks visible to the unaided eye		N/A
8.11.2.2	Verification of resistance to abnormal heat and fire		P
8.11.2.2.1	Parts of insulating material, except ceramic, have a limited duration of burning without spreading fire by flames or burning droplets or glowing particles falling from the specimen		P
8.11.2.2.5	Glow-wire test: (650 ± 10) °C		P
	Parts of insulating materials not necessary to retain current-carrying parts in position even though they are in contact with them, made the glow-wire test (650 ± 10) °C		P

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Clause	Requirement + Test	Result - Remark	Verdict
	No visible flame, or burning or glowing of the specimen extinguish within max. (s) after removal of the glow-wire. Limit (30 ± 1) s	Extinguishing within 3s after removal of the glow-wire	P
	No burning of the tissue paper		P
	No scorching of the pinewood board		P
	Glow-wire test: (960 ± 10) °C		P
	Parts of insulating materials necessary to retain current-carrying parts and parts of the earthing circuit, if any, in position, made the glow-wire test (960 ± 10) °C		P
	No visible flame, or burning or glowing of the specimen extinguish within max. (s) after removal of the glow-wire. Limit (30 ± 1) s	Extinguishing within 3s after removal of the glow-wire	P
	No burning of the tissue paper		P
	No scorching of the pinewood board		P
8.11.2.3	Verification of resistance to rusting		P
	Tested parts after degreasing (10 min in specified solution) placed for 10 min in air saturated with moisture and after that dried 10 min in an ambient temperature (100 ± 5) °C		P
	Surface of tested parts show no signs of rust		P

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