Fachbereich	Norm/ Hausverfahren/ Version	Titel der Norm oder des Hausverfahrens (ggf. Abweichungen / Modifizierungen von Normverfahren angeben)	Prüfbereich/ Einschränkung
Niederspannungsgeräte und -anlagen	VDE 0660 Teil 600-1 DIN EN 61439-1 EN 61439-1 IEC 61439-1	Niederspannungs-Schaltgerätekombinationen; Teil 1: Allgemeine Festlegungen	
	VDE 0660 Teil 600-5 DIN EN 61439-5 EN 61439-5 IEC 61439-5	Niederspannungs-Schaltgerätekombinationen; Teil 5: Schaltgerätekombinationen in öffentlichen Energieversorgungsnetzen	
	VDE 0660 Teil 505 DIN VDE 0660-505	Niederspannungs-Schaltgerätekombinationen; Teil 505: Bestimmung für Hausanschlusskästen und Sicherungskästen	
	VDE 0682-1-2 DIN EN 61482-1-2	Arbeiten unter Spannung - Schutzkleidung gegen die thermischen Gefahren eines elektrischen Lichtbogens - Teil 1-2: Prüfverfahren - Verfahren 2: Bestimmung der Lichtbogen-Schutzklasse des Materials und der Kleidung unter Verwendung eines gerichteten Prüflichtbogens (Box-Test)	
	GS-ET-29	BG-Prüfzert: Zusatzanforderungen für die Prüfung und Zertifizierung von Elektriker-Gesichtsschutz	
	PIP001	RWE Eurotest GmbH: Prüfung der Störlichtbogenfestigkeit von Schutzkleidung	
	VDE 0122-1; DIN EN 61851-1; IEC 61851-1	Elektrische Ausrüstung von Elektro-Straßenfahrzeugen - Konduktive Ladesysteme für Elektrofahrzeuge - Teil 1: Allgemeine Anforderungen	
	VDE 0122-2-2; DIN EN 61851-22; IEC 61851-22	Elektrische Ausrüstung von Elektro-Straßenfahrzeugen - Konduktive Ladesysteme für Elektrofahrzeuge - Teil 2-2: Wechselstrom-Ladestation für Elektrofahrzeuge	
EMV-Prüfungen	DIN EN 50160	Merkmale der Spannung in öffentlichen Elektrizitätsversorgungsnetzen	Prüfbereich: Messungen bis 1000V und 1000 A
	DIN EN 50413 (VDE 0848-1)	Grundnorm zu Mess- und Berechnungsverfahren der Exposition von Personen in elektrischen, magnetischen und elektromagnetischen Feldern (0 Hz bis 300 GHz);	Prüfbereich: Messung der elektrischen und magnetischen Felder von 0-30 kHz
Kabel und Leitungen	VDE 0271 DIN VDE 0271	Starkstromkabel - Festlegungen für Starkstromkabel ab 0,6/1 kV für besondere Anwendungen	Einschänkung: kein ▪ Brennverhalten

Fachbereich	Norm/ Hausverfahren/ Version	Titel der Norm oder des Hausverfahrens (ggf. Abweichungen / Modifizierungen von Normverfahren angeben)	Prüfbereich/ Einschränkung
	VDE 0276 Teil 603 DIN VDE 0276-603 HD 603 S1/A3	Starkstromkabel - Teil 603: Energieverteilungskabel mit Nennspannungen U_0/U 0,6/1 kV	Einschränkung: kein ▪ Brennverhalten
	VDE 0276 Teil 605 DIN VDE 0276-605 HD 605 S2	Starkstromkabel - Teil 605: Ergänzende Prüfverfahren	Einschränkung: kein ▪ Weiterreißwiderstand ▪ Druckprüfung ▪ Bestimmung der Härte von elastomeren Isolierhüllen und Mänteln ▪ Umweltbeständigkeit UV; Bewitterung; ▪ Wickelprüfungen ▪ Biegeprüfungen ▪ Torsionsprüfungen ▪ Abriebprüfung ▪ Kerbkraftprüfung ▪ Verzinkungsgüte ▪ Steifigkeit ▪ Thermogravimetrische Prüfung ▪ Wasseraufnahme durch Kapazitätsmessung ▪ Vernetzungsgrad von VPE ▪ Durchlaufspannungsprüfung ▪ Brandprüfungen
	VDE 0276 Teil 620 DIN VDE 0276-620 HD 620 S2	Starkstromkabel - Teil 620: Energieverteilungskabel mit extrudierter Isolierung für Nennspannungen U_0/U 3,6/6 kV bis 20,8/36 kV	Einschränkung: kein ▪ Brennverhalten ▪ Langzeitprüfung
	VDE 0276 Teil 626 + A1 DIN VDE 0276-626 + A1 HD 626 S1 + A1	Starkstromkabel - Teil 626: Isolierte Freileitungsseile für oberirdische Verteilungsnetze mit Nennspannung U_0/U (U_m) 0,6/1 (1,2) kV	Einschränkung: Bei HD 626 S1 + A1 nur Teil 4 F
	IEC 60840	Power cables with extruded insulation and their accessories for rated voltages above 30 kV (Um = 36 kV) up to 150 kV (Um = 170 kV) - Test methods and requirements	Ohne Brandprüfungen

Fachbereich	Norm/ Hausverfahren/ Version	Titel der Norm oder des Hausverfahrens (ggf. Abweichungen / Modifizierungen von Normverfahren angeben)	Prüfbereich/ Einschränkung
Starkstrom-kabel-Garnituren	VDE 0278-393 DIN EN 50393	Prüfverfahren und Prüfanforderungen für die Garnituren von Verteilerkabeln mit einer Nennspannung von 0,6/1,0 (1,2) kV	
	VDE 0278 Teil 442 DIN EN 61442	Prüfverfahren für Starkstromkabelgarnituren mit einer Nennspannung von 6 kV (U = 7,2 kV) bis 36 kV (U = 42 kV) (IEC 61442:2005, modifiziert)	
	VDE 0278 Teil 629-1 DIN VDE 0278-629-1 HD 629.1 S2	Prüfanforderungen für Kabelgarnituren für Starkstromkabel mit einer Nennspannung von 3,6/6(7,2) kV bis 20,8/36(42) kV - Teil 1: Kabel mit extrudierter Kunststoffisolierung	
	VDE 0278 Teil 629-2 DIN VDE 0278-629-2 HD 629.2 S2	Prüfanforderungen für Kabelgarnituren für Starkstromkabel mit einer Nennspannung von 3,6/6(7,2) kV bis 20,8/36(42) kV - Teil 2: Kabel mit massegetränkter Papierisolierung	
	IEC 60502-1	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1.2 kV) up to 30 kV (U_m = 36 kV) - Part 1: Cables for rated voltages of 1 kV (U_m = 1.2 kV) and 3 kV (U_m = 3.6 kV)	
	IEC 60502-2	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1.2 kV) up to 30 kV (U_m = 36 kV) - Part 2: Cables for rated voltages from 6 kV (U_m = 7.2 kV) up to 30 kV (U_m = 36 kV)	
	IEC 60502-4	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1.2 kV) up to 30 kV (U_m = 36 kV) - Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV)	
Press- und Schraub-verbinder	zVDE 0220 Teil 1 zDIN VDE 0220-1	Bestimmungen für lösbare Kabelklemmen in Starkstrom-Kabelanlagen bis 1000 V	
	zVDE 0220 Teil 2 zDIN VDE 0220-2	Bestimmungen für Pressverbinder in Starkstrom-Kabelanlagen	
	VDE 0220 Teil 100 DIN EN 61238-1 IEC 61238-1	Pressverbinder und Schraubverbinder für Starkstromkabel für Nennspannungen bis einschließlich 36 kV (U_m = 42 kV) - Teil 1: Prüfverfahren und Anforderungen	
Isolierstoffe	VDE 0370 Teil 2 DIN EN 60422 IEC 60422	Richtlinie zur Überwachung und Wartung von Isolierölen auf Mineralölbasis in elektrischen Betriebsmitteln (IEC 60422:2005	

Fachbereich	Norm/ Hausverfahren/ Version	Titel der Norm oder des Hausverfahrens (ggf. Abweichungen / Modifizierungen von Normverfahren angeben)	Prüfbereich/ Einschränkung
	VDE 0370 Teil 5 DIN EN 60156 EN 60156 IEC 60156	Isolierflüssigkeiten Bestimmung der Durchschlagspannung bei Netzfrequenz Prüfverfahren	
	VDE 0370 Teil 20 DIN EN 60814 IEC 60814	Isolierflüssigkeiten Ölimprägniertes Papier und ölimprägnierter Pressspan; Bestimmung von Wasser mit automatischer Karl-Fischer-Titration	
	VDE 0380 Teil 2 DIN EN 60247 IEC 60247	Isolierflüssigkeiten - Messung der Permittivitätszahl, des dielektrischen Verlustfaktors (tan δ) und des spezifischen Gleichstrom-Widerstandes	
	VDE 0370-31 DIN EN 62021-1 IEC 62021-1	Isolierflüssigkeiten - Bestimmung des Säuregehaltes - Teil 1: Automatische potentiometrische Titration	
	VDE 0278-631-1 DIN VDE 0278-631-1 HD 631.1 S2	Kabel und isolierte Leitungen - Garnituren - Materialcharakterisierung - Teil 1: Fingerprint- und Typprüfungen für Reaktionsharzmassen	Einschänkung: keine ▪ Volumenschwindung

ВЯРНО С ОРИГИНАЛА

Organisme belge d'Accréditation
Belgische Accreditatieinstelling
Belgische Akkreditierungsstelle
Belgian Accreditation Body

Signatory to EA, ILAC and IAF Multilateral Agreements

Accreditation Certificate No. 144-TEST

In compliance with the provisions of the Royal Decree of 31 January 2006 setting up BELAC, the Accreditation Board hereby declares, that the test laboratory

NEXANS NETWORK SOLUTIONS NV
DIV. EUROMOLD
ELAB
Industrielaan, 12 - Zuid III
9320 EREMBODEGEM - Belgium

has the competence to perform the tests as described in the annex which is an integral part of the present certificate, in accordance with the requirements of the standard NBN EN ISO/IEC 17025:2005. The present accreditation is the subject of regular surveillance in order to confirm the compliance with the accreditation conditions.

ВЯРНО С ОРИГИНАЛА

The Chair of the Accreditation Board BELAC,

Issue date : **2011-09-06**

Validity date : **2016-06-14**

Nicole MEURÉE-VANLAETHEM

Original version of this certificate is in Dutch.

.be

Приложение № 5

PS ELECTRIC

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният: **ПС Електрик ООД**

С адрес на управление: **9700 гр. Шумен, бул Мадара 12**

Декларирам на собствена отговорност, че продуктът

Щепселна кабелна глава Euromold K158 LR

Произведена от:

Nexans Network Solutions NV

За която се отнася тази декларация,
Отговаря на приложимите български и международни стандарти или еквиваленти и на техните валидни изменения и поправки:
БДС HD 629.1 S2: 2006 Изисквания за изпитване на аксесоари за използване със силови кабели с обявено напрежение от 3,6/6(7.2) kV до 20,8/36(42) kV. Част 1: Кабели с екструдирана изолация;
БДС HD 629.1 S2: 2006/A1: 2008 Изисквания за изпитване на аксесоари за използване със силови кабели с обявено напрежение от 3,6/6(7.2) kV до 20,8/36(42) kV. Част 1: Кабели с екструдирана изолация;
БДС EN 50181:2001 Проходни изводи щепселен тип над 1kV до 36kV и от 250A до 31,5kA за съоръжения, различни от маслени трансформатори;
БДС HD 620 S2: 2010 Разпределителни кабели с екструдирана изолация за обявено напрежение от 3,6/6(7.2) kV до 20,8/36(42) kV

Декларирам, че ми е известна отговорността, която нося по член 313 от НК

30.08.2013 год
Гр. Шумен

Божидар Маринов
Управител

ПС електрик ООД BULGARIA

Централен офис адрес: 9700 Шумен, бул. Мадара 12; тел: +359 54 87 44 99; факс: +359 54 87 45 00
Офис София адрес: 1000 София, бул. Витоша 129; тел: +359 2 952 24 05; факс: +359 2 952 67 20

Приложение 17

MI 21020B

Euromold
a Nexans company

IS 158LR-BG-09
Page 1 of 10 - June 2005

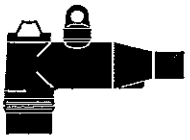
ВНИМАНИЕ: Да се прочетат инструкциите преди началото на монтажа.

Инструкции за монтаж на разглобяем L-образен конектор - тип A за кабели с екран от медни телове

(K)158LR

За размери FG - GA - GAB - GH

Нужните компоненти за монтаж на конектора:

1 x L-образно тяло на конектора 

1 x Щифтов контакт + ключе 

1 x Кабелен контакт (обувка) 

1 x Осигурителна скоба 

1 x 11TL адаптор (опция за кабели с ограничено екструдиран полупроводим слой

- Силиконова смазка

- Инструкции за монтаж и схема на каб. разделка

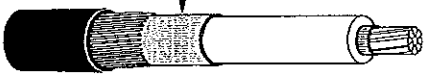
Други компоненти, зависещи от приложението (само по заявка) :

- Водохерметизиращ мастик, тип MWS, само за открит монтаж

Изберете схемата съгласно типа на кабела

A

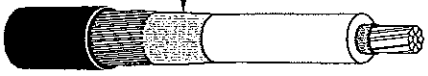
Ограничено екстр. полупроводим слой



Отиди на стр. 2

B

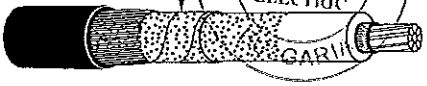
Свободно екстр. полупроводим слой



Отиди на стр. 4

C

Полупроводим слой от графит



Отиди на стр. 6

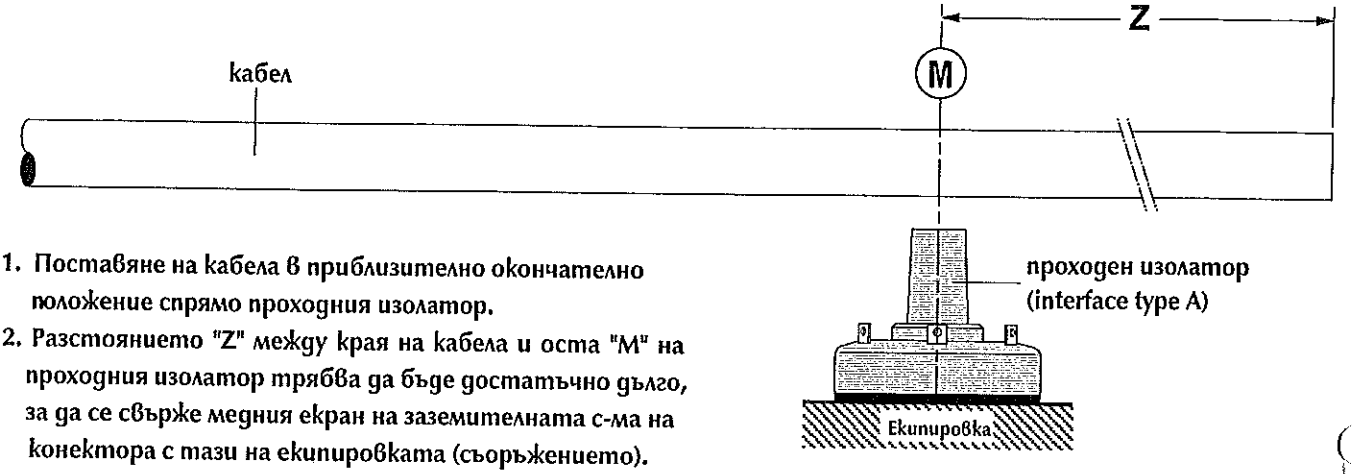
90006BG-R/0

Този продукт трябва да се монтира от компетентен работник, който има разрешение да работи с високоволтова екипировка. Тези инструкции не са замислени като заместител на адекватния опит по условията на безопасност. Тези инструкции не заместват осигуряването за всеки възможен случай. Неспазването им може да доведе до увреждане на продукта и до сериозни и фатални загуби.
ВАЖНО: Кабелът и съедин. апаратура трябва да се изключат и обозначат преди началото на монтажа.

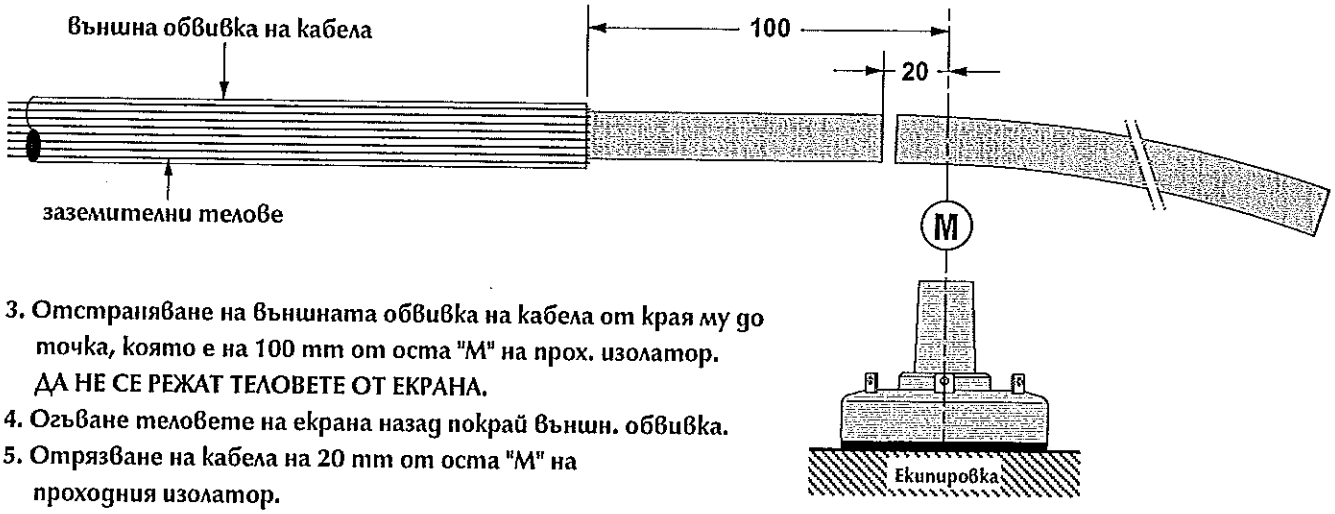
ВЯРНО С ОРИГИНАЛА

A С ограничено екструдиран полупр. слой

КАБЕЛНА РАЗДЕЛКА

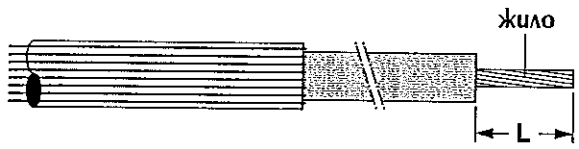


1. Поставяне на кабела в приблизително окончателно положение спрямо проходния изолатор.
2. Разстоянието "Z" между края на кабела и оста "M" на проходния изолатор трябва да бъде достатъчно дълго, за да се свърже медния екран на заземителната с-ма на конектора с тази на екипировката (съоръжението).



3. Отстраняване на външната обвивка на кабела от края му до точка, която е на 100 mm от оста "M" на прох. изолатор. ДА НЕ СЕ РЕЖАТ ТЕЛОВЕТЕ ОТ ЕКРАНА.
4. Огъване телове на екрана назад покрай външн. обвивка.
5. Отрязване на кабела на 20 mm от оста "M" на проходния изолатор.

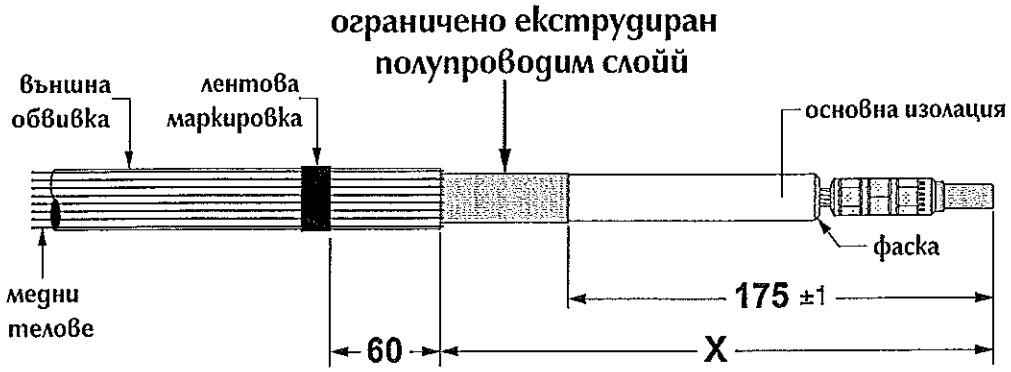
КЕРБОВАНЕ НА КАБЕЛНИЯ КОНТАКТ



1. Отстраняване на осн. изолация от жилото на разстояние "L" от края на кабела:
   - за медно жило: L = 40 mm;
   - за алуминиево жило: L = 50 mm.
2. При алуминиево жило: преди монтирането на каб. контакт, жилото се почиства с телена четка.

3. Поставяне на каб. контакт, така че отворът му да е съосен с отвора на проходния изолатор.
4. Пресоване на кабелния контакт. СТАРАТЕЛНО ИЗБЪРСВАНЕ.

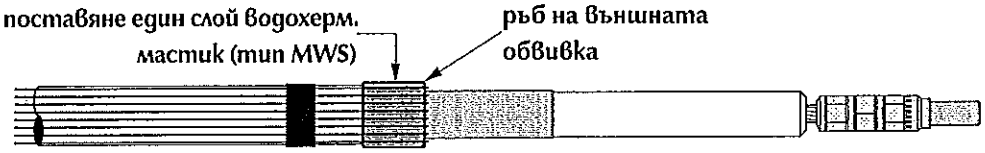
ПОДГОТОВКА НА КАБЕЛА И МОНТАЖ НА 11TL-АДАПТОРА (ако се изисква)

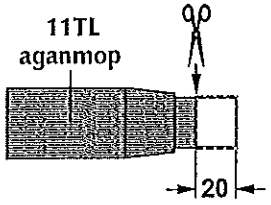


Използван адаптор	X (mm)
не	205
11TL	230

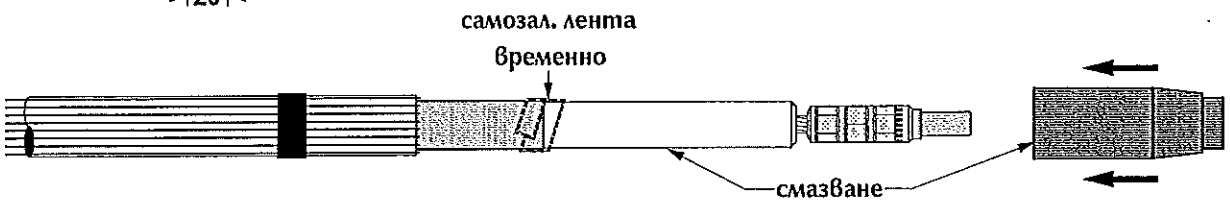
1. Отстраняване на външната обвивка на кабела до точка, която е на "X" mm от края на кабелния контакт.
2. Ако се използва адаптор 11TL, се поставя лентова маркировка на 60 mm от края на външната обвивка.
3. Отстраняване на полупроводимия слой на разстояние 175 ±1 mm от края на кабелния контакт.
4. Направа на малка фаска на края на основната изолация (2 mm max).
5. Ако не се използва адаптор 11 TL се продължава на стр. 8: "Монтаж на конектора".

6. ЗА ОТКРИТ МОНТАЖ
   Поставяне един слой водохерметизиращ мастик (тип MWS) върху външн. обвивка наравно с края й (min 25 mm шир.).
   Отново огъване на теловете назад покрай външната обвивка като се натискват в херметизиращия мастик.

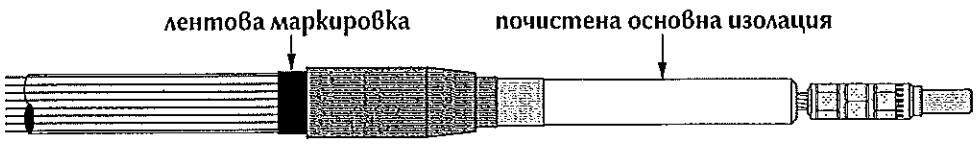




7. Отрязване пръстена на адаптора 11TL на разстояние 20 mm.



8. Като помощ при монтажа на адаптора се препоръчва да се навият един или два слоя самозалепваща се лента застъпващо върху края на полупроводимия слой.
9. Да се намаже* основната изолация и вътрешността на адаптора.



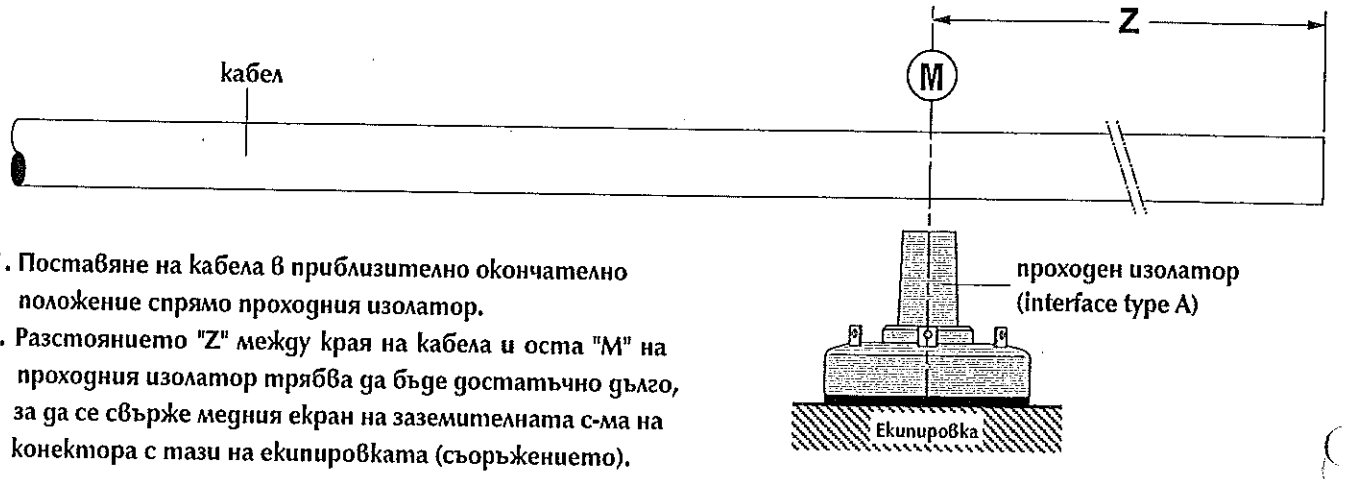
10. Плъзгане на адаптора над основната изолация, докато се изравни с лентовата маркировка.
11. Отстраняване на самозалепващата се лента, използвана в стъпка 8.
    ВНИМАТЕЛНО ПОЧИСТВАНЕ НА ОСНОВНАТА ИЗОЛАЦИЯ, ИЗПОЛЗВАЙКИ ПОЧИСТВАЩИТЕ МАТЕРИАЛИ.
    Избърсването винаги да става по посока теловете на екрана.

ПРЕМИНАВАНЕ НА СТРАНИЦА 8 ЗА МОНТАЖ НА КОНЕКТОРА

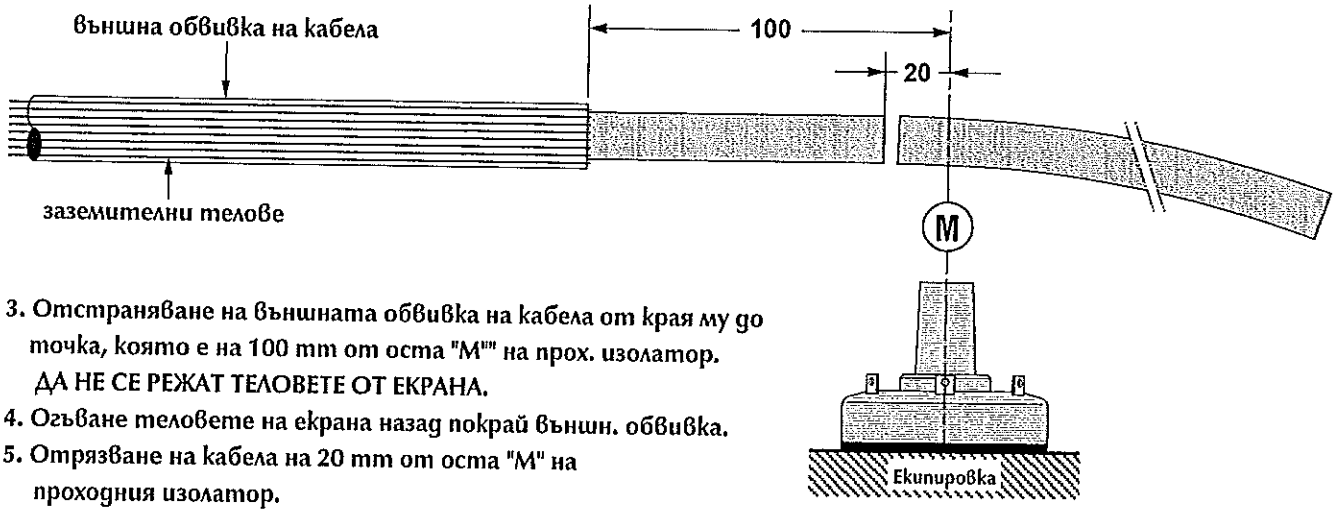
* Да се използва само поставената в комплекта силиконова смазка

B Свободно екструдиран полупров. слой

КАБЕЛНА РАЗДЕЛКА

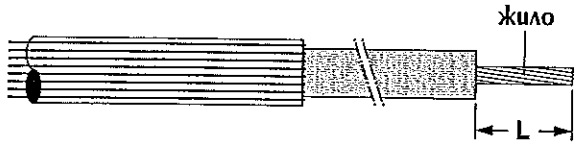


1. Поставяне на кабела в приблизително окончателно положение спрямо проходния изолатор.
2. Разстоянието "Z" между края на кабела и оста "M" на проходния изолатор трябва да бъде достатъчно дълго, за да се свърже медния екран на заземителната с-ма на конектора с тази на екипировката (съоръжението).

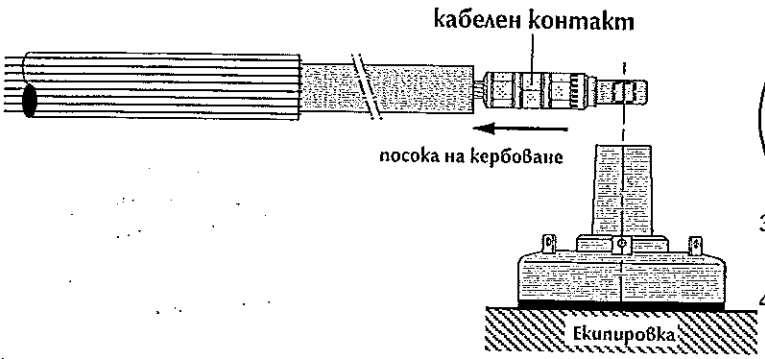


3. Отстраняване на външната обвивка на кабела от края му до точка, която е на 100 mm от оста "M"" на прох. изолатор. ДА НЕ СЕ РЕЖАТ ТЕЛОВЕТЕ ОТ ЕКРАНА.
4. Огъване телоевете на екрана назад покрай външн. обвивка.
5. Отрязване на кабела на 20 mm от оста "M" на проходния изолатор.

КЕРБОВАНЕ НА КАБЕЛНИЯ КОНТАКТ



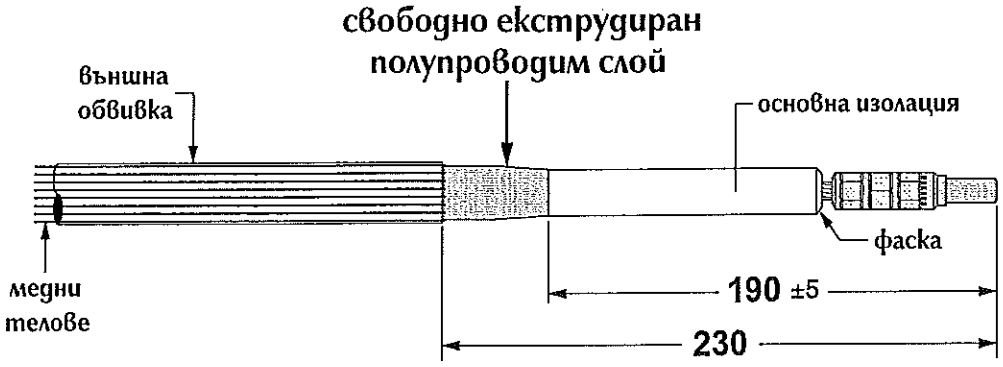
1. Отстраняване на осн. изолация от жилото на разстояние "L" от края на кабела:
   - за медно жило: L = 40 mm;
   - за алуминиево жило: L = 50 mm.
2. При алуминиево жило: преди монтирането на каб. контакт, жилото се почиства с телена четка.



3. Поставяне на каб. контакт, така че отворът му да е съосен с отвора на проходния изолатор.
4. Пресоване на кабелния контакт. СТАРАТЕЛНО ИЗБЪРСВАНЕ.

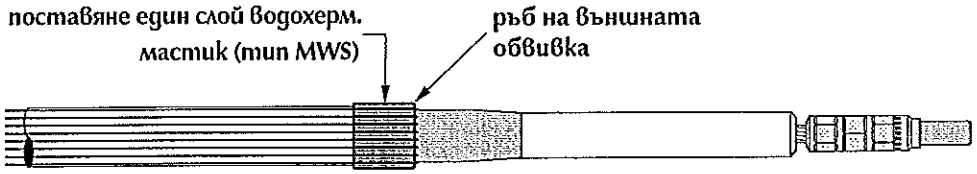
ВЯРНО С ОРИГИНАЛА

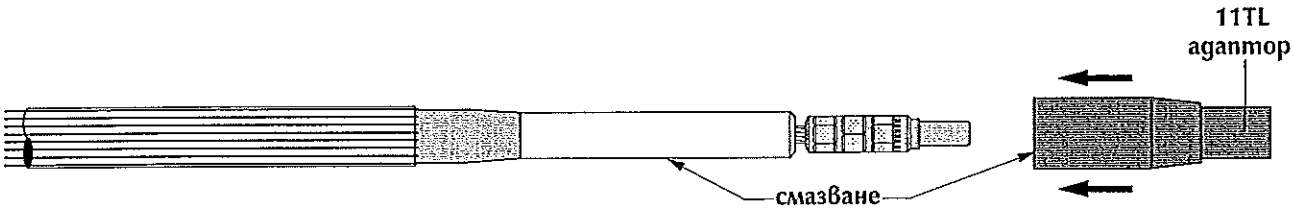
ПОДГОТОВКА НА КАБЕЛА И МОНТАЖ НА 11 TL-АДАПТОРА



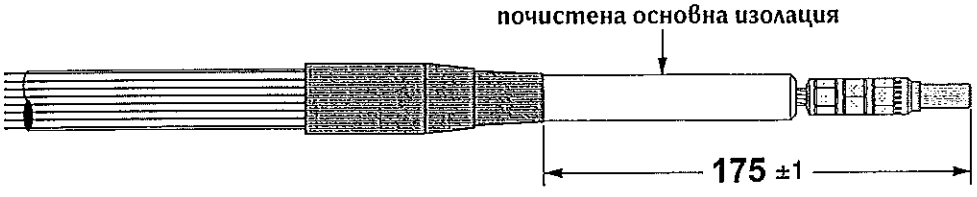
1. Отстраняване на външната обвивка на кабела до точка, която е на 230 mm от края на кабелния контакт.
2. Отстраняване на полупроводимия слой на разстояние 190 ±5 mm от края на кабелния контакт.
3. Направа на малка фаска на края на основната изолация (2 mm max).

4. ЗА ОТКРИТ МОНТАЖ
   Поставяне един слой водохерметизиращ мастик (тип MWS) върху външн. обвивка наравно с края й (min 25 mm шир.). Отново огъване на теловете назад покрай външната обвивка като се натискват в херметизиращия мастик.





5. Да се намаже* основната изолация и вътрешността на адаптора.



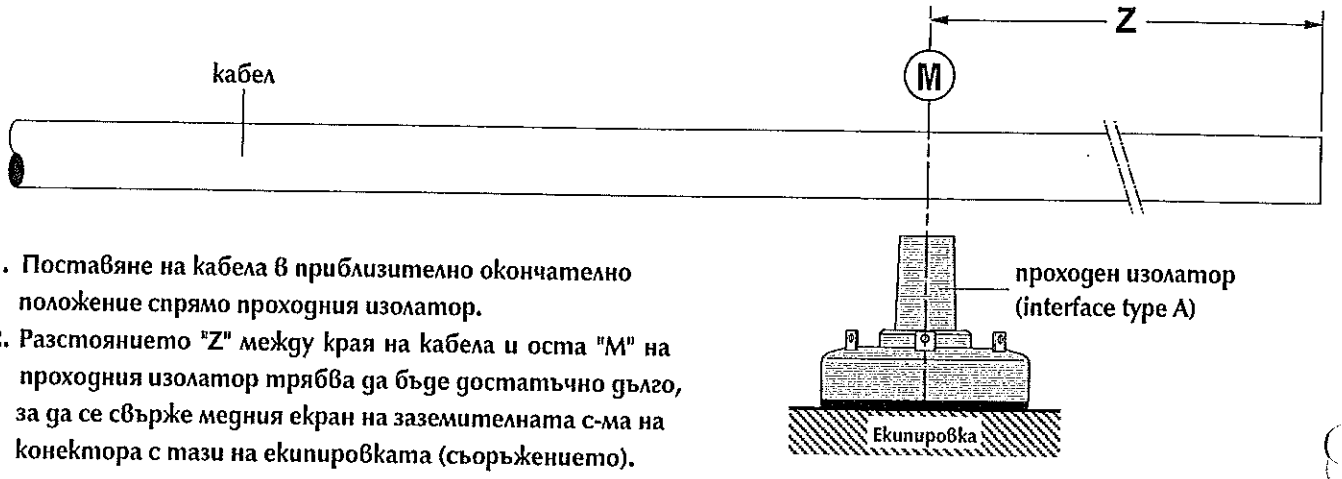
6. Плъзгане на адаптора над основната изолация до точка 175 ±1 mm от края на кабелния контакт.
   ВНИМАТЕЛНО ПОЧИСТВАНЕ НА ОСНОВНАТА ИЗОЛАЦИЯ, ИЗПОЛЗВАЙКИ ПОДХОДЯЩ РАЗТВОРИТЕЛ.
   Избърсването винаги да става по посока теловете на екрана.

ПРЕМИНАВАНЕ НА СТРАНИЦА 8 ЗА МОНТАЖ НА КОНЕКТОРА

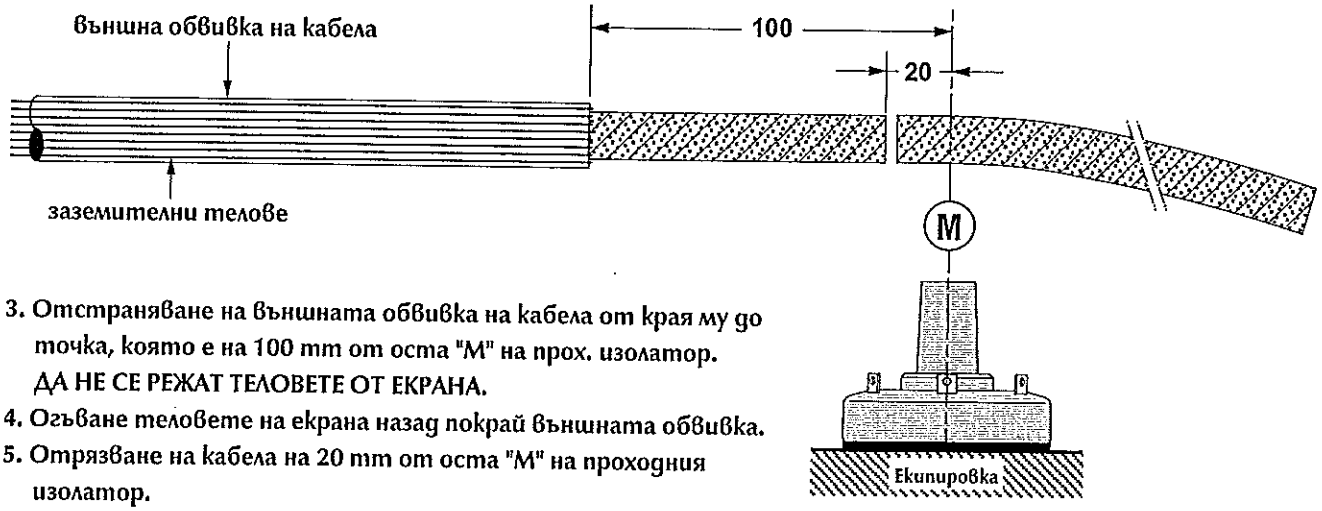
* Да се използва само поставената в комплекта силиконова смазка

C Екран от графитна обмазка

КАБЕЛНА РАЗДЕЛКА

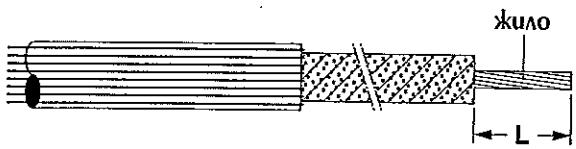


1. Поставяне на кабела в приблизително окончателно положение спрямо проходния изолатор.
2. Разстоянието "Z" между края на кабела и оста "M" на проходния изолатор трябва да бъде достатъчно дълго, за да се свърже медния екран на заземителната с-ма на конектора с тази на екипировката (съоръжението).

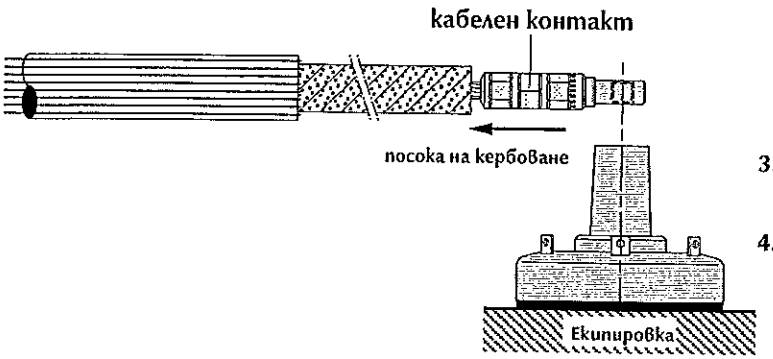


3. Отстраняване на външната обвивка на кабела от края му до точка, която е на 100 mm от оста "M" на прох. изолатор. ДА НЕ СЕ РЕЖАТ ТЕЛОВЕТЕ ОТ ЕКРАНА.
4. Огъване телоВете на екрана назад покрай външната обвивка.
5. Отрязване на кабела на 20 mm от оста "M" на проходния изолатор.

КЕРБОВАНЕ НА КАБЕЛНИЯ КОНТАКТ



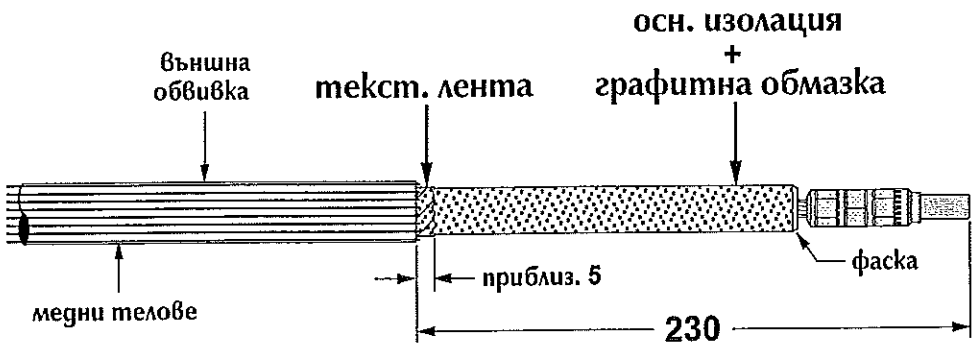
1. Отстраняване на осн. изолация от жилото на разстояние "L" от края на кабела:
   - за медно жило: L = 40 mm;
   - за алуминиево жило: L = 50 mm.
2. При алуминиево жило: преди монтирането на каб. контакт, жилото се почиства с телена четка.



3. Поставяне на каб. контакт, така че отворът му да е съосен с отвора на проходния изолатор.
4. Пресоване на кабелния контакт. СТАРАТЕЛНО ИЗБЪРСВАНЕ.

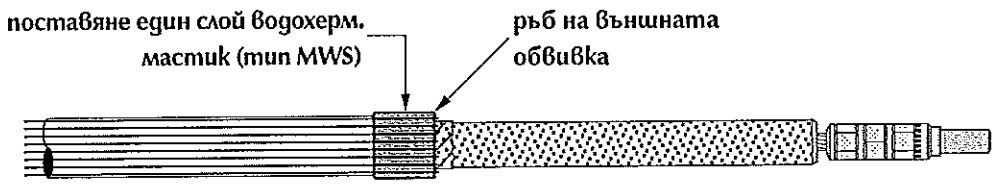
ВЯРНО С ОРИГИНАЛА

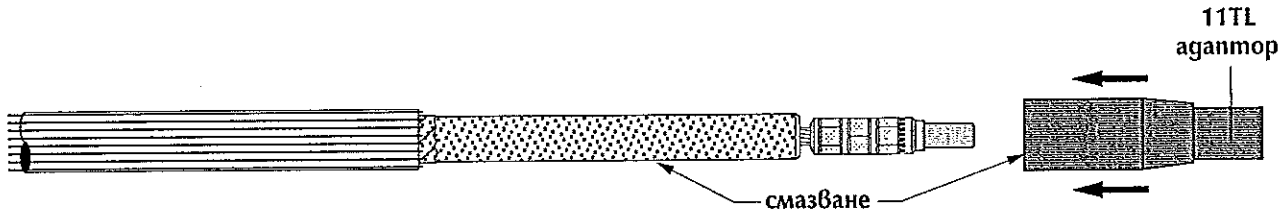
ПОДГОТОВКА НА КАБЕЛА И МОНТАЖ НА 11 TL-АДАПТОРА



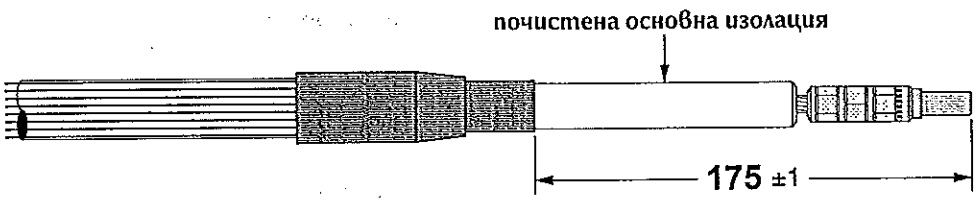
1. Отстраняване на външната обвивка на кабела до точка, която е на 230 mm от края на кабелния контакт.
2. Отстраняване на текстилната лента на разстояние приблизително 5 mm от края на външната обвивка.
   НА ТОЗИ ЕТАП ДА НЕ СЕ ОТСТРАНЯВА ГРАФИТНАТА ОБМАЗКА.
3. Направа на малка фаска на края на основната изолация (2 mm max).

4. ЗА ОТКРИТ МОНТАЖ
   Поставяне един слой водохерметизиращ мастик (тип MWS) върху външн. обвивка наравно с края ѝ (min 25 mm шир.).
   Отново огъване на теловете назад покрай външната обвивка като се натискват в херметизиращия мастик.





5. Да се намаже* основната изолация и вътрешността на адаптора.

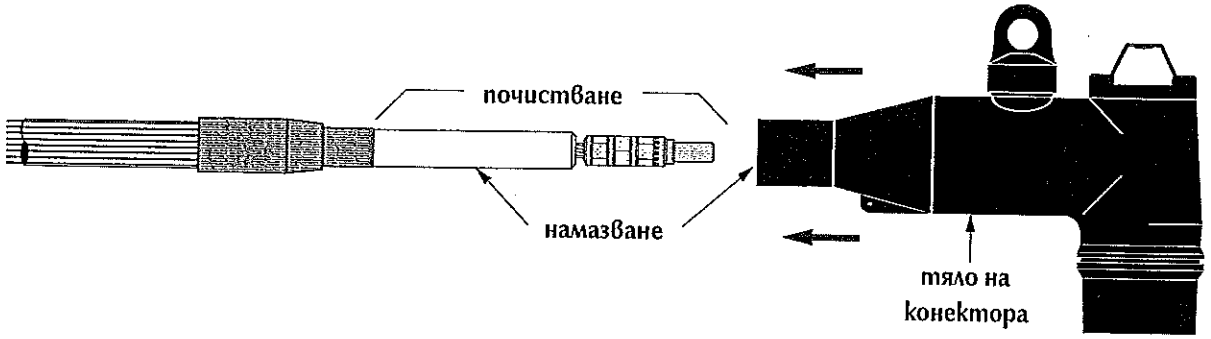


6. Плъзгане на адаптора над основната изолация до точка 175 ±1 mm от края на кабелния контакт.
   ВНИМАТЕЛНО ПОЧИСТВАНЕ НА ГРАФИТНАТА ОБМАЗКА, ИЗПОЛЗВАЙКИ ПОДХОДЯЩ РАЗТВОРИТЕЛ.
   Избърсването винаги да става по посока теловете на екрана.

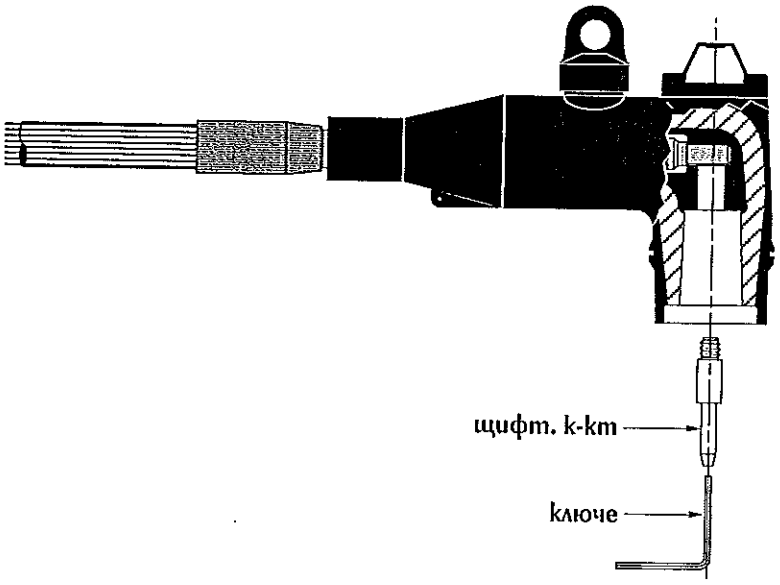
* Да се използва само поставената в комплекта силиконова смазка.

A B C **Прилага се при всички кабели**

МОНТАЖ НА КОНЕКТОРА И НА ЗАЗЕМИТЕЛНИЯ ЕКРАН

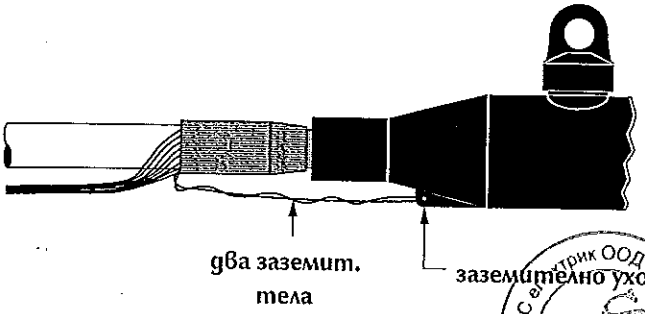


1. СТАРАТЕЛНО ПОЧИСТВАНЕ НА ОСНОВНАТА ИЗОЛАЦИЯ, ОТСТРАНЯВАЙКИ ВСИЧКИ ОСТАТЪЦИ ОТ ПОЛУПРОВОДИМИЯ СЛОЙ. Избърсването винаги да става по посока теловете на екрана.
2. Намазване* на основната изолация и вътрешната повърхнина на конектора.
3. Проверка на позиционирането на L-образния конектор спрямо отвора в ухото на кабелния контакт и тялото на конектора се плъзга спокойно по кабела, докато повече не може да се придвижи.

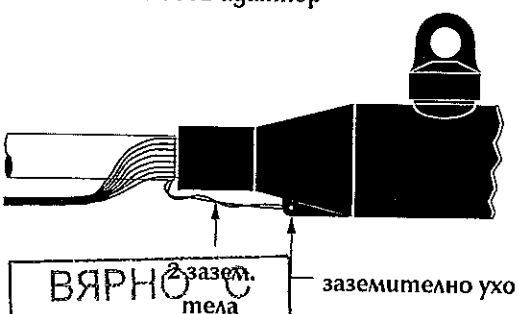


4. Поставяне с ръка на щифтовия контакт с резбата напред в съединителната част на конектора.
5. Завиване чрез шестостенното ключе от комплекта докато понататъшното навиване стане невъзможно.

Монтаж с 11TL-адаптор



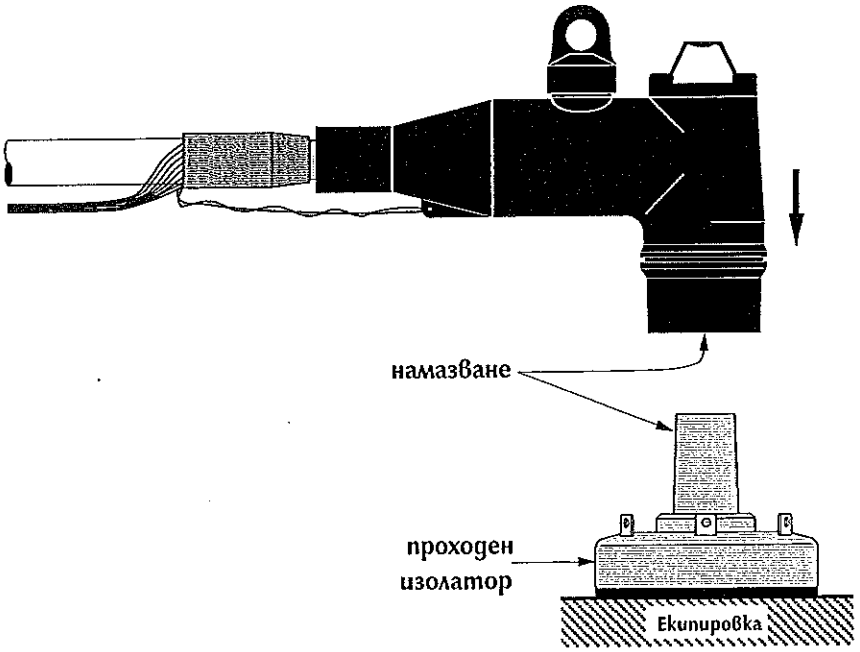
Монтаж без 11TL-адаптор



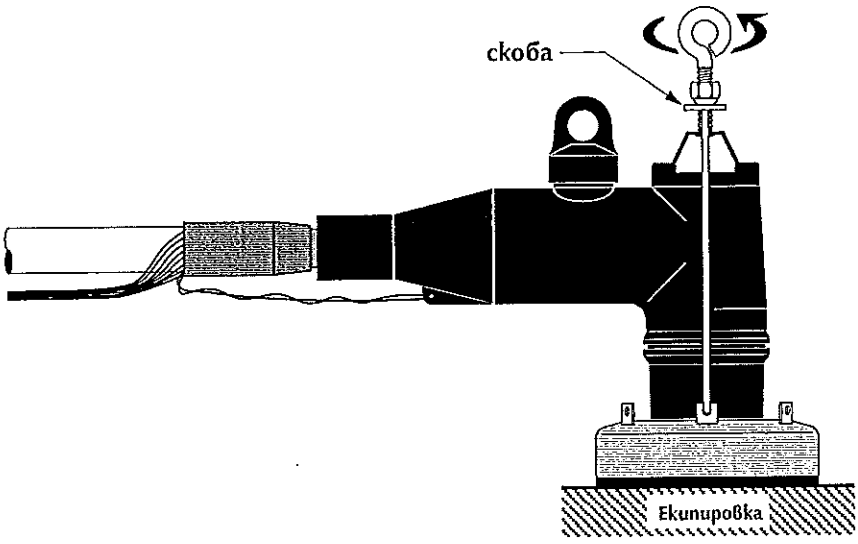
6. Свързване на заземит. екран на кабела чрез два от заземит. телове със зазем. ухо на конектора.

*Да се използва само поставената в комплекта силиконова смазка.

МОНТАЖ НА КОНЕКТОРА КЪМ ПРОХОДНИЯ ИЗОЛАТОР



1. Почистване и намазване* вътрешната повърхнина на конектора и външната повърхнина на проходния изолатор.
2. Набутване на конектора върху проходния изолатор.



3. Поставяне на скобата в ушите на проходния изолатор.
4. Позициониране на скобата и завиване на ухото-болт.

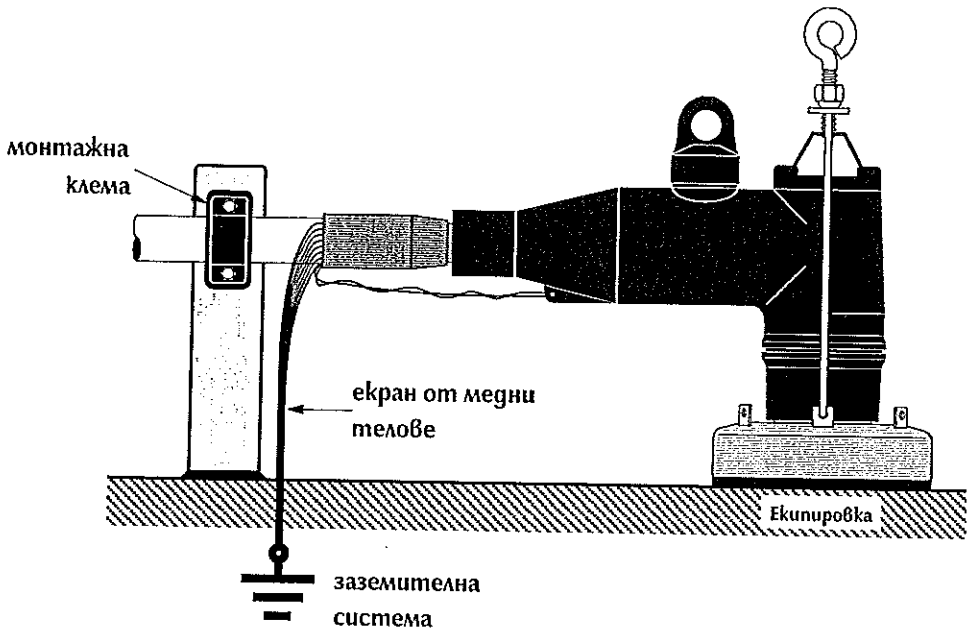
ДА НЕ СЕ ПРИЛАГА ПРЕКАЛЕНА СИЛА ВЪРХУ L-КОНЕКТОРА.

Нагласяване на контрагайката, така че ухото-болт сигурно да стои върху фиксатора. Контрагайката не позволява чрез ухото-болт да се прилага допълнително прекалено усилие върху конектора.

Щом веднъж е нагласена контрагайката, тя не трябва да се пренастройва при вадене на конектора.

*Да се използва само поставената в комплекта силиконова смазка.

ЗАЗЕМЯВАНЕ НА ЕКРАНА И УКРЕПВАНЕ НА КАБЕЛА



1. Извиване назад на телoвете от екрана и оформянето им като "свинска опашка".
2. Свързване на телoвете от екрана със заземителната система.

БЕЛЕЖКА:

Комбинацията конектор/проходен изолатор не би могла да носи цялото тегло на кабела.

Необходимо е да се укрепи кабела възможно най-близко до конектора.

ВАЖНИ БЕЛЕЖКИ:

- Никога да не се съединява или разединява конектора без да са инсталирани преди това неговите съставни части.
- Да не се използват хидрокарбонови масла и разредители, защото разлагат EPDM гумата. В случай на замърсяване, повърхнините да се избърсват със сух парцал.

Euromold
a Nexans company

"МАКРИС-ГПХ" ООД
Промишлена зона "Орион", ул. "3020" №34
1360 СОФИЯ, БЪЛГАРИЯ
тел.: +359 (0)2/920 41 43, телефакс: +359 (0)2/20 29 20

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД

Внимание: Да се прочетат инструкциите преди началото на монтажа.

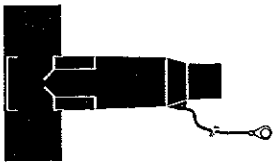
Инструкции за монтаж

(K),(M)400TB/G

Разглобяем Т-образен конектор - тип С

Да се използва само за кабели с екран от медни телове
и екструдиран полупроводим слой (Част А) или графитен полупроводим слой (Част В)

Нужните компоненти за монтаж на конектора:

1 x Тяло на конектора - 400BT/G 

1 x Кабелен редуцир - 411CA-W 

1 x Клемна шпилка - 400TCS 

1 x Кабелен контакт (обувка) - TBC-X или TMBC-X 

1 x Осн. изолационна тапа + капачка - 400BIPA 

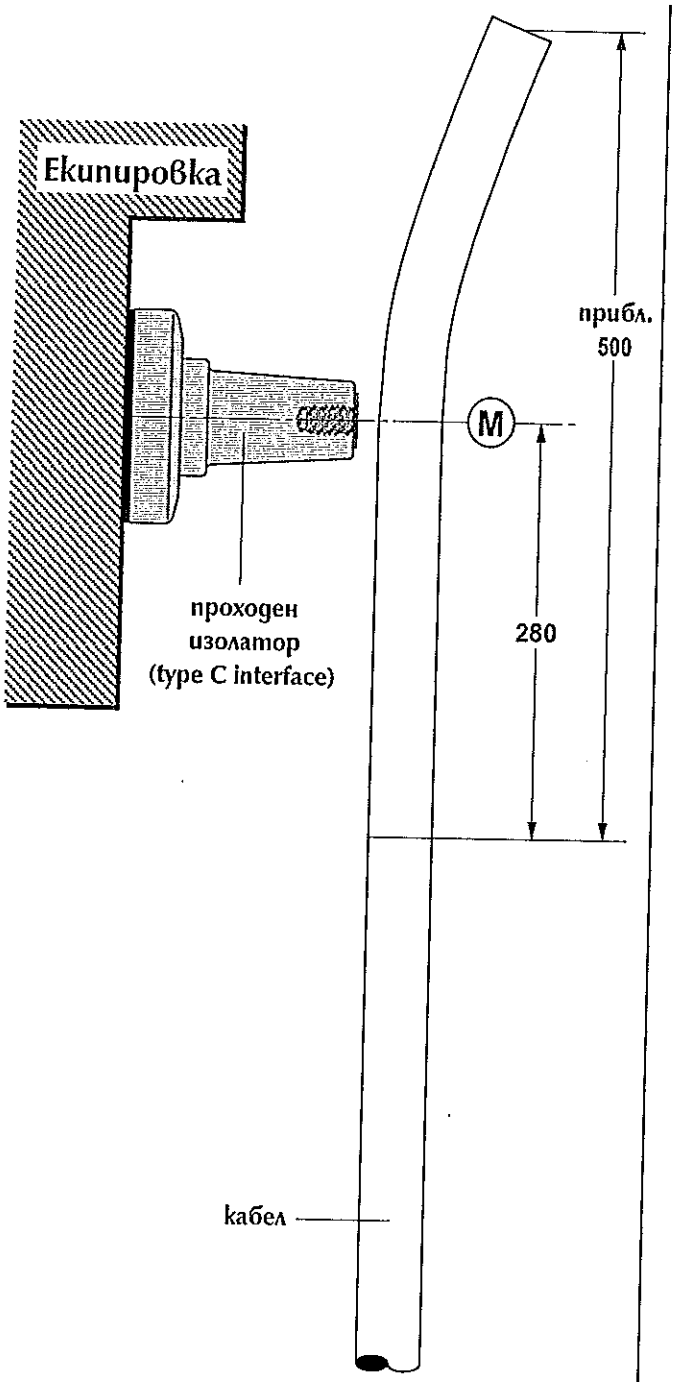
- Мастик за контрол на полето, тип MFC
- Силиконова смазка + почистващи материали
- Инструкции за монтаж + схема на кабелната разделка

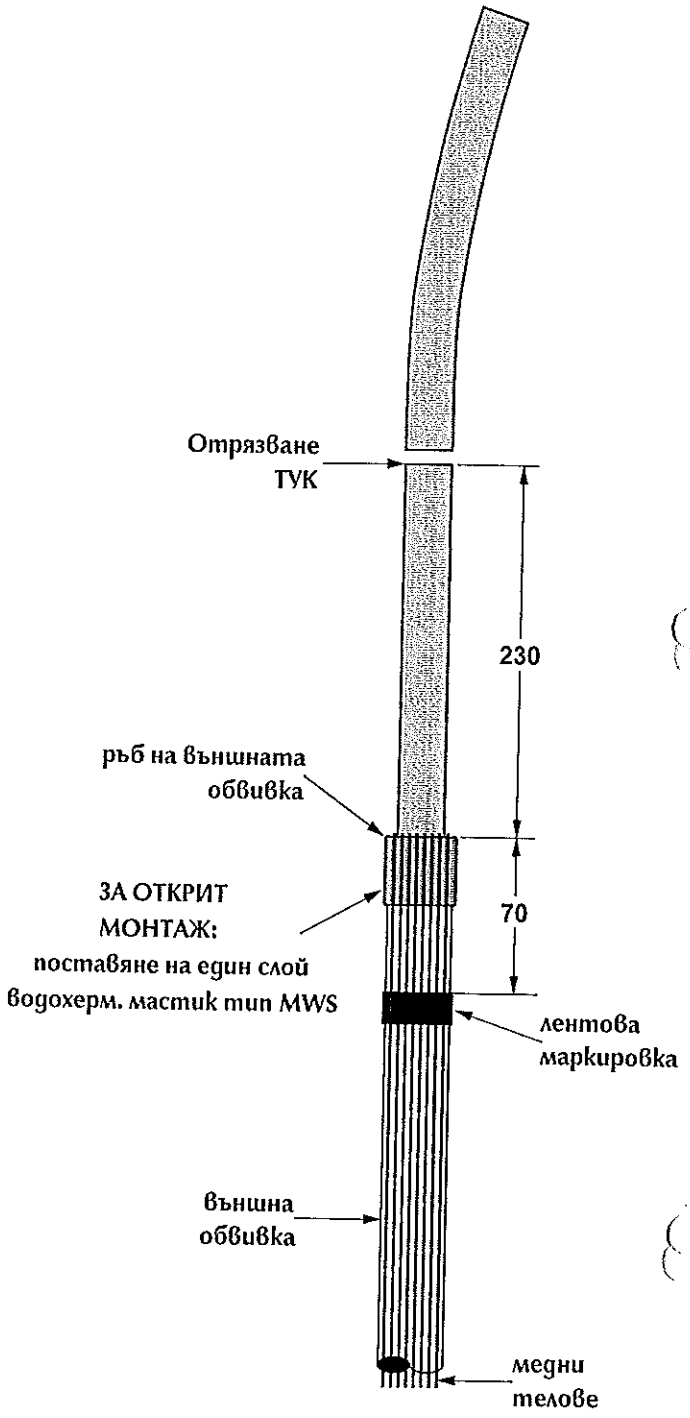
Допълнителни компоненти, зависещи от приложението и типа на кабела (само по заявка):

- Полупроводима лента, тип TSC, за кабел с графитен полупроводим слой;
- Водохерметизиращ мастик, тип MWS, само за открит монтаж.

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА





1. Поставяне на кабела в приблизително окончателно положение спрямо проходния изолатор.
2. Отстраняване на външн. обвивка на кабела от края му до точка, която е на 280 mm от оста «М».
3. Поставяне на лентова маркировка на 70 mm от ръба на външната обвивка. При вътрешен монтаж теловете от екрана се огъват назад покрай външната обвивка, след което се продължава със стъпка 4.

ЗА МОНТАЖ НА ОТКРИТО:

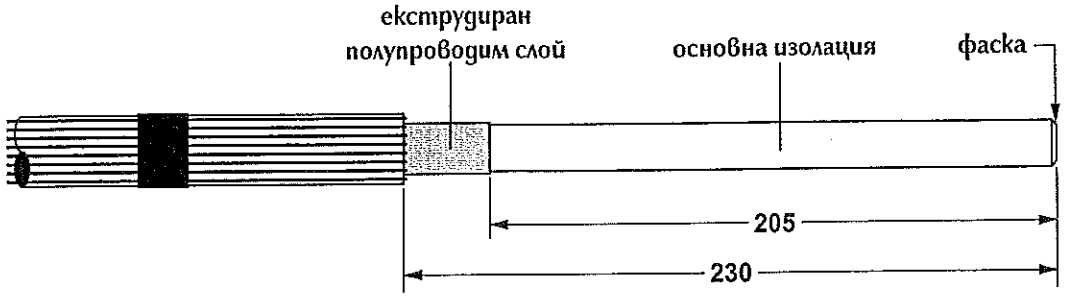
- Поставяне един слой водохерметизиращ мастик, тип MWS, върху външната обвивка наравно с края й (min 25 mm шири на), като трябва кабелът напълно да се обгърне.
- Огъване теловете на екрана назад покрай външн. обвивка и нанасяне на същите в херметизиращия мастик.

ВАЖНО: Теловете от екрана не трябва да се допират един до друг, когато се напъхват в мастика, за да се предотвра ти влизането на вода.

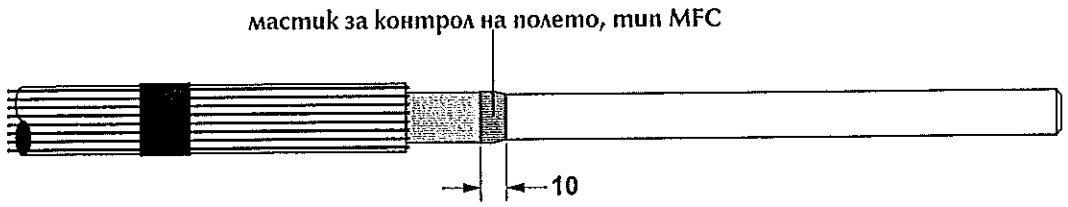
4. Отрязване на кабела на 230 mm от края на външн. обвивка.

КАБЕЛНА РАЗДЕЛКА

Част А | Кабел с екран от медни телове и екструд. полупров. слой



1. Проверка на разстоянието от 230 mm.
2. Отстраняване на полупроводимия слой на разстояние 205 mm от края на кабела.
   За ограничено екструдиран полупроводим слой: да се сваля като се щади основната изолация.
   За свободно екструдиран полупроводим слой (тип "банан"): да се сваля с подходящ инструмент.
3. Направа на малка фаска на края на основната изолация.

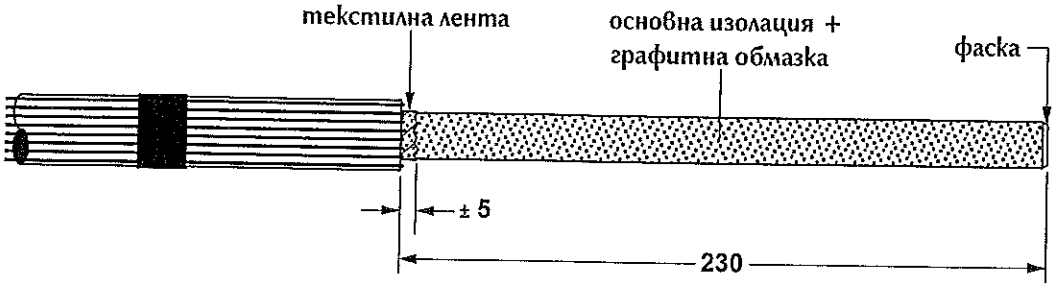


4. Отстраняване на опаковъчната хартия от мастика за контрол на полето, тип MFC.
5. Внимателно мастикът се разтегля от единия край, като се внимава да не се скъса.
6. Позиционира се мастика, така че да покрива приблизително 5 mm от полупроводимия слой и 5 mm от основната изолация.
7. Притискайки мастика в мястото на разтягане се навива, докато се припокрият двата края и се къса излишното.
8. Използвайки опаковъчната хартия плътно се притиска мастика върху полупроводимия екран.

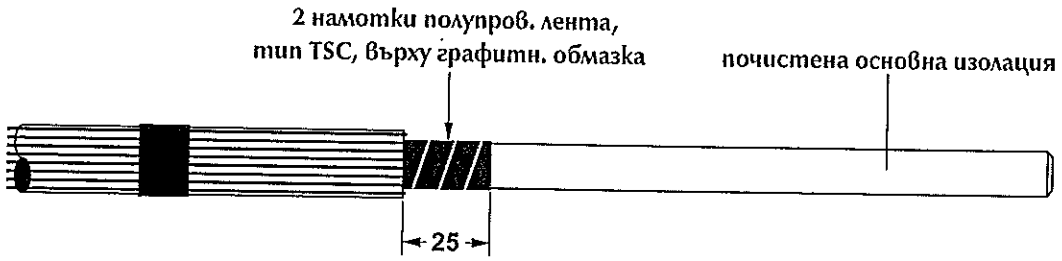
ПРЕМИНАВАНЕ НА СТРАНИЦА 5 ЗА МОНТАЖ НА КАБЕЛНИЯ РЕДУЦИР

КАБЕЛНА РАЗДЕЛКА

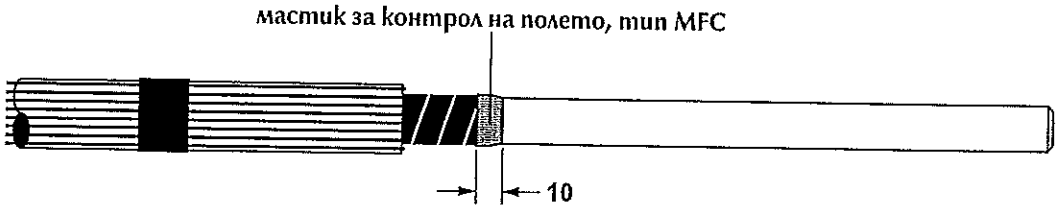
Част B | Кабел с екран от медни телове и граф. полупров. слой



1. Проверка на разстоянието от 230 mm.
2. Отстраняване на текстилната лента на приблизително 5 mm от външната обвивка.
   НА ТОЗИ ЕТАП ДА НЕ СЕ ОТСТРАНЯВА ГРАФИТНАТА ОБМАЗКА.
3. Направа на малка фаска на края на основната изолация.



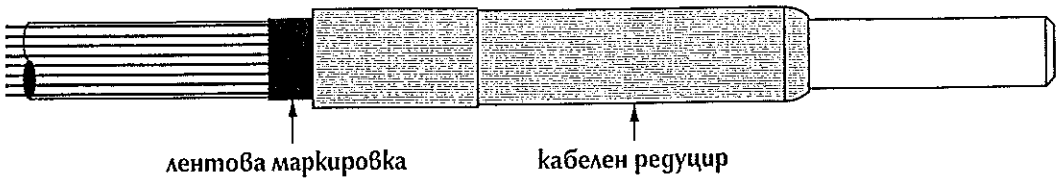
4. Навиване на 2 намотки от полупроводима лента, тип TSC, върху графитната обмазка на 25 mm от външната обвивка.
5. ВНИМАТЕЛНО ОТСТРАНЯВАНЕ НА ГРАФИТНАТА ОБМАЗКА ДО ПОЛУПРОВОДИМАТА ЛЕНТА, ИЗПОЛЗВАЙКИ ПОДХОДЯЩ РАЗТВОРИТЕЛ.



6. Отстраняване на опаковъчната хартия от мастика за контрол на полето, тип MFC.
7. Внимателно се разтегля мастика от единия край, като се внимава да не се скъса.
8. Позиционира се мастика, така че да покрива приблизително 5 mm от полупроводимата лента и 5 mm от основната изолация.
9. Притискайки мастика в мястото на разтегляне се навива, докато се припокрият двата края и излишното се къса.
10. Използвайки опаковъчната хартия плътно се притиска мастика върху полупроводимата лента.

ВЯРНО С ОРИГИНАЛА

МОНТАЖ НА КАБЕЛНИЯ РЕДУЦИР

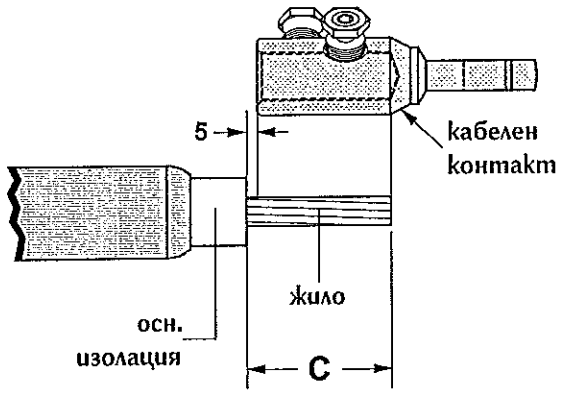


1. ОТСТРАНЯВАНЕ НА ВСИЧКИ ОСТАТЪЦИ ОТ ПОЛУПРОВОДИМИЯ СЛОЙ ВЪРХУ ОСНОВНАТА ИЗОЛАЦИЯ.
   Избърсването винаги да става по посока теловете на екрана.
2. Почистване и намазване* на основната изолация и вътрешната повърхнина на кабелния редуцир.
   Плъзгане на редуцира по основната изолация, докато края му се изравни с лентовата маркировка.

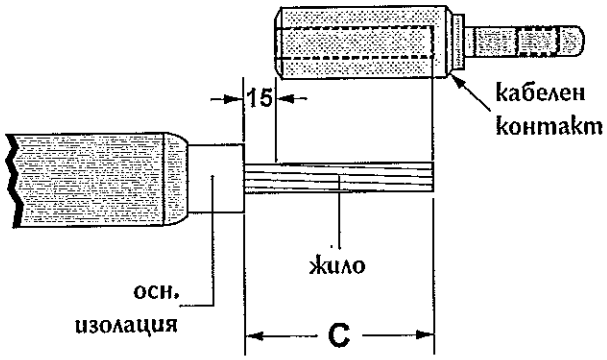
ПРЕСОВАНЕ НА КАБЕЛНИЯ КОНТАКТ

Моля използвайте една от двете схеми съгласно вида на кабелния контакт.

A. Винтов кабелен контакт



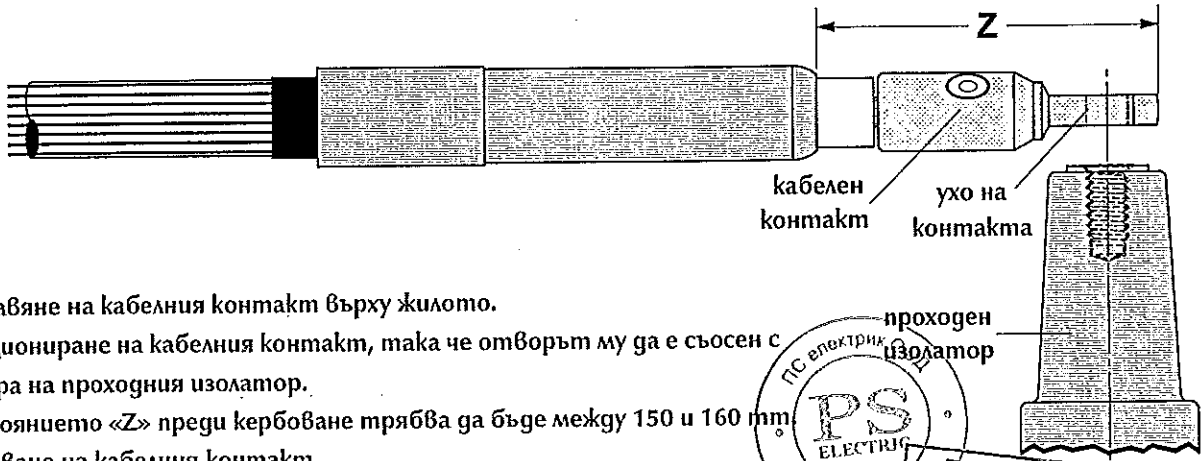
B. Пресов кабелен контакт



1A. За винтов кабелен контакт: отстраняване на основната изолация от жилото на разстояние "C" mm (C = дълбочината на отвора в кабелния контакт + 5 mm).

1B. За пресов кабелен контакт: отстраняване на основната изолация от жилото на разстояние "C" mm (C = дълбочината на отвора в кабелния контакт + 15 mm).

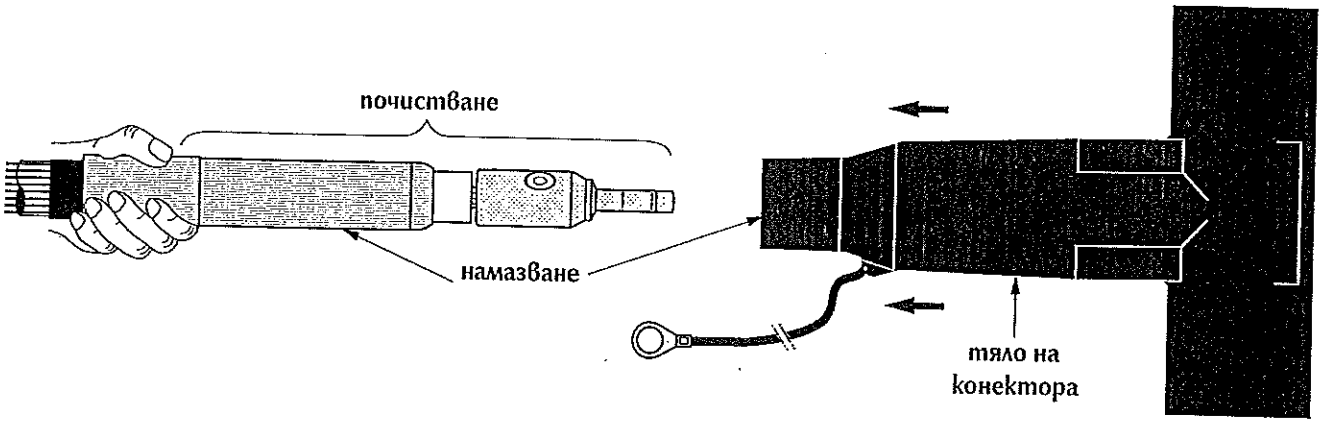
2. При алуминиево жило: преди монтирането на кабелния контакт, жилото се почиства с телена четка.



3. Поставяне на кабелния контакт върху жилото.
4. Позициониране на кабелния контакт, така че отворът му да е съосен с отвора на проходния изолатор.
5. Разстоянието «Z» преди кербоване трябва да бъде между 150 и 160 mm.
6. Пресоване на кабелния контакт.
7. След пресоването разстоянието «Z» трябва да бъде между 155 и 165 mm.
8. ОТСТРАНЯВАНЕ НА ЧЕПЛЪЦИ ОТ ПРЕСОВАНЕТО И СТАРАТЕЛНО ИЗБЪРСВАНЕ.

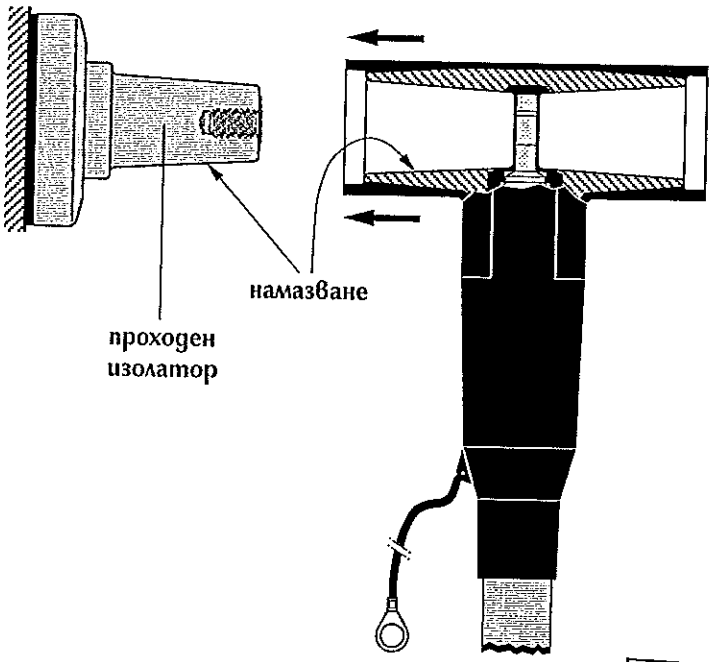
*Да се използва само поставената в комплекта силиконова смазка

МОНТАЖ НА КОНЕКТОРА



1. Почистване и намазване* вътрешната повърхнина на конектора и външната повърхнина на кабелния редуцир.
2. Проверка на позиционирането на Т-образния конектор спрямо ухото на кабелния контакт и като се придържа превантивно кабелния редуцир, тялото на конектора се плъзга спокойно по кабела, докато повече не може да се придвижи назад.
3. Проверка дали кабелния редуцир е останал на мястото си повреме на монтажа и отстраняване на лент. маркировка.

МОНТАЖ НА КОНЕКТОРА КЪМ ПРОХОДНИЯ ИЗОЛАТОР



1. Почистване и намазване* вътрешната повърхнина на конектора и външната повърхнина на проходния изолатор.
2. Набутване на конектора върху проходния изолатор (ВИЖ ВАЖНИТЕ БЕЛЕЖКИ ОТ СТРАНИЦА 8).

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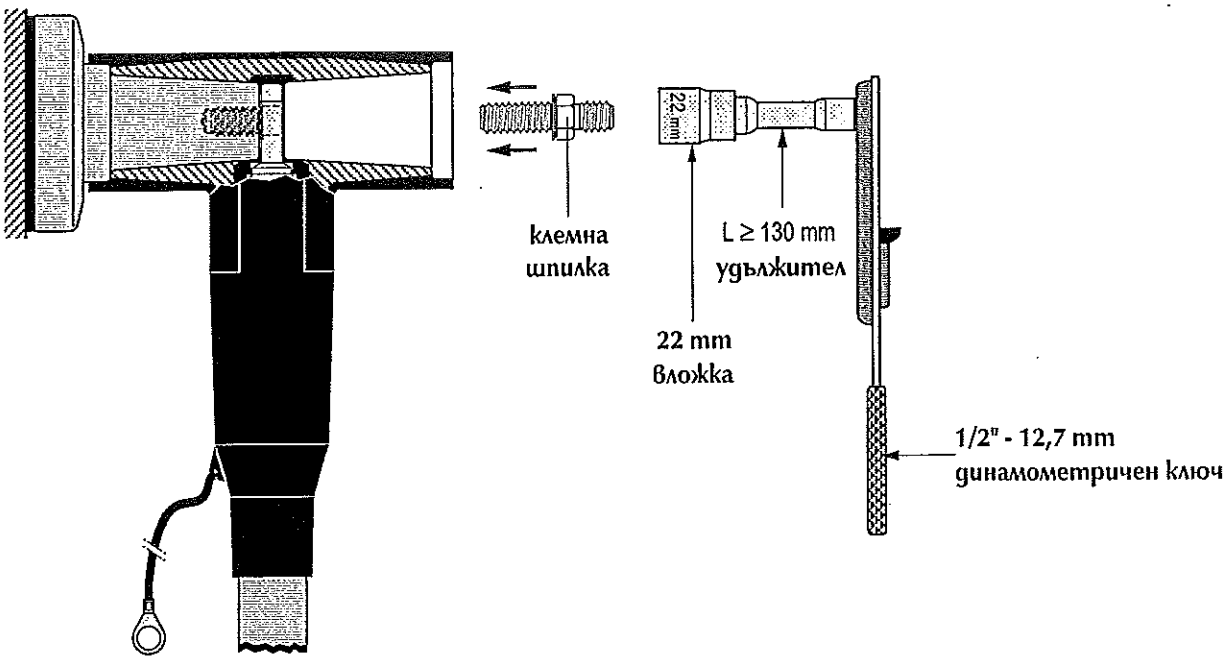
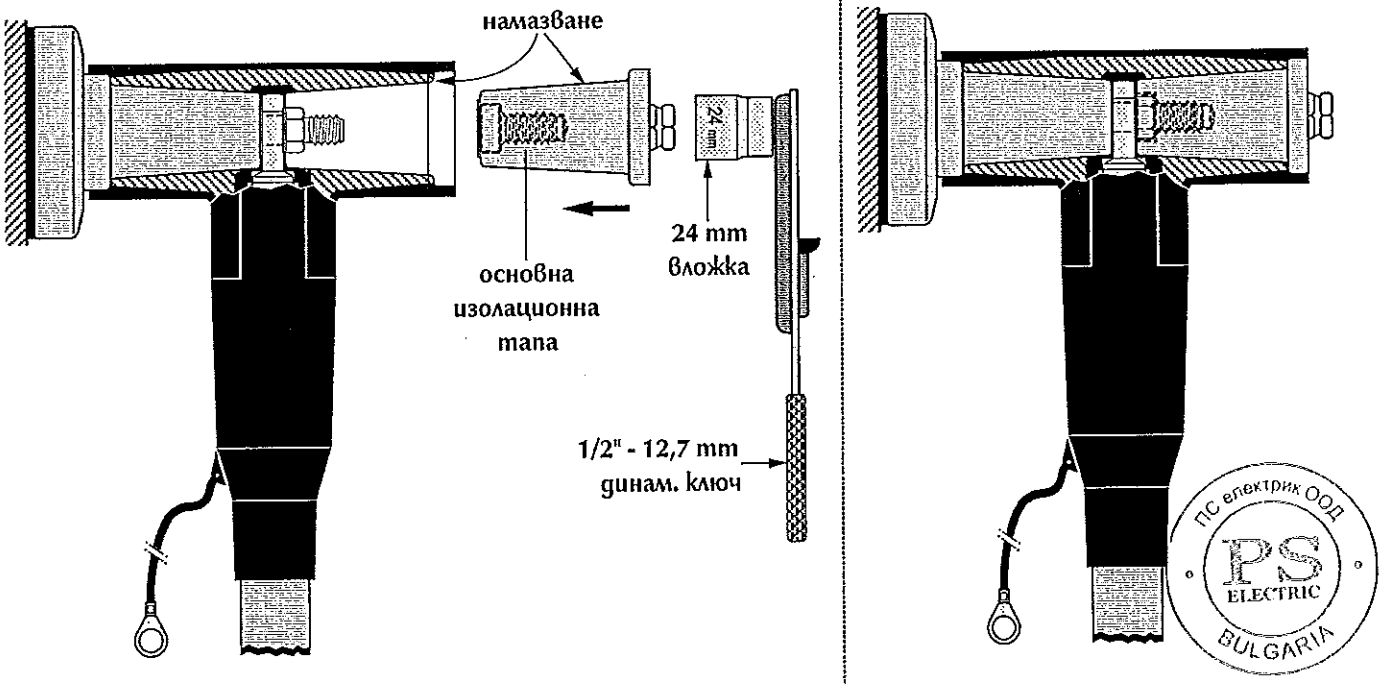
*Да се използва само поставената в комплекта силиконова смазка



3. Поставяне на клемната шпилка в резбовия отвор на проходния изолатор.
4. Използвайки динамометричен ключ с вложка 22, се завива с въртящ момент 50 Nm.

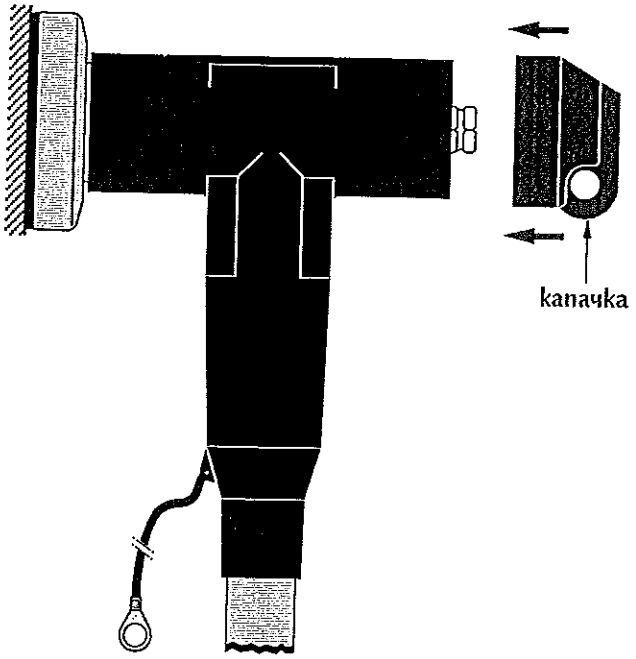
(ВИЖ ВАЖНИТЕ БЕЛЕЖКИ ОТ СТРАНИЦА 8).



5. Почистване и намазване* на основната изолационна тапа и задната вътрешна повърхност на конектора.
6. Поставяне на тапата в конектора, зацепване с резбата на клемната шпилка и навиване на ръка.
7. Използвайки динамометричен ключ с вложка 24 се завива тапата с въртящ момент 50 Nm.

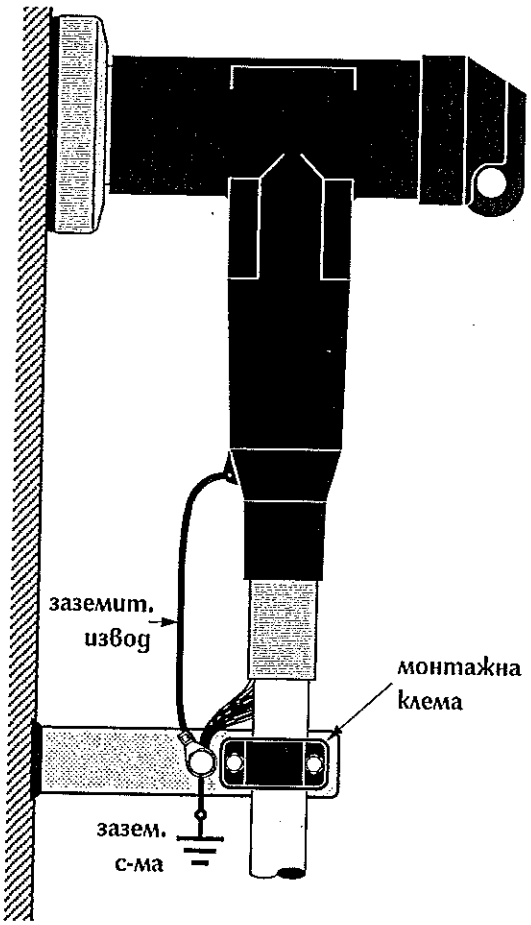
(ВИЖ ВАЖНИТЕ БЕЛЕЖКИ ОТ СТРАНИЦА 8).

*Да се използва само поставената в комплекта силиконова смазка.



8. Почистване на вътрешната повърхнина на капачката (не се маже) и поставяне върху конектора. Здраво да се притисне, докато щракне в мястото си.

ЗАЗЕМЯВАНЕ НА ЕКРАНА И УКРЕПВАНЕ НА КАБЕЛА



1. Оплитане на теловете на екрана покрай външната обвивка на кабела под формата на опашка.
2. Свързване на заземителния извод на конектора и екрана на кабела със заземителната система.

БЕЛЕЖКА:

Комбинацията конектор / проходен изолатор не би могла да носи цялото тегло на кабела. Необходимо е да се укрепи кабела възможно най-близко до конектора.

ВАЖНИ БЕЛЕЖКИ:

- За да се постигне коректния въртящ момент не трябва да се намазват резбовите части.
- Никога да не се съединява или разединява конектора без да са инсталирани преди това неговите съставни части.
- Да не се използват хидрокарбонови масла и разредители, защото разлагат EPDM гумата. В случай на замърсяване повърхнините да се избърсват със сух парцал.

ПС електрик ООД BULGARIA

ВЯРНО С ОРИГИНАЛА

Euromold
a Nexans company

"МАКРИС-ГПХ" ООД
Промишлена зона "Орион", ул. "3020" №34
1360 СОФИЯ, БЪЛГАРИЯ
тел.: +359 (0)2/920 41 43, телефакс: +359 (0)2/20 29 20

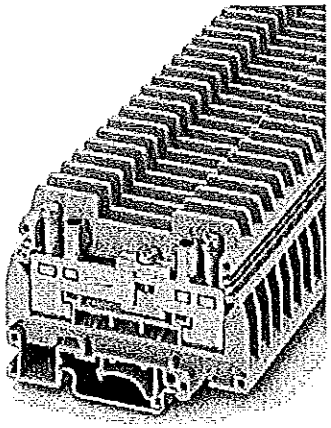
Приложение 18 1

PHOENIX CONTACT

Extract from the online catalog

URTK/S

Order No.: 0311087



http://eshop.phoenixcontact.net/phoenix/treeViewClick.do?UID=0311087

Test disconnect terminal block, Connection method: Screw connection, Cross section: 0.5 mm² -10 mm² , AWG: 20 - 10, Width: 8.2 mm, Mounting type: NS 35/7.5, NS 35/15, NS 32, Color: gray

Product notes

WEEE/RoHS-compliant since: 01/01/2003

http://www.download.phoenixcontact.com
Please note that the data given here has been taken from the online catalog. For comprehensive information and data, please refer to the user documentation. The General Terms and Conditions of Use apply to Internet downloads.

Commercial data

EAN	4 017918 001292
Pack	50 pcs.
Customs tariff	85369010
Gross weight in pieces	0.035996 KG
Net weight per piece (exclusive packing)	0.03581 KG
Catalog page information	Page 463 (CL1-2011)

Technical data

General

Number of levels	1
Number of connections	2
Color	gray

ПС ЕЛЕКТРИК ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Insulating material	PA
Inflammability class according to UL 94	V0

Dimensions

Length	72 mm
Width	8.2 mm
Height NS 35/7,5	51.5 mm
Height NS 35/15	59 mm
Height NS 32	56 mm

Technical data

Rated surge voltage	6 kV
Pollution degree	3
Surge voltage category	III
Insulating material group	I
Connection in acc. with standard	IEC 60947-7-1
Nominal current I_N	41 A
Nominal voltage U_N	400 V
Open side panel	ja
Shock protection test specification	DIN EN 50274 (VDE 0660-514):2002-11
Back of the hand protection	guaranteed
Surge voltage test setpoint	7.3 kV
Result of surge voltage test	Test passed
Power frequency withstand voltage setpoint	1.89 kV
Result of power-frequency withstand voltage test	Test passed
Checking the mechanical stability of terminal points (5 x conductor connection)	Test passed
Bending test rotation speed	10 rpm
Bending test turns	135
Bending test conductor cross section/weight	0.5 mm² / 0.3 kg
	6 mm² / 1.4 kg
	10 mm² / 2 kg
Result of bending test	Test passed
Conductor cross section tensile test	0.5 mm²
Tractive force setpoint	20 N
Conductor cross section tensile test	6 mm²
Tractive force setpoint	80 N

Conductor cross section tensile test	10 mm²
Tractive force setpoint	90 N
Tensile test result	Test passed
Tight fit on carrier	NS 32/NS 35
Setpoint	5 N
Result of tight fit test	Test passed
Result of voltage drop test	Test passed
Temperature-rise test	Test passed
Conductor cross section short circuit testing	6 mm²
Short-time current	0.72 kA
Conductor cross section short circuit testing	10 mm²
Short-time current	1.2 kA
Short circuit stability result	Test passed
Proof of thermal characteristics (needle flame) effective duration	30 s
Result of thermal test	Test passed
Temperature index, insulating material (DIN EN 60216-1 (VDE 0304-21))	130 °C
Static insulating material application in cold	-60 °C

Connection data

Conductor cross section solid min.	0.5 mm²
Conductor cross section solid max.	10 mm²
Conductor cross section stranded min.	0.5 mm²
Conductor cross section stranded max.	6 mm²
Conductor cross section AWG/kcmil min.	20
Conductor cross section AWG/kcmil max	8
Conductor cross section stranded, with ferrule without plastic sleeve min.	0.5 mm²
Conductor cross section stranded, with ferrule without plastic sleeve max.	6 mm²
Conductor cross section stranded, with ferrule with plastic sleeve min.	0.5 mm²
Conductor cross section stranded, with ferrule with plastic sleeve max.	4 mm²
2 conductors with same cross section, solid min.	0.5 mm²
2 conductors with same cross section, solid max.	2.5 mm²
2 conductors with same cross section, stranded min.	0.5 mm²

2 conductors with same cross section, stranded max.	6 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.5 mm²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	4 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	4 mm²
Connection method	Screw connection
Stripping length	13 mm
Internal cylindrical gage	A5
Screw thread	M4
Tightening torque, min	1.2 Nm
Tightening torque max	1.5 Nm

Certificates / Approvals

Certification — CSA, cULus Recognized, GOST, KEMA-KEUR, DNV, LR, PRS, RS, CCA

Certifications applied for:

Certification Ex:

Accessories

Item	Designation	Description
Assembly		
3034361	AP-ME METER	Cover profile, for covering terminal strips, snapped onto APT-ME cover profile carrier or APH-ME end bracket. A cover profile carrier should be positioned at the ends and at intervals of around 40 cm. Length supplied: 1 m
3034374	APH-ME	Cover profile carrier for mounting on NS 35/7.5 DIN rail for attaching the cover profile AP-ME
3034358	APT-ME	Cover profile carrier for mounting on NS 35/7.5 DIN rail for attaching the cover profile AP-ME

0310224	ATS-RTK	Partition plate, Length: 72 mm, Width: 0.8 mm, Height: 51.5 mm, Color: gray
3022218	CLIPFIX 35	Snap-on end bracket, for 35 mm NS 35/7.5 or NS 35/15 DIN rail, can be fitted with Zack strip ZB 8 and ZB 8/27, terminal strip marker KLM 2 and KLM, width: 9.5 mm, color: gray
3022276	CLIPFIX 35-5	Quick mounting end clamp for NS 35/7,5 DIN rail or NS 35/15 DIN rail, can be fitted with ZB 5 and ZBF 5 zack marker strip, KLM 2, KLM3, and KML3L terminal strip marker, parking option for FBS...5, FBS...6, KSS 5, KSS 6, width: 5.15 mm, color: gray
0310020	D-URTK	End cover, Length: 72 mm, Width: 2.2 mm, Height: 41.5 mm, Color: gray
1201442	E/UK	End clamp, for assembly on NS 32 or NS 35/7.5 DIN rail
1201413	E/UK 1	End clamps, for supporting the ends of double-level and three-level terminal blocks, width: 10 mm, color: gray
1201002	NS 32 PERF 2000MM	G-profile DIN rail, material: Steel, perforated, height 15 mm, width 32 mm, length 2 m
1201015	NS 32 UNPERF 2000MM	G-profile DIN rail, material: Steel, unperforated, height 15 mm, width 32 mm, length 2 m
0801704	NS 35/ 7,5 AL UNPERF 2000MM	DIN rail, material: Aluminum, unperforated, height 7.5 mm, width 35 mm, length: 2 m
1206560	NS 35/ 7,5 CAP	DIN rail end piece, for DIN rail NS 35/7.5
0801762	NS 35/ 7,5 CU UNPERF 2000MM	DIN rail, material: Copper, unperforated, height 7.5 mm, width 35 mm, length: 2 m
0801733	NS 35/ 7,5 PERF 2000MM	DIN rail, material: steel galvanized and passivated with a thick layer, perforated, height 7.5 mm, width 35 mm, length: 2000 mm
0801681	NS 35/ 7,5 UNPERF 2000MM	DIN rail, material: Steel, unperforated, height 7.5 mm, width 35 mm, length: 2 m
1204119	NS 35/ 7,5 WH PERF 2000MM	DIN rail 35 mm (NS 35)
1204122	NS 35/ 7,5 WH UNPERF 2000MM	DIN rail 35 mm (NS 35)
1206421	NS 35/ 7,5 ZN PERF 2000MM	DIN rail, material: Galvanized, perforated, height 7.5 mm, width 35 mm, length: 2 m
1206434	NS 35/ 7,5 ZN UNPERF 2000MM	DIN rail, material: Galvanized, unperforated, height 7.5 mm, width 35 mm, length: 2 m
1201756	NS 35/15 AL UNPERF 2000MM	DIN rail, deep drawn, high profile, unperforated, 1.5 mm thick, material: aluminum, height 15 mm, width 35 mm, length 2000 mm
1206573	NS 35/15 CAP	DIN rail end piece, for DIN rail NS 35/15
1201895	NS 35/15 CU UNPERF 2000MM	DIN rail, material: Copper, unperforated, 1.5 mm thick, height 15 mm, width 35 mm, length: 2 m
1201730	NS 35/15 PERF 2000MM	DIN rail, material: steel galvanized and passivated with a thick layer, perforated, height 15 mm, width 35 mm, length: 2000 mm
1201714	NS 35/15 UNPERF 2000MM	DIN rail, material: Steel, unperforated, height 15 mm, width 35 mm, length: 2 m

0806602	NS 35/15 WH PERF 2000MM	DIN rail 35 mm (NS 35)
1204135	NS 35/15 WH UNPERF 2000MM	DIN rail 35 mm (NS 35)
1206599	NS 35/15 ZN PERF 2000MM	DIN rail, material: Galvanized, perforated, height 15 mm, width 35 mm, length: 2 m
1206586	NS 35/15 ZN UNPERF 2000MM	DIN rail, material: Galvanized, unperforated, height 15 mm, width 35 mm, length: 2 m
1201798	NS 35/15-2,3 UNPERF 2000MM	DIN rail, material: Steel, unperforated, 2.3 mm thick, height 15 mm, width 35 mm, length: 2 m
0310211	TS-RTK	Separating plate, Length: 72 mm, Width: 0.8 mm, Color: gray

Bridges

0311281	ASB 2-RTK/S	Switching jumper, Number of positions: 2, Color: silver
0202154	EB 2- 8	Insertion bridge, Number of positions: 2, Color: gray
0202141	EB 3- 8	Insertion bridge, Number of positions: 3, Color: gray
0202142	EB 4- 8	Insertion bridge, Number of positions: 4, Color: gray
0202138	EB 10- 8	Insertion bridge, Number of positions: 10, Color: gray
0311171	FB 10- RTK/S	Fixed bridge, Number of positions: 10, Color: silver
0308359	S	Switching lock, Length: 12 mm, Width: 8.2 mm, Color: white
0311236	SB 2-RTK/S	Switching jumper, Number of positions: 2, Color: silver
0311265	SB 4-RTK/S	Switching jumper, Number of positions: 4, Color: silver
0311278	USB 2-RTK/S	Switching jumper, Number of positions: 2, Color: silver

General

0800886	E/NS 35 N	End clamp, width: 9.5 mm, color: gray

Marking

1007235	SBS 8:UNBEDRUCKT	Marker cards, Card, white, Unlabeled, Can be labeled with: Plotter, Mounting type: Snap into tall marker groove, Snap into flat marker groove, For terminal block width: 8.2 mm, Lettering field: 6 x 8.1 mm
0818072	UC-TM 8	Marker for terminal blocks, Sheet, white, Unlabeled, Can be labeled with: BLUEMARK CLED, Bluemark, Plotter, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 7.6 x 10.5 mm
0824597	UC-TM 8 CUS	Marker for terminal blocks, Can be ordered: By sheet, white, Labeled according to customer specifications, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 7.6 x 10.5 mm
0828740	UCT-TM 8	Marker for terminal blocks, Sheet, white, Unlabeled, Can be labeled with: Thermomark C+, Thermomark C, BLUEMARK CLED, Bluemark, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 7.6 x 10.5 mm

0829616	UCT-TM 8 CUS	Marker for terminal blocks, Can be ordered: By sheet, white, Labeled according to customer specifications, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 7.6 x 10.5 mm
0825011	ZB 8 CUS	Zack marker strip, Can be ordered: Strip, white, Labeled according to customer specifications, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 10.5 x 8.15 mm
1052002	ZB 8:UNBEDRUCKT	Zack marker strip, Strip, white, Unlabeled, Can be labeled with: Plotter, Mounting type: Snap into tall marker groove, For terminal block width: 8.2 mm, Lettering field: 10.5 x 8.15 mm

Plug/Adapter

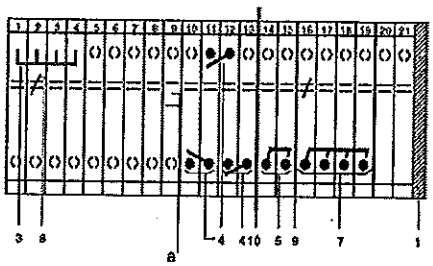
0311728	PSBJ-URTK/S BK	Female test connector, Color: black
0311757	PSBJ-URTK/S BU	Female test connector, Color: blue
0311760	PSBJ-URTK/S GN	Female test connector, Color: green
0311744	PSBJ-URTK/S RD	Female test connector, Color: red
0311773	PSBJ-URTK/S VT	Female test connector, Color: violet
0311731	PSBJ-URTK/S YE	Female test connector, Color: yellow

Tools

1205066	SZS 1,0X4,0 VDE	Screwdriver, bladed, VDE insulated, size: 1.0 x 4.0 x 100 mm, 2-component grip, with non-slip grip

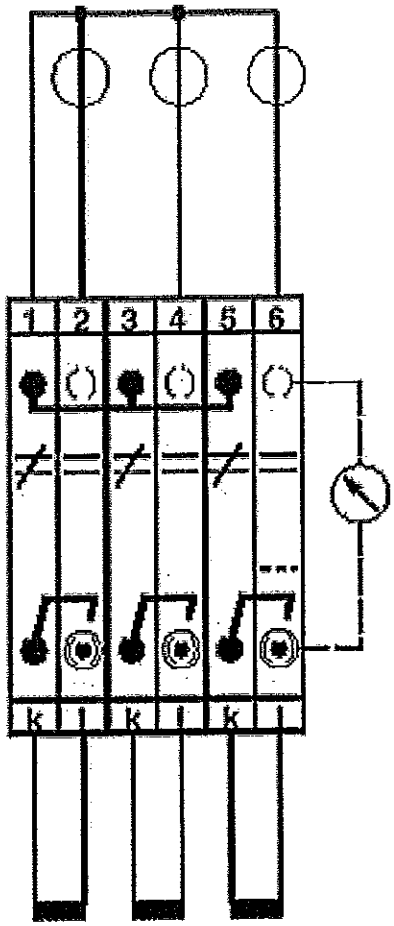
Diagrams/Drawings

Circuit diagram

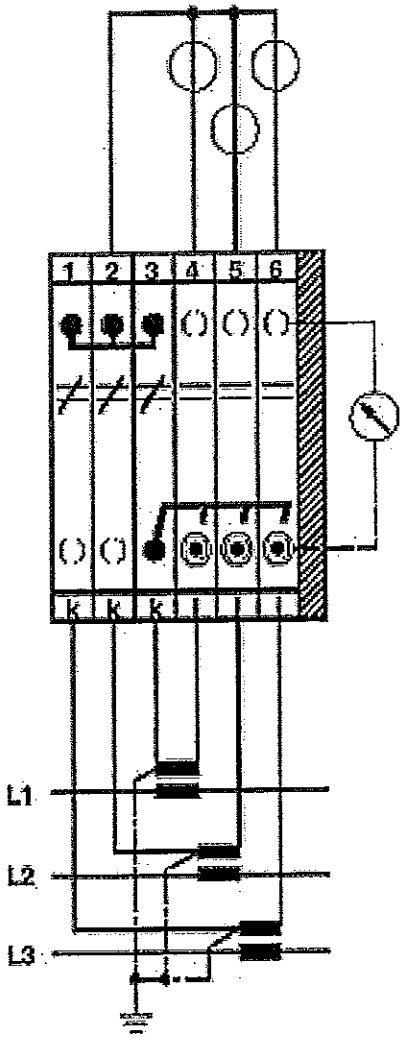


a = open
1 = cover
3 = fixed bridge
4 = switch bar, for 2 terminal blocks, useable on both sides of the disconnect point, inward switching motion
5 = switch bar, for 2 terminal blocks, useable on both sides of the disconnect point, outward switching motion
7 = switch bar, for 3-phasige short-circuiting of linked current transformer sets; only on the right
8 = switching lock, prevents disconnect slide from being actuated
9 = separating plate, for electrical separation of neighboring bridges in terminal center
10 = partition plate

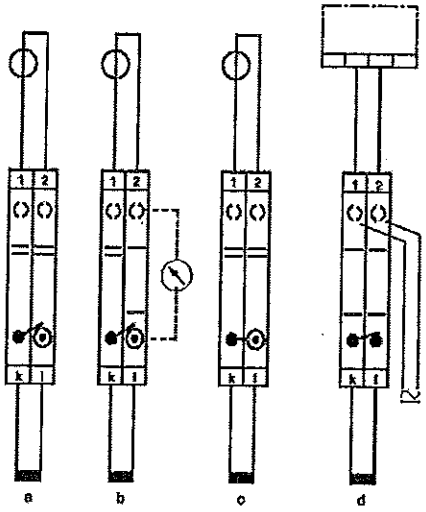
Schematic diagram



Three-phase transducer test set



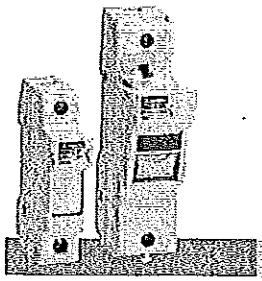
Three-phase linked transducer test set



Simple current transformer test circuit
a = normal operation
b = measured value testing
c = transformer short-circuit
d = relay testing

Address

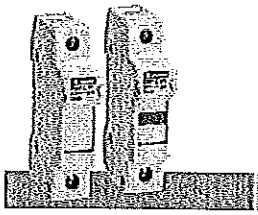
PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstr. 8
32825 Blomberg,Germany
Phone +49 5235 3 00
Fax +49 5235 3 41200
http://www.phoenixcontact.com



Page 12-2

AC FUSE HOLDERS

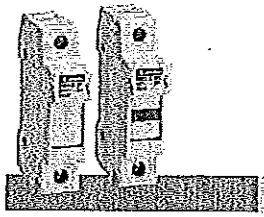
- Version without indicator: 1P, 1P+N, 2P, 3P, 3P+N
- Version with indicator: 1P
- For fuses 10x38, 14x51 and 22x58mm IEC class gG or aM.
- Rated current: 32A, 50A, 125A
- Rated voltage: 690VAC.



Page 12-2

AC FUSE HOLDERS CLASS CC FOR NORTH AMERICAN MARKET

- Version without indicator: 1P, 2P, 3P
- Version with indicator: 1P
- For 10x38mm UL/CSA class CC fuses
- Rated current: 30A
- Rated voltage: 600VAC.



Page 12-3

DC FUSE HOLDERS FOR PHOTOVOLTAIC APPLICATIONS

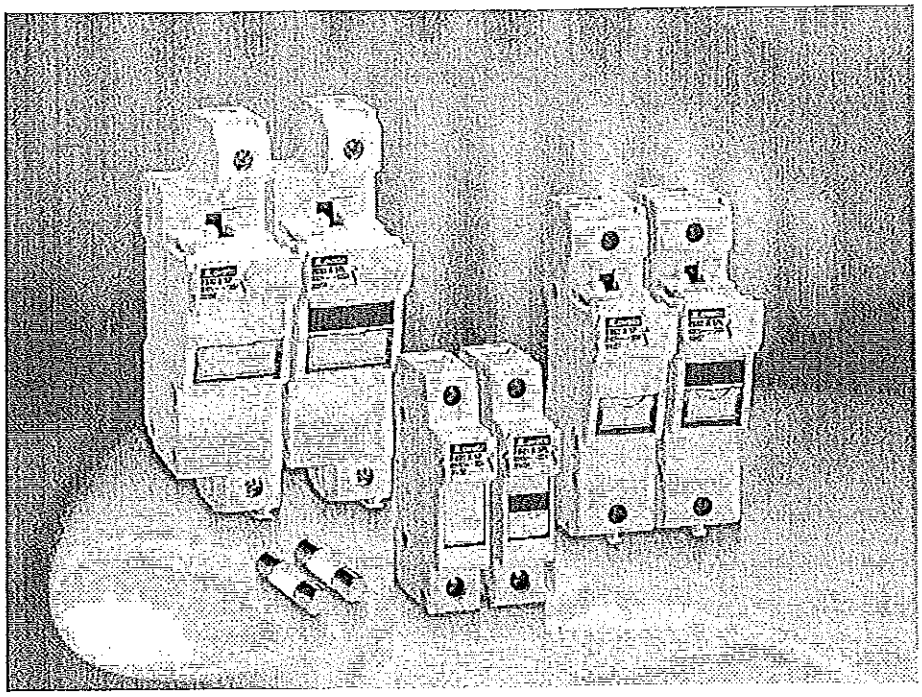
- Version without indicator: 1P, 2P
- Version with indicator: 1P, 2P
- For 10x38mm IEC class gPV fuses
- Rated current: 32A
- Rated voltage: 1000VDC
- IEC utilisation category: DC20B.

Page 12-3

DC FUSES FOR PHOTOVOLTAIC APPLICATIONS

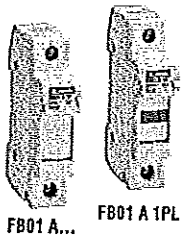
- 10x38mm, IEC class gPV
- Rated current: 20A
- Rated voltage: 1000VDC.

FUSE HOLDERS

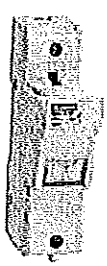


- Modular size for 10x38, 14x51 and 22x58mm fuses
- Finger safe - IP20 IEC degree of protection against accidental contact with live parts and with sealable cover for operators' safety
- Version with status indicator to quickly determine if the fuse is still operative or needs to be replaced
- UL and CSA certified versions.

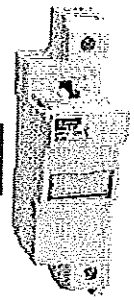
Fuse holders UL Recognized and CSA certified

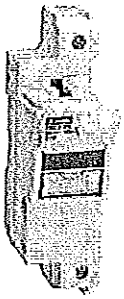

FB01 A...

FB01 A 1PL


FB02 A...


FB02 A 1PL


FB03 A...


FB03 A 1PL

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 690VAC.					
FB01 A 1P	1P	—	1	12	0.066
FB01 A 1PL	1P	YES	1	12	0.065
FB01 A 1MO	1P+N	—	1	12	0.062
FB01 A 1N	1P+N	—	2	6	0.134
FB01 A 2P	2P	—	2	6	0.132
FB01 A 3P	3P	—	3	4	0.188
FB01 A 3N	3P+N	—	4	3	0.260
For 14x51mm fuses. 50A rated current at 690VAC.					
FB02 A 1P	1P	—	1	12	0.113
FB02 A 1PL	1P	YES	1	12	0.114
FB02 A 1N	1P+N	—	2	6	0.237
FB02 A 2P	2P	—	2	6	0.224
FB02 A 3P	3P	—	3	4	0.335
FB02 A 3N	3P+N	—	4	3	0.460
For 22x58mm fuses. 125A rated current at 690VAC.					
FB03 A 1P	1P	—	1	12	0.167
FB03 A 1PL	1P	YES	1	12	0.167
FB03 A 1N	1P+N	—	2	6	0.354
FB03 A 2P	2P	—	2	6	0.334
FB03 A 3P	3P	—	3	4	0.500
FB03 A 3N	3P+N	—	4	3	0.720

❶ Not certified.

Operational characteristics
- IEC rated voltage Ue:
  - 690VAC (FB01 A 1M excluded)
  - 400VAC (FB01 A 1M only)
- IEC rated current Ie:
  - FB01 A: 32A
  - FB02 A: 50A
  - FB03 A: 125A
- IEC utilisation category:
  - FB01 A: AC22B 500V, AC21B 690V (except FB01 A 1M: AC22B 400V)
  - FB02 A: AC22B 500V, AC21B 690V
  - FB03 A: AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection: IP20.

Certifications and compliance
Certifications obtained:

Type	UL Recognized for USA (File E343395)	CSA certified (File 252040 class 6255)	UL Recognized for USA and Canada (File E343395)
FB01 A 1P, FB01 A 1PL, FB01 A 1N	❷	❷	—
FB02 A...	—	—	❷
FB03 A...	—	—	❷

❷ Certification obtained.

"UL Recognized": Products having this type of marking are intended for use as components of complete workshop-assembled equipment.

Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4.

Fuse holders


FB01 B...


FB01 B 1PL

Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 690VAC.					
FB01 B 1P	1P	—	1	12	0.062
FB01 B 1PL	1P	YES	1	12	0.064
FB01 B 1N	1P+N	—	2	6	0.127
FB01 B 2P	2P	—	2	6	0.128
FB01 B 3P	3P	—	3	4	0.185
FB01 B 3N	3P+N	—	4	3	0.247

Operational characteristics
- IEC rated voltage Ue: 690VAC
- IEC rated current Ie: 32A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for IEC fuse class: gG and aM
- IEC degree of protection IP20.

Reference standards
Compliant with standards: IEC/EN 60947-1, IEC/EN 60947-3, IEC/EN 60269-1, IEC/EN 60269-2.

Fuse holders UL Listed and CSA certified for class CC fuses for North American market


FB01 C...


FB01 C 1PL

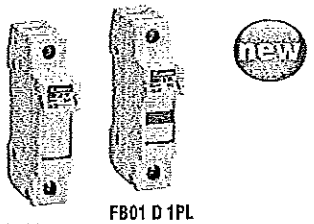
Order code	Pole arrange-ment	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. 30A rated current at 600VAC.					
FB01 C 1P	1P	—	1	12	0.070
FB01 C 1PL	1P	YES	1	12	0.072
FB01 C 2P	2P	—	2	6	0.140
FB01 C 3P	3P	—	3	4	0.210

NOTE: UL Listed and CSA certified as "Fuseholders, Cartridge Fuse" for use with Class CC fuses. Interrupting rating 200,000 Amps rms symmetrical. Voltage rating 600V. Current rating 30A.

Operational characteristics
- IEC rated voltage Ue: 600VAC
- IEC rated current Ie: 30A
- IEC utilisation category: AC22B 500V, AC21B 690V
- Suitable for UL/CSA fuse class: CC.
- IEC degree of protection IP20.

Certifications and compliance
Certifications obtained: UL Listed (File E343395) and CSA certified (File 252040 class 6225).
Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3, UL 4248-1, UL 4248-4, CSA C22.2 n°4248.1, CSA C22.2 n°4248.4.

Fuse holders for photovoltaic applications


FB01 D...

FB01 D 1PL

new

Order code	Pole arrangement	Status indicator	DIN size	Qty per pkg	Wt
			n°	n°	[kg]
For 10x38mm fuses. 32A rated current at 1000VDC.					
FB01 D 1P	1P	—	1	12	0.064
FB01 D 1PL	1P	YES	1	12	0.065
FB01 D 2P	2P	—	2	6	0.127
FB01 D 2PL	2P	YES	2	6	0.130

Operational characteristics
- IEC rated voltage Ue: 1000VDC
- IEC rated current Ie: 32A
- IEC utilisation category: DC20B 1000VDC
- Suitable for IEC fuse class: gPV
- IEC degree of protection: IP20.

Reference standards
Compliant with standards: IEC/EN 60269-1, IEC/EN 60269-2, IEC/EN 60947-1, IEC/EN 60947-3.

Fuses for photovoltaic applications


FE01 D...

new

Order code	Rated current In	Qty per pkg	Wt
	[A]	n°	[kg]
For 10x38mm fuses. 30kA breaking capacity at 1000VDC.			
FE01 D 00200	2	10	0.008
FE01 D 00400	4	10	0.008
FE01 D 00600	6	10	0.008
FE01 D 00800	8	10	0.008
FE01 D 01000	10	10	0.008
FE01 D 01200	12	10	0.008
FE01 D 01600	16	10	0.008
FE01 D 02000	20	10	0.008

Operational characteristics
- IEC rated voltage Ue: 1000VDC
- IEC rated current Ie: 2-20A
- IEC fuse class: gPV.

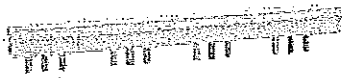
Reference standards
Compliant with standards: IEC/EN 60269-6.

Accessories


FBX 00


FBX 01
FBX 02

new


FBX 05


FBX 07


FBX 08


FBX 11

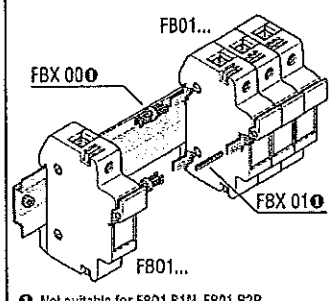
Order code	Description	Qty per pkg	Wt
	[A]	n°	[kg]
FBX 00❶	Coupling clip for 10x38, 14x51 and 22x58mm sizes❶	100	0.003
FBX 01❶	Coupling pin for 10x38mm size❶	100	0.005
FBX 02	Coupling pin for 14x51 and 22x58mm sizes	100	0.008
For FB01 A... and FB01 B... types.			
FBX 05	Three-phase connection busbar, for 57 modules in total, 1m/3.3ft long	10	0.465
FBX 07	One-pole terminal for 25mm² max conductor	25	0.010
FBX 08	One-pole terminal for 50mm² max conductor	25	0.020
FBX 11	End cap for FBX05 busbar	50	0.001

❶ Not suitable for FB01 B1N, FB01 B2P, FB01 B3P and FB01 B3N types.

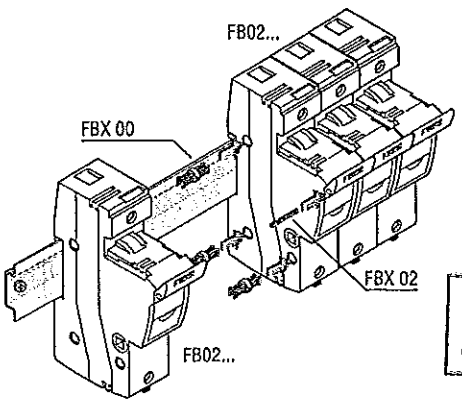
General and operational characteristics
THREE-PHASE BUSBAR
- Central point of power supply: 130A max
- Side point of power supply: 80A max
- Pitch: 18mm/0.7in
- Busbar section: 10mm²
- Number of modules/poles: 57
- For paralleling connection
- Length (standard supplied): 1m/3.3ft which can be cut in shorter sections.

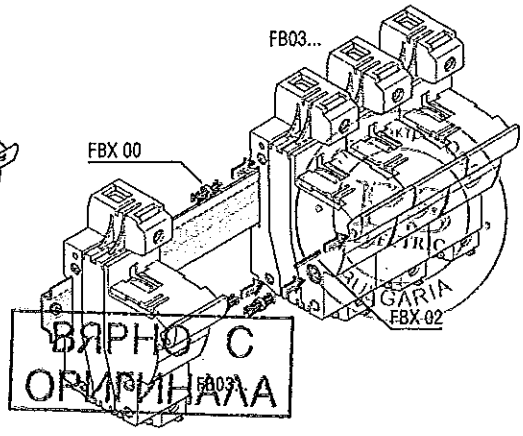
12

Fuse holder assembly in multiple pole configuration



❶ Not suitable for FB01 B1N, FB01 B2P, FB01 B3P and FB01 B3N types.

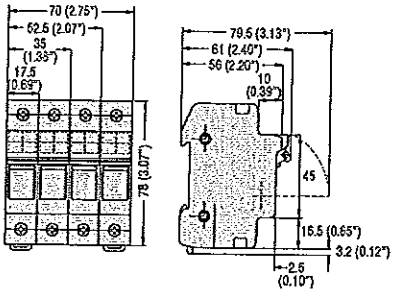




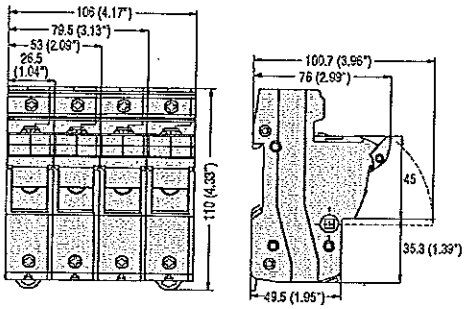
Fuse holders
Dimensions [mm (in)]

FUSE HOLDERS

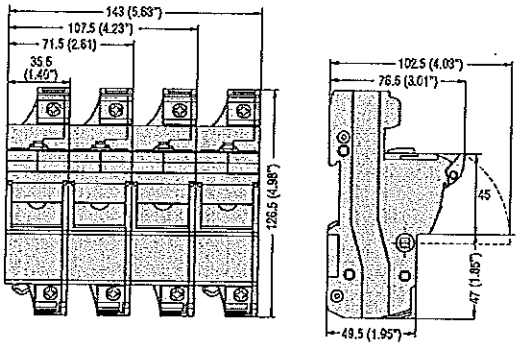
FB01 A... FB01 B... FB01 C... FB01 D...



FB02 A...

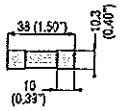


FB03 A...

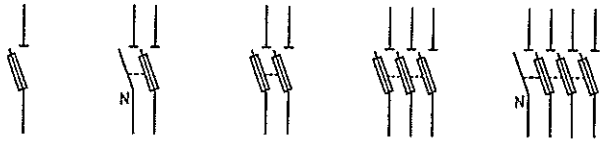


FUSES

FE01 D 0...



Wiring diagrams



1P 1P+N 2P 3P 3P+N

TYPE		FB01 A...	FB01 B...	FB02 A...	FB03 A...	FB01 C...	FB01 D...
Range		AC				Class CC (AC)	DC
IEC maximum rated current In		32A		50A	125A	30A	32A
IEC maximum rated voltage In		690VAC; 400VAC ❶	690VAC			600VAC	1000VDC
IEC utilisation category		AC22B 500V; AC21B 690V; AC22B 400V ❶			AC21B 690V	AC22B 500V; AC21B 690V	DC20B 1000VDC
Maximum power dissipation		3W		5W	9.5W	3W	4W
Derating factor of current In for different ambient temperatures	20°C	1					
	30°C	0.95					
	40°C	0.9					
	50°C	0.8					
	60°C	0.7					
	70°C	0.5					
Derating factor of current In for side-by-side fuse holders - n° poles	1-4	1					
	5-6	0.8					
	7-9	0.7					
	≥10	0.6					
Voltage for status indicator		120...690VAC		230...690VAC		120...600VAC	350...1000VDC

CONNECTIONS						
Maximum tightening torque		2.5Nm; 2Nm ❶ / 22lbin	3Nm / 26lbin	4Nm / 35lbin	2.5Nm / 22lbin	
Maximum conductor cross section	flexible/stranded	1x16mm²; 1-16mm² ❶ / 8AWG	1x25mm² / 6AWG	1x35mm² / 2AWG	1x16mm² / 8AWG	1x16mm² / 6AWG
	rigid/solid	1x25mm²; 1-10mm² ❶ / 8AWG	1x35mm² / 8AWG	1x50mm² / 1AWG	1x25mm² / 10AWG	1x25mm² / 4AWG

AMBIENT CONDITIONS	
Operating temperature	-20...+70°C
Storage temperature	-40...+80°C
Maximum altitude	3,000m
Operation position	Any
Fixing	On 35mm DIN rail (IEC/EN 60715)

❶ Values valid only for FB01 A 1M type.

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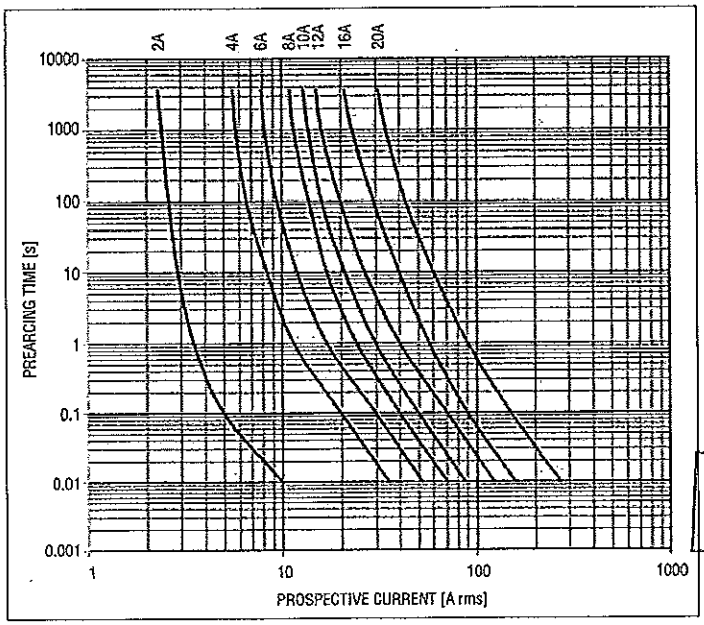
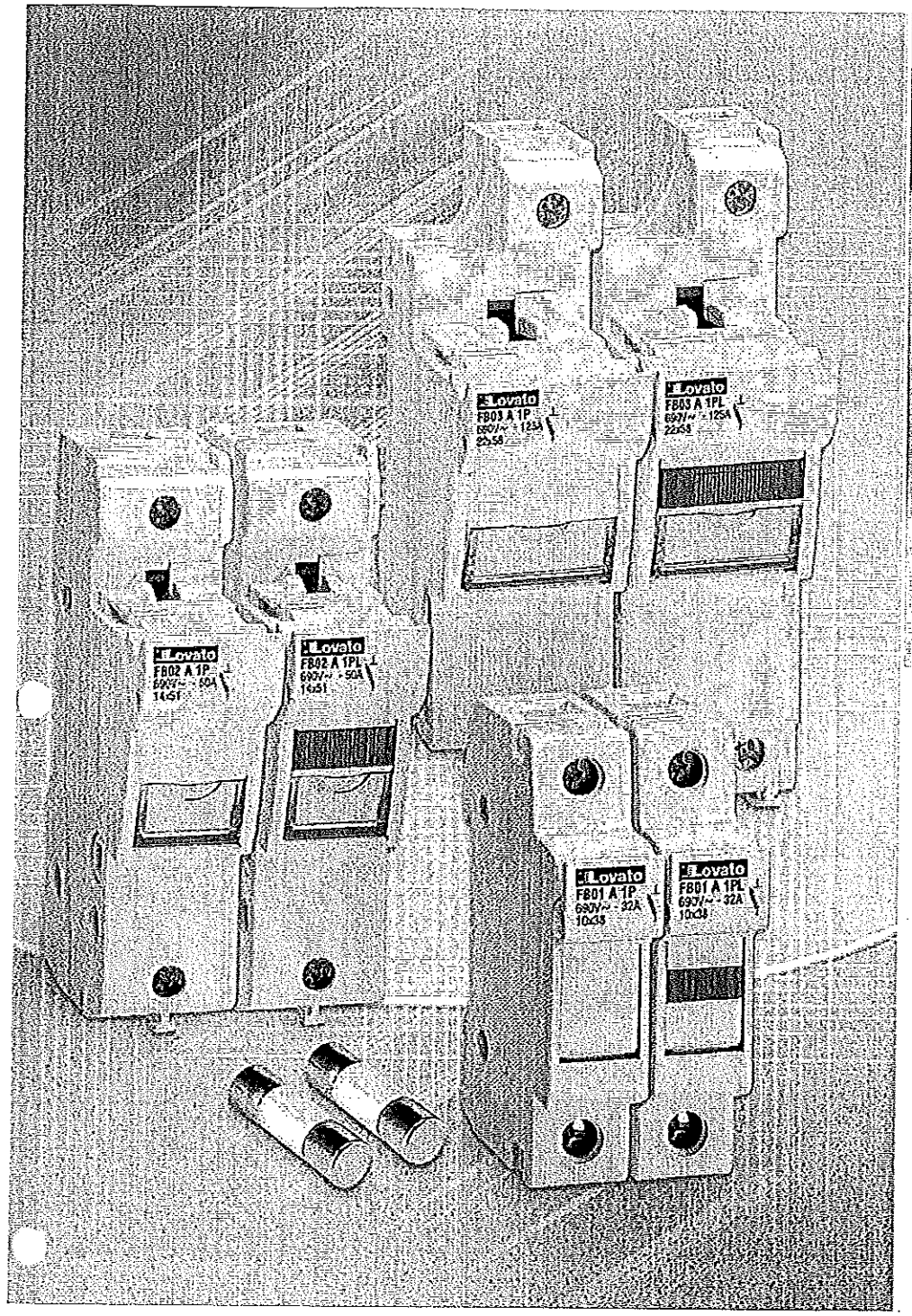
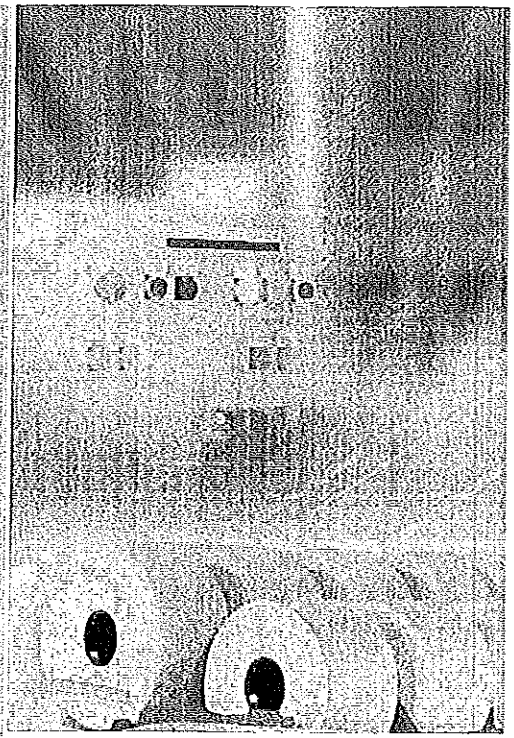
TECHNICAL CHARACTERISTICS FOR FE01 D... FUSES

TYPE	Rated current [A]	Power consumption at 0.7 In [W]	Power consumption at In [W]	Prearcing I²t [A²s]	Total I²t at 1000VDC [A²s]
FE01 D 00200	2	0.62	1.54	1.78	6.5
FE01 D 00400	4	0.73	1.84	3	11
FE01 D 00600	6	0.96	2.4	8.5	32
FE01 D 00800	8	1.02	2.55	25	93
FE01 D 01000	10	1.03	2.58	11	52
FE01 D 01200	12	1.04	2.6	25	116
FE01 D 01600	16	1.08	2.7	33	152
FE01 D 02000	20	1.16	2.9	85	390

TIME-CURRENT CHARACTERISTICS FOR FE01 D... FUSES





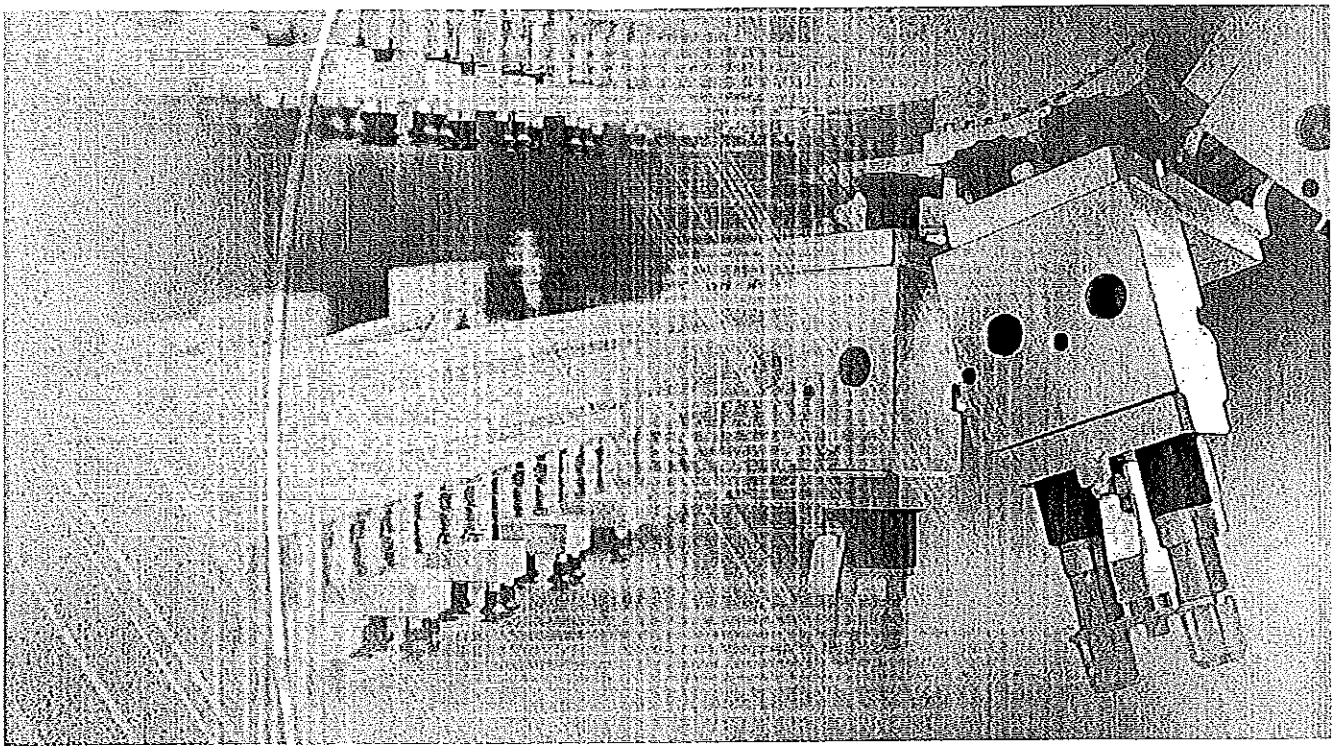


Fuse holders and fuses

Lovato electric

100% electricity

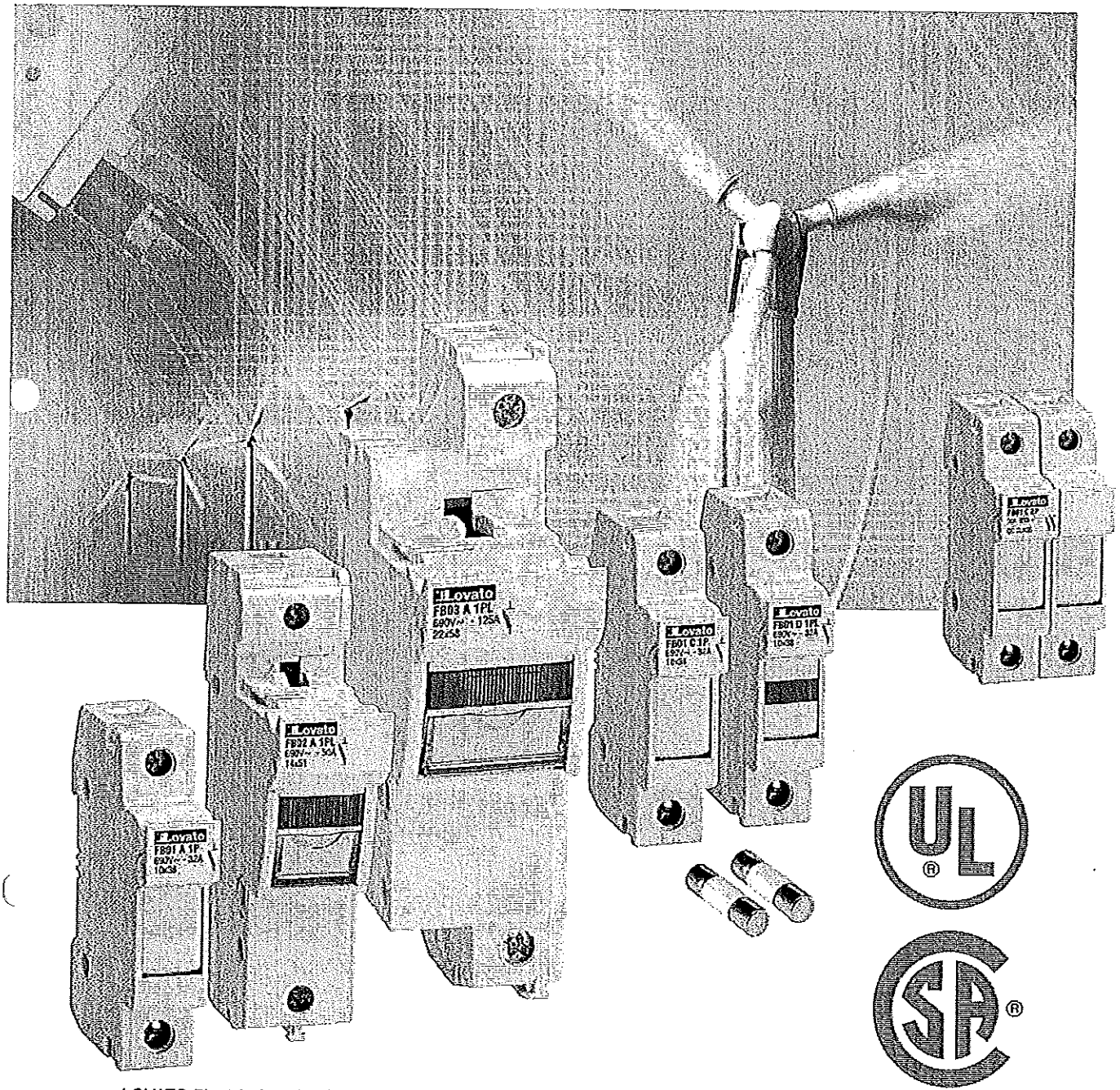
Fuse holders



- Modular concept for quick assembly of different versions based on various requirements.
- Compact size compliant with standards for electrical equipment.
- DIN rail mounting and removal ease.
- IP20 protection degree, finger safe.
- Sealable cover in open or closed position to increase user's safety.
- Version with status indicator to quickly determine if the fuse is still operative or needs to be replaced.
- Ergonomic grip for easy cover opening.
- Dedicated cylindrical 10x38 DC fuses for photovolatic systems.
- UL and CSA certified versions.

Range	AC			DC	DC FUSES	CLASS CC
Fuse size	10x38	14x51	22x58	10x38	10x38	10x38
Type	gG or aM			gPV	gPV	Class CC
Rated voltage	690VAC			1000VDC / 690VAC	1000VDC	600VAC
Rated current	32A	50A	125A	32A	20A	30A
Utilisation category	AC-22B 500V AC-21B 690V		–	DC-20B 1000VDC AC-21B 690V	DC-20B 1000VDC	AC-22B 500V AC-21B 690V

and fuses



LOVATO Electric fuse holders can be used to protect against overloads and short circuits of electric lines, for motor protection and control and for the protection of electric installations.

This equipment can assure the disconnect function but is not suitable for isolation so cannot be used as switch disconnector.

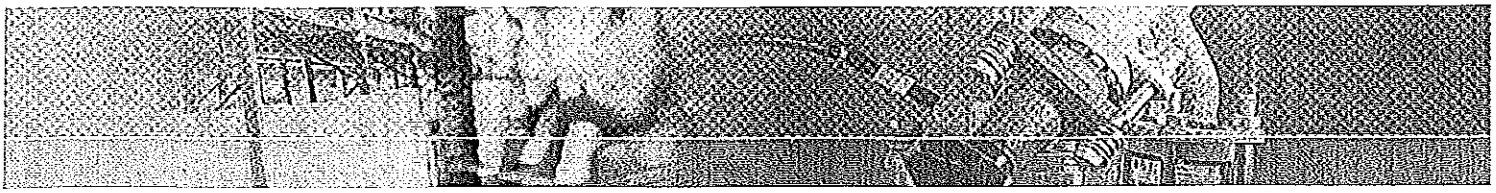
The range is available in two versions: with or without fuse status indicator. If the fuse fitted on the holder blows, the failure status is shown by the indicator on the fuse-holder front.

All the fuse holders are certified for the North-American market (UL Listed, UL Recognized and CSA). Furthermore, there is a non-certified version in 10x38mm size available too.

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Lovato electric

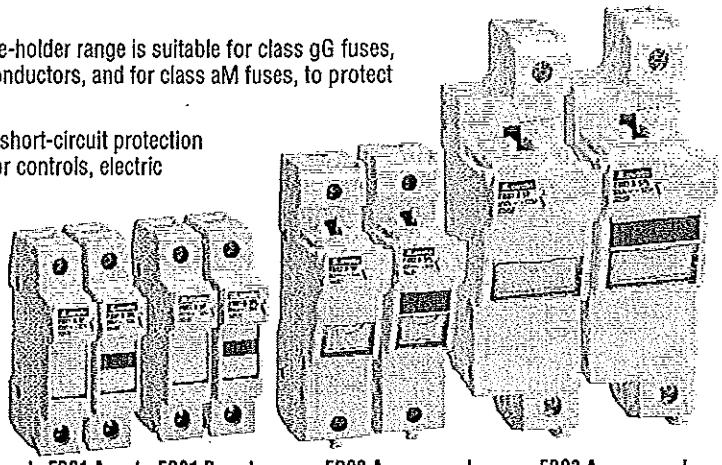


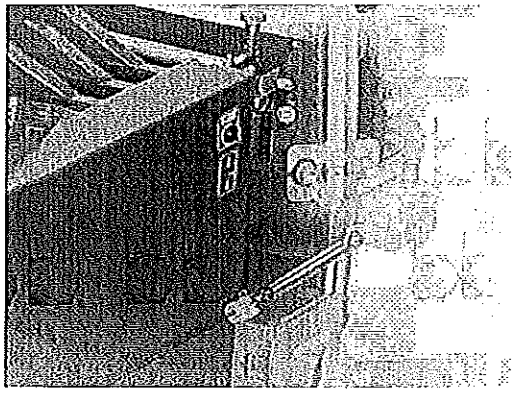
Fuse holders AC RANGE

LOVATO Electric AC fuse-holder range is suitable for class gG fuses, to protect cables and conductors, and for class aM fuses, to protect motor starting.

Function: Overload and short-circuit protection of control circuits, motor controls, electric installations.

Usage: Service industry, electric panels onboard machinery, electric installations in general.

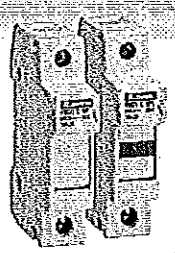




	FB01 A...	FB01 B...	FB02 A...	FB03 A...
Fuse size	10x38		14x51	22x58
Version without indicator	1P, 1P+N, 2P, 3P, 3P+N			
Version with indicator	1P			
Main characteristics				
- Rated voltage	690VAC			
- Rated current	32A		50A	125A
- Utilisation category	AC-22B 500V, AC-21B 690V		AC-22B 500V, AC-21B 690V	AC-21B 690V
- Suitable for fuses	10x38 gG or aM		14x51 gG or aM	22x58 gG or aM
- Maximum conductor cross section	16mm² flexible/stranded; 25mm² rigid/solid		25mm² flexible/stranded; 35mm² rigid/solid	35mm² flexible/stranded; 50mm² rigid/solid
Certifications obtained	UR, CSA	--	cURus	cURus
Compliant with standards	IEC/EN 60947-1, IEC/EN 60947-3, RoHS directive, UL512, CSA C22.2 n°39			

UR: UL Recognized; cURus: UL Recognized for USA and Canada.

CLASS CC Fuse holders RANGE

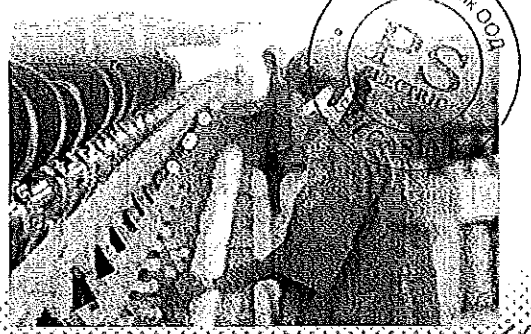


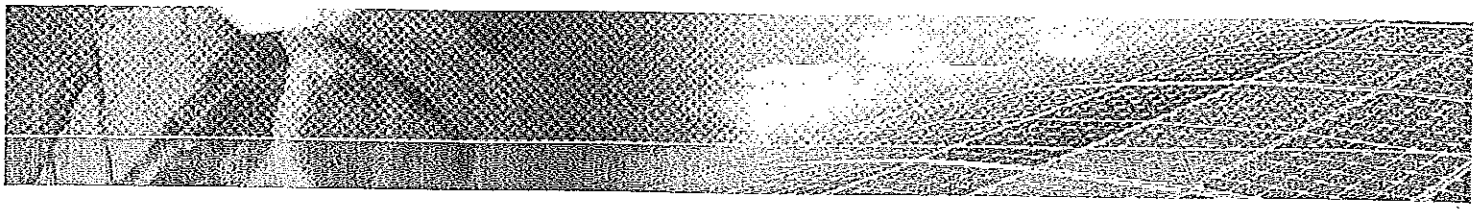
FB01 C...

LOVATO Electric fuse holders for class CC fuses are used to protect branch circuits, consisting of conductors and components following the last overcurrent protective device protecting a load, in industrial applications which require high breaking capacity.
Suitable only and exclusively for fitting fuses defined as "class CC", quite common on the North American market.

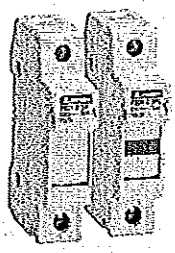
Usage: Service industry, electric panels onboard machinery, electric installations in general.

Fuse size	**Class CC**
Version without indicator	1P, 2P, 3P
Version with indicator	1P
Main characteristics	
- Rated voltage	600VAC
- Rated current	30A
- Utilisation category	AC-22B 500V, AC-21B 690V
- Suitable for fuses	10x38 class CC
- Maximum conductor cross section	16mm² flexible/stranded; 25mm² rigid/solid
Certifications obtained	UL, CSA
Compliant with standards	IEC/EN 60947-1, IEC/EN 60947-3UL512, RoHS directives, CSA 22.2 n° 99





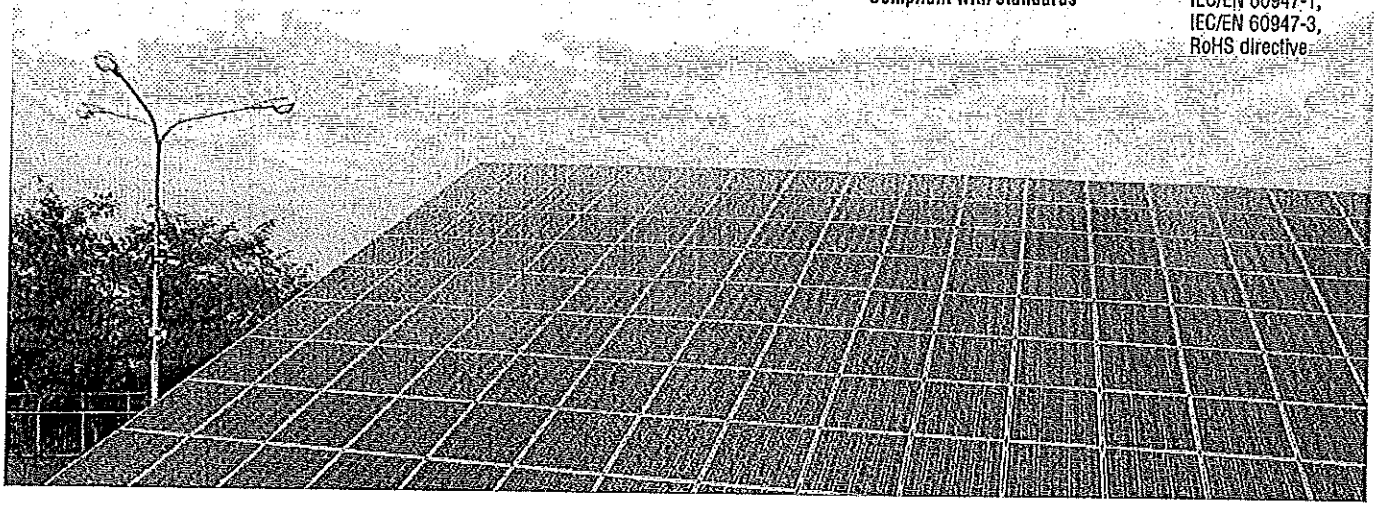
Fuse holders DC RANGE



FB01 D...

LOVATO Electric DC fuse holder range is suitable for 1000VDC rated voltage and gPV class.
Used for overload and short-circuit protection of photovoltaic modules (strings) and the relative connecting cables.

Fuse size	10x38
Version without indicator	1P, 2P
Version with indicator	1P
Main characteristics	
- Rated voltage	1000VDC / 690VAC
- Rated current	32A
- Utilisation category	DC-20B 1000VDC, AC-21B 690V
- Suitable for fuses	10x38 gPV
- Maximum conductor cross section	16mm² flexible/stranded, 25mm² rigid/solid
Compliant with standards	IEC/EN 60947-1, IEC/EN 60947-3, RoHS directive



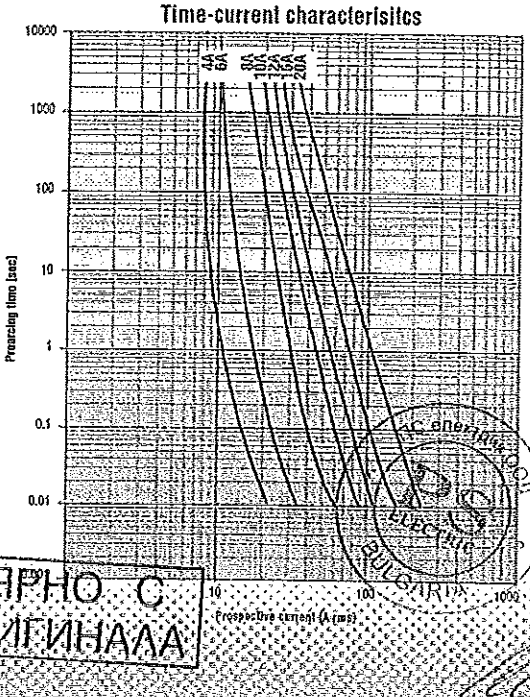
Fuses DC RANGE

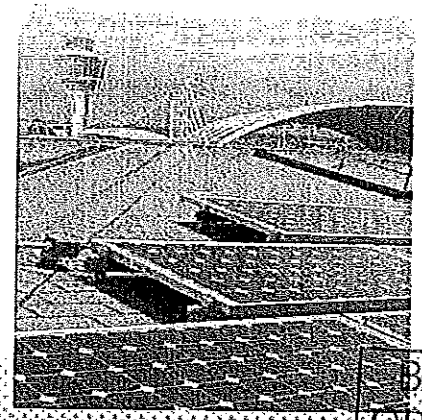
FE01 D 0...

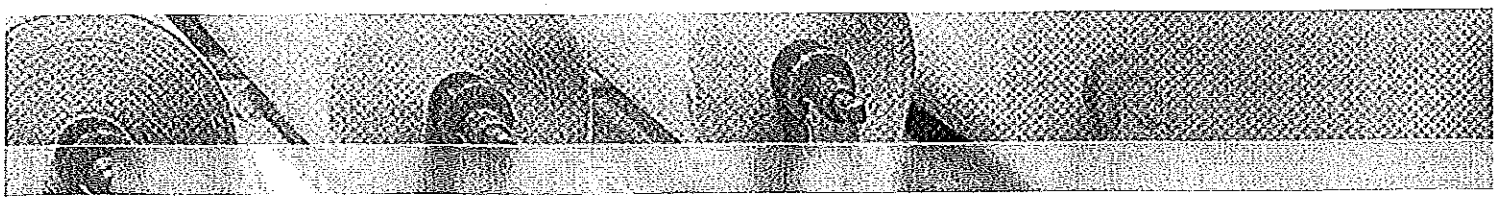
LOVATO Electric offers a range of cylindrical 10x38 fuses dedicated to photovoltaic duty and designed for 1000VDC maximum use.
Contrary to AC type fuses that blow for high overcurrent values, this type of DC fuse is designed to blow with low-intensity overcurrent values, created on photovoltaic cells and panels.

Fuses for photovoltaic application	
Breaking capacity	30kA
Mains characteristics	
- Rated voltage	1000VDC
- Rated current	2...20A

Time-current characterisitcs





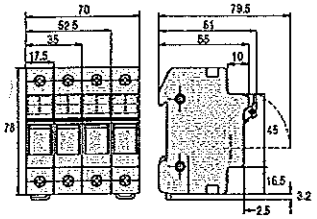


TECHNICAL CHARACTERISTICS

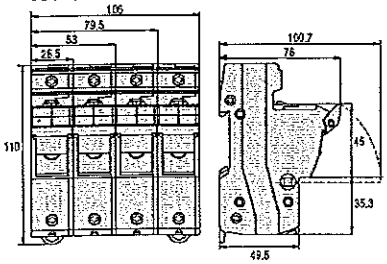
Type		FB01 A...	FB01 B...	FB02 A...	FB03 A...	FB01 C...	FB01 D...
Range		**AC**	**AC**	**AC**	**AC**	**Class CC (AC)**	**DC**
Certifications obtained		UR, CSA	–	cURus	cURus	UL, CSA	–
Maximum power dissipation		3W	3W	5W	9.5W	3W	4W
Derating factor of current Ie for different ambient temperatures	20°C	1	1	1	1	1	1
	30°C	0.95	0.95	0.95	0.95	0.95	0.95
	40°C	0.9	0.9	0.9	0.9	0.9	0.9
	50°C	0.8	0.8	0.8	0.8	0.8	0.8
	60°C	0.7	0.7	0.7	0.7	0.7	0.7
	70°C	0.5	0.5	0.5	0.5	0.5	0.5
Derating factor of current Ie for sid-by-side fuse holders - n° poles	1-3	1	1	1	1	1	1
	4-6	0.8	0.8	0.8	0.8	0.8	0.8
	7-9	0.7	0.7	0.7	0.7	0.7	0.7
	>10	0.6	0.6	0.6	0.6	0.6	0.6
Voltage for status indicator		120...690VAC	120...690VAC	230...690VAC	230...690VAC	120...600VAC	350...1000VDC
CONNECTIONS							
Maximum tightening torque		2.5Nm/22lbin	2.5Nm/22lbin	3Nm/26lbin	4Nm/35lbin	2.5Nm/22lbin	2.5Nm/22ibin
Maximum conductor cross section	flexible/stranded	1-16mm²/8 AWG	1-16mm²/6 AWG	1-25mm²/4 AWG	1-35mm²/2 AWG	1-16mm²/8 AWG	1-16mm²/6 AWG
	rigid/solid	1-25mm²/8 AWG	1-25mm²/4 AWG	1-35mm²/2 AWG	1-50mm²/1 AWG	1-25mm²/10 AWG	1-25mm²/4 AWG
AMBIENT CONDITIONS							
Operating temperature		-20...+70°C	-20...+70°C	-20...+70°C	-20...+70°C	-20...+70°C	-20...+70°C
Storage temperature		-40...+80°C	-40...+80°C	-40...+80°C	-40...+80°C	-40...+80°C	-40...+80°C
HOUSING							
Din rail mount version		Yes	Yes	Yes	Yes	Yes	Yes
Degree of protection		IP20	IP20	IP20	IP20	IP20	IP20

DIMENSIONS

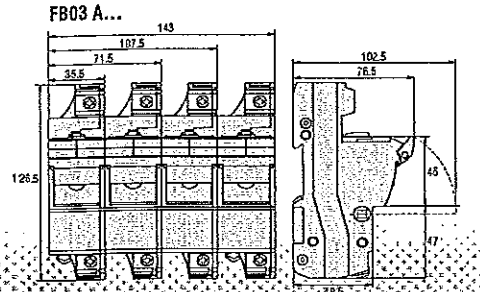
FB01 A... FB01 B... FB01 C... FB01 D...



FB02 A...

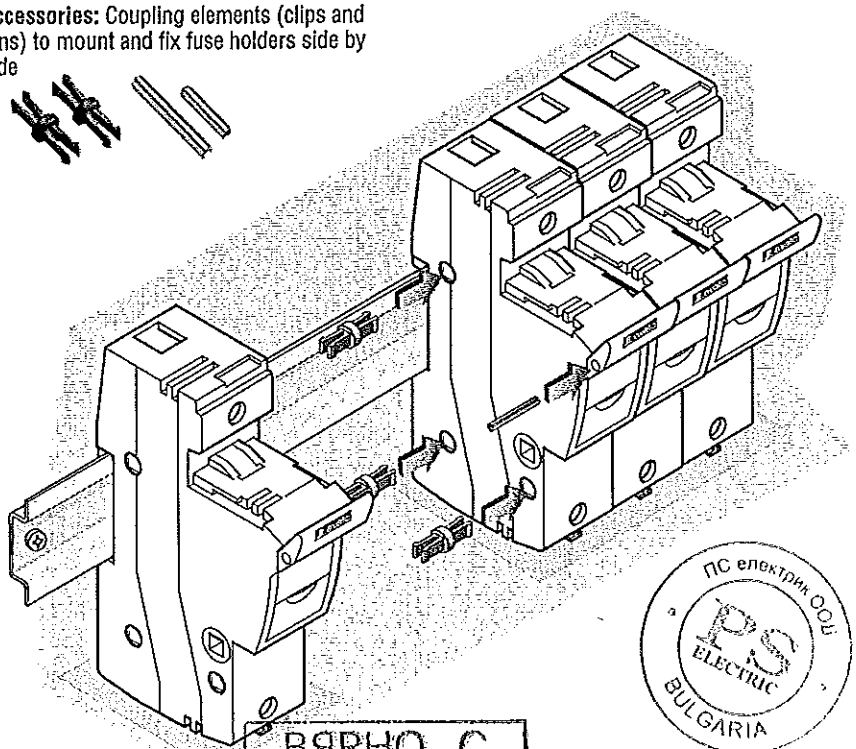


FB03 A...



ASSEMBLY

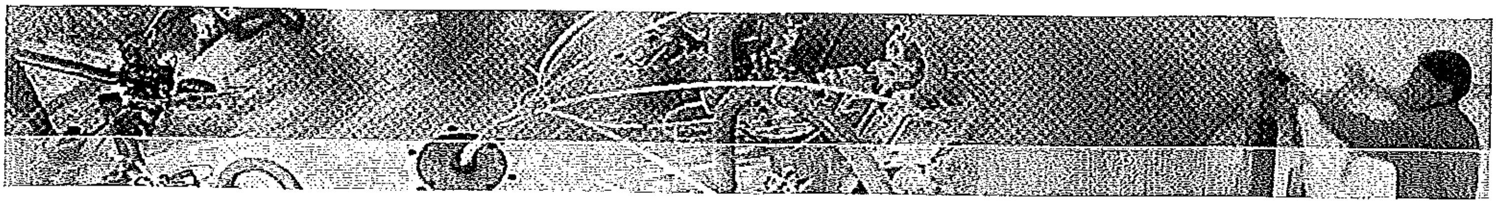
Accessories: Coupling elements (clips and pins) to mount and fix fuse holders side by side



ВЯРНО С ОРИГИНАЛА

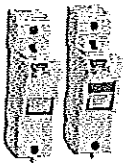
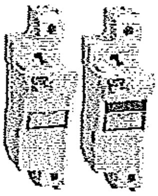
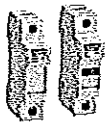
ПС електрик ООД BULGARIA

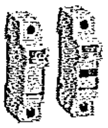
Lovato electric



HOW TO ORDER

FUSE HOLDERS



Order code	Pole arrangement	DIN modules	Status indicator	Rated voltage Ue	Rated nominale Ie	Qty per pkg	Weight
		n°		[V]	[A]	n°	[kg]
Fuse holder (fuse disconnector), 10x38, certified by UR and CSA.							
FB01 A 1P	1 pole	1	–	690VAC	32	12	0.750
FB01 A 1PL	1 pole	1	Yes	690VAC	32	12	0.750
FB01 A 1N	1 pole + N	2	–	690VAC	32	6	0.750
FB01 A 2P	2 poles	2	–	690VAC	32	6	0.750
FB01 A 3P	3 poles	3	–	690VAC	32	4	0.750
FB01 A 3N	3 poles + N	4	–	690VAC	32	3	0.750
Fuse holder (fuse disconnector), 14x51, certified by cURus.							
FB02 A 1P	1 pole	1.5	–	690VAC	50	6	1.000
FB02 A 1PL	1 pole	1.5	Yes	690VAC	50	6	1.000
FB02 A 1N	1 pole + N	3	–	690VAC	50	3	1.000
FB02 A 2P	2 poles	3	–	690VAC	50	3	1.000
FB02 A 3P	3 poles	4.5	–	690VAC	50	2	1.000
FB02 A 3N	3 poles + N	6	–	690VAC	50	1	0.650
Fuse holder (fuse disconnector), 22x58, certified byt cURus.							
FB03 A 1P	1 pole	2	–	690VAC	125	6	1.050
FB03 A 1PL	1 pole	2	Yes	690VAC	125	6	1.050
FB03 A 1N	1 pole + N	4	–	690VAC	125	3	1.050
FB03 A 2P	2 poles	4	–	690VAC	125	3	1.050
FB03 A 3P	3 poles	6	–	690VAC	125	2	1.050
FB03 A 3N	3 poles + N	8	–	690VAC	125	1	0.700
Fuse holder (fuse disconnector), class CC, certified by UL and CSA.							
FB01 C 1P	1 pole	1	–	600VAC	30	12	0.750
FB01 C 1PL	1 pole	1	Yes	600VAC	30	12	0.750
FB01 C 2P	2 poles	2	–	600VAC	30	6	0.750
FB01 C 3P	3 poles	3	–	600VAC	30	4	0.750
Fuse holder (fuse disconnector), 10x38.							
FB01 B 1P	1 pole	1	–	690VAC	32	12	0.750
FB01 B 1PL	1 pole	1	Yes	690VAC	32	12	0.750
FB01 B 1N	1 pole + N	2	–	690VAC	32	6	0.750
FB01 B 2P	2 poles	2	–	690VAC	32	6	0.750
FB01 B 3P	3 poles	3	–	690VAC	32	4	0.750
FB01 B 3N	3 poles + N	4	–	690VAC	32	3	0.750
Fuse holder (fuse disconnector), 10x38, for photovoltaic applications.							
FB01 D 1P	1 pole	1	–	1000VDC	32	12	0.750
FB01 D 1PL	1 pole	1	Yes	1000VDC	32	12	0.750
FB01 D 2P	2 poles	2	–	1000VDC	32	6	0.750

FUSES FOR PHOTOVOLTAIC APPLICATIONS

Order code	Rated breaking capacity	Rated voltage Ue	Rated current Ie	Qty per pkg	Weight
	[kA]	[V]	[A]	n°	[kg]
FE01 D 00200	30	1000VDC	2	10	0.130
FE01 D 00400	30	1000VDC	4	10	0.130
FE01 D 00600	30	1000VDC	6	10	0.130
FE01 D 00800	30	1000VDC	8	10	0.130
FE01 D 01000	30	1000VDC	10	10	0.130
FE01 D 01200	30	1000VDC	12	10	0.130
FE01 D 01600	30	1000VDC	16	10	0.130
FE01 D 02000	30	1000VDC	20	10	0.130

ACCESSORIES

Order code	Description	Qty per pkg	Weight
		n°	[kg]
FBX 00	Coupling clip for 10x38, 14x51 and 22x58 sizes	100	0.050
FBX 01	Coupling pin for 10x38 size	100	0.130
FBX 02	Coupling pin for 14x51 and 22x58 sizes	100	0.150

N.B. Two clips FBX 00 and one pin FBX 01 are needed to couple two fuse holder FB01... types.
Three clips FBX 00 and one pin FBX 02 are needed to couple two fuse holder FB02... and FB03... types.

WIRING DIAGRAMS

ВЯРНО С ОРИГИНАЛА

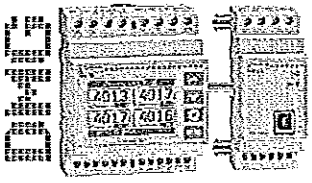
ELECTRIC BULGARIA

Lovato electric

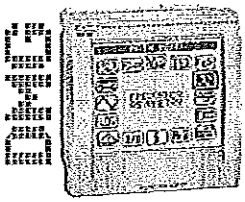
new

2011

Switch disconnectors
16 to 1600A

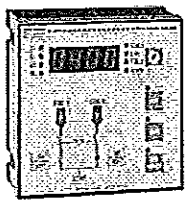


Modular digital multimeters



Flush-mount digital multimeters and power analyzers

Energy meters

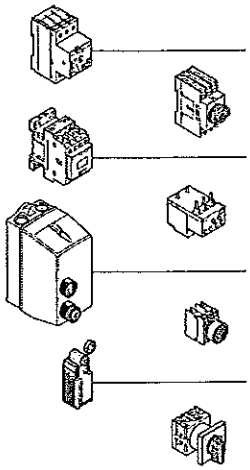


Automatic transfer switch controllers

Switching power supplies

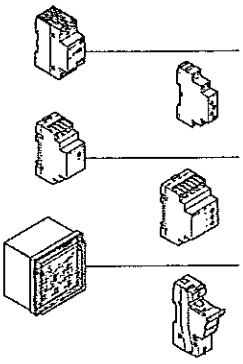
Lovato electric
100% electricity

Planet Switch



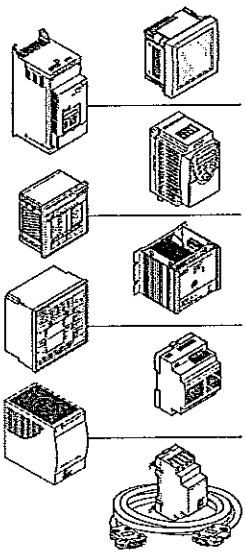
- Motor protection circuit breakers
- Switch disconnectors
- Contactors
- Motor protection relays
- Electromechanical starters
- Control and signalling units
- Limit , micro and foot switches
- Rotary cam switches

Planet Din



- Modular contactors
- Time relays
- Protection relays
- Level control relays
- Earth leakage relays
- Fuse holders

Planet Logic



- Metering instruments and current transformers
- Soft starters
- AC motor drives
- Automatic power factor controllers
- Automatic battery chargers
- Automatic transfer switch controllers
- Programmable logic relays
- Switching power supplies
- Expansion modules and accessories

Present in over 90 countries

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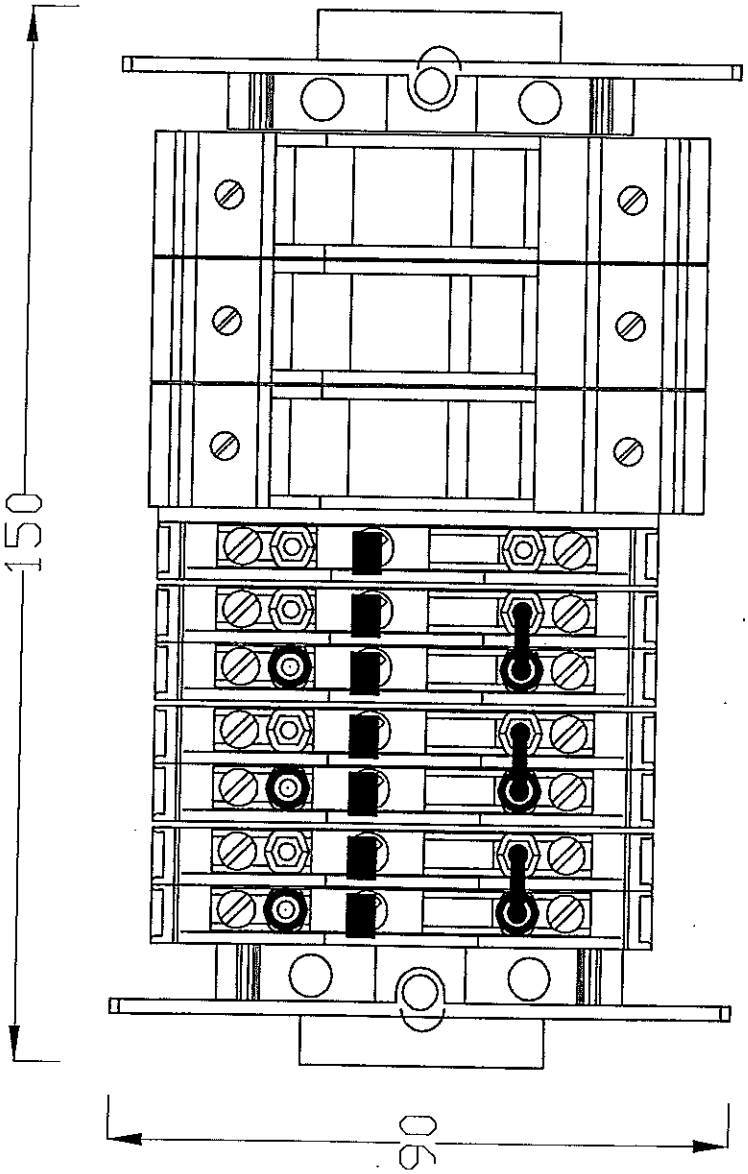
PD67 GB 01 11

Приложение 19 2



ВиВ Изоматик ООД
1680 София, ул. "Пимен" №40А
тел. 02 958 63 40, 958 63 44, 958 31 11, факс 958 22 70

ОБЕКТ/измервателен клеморед ЧЕЗ

части	лист No1 1/ 1
фази РП	мащаб ---

СЪГЛАСУВАНИ

ВЪЗЛОЖИТЕЛ/

Чертал/

Р-л фирмал инж. Вл. Лазаров

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД
PS ELECTRIC
BULGARIA

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Факс: (+359 2) 958 2270
E-mail: v.v@techno-lhk.com
http://www.viv-isomatic.com

Банкова сметка 1004621117, Булбанк София 62196214

ТЕХНИЧЕСКИ ХАРАКТЕРИСТИКИ

Предлаганите клеми са производство на фирма Phoenix Contact – Германия. Фирмата е сертифицирана по ISO 9001. Клемите са тествани и са в съответствие с IEC 60 947-7-1, IEC 60947-1, IEC 60695-2-2, EN 50019, а също така притежават и други сертификати, които са дадени за всяка клема в каталога.
Клемите на Phoenix Contact са с универсална основа за закрепване както към симетрична шина NS 35/7,5, NS 35/15, така и към несиметрична - NS 32. Кабелните входове на клемата са затворени фунии, което улеснява въвеждането на проводника. Всички клеми имат гнезда за индивидуално и рационално маркиране.
Предлаганите клеми, производство на Phoenix Contact притежават следните по-важни качества:

- **всички метални части са устойчиви на електролитна корозия и ръжда**

Всички метални елементи на клемите са изработени от медна сплав, с високо съдържание на мед, като напълно се избягва използването на стомана. Това елиминира две възможни причини за корозия: Едната е електролитна корозия, която възниква между медния проводник и стоманата, при наличие на влага. Втората е ръждата и последиците от нея – ненадежден електрически контакт, блокирани винтчета. Използването само на медна сплав има и допълнителни предимства като: 1) ниско температурно повишение, поради високата електрическа проводимост и 2) по-малко вероятно е разхлабване на винтчетата, тъй като практически няма относително термично разширение между проводника и притискащата част.
Повърхността на металните части е защитена с калаено или никелово галванично покритие.

- **блокиране на винтчетата срещу саморазвиване**

Phoenix Contact притежава патент, наречен "Reakdyn principle" за предпазване на винтчетата от саморазвиване. Конструкцията на притискащата част е на приципа на движеща се клетка. При завъртане на винта, той натиска тоководещата част и издърпва проводника в клетката към тоководещата част. Поради високата притискаща сила проводника се интегрира в мекото калаено покритие на тоководещата част. Така се постига контактно съпротивление което превишава изискванията на IEC 60 947-7-1, като за клема 4 mm^2 то е 0,3mΩ.
Поради специалната си форма при затягане на винтчето горната част на клетката се деформира еластично и предизвиква нарастваща триеща сила в главата на винтчето, която не му позволява да се саморазвие.

- **надежна механична и електрическа връзка, съгласно IEC 60 947-7-1**

Конструкцията на притискащата част на клемата не само удовлетворява тези изсквания, но дори ги надвишава, поради следните качества: 1) Равната основа на притискащата част гарантира, че дори и най тънкия проводник ще бъде стегнат както трябва., 2) напречните жлебове на тоководещата част гарантират нарушаване оксидацията по проводника, без да го извиват и така осигуряват добър контакт, 3) стабилната конструкция на притискащите части, заедно с високата точност при изработка, осигуряват връзка, недопускаща проникването на газ, както и голяма

сила на притискане. Това означава, че условията за контакт могат да се поддържат стабилни за дълъг период от време, дори в агресивна атмосфера.

- **качества на изолационния материал**

Изолационния материал на клемите, които са предмет на настоящия търг е Полиамид 6.6. Този материал е одобрен от всички оторизирани лаборатории като CSA, NEMKO, KEMA, VDE и др. Той има отлични електрически, механични, химически и други качества, дори при високи температури. Позволени са кратковременно температури до 200° С. Полиамида абсорбира вода до 2,8%, но тази влага не е във формата на кристализирана вода в пластмасата, а е химически свързана в молекулната структура. Това прави пластмасата гъвкава и нечуплива, дори при ниски температури от -40° С. Полиамида има клас на негоримост V0, съгласно UL 94.

Максималния допустим ток на клемите зависи от максимално допустимото сечение на проводника и е в съответствие с IEC 60947-7-1.

Съответствие на техническите изисквания

Съгласно горното, предлаганите клеми притежават следните характеристики в съответствие с техническите изисквания:

1. Проводниците се присъединяват към клемите чрез винтова връзка, осигуряваща необслабваща електическа връка при вибрации и стареене;
2. Проводимите и притискащи части са устойчиви срещу електролитна корозия и ръжда. Гарантиран клас на негоримост – V0 съгласно UL 94;
3. Повишена механична устойчивост;
4. Изолационният материал не абсорбира влага;
5. Клемите са с гнезда за поставяне на етикети от двете страни;
6. Клемите се монтират върху универсална монтажна рейка. Възможен е монтаж както както към симетрична шина NS 35/7,5, NS 35/15, така и към несиметрична - NS 32
7. Токови клеми:
   - Пофазно шунтиране на токовите вериги към ТТ с подвижни (фиксирани към клемата) или преносими изолирани мостове, съгласно приложената схема;
   - Видимо разкъсване на токовите вериги след шунтиране;
   - Включване на товарно устройство за тестване – монтирана или с възможност за монтаж на тест букса с диаметър 4mm;
   - Видимо разделяне на токовите вериги по предназначение (ядра);
8. Напреженови вериги:
   - Видимо разкъсване ;
   - Включване на товарно устройство за тестване – монтирана или с възможност за монтаж на тест букса с диаметър 4mm;
   - Възможност за видимо разделяне на напреженовите вериги по фази и предназначение;
   - Възможност за включване на измервателни уреди от двете страни на клемата;

Кратко описание на предложените клеми и аксесоари към тях

1. **URTK/S**

Клеми с винтова връзка за присъединяване на кръгъл твърд проводник до $10mm^2$ или гъвкав проводник с/без накрайник до $6mm^2$. Клемата е с възможност за фиксирано разкъсване на връзката, с гнезда за присъединяване на тестови проводници или за поставяне на шунтиращи мостчета от двете страни на клемата - щифт 4mm. Тази клема е универсална и удовлетворява всички изисквания за яснота на веригата, удобства за превключване. Клемата предлага няколко типа на замостване: чрез конектори с изолирана ръкохватка (2, 4 поз.), превключващи мостове (2, 4 поз.) за окъсяване на трансформаторни вериги, фиксиран мост – 10 позиционен, делим, окомплектован с винтове. Гнездата за тестови проводник или шунтиращ конектор всяка страна са независими от винта за присъдиняване на проводника.

2. **URTK/SP**

Клеми с винтова връзка за присъединяване на кръгъл твърд проводник до $10mm^2$ или гъвкав проводник с/без накрайник до $6mm^2$. Клемата е с възможност за фиксирано разкъсване на връзката, с гнезда за присъединяване на тестови проводници или за поставяне на шунтиращи мостчета от двете страни на клемата - щифт 4mm. Тази клема е универсална и удовлетворява всички изисквания за яснота на веригата, удобства за превключване и защита от допир до тоководещи части. Клемата предлага няколко типа на замостване: чрез изолирани превключващи мостове (2, 3, 4, 10 поз.), неизолиран фиксиран мост, конектори с изолирана ръкохватка (2, 4 поз.) Гнездата за тестови проводник или шунтиращ конектор са напълно изолирани.

3. **D-URTK**

Крайна капачка за клема URTK/S.

4. **Разделителна пластина ATP-URTK/SP.**

Секционна разделителна пластина за визуално и електрическо разделяне на клемни групи за директен монтаж на DIN шина. Дебелина: 2 мм.

Подходяща за използване с всички токови и напреженови клеми.

5. **Шунтиращ мост SB 2-RTK/S.**

Двупозиционен подвижен, шунтиращ мост за клеми URTK/S.

6. **Шунтиращ мост SB 2-URTK/SP.**

Двупозиционен изолиран, подвижен, шунтиращ мост за клеми URTK/SP.

7. **Фиксатор за клемен пакет CLIPFIX 35.**

Фиксатор със защипване за симетрични шини 35/7,5 мм, 35/15 мм.
Ширина: 9,5 мм. Материал: полиамид.
Клас на запалимост: V0. Цвят: сив.
Може да се маркира със стантартни клемни маркировки ZB, маркировки: KLM, KLM 2.

Съставил:

Инж. Владимир Лазаров
"ВиВ Изоматик" ООД

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Приложение 20 з

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Telefax: ++49 / (0) 52 35/34 12 00
Internet: http://www.phoenixcontact.com
USt-Id-Nr.: DE124613250

PHOENIX CONTACT GmbH & Co. KG · 32823 Blomberg

TO WHOM IT MAY CONCERN

Development Quality Laboratory
Business Unit
Industrial Connection Technology

Telefon: ++49 / (0) 52 35/34 20 71
++49 / (0) 52 35/34 10 97
Telefax: ++49 / (0) 52 35/34 12 06

04st of Decembre 2009

Certification regarding the static use of modular terminal blocks in the temperature range from -60°C to +120°C

Dear Sir or Madam,

Based on the available documentation of our plastic suppliers, we herewith certify for the non-reinforced polyamide plastics used in the area of CLIPLINE (Industrial Connection Technology) as follows:

Considering self-heating, articles made of the above materials can be used in static operation from -60°C to +120°C.

Best regards

PHOENIX CONTACT GmbH & Co. KG

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg, Germany
Development Quality Laboratory
Business Unit
Industrial Connection Technology

i.V. Dipl.-Phys. Ing. Alessandro Alberani
Head of Development
Quality Laboratory
Business Unit ICT

i.V. Dipl.-Phys. Ing. Alessandro Alberani

i.A. Dipl.-Chem. Ing. J. Jacke

ПС ЕЛЕКТРИК ООД
PS ELECTRIC
BULGARIA

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WEEE-Reg.-Nr.: DE50738265

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Business Unit
Industrial Connection Technology

Phone: ++49 / (0) 52 35/34 20 71
Fax: ++49 / (0) 52 35/341 2 06

04st of Decembre 2009

Confirmation

Dear Sir or Madam,

We hereby confirm that the universal test disconnect terminal block URTK/S (0311087) is applicable at the rated insulation voltage up to 500 V in accordance to IEC 60947-7-1:2002-07 (partly)

Yours sincerely

PHOENIX CONTACT GmbH & Co. KG
Flachsmarktstraße 8
32825 Blomberg, Germany
Development Quality Laboratory
Business Unit
Industrial Connection Technology

PHOENIX CONTACT GmbH & Co. KG

i.V. Dipl.-Phys. Ing. Alessandro Alberani
Head of Development
Quality Laboratory
Business Unit ICT

i.V. Dipl.-Phys. Ing. Alessandro Alberani

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД
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BULGARIA

Приложение 21 4

KEMA
REGISTERED QUALITY

KEMA KEUR

CERTIFICATE

KEMA No.: 97.4117.13

Issued to:
Applicant:
Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28
BLOMBERG, Germany

Manufacturer/Licensee:
Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28
BLOMBERG, Germany

Product : terminal blocks

Trade name : PHOENIX CONTACT
Types/models : URTK/S-BEN BU, URTK/S-BEN, URTK/S, URTK/SP, USLKG 10, USLKG 6N

The product and any acceptable variation thereto is specified in the Annex to this certificate and the documents therein referred to.

KEMA hereby declares that the above-mentioned product has been certified on the basis of:

- a type test according to the standard EN 60947-7-1:1991, EN 60947-7-2:1995
- an inspection of the production location according to CCA Group Operational Document CCA 204
- a certification agreement with the number 900469

KEMA hereby grants the right to use the KEMA certification mark

KEMA KEUR

The KEMA-KEUR certification mark may be applied to the product as specified in this certificate for the duration of the KEMA-KEUR certification agreement and under the conditions of the KEMA-KEUR certification agreement.

This certificate is issued on: August 6, 1999

C.M. Boschloo
Certification Manager

ВЯРНО С ОРИГИНАЛА

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET Arnhem, The Netherlands
Telephone +31 26 3 56 28 50, Telefax +31 26 3 51 49 22

ACCREDITED BY THE DUTCH COUNCIL FOR ACCREDITATION

BULGARIA

SPECIFICATION OF THE CERTIFIED PRODUCT

Product data

product	:	terminal blocks
trade name	:	PHOENIX CONTACT
types	:	URTK/S-BEN BU, URTK/S-BEN, URTK/S, URTK/SP, USLKG 10, USLKG 6N
material	:	thermoplastic material
mounting	:	top hat rail 35 mm (EN 50022) and G-profile rail 32 mm (EN 50035)

Additional information

Markings

Trademark, type designation, rated connection capacity and rated insulation voltage are indented in the insulation material.

Product data – type USLKG 6N

rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,2 - 10 mm² solid 0,2 - 6 mm² flexible without ferrule 0,25 - 6 mm² flexible with ferrule two conductors 0,2 - 2,5 mm² solid 0,2 - 2,5 mm² flexible without ferrule 0,25 - 1,5 mm² flexible with ferrule
description	:	protective conductor terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S

rated voltage	:	400 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562850, Telefax +31 26 3514922

Product data – type USLKG 10

rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 6 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 2,5 mm² flexible without ferrule 0,5 - 2,5 mm² flexible with ferrule
description	:	protective conductor terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S-BEN

rated voltage	:	500 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

Product data – type URTK/S-BEN BU

rated voltage	:	500 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 10 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 4 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

N.V. KEMA
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P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562650, Telefax +31 26 3514922

ПС ЕЛЕКТРИК ООД
PS ELECTRIC
BULGARIA

ВЯРНО С ОРИГИНАЛА

Product data – type URTK/SP

rated voltage	:	500 V
rated connection capacity	:	6 mm²
connectable conductors	:	one conductor 0,5 - 10 mm² solid 0,5 - 6 mm² flexible without ferrule 0,5 - 6 mm² flexible with ferrule two conductors 0,5 - 2,5 mm² solid 0,5 - 4 mm² flexible without ferrule 0,5 - 2,5 mm² flexible with ferrule
rated impulse withstand voltage	:	6 kV
description	:	disconnect terminal block with 2 screw-type clamping units, 1-pole

TESTS

Test requirements

EN 60947-7-1:1991 + C:1997-06 + A11:1997
EN 60947-7-2:1995 + C:1996-01

Test results
The test results are laid down in KEMA test file 97.4117.13.

Conclusion
The examination proved that all test requirements were met.

Tested by : H.L. Schendstok

Checked by : L.J.W. van Megen

FACTORY-LOCATION(S)

Phoenix Contact GmbH & Co.
Flachsmarktstrasse 8-28, BLOMBERG, Germany

N.V. KEMA
Utrechtseweg 310, 6812 AR Arnhem, The Netherlands
P.O. Box 9035, 6800 ET ARNHEM, The Netherlands
Telephone +31 26 3562850, Telefax +31 26 3514922

DEVICE UNDER TEST..... **Fuse holder *FB01B types***

MANUFACTURER..... Lovato Electric S.p.A.

TYPE OF TEST..... **Temperature rise test on FB01B fuse holders**

DATE OF DEVICE RECEIPT..... 27/04/2011

START / END TESTING..... 29/04/2011 – 13/05/2011

SAMPLES STORING..... ☒ Eliminated / returned to customer ☐ Storage :

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ISSUE 16/05/2011

COMPILED ..... STAFF LPR

APPROVED ..... RESP. LPR

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

1. PURPOPSE OF TESTING

Requested test (according to the customer specification):
Temperature rise at 690V – 32A on FB01B fuse holders

Test purpose:
"Verify the good function of FB01B fuse holders ."

Test target:
Pass the test.

2. TEST SAMPLES

N. 1 FB01B1P fuse holder - 32A (10 x 38 mm), batch production number ...[1]
N. 1 FB01B2P fuse holder - 32A (10 x 38 mm), batch production number ...[1]
N. 1 FB01B3P fuse holder - 32A (10 X 38 mm), batch production number ...[1]

3. TEST METHOD

IEC 60947-3 (2008-08) Ed. 3.0 + IEC 60947-1 Ed. 5.1 (2011-03)
Temperature rise (§ 8.3.3.1)

4. TEST PROCEDURES

Temperature rise..... Test instruction LPR 051-1, rev. 4, dated 11/10/2010.

[1] not available
[1] not available
[1] not available

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД BULGARIA

5. TEST RESULTS

5.1 TEMPERATURE RISE

5.1.1 WITH LEGRAND FUSE 32 A gG 400 V

Sample under test.....N. 1 FB01B1P - 32A
N. 1 FB01B2P - 32A
N. 1 FB01B3P - 32A

Test conditions

Ambient temperature.....21 °C
Relative humidity.....46 %
Installation.....in vertical way, on DIN RAIL 35mm

Data sheet fusible used:
- Supplier.....Legrand
- Code.....cod. 133 32

Test parameters

Wiring of the main circuit
- cables section / length.....6,0 mm^2 / 1,0 m
- screws tightening nominal torque.....2,0 ÷ 2,5 N.m
- screws applied tightening torque.....2,0 N·m

Supply of the main circuit
- rated current.....Ith = 25 - 32 A
- test current.....I = 32 A
- supply frequency.....50 Hz

Test results

See next page.

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

Temperature rise main circuit

	[K]			Standard limit EN60947-1 tab. 2
	One pole fuse holder FB01B1P	2 pole fuse holder FB01B2P	3 pole fuse holder FB01B3P	
Terminal L1	43	54	57	65
Terminal T1	39	51	52	65
Terminal L2	-	55	61	65
Terminal T2	-	49	58	65
Terminal L3	-	-	57	65
Terminal T3	-	-	50	65
Note	Silver plated-brass terminal			

Temperature rise for accessibile parts

	[K]			Standard limit EN60947-1 tab. 3
	One pole fuse holder FB01B1P	2 pole fuse holder FB01B2P	3 pole fuse holder FB01B3P	
Line side	14	24	29	40
Load side	10	19	21	40
Left side	24	30	32	40
Right side	22	30	31	40
On front	18	24	29	40
Lever	9	16	17	40

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

6. TEST EQUIPMENT AND INSTRUMENTS

6.1. TEST EQUIPMENT

Description	Used for	Full scale	Code
Current supply station	Power supply main circuit	20V – 50A	LPRA 065

6.2. MEASURING INSTRUMENTS

Description	Used to measure	Full scale	Code	Calibration expiration date
Thermohygrometer	Ambient temperature	-5 ÷ 50 °C	LPR 165	27/10/2011
Thermohygrometer	Relative humidity	10 ÷ 90%	LPR 165	27/10/2011
Termometric instrument	Temperature rise	-30 ÷ +200 °C	LPR 201	10/01/2012
Termocouple T type	Temperature rise	-30 ÷ +200 °C	L PR 201	10/01/2012
Termocouple T type	Temperature rise	-30 ÷ +200 °C	L PR 201.13	10/01/2012
Current transformer	Main circuit current	1.004/50 A	LPR 155	11/05/2014
Digital multimeter	Main circuit current	10 A	LPR 55	11/05/2012
Digital multimeter	Drop voltage	mV - Autom.	LPR 125	11/05/2012
Dynamometric screw driver	Main terminal screw tightening	6,0 Nm	LPR 231	07/01/2012

7. REMARKS & ANALYS

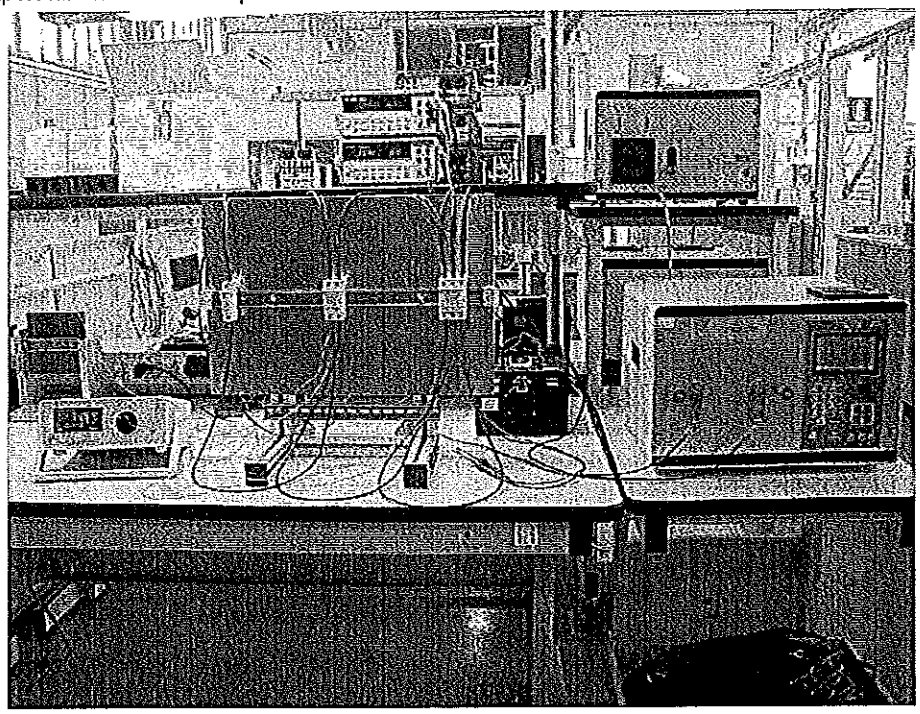
Temperature rise test 690V – 32A: test passed

ВЯРНО С ОРИГИНАЛА

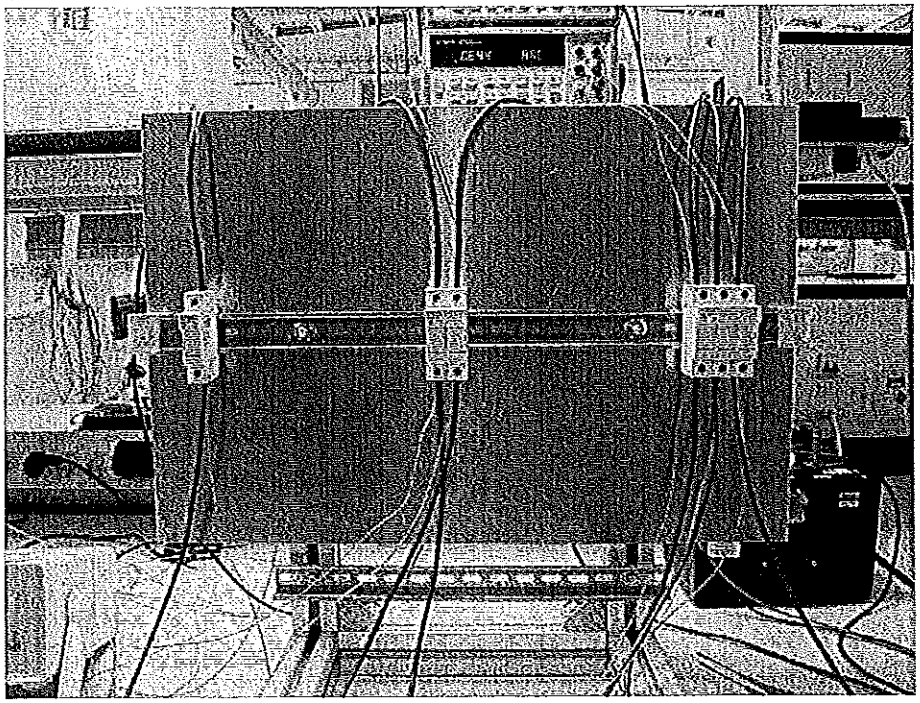
ПС електрик ООД PS ELECTRIC BULGARIA

8. ANNEX

Picture 1: Temperature rise – test setup



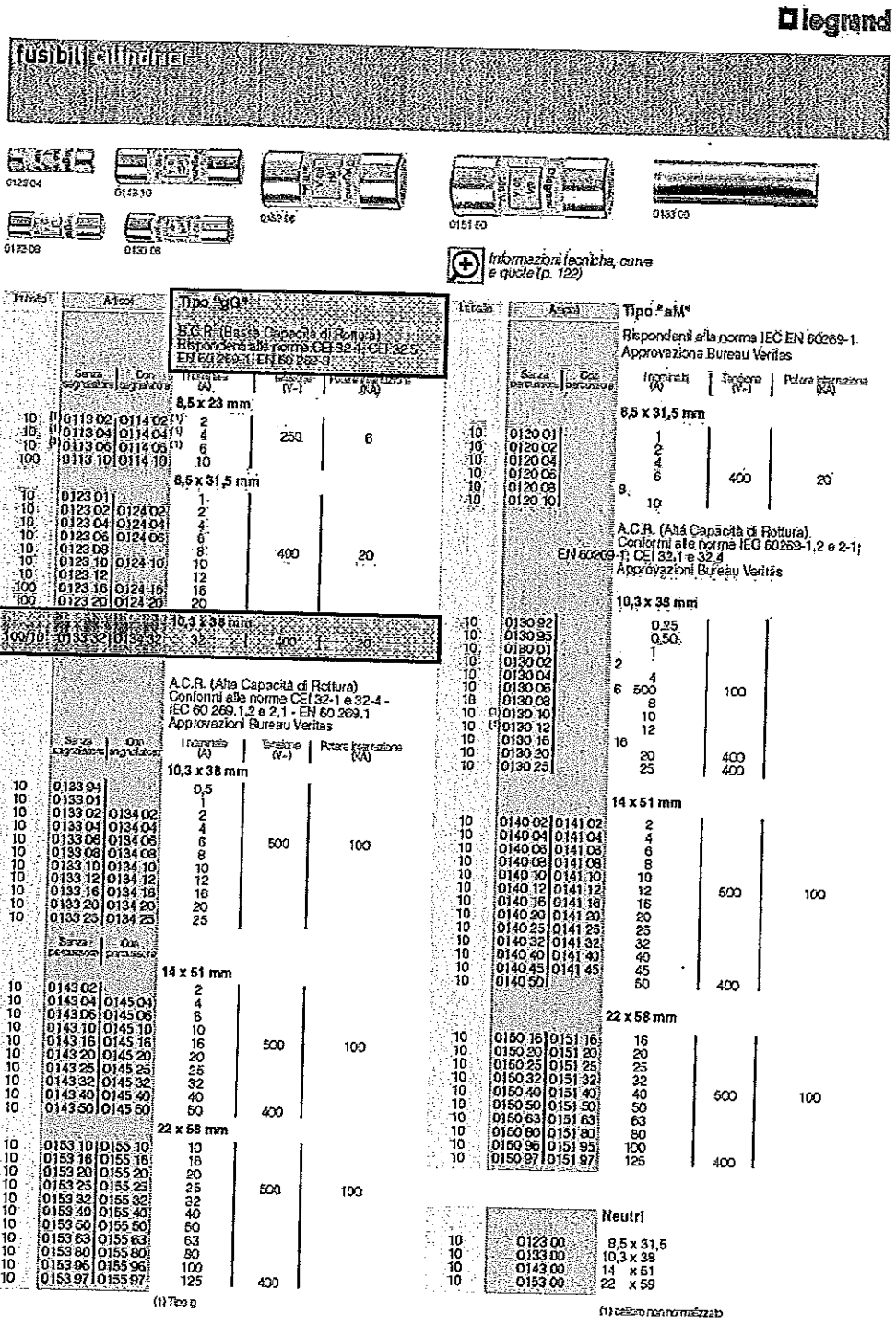
Picture 1a: Temperature rise – test setup



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Picture 2: Catalogue Legrand fuses



legrand

fusibili cilindrici

0123 04 0143 10 0153 16 0151 60 0133 09 0123 08 0130 08

Informazioni tecniche, curve e quote (p. 122)

Tipo "gG"

A.C.R. (Alta Capacità di Rottura)
Rispondenti alle norme CEI 32-1, CEI 32-5, EN 60 269-1, EN 60 269-2

Fusibile	Alveoli: Senza segnalazione	Alveoli: Con segnalatore	In nominale (A)	Tensione (V~)	Potere interruzione (kA)
8,5 x 23 mm					
10	0113 02	0114 02 (1)	2	250	6
10	0113 04	0114 04 (1)	4		
10	0113 06	0114 06 (1)	6		
100	0113 10	0114 10	10		
8,5 x 31,5 mm					
10	0123 01		1	400	20
10	0123 02	0124 02	2		
10	0123 04	0124 04	4		
10	0123 06	0124 06	6		
10	0123 08		8		
10	0123 10	0124 10	10		
10	0123 12		12		
100	0123 16	0124 16	16		
100	0123 20	0124 20	20		
10,3 x 38 mm					
100 (1)	0133 32	0134 32	32	400	20

A.C.R. (Alta Capacità di Rottura)
Conformi alle norme CEI 32-1 e 32-4 - IEC 60 269,1,2 e 2,1 - EN 60 269,1
Approvazioni Bureau Veritas

	Senza segnalatore	Con segnalatore	In nominale (A)	Tensione (V~)	Potere interruzione (kA)
10,3 x 38 mm					
10	0133 01		0,5	500	100
10	0133 01		1		
10	0133 02	0134 02	2		
10	0133 04	0134 04	4		
10	0133 06	0134 06	6		
10	0133 08	0134 08	8		
10	0133 10	0134 10	10		
10	0133 12	0134 12	12		
10	0133 16	0134 16	16		
10	0133 20	0134 20	20		
10	0133 25	0134 25	25		
	Senza segnalatore	Con segnalatore			
14 x 51 mm					
10	0143 02		2	500	100
10	0143 04	0145 04	4		
10	0143 06	0145 06	6		
10	0143 10	0145 10	10		
10	0143 16	0145 16	16		
10	0143 20	0145 20	20		
10	0143 25	0145 25	25		
10	0143 32	0145 32	32		
10	0143 40	0145 40	40		
10	0143 50	0145 50	50	400	
22 x 58 mm					
10	0153 10	0155 10	10	500	100
10	0153 16	0155 16	16		
10	0153 20	0155 20	20		
10	0153 25	0155 25	25		
10	0153 32	0155 32	32		
10	0153 40	0155 40	40		
10	0153 50	0155 50	50		
10	0153 63	0155 63	63		
10	0153 80	0155 80	80		
10	0153 96	0155 96	100		
10	0153 97	0155 97	125	400	

(1) Tipo g

Tipo "aM"

Rispondenti alla norma IEC EN 60269-1.
Approvazione Bureau Veritas

Fusibile	Alveoli: Senza segnalazione	Alveoli: Con segnalazione	In nominale (A)	Tensione (V~)	Potere interruzione (kA)
8,5 x 31,5 mm					
10	0120 01		1	400	20
10	0120 02		2		
10	0120 04		4		
10	0120 06		6		
10	0120 08		8		
10	0120 10		10		

A.C.R. (Alta Capacità di Rottura)
Conformi alle norme IEC 60269-1,2 e 2-1; EN 60269-1; CEI 32,1 e 32,4
Approvazioni Bureau Veritas

10,3 x 38 mm					
10	0130 92		0,25	500	100
10	0130 95		0,50		
10	0130 01		1		
10	0130 02		2		
10	0130 04		4		
10	0130 06		6		
10	0130 08		8		
10	0130 10		10		
10	0130 12		12		
10	0130 16		16		
10	0130 20		20	400	
10	0130 25		25		
14 x 51 mm					
10	0140 02	0141 02	2	500	100
10	0140 04	0141 04	4		
10	0140 06	0141 06	6		
10	0140 08	0141 08	8		
10	0140 10	0141 10	10		
10	0140 12	0141 12	12		
10	0140 16	0141 16	16		
10	0140 20	0141 20	20		
10	0140 25	0141 25	25		
10	0140 32	0141 32	32		
10	0140 40	0141 40	40		
10	0140 45	0141 45	45		
10	0140 50		50	400	
22 x 58 mm					
10	0150 16	0151 16	16	500	100
10	0150 20	0151 20	20		
10	0150 25	0151 25	25		
10	0150 32	0151 32	32		
10	0150 40	0151 40	40		
10	0150 50	0151 50	50		
10	0150 63	0151 63	63		
10	0150 80	0151 80	80		
10	0150 96	0151 95	100		
10	0150 97	0151 97	125	400	

Neutri

10	0123 00	8,5 x 31,5
10	0133 00	10,3 x 38
10	0143 00	14 x 51
10	0153 00	22 x 58

(1) calibro non normalizzato

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ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

СПИСЪК

На отделните изпитания

1. Изолационно напрежение
2. Контактни повърхности
3. Проверка с импулсно напрежение
4. Термично претоварване
5. Устойчивост на температура

ПС електрик ООД
PS ELECTRIC
BULGARIA

ВЯРНО С ОРИГИНАЛА

Annex to ISO/IEC 17025 declaration of accreditation
for registration number: **K 006**

of **KEMA Nederland B.V.**
Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	-80 dBm to –10 dBm	0,1 MHz to 2700 MHz	1,1 dB	source < 2 Generating: (0,09 - 3200) MHz
RF 5 0	Rise time (10% to 90%) 1 ns to 1 ms		$2 \cdot 10^{-2}$ I← +200 ps	10 mV/div to 1 kV/div
TF 0 0	TIME and FREQUENCY			
TF2 1	Frequency	1 Hz to 1,2 GHz	$5 \cdot 10^{-10} f$	
TF 2 2	Time interval	1 ≥s to {	$5 \cdot 10^{-10} f$ + 100 ns	
TF 3 2	Harmonic Distortion < 0,1 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-4}$	(1)
	0,1 % to 1 %	20 Hz to 2,5 kHz	$1 \cdot 10^{-3}$	
	1 % to 10 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-3}$	
	10 % to 30 %	20 Hz to 2,5 kHz	$1 \cdot 10^{-2}$	
	30 % to 100 %	20 Hz to 2,5 kHz	$3 \cdot 10^{-2}$	

Part II, Mechanical quantities and Temperature

Measured quantity, Instrument, Gauge		Range	Best measurement capabilities (k=2)	Remarks
PV 1 0	Pressure			(2)
	Relative Pressure	(-10 to 10) kPa	$3 \cdot 10^{-4} p_e$ + 4 Pa	medium: air
		(-98 to 100) kPa	$3 \cdot 10^{-4} p_e$ + 5 Pa	medium: nitrogen
		100 kPa to 10 MPa	$3 \cdot 10^{-4} p_e$	medium: nitrogen
		(10 to 70) MPa	$3 \cdot 10^{-4} p_e$	medium: oil

ВЯРНО С ОРИГИНАЛА

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Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	Absolute Pressure	(80 to 110) kPa	$3I10^{-4}Ip$	medium: air
		(2 to 200) kPa	$3I10^{-4}Ip$ + 5 Pa	medium: nitrogen
		200 kPa to 10 MPa	$3I10^{-4}Ip$	medium: nitrogen
		(10 to 70) MPa	$3I10^{-4}Ip$	medium: oil
TE 0 0	TEMPERATURE, HUMIDITY AND THERMOPHYSICAL PROPERTIES			
TE 1 0	Resistance thermometers	-50 πC to 20 πC	0,02 K	
		20 πC to 50 πC	0,05 K	
		50 πC to 300 πC	0,05 K	
		300 πC to 550 πC	0,16 K	
		550 πC to 650 πC	0,50 K	
TE 3 0	Thermocouples	-50 πC to 20 πC	0,16 K	Including C.J. references
		20 πC to 50 πC	0,16 K	
		50 πC to 300 πC	0,16 K	
		300 πC to 550 πC	0,21 K	
		550 πC to 650 πC	0,6 K	
		650 πC to 1000 πC	1,6 K	
TE 4 0	Liquid-in-glass thermometers	-50 πC to 50 πC	0,02 K	
		20 πC to 50 πC	0,04 K	
		50 πC to 300 πC	0,02 K	
	Differential Temperature	-50 πC to 200 πC	0,05 K	t_{min} = -50 °C t_{max} = 200 °C
TE 4 1	Self indicating thermometers			

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Calibration & Metering
Arnhem

This annex is valid from: **30-03-2010** to **01-03-2014** Replaces annex dated: **30-06-2009**

HCS code	Measured quantity, Range	Frequency	Best measurement capabilities (k=2)	Remarks
	Dry Block Calibrators	-20 ºC to 650 ºC	$(8 \cdot 10^{-4} \cdot t_{90} + 0{,}06)$ K	
	Writing thermometers	15 ºC to 50 ºC	0,5 K	
	Digital thermometers	-50 ºC to 20 ºC	0,02 K	including C.J. references
		20 ºC to 50 ºC	0,05 K	
		50 ºC to 300 ºC	0,05 K	resolution 1 digit
		300 ºC to 550 ºC	0,16 K	
		550 ºC to 630 ºC	0,50 K	
		630 ºC to 1000 ºC	1,5 K	

Remarks:

The ambient temperature during calibration is, unless specified otherwise, for:
LF measurements @ (23 ± 1)ºC
TF measurements @ (23 ± 1)ºC
Pressure measurements @ (23 ± 2)ºC
Temperature measurements @ (23 ± 2)ºC

(1) The stated best measurement capabilities are based on the fundamental frequency of the input signal. If desired the distortion can be specified as a rang number of the harmonics.

(2) $p_e = p - p_{amb}$; p_e is the relative pressure, p_{amb} is the local air pressure, p is the absolute pressure.

The best measurement capability is the highest achievable accuracy for a given measuring value or measuring range, expressed as the total positive and negative measurement uncertainty.

The uncertainty is calculated according to EA-4/02 "Expression of the Uncertainty of Measurement in Calibration".

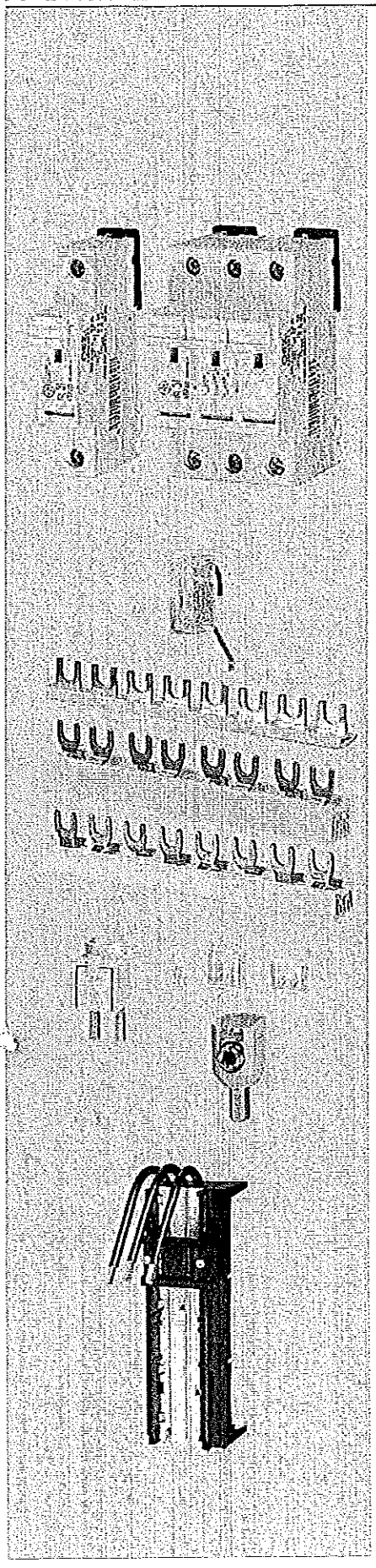
Calibrations are performed inside the laboratory, unless specified otherwise.

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

Приложение 23 24

FUSE SWITCH-DISCONNECTORS FOR CYLINDRICAL FUSE-LINKS UP TO 32 A



Fuse switch-disconnectors OPV10 are intended for cylindrical fuse-links PV10 size 10x38. They can safely switch off rated current and overcurrent up to 1.5 rated current and meet the requirements for safe disconnection. Inverse connection is permissible and it affects neither the technical parameters nor the safety of the operator.

- Switch-disconnectors OPV can be sealed in the closed state.
- The devices are designed as modular for 45 mm cutout in the switchboard.
- Optional light indication of fuse state.
- Mounted on „U" rail of type TH35 according to EN 60715 or on the panel (steel rail recommended).
- Fuse-link state can be indicated by means of electronic signalling, see page D17.

Fuse switch-disconnectors

Type	Product code	I_n [A]	Number of poles	Weight [kg]	Package [pcs]
OPV10S-1	38819	32	1	0.100	12
OPV10-N	38825		N	0.107	12
OPV10S-1N	38820		1+N	0.187	6
OPV10S-2	38821		2	0.180	6
OPV10S-3	38822		3	0.280	4
OPV10S-3N	38823		3+N	0.360	3
OPV10S-4	38824		4	0.360	3

[1] OPV10-N design is without the possibility of signalling of fuse state.

Accessories

Description	Type	Product code	Weight [kg]	Package [pcs]
Light indication, operating voltage 100 ÷ 500 V a.c., d.c.	S-OPV10	08703	0.002	1
Light indication, operating voltage 12 ÷ 48 V d.c., a.c. (+ pole up)	S-OPV10/48	11812	0.002	1
Light indication, operating voltage 12 ÷ 48 V d.c., a.c. (+ pole down)	S-OPV10/48PD	18234	0.002	1
1-pole interconnecting busbar, cross-section 12 mm², max. current 65 A, rated operating voltage 415 V, max. operating voltage 500 V, length 1 m	G1L-1000-12	37355	0.300	1
2-pole interconnecting busbar, cross-section 16 mm², max. current 80 A rated operating voltage 415 V, max. operating voltage 500 V, length 1 m	G2L-1000-16	37361	0.477	20
3-pole interconnecting busbar, cross-section 10 mm², max. current 63 A, rated operating voltage 415 V, max. operating voltage 500 V, length 1 m	G3L-1000-10C	37365	0.300	1
End cap, for 1-pole busbars with diameter 10, 12, 16 mm²	EKC-1	37383	0.0005	10
End cap, for 3-pole busbars with diameter 10 mm²	EKC-3	37385	0.001	10
End cap, for 2-pole and 3-pole busbars with diameter. 16 mm²	EKC-2+3	37384	0.001	10
Terminal extension, for connection of conductor of cross-section up to 25 mm²	AS-25-G	37390	0.012	10
Terminal extension, for connection of Cu/Al conductor of cross-section 2.5 ÷ 50 mm²	AS-50-S-AL01	38749	0.02	1
Adapter for busbars with spacing 60 mm, busbar thickness 5 or 10 mm, busbar width 12 ÷ 30 mm, cable outlet bottom, max. current 63 A	GA-60/63/54-1x7,5	11883	0.560	1

Specifications

Rated operating current	I_e		32 A
Rated operating voltage (a.c./d.c.)	U_e		690 V
Utilization category		690 V a.c.	AC-21B
		250 V d.c.	DC-21B
		700 V d.c.	DC-20B
Rated thermal current with fuse-link	I_{th}		32 A
Rated frequency	f_n		40 ÷ 60 Hz
Rated insulation voltage	U_i		800 V a.c.

FUSE SWITCH-DISCONNECTORS FOR CYLINDRICAL FUSE-LINKS UP TO 32 A

Specifications

Rated conditional short-circuit current with fuse-links PV (RMS)	I_{cc}	690 V	110 kA
Rated pulse withstand voltage	U_{imp}		4 kV
Fuse-link size	diameter x length		10x38
Max. rated current of the fuse-link	I_n		32 A
Max. power losses of the fuse-link**	P_v		3.5 W
Rated short-time withstand current	I_{cw}	1s	1.6 kA
Rated short-circuit making capacity at 400 V a.c.	I_{cm}		4 kA
Electrical endurance			300
Mechanical endurance			1700
Degree of protection, cover closed			IP20
Degree of protection, cover opened			IP20
Connection cross-section			Cu/0.5 ÷ 25 mm² (2x 16 mm²)
Torque			2 Nm
Operating ambient temperature	t		-25 ÷ +55 °C
Max. sea level			2000 m
Seismic resistance according to VE ŠKODA			3 g/8 ÷ 50 Hz
Overvoltage category/Rated voltage			I (II*)/690 V a.c., II (III*)/500 V a.c., III/400 V a.c.
Standards			IEC 60947-1, -3; EN 60947-1, -3
Approval marks			

* For underground cable distribution systems with overvoltage protection or for exposure to a low thunderstorm electricity (table H2 EN 60947-1, IEC 60947-1).

** Conditions for the use of fuse-links for semiconductor protection PV510 in chapter „Conditions for the use of fuse-links in fuse switch-disconnectors" see page H33.

EN 60947-3 ed. 2/A2, p. C.5 Instructions for the use of 1-pole controlled devices states:
These devices are intended for distribution systems, with possible necessity of switching and/or safe disconnection of individual phases, and must not be used for switching a primary circuit of a three-phase equipment.

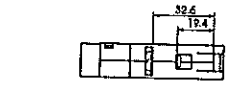
Reduction of rated current of fuse-links PV gG, aM according to the number of poles

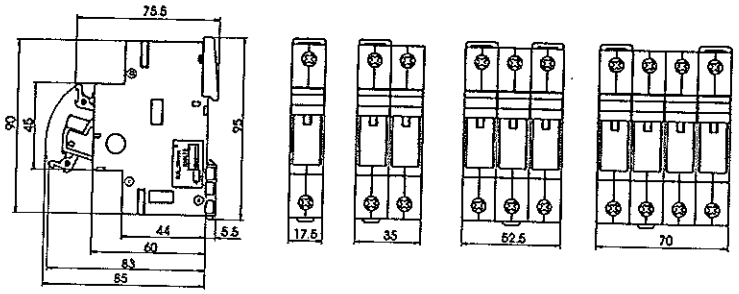
Type	I_n [A]	Reduced rated current [A] (Number of poles)					
		1	3	5	7	10	
OPV10	32	32	32	32	32	32	

Neutral pole

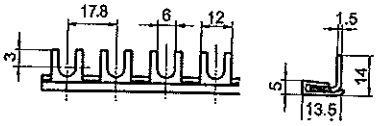
		OPV10-N
Rated operating current	I_n	32 A
Thermal current with disconnecting link ZPV10	I_{th}	110 A/25 mm²
Utilization category of the neutral pole at I_n		AC-20B
Rated short-time withstand current	I_{cw} 1s	1.6 kA
Rated short-circuit making capacity at 690 V a.c.	I_{cm} [kA]	5 kA
Rated short-circuit making capacity at 250 V d.c.	I_{cm} [kA]	5.1 kA
Power losses with disconnecting link at I_n	P_v [W]	4.8 W
Connection cross-section		0.5 ÷ 25 mm²

Dimensions

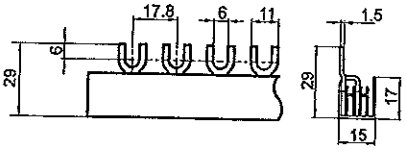




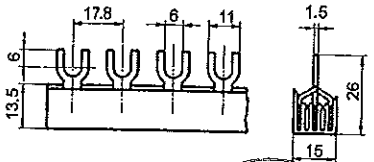
G1L-1000-12



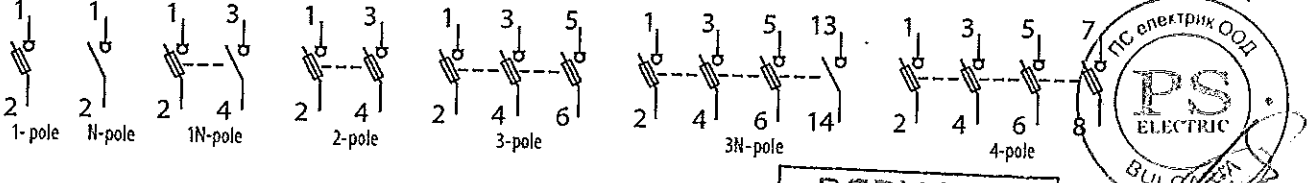
G2L-1000-16



G3L-1000-10C



Diagram



MINIMAL CONNECTING CROSS-SECTION OF FUSE SWITCH-DISCONNECTORS

Minimal connecting cross-section of cables of fuse switch-disconnectors for cylindrical fuse-links

Fuse-links I_n [A]	Fuse switch-disconnectors for cylindrical fuse-links			Cable S [mm²]	
	OPV10	OPV14	OPV22	Cu	Al
0.25	x	x		1	-
0.5	x	x		1	-
1	x	x		1	-
2	x	x		1	-
4	x	x		1	-
6	x	x		1	-
8	x	x		1	-
10	x	x		1.5	-
12	x	x		1.5	-
16	x	x	x	2.5	-
20	x	x	x	2.5	-
25	x	x	x	4	-
32	x	x	x	4	-
40		x	x	10	-
50		x	x	10	16
63		x	x	16	25
80			x	25	35
100			x	35	50
125			x	50	70

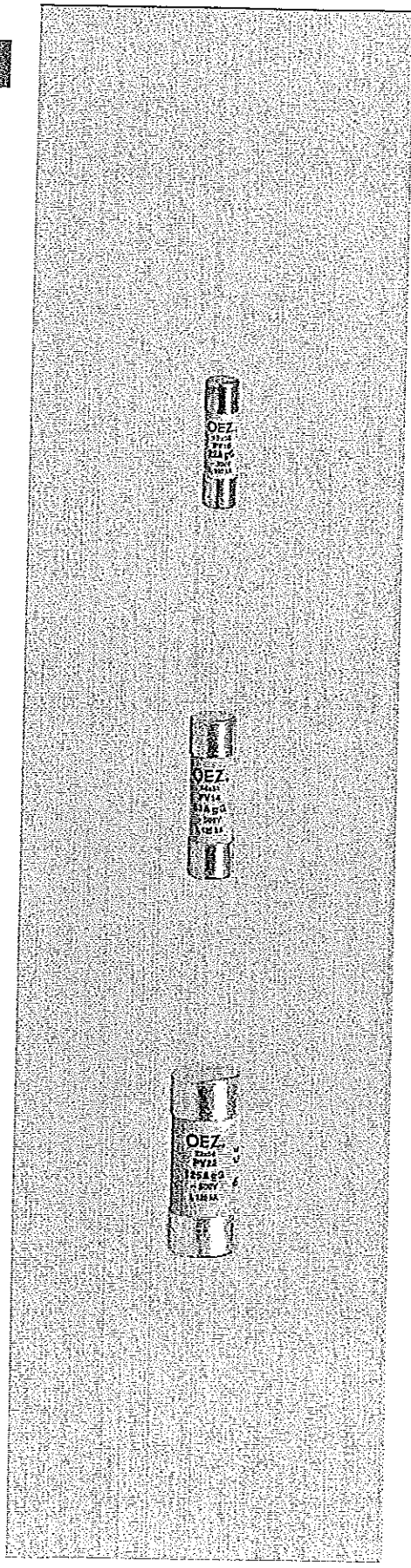
Notes:
1) Applies to ambient temperature of swich-disconnectors max. 40 °C
2) Applies to HRC fuse-links PV10, PV14, PV22

Minimal connecting cross-section of cables and busbars of fuse switch-disconnectors and fuse rails

Fuse-links I_n [A]	Fuse switch-disconnectors and fuse-rails									Cable S [mm²]		Busbar w x h	
	FH000	FH00	FH1	FH2	FH3	FD00 FR00	FD1 FR1	FD2 FR2	FD3 FR3	Cu	Al	Cu	Al
4	x	x				x				1	-	-	-
6	x	x	x			x	x			1	-	-	-
8	x	x	x			x	x			1	-	-	-
10	x	x	x			x	x			1.5	-	-	-
12	x	x	x			x	x			1.5	-	-	-
16	x	x	x			x	x			2.5	-	-	-
20	x	x	x			x	x			2.5	-	-	-
25	x	x	x			x	x			4	-	-	-
32	x	x	x	x		x	x	x		4	-	-	-
35	x	x	x	x		x	x	x		6	-	-	-
40	x	x	x	x		x	x	x		10	-	-	-
50	x	x	x	x		x	x	x		10	16	-	-
63	x	x	x	x		x	x	x		16	25	-	-
80	x	x	x	x	x	x	x	x	x	25	35	-	-
100	x	x	x	x	x	x	x	x	x	35	50	20 x 2	25 x 2
125	x	x	x	x	x	x	x	x	x	50	70	25 x 2	25 x 3
160	x	x	x	x	x	x	x	x	x	70	95	25 x 3	25 x 4
200			x	x	x		x	x	x	95	120	25 x 4	25 x 5
224			x	x	x		x	x	x	95	120	25 x 4	25 x 5
250			x	x	x		x	x	x	120	150	25 x 5	25 x 6
315				x	x			x	x	150	185	32 x 5	32 x 6
350				x	x			x	x	185	240	32 x 6	32 x 8
400				x	x			x	x	240	2x 150	32 x 8	40 x 8
500					x				x	2x 150	2x 185	2x 30 x 5	2x 40 x 5
630					x				x	2x 185	2x 240	2x 40 x 5	2x 40 x 8

Notes:
1) Applies to ambient temperature of swich-disconnectors max. 40 °C
2) Applies to HRC fuse-links PNA, PHNA

FUSE-LINKS PV



- Small dimensions.
- High limiting and breaking capacity.
- Low power losses.
- The fuse-links do not contain harmful substances according to the RoHS Regulation (cadmium, lead and other).
- Utilization category gG for protection of lines, cables and other equipment against overload and short- circuit.
- Utilization category aM for protection of motors, overcurrent relays, contactors and similar devices only against short-circuit.

Fuse-links PV

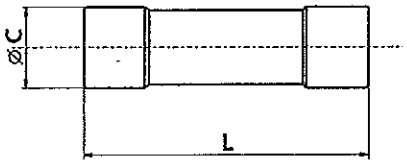
	Utilization category gG					Utilization category aM					
	I_n [A]	Type	U_n [V]	Product code	Power losses [W]	Type	U_n [V]	Product code	Power losses [W]	Weight [kg]	Package [pcs]
10 x 38	0,25	-	-	-	-	PV10 0,25A aM	500	06688	0.11	0.011	20
	0,5	-	-	-	-	PV10 0,5A aM	500	06689	0.17	0.011	20
	1	-	-	-	-	PV10 1A aM	500	06690	0.29	0.011	20
	2	PV10 2A gG	500	06691	0.72	PV10 2A aM	500	06692	0.92	0.011	20
	4	PV10 4A gG	500	06693	1.17	PV10 4A aM	500	06694	0.25	0.011	20
	6	PV10 6A gG	500	06695	0.88	PV10 6A aM	500	06696	0.31	0.011	20
	8	PV10 8A gG	500	06697	1.04	PV10 8A aM	500	06698	0.46	0.011	20
	10	PV10 10A gG	500	06699	1.29	PV10 10A aM	500	06700	0.46	0.011	20
	12	PV10 12A gG	500	06701	1.48	PV10 12A aM	500	06702	0.47	0.011	20
	16	PV10 16A gG	500	06703	1.86	PV10 16A aM	500	06704	0.67	0.011	20
	20	PV10 20A gG	500	06705	2.20	PV10 20A aM	400	06706	0.87	0.011	20
	25	PV10 25A gG	500	06707	2.58	PV10 25A aM	400	06708	1.05	0.011	20
	32	PV10 32A gG	500	06709	2.54	PV10 32A aM	400	06710	1.50	0.011	20
14 x 51	0,25	-	-	-	-	PV14 0,25A aM	690	06711	0.12	0.020	10
	0,5	-	-	-	-	PV14 0,5A aM	690	06712	0.18	0.020	10
	1	-	-	-	-	PV14 1A aM	690	06713	0.30	0.020	10
	2	PV14 2A gG	690	06714	0.95	PV14 2A aM	690	06715	0.99	0.020	10
	4	PV14 4A gG	690	06716	1.57	PV14 4A aM	690	06717	0.31	0.020	10
	6	PV14 6A gG	690	06718	2.24	PV14 6A aM	690	06719	0.34	0.020	10
	8	PV14 8A gG	690	06720	1.20	PV14 8A aM	690	06721	0.45	0.020	10
	10	PV14 10A gG	690	06722	1.58	PV14 10A aM	690	06723	0.56	0.020	10
	12	PV14 12A gG	690	06724	1.49	PV14 12A aM	690	06725	0.63	0.020	10
	16	PV14 16A gG	690	06726	2.0	PV14 16A aM	500	06727	1.01	0.020	10
	20	PV14 20A gG	690	06728	2.24	PV14 20A aM	500	06729	1.04	0.020	10
	25	PV14 25A gG	690	06730	2.70	PV14 25A aM	500	06731	1.30	0.020	10
	32	PV14 32A gG	690	06732	3.33	PV14 32A aM	500	06733	1.94	0.020	10
	40	PV14 40A gG	500	06734	3.86	PV14 40A aM	500	06735	2.04	0.020	10
	50	PV14 50A gG	500	06736	4.10	PV14 50A aM	400	06737	2.91	0.020	10
	63	PV14 63A gG	500	06738	5.35	PV14 63A aM	400	06739	3.69	0.020	10
22 x 58	16	PV22 16A gG	690	06740	2.23	PV22 16A aM	690	06741	0.92	0.060	10
	20	PV22 20A gG	690	06742	2.24	PV22 20A aM	690	06743	1.06	0.060	10
	25	PV22 25A gG	690	06744	2.90	PV22 25A aM	690	06745	1.43	0.060	10
	32	PV22 32A gG	690	06746	4.10	PV22 32A aM	690	06747	2.03	0.060	10
	40	PV22 40A gG	690	06748	4.52	PV22 40A aM	690	06749	2.50	0.060	10
	50	PV22 50A gG	690	06750	6.45	PV22 50A aM	690	06751	2.55	0.060	10
	63	PV22 63A gG	500	06752	5.82	PV22 63A aM	500	06753	4.05	0.060	10
	80	PV22 80A gG	500	06754	6.82	PV22 80A aM	500	06755	4.85	0.060	10
	100	PV22 100A gG	500	06756	7.81	PV22 100A aM	500	06757	5.59	0.060	10
	125	PV22 125A gG	500	18271	10.5	PV22 125A aM	400	06758	6.31	0.060	10

FUSE-LINKS PV

Parameters

Rated voltage	U_n	400 ÷ 690 V a.c. 250 V d.c.
Rated breaking capacity (rms)	I_1	120 kA/400 ÷ 690 V a.c. (100 kA/PV10 32A gG, 80 kA/PV14 63A gG) 50 kA/250 V d.c.
Utilization category		gG aM
Discrimination		1 : 1.6
Standards		IEC 60269 EN 60269
Approval marks		

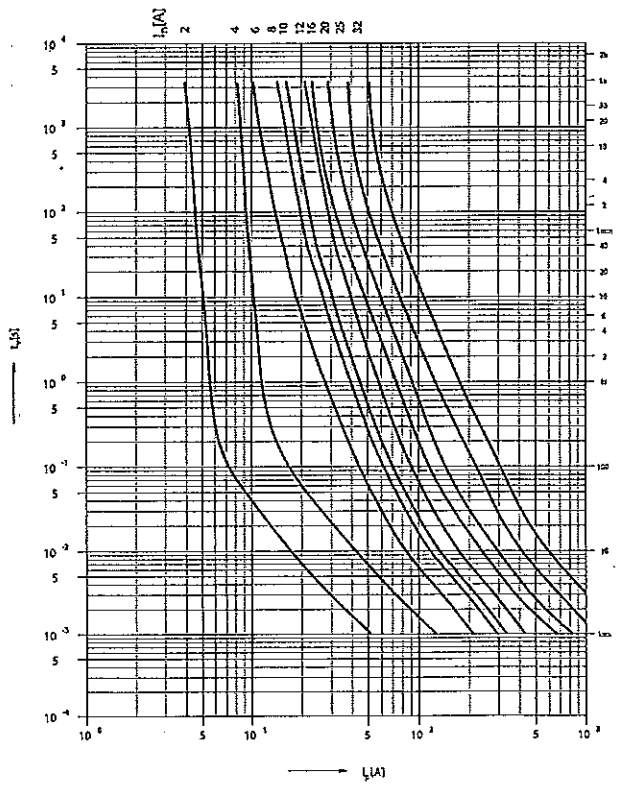
Dimensions



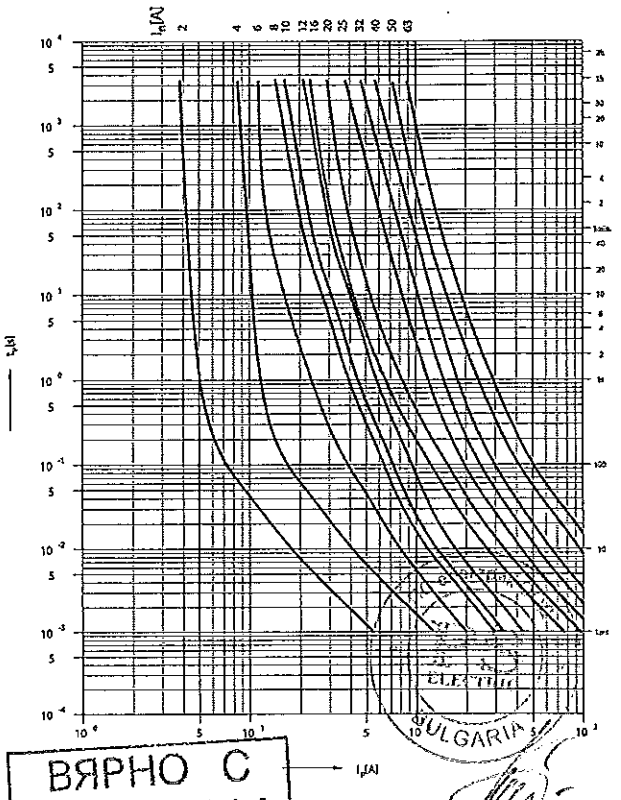
Type	ØC	L
PV10	10.3± 0.1	38± 0.6
PV14	14.3± 0.1	$51^{0.6}_{-1}$
PV22	22.2±1	$58^{+0.1}_{-2}$

Characteristics

Prearcing time/current characteristic
PV10 gG



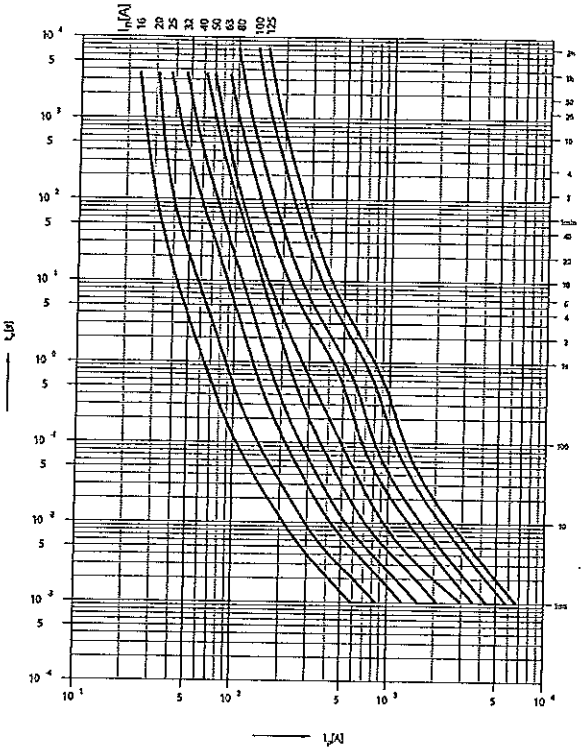
Prearcing time/current characteristic
PV14 gG



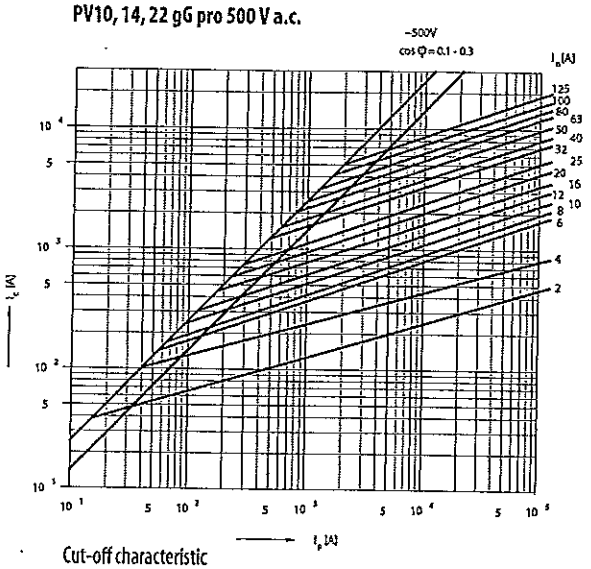
FUSE-LINKS PV

Characteristics

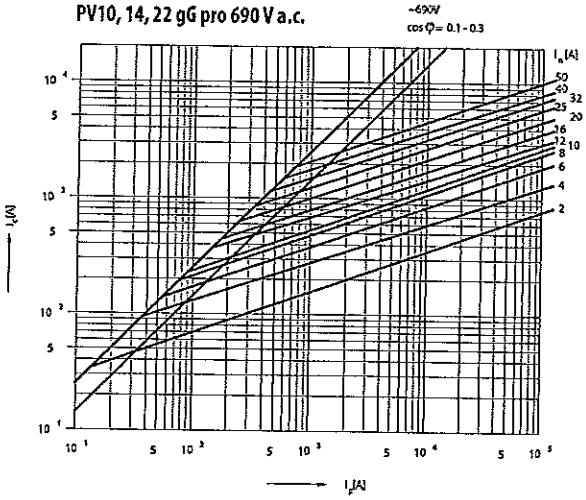
Prearcing time/current characteristic
PV22 gG



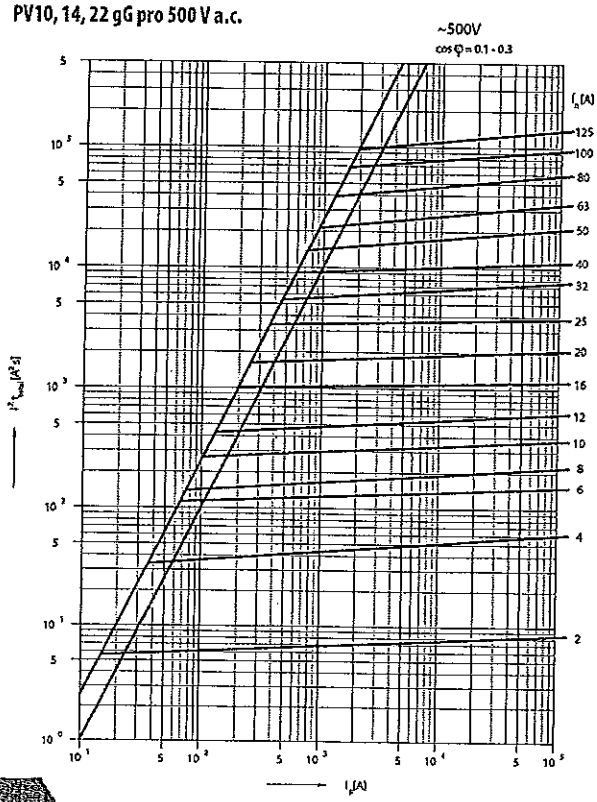
Cut-off characteristic
PV10, 14, 22 gG pro 500 V a.c.



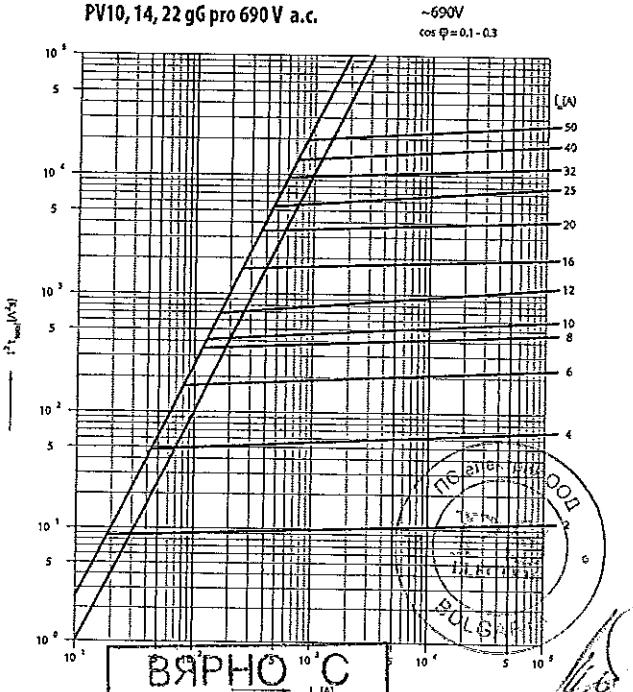
Cut-off characteristic
PV10, 14, 22 gG pro 690 V a.c.



I^2t characteristic
PV10, 14, 22 gG pro 500 V a.c.



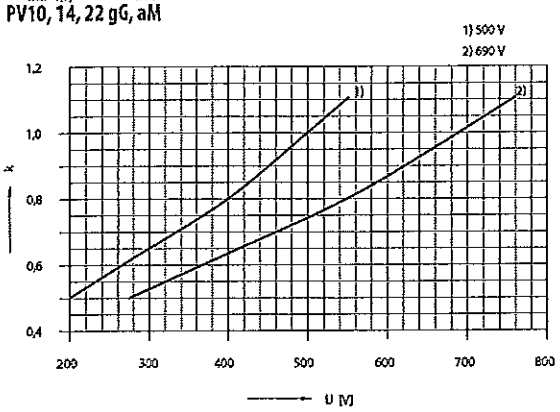
I^2t characteristic
PV10, 14, 22 gG pro 690 V a.c.



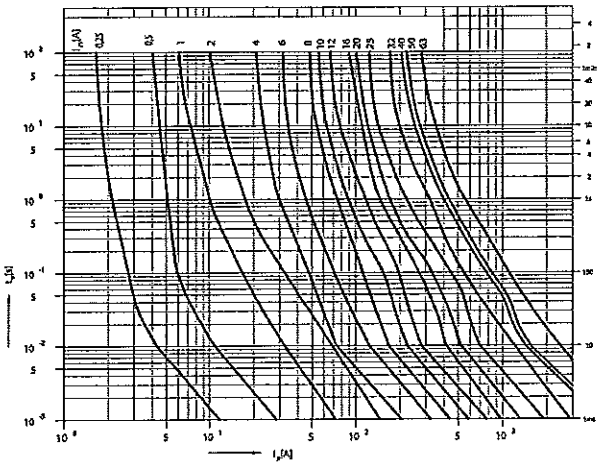
FUSE-LINKS PV

Characteristics

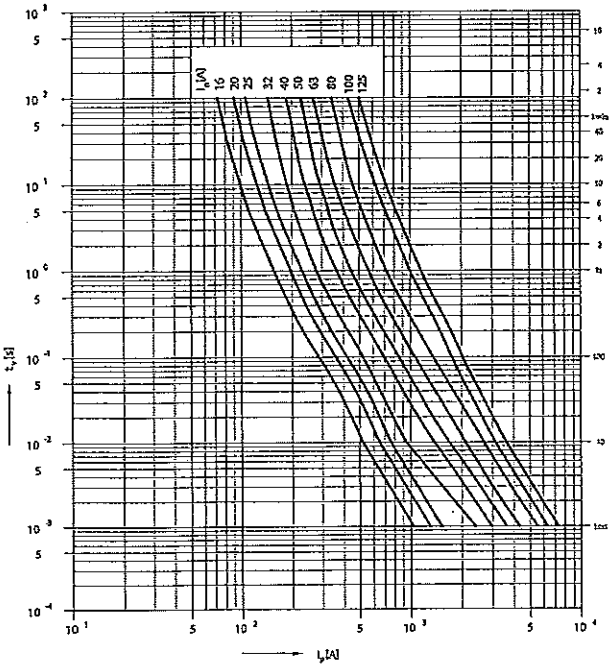
Correction factor „k" of I^2t dependence on operating voltage U
$(I^2t_{total})_{f(U)} = k \times I^2t_{total}$
PV10, 14, 22 gG, aM



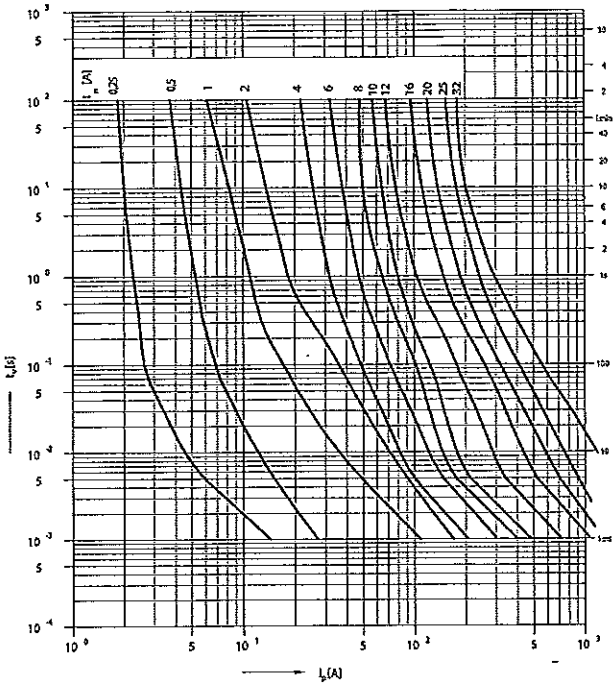
Prearcing time/current characteristic
PV14 aM



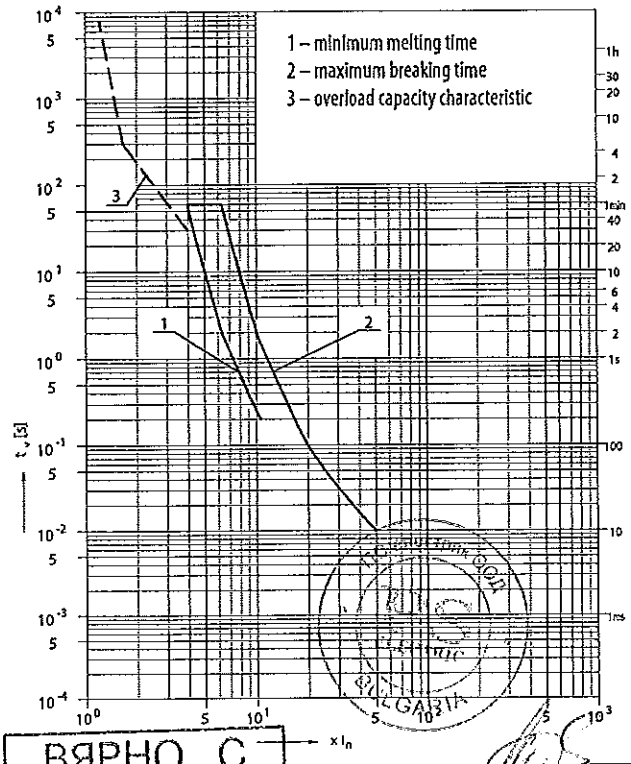
Prearcing time/current characteristic
PV22 aM



Prearcing time/current characteristic
PV10 aM



Time/current ranges
PV10, 14, 22 aM

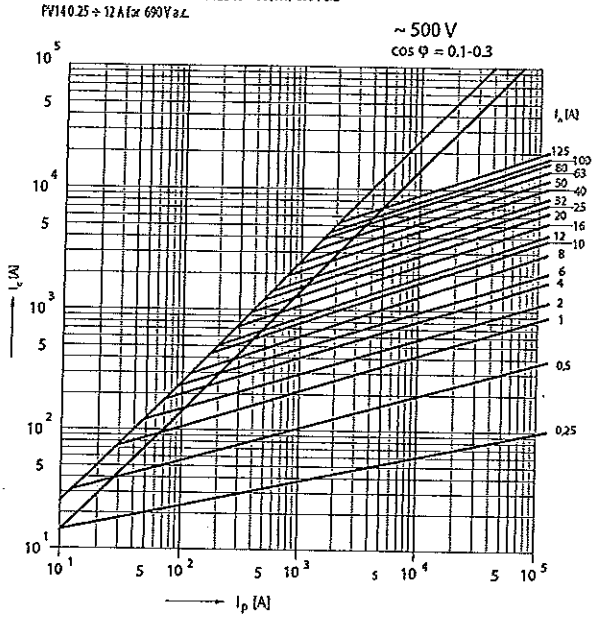


FUSE-LINKS PV

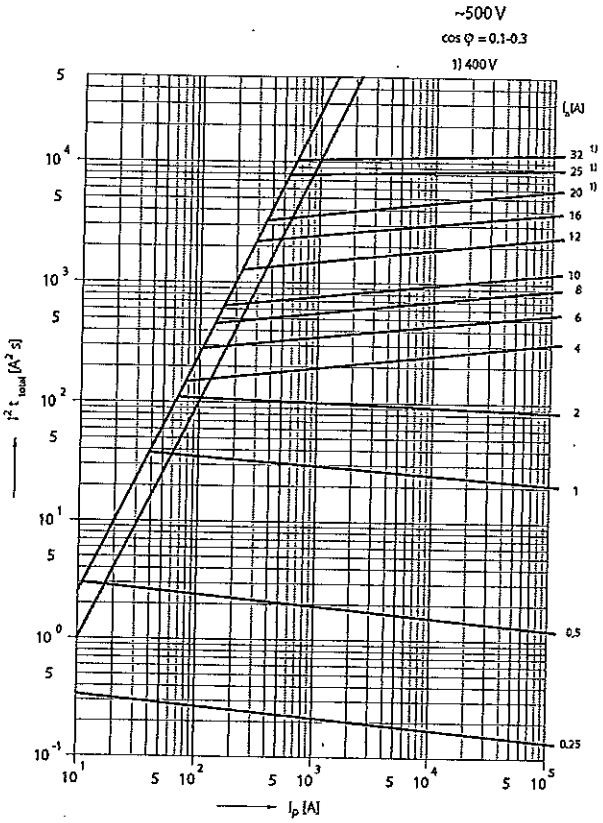
Characteristics

Cut-off characteristic
PV10, 14, 22 aM

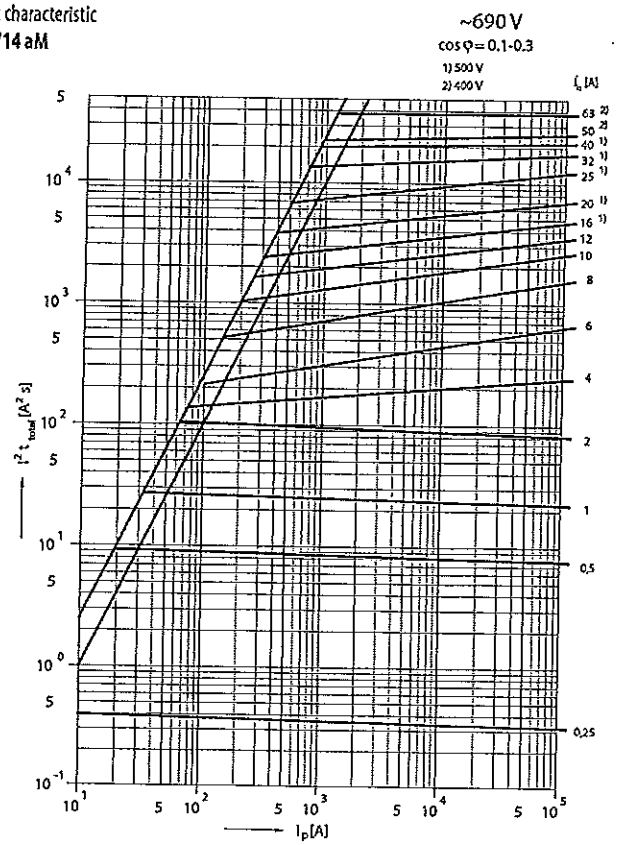
PV10 20 ÷ 32 A for 400 V a.c. PV22 125 A for 400 V a.c.
PV14 50 a 63 A for 400 V a.c. PV22 16 ÷ 50 A for 690 V a.c.
PV14 0.25 ÷ 12 A for 690 V a.c.



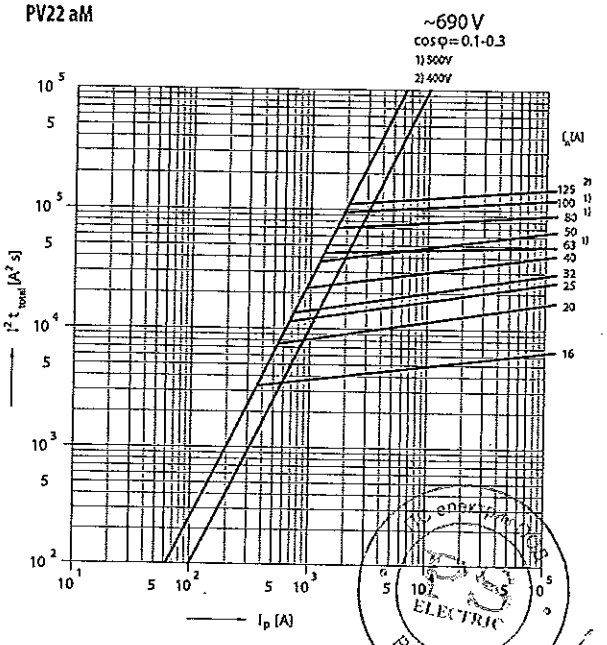
I^2t characteristic
PV10 aM



I^2t characteristic
PV14 aM



I^2t characteristic
PV22 aM



Приложение 25

OEZ

ES PROHLÁŠENÍ O SHODĚ / *CE DECLARATION OF CONFORMITY*

Číslo / *No.* : 502300/1210

My / *We*, **OEZ s.r.o.**
Šedivská 339, 561 51 Letohrad, Česká republika

prohlašujeme na svou výlučnou odpovědnost, že
declare on our own responsibility that

Výrobek: Odpínače válcových pojistek velikosti 10x38
Product: Fuse switch-sdisconnectors for cylindrical fuse-links size 10x38

Typ / *Type*: OPVA10

Příslušenství / *Accessory*:

je ve shodě s následujícími normami:
complies with the following standards:

České normy / *Czech standards*	**Evropské normy** / *European standards*
ČSN EN 60947-1:08ed.4 +A1:11 ČSN EN 60947-3:10ed.3	EN 60947-1:07 EN 60947-3:09

a následujícími nařízeními vlády, ve znění pozdějších předpisů (NV)
and the following government regulations (NV), as amended

NV 17/2003 Sb. v platném znění	2006/95/ES - including amendments

Elektrotechnický zkušební ústav, Pod Lisem 129, 171 02 Praha 71, Česká republika
zkoušel / certifikoval daný výrobek a vydal:
tested / certified the product and issued:

EZU Certifikát / *EZU Certificate*: 1120754 ze dne 29.09.2012
EZÚ zkušební protokol / *EZU test report*: 204265-01/01 ze dne 21.09.2012

Poslední dvojčíslí roku, v němž bylo označení CE na výrobek umístěno: 12
Last two digits of the year in which the CE mark was placed on the product:

Místo vydání: **Letohrad**
Place of issue:

Datum vydání: **08.10.2012**
Date of issue:

Zástupce výrobce a podpis: **Ing. Roman Schiffer**
Manufacturer's representative and signature:

Funkce: **generální ředitel**
Position: *general director*

OEZ
OEZ s.r.o.
Šedivská 339, Letohrad 561 51
Česká republika
IČO: 49810146, DIČ: CZ49810146

ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Превод от английски език

ОЕЗ АД
Шедивска 339, 561 51 Летохрад, Чешка република

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ
№ 502300/1210

Ние, **ОЕЗ АД**, с адрес: Шедивска 339, 561 51 Летохрад, Чешка република, декларираме на наша собствена отговорност, че

Продуктът **Разединител - предпазител за цилиндрични стояеми вложки размер 10x38**

Тип **OPVA10**

Аксесоари:

Съответства на следните стандарти:

Чешки стандарт	Европейски стандарт
CSN EN 60947-1:08 ed.4+A1:11 CSN EN 60947-3:10 ed.3	EN 60947-1:07 EN 60947-3:09

И на следните държавни наредби (NV) и измененията към тях

NV17/2003 Sb. - включително измененията	2006/95/ES - включително измененията

EЗУ (Дружество за електротехнически изпитания) с адрес: Под Листем 129, 171 02 Прага 71, Чешка република, удостовери продукта и издаде:

Сертификат № 1120754 от дата 29.09.2012 г.
Изпитателен протокол № 204265-01/01 от дата 21.09.2012 г.

Последните две цифри от годината, в която е поставен знакът ЕС върху продукта: 12

Място на издаване: Летохрад/ дата на издаване: 08.10.2012 г.
Представител на производителя: инж. Роман Шифер, генерален директор (подпис)
ОЕЗ АД с адрес: Шедивска 339, 561 51 Летохрад, Чешка република

ПС електрик ООД
PS ELECTRIC
BULGARIA

ВЯРНО С ОРИГИНАЛА

OEZ

ES PROHLÁŠENÍ O SHODĚ / *CE DECLARATION OF CONFORMITY*

Číslo / *No.* : 493200/1210

My / *We,* **OEZ s.r.o.**
Šedivská 339, 561 51 Letohrad, Česká republika

prohlašujeme na svou výlučnou odpovědnost, že
declare on our own responsibility that

Výrobek: Pojistkové vložky
Product: Fuse-links

Typ / *Type*: PVA

Příslušenství / *Accessory*:

je ve shodě s následujícími normami:
complies with the following standards:

České normy / *Czech standards*	**Evropské normy** / *European standards*
ČSN EN 60269-1:08ed.3 ČSN 354701-2:11ed.2	EN 60269-1:07 HD 60269-2:10

a následujícími nařízeními vlády, ve znění pozdějších předpisů (NV)
and the following government regulations (NV), as amended

NV 17/2003 Sb. v platném znění	2006/95/ES - including amendments

Elektrotechnický zkušební ústav, Pod Lisem 129, 171 02 Praha 71, Česká republika
zkoušel / certifikoval daný výrobek a vydal:
tested / certified the product and issued:

EZU Certifikát / *EZU Certificate*: 1120633 ze dne 14.8.2012
EZÚ zkušební protokol / *EZU test report*: 203275-01/01 ze dne 30.07.2012

Poslední dvojčíslí roku, v němž bylo označení CE na výrobek umístěno: 12
Last two digits of the year in which the CE mark was placed on the product:

Místo vydání: **Letohrad**
Place of issue:

Datum vydání: **08.10.2012**
Date of issue:

Zástupce výrobce a podpis: **Ing. Roman Schiffer**
Manufacturer's representative and signature:

Funkce: **generální ředitel**
Position: *general director*

OEZ
OEZ s. r. o.
Šedivská 339, Letohrad 561 51
Česká republika
IČO: 49810146, DIČ: CZ49810146

ПС електрик ЕООД ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Превод от английски език

ОЕЗ АД
Шедивска 339, 561 51 Летохрад, Чешка република

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ
№ 493200/1210

Ние, **ОЕЗ АД**, с адрес: Шедивска 339, 561 51 Летохрад, Чешка република, декларираме на наша собствена отговорност, че

Продуктът **Стопяем предпазител**

Тип **PVA**

Аксесоари:

Съответства на следните стандарти:

Чешки стандарт	Европейски стандарт
CSN EN 60269-1:08 ed.3 CSN 354701-2:11 ed.2	EN 60269-1:07 HD 60269-2:10

И на следните държавни наредби (NV) и измененията към тях

NV17/2003 Sb. - включително измененията	2006/95/ES - включително измененията

ЕЗУ (Дружество за електротехнически изпитания) с адрес: Под Листем 129, 171 02 Прага 71, Чешка република, удостовери продукта и издаде:

Сертификат № 1120633 от дата 14.08.2012 г.
Изпитателен протокол № 203275-01/01 от дата 30.07.2012 г.

Последните две цифри от годината, в която е поставен знакът ЕС върху продукта: 12

Място на издаване: Летохрад/ дата на издаване: 08.10.2012 г.
Представител на производителя: инж. Роман Шифер, генерален директор (подпис)
ОЕЗ АД с адрес: Шедивска 339, 561 51 Летохрад, Чешка република

ПС електрик ООД
PS ELECTRIC
BULGARIA

ВЯРНО С ОРИГИНАЛА

Приложение 26

Ref. Certif. No.

CZ-1823

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

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

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product Produit	Low-voltage fuses
Name and address of the applicant Nom et adresse du demandeur	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic
Name and address of the manufacturer Nom et adresse du fabricant	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic
Name and address of the factory Nome et adresse de l'usine	OEZ s. r. o. Šedivská 339, 561 51 Letohrad, Czech Republic
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	500 V; 2, 4, 6, 8, 10, 12, 16, 20, 25, 32 A
Trademark (if any) Marque de fabrique (si elle existe)	
Model / Type Ref. Ref. De type	PV10 gG Cd/Pb free
Additional information (if necessary) Information complémentaire (si nécessaire)	

A sample of the product was tested and found to be in conformity with
Un échantillon de ce produit a été essayé et a été considéré conforme à la

PUBLICATION	EDITION
IEC 60269-1	1998+A1:2005
IEC 60269-2	1986+A1:1995+A2:2001
IEC 60269-2-1	2004

As shown in the Test Report Ref. No. which forms part of this Certificate
Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat

702102-01/01 of: 03.08.2007

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

Elektrotechnický zkušební ústav, s.p.
Pod Lisem 129, 171 02 Praha 8 – Troja
Czech Republic

Date: 7.8.2007

ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV - POD LISEM 129 - PRAHA - TROJA

Signature: Pavel Kudrna
Certification and Inspection Manager

ПС електрик ЕООД BULGARIA

ВЯРНО С ОРИГИНАЛА

Issued 2001-12

CES/CZ-1823

702102-01

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

Report	
Reference No.	702102-01/01
Tested by (+ signature)	Klípa
Approved by (+ signature)	Hlavatý
Date of issue	03.08. 2007
Contents	78 pages
Oscillograms	85, page 36 - 78
Testing laboratory	
Name	Elektrotechnický zkušební ústav
Address	Pod Lisem 129 , 171 02 Praha 8 - Troja , Czech Republic
Testing location	as above
Client	
Name	OEZ s.r.o.
Address	Šedivská 339, 56151 Letohrad, Czech Republic
Test specification	
Standard	IEC 60269-1:98 3rd ed.+Amd1:05; IEC 60269-2:86 2nd ed. +Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.
Test procedure	CB-scheme
Procedure deviation	N.A.
Non-standard test method	N.A.
Test item	
Description	**Low-voltage fuses**
Trademark	OEZ.
Model and/or type reference	**PV10 gG Cd/Pb free**
Manufacturer	**OEZ s.r.o.**
Rating(s)	**500V / 2, 4, 6, 8, 10, 12, 16, 20, 25, 32A**
Test case verdicts	
Test case does not apply to the test object	N(.A.)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)

ПС електрик СОФ ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

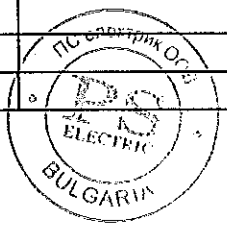
LOW-VOLTAGE FUSE; NH-SYSTEM

IEC 60269 Test sequence

Number of CB-Test report	Type	Rated current (A)	Rated voltage (V)	Rated breaking capacity (kA)	Size	Table
	PV10 gG	**2**	**500**	**120**	**10x38**	**7B**
	PV10 gG	**4**	**500**	**120**	**10x38**	**7A**
	PV10 gG	**6**	**500**	**120**	**10x38**	**7A**
	PV10 gG	**8**	**500**	**120**	**10x38**	**7B**
	PV10 gG	**10**	**500**	**120**	**10x38**	**7C**
	PV10 gG	**12**	**500**	**120**	**10x38**	**7A**
	PV10 gG	**16**	**500**	**120**	**10x38**	**7B**
	PV10 gG	**20**	**500**	**120**	**10x38**	**7A**
	PV10 gG	**25**	**500**	**120**	**10x38**	**7A**
	PV10 gG	**32**	**500**	**100**	**10x38**	**7A**

Type listing

Rated current (A)	Type	Type	Type	Type



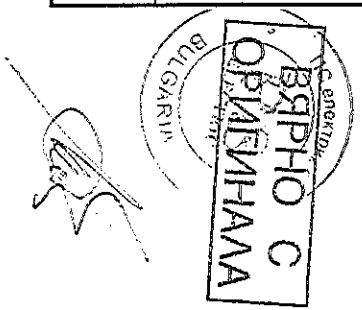
ВЯРНО С ОРИГИНАЛА

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 2A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page - 5 / 78 - **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.5 No1	Breaking capacity (I1)	11	129	558	125	0,16	46	0,620		640	46	0,01	0,12			27DS044	P	∞ MΩ
		12	130	558	125	0,16	86	0,623		916	86	0,01	0,15			27DS045	P	∞ MΩ
		13	137	558	125	0,16	84	0,494		803	84	0,01	0,10			27DS046	P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	14	140	192	0,013	0,26	0							3,10		98645	P	∞ MΩ
		15	141	192	0,013	0,26	0							2,89		98646	P	∞ MΩ
		16	131	320	0,066	0,25	7								3,66	98651	P	∞ MΩ
		17	131	328	0,066	0,25	0								3,61	98652	P	∞ MΩ
8.9.2	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 4A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 7 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 9
8.1.5.1	Resistance (R_i)	1-23							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 7, 8
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	**54,0**	**10**	**4**	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 22°C; Conventional time 1 h	P	P_n = 1,17W ΔT = 16K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	**54,0**	**10**	**6**	-		**> 3600**	not operate within the conventional time 1h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	**49,5**	**10**	**8,4**	-		**1140**	operate within the conventional time 1.h	P	
8.4.3.2	Rated current	3	**53,8**	**10**	**6**	-		**> 3600**	100 h pulse test; test current 1,05 x I_n **4,2 A** ; on 1 h/ off 0,1 x 1h, after the test conventional non-fusing current (I_{nf}) **6 A**; conventional time 1h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	**51,3**	**10**	**7,8**	-	**>4200**		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	**52,0**	**200**	**18,5**	-	**0,062**		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	**51,0**	**200**	**14**	-	**0,144**		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	**51,5**	**200**	**47**	-	**0,008**		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	**50,8**	**10**	**8,6**	-	**390**		50 pulses; test current equal to 0,8 x **10,8** A stated for a pre-arcing time of 5 s	P	
		9	**52,0**	**10**	**8,6**	-	**420**		on - 5 s / off - 0,2 x 1 h of the conventional time; current **8,6** A equal to	P	
		10	**53,0**	**10**	**8,6**	-	**360**		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	



EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 4A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 8 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Verdict	Result-Remark Remark
8.5 No.	Breaking capacity (I_1)	11	55,0	558	125	0,16	84	0,802		1104	85	0,03	0,04			27DS041	P	∞ MΩ
		12	54,5	558	125	0,16	83	0,591		1104	84	0,03	0,04			27DS042	P	∞ MΩ
		13	54,0	558	125	0,16	46	0,627		1100	46	0,01	0,04			27DS043	P	∞ MΩ
8.5 No 2	Breaking capacity (I_2)	14	52,5	552	0,124	0,26	0		0,122	2416	69	3,90	6,67			98527	P	∞ MΩ
		15	52,2	560	0,124	0,26	0		0,121	2404	69	3,87	6,87			98528	P	∞ MΩ
		16	52,0	552	0,124	0,26	1		0,121	2528	72	3,97	6,70			98529	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	17	52,0	552	0,026	0,38							0,037 s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	18	52,5	560	0,020	0,40							0,070 s				P	∞ MΩ
8.5 No 5	Breaking capacity (I_5)	19	52,0	556	0,012	0,41							0,480 s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	20	53,8	288	0,034	0,29	3							19,27		98648	P	∞ MΩ
		21	54,0	288	0,034	0,29	1							17,66		98649	P	∞ MΩ
		22	50,0	328	0,130	0,27	5								24,91	98661	P	∞ MΩ
		23	53,3	328	0,130	0,27	4								26,15	98662	P	∞ MΩ
8.9	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 4A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 9 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 4A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.5**	**37.5**	**37.7**	**P**	
				Dimension marking b	max 10,5	**9.1**	**9.4**	**9.1**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.2**	**10.2**	**P**	
				Dimension marking d	min 6	**10.2**	**10.2**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

ВЯРНО С ОРИГИНАЛА

BULGARIA ELECTRIC ПС електрик ООД

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 6A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 10 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	**P**	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	**P**	see page 12
8.1.5.1	Resistance (R_i)	1-23							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	**P**	see page 10, 11
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	**23,3**	**10**	**6**	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: **20°C**; Conventional time **1 h**	**P**	P_n = 0,88W ΔT = 13K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	**23,3**	**10**	**9**	-		**> 3600**	not operate within the conventional time **1h**	**P**	
8.4.3.1b)	Conv. fusing current (I_f)	2	**19,0**	**10**	**11,4**	-		**780**	operate within the conventional time **1.h**	**P**	
8.4.3.2	Rated current	3	**20,0**	**10**	**9**	-		**> 3600**	100 h pulse test; test current 1,05 x I_n **6,3A** ; on **1** h/ off 0,1 x **1h**, after the test conventional non-fusing current (I_{nf}) **9 A**; conventional time **1h**	**P**	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	**19,0**	**10**	**11**	-	**>4200**		Testing current of Table 3, column 2; operating time > 10 s	**P**	
	„ b) I_{max} (5 s)	5	**19,0**	**200**	**28**	-	**0,86**		„ „ „ 3, „ 3 operate within ≤ 5 s	**P**	
	„ c) I_{min} (0,1 s)	6	**19,2**	**200**	**26**	-	**1,18**		„ „ „ 3, „ 4 operating time > 0,1 s	**P**	
	„ d) I_{max} (0,1 s)	7	**19,3**	**200**	**72**	-	**0,015**		„ „ „ 3, „ 5 operate within ≤ 0,1 s	**P**	
8.4.3.4	Overload	8	**19,3**	**10**	**16,0**	-	**40**		50 pulses; test current equal to 0,8 x **20** A stated for a pre-arcing time of 5 s	**P**	
		9	**19,7**	**10**	**16,0**	-	**38**		on - 5 s / off - 0,2 x **1** h of the conventional time; current **16,0** A equal to	**P**	
		10	**19,8**	**10**	**16,0**	-	**42**		current for the overload test; pre-arcing time of sample lies within stated zone	**P**	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	**N**	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 6A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 11 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Verdict	Result-Remark Remark
																	Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ**	
8.5 No	Breaking capacity (I_1)	11	19,3	558	125	0,16	46	1,592		803	46	0,01	4,60			27DS038	P	∞ MΩ
		12	19,3	558	125	0,16	84	1,859		1167	85	0,03	2,74			27DS039	P	∞ MΩ
		13	19,5	558	125	0,16	84	1,788		929	84	0,02	2,42			27DS040	P	∞ MΩ
8.5 No 2	Breaking capacity (I_2)	14	19,7	552	0,210	0,27	1		0,209	1408	73	4,13	8,80			98519	P	∞ MΩ
		15	19,7	552	0,210	0,27	0		0,190	1400	71	4,00	8,90			98520	P	∞ MΩ
		16	19,7	552	0,210	0,27	0		0,211	1272	70	3,93	9,23			98521	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	17	19,3	552	0,036	0,37							0,191s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	18	19,7	552	0,026	0,38							0,988 s				P	∞ MΩ
8.5 No 5	Breaking capacity (I_5)	19	19,3	552	0,015	0,4							43,3s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	20	20,0	328	0,066	0,25	5							51,04		98653	P	∞ MΩ
		21	20,8	328	0,066	0,25	2							53,49		98654	P	∞ MΩ
		22	18,8	328	0,221	0,23	8								72,02	98671	P	∞ MΩ
		23	18,8	328	0,221	0,23	7								69,08	98672	P	∞ MΩ
8.9.2	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 6A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.5**	**37.7**	**P**	
				Dimension marking b	max 10,5	**9.2**	**9.4**	**9.1**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 8A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page **- 13 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 15
8.1.5.1	Resistance (R_i)	1-23							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 13, 14
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	13,6	10	8,0	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 20°C; Conventional time 1 h	P	P_n = 1,04W ΔT = 18K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	13,6	10	12,0	-		> 3600	not operate within the conventional time 1h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	12,5	10	15,2	-		840	operate within the conventional time 1.h	P	
8.4.3.2	Rated current	3	13,1	10	12	-		> 3600	100 h pulse test; test current 1,05 x I_n 8,4A ; on 1 h/ off 0,1 x 1h, after the test conventional non-fusing current (I_{nf}) 12 A; conventional time 1h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	12,8	10	16,0	-	600		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	12,9	200	35,2	-	1,91		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	13,0	200	41,6	-	0,61		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	12,8	200	92,0	-	0,013		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	12,8	10	25,0	-	20		50 pulses; test current equal to 0,8 x 31 A stated for a pre-arcing time of 5 s	P	
		9	13,3	10	25,0	-	18		on - 5 s / off - 0,2 x 1 h of the conventional time; current 25 A equal to	P	
		10	13,5	10	25,0	-	24		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 8A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page **- 14 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.5 No	Breaking capacity (I_1)	11	13,3	562	125	0,16	84	2,059		1217	85	0,04	2,77			27DS035	P	∞ MΩ
		12	13,3	558	125	0,16	83	2,059		1217	84	0,04	2,11			27DS036	P	∞ MΩ
		13	13,4	558	125	0,16	46	1,392		1029	46	0,01	3,89			27DS037	P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	14	13,5	328	0,096	0,23	4							69,63		98658	P	∞ MΩ
		15	13,6	328	0,096	0,23	0							69,99		98659	P	∞ MΩ
		16	12,6	328	0,315	0,24	4								93,50	98679	P	∞ MΩ
		17	12,6	328	0,315	0,24	10								96,98	98680	P	∞ MΩ

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 8A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page **- 15 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 8A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.6**	**37.7**	**P**	
				Dimension marking b	max 10,5	**9.2**	**9.4**	**9.1**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.2**	**10.3**	**P**	
				Dimension marking d	min 6	**10.2**	**10.2**	**10.3**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

ВЯРНО С ОРИГИНАЛА

ЕС ЕЛЕКТРИК ООД BULGARIA

	Type of fuse: **HRC-fuse ; Type PV10 gG ; 10A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7C**	**CB** page **- 16 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7C** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
8.1	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 18
8.1.5.1	Resistance (R_i)	1-11							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 16, 17
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	**10,4**	**10**	**10**	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: **20**°C; Conventional time **1** h	P	**P_n = 1,29W** **ΔT = 20K**
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	**10,4**	**10**	**15**	-		**> 3600**	not operate within the conventional time **1**h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	**9,45**	**10**	**19**	-		**600**	operate within the conventional time **1**.h	P	
8.4.3.2	Rated current	3	**10,2**	**10**	**15**	-		**> 3600**	100 h pulse test; test current 1,05 x I_n **10,5A** ; on **1** h/ off 0,1 x **1**h, after the test conventional non-fusing current (I_{nf}) **15 A**; conventional time **1**h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	**9,80**	**10**	**22**	-	**208**		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	**9,90**	**200**	**46**	-	**0,83**		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	**9,75**	**200**	**58**	-	**0,22**		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	**9,75**	**200**	**110**	-	**0,023**		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	

ВЯРНО С ОРИГИНАЛА

	Type of fuse: **HRC-fuse ; Type PV10 gG ; 10A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7C**	**CB** page **- 17 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7C** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.7.4	Overcurrent discrimination(I^2t-Wert)	**8**	**10,4**	**328**	**0,130**	**0,27**	**3**							**121,86**		**98663**	**P**	**∞ MΩ**
		9	**10,4**	**328**	**0,130**	**0,27**	**2**							**123,57**		**98664**	**P**	**∞ MΩ**
		10	**9,60**	**328**	**0,404**	**0,25**	**8**								**175,38**	**98682**	**P**	**∞ MΩ**
		11	**9,65**	**320**	**0,404**	**0,25**	**7**								**178,13**	**98683**	**P**	**∞ MΩ**

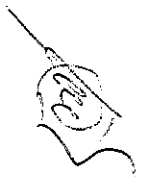
	Type of fuse: **HRC-fuse ; Type PV10 gG ; 10A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7C**	**CB** page **- 18 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7C** **Checked by: J,. Hlavatý** **Dated:03.08.07**

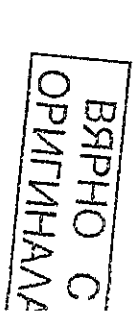
Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 10A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.6**	**37.7**	**P**	
				Dimension marking b	max 10,5	**9.2**	**9.4**	**9.2**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

ВЯРНО С ОРИГИНАЛА

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 12A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 19 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 21
8.1.5.1	Resistance (R_i)	1-23							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 19, 20
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	8,04	10	12,0	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 20°C; Conventional time 1 h	P	P_n = 1,48k W ΔT = 23K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	8,04	10	18,0	-		> 3600	not operate within the conventional time 1h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	7,17	10	22,8	-		480	operate within the conventional time 1.h	P	
8.4.3.2	Rated current	3	7,83	10	18	-		> 3600	100 h pulse test; test current 1,05 x I_n 12,6A ; on 1 h/ off 0,1 x 1h, after the test conventional non-fusing current (I_{nf}) 18 A; conventional time 1h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	7,54	10	24	-	193		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	8,04	200	55,2	-	1,18		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	7,25	200	69,6	-	0,316		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	7,71	200	140,4	-	0,021		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	7,33	10	36,0	-	22		50 pulses; test current equal to 0,8 x 45 A stated for a pre-arcing time of 5 s	P	
		9	7,50	10	36,0	-	20		on - 5 s / off - 0,2 x 1 h of the conventional time; current 36 A equal to	P	
		10	7,67	10	36,0	-	23		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	





EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 12A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 20 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Verdict	Result-Remark Remark
8.5 No 1	Breaking capacity (I_1)	11	7,33	558	125	0,16	48	2,647		1067	49	0,06	4,94			27DS031	P	∞ MΩ
		12	7,33	558	125	0,16	86	3,039		1406	87	0,04	3,06			27DS032	P	∞ MΩ
		13	7,33	558	125	0,16	85	3,000		1343	86	0,04	3,18			27DS033	P	∞ MΩ
8.5 No 2	Breaking capacity (I_2)	14	7,58	560	0,471	0,27	0		0,462	1520	62	3,47	8,63			98503	P	∞ MΩ
		15	7,58	560	0,471	0,27	1		0,472	1544	61	3,50	8,47			98504	P	∞ MΩ
		16	7,54	560	0,471	0,27	1		0,462	1504	59	3,37	8,57			98505	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	17	7,83	552	0,074	0,4							0,231 s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	18	7,29	552	0,050	0,48							1,78 s				P	∞ MΩ
8.5 No 5	Breaking capacity(I_5)	19	7,29	556	0,032	0,38							30,4 s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	20	7,88	328	0,175	0,26	5							220,17		98668	P	∞ MΩ
		21	7,83	320	0,175	0,26	0							220,73		98669	P	∞ MΩ
		22	7,21	328	0,451	0,25	11								316,63	98689	P	∞ MΩ
		23	7,21	328	0,451	0,25	6								315,05	98690	P	∞ MΩ
8.9.2	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

ОРИГИНАЛ

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 12A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 21 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 12A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.7**	**37.6**	**37.6**	**P**	
				Dimension marking b	max 10,5	**9.5**	**9.4**	**9.2**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.3**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.3**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.3**	**1.2**	**1.3**	**P**	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 16A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page **- 22 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	R_i mΩ	Test-voltage V (AC)	Test-current A	cosφ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark) Verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 24
8.1.5.1	Resistance (R_i)	1-17							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 22 , 23
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	5,69	10	16	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 24°C; Conventional time 1 h	P	P_n=1,86W ΔT = 25K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	5,69	10	20	-		> 3600	not operate within the conventional time 1 h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	5,25	10	25,6	-		780	operate within the conventional time 1 h	P	
8.4.3.2	Rated current	3	5,63	10	20	-		> 3600	100 h pulse test; test current 1,05 x I_n, 16,8 A; on 1 h/ off 0,1 x 1 h, after the test conventional non-fusing current (I_{nf}) 20A; conventional time 1 h	P	
8.4.3.3.2	Gate a) I_{min} (10 s)	4	5,47	10	33	-	87		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	5,44	200	65	-	2,05		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	5,56	200	85	-	0,52		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	5,53	200	150	-	0,032		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	5,38	10	46,0	-	15		50 pulses; test current equal to 0,8 x 57,0 A stated for a pre-arcing time of 5 s	P	
		9	5,38	10	46,0	-	14		on - 5 s / off - 0,2 x 1 h of the conventional time; current 46,0 A equal to	P	
		10	5,42	10	46,0	-	16		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 16A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** page **- 23 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.5 No I	Breaking capacity (I_1)	11	5,63	558	125	0,16	85	3,490		1368	86	0,06	3,51			27DS028	P	∞ MΩ
		12	5,63	558	125	0,16	86	3,608		1368	87	0,06	3,39			27DS029	P	∞ MΩ
		13	5,75	558	125	0,16	48	3,294		1104	49	0,08	5,19			27DS030	P	∞ MΩ
8.7.4	overcurrent discrimination (I^2t-Wert)	14	5,56	328	0,278	0,24	2							448,24		99982	P	∞ MΩ
		15	5,56	320	0,278	0,24	0							429,26		99983	P	∞ MΩ
		16	5,25	320	0,544	0,23	3								761,03	99977	P	∞ MΩ
		17	5,31	320	0,544	0,23	5								752,26	99978	P	∞ MΩ

ВЯРНО С ОРИГИНАЛА

ЕС електрик ООД BULGARIA ELECTRIC

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 16A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7B**	**CB** **Ref. No.: 702102-01/01** **Table No: 7B** **Checked by: J,. Hlavatý**	page - 24 / 78 - **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 16 A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.5**	**37.6**	**P**	
				Dimension marking b	max 10,5	**9.5**	**9.4**	**9.3**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

ВЯРНО С ОРИГИНАЛА

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 20A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 25 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 27
8.1.5.1	Resistance (R_i)	1-23							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 25, 26
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	4,33	10	20	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 24°C; Conventional time 1 h	P	P_n = 2,2 W ΔT = 33K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	4,33	10	25	-		> 3600	not operate within the conventional time 1h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	3,95	10	32	-		480	operate within the conventional time 1.h	P	
8.4.3.2	Rated current	3	4,20	10	25	-		> 3600	100 h pulse test; test current 1,05 x I_n 21A ; on 1 h/ off 0,1 x 1h, after the test conventional non-fusing current (I_{nf}) 25 A; conventional time 1h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	4,18	10	42	-	56		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	3,90	200	85	-	2,64		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	4,03	200	110	-	0,27		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	4,05	200	200	-	0,038		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	4,00	10	56,0	-	15		50 pulses; test current equal to 0,8 x 70,0 A stated for a pre-arcing time of 5 s	P	
		9	4,03	10	56,0	-	16		on - 5 s / off - 0,2 x 1 h of the conventional time; current 56,0 A equal to	P	
		10	4,03	10	56,0	-	15		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.6	Indicating devices								Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	

EZU Testing and Certification - Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 20A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 26 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.5 No-1	Breaking capacity (I_1)	11	3,90	558	125	0,16	48	4,157		1155	50	0,09	4,68			27DS025	P	∞ MΩ
		12	3,90	558	125	0,16	87	4,628		1443	88	0,08	2,19			27DS026	P	∞ MΩ
		13	3,95	558	125	0,16	85	4,588		1418	86	0,07	2,58			27DS027	P	∞ MΩ
8.5 No-2	Breaking capacity (I_2)	14	3,98	560	0,993	0,24	0		0,908	1384	68	3,80	7,70			99989	P	∞ MΩ
		15	3,98	560	0,993	0,24	3		0,896	1328	68	3,63	7,37			99990	P	∞ MΩ
		16	4,00	560	0,993	0,24	4		0,900	1272	69	3,63	7,70			99991	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	17	4,03	560	0,117	0,43							0,221 s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	18	4,10	552	0,075	0,4							1,54 s				P	∞ MΩ
8.5 No 5	Breaking capacity(I_5)	19	4,18	558	0,044	0,38							59,3 s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	20	4,00	320	0,408	0,24	1							740,98		99980	P	∞ MΩ
		21	4,03	320	0,408	0,24	4							748,83		99981	P	∞ MΩ
		22	3,95	344	0,793	0,28	6								1263,84	99972	P	∞ MΩ
		23	4,00	336	0,793	0,28	5								1236,53	99973	P	∞ MΩ
8.9.2	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 20 A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.5**	**37.6**	**P**	
				Dimension marking b	max 10,5	**9.5**	**9.4**	**9.3**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.2**	**1.2**	**1.3**	**P**	

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД BULGARIA ELECTRIC

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 25A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 28 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	R_i mΩ	Test-voltage V (AC)	Test-current A	cosφ	Pre-arcing time s	Operating time s	Requirement-Test	Result-Remark) Verdict	
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 30
8.1.5.1	Resistance (R_i)	1-20							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 28, 29
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	3,14	10	25	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 24°C; Conventional time 1 h	P	P_n = 2,58W ΔT = 33K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	3,14	10	31,25	-		> 3600	not operate within the conventional time 1 h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	2,9	10	40	-		1620	operate within the conventional time 1 h	P	
8.4.3.2	Rated current	3	3,60	10	31,25	-		> 3600	100 h pulse test; test current 1,05 x I_n, 26,25 A; on 1 h/ off 0,1 x 1 h, after the test conventional non-fusing current (I_{nf}) 31,25; conventional time 1 h	P	
8.4.3.3.2	Gate a) I_{min} (10 s)	4	3,18	10	52	-	117		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	3,06	200	110	-	2,86		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	3,02	200	150	-	0,7		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	3,02	200	260	-	0,037		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	2,96	10	78,0	-	16		50 pulses; test current equal to 0,8 x 98,0 A stated for a pre-arcing time of 5 s	P	
		9	3,00	10	78,0	-	15		on - 5 s / off - 0,2 x 1 h of the conventional time; current 78,0A equal to	P	
		10	3,04	10	78,0	-	18		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.5	Conventional cable overload protection	11	3,08	10	37,7	-		1560	conductors of cross-sectional areas 2,5 mm²;	P	
		12	3,10	10	37,7	-		1320	preheated with test current I_n (25 A); time. 1 h equal to the conv. time;	P	
		13	3,12	10	37,7	-		1140	test current increased 1,45 x I_z 37,7 A; samples operated within the conv. time (1 h)	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	

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Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark: Resistance between fuse-link contacts measured after each test. Test voltage DC 500 V Resistance >1000 MΩ — Verdict	Remark
8.5 No 1	Breaking capacity (I_1)	14	3,08	558	125	0,16	76	5,333		1368	77	0,08	2,71			27DS022	P	∞ MΩ
		15	3,08	558	125	0,16	90	5,490		1418	92	0,09	2,23			27DS023	P	∞ MΩ
		16	3,08	558	125	0,16	50	4,902		1117	52	0,12	4,27			27DS024	P	∞ MΩ
8.5 No 2	Breaking capacity (I_2)	17	2,92	552	1,260	0,27	5		1,216	1376	72	3,73	7,27			1604	P	∞ MΩ
		18	2,92	552	1,260	0,27	3		1,184	1400	70	3,73	7,43			1605	P	∞ MΩ
		19	2,98	552	1,260	0,27	3		1,200	1368	68	3,67	7,17			1606	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	20	3,02	560	0,145	0,48							0, 595 s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	21	3,02	552	0,093	0,43							5,66 s				P	∞ MΩ
8.5 No 5	Breaking capacity(I_5)	22	2,98	556	0,058	0,41							104 s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	23	3,04	328	0,544	0,23	4							1399,3		99975	P	∞ MΩ
		24	3,04	320	0,544	0,23	1							1255,4		99976	P	∞ MΩ
		25	2,96	344	1,010	0,26	5								1967,3	99964	P	∞ MΩ
		26	2,96	344	1,010	0,26	8								1986,9	99965	P	∞ MΩ
8.9.[illegible]	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) ....N													N	
8.[illegible].3	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 25A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 30 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 25A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.7**	**37.4**	**P**	
				Dimension marking b	max 10,5	**9.3**	**9.4**	**9.7**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.3**	**10.3**	**10.2**	**P**	
				Dimension marking d	min 6	**10.3**	**10.3**	**10.2**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.3**	**1.2**	**1.3**	**P**	

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 32A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** table 7A	**CB** page **- 31 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test-sequence	Samples No	R_i mΩ	Test-voltage V (AC)	Test current A	cos φ	Pre-arcing time s	Operating time s	Requirement-Test	verdict	Result-Remark
6	Marking	1							The marking of the rated voltage/rated current /size discernible from the front	P	see page 34
8.1.4	Dimension	1-3							Fig. 1(III) Size 10 x 38	P	see page 33
8.1.5.1	Resistance (R_i)	1-26							Measuring current ≤ 0,1 I_n ; Ambient air temperature 20 ± 5°C	P	see page 31, 32
8.3	Power dissipation (P_n) / / temperature rise (ΔT)	1	1,97	10	32	-			Tab. M and Fig. 1(III) (60269-2-1), P_n = max 3 W, Ambient air temperature: 24°C; Conventional time 1 h	P	P_n = 2,54 W ΔT = 36K
8.4.3.1a)	Conv. non-fusing current (I_{nf})	1	1,97	10	40	-		> 3600	not operate within the conventional time 1h	P	
8.4.3.1b)	Conv. fusing current (I_f)	2	1,86	10	51,2	-		1560	operate within the conventional time 1.h	P	
8.4.3.2	Rated current	3	1,88	10	40	-		> 3600	100 h pulse test; test current 1,05 x I_n 33,6A ; on 1 h/ off 0,1 x 1h, after the test conventional non-fusing current (I_{nf}) 40 A; conventional time 1h	P	
8.4.3.3.1	Gate a) I_{min} (10 s)	4	1,94	10	75	-	84		Testing current of Table 3, column 2; operating time > 10 s	P	
	„ b) I_{max} (5 s)	5	1,91	200	150	-	3,0		„ „ „ 3, „ 3 operate within ≤ 5 s	P	
	„ c) I_{min} (0,1 s)	6	2,13	200	200	-	0,58		„ „ „ 3, „ 4 operating time > 0,1 s	P	
	„ d) I_{max} (0,1 s)	7	1,92	200	350	-	0,067		„ „ „ 3, „ 5 operate within ≤ 0,1 s	P	
8.4.3.4	Overload	8	1,91	10	104	-	17		50 pulses; test current equal to 0,8 x 130 A stated for a pre-arcing time of 5 s	P	
		9	1,92	10	104	-	18		on - 5 s / off - 0,2 x 1 h of the conventional time; current 104A equal to	P	
		10	1,92	10	104	-	15		current for the overload test; pre-arcing time of sample lies within stated zone	P	
8.4.3.5	Conventional cable overload protection	11	1,97	10	50,75	-		900	conductors of cross-sectional areas 4 mm²;	P	
		12	1,95	10	50,75	-		1020	preheated with test current I_n (32 A); time. 1 h equal to the conv. time;	P	
		13	1,94	10	50,75	-		780	test current increased 1,45 x I_z 50,75 A; samples operated within the conv. time (1 h)	P	
8.4.3.6	Indicating devices	-	-						Operation of indicating device verified in combination with the verification of breaking capacity I_1 to I_5 (8.5.5)	N	

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ВЯРНО С ОРИГИНАЛА

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 32A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 32 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Sample No	R_i mΩ	Test-voltage V (AC)	Test-current kA	cos φ	Making angle after voltage zero (U_0)	i_D kA	i_S kA	Peak arc voltage V	Initiation of arcing after voltage zero (U_0)	Pre-arcing time ms	Operating time ms	Pre-arcing I^2t A^2s	Operating I^2t A^2s	Osz No	Result-Remark Resistance between fuse-link contacts measured after each test. **Test voltage DC 500 V Resistance >1000 MΩ** Verdict	Remark
8.5 No 1	Breaking capacity (I_1)	14	1,84	552	103	0,17	47	6,549		1355	50	0,18	3,73			22ES048	P	∞ MΩ
		15	1,88	555	103	0,17	84	7,137		1531	86	0,14	2,28			22ES049	P	∞ MΩ
		16	1,88	555	103	0,17	83	7,216		1544	86	0,15	2,60			22ES051	P	∞ MΩ
8.5 No 2	Breaking capacity (I_2)	17	1,91	552	1,722	0,29	5		1,808	1584		4,00	6,70			99997	P	∞ MΩ
		18	1,91	552	1,722	0,29	0		1,792	1488		4,10	6,80			99998	P	∞ MΩ
		19	1,91	552	1,722	0,29	5		1,728	1376		3,87	7,17			99999	P	∞ MΩ
8.5 N0 3	Breaking capacity (I_3)	20	1,88	552	0,179	0,31							1,21 s				P	∞ MΩ
8.5 No 4	Breaking capacity (I_4)	21	1,88	560	0,117	0,43							5,26 s				P	∞ MΩ
8.5 No 5	Breaking capacity(I_5)	22	1,89	554	0,075	0,40							108,6 s				P	∞ MΩ
8.7.4	Overcurrent discrimination(I^2t-Wert)	23	1,95	344	0,793	0,28	5							3632,9		99970	P	∞ MΩ
		24	1,95	344	0,793	0,28	2							3572,3		99971	P	∞ MΩ
		25	1,89	328	1,220	0,28	6								4939,3	99961	P	∞ MΩ
		26	1,88	320	1,220	0,28	0								4816,5	99962	P	∞ MΩ
8.9.2	Resistance to heat			Gripping-lugs; to 80°C; 2h, then loaded with 150% rated current; tensile force F_{max} (Table J) .....N													N	
8.11.1.8	Impact resistance			Gripping-lugs; the facility is given in Fig. 9; 168h to 150°C; the weight 300 g; the height 300 mm													N	
				Gripping-lugs; the facility is given in Fig. 9; 72h to -15°C; the weight 300 g; the height 300 mm													N	
8.11.2.2	Resistance to abnormal heat and fire			parts of insulating materials; glow-wire 960°C; to item a) of sub-clause 8.11.2.2.5													N	
				parts of insulating materials; glow-wire 650°C; to item b) of sub-clause 8.11.2.2.5													N	
8.11.2.4	Non-deterioration of insulating parts of fuse-link and fuse-base			for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h; Breaking capacity (I_1) to Table 12A													N	
				for equipment comprising moulded elements intended to support live parts; 150°C; 168h ;Breaking capacity (I_2) to Table 12A													N	

ОРИГИНАЛ

EZU Testing and Certification Institute	Type of fuse: **HRC-fuse ; Type PV10 gG ; 32A ; AC 500V ; Size 10x38** Made by: **OEZ Letohrad s.r.o.** **Tests according** **IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01;** **IEC 60269-2-1:04 4th ed.** **table 7A**	**CB** page **- 33 / 78 -** **Ref. No.: 702102-01/01** **Table No: 7A** **Checked by: J,. Hlavatý** **Dated:03.08.07**

Clause	Test sequence	Samples Nr	Requirement-Test	***Deviations: Type: PV10 In = 32A***					Result-Remark) Verdict	
8.1.4	Dimensions	1-3	Fig. 1(III) Size 10 x 38		Prescribed (mm)	Measured (mm)				
						Samples Nr 1	Samples Nr 2	Samples Nr 3		
				Dimension marking a	38 ± 0,6	**37.6**	**37.5**	**37.6**	**P**	
				Dimension marking b	max 10,5	**9.3**	**9.6**	**9.5**	**P**	
				Dimension marking c	10,3 ± 0,1	**10.2**	**10.3**	**10.3**	**P**	
				Dimension marking d	min 6	**10.2**	**10.3**	**10.3**	**P**	
				Dimension marking r	1,5 ± 0,5	**1.3**	**1.2**	**1.2**	**P**	

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

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ВЯРНО С ОРИГИНАЛА

PV10gG, In = 2 A, dU = 258 mV, č.11 — Záznam číslo 27DS044 ze dne 27. 4.2006

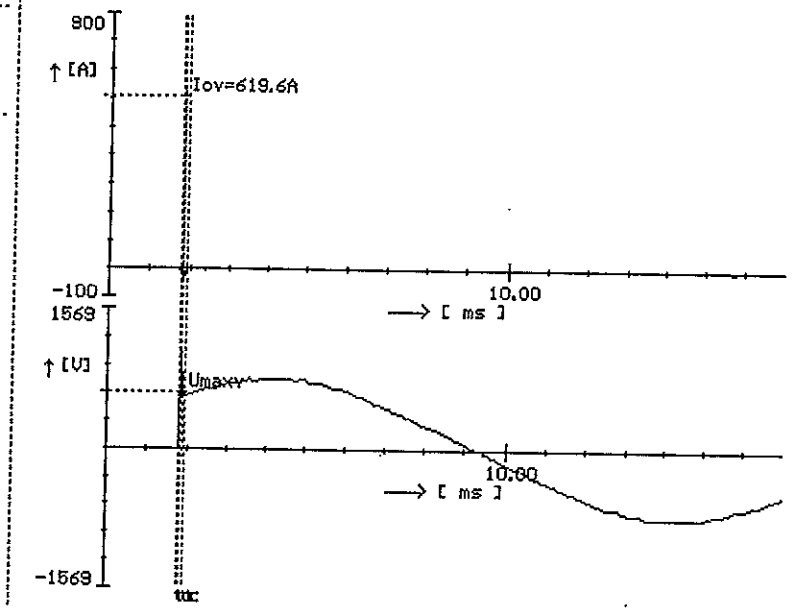
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.01	ms
tc =	0.12	ms
It =	369	A
Io =	620	A
Umax =	640	V
Uzot =	558	V
I2tt =	0.68	A2s
I2tc =	5.22	A2s
Alfa =	46	st.el.
Psi =	46	st.el.
It =	0.00 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 2 A, dU = 260 mV, č.12 — Záznam číslo 27DS045 ze dne 27. 4.2006

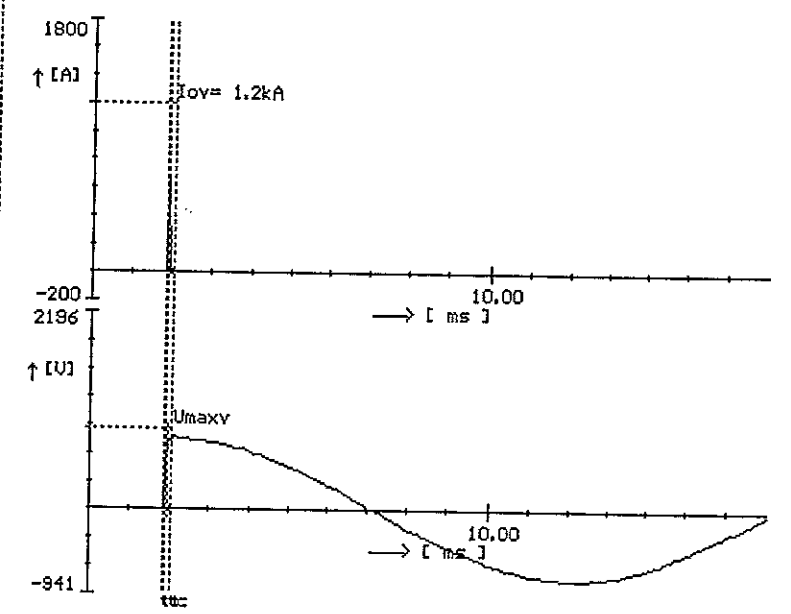
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.01	ms
tc =	0.15	ms
It =	675	A
Io =	623	A
Umax =	916	V
Uzot =	558	V
I2tt =	0.39	A2s
I2tc =	4.23	A2s
Alfa =	86	st.el.
Psi =	86	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



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ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 2 A, dU = 275 mV, č.13 Záznam číslo 27DS046 ze dne 27. 4.2006

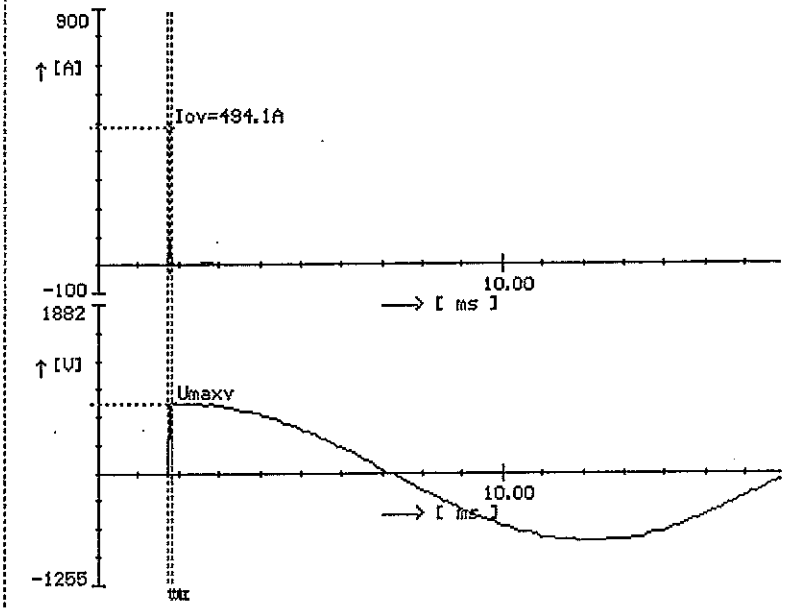
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.01	ms
tc =	0.10	ms
It =	118	A
Io =	494	A
Umax =	803	V
Uzot =	558	V
I2tt =	0.07	A2s
I2tc =	2.66	A2s
Alfa =	84	st.el.
Psi =	84	st.el.
It =	0.00 x Ip	
Ri =	9999.00	MOhm

Ii



PV10gG, In = 4 A, dU = 220 mV, č. 11 Záznam číslo 27DS041 ze dne 27. 4.2006

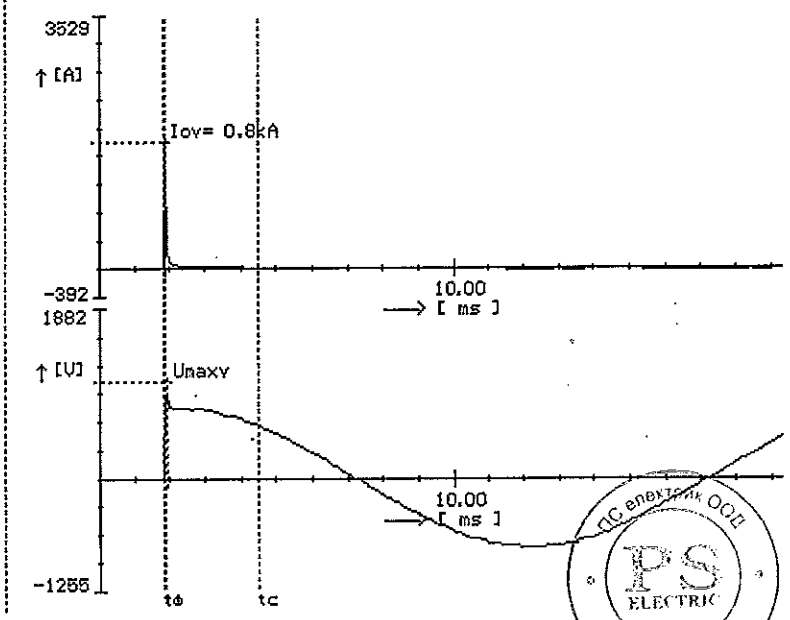
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.03	ms
tc =	0.04	ms
It =	256	A
Io =	802	A
Umax =	1104	V
Uzot =	558	V
I2tt =	0.36	A2s
I2tc =	4.92	A2s
Alfa =	84	st.el.
Psi =	85	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

Ii



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 4 A, dU = 218 mV, č.12 — Záznam číslo 27DS042 ze dne 27. 4.2006

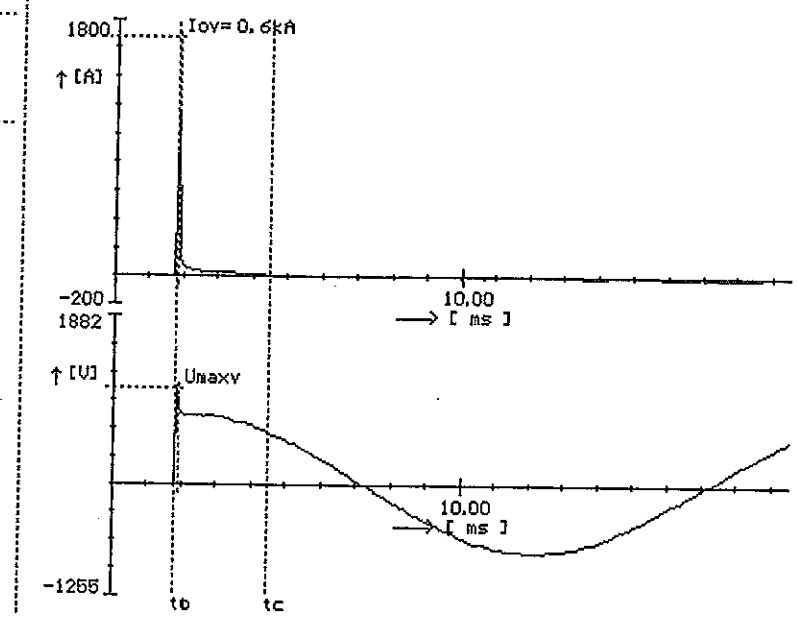
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.03	ms
tc =	0.04	ms
It =	239	A
Io =	691	A
Umax =	1104	V
Uzot =	558	V
I2tt =	0.24	A2s
I2tc =	4.39	A2s
Alfa =	83	st.el.
Psi =	84	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 4 A, dU = 216 mV, č.13 — Záznam číslo 27DS043 ze dne 27. 4.2006

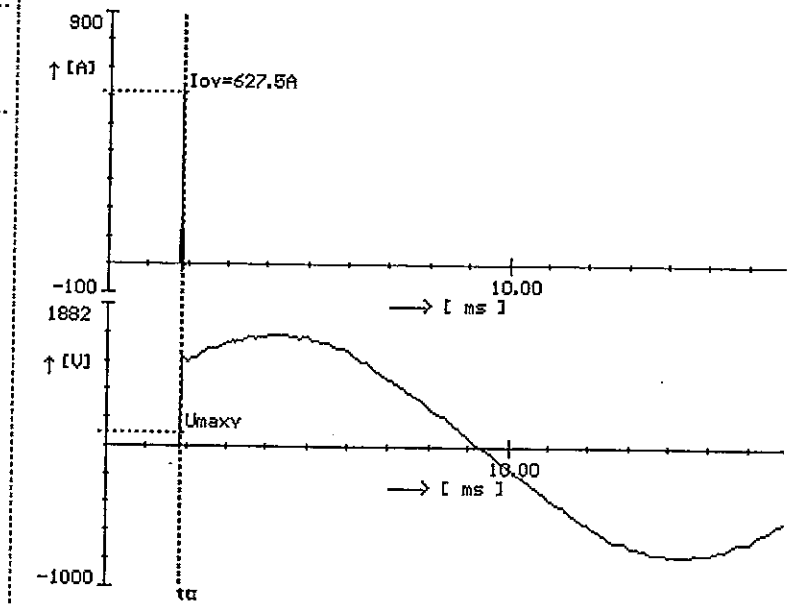
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.01	ms
tc =	0.12	ms
It =	243	A
Io =	627	A
Umax =	1100	V
Uzot =	558	V
I2tt =	0.30	A2s
I2tc =	4.58	A2s
Alfa =	46	st.el.
Psi =	46	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 6 A, dU = 116 mV, č.11 Záznam číslo 27DS038 ze dne 27. 4.2006

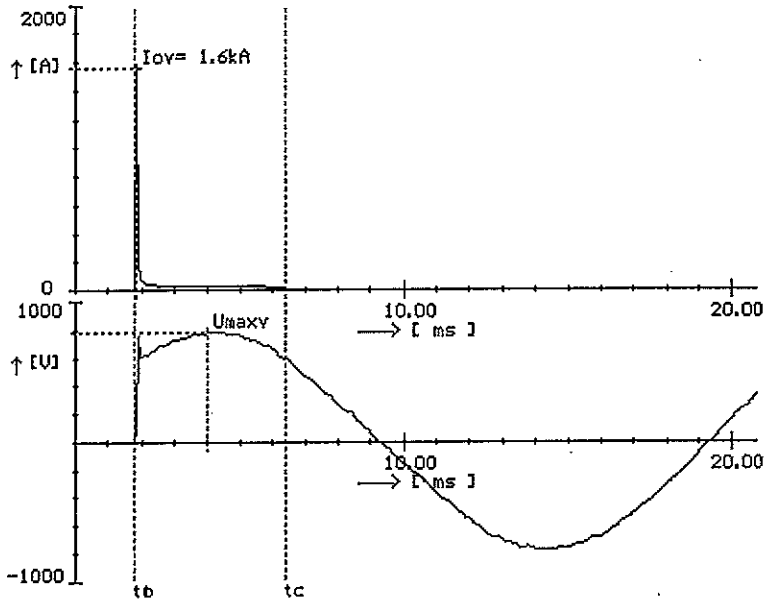
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.01	ms
tc	=	4.60	ms
It	=	1337	A
Io	=	1592	A
Unax	=	803	V
Uzot	=	558	V
I2tt	=	14.57	A2s
I2tc	=	100.23	A2s
Alfa	=	46	st.el.
Psi	=	46	st.el.
It	=	0.01 x Ip	
Ri	=	9999.00	MOhm

I1



PV10gG, In = 6 A, dU = 116 mV, č.12 Záznam číslo 27DS039 ze dne 27. 4.2006

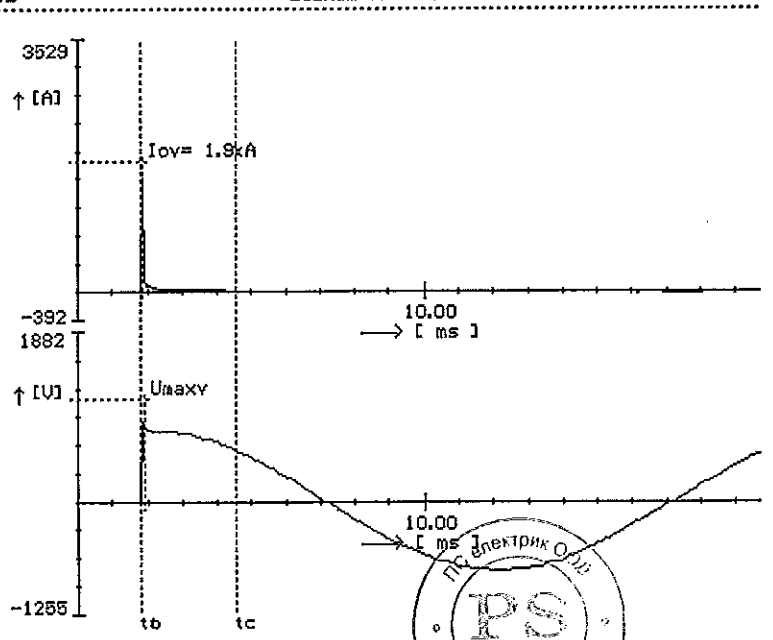
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.03	ms
tc	=	2.74	ms
It	=	1420	A
Io	=	1859	A
Unax	=	1167	V
Uzot	=	558	V
I2tt	=	15.75	A2s
I2tc	=	152.49	A2s
Alfa	=	84	st.el.
Psi	=	85	st.el.
It	=	0.01 x Ip	
Ri	=	9999.00	MOhm

I1



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 6 A, dU = 117 mV, č.13 Záznam číslo 27DS040 ze dne 27. 4.2006

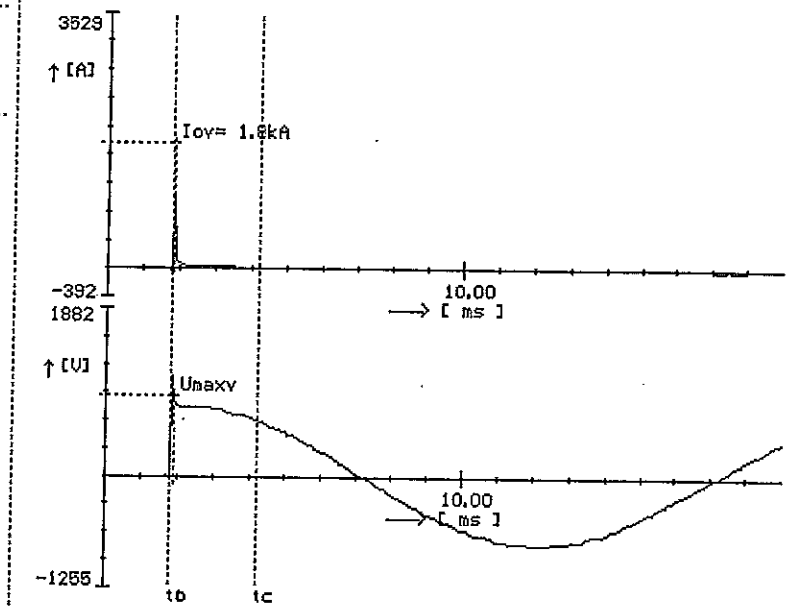
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.02	ms
tc =	2.42	ms
It =	1349	A
Io =	1788	A
Umax =	929	V
Uzot =	558	V
I2tt =	13.57	A2s
I2tc =	129.63	A2s
Alfa =	84	st.el.
Psi =	84	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 8 A, dU = 106 mV, č.11 Záznam číslo 27DS035 ze dne 27. 4.2006

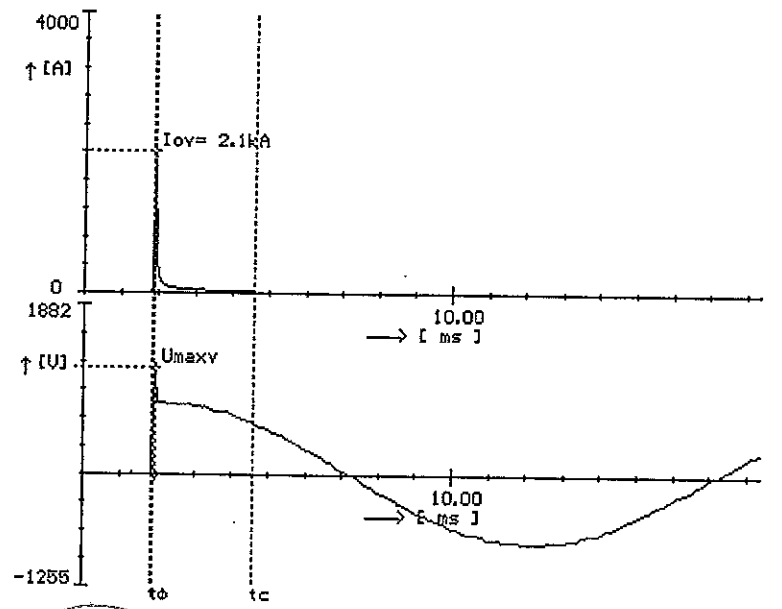
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.04	ms
tc =	2.77	ms
It =	1902	A
Io =	2059	A
Unax =	1217	V
Uzot =	562	V
I2tt =	46.28	A2s
I2tc =	220.47	A2s
Alfa =	84	st.el.
Psi =	85	st.el.
It =	0.02 x Ip	
Ri =	9999.00	MOhm

I1



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IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 8 A, dU = 106 mV, č.12 Záznam číslo 27DS036 ze dne 27. 4.2006

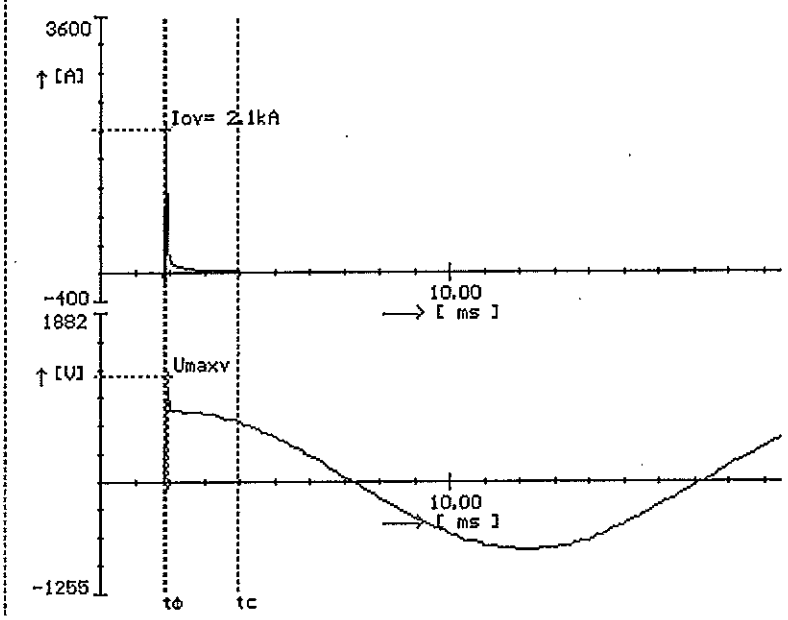
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.04	ms
tc =	2.11	ms
It =	1863	A
Io =	2059	A
Umax =	1217	V
Uzot =	558	V
I2tt =	39.05	A2s
I2tc =	217.23	A2s
Alfa =	83	st.el.
Psi =	84	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 8 A, dU = 107 mV, č.13 Záznam číslo 27DS037 ze dne 27. 4.2006

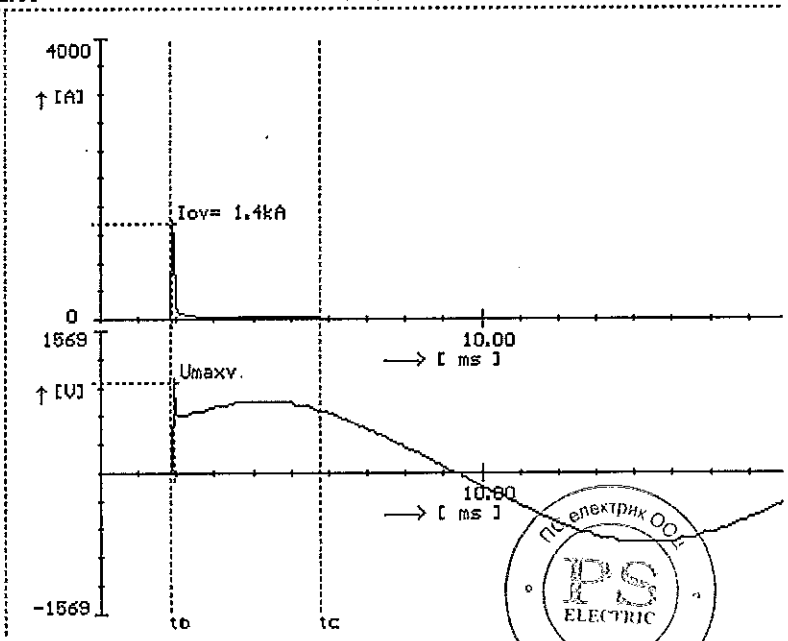
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.01	ms
tc =	3.89	ms
It =	1839	A
Io =	1392	A
Umax =	1029	V
Uzot =	558	V
I2tt =	38.01	A2s
I2tc =	148.12	A2s
Alfa =	46	st.el.
Psi =	46	st.el.
It =	0.01 x Ip	
Ri =	9999.00	MOhm

I1



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 12 A, dU = 88 mV, č.11 — Záznam číslo 27DS031 ze dne 27. 4.2006

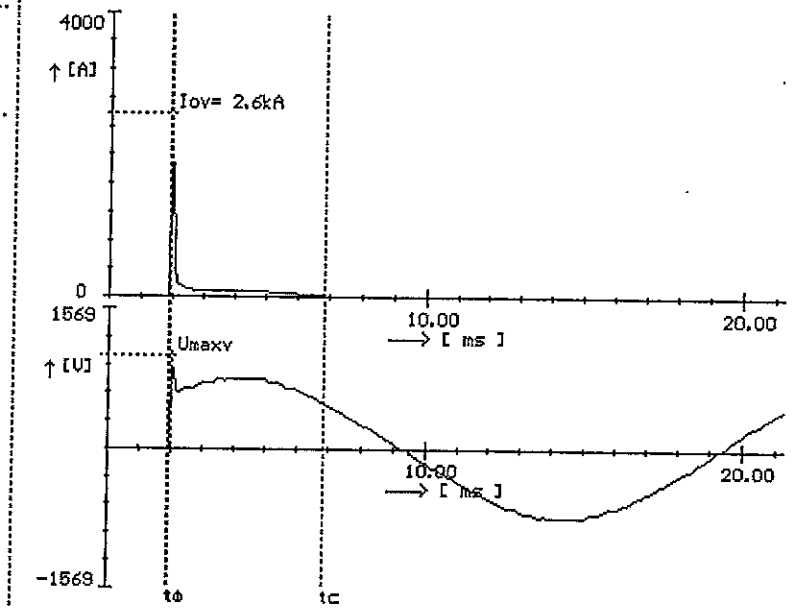
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.06	ms
tc =	4.94	ms
It =	2647	A
Io =	2647	A
Umax =	1067	V
Uzot =	558	V
I2tt =	146.38	A2s
I2tc =	479.85	A2s
Alfa =	48	st.el.
Psi =	49	st.el.
It =	0.02 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 12 A, dU = 88 mV, č.12 — Záznam číslo 27DS032 ze dne 27. 4.2006

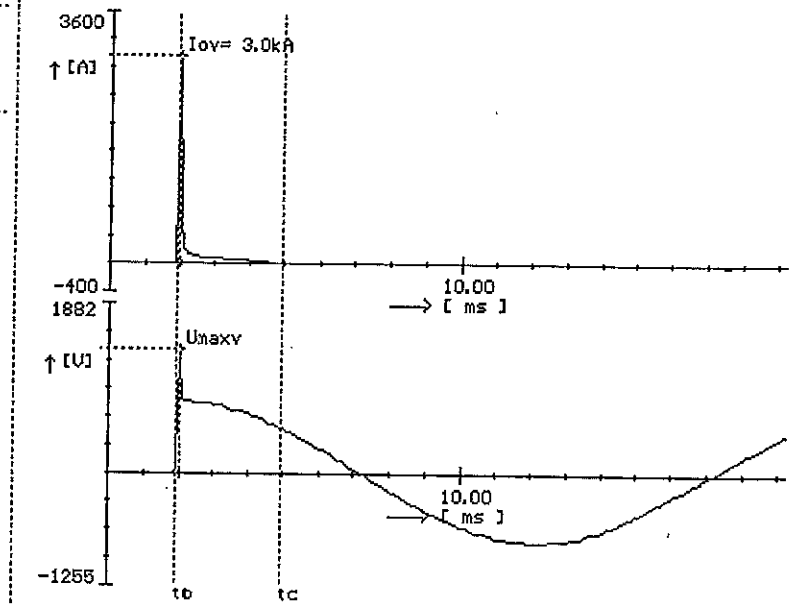
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.04	ms
tc =	3.06	ms
It =	2216	A
Io =	3039	A
Umax =	1405	V
Uzot =	558	V
I2tt =	67.44	A2s
I2tc =	588.86	A2s
Alfa =	86	st.el.
Psi =	87	st.el.
It =	0.02 x Ip	
Ri =	9999.00	MOhm

I1



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 12 A, dU = 88 mV, č.13 Záznam číslo 27DS033 ze dne 27. 4.2006

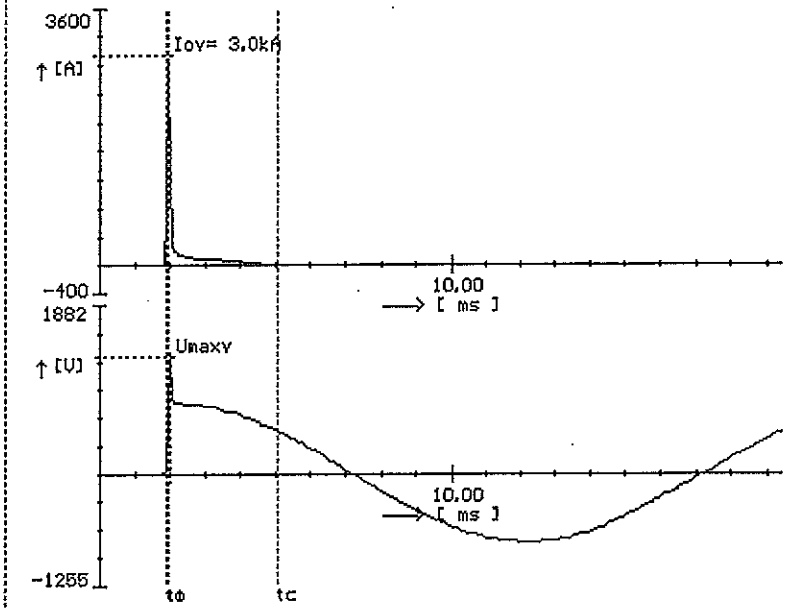
Nastavené hodnoty

Ip =	120000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.04	ms
tc =	3.18	ms
It =	2588	A
Io =	3000	A
Umax =	1343	V
Uzot =	558	V
I2tt =	94.00	A2s
I2tc =	602.28	A2s
Alfa =	85	st.el.
Psi =	86	st.el.
It =	0.02 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 16 A, dU = 90,5 mV, č.11 Záznam číslo 27DS028 ze dne 27. 4.2006

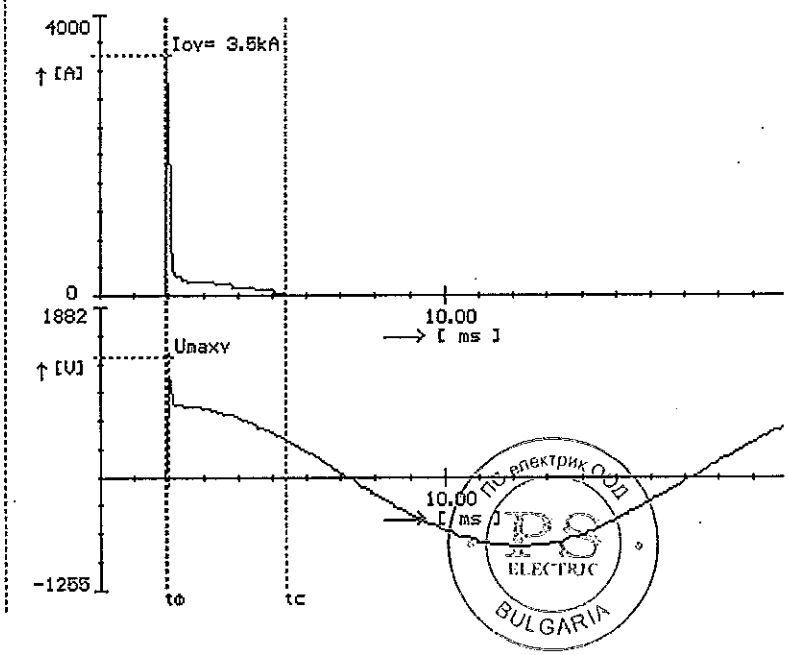
Nastavené hodnoty

Ip =	120000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.06	ms
tc =	3.51	ms
It =	2706	A
Io =	3490	A
Umax =	1368	V
Uzot =	558	V
I2tt =	115.26	A2s
I2tc =	1102.25	A2s
Alfa =	85	st.el.
Psi =	86	st.el.
It =	0.02 x Ip	
Ri =	9999.00	MOhm

I1



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 16 A, dU = 90,5 mV, č.12 Záznam číslo 270S028 ze dne 27. 4.2006

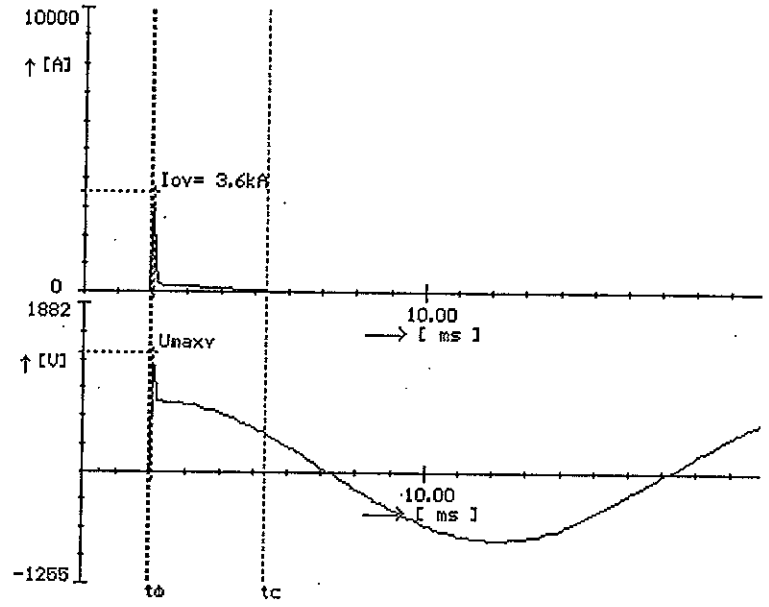
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.06	ms
tc =	3.39	ms
It =	3137	A
Io =	3608	A
Umax =	1368	V
Uzot =	558	V
I2tt =	183.90	A2s
I2tc =	1091.61	A2s
Alfa =	86	st.el.
Psi =	87	st.el.
It =	0.03 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 16 A, dU = 92 mV, č.13 Záznam číslo 270S030 ze dne 27. 4.2006

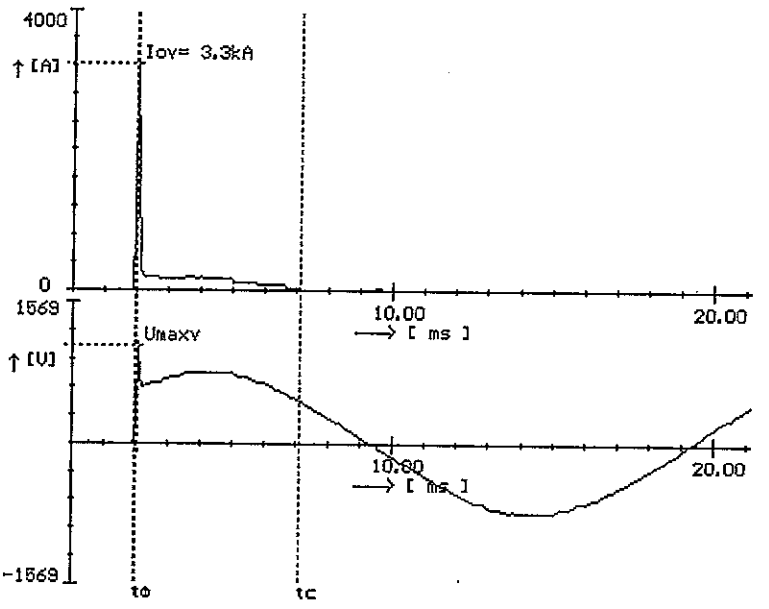
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.08	ms
tc =	5.19	ms
It =	3216	A
Io =	3284	A
Umax =	1104	V
Uzot =	558	V
I2tt =	253.67	A2s
I2tc =	866.96	A2s
Alfa =	48	st.el.
Psi =	48	st.el.
It =	0.03 x Ip	
Ri =	9999.00	MOhm

I1



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 20 A, dU = 78 mV, č.11 Záznam číslo 27DS025 ze dne 27. 4.2006

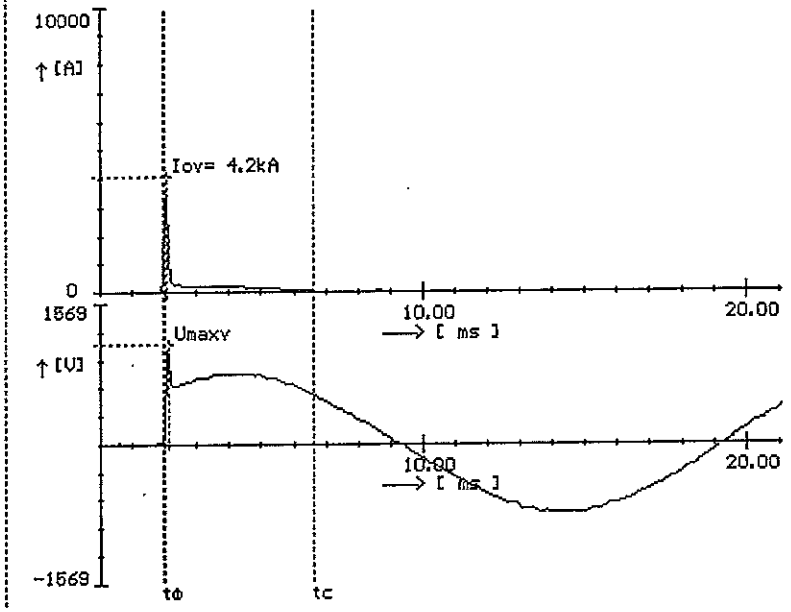
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.09	ms
tc	=	4.68	ms
It	=	3608	A
Io	=	4157	A
Umax	=	1155	V
Uzot	=	558	V
I2tt	=	352.46	A2s
I2tc	=	1685.44	A2s
Alfa	=	48	st.el.
Psi	=	50	st.el.
It	=	0.03 x Ip	
Ri	=	9999.00	MOhm

I1



PV10gG, In = 20 A, dU = 78,5 mV, č.12 Záznam číslo 27DS026 ze dne 27. 4.2006

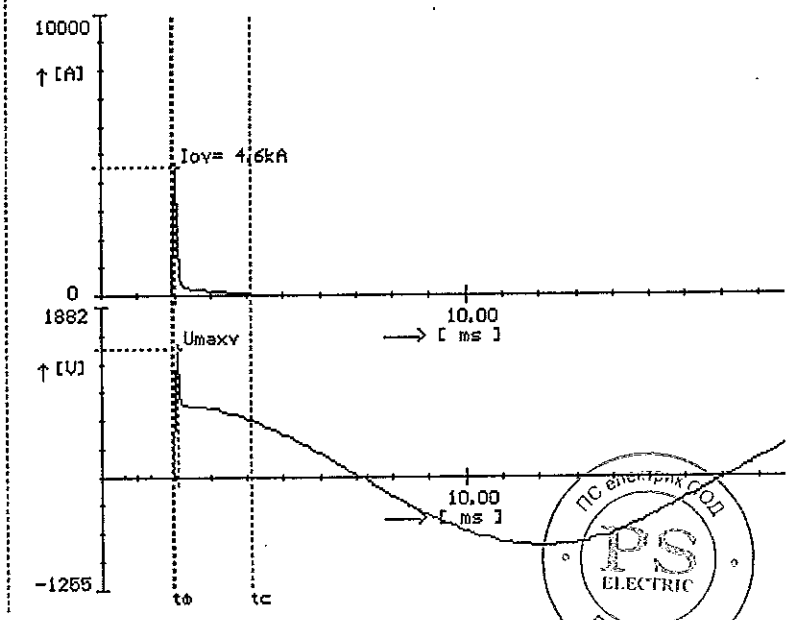
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.08	ms
tc	=	2.19	ms
It	=	4039	A
Io	=	4627	A
Umax	=	1443	V
Uzot	=	568	V
I2tt	=	368.67	A2s
I2tc	=	1897.79	A2s
Alfa	=	87	st.el.
Psi	=	88	st.el.
It	=	0.03 x Ip	
Ri	=	9999.00	MOhm

I1



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 20 A, dU = 79 mV, č.13

Záznam číslo 27DS027 ze dne 27. 4.2006

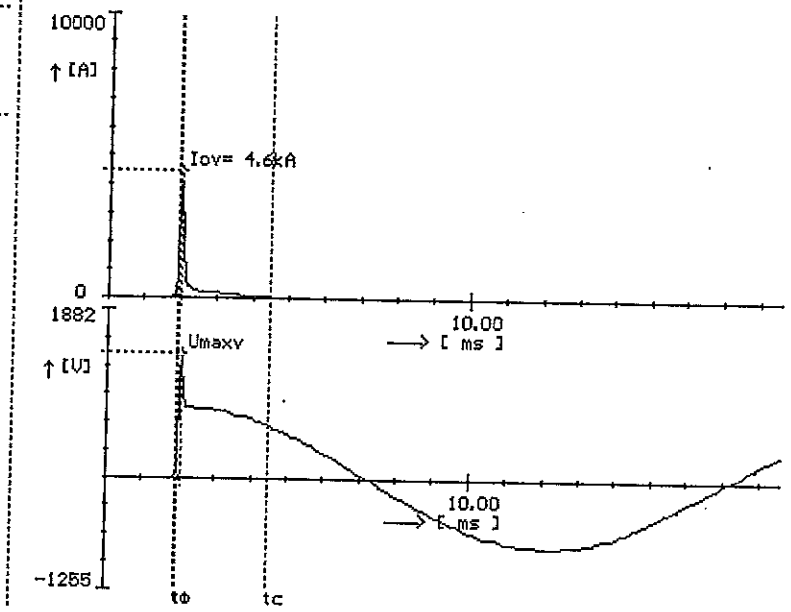
Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.07	ms
tc =	2.58	ms
It =	3882	A
Io =	4588	A
Umax =	1418	V
Uzot =	558	V
I2tt =	330.33	A2s
I2tc =	1974.36	A2s
Alfa =	85	st.el.
Psi =	86	st.el.
It =	0.03 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 26 A, dU = 77,5 mV, č.14

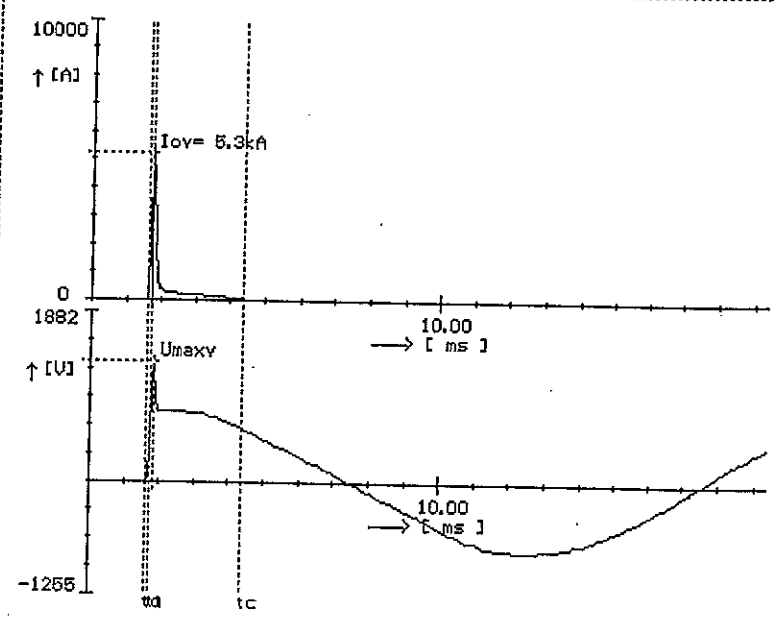
Záznam číslo 27DS022 ze dne 27. 4.2006

Nastavené hodnoty

Ip =	125000	A
Uef =	550	V
cosfi=	0.16	

Naměřené hodnoty

tt =	0.08	ms
tc =	2.71	ms
It =	4667	A
Io =	5333	A
Unax =	1368	V
Uzot =	558	V
I2tt =	595.36	A2s
I2tc =	3121.41	A2s
Alfa =	76	st.el.
Psi =	77	st.el.
It =	0.04 x Ip	
Ri =	9999.00	MOhm



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IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 25 A, dU = 77,5 mV, č.15 Záznam číslo 27DS023 ze dne 27. 4.2006

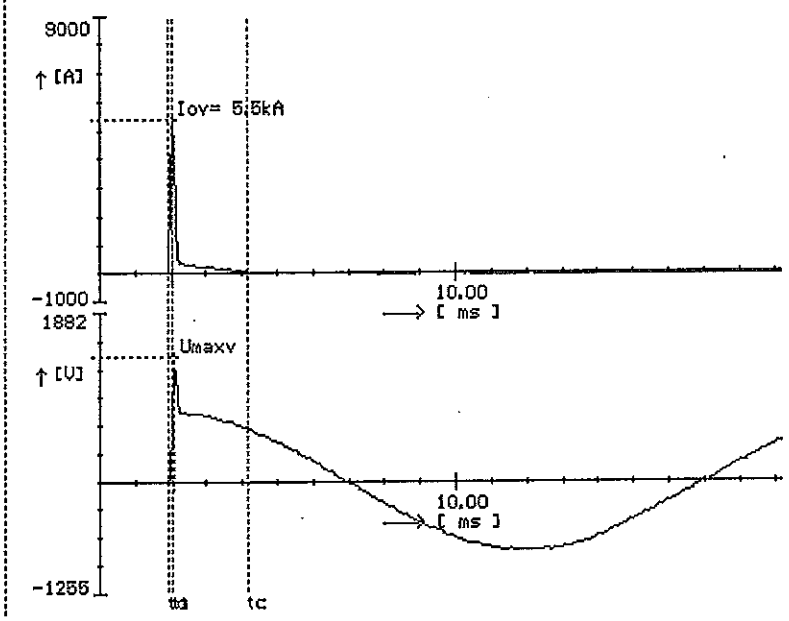
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.09	ms
tc	=	2.23	ms
It	=	4824	A
Io	=	5490	A
Unax	=	1418	V
Uzot	=	558	V
I2tt	=	642.75	A2s
I2tc	=	3304.46	A2s
Alfa	=	90	st.el.
Psi	=	92	st.el.
It	=	0.04 x Ip	
Ri	=	9999.00	MOhm

I1



PV10gG, In = 25 A, dU = 77,5 mV, č.16 Záznam číslo 27DS024 ze dne 27. 4.2006

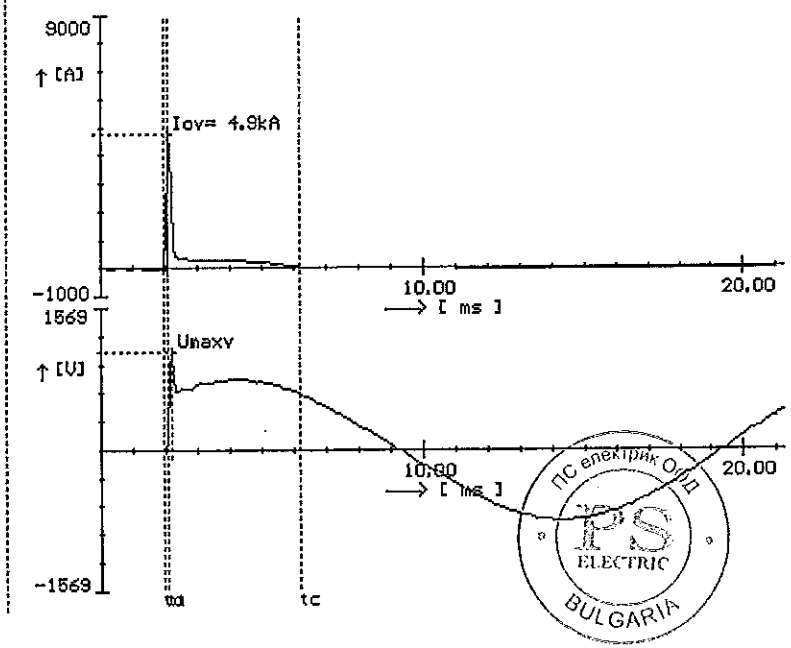
Nastavené hodnoty

Ip	=	126000	A
Uef	=	550	V
cosfi=		0.16	

Naměřené hodnoty

tt	=	0.12	ms
tc	=	4.27	ms
It	=	4157	A
Io	=	4902	A
Unax	=	1117	V
Uzot	=	558	V
I2tt	=	523.02	A2s
I2tc	=	3082.31	A2s
Alfa	=	50	st.el.
Psi	=	52	st.el.
It	=	0.03 x Ip	
Ri	=	9999.00	MOhm

I1



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 32 A, dU = 59,5 mV, č.14 — Záznam číslo 22ES048 ze dne 22. 5.2006

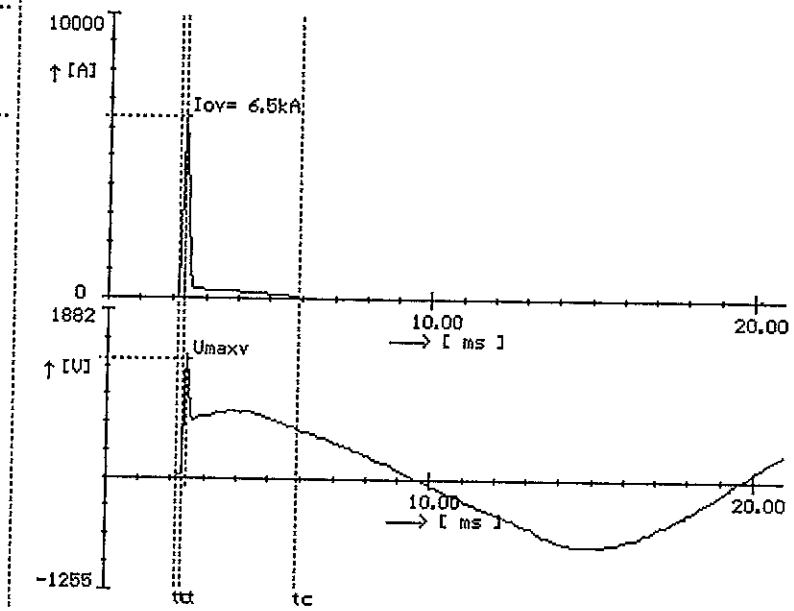
Nastavené hodnoty

Ip =	103000	A
Uef =	550	V
cosfi=	0.17	

Naměřené hodnoty

tt =	0.18	ms
tc =	3.73	ms
It =	6235	A
Io =	6549	A
Umax =	1355	V
Uzot =	552	V
I2tt =	2309.44	A2s
I2tc =	6160.38	A2s
Alfa =	47	st.el.
Psi =	50	st.el.
It =	0.06 x Ip	
Ri =	9999.00	MOhm

I1



PV10gG, In = 32 A, dU = 60 mV, č.15 — Záznam číslo 22ES049 ze dne 22. 5.2006

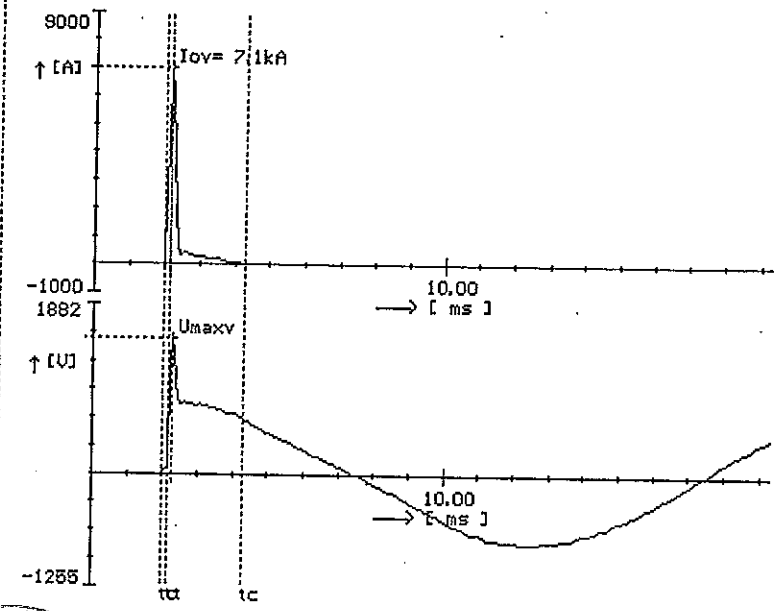
Nastavené hodnoty

Ip =	103000	A
Uef =	550	V
cosfi=	0.17	

Naměřené hodnoty

tt =	0.14	ms
tc =	2.28	ms
It =	6941	A
Io =	7137	A
Unax =	1531	V
Uzot =	549	V
I2tt =	2434.06	A2s
I2tc =	7303.22	A2s
Alfa =	84	st.el.
Psi =	86	st.el.
It =	0.07 x Ip	
Ri =	9999.00	MOhm

I1



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IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

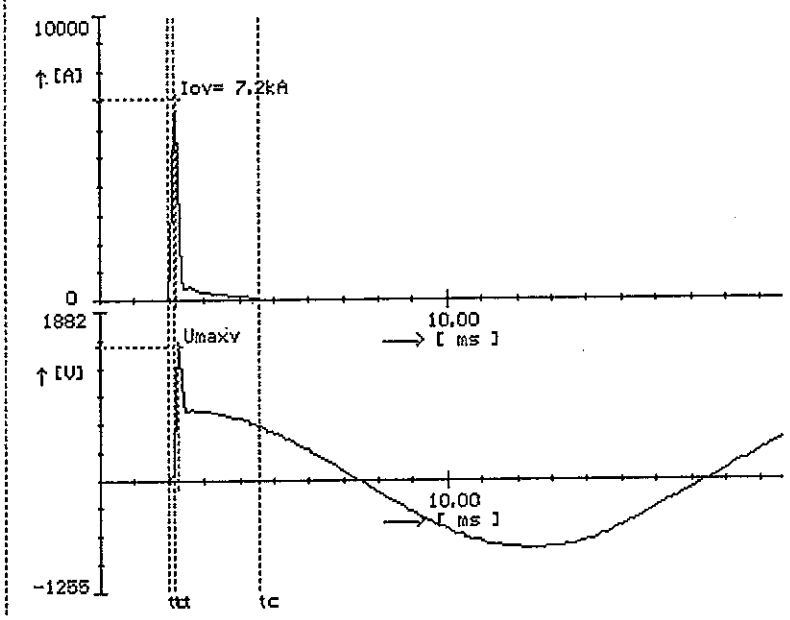
PV10gG, In = 32 A, dU = 60,5 mV, č.16.2 Záznam číslo 22ES051 ze dne 22. 5.2006

Nastavené hodnoty

Ip	=	103000	A
Uef	=	550	V
cosfi=		0.17	

Naměřené hodnoty

tt	=	0.15	ms
tc	=	2.60	ms
It	=	6980	A
Io	=	7216	A
Umax	=	1544	V
Uzot	=	555	V
I2tt	=	2487.93	A2s
I2tc	=	7564.54	A2s
Alfa	=	83	st.el.
Psi	=	86	st.el.
It	=	0.07 x Ip	
Ri	=	9999.00	MOhm



PV10gG, In = 32 A, dU = 61 mV, č.17.2 Záznam číslo 99997 ze dne 9. 6.2006

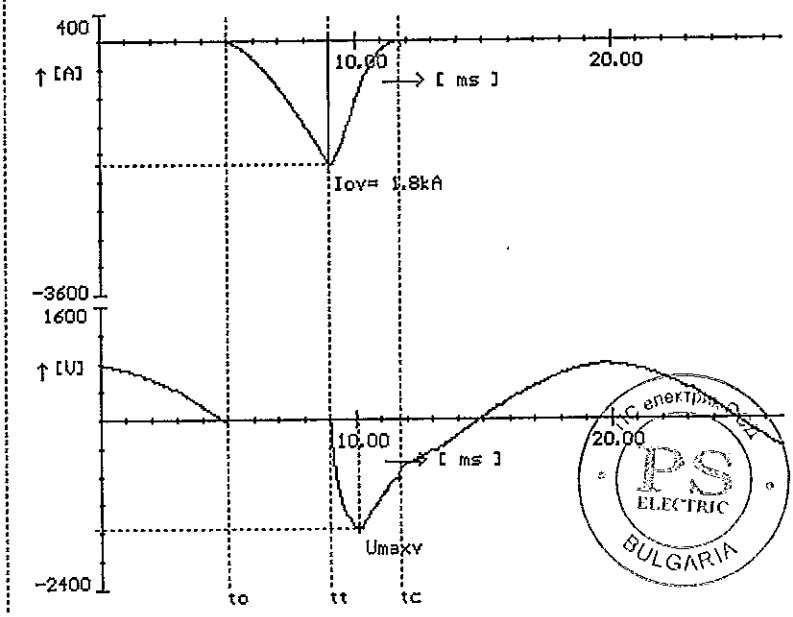
Nastavené hodnoty

Ip	=	1722	A
Uef	=	552	V
cosfi=		0.29	

Naměřené hodnoty

tt	=	4.00	ms
tc	=	6.70	ms
It	=	1808	A
Io	=	1808	A
Umax	=	1584	V
Uzot	=	552	V
I2tt	=	3462.27	A2s
I2tc	=	5787.80	A2s
Alfa	=	5	st.el.
Psi	=	76	st.el.
It	=	1.05 x Ip	
Ri	=	9999.00	MOhm

I2105



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 32 A, dU = 61 mV, č.18 — Záznam číslo 99998 ze dne 9. 6.2006

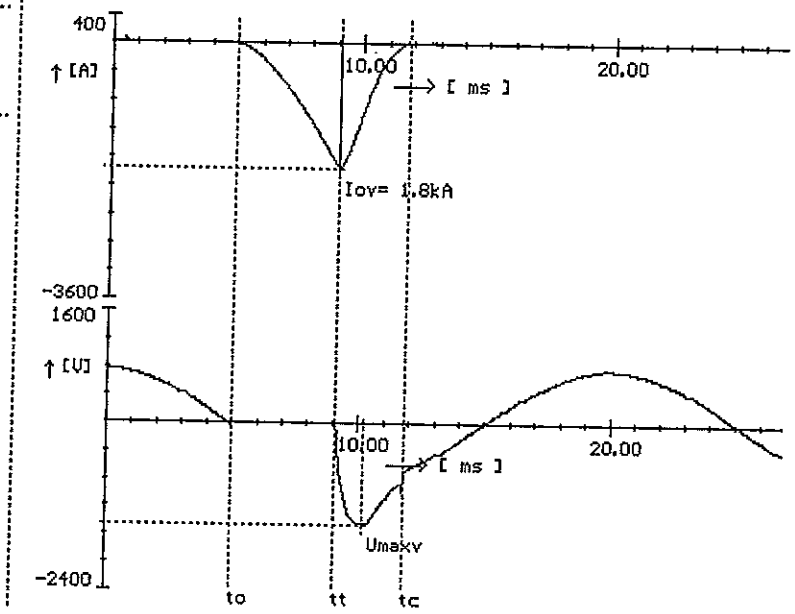
Nastavené hodnoty

Ip =	1722	A
Uef =	552	V
cosfi=	0.29	

Naměřené hodnoty

tt =	4.10	ms
tc =	6.80	ms
It =	1792	A
Io =	1792	A
Umax =	1488	V
Uzot =	552	V
I2tt =	3382.42	A2s
I2tc =	5653.58	A2s
Alfa =	0	st.el.
Psi =	73	st.el.
It =	1.04 x Ip	
Ri =	9999.00	MOhm

I2104



PV10gG, In = 32 A, dU = 61 mV, č.19 — Záznam číslo 99999 ze dne 9. 6.2006

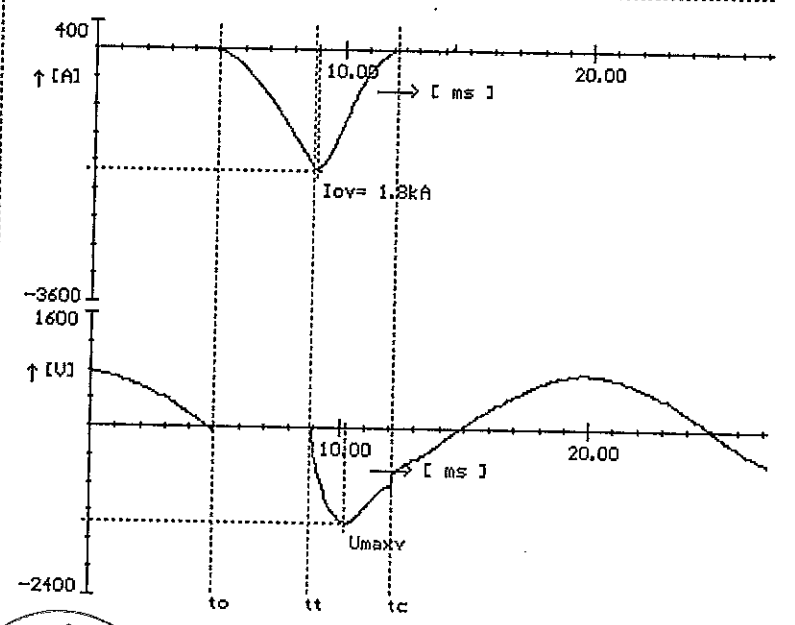
Nastavené hodnoty

Ip =	1722	A
Uef =	552	V
cosfi=	0.29	

Naměřené hodnoty

tt =	3.87	ms
tc =	7.17	ms
It =	1728	A
Io =	1760	A
Umax =	1376	V
Uzot =	552	V
I2tt =	3043.11	A2s
I2tc =	6232.34	A2s
Alfa =	6	st.el.
Psi =	74	st.el.
It =	1.00 x Ip	
Ri =	9999.00	MOhm

I2100



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 25 A, dU = 73 mV, č.17 Záznam číslo 1604 ze dne 23. 2.2007

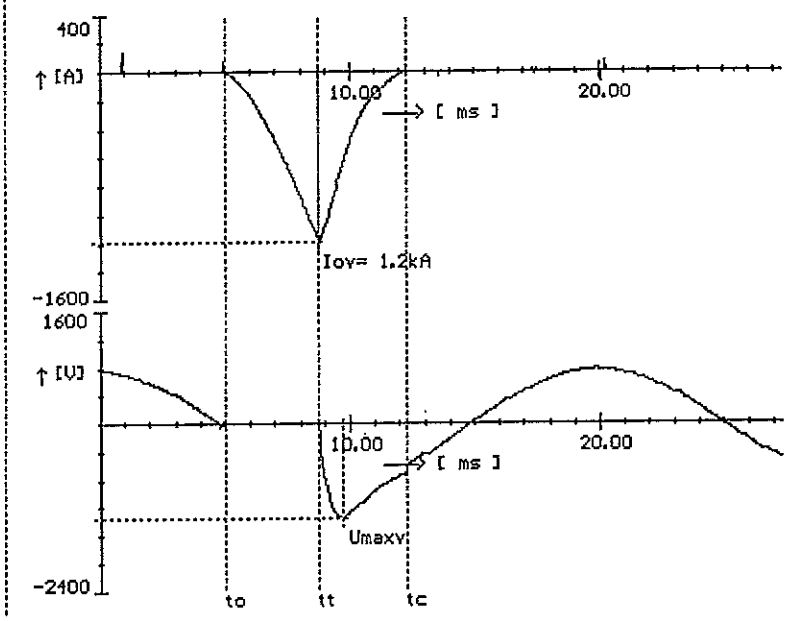
Nastavené hodnoty

Ip =	1260	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.73	ms
tc =	7.27	ms
It =	1216	A
Io =	1216	A
Umax =	1376	V
Uzot =	552	V
I2tt =	1431.07	A2s
I2tc =	2574.38	A2s
Alfa =	5	st.el.
Psi =	72	st.el.
It =	0.97 x Ip	
Ri =	9999.00	MOhm

I2097



PV10gG, In = 25 A, dU = 73 mV, č.18 Záznam číslo 1605 ze dne 23. 2.2007

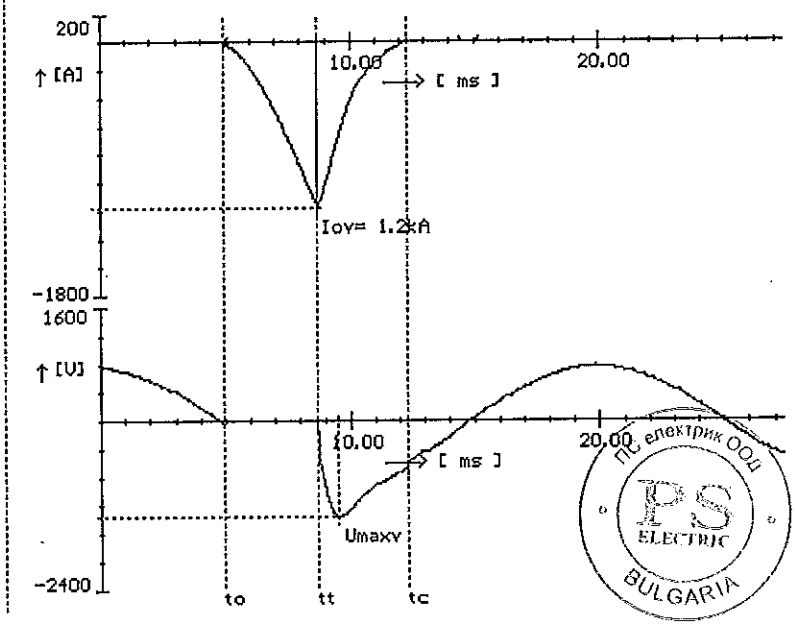
Nastavené hodnoty

Ip =	1260	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.73	ms
tc =	7.43	ms
It =	1184	A
Io =	1208	A
Umax =	1400	V
Uzot =	552	V
I2tt =	1324.70	A2s
I2tc =	2449.59	A2s
Alfa =	3	st.el.
Psi =	70	st.el.
It =	0.94 x Ip	
Ri =	9999.00	MOhm

I2094



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 25 A, dU = 74.5 mV, č.19

Záznam číslo 1606 ze dne 23. 2.2007

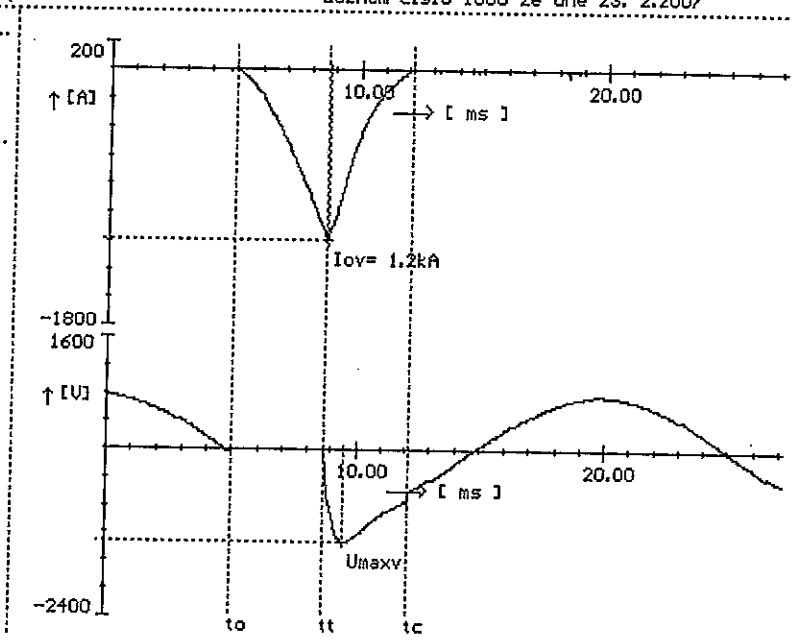
Nastavené hodnoty

Ip =	1260	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.67	ms
tc =	7.17	ms
It =	1200	A
Io =	1216	A
Umax =	1368	V
Uzot =	552	V
I2tt =	1369.32	A2s
I2tc =	2543.83	A2s
Alfa =	3	st.el.
Psi =	68	st.el.
It =	0.95 x Ip	
Ri =	9999.00	MOhm

I2095



PV10gG, In = 20 A, dU = 79.6 mV, č.14

Záznam číslo 99989 ze dne 9. 6.2006

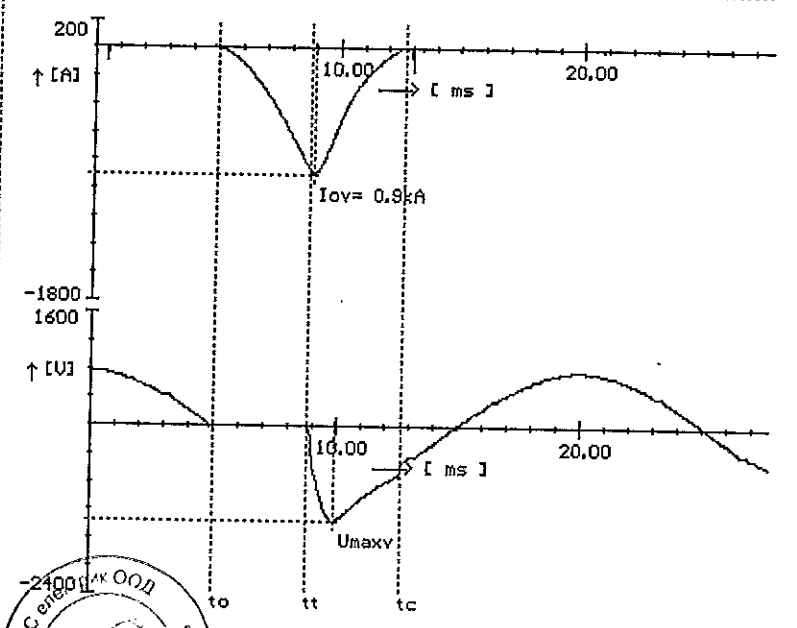
Nastavené hodnoty

Ip =	992.78	A
Uef =	556	V
cosfi=	0.24	

Naměřené hodnoty

tt =	3.80	ms
tc =	7.70	ms
It =	908.00	A
Io =	928.00	A
Umax =	1384	V
Uzot =	560	V
I2tt =	765.65	A2s
I2tc =	1670.82	A2s
Alfa =	0	st.el.
Psi =	68	st.el.
It =	0.91 x Ip	
Ri =	9999.00	MOhm

I2091



ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 20 A, dU = 79.5 mV, č.15 Záznam číslo 99990 ze dne 9. 6.2006

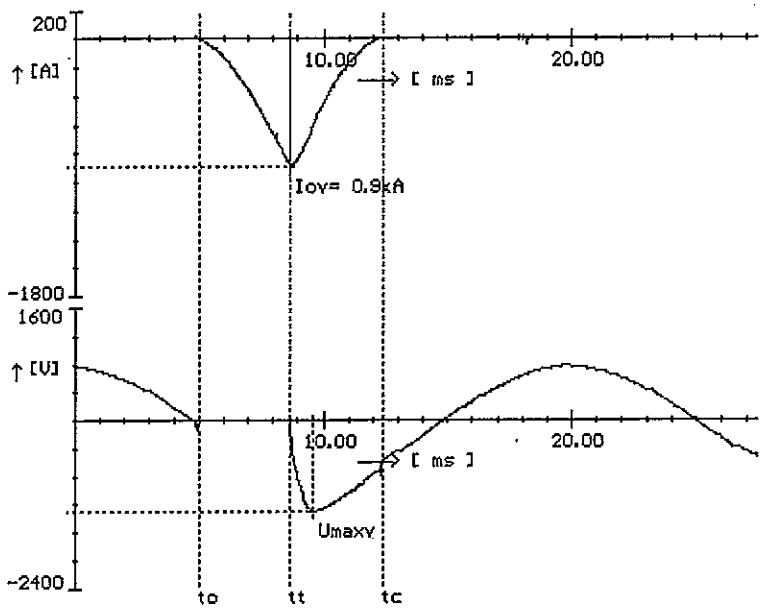
Nastavené hodnoty

Ip =	992.78	A
Uef =	556	V
cosfi=	0.24	

Naměřené hodnoty

tt =	3.63	ms
tc =	7.37	ms
It =	896.00	A
Io =	912.00	A
Umax =	1328	V
Uzot =	560	V
I2tt =	736.08	A2s
I2tc =	1577.71	A2s
Alfa =	3	st.el.
Psi =	68	st.el.
It =	0.90 x Ip	
Ri =	9999.00	MOhm

I2090



PV10gG, In = 20 A, dU = 80 mV, č.16 Záznam číslo 99991 ze dne 9. 6.2006

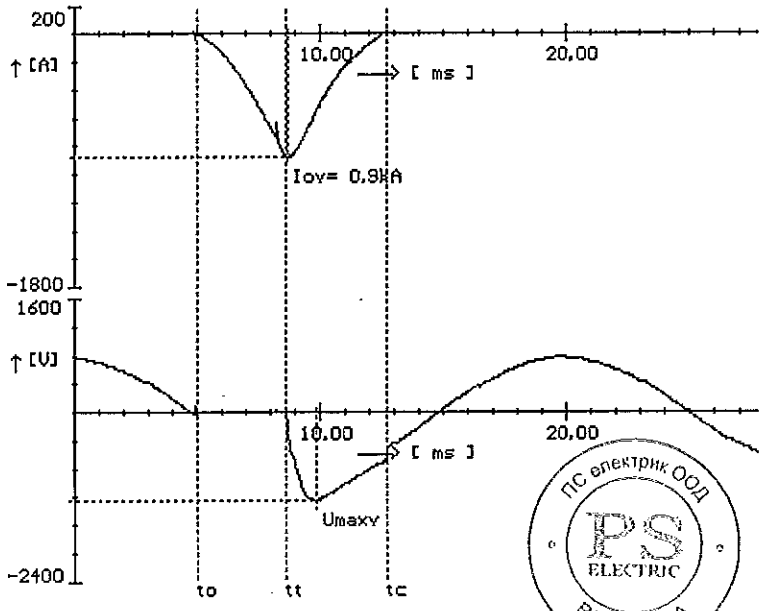
Nastavené hodnoty

Ip =	992.78	A
Uef =	556	V
cosfi=	0.24	

Naměřené hodnoty

tt =	3.63	ms
tc =	7.70	ms
It =	900.00	A
Io =	904.00	A
Umax =	1272	V
Uzot =	560	V
I2tt =	748.78	A2s
I2tc =	1690.63	A2s
Alfa =	4	st.el.
Psi =	69	st.el.
It =	0.91 x Ip	
Ri =	9999.00	MOhm

I2091



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 12 A, dU = 91 mV, č.14 Záznam číslo 98503 ze dne 28. 3.2006

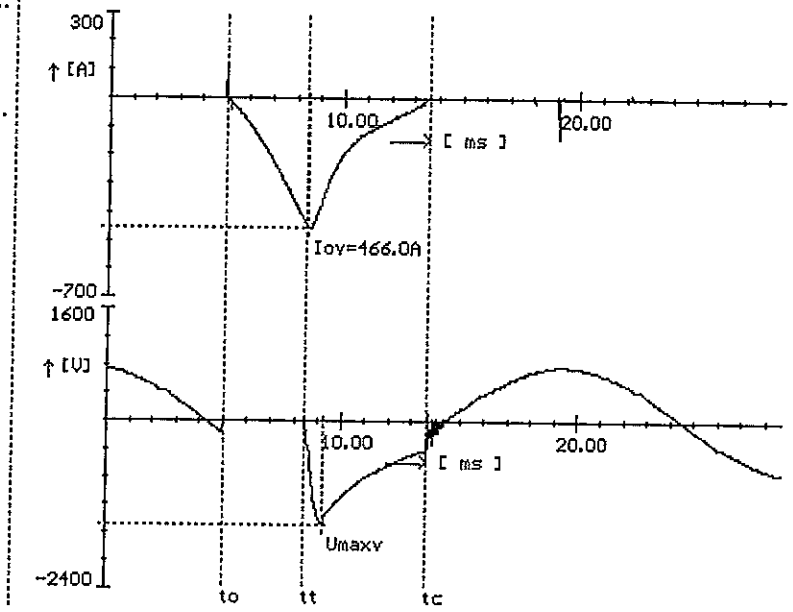
Nastavené hodnoty

Ip =	470.93	A
Uef =	548	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.47	ms
tc =	8.63	ms
It =	462.00	A
Io =	466.00	A
Umax =	1520	V
Uzot =	560	V
I2tt =	208.29	A2s
I2tc =	433.86	A2s
Alfa =	0	st.el.
Psi =	62	st.el.
It =	0.98 x Ip	
Ri =	9999.00	MOhm

I2098



PV10gG, In = 12 A, dU = 91 mV, č.15 Záznam číslo 98504 ze dne 28. 3.2006

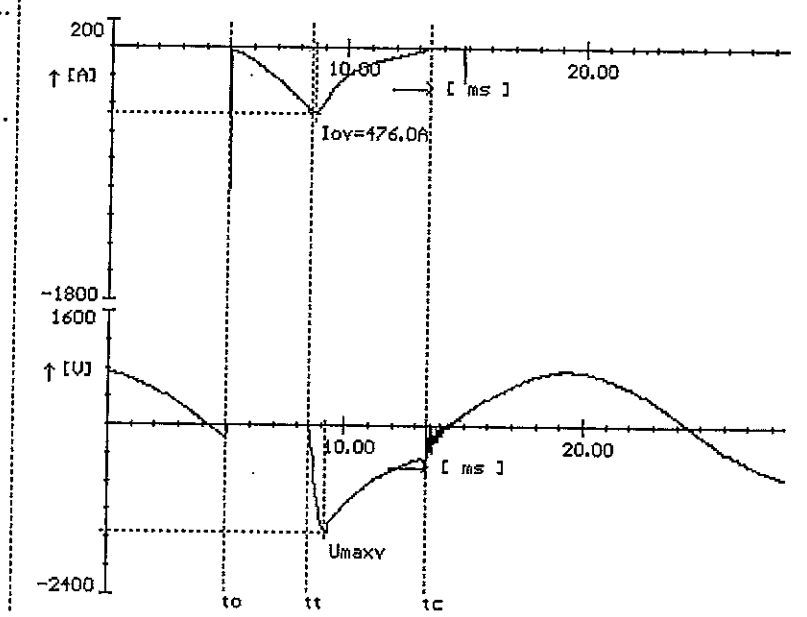
Nastavené hodnoty

Ip =	470.93	A
Uef =	548	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.50	ms
tc =	8.47	ms
It =	472.00	A
Io =	476.00	A
Umax =	1544	V
Uzot =	560	V
I2tt =	253.17	A2s
I2tc =	469.69	A2s
Alfa =	1	st.el.
Psi =	61	st.el.
It =	1.00 x Ip	
Ri =	9999.00	MOhm

I2100



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 12 A, dU = 90.5 mV, č.16 Záznam číslo 98505 ze dne 28. 3.2006

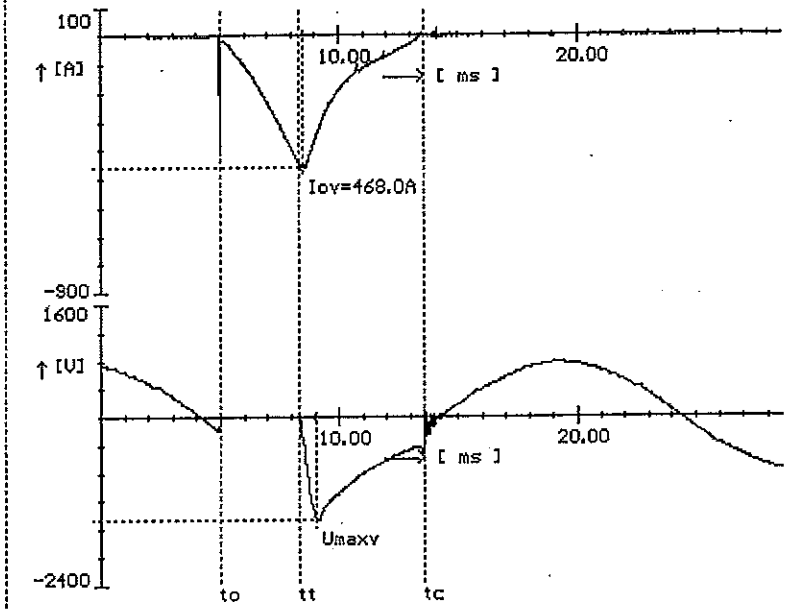
Nastavené hodnoty

Ip =	470.93	A
Uef =	548	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.37	ms
tc =	8.67	ms
It =	462.00	A
Io =	468.00	A
Unax =	1504	V
Uzot =	560	V
I2tt =	205.10	A2s
I2tc =	438.87	A2s
Alfa =	1	st.el.
Psi =	59	st.el.
It =	0.98 x Ip	
Ri =	9999.00	MOhm

I2098



PV10gG, In = 6 A, dU = 118 mV, č.14.2 Záznam číslo 98519 ze dne 28. 3.2006

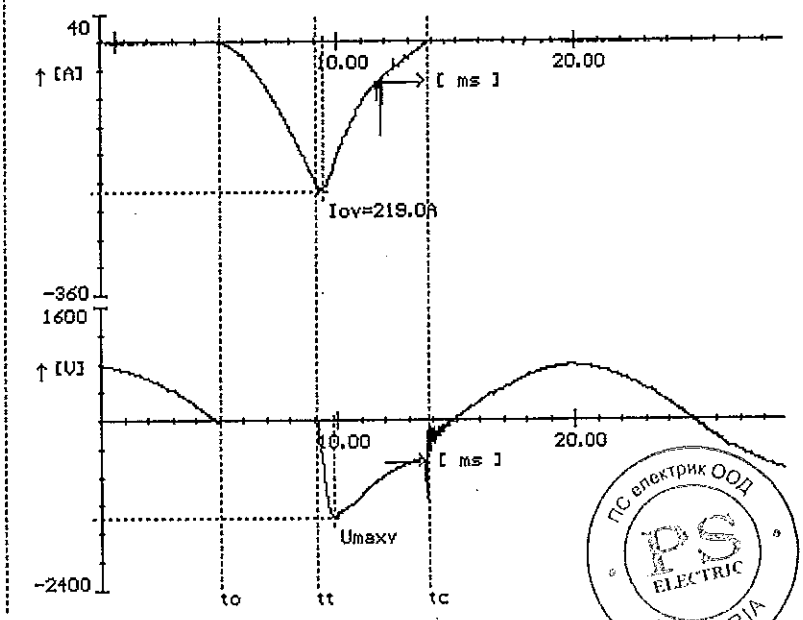
Nastavené hodnoty

Ip =	210.36	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	4.13	ms
tc =	8.80	ms
It =	208.00	A
Io =	219.00	A
Unax =	1408	V
Uzot =	552	V
I2tt =	44.06	A2s
I2tc =	102.65	A2s
Alfa =	1	st.el.
Psi =	73	st.el.
It =	0.99 x Ip	
Ri =	9999.00	MOhm

I2099



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 6 A, dU = 118 mV, č.15

Záznam číslo 98520 ze dne 28. 3.2006

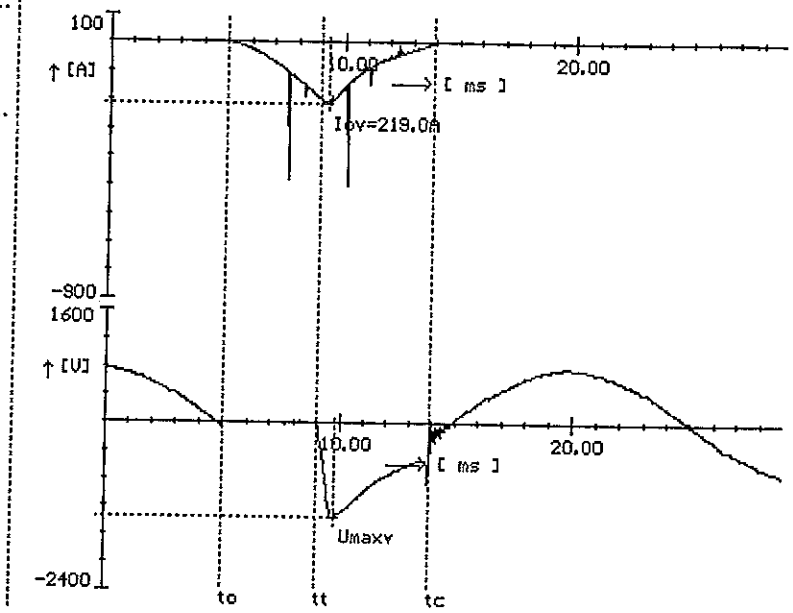
Nastavené hodnoty

Ip =	210.36	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	4.00	ms
tc =	8.90	ms
It =	190.00	A
Io =	219.00	A
Umax =	1400	V
Uzot =	552	V
I2tt =	60.76	A2s
I2tc =	122.07	A2s
Alfa =	0	st.el.
Psi =	71	st.el.
It =	0.90 x Ip	
Ri =	9999.00	MOhm

I2090



PV10gG, In = 6 A, dU = 118 mV, č.16

Záznam číslo 98521 ze dne 28. 3.2006

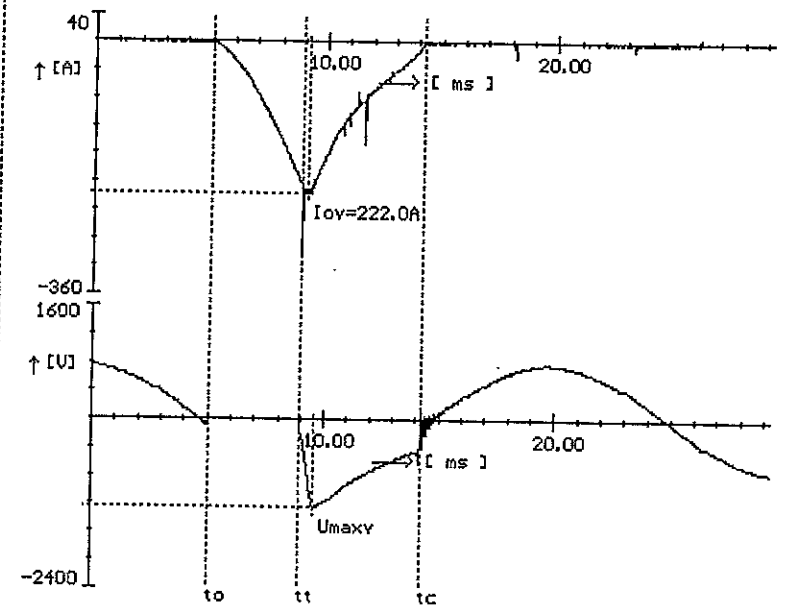
Nastavené hodnoty

Ip =	210.36	A
Uef =	552	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.93	ms
tc =	9.23	ms
It =	211.00	A
Io =	222.00	A
Umax =	1272	V
Uzot =	552	V
I2tt =	44.93	A2s
I2tc =	120.47	A2s
Alfa =	0	st.el.
Psi =	70	st.el.
It =	1.00 x Ip	
Ri =	9999.00	MOhm

I2100



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 4 A, dU = 210 mV, č.14.3 Záznam číslo 98527 ze dne 28. 3.2006

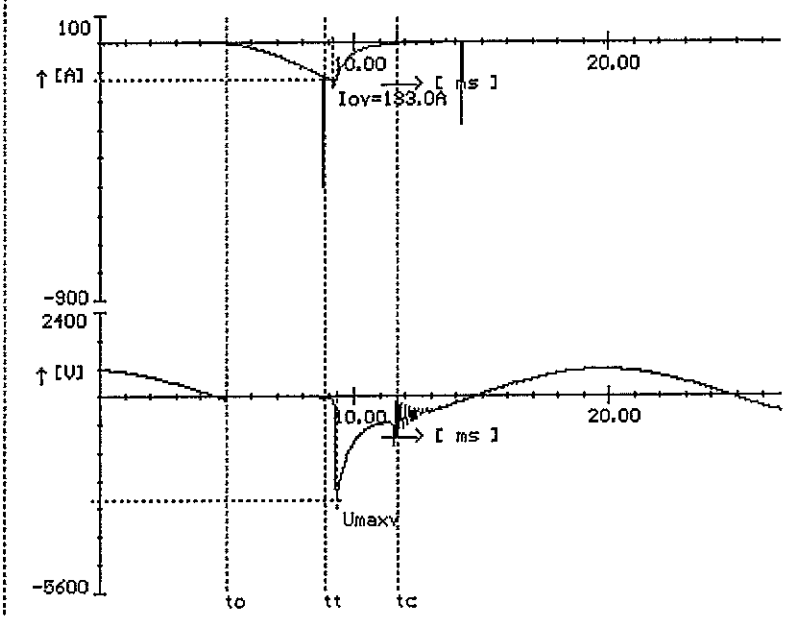
Nastavené hodnoty

Ip	=	124.45	A
Uef	=	556	V
cosfi	=	0.26	

Naměřené hodnoty

tt	=	3.80	ms
tc	=	6.67	ms
It	=	122.00	A
Io	=	133.00	A
Umax	=	2416	V
Uzot	=	552	V
I2tt	=	23.08	A2s
I2tc	=	34.54	A2s
Alfa	=	0	st.el.
Psi	=	69	st.el.
It	=	0.98 x Ip	
Ri	=	9999.00	MOhm

I2098



PV10gG, In = 4 A, dU = 209 mV, č.15 Záznam číslo 98528 ze dne 28. 3.2006

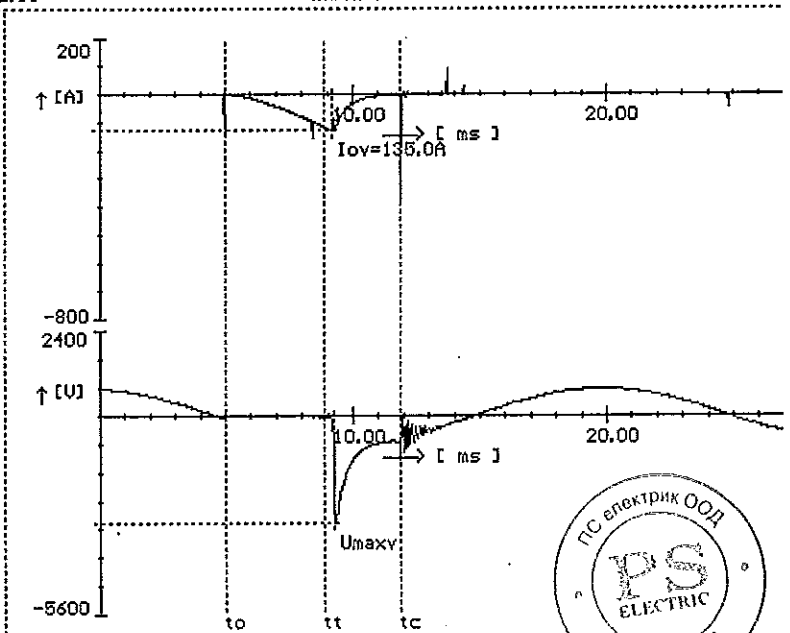
Nastavené hodnoty

Ip	=	124.45	A
Uef	=	556	V
cosfi	=	0.26	

Naměřené hodnoty

tt	=	3.87	ms
tc	=	6.87	ms
It	=	121.00	A
Io	=	135.00	A
Umax	=	2404	V
Uzot	=	560	V
I2tt	=	15.03	A2s
I2tc	=	26.27	A2s
Alfa	=	0	st.el.
Psi	=	68	st.el.
It	=	0.97 x Ip	
Ri	=	9999.00	MOhm

I2097



ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 4 A, dU = 208 mV, č.16 — Záznam číslo 98529 ze dne 28. 3.2006

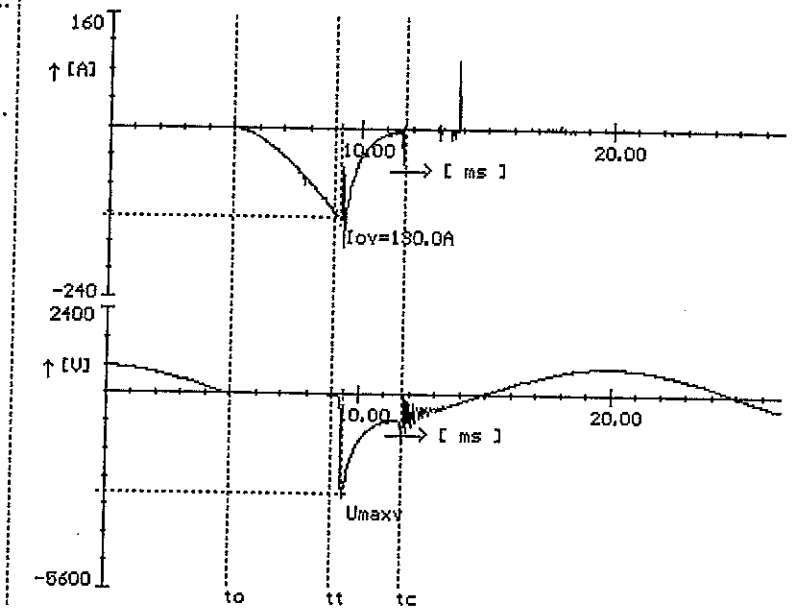
Nastavené hodnoty

Ip =	124.45	A
Uef =	556	V
cosfi=	0.26	

Naměřené hodnoty

tt =	3.97	ms
tc =	6.70	ms
It =	121.00	A
Io =	130.00	A
Umax =	2528	V
Uzot =	582	V
I2tt =	14.40	A2s
I2tc =	25.60	A2s
Alfa =	1	st.el.
Psi =	72	st.el.
It =	0.97 x Ip	
Ri =	9999.00	MOhm

I2097



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

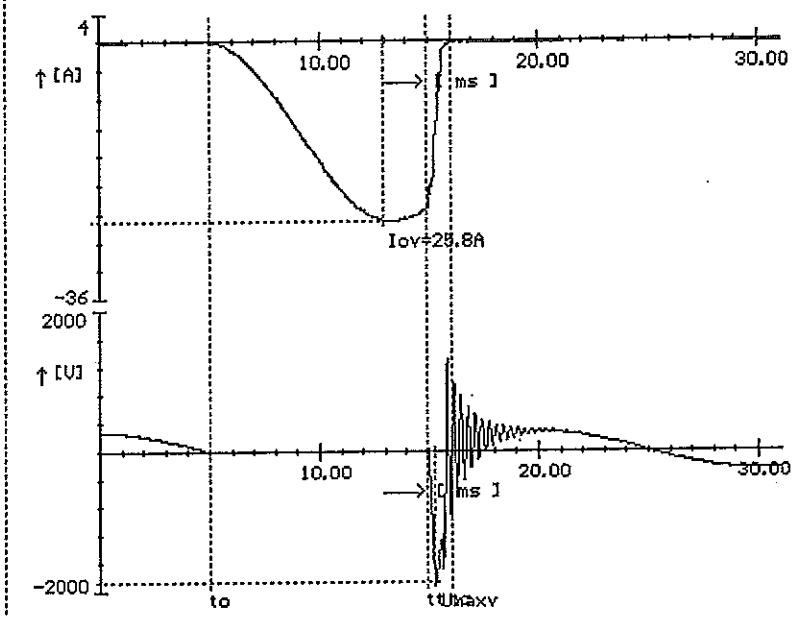
PV10gG, In = 2 A, dU = 280 mV, č.14 Záznam číslo 98645 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	12.83	A
Uef =	188	V
cosfi=	0.26	

Naměřené hodnoty

tt =	9.80	ms
tc =	11.03	ms
It =	23.80	A
Io =	25.80	A
Umax =	1912	V
Uzot =	192	V
I2tt =	3.10	A2s
I2tc =	3.30	A2s
Alfa =	0	st.el.
Psi =	177	st.el.
It =	1.86 x Ip	
Ri =	9999.00	MOhm



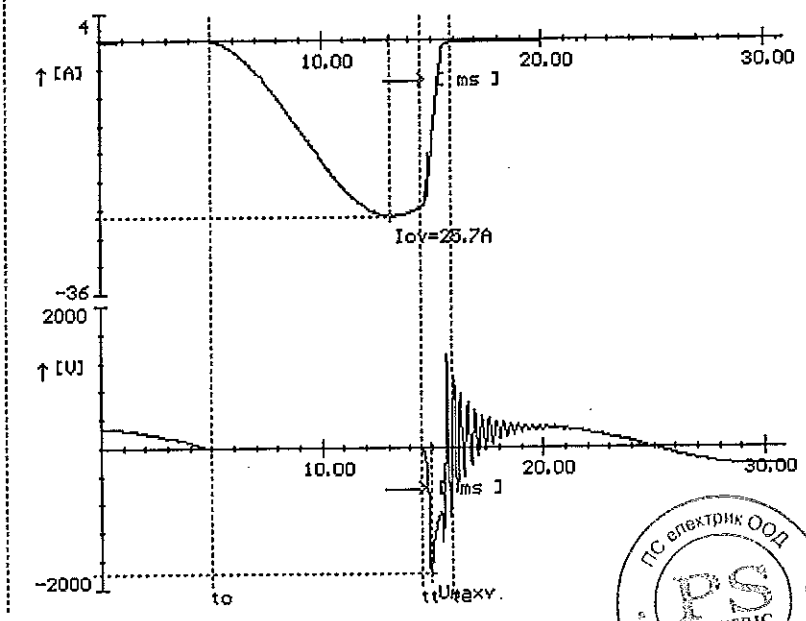
PV10gG, In = 2 A, dU = 281 mV, č.15 Záznam číslo 98646 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	12.83	A
Uef =	188	V
cosfi=	0.26	

Naměřené hodnoty

tt =	9.63	ms
tc =	10.93	ms
It =	24.40	A
Io =	25.70	A
Umax =	1848	V
Uzot =	192	V
I2tt =	2.89	A2s
I2tc =	3.18	A2s
Alfa =	0	st.el.
Psi =	171	st.el.
It =	1.90 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД DS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

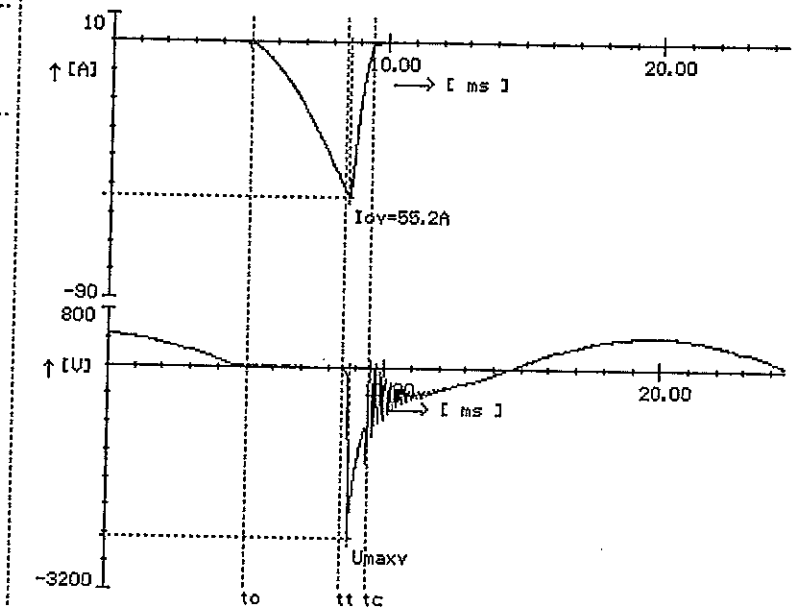
PV10gG, In = 2 A, dU = 261 mV, č.16 — Záznam číslo 98651 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	65.62	A
Uef =	324	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.47	ms
tc =	4.47	ms
It =	52.00	A
Io =	55.20	A
Umax =	2512	V
Uzot =	320	V
I2tt =	2.38	A2s
I2tc =	3.66	A2s
Alfa =	7	st.el.
Psi =	69	st.el.
It =	0.79 x Ip	
Ri =	9999.00	MOhm



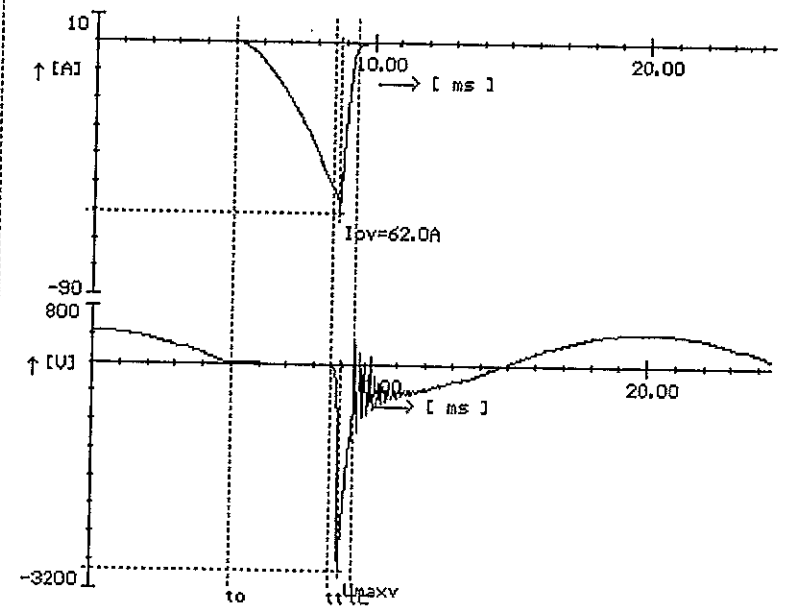
PV10gG, In = 2 A, dU = 262 mV, č.17 — Záznam číslo 98652 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	65.62	A
Uef =	324	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.60	ms
tc =	4.40	ms
It =	52.40	A
Io =	62.00	A
Umax =	3000	V
Uzot =	328	V
I2tt =	2.36	A2s
I2tc =	3.61	A2s
Alfa =	0	st.el.
Psi =	64	st.el.
It =	0.80 x Ip	
Ri =	9999.00	MOhm



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

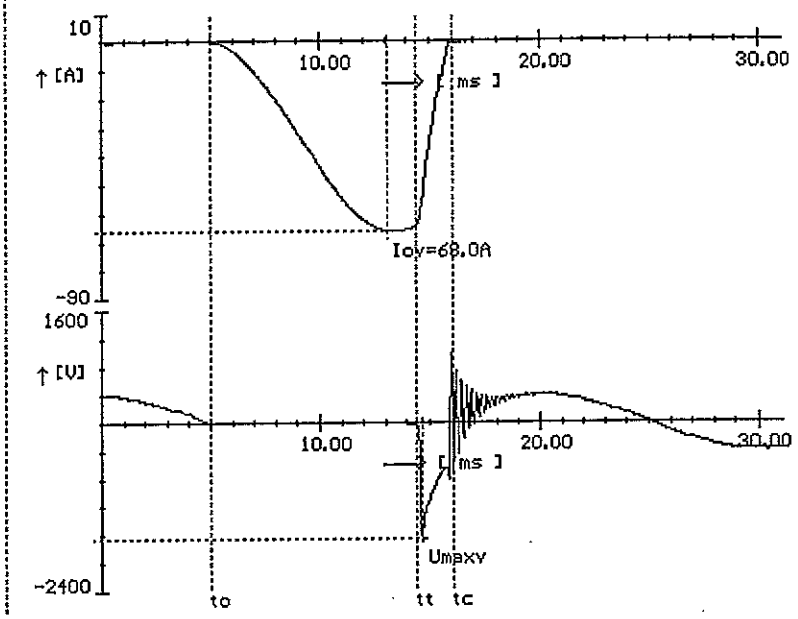
PV10gG, In = 4 A, dU = 215 mV, č.20 Záznam číslo 98648 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	34.47	A
Uef =	280	V
cosfi=	0.29	

Naměřené hodnoty

tt =	9.37	ms
tc =	11.03	ms
It =	66.00	A
Io =	68.00	A
Umax =	1696	V
Uzot =	288	V
I2tt =	19.27	A2s
I2tc =	21.50	A2s
Alfa =	3	st.el.
Psi =	171	st.el.
It =	1.91 x Ip	
Ri =	9999.00	MOhm



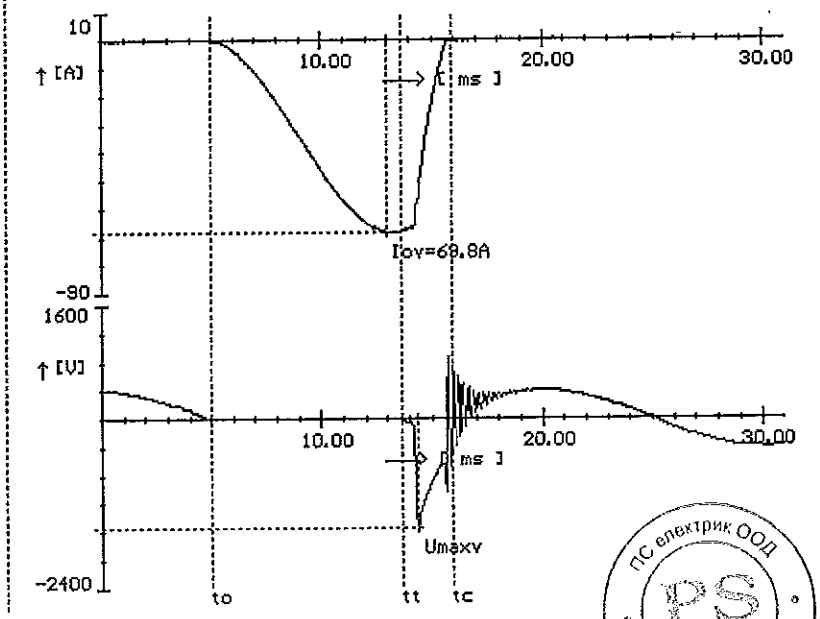
PV10gG, In = 4 A, dU = 216 mV, č.21 Záznam číslo 98649 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	34.47	A
Uef =	280	V
cosfi=	0.29	

Naměřené hodnoty

tt =	8.70	ms
tc =	10.93	ms
It =	69.20	A
Io =	69.80	A
Umax =	1568	V
Uzot =	288	V
I2tt =	17.66	A2s
I2tc =	21.84	A2s
Alfa =	1	st.el.
Psi =	157	st.el.
It =	2.01 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 4 A, dU = 200 mV, č.22

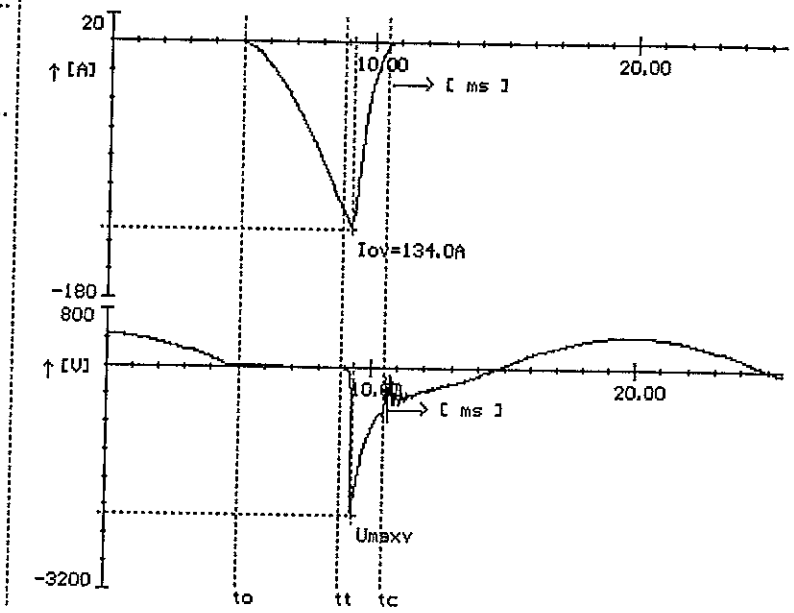
Záznam číslo 98661 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	129.75	A
Uef =	324	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.87	ms
tc =	5.50	ms
It =	120.00	A
Io =	134.00	A
Umax =	2192	V
Uzot =	328	V
I2tt =	13.98	A2s
I2tc =	24.91	A2s
Alfa =	6	st.el.
Psi =	74	st.el.
It =	0.92 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 4 A, dU = 213 mV, č.23

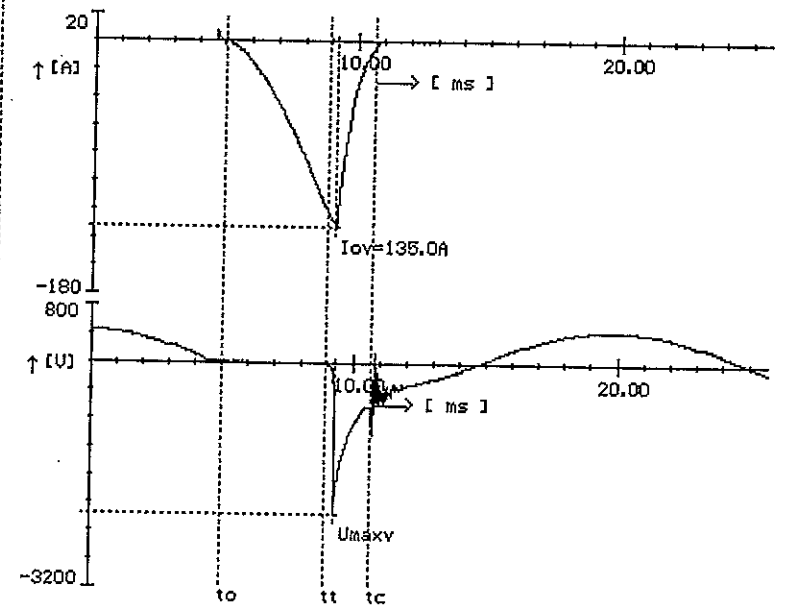
Záznam číslo 98662 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	129.75	A
Uef =	324	V
cosfi=	0.27	

Naměřené hodnoty

tt =	3.93	ms
tc =	5.63	ms
It =	125.00	A
Io =	135.00	A
Umax =	2200	V
Uzot =	328	V
I2tt =	15.84	A2s
I2tc =	26.15	A2s
Alfa =	4	st.el.
Psi =	74	st.el.
It =	0.96 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

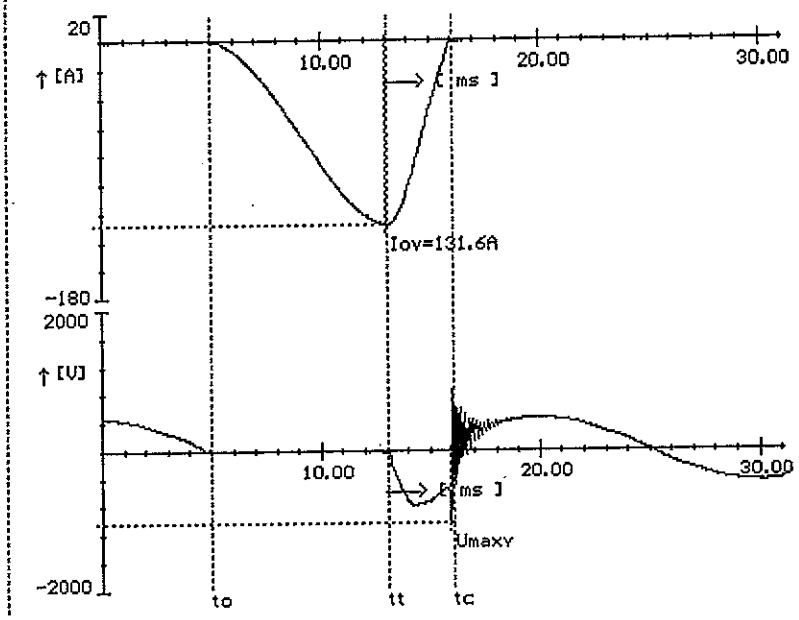
PV10gG, In = 6 A, dU = 120 mV, č.20 Záznam číslo 98653 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	65.62	A
Uef =	324	V
cosfi=	0.25	

Naměřené hodnoty

tt =	8.07	ms
tc =	11.07	ms
It =	131.60	A
Io =	131.60	A
Umax =	1056	V
Uzot =	328	V
I2tt =	51.04	A2s
I2tc =	72.14	A2s
Alfa =	5	st.el.
Psi =	149	st.el.
It =	2.01 x Ip	
Ri =	9999.00	MOhm



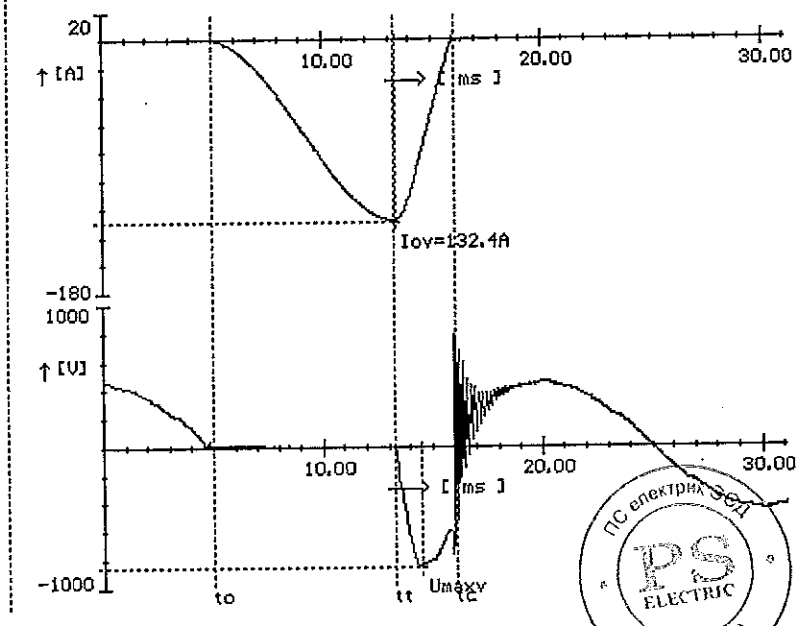
PV10gG, In = 6 A, dU = 125 mV, č.21 Záznam číslo 98654 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	65.62	A
Uef =	324	V
cosfi=	0.25	

Naměřené hodnoty

tt =	8.27	ms
tc =	11.07	ms
It =	131.60	A
Io =	132.40	A
Umax =	872	V
Uzot =	328	V
I2tt =	53.49	A2s
I2tc =	73.72	A2s
Alfa =	2	st.el.
Psi =	150	st.el.
It =	2.01 x Ip	
Ri =	9999.00	MOhm



ПС електрик ЕООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

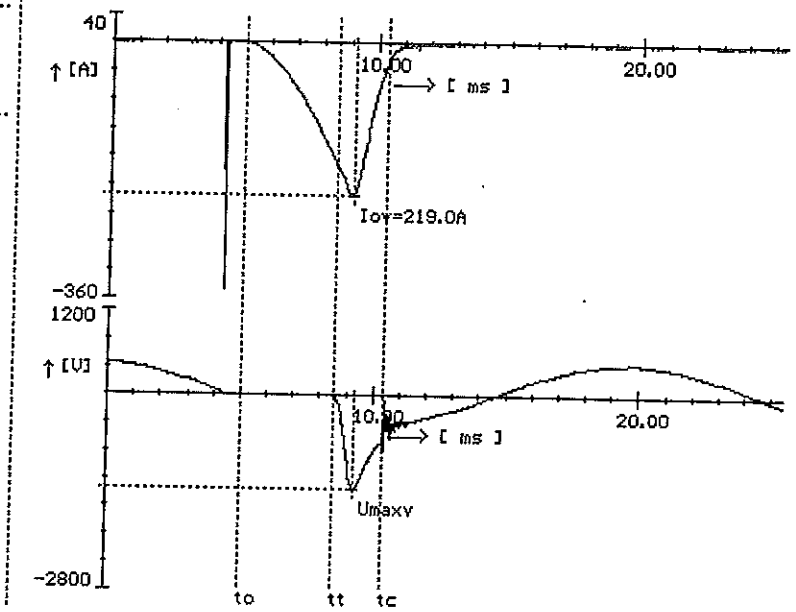
PV10gG, In = 6 A, dU = 113 mV, č.22 — Záznam číslo 98671 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	220.97	A
Uef =	324	V
cosfi=	0.23	

Naměřené hodnoty

tt =	3.57	ms
tc =	5.40	ms
It =	178.00	A
Io =	219.00	A
Umax =	1376	V
Uzot =	328	V
I2tt =	26.52	A2s
I2tc =	72.02	A2s
Alfa =	8	st.el.
Psi =	72	st.el.
It =	0.81 x Ip	
Ri =	9999.00	MOhm



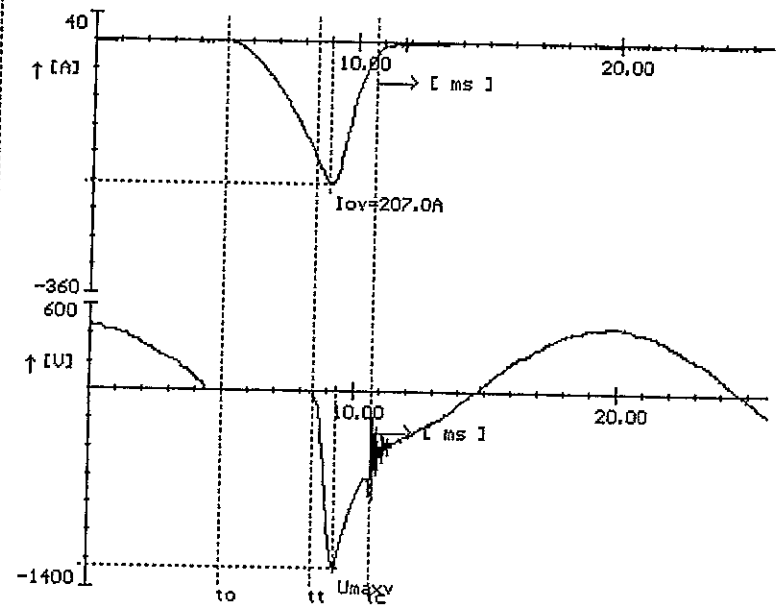
PV10gG, In = 6 A, dU = 113 mV, č.23 — Záznam číslo 98672 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	220.97	A
Uef =	324	V
cosfi=	0.23	

Naměřené hodnoty

tt =	3.50	ms
tc =	5.73	ms
It =	168.00	A
Io =	207.00	A
Umax =	1288	V
Uzot =	328	V
I2tt =	22.50	A2s
I2tc =	69.08	A2s
Alfa =	7	st.el.
Psi =	70	st.el.
It =	0.76 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

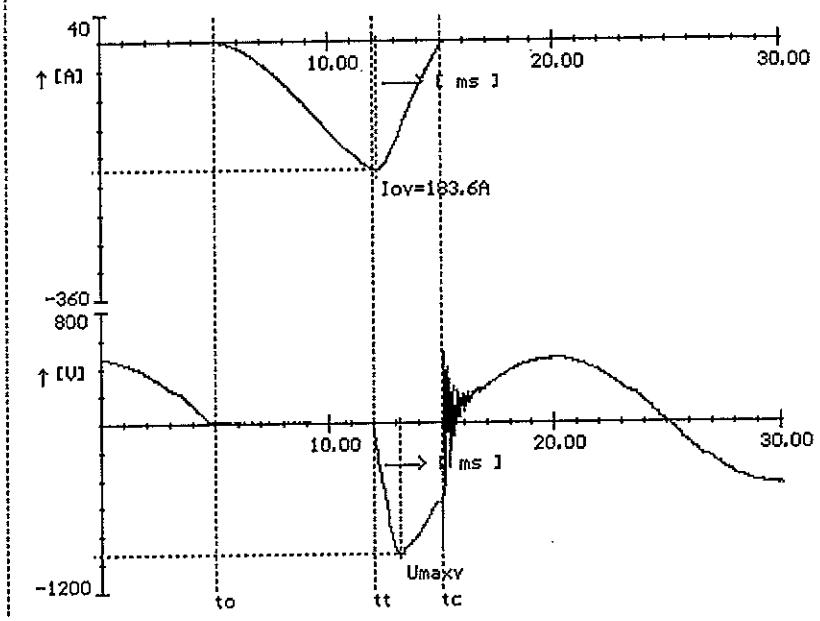
ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

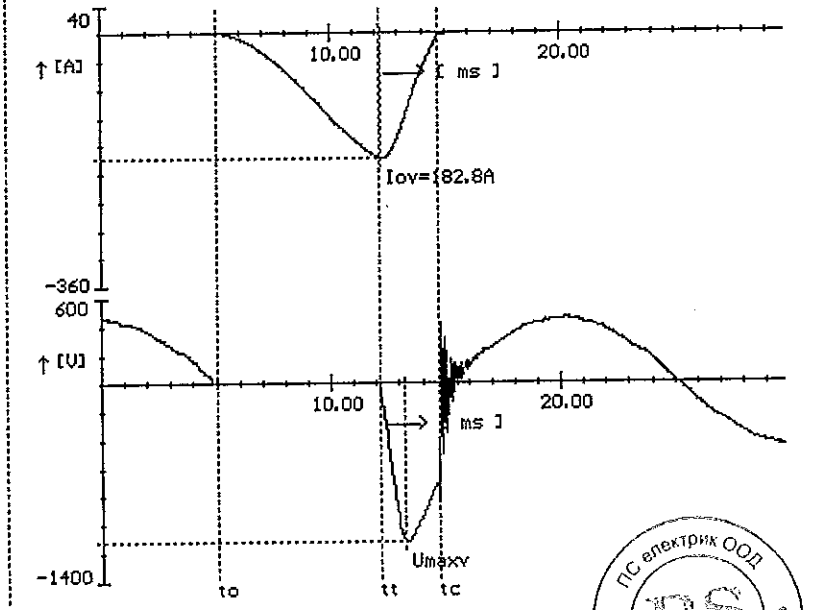
PV10gG, In = 8 A, dU = 108 mV, č.14 Záznam číslo 98658 ze dne 5. 4.2006

Nastavené hodnoty		
Ip =	95.64	A
Uef =	324	V
cosfi=	0.23	
Naměřené hodnoty		
tt =	7.00	ms
tc =	10.03	ms
It =	182.00	A
Io =	183.60	A
Unax =	960	V
Uzot =	328	V
I2tt =	69.63	A2s
I2tc =	113.24	A2s
Alfa =	4	st.el.
Psi =	129	st.el.
It =	1.90 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 8 A, dU = 109 mV, č.15 Záznam číslo 98659 ze dne 5. 4.2006

Nastavené hodnoty		
Ip =	95.64	A
Uef =	324	V
cosfi=	0.23	
Naměřené hodnoty		
tt =	7.13	ms
tc =	9.73	ms
It =	182.00	A
Io =	182.80	A
Unax =	1152	V
Uzot =	328	V
I2tt =	69.89	A2s
I2tc =	107.90	A2s
Alfa =	0	st.el.
Psi =	128	st.el.
It =	1.90 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

PV10gG, In = 8 A, dU = 101 mV, č. 16

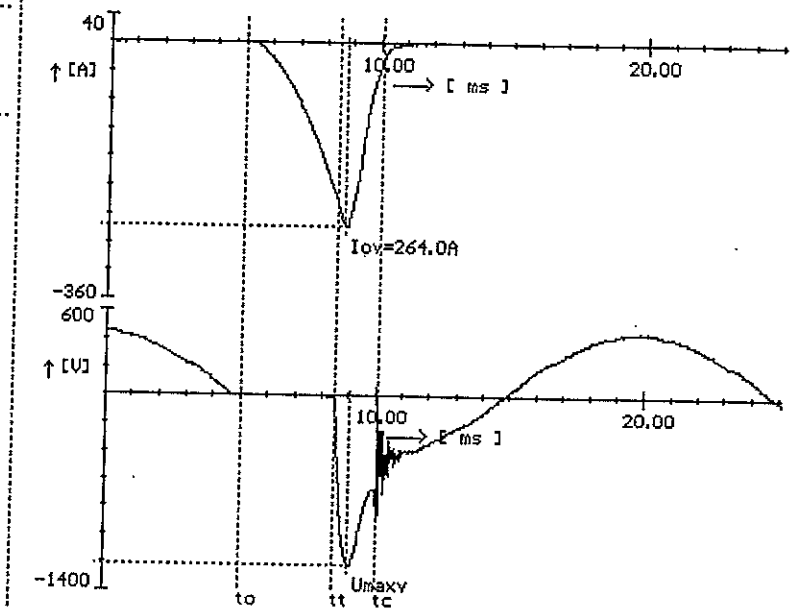
Záznam číslo 98678 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	315.20	A
Uef =	324	V
cosfi=	0.24	

Naměřené hodnoty

tt =	3.47	ms
tc =	5.07	ms
It =	226.00	A
Io =	264.00	A
Umax =	1248	V
Uzot =	328	V
I2tt =	38.73	A2s
I2tc =	93.50	A2s
Alfa =	4	st.el.
Psi =	66	st.el.
It =	0.72 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 8 A, dU = 101 mV, č. 17

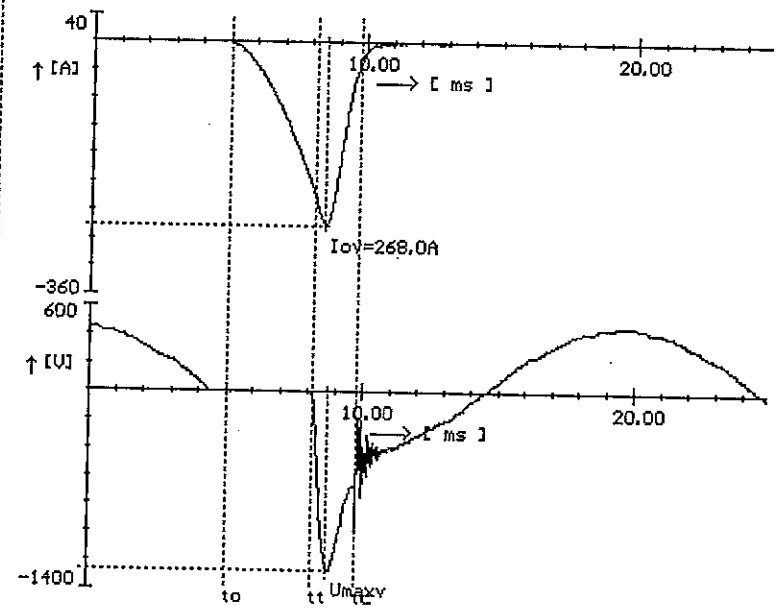
Záznam číslo 98680 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	315.20	A
Uef =	324	V
cosfi=	0.24	

Naměřené hodnoty

tt =	3.20	ms
tc =	4.77	ms
It =	226.00	A
Io =	268.00	A
Umax =	1296	V
Uzot =	328	V
I2tt =	39.01	A2s
I2tc =	96.98	A2s
Alfa =	10	st.el.
Psi =	67	st.el.
It =	0.72 x Ip	
Ri =	9999.00	MOhm

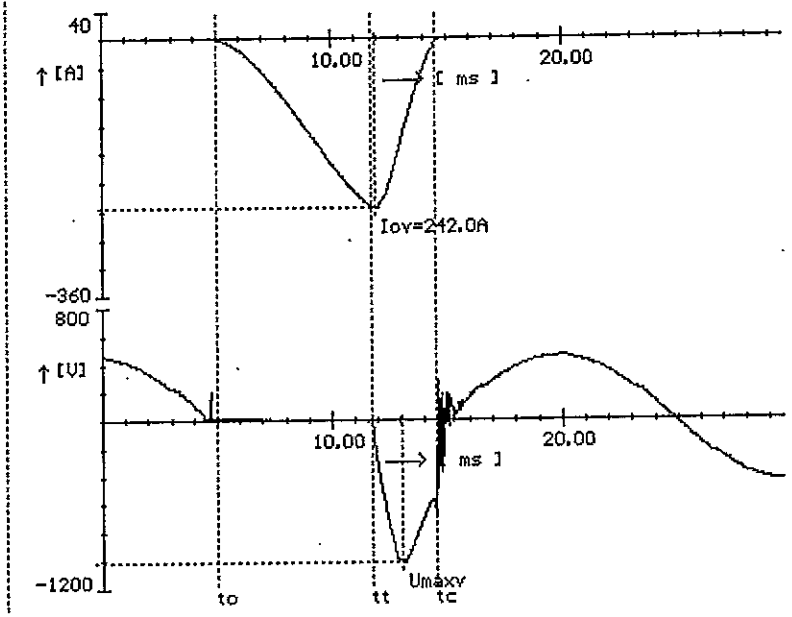


TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

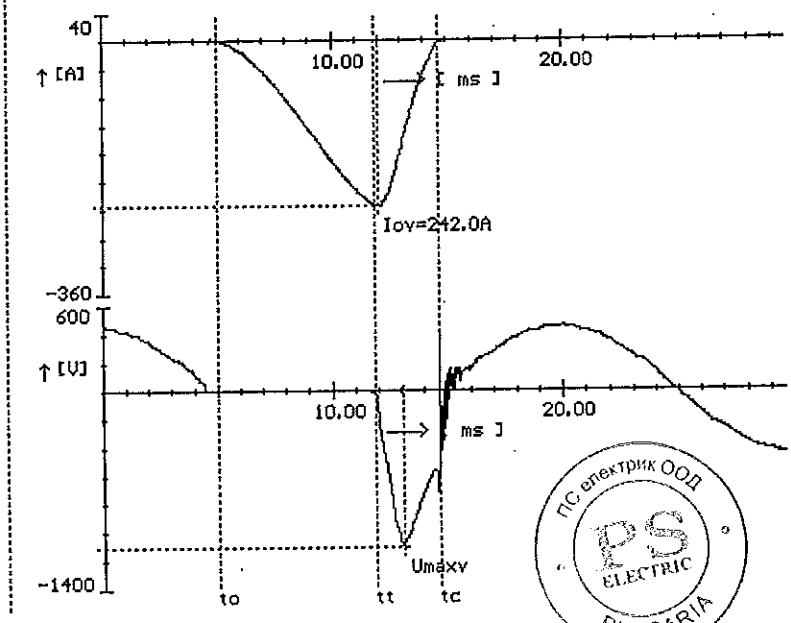
PV10gG, In = 10 A, dU = 104 mV, č.8 Záznam číslo 98663 ze dne 5. 4.2006

Nastavené hodnoty		
Ip =	129.75	A
Uef =	324	V
cosfi=	0.27	
Naměřené hodnoty		
tt =	6.77	ms
tc =	9.53	ms
It =	241.00	A
Io =	242.00	A
Umax =	1040	V
Uzot =	328	V
I2tt =	121.86	A2s
I2tc =	187.93	A2s
Alfa =	3	st.el.
Psi =	124	st.el.
It =	1.86 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 10 A, dU = 104 mV, č.9 Záznam číslo 98664 ze dne 5. 4.2006

Nastavené hodnoty		
Ip =	129.75	A
Uef =	324	V
cosfi=	0.27	
Naměřené hodnoty		
tt =	6.87	ms
tc =	9.60	ms
It =	241.00	A
Io =	242.00	A
Umax =	1128	V
Uzot =	328	V
I2tt =	123.57	A2s
I2tc =	188.35	A2s
Alfa =	2	st.el.
Psi =	125	st.el.
It =	1.86 x Ip	
Ri =	9999.00	MOhm



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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 10 A, dU = 96 mV, č.10

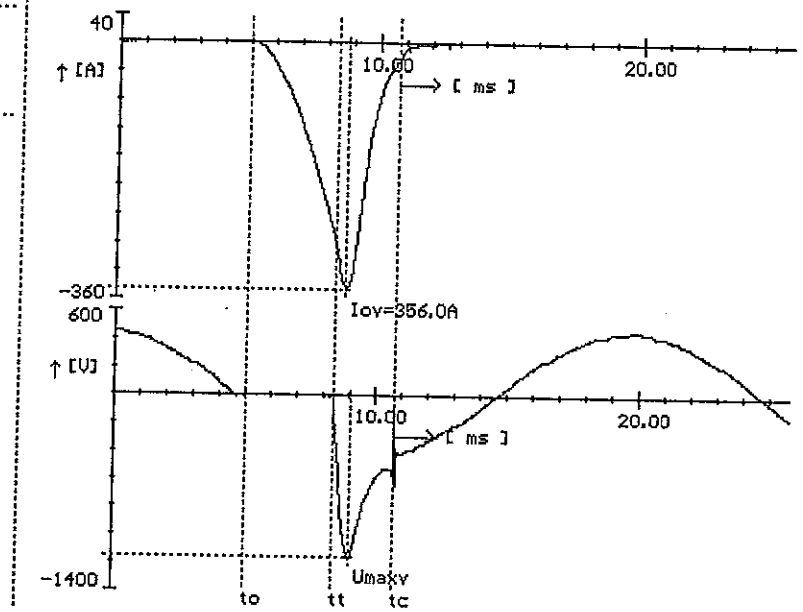
Záznam číslo 98682 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	403.76	A
Uef =	320	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.40	ms
tc =	5.70	ms
It =	286.00	A
Io =	356.00	A
Umax =	1192	V
Uzot =	328	V
I2tt =	62.61	A2s
I2tc =	175.38	A2s
Alfa =	8	st.el.
Psi =	68	st.el.
It =	0.71 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 10 A, dU = 96.5 mV, č.11

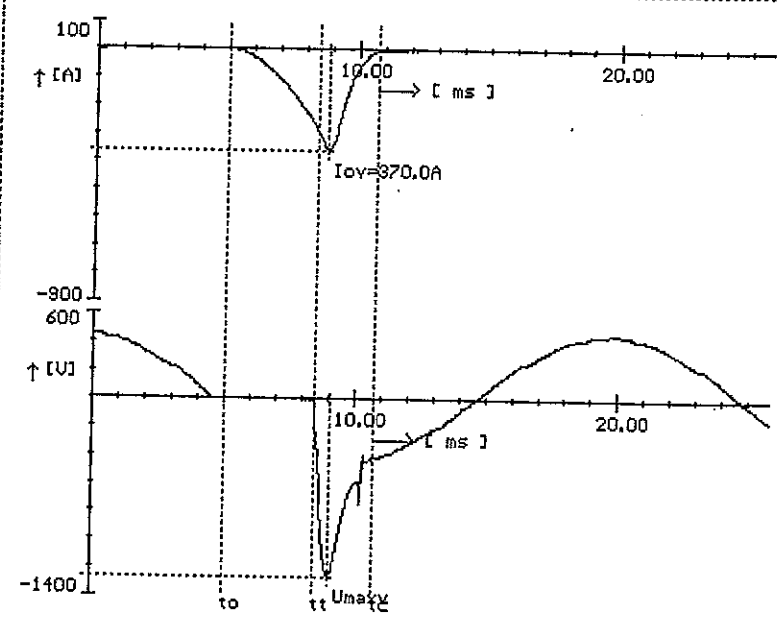
Záznam číslo 98683 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	403.76	A
Uef =	320	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.50	ms
tc =	5.77	ms
It =	300.00	A
Io =	370.00	A
Umax =	1296	V
Uzot =	320	V
I2tt =	67.93	A2s
I2tc =	178.13	A2s
Alfa =	7	st.el.
Psi =	70	st.el.
It =	0.74 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

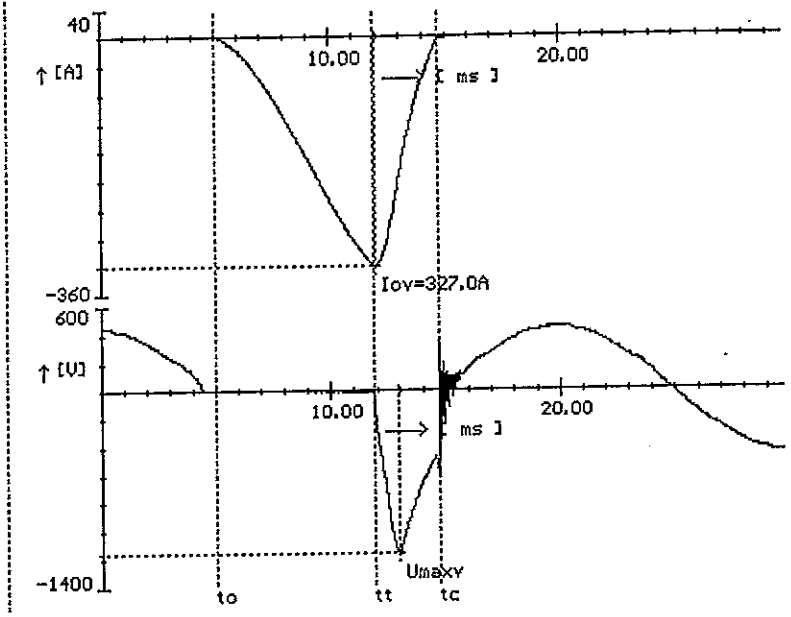
PV10gG, In = 12 A, dU = 94.5 mV, č.20 Záznam číslo 98668 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	174.66	A
Uef =	324	V
cosfi=	0.26	

Naměřené hodnoty

tt =	6.83	ms
tc =	9.67	ms
It =	325.00	A
Io =	327.00	A
Umax =	1184	V
Uzot =	328	V
I2tt =	220.17	A2s
I2tc =	334.06	A2s
Alfa =	5	st.el.
Psi =	127	st.el.
It =	1.86 x Ip	
Ri =	9999.00	MOhm



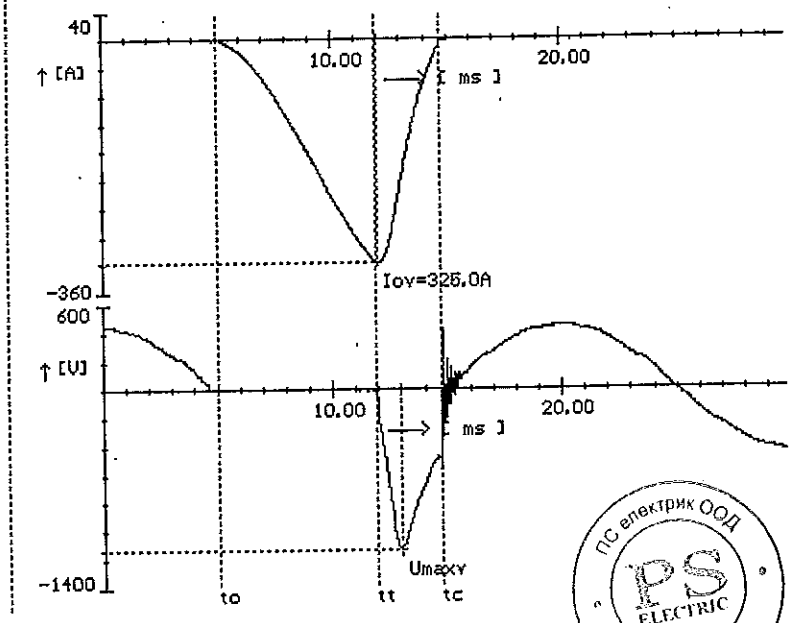
PV10gG, In = 12 A, dU = 94 mV, č.21 Záznam číslo 98669 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	174.66	A
Uef =	324	V
cosfi=	0.26	

Naměřené hodnoty

tt =	6.93	ms
tc =	9.73	ms
It =	324.00	A
Io =	325.00	A
Umax =	1160	V
Uzot =	320	V
I2tt =	220.73	A2s
I2tc =	330.36	A2s
Alfa =	0	st.el.
Psi =	124	st.el.
It =	1.86 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

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TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

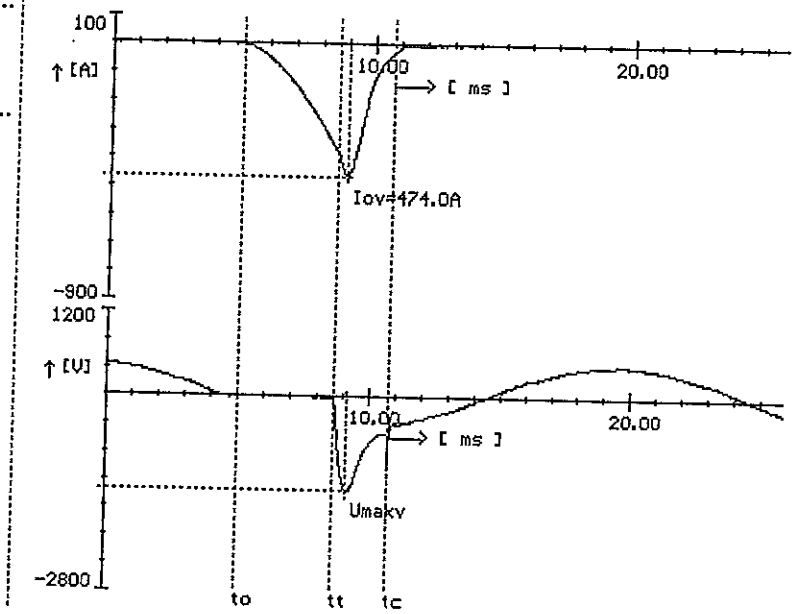
PV10gG, In = 12 A, dU = 86.5 mV, č.22 — Záznam číslo 98689 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	450.77	A
Uef =	320	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.63	ms
tc =	5.77	ms
It =	386.00	A
Io =	474.00	A
Umax =	1384	V
Uzot =	328	V
I2tt =	131.60	A2s
I2tc =	316.63	A2s
Alfa =	11	st.el.
Psi =	76	st.el.
It =	0.86 x Ip	
Ri =	9999.00	MOhm



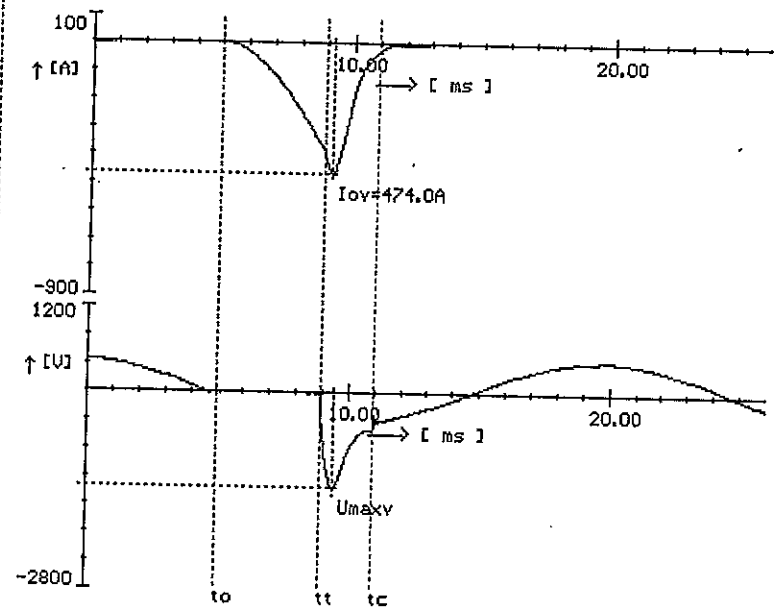
PV10gG, In = 12 A, dU = 86.5 mV, č.23 — Záznam číslo 98690 ze dne 5. 4.2006

Nastavené hodnoty

Ip =	450.77	A
Uef =	320	V
cosfi=	0.25	

Naměřené hodnoty

tt =	3.90	ms
tc =	5.93	ms
It =	392.00	A
Io =	474.00	A
Umax =	1384	V
Uzot =	328	V
I2tt =	136.93	A2s
I2tc =	315.05	A2s
Alfa =	6	st.el.
Psi =	76	st.el.
It =	0.87 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

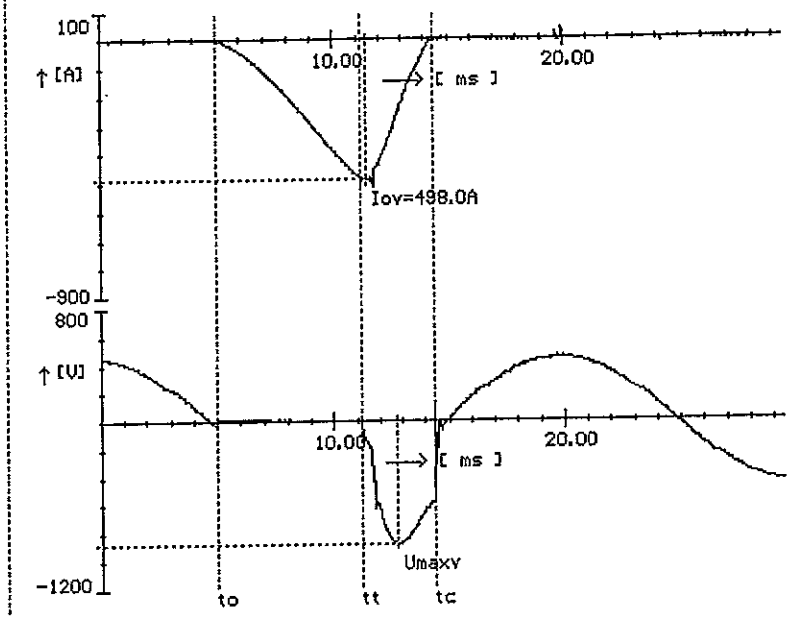
PV10gG, In = 16 A, dU = 89 mV, č.14 Záznam číslo 99982 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	278.25	A
Uef =	324	V
cosfi=	0.24	

Naměřené hodnoty

tt =	6.17	ms
tc =	9.40	ms
It =	492.00	A
Io =	498.00	A
Umax =	896	V
Uzot =	328	V
I2tt =	448.24	A2s
I2tc =	781.96	A2s
Alfa =	2	st.el.
Psi =	112	st.el.
It =	1.77 x Ip	
Ri =	9999.00	MOhm



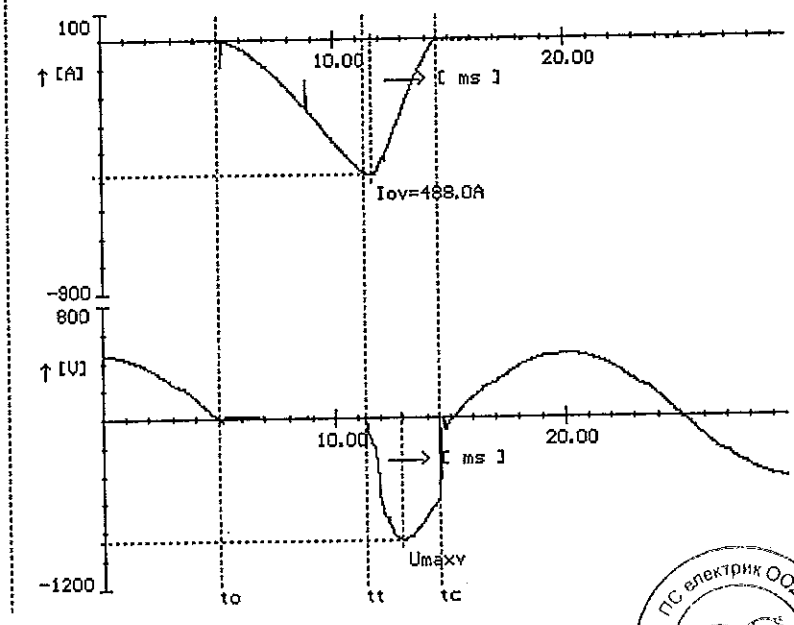
PV10gG, In = 16 A, dU = 89 mV, č.15 Záznam číslo 99983 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	278.25	A
Uef =	324	V
cosfi=	0.24	

Naměřené hodnoty

tt =	6.33	ms
tc =	9.53	ms
It =	488.00	A
Io =	488.00	A
Umax =	888	V
Uzot =	320	V
I2tt =	429.26	A2s
I2tc =	747.69	A2s
Alfa =	0	st.el.
Psi =	114	st.el.
It =	1.76 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 16 A, dU = 84 mV, č.16

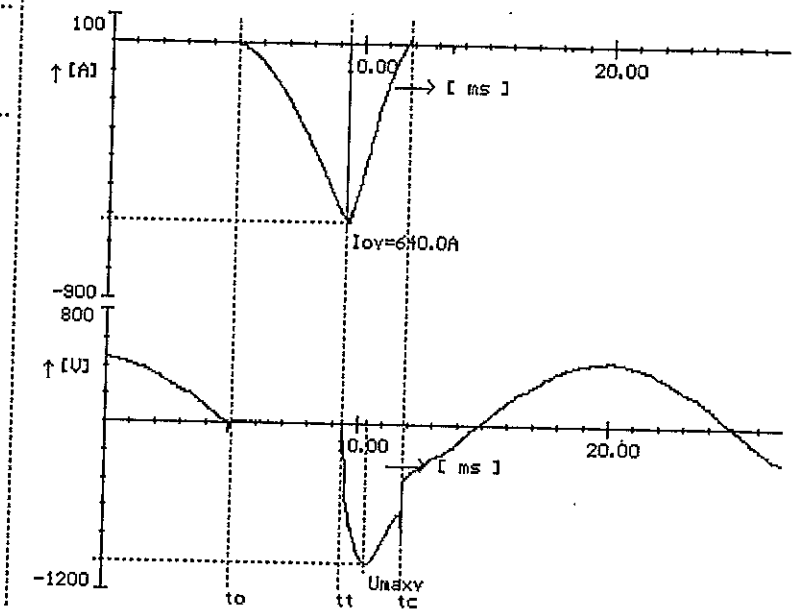
Záznam číslo 99977 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	543.77	A
Uef =	320	V
cosfí=	0.23	

Naměřené hodnoty

tt =	4.40	ms
tc =	6.87	ms
It =	636.00	A
Io =	640.00	A
Umax =	1024	V
Uzot =	320	V
I2tt =	456.46	A2s
I2tc =	761.03	A2s
Alfa =	3	st.el.
Psi =	82	st.el.
It =	1.17 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 16 A, dU = 85 mV, č.17

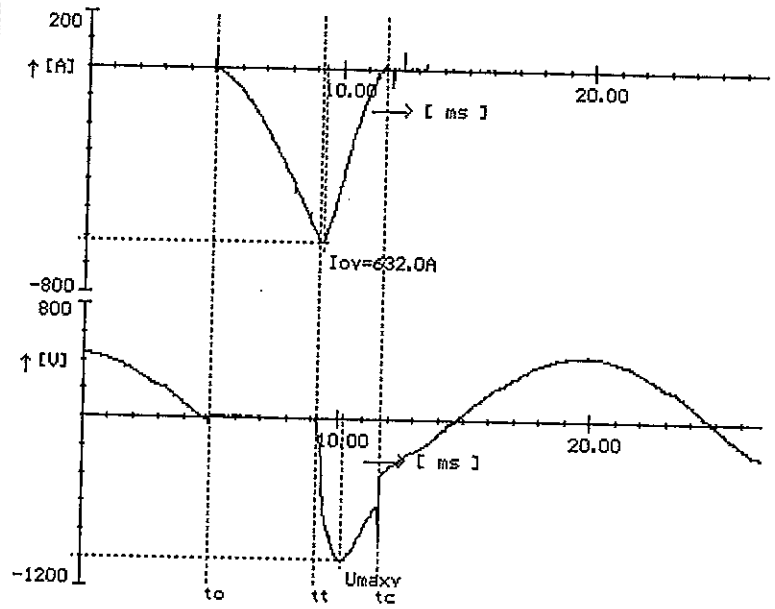
Záznam číslo 99978 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	543.77	A
Uef =	320	V
cosfí=	0.23	

Naměřené hodnoty

tt =	4.20	ms
tc =	6.73	ms
It =	624.00	A
Io =	632.00	A
Umax =	1032	V
Uzot =	320	V
I2tt =	429.80	A2s
I2tc =	752.26	A2s
Alfa =	5	st.el.
Psi =	80	st.el.
It =	1.15 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

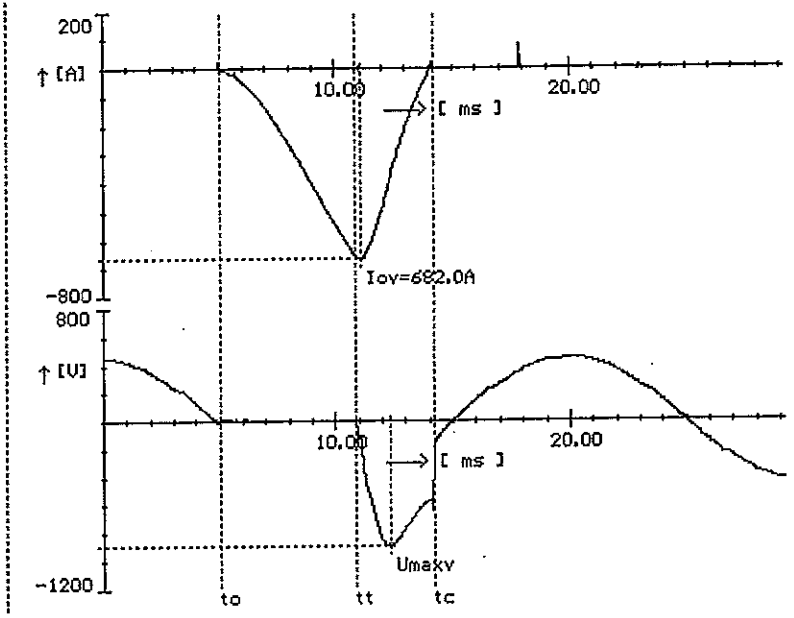
PV10gG, In = 20 A, dU = 80 mV, č.20 — Záznam číslo 99980 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	408.00	A
Uef =	320	V
cosfi=	0.24	

Naměřené hodnoty

tt =	6.87	ms
tc =	9.17	ms
It =	672.00	A
Io =	682.00	A
Umax =	920	V
Uzot =	320	V
I2tt =	740.98	A2s
I2tc =	1326.57	A2s
Alfa =	1	st.el.
Psi =	106	st.el.
It =	1.65 x Ip	
Ri =	9999.00	MOhm



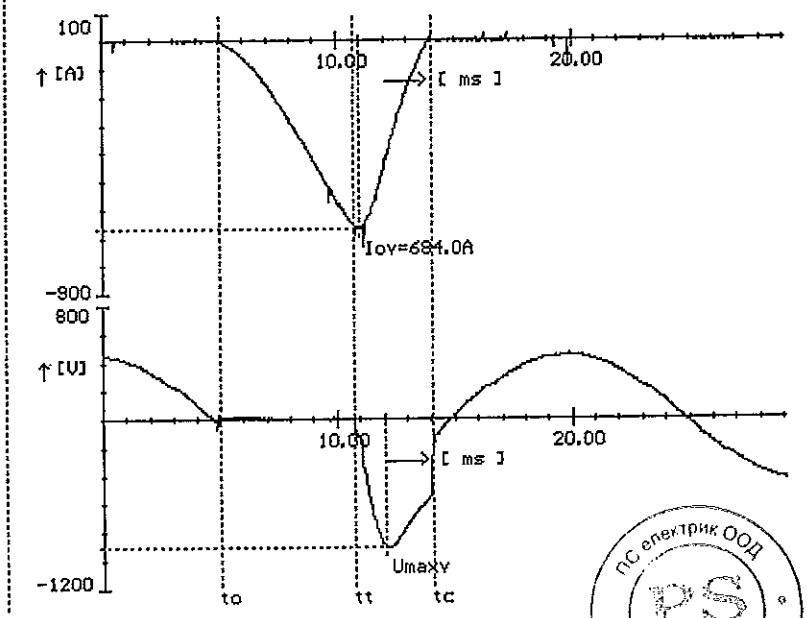
PV10gG, In = 20 A, dU = 80.5 mV, č.21 — Záznam číslo 99981 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	408.00	A
Uef =	320	V
cosfi=	0.24	

Naměřené hodnoty

tt =	6.73	ms
tc =	9.07	ms
It =	672.00	A
Io =	684.00	A
Umax =	936	V
Uzot =	320	V
I2tt =	748.83	A2s
I2tc =	1356.44	A2s
Alfa =	4	st.el.
Psi =	107	st.el.
It =	1.65 x Ip	
Ri =	9999.00	MOhm



TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 20 A, dU = 78 mV, č.22

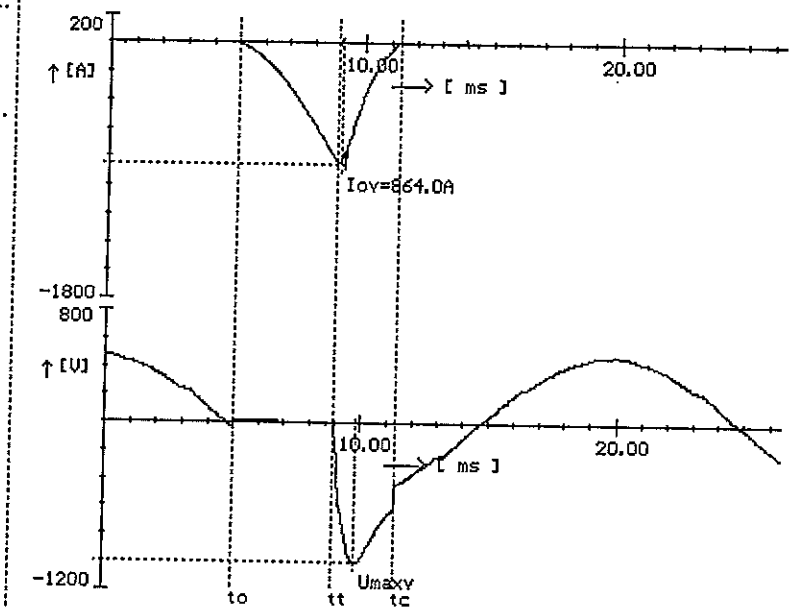
Záznam číslo 99972 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	793.37	A
Uef =	332	V
cosfi=	0.28	

Naměřené hodnoty

tt =	3.93	ms
tc =	6.40	ms
It =	848.00	A
Io =	864.00	A
Umax =	1032	V
Uzot =	344	V
I2tt =	747.55	A2s
I2tc =	1263.84	A2s
Alfa =	6	st.el.
Psi =	76	st.el.
It =	1.07 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 20 A, dU = 80 mV, č.23

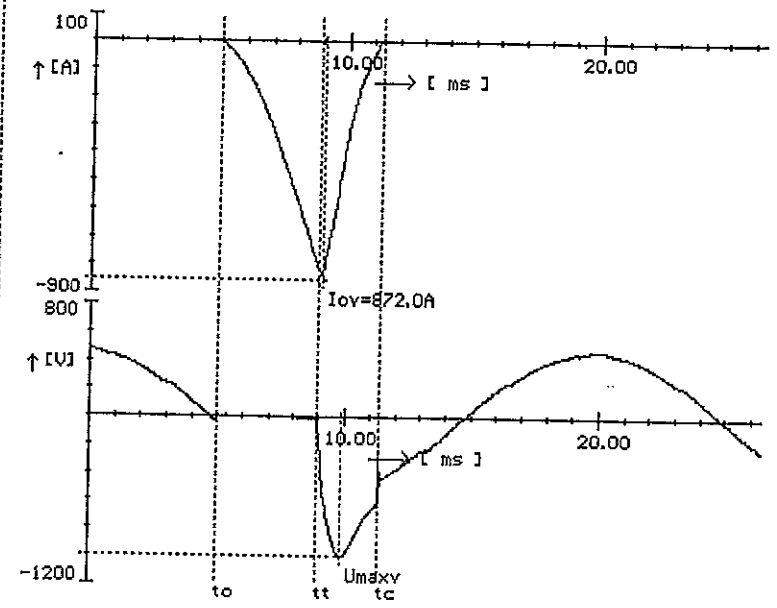
Záznam číslo 99973 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	793.37	A
Uef =	332	V
cosfi=	0.28	

Naměřené hodnoty

tt =	3.93	ms
tc =	6.37	ms
It =	840.00	A
Io =	872.00	A
Umax =	1032	V
Uzot =	336	V
I2tt =	731.85	A2s
I2tc =	1236.53	A2s
Alfa =	5	st.el.
Psi =	75	st.el.
It =	1.06 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

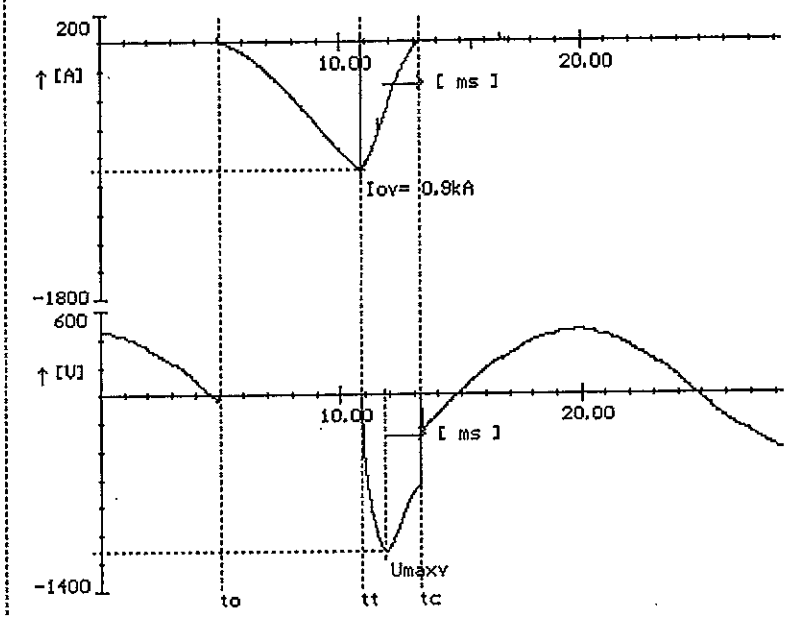
PV10gG, In = 25 A, dU = 76 mV, č.23 Záznam číslo 99975 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	543.77	A
Uef =	320	V
cosfi=	0.23	

Naměřené hodnoty

tt =	5.80	ms
tc =	8.30	ms
It =	916.00	A
Io =	916.00	A
Umax =	1144	V
Uzot =	328	V
I2tt =	1399.31	A2s
I2tc =	2073.68	A2s
Alfa =	4	st.el.
Psi =	108	st.el.
It =	1.68 x Ip	
Ri =	9999.00	MOhm



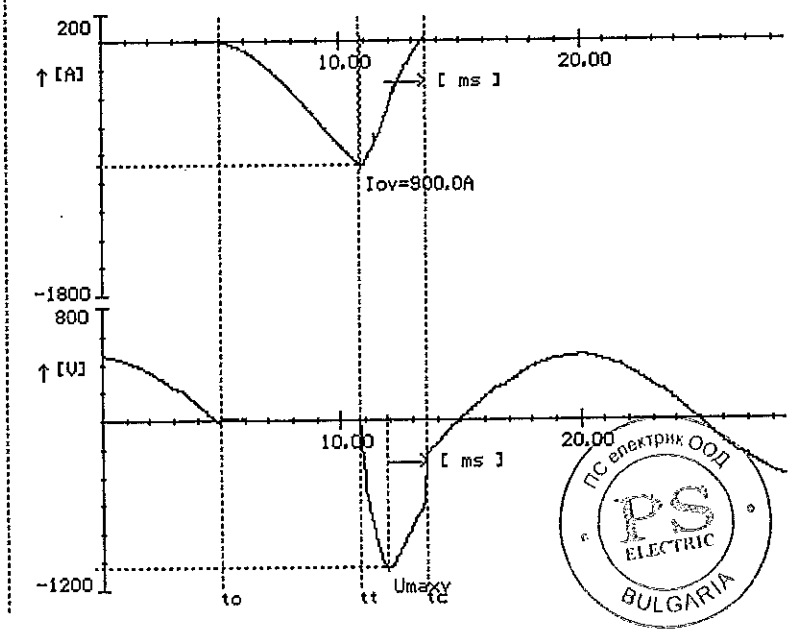
PV10gG, In = 25 A, dU = 76 mV, č.24 Záznam číslo 99976 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	543.77	A
Uef =	320	V
cosfi=	0.23	

Naměřené hodnoty

tt =	5.73	ms
tc =	8.50	ms
It =	888.00	A
Io =	900.00	A
Umax =	1072	V
Uzot =	320	V
I2tt =	1255.41	A2s
I2tc =	2044.06	A2s
Alfa =	1	st.el.
Psi =	104	st.el.
It =	1.63 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

PV10gG, In = 25 A, dU = 74 mV, č.25

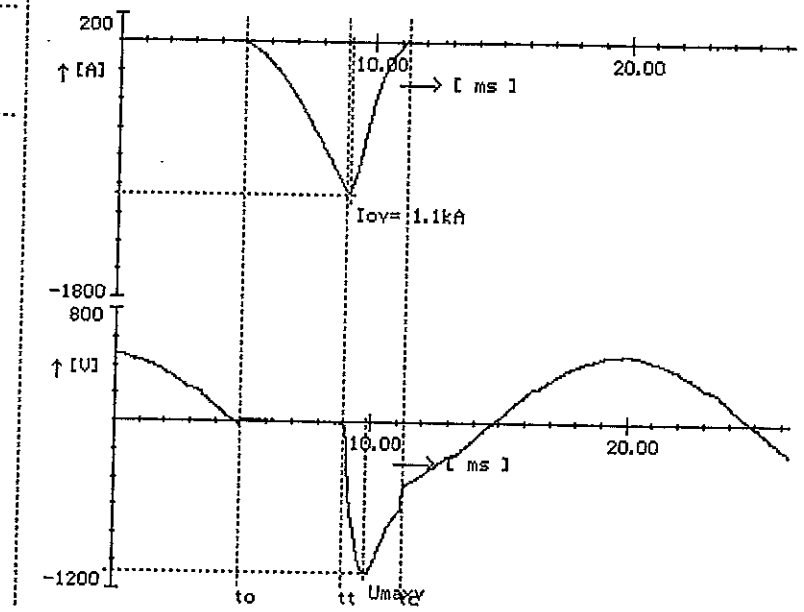
Záznam číslo 99964 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	1010	A
Uef =	340	V
cosfi=	0.26	

Naměřené hodnoty

tt =	4.00	ms
tc =	6.30	ms
It =	1072	A
Io =	1088	A
Umax =	1112	V
Uzot =	344	V
I2tt =	1189.52	A2s
I2tc =	1967.25	A2s
Alfa =	5	st.el.
Psi =	76	st.el.
It =	1.06 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 25 A, dU = 74 mV, č.26

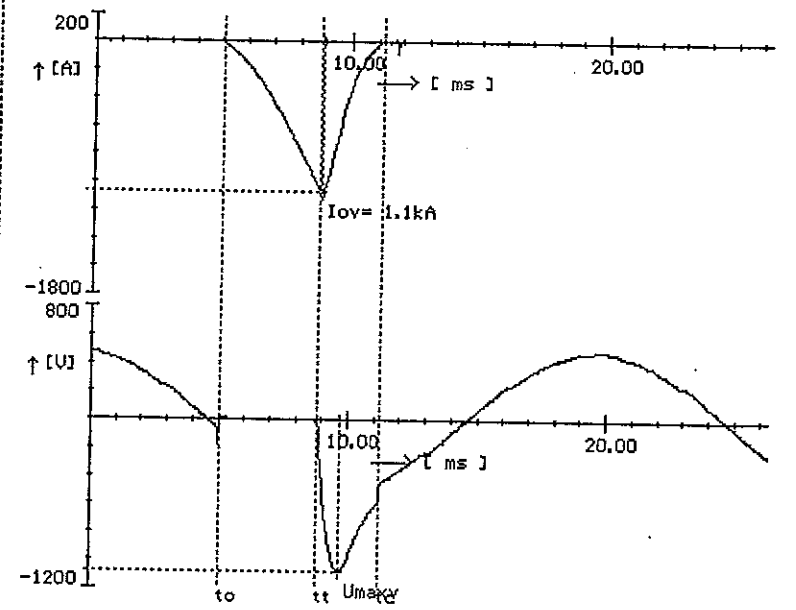
Záznam číslo 99965 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	1010	A
Uef =	340	V
cosfi=	0.26	

Naměřené hodnoty

tt =	3.80	ms
tc =	6.27	ms
It =	1072	A
Io =	1092	A
Umax =	1112	V
Uzot =	344	V
I2tt =	1177.36	A2s
I2tc =	1986.90	A2s
Alfa =	8	st.el.
Psi =	76	st.el.
It =	1.06 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

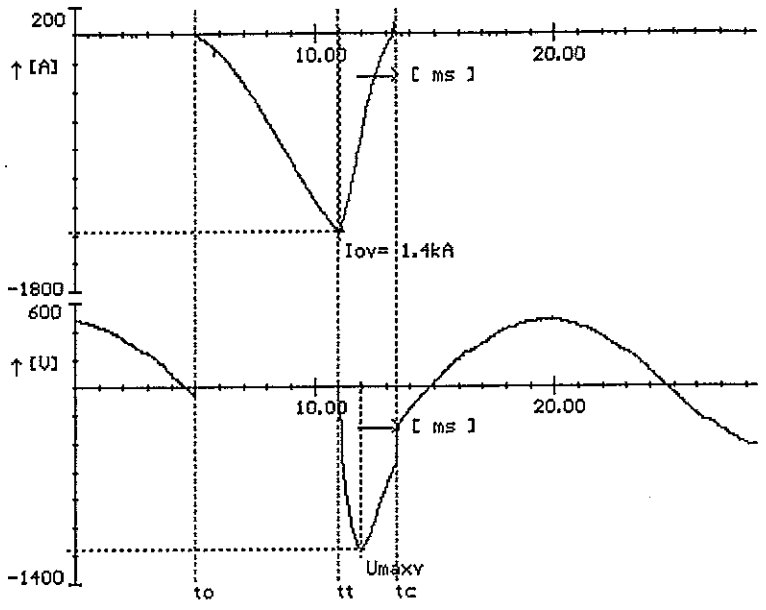
ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

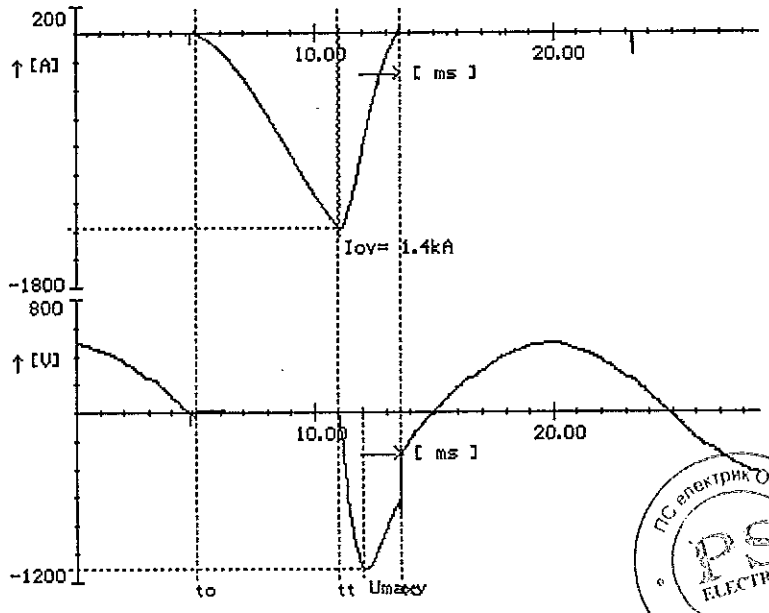
PV10gG, In = 32 A, dU = 62.5 mV, č.23 Záznam číslo 99970 ze dne 8. 6.2006

Nastavené hodnoty		
Ip =	793.37	A
Uef =	332	V
cosfi=	0.28	
Naměřené hodnoty		
tt =	5.97	ms
tc =	8.43	ms
It =	1408.00	A
Io =	1408.00	A
Unax =	1184	V
Uzot =	344	V
I2tt =	3632.89	A2s
I2tc =	5138.28	A2s
Alfa =	5	st.el.
Psi =	112	st.el.
It =	1.77 x Ip	
Ri =	9999.00	MOhm



PV10gG, In = 32 A, dU = 62.5 mV, č.24 Záznam číslo 99971 ze dne 8. 6.2006

Nastavené hodnoty		
Ip =	793.37	A
Uef =	332	V
cosfi=	0.28	
Naměřené hodnoty		
tt =	6.00	ms
tc =	8.60	ms
It =	1408.00	A
Io =	1416.00	A
Umax =	1144	V
Uzot =	344	V
I2tt =	3572.32	A2s
I2tc =	5354.69	A2s
Alfa =	2	st.el.
Psi =	109	st.el.
It =	1.77 x Ip	
Ri =	9999.00	MOhm



ПС ЕЛЕКТРИК ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TEST REPORT

IEC 60269-1:98 3rd ed.+ Amd1:05; IEC 60269-2: 2nd ed.+ Amd1:95+ Amd2:01; IEC 60269-2-1:04 4th ed.

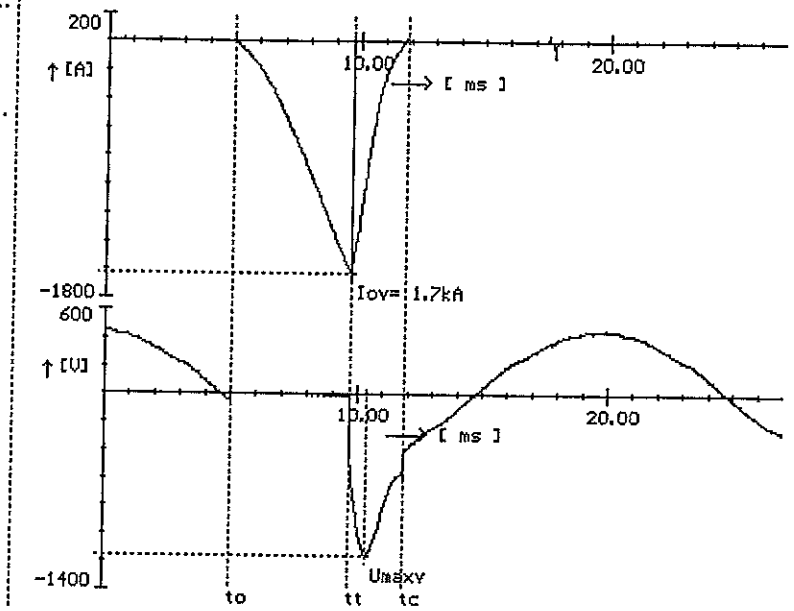
PV10gG, In = 32 A, dU = 60.6 mV, č.25 — Záznam číslo 99961 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	1220	A
Uef =	312	V
cosfi=	0.28	

Naměřené hodnoty

tt =	4.67	ms
tc =	6.87	ms
It =	1664	A
Io =	1664	A
Umax =	1184	V
Uzot =	328	V
I2tt =	3596.55	A2s
I2tc =	4939.33	A2s
Alfa =	6	st.el.
Psi =	89	st.el.
It =	1.36 x Ip	
Ri =	9999.00	MOhm



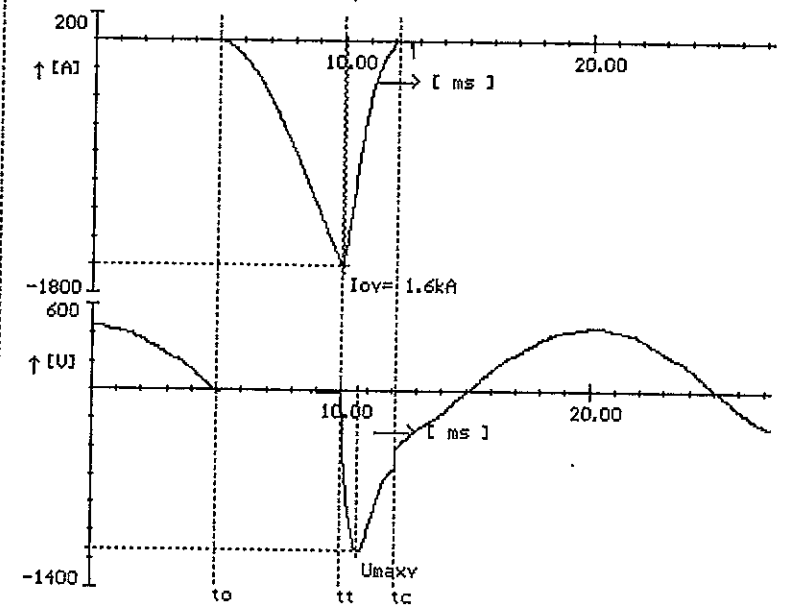
PV10gG, In = 32 A, dU = 60 mV, č.26 — Záznam číslo 99962 ze dne 8. 6.2006

Nastavené hodnoty

Ip =	1220	A
Uef =	312	V
cosfi=	0.28	

Naměřené hodnoty

tt =	4.97	ms
tc =	7.20	ms
It =	1632	A
Io =	1640	A
Umax =	1168	V
Uzot =	320	V
I2tt =	3441.76	A2s
I2tc =	4816.47	A2s
Alfa =	0	st.el.
Psi =	89	st.el.
It =	1.34 x Ip	
Ri =	9999.00	MOhm



ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

8.5 No 1 Изключвателна способност (I_1)

8.5 No 2 Изключвателна способност (I_2)

8.5 No 2 Изключвателна способност (I_3)

8.5 No 2 Изключвателна способност (I_4)

8.5 No 2 Изключвателна способност (I_5)

8.7.4 Термично претоварване

8.9.2 Устойчивост на температура

8.11.1.8 Устойчивост на удар

8.11.2.2 Устойчивост на свръх нормална температура и огън

8.11.2.4 Проверка за ненарушимостта на изолиращите части

Приложение 2

NÁRODNÍ AKREDITAČNÍ ORGÁN

Český institut pro akreditaci, o.p.s.
130 00 Praha 3, Olšanská 54/3

vydává

OSVĚDČENÍ O AKREDITACI

č. 635 / 2012

Elektrotechnický zkušební ústav, s.p.
se sídlem Pod Lisem 129, 171 02 Praha 8 - Troja, IČ 00001481

pro zkušební laboratoř č. 1056
Zkušební laboratoř

Předmět akreditace:

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

Toto osvědčení o akreditaci vydal Český institut pro akreditaci, o.p.s. na základě posouzení splnění akreditačních požadavků podle

ČSN EN ISO/IEC 17025:2005

a po zjištění, že zkušební laboratoř je odborně způsobilá objektivně a nezávisle vykonávat činnosti uvedené v rozsahu předmětu akreditace.

Adresát tohoto osvědčení je oprávněn používat při své činnosti v rozsahu tohoto osvědčení a po dobu jeho platnosti vedle svého názvu označení „zkušební laboratoř akreditovaná ČIA č. 1056", pod podmínkou, že bude vždy postupovat v souladu s příslušnými předpisy vztahujícími se k činnosti akreditované zkušební laboratoře, a to zejména ČSN EN ISO/IEC 17011, čl. 8.1, ČSN EN ISO/IEC 17025, zákona č. 22/1997Sb., o technických požadavcích na výrobky, ve znění pozdějších předpisů, včetně navazujících předpisů vydaných Českým institutem pro akreditaci, o.p.s.

Prokáže-li se, že adresát tohoto osvědčení neplní akreditační požadavky rozhodné pro jeho vydání a nedodržuje závazky podmiňující akreditaci, může Český institut pro akreditaci, o.p.s. účinnost tohoto osvědčení pozastavit nebo osvědčení o akreditaci zrušit.

Toto osvědčení je vydáno v souladu s ustanovením § 16 odst. 1 zákona č. 22/1997 Sb., o technických požadavcích na výrobky a v souladu s ustanovením § 151 zákona č. 500/2004 Sb., správní řád.

Toto osvědčení je platné do **15.10.2017**

V Praze dne 07.11.2012

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

ВЯРНО С ОРИГИНАЛА

Превод от чешки ези

Чешки институт по акредитация
130 00 Прага 3, Олшанска 54/3

издава

УДОСТОВЕРЕНИЕ ЗА АКРЕДИТАЦИЯ

№ 635 /2012

на
Изпитвателна лаборатория №1056
Електротехнически изпитвателен институт , държ.предпр.
Под Лисем 129, 171 02 Прага 8 – Троя, Ин № 00001481

Предмет на акредитацията

Изпитване на изделия, детайли, части, материали и пособия до степента, определена в Приложението на това удостоверение.

Това свидетелство за акредитация се издава от Чешкия институт по акредитация СОД въз основа на оценката и изпълнението на критериите за акредитация съгласно

CSN EN ISO/IEC 17025:2005

и след констатацията и установяване обективно и независимо, че лабораторията за изпитване е компетентна да извърши дейностите, включени в обхвата на предмета на акредирация.
Адресатът на удостоверението е упълномощен да го използва в своята дейност в този обхват и време на валидност, добавяйки към своето название и обозначението „акредитирана изпитвателна лаборатория №1056", ако спазва всички съответстващи предисания, отнасящи се до дейността на акредитираната изпитвателна лаборатория, включително предписанията, издадени от Чешкия институт по акредитация СОД.

При условие че адресатът на това свидетелство не изпълнява критериите за акредитация, приложими към издаването му и задълженията произтичащи от акредитацията, то Чешкия институт по акредитация СОД., може да преустанови удостоверението за акредитация или да го отмени, или измени.

Настоящото удостоверение се иаздава в съответствие с § 16 от Закон № 22 / 1997., за техническите изисквания към продуктите и в съответствие с разпоредбите на §15, от Закон № 500/2004, Административно-процесуален.

Настоящото удостоверение е в сила до 15.10.2017 г.

Прага , 07.11.2012г.

Подпис: / не се чете /
инж. Иржи Ружичка
директор на Чешкия институт по акредитация СОД

ПС електрик ООД ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

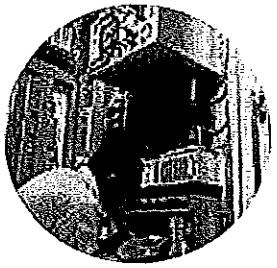
Приложение 28, 29

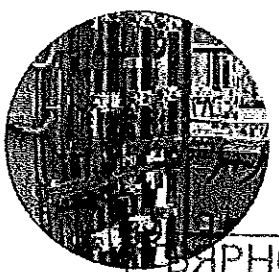
The GUIDE

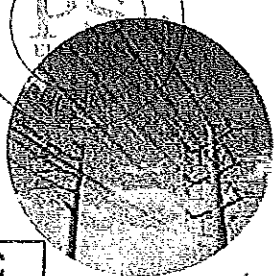
FERRAZ SHAWMUT IS NOW

MERSEN

Overcurrent Protection/Surge Protection







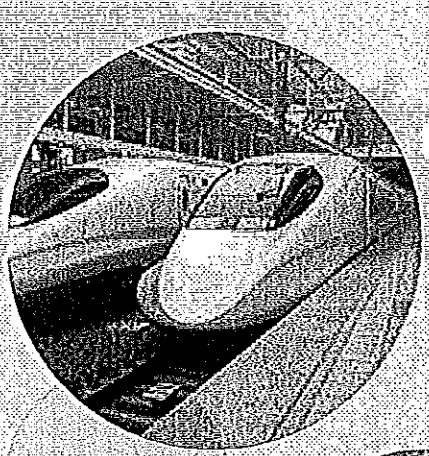
FERRAZ SHAWMUT IS NOW

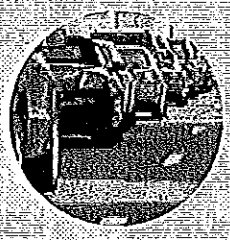
MERSEN

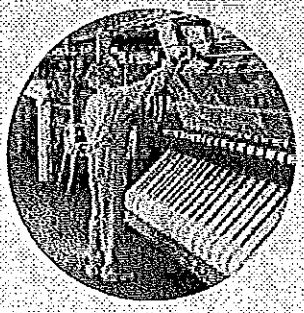
Expertise, our source of energy

Mersen is One Company

Ferraz Shawmut has long benefited from being part of Carbone Lorraine, a large international group which specializes in providing high-performance materials for extreme environments and solutions to enhance the reliability and safety of electrical systems.
The company now consolidates its identity under one name – Mersen.







We are Mersen

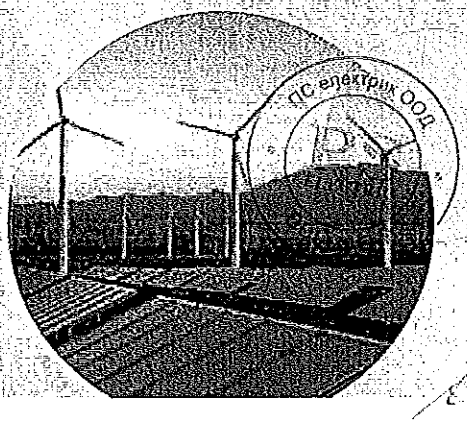
The name change reflects our history - and more importantly our strategic direction. Ferraz Shawmut is now Mersen.

Mersen is Diversity

We embrace diversity. Through innovative product development and strategic acquisitions we are positioned to serve a broad range of electrical applications with diverse solutions. We are a recognized leader in diverse markets - energy, transportation, chemical/pharmaceutical, electronics, process industries with a focus on sustainability. Our people represent every nationality around the globe, with production located to serve local markets across Asia, Europe and the Americas.
We are a diverse company operating under a single mission – Mersen.

Mersen is Industry-Leading Expertise

A trusted leader in electrical protection for more than 125 years, we remain fiercely committed to essential research in electrical safety and reliability.
Our people are industry experts providing leading edge design and applications support. Combining a culture of knowledge and curiosity we build on our expertise every day. Expertise is our source of energy – Mersen.

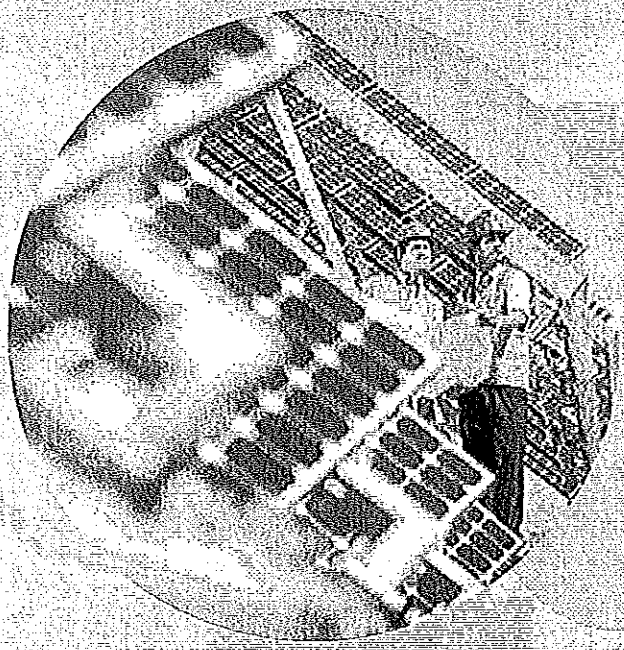


ВЯРНО С ОРИГИНАЛА

At Mersen Safety & Reliability for Electrical Power, we integrate our product expertise into the customer's application to make it safe, reliable and profitable. Our product expertise includes:

- Overcurrent protection (fuses and fusegear)
- Surge protection
- Electronic Systems for Energy Management
- Cooling of power electronics
- Low voltage and high power switches
- Power transfer for rail vehicles

A trusted team member, Mersen invests early in the projects of customer with research and design support. Our experts offer experienced, attentive and responsive applications support in power low voltage distribution, power controls, power electronics and power transmission & distribution, from the initial design stage, through system implementation and to well after the sale.

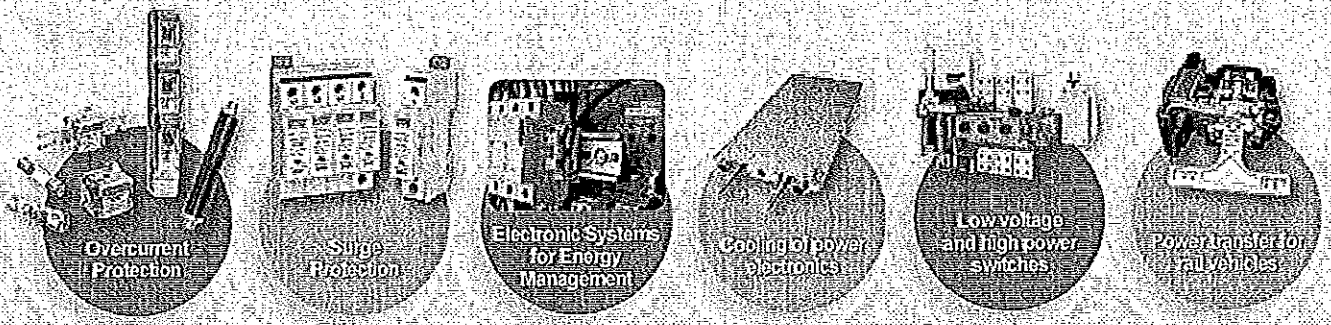


We bring our expertise to you with products designed to meet your standards. Thousands of local sales representatives & distributors, around the globe, provide experienced and attentive customer service.

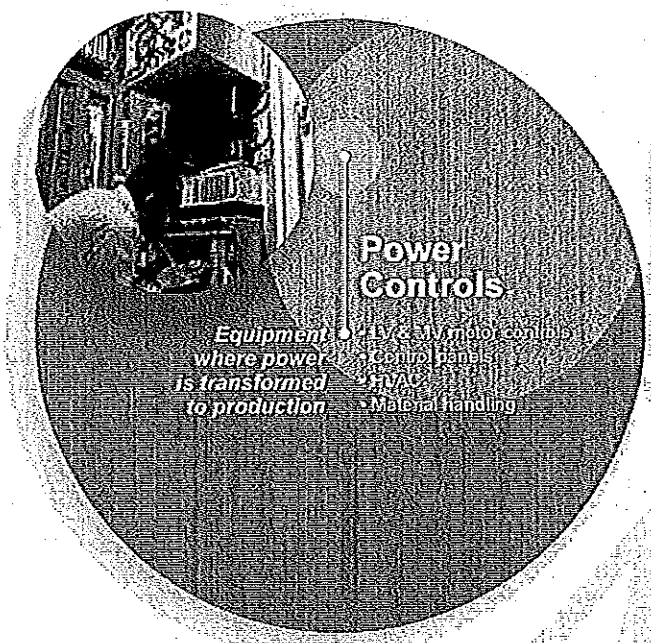
As a global partner, Mersen has an outstanding reputation for helping our customers do more, achieve more and grow more. At OEMs' in terms of increasing system life-time, reducing costs and improving lead times, improving electrical performance and reliability, developing technical solutions that increase the competitiveness, increasing the global capacity and seizing opportunities in emerging markets; At after market in terms of reducing system downtime, protecting electrical systems, people and investment and improving electrical performance and reliability in energy, transportation, electronics, process industries and chemical/pharmaceutical markets.

ВЯРНО С ОРИГИНАЛА

Six product expertises...



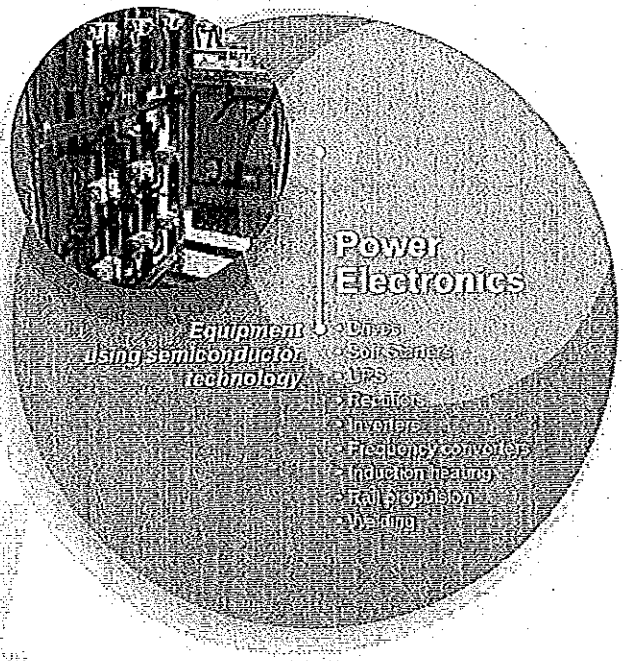
...via four power applications:



Power Controls

Equipment where power is transformed to production

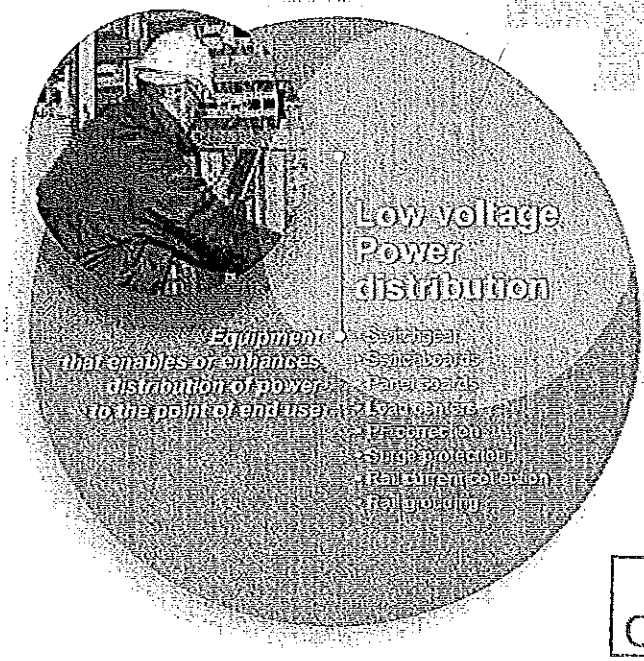
- LV & MV motor controls
- Control panels
- HVAC
- Material handling



Power Electronics

Equipment using semiconductor technology

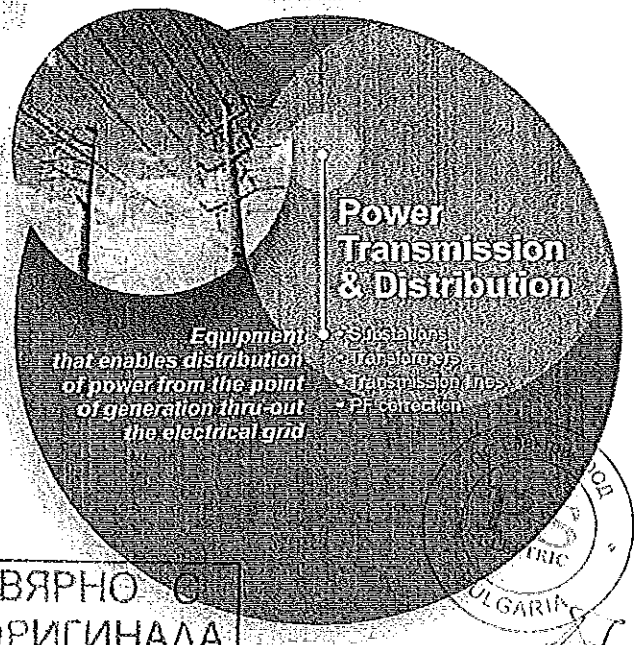
- Drives
- Soft Starters
- UPS
- Rectifiers
- Inverters
- Traction/conveyors
- Induction heating
- Rail propulsion
- Welding



Low voltage Power distribution

Equipment that enables or enhances distribution of power to the point of end use

- Switchgear
- Switchboards
- Panelboards
- Load centers
- PF correction
- Surge protection
- Rail current collection
- Rail grounding



Power Transmission & Distribution

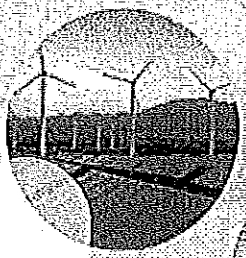
Equipment that enables distribution of power from the point of generation thru-out the electrical grid

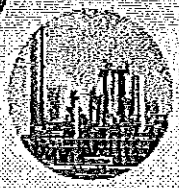
- Substations
- Transformers
- Transmission lines
- PF correction

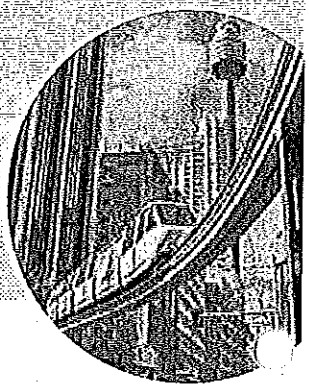
...serve large end markets

Energy

Mersen offers a full basket of high added-value electrical protection solutions for low and medium voltages, AC and DC, for renewable energies (solar PV, wind, hydropower, geothermal), fossil fuel thermal and nuclear.





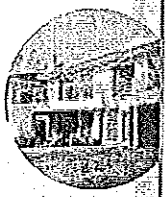


Transport

Mersen is a partner to OEMs in transport, whether rail (tram, train and subway), automobile, aerospace or aeronautic, as well as ports and maritime transport, in designing protection equipment and complete systems to their specifications.

Electronics

Mersen provides industry with energy efficiency solutions for power electronics to use semi-conductors, drives, UPS, converters, inverters, rectifiers, induction heating, welding stations, and more.

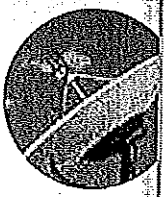


Industrial processes

Manufacturers of steel, pulp & paper, and glass, as well as the food processing and recycling industries, all profit from Mersen's solutions for energy efficiency and control, interchangeable equipment available from any major professional distributor, and services to help streamline their electrical maintenance inventory.

Chemicals/Pharmaceuticals

Mersen is especially attentive to the specific needs of the chemicals (specialty chemicals, inorganic and organic chemicals) and pharmaceuticals industrial sectors.

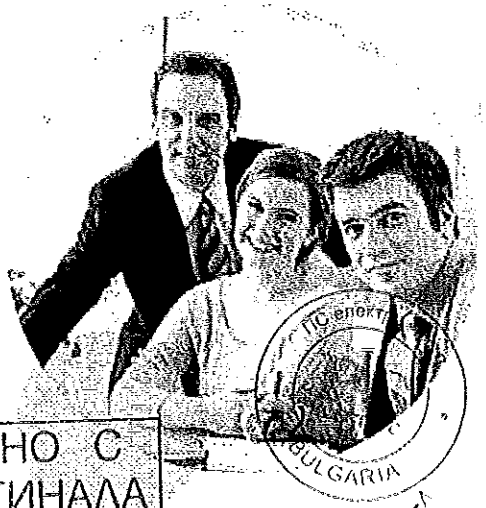


And also:

- **Residential**
  Mersen keeps up with developments to answer the needs of electrical contractors and tradesmen.
- **Service & commercial**
  Mersen proposes standardized power supply solutions in medium and low voltage for main and auxiliary power.
- **Communications**
  Mersen helps ensure the quality of electrical signals with no outage, for communications systems, data centers, cell antennas, radars, etc.

To do more with Mersen:

- Protect electrical systems and the people who use them
- Improve electrical safety, performance and reliability
- Reduce system downtime
- Develop technical solutions that increase your competitiveness
- Reduce investment costs and lead times
- Increase your global capacity
- Seize opportunities in emerging markets



Selection guidelines

Ask the right questions to choose the right fuse

What type of application?

A : MV protection
B : LV protection
C : PCB protection
D : Power electronics protection
E : Forklift battery protection

What type of fuse?

1 : Ferrule-style fuses
2 : Blade-style fuses
3 : Square body fuses
4 : Special purpose fuses

What operating class?

- Class gG for general purpose use fuses on distribution circuits
- Class aM for back-up fuses on direct-on-line motors
- Class gR, ultrafast fuses (UR), to break all types of overload and short-circuit current
- Class aR, ultrafast fuses (UR), to break all types of short-circuit current requiring an outside device to clear small overloads

What size fuse?

Diameter in mm for fuses with cylindrical bodies

- 8, 10, 14, 22

Cross section in mm for fuses with rectangular bodies

- 40x21 size 000
- 46x30 size 00
- 46x36 size 0
- 52x47 size 1
- 74x60 size 2
- 75x75 size 3
- 107x90 size 4

Cross section in mm for fuses with square bodies

- 40x40 size 30
- 51x51 size 31
- 60x60 size 32
- 75x75 size 33

What operating voltage?

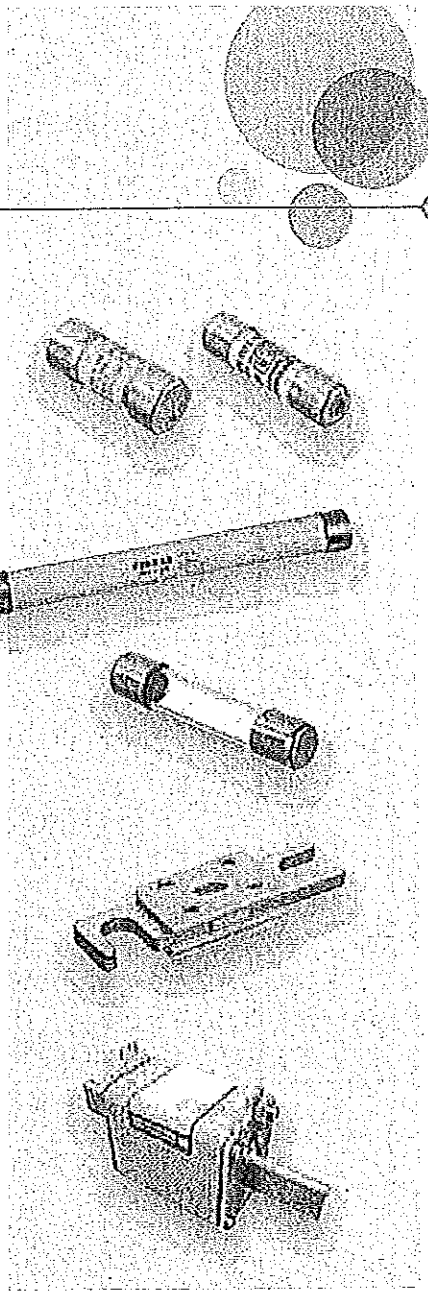
400, 500, 690 ...

What fuse rating in Amperes?

1, 2, 4, 6, 8, 10...

What type of blown fuse indication?

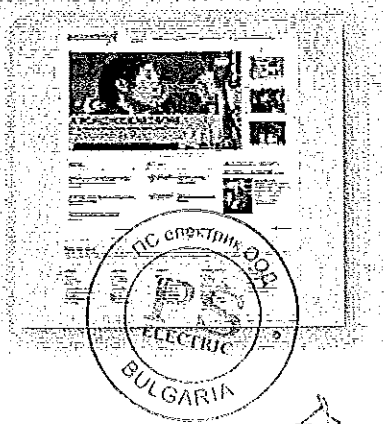
- w/o indicator
- with indicator
- with striker



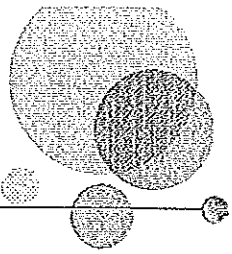
Cross-reference chart at your disposal

If the fuse you've got isn't the Mersen brand, use our cross-reference software SAF/X-Refs on line at the Mersen web site at:

www.mersen.com



Fuses for what applications?



	A Medium voltage	B Low voltage	C Printed circuit boards	D Power electronics	E Automotive
1 - Ferrule-style fuses					
2 - Blade-style fuses					
3 - Square body fuses					
4 - Special purpose fuses					
Infrastructure / construction					
MV electrical systems	•				
MV/LV transformers	•				
LV electrical systems		•			
LV mains / branch circuits		•			
Solar PV installations					
Solar PV strings		•	•		
Inverters				•	
To-grid connection	•				
Manufacturing equipment and automatic control for industry					
MV electric motors	•				
LV electric motors		•			
Soft starters				•	
Speed controllers				•	
Uninterrupted power supplies (UPS)				•	
Rectifiers				•	
Converters				•	
Printed circuit boards			•		
Point of use equipment		•			
Logistics					
Forklift trucks					•
Electric pallet-forks					•
Motorized platforms					•

Fuses or circuit breakers?

The miniature fuse solution is the best choice to protect printed circuit boards.
Protection by ultrafast fuses is the best choice for power electronics (e.g. thyristors).
To protect low voltage general distribution circuits, two alternatives share the market: fuses and circuit breakers.

In residential applications, an easy-to-use circuit breaker is often chosen over the more economical fuse.
But in industrial applications, the fuse offers better performances than the circuit breaker and remains the best solution:

- to protect against short circuits, thanks to a high breaking capacity, up to 250 kA;
- to guarantee the circuit will open, thanks to the simple physical principle behind the fuse;
- for risk-free interchangeability thanks to IEC standard 269, which defines melting time/current data;
- for the range of mounting techniques: on clips, in disconnectors, on busbars, on threaded rods, by welding, etc.

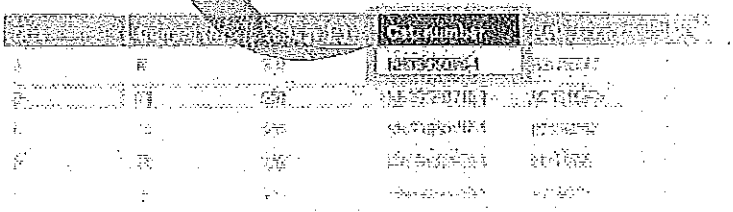
The Catalog Number

A new, more explicit, customer focused way of classifying items

At present: **J219819C**

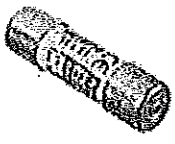
In the future:

NH	2	G	G	50	V	25	-1
Technology NH = Niederspannung-Hochleistung	Size	Curve		Voltage in V/10		Current in A	Miscellaneous: connections, indicator, striker, etc.



NH for Niederspannung-Hochleistung

NH2GG50V25-1

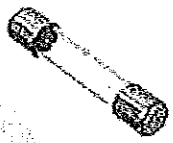


FR for FRench standard

FR14GG69V10

PC for Protection of semi-Conductors

PC30UD69V125TF



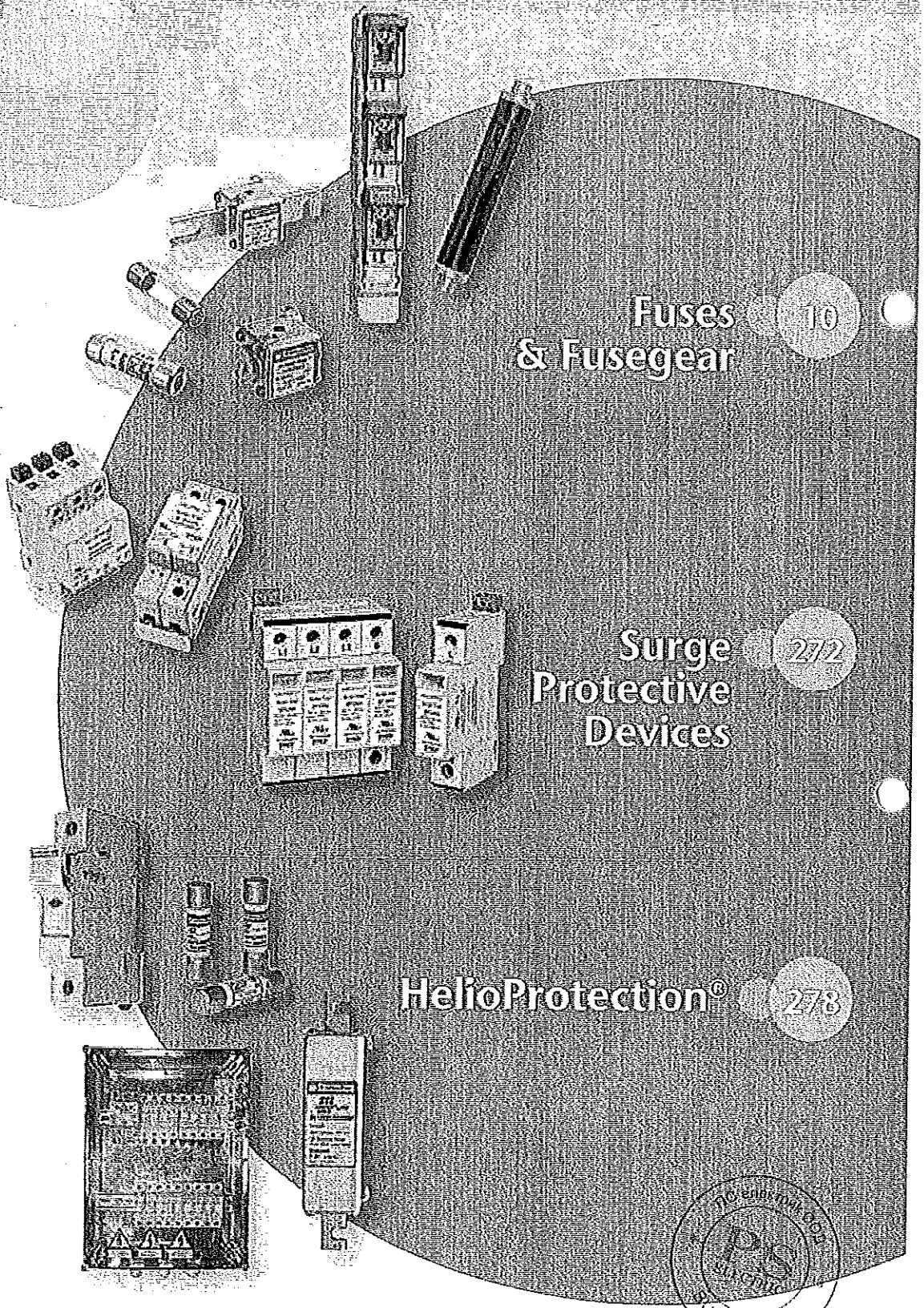
MI for MIniatures

MI6SB25V0,5

ВЯРНО С ОРИГИНАЛА

ПС електрик ООД PS ELECTRIC BULGARIA

Contents



Fuses & Fusegear

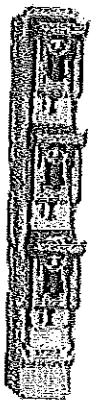
MULTIVERT® 400A

NH-vertical fuse switch disconnector, size 2, 400A, 690VAC

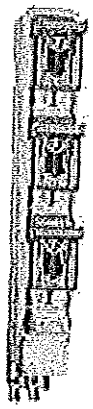
ÖVE

in accordance with IEC/EN 60 947-3.
For NH-fuse links size 2 in accordance with IEC/EN 60 269-2, VDE 0636-2.

- Installation on to 185mm bus bar system
  Standard design with M 12 screws: M = ±35 3Nm
  Direct installation without drilling with hooked clamps
- Symmetrical switch - top/bottom cable terminal connection
- Touch protection IP30 with central cover
- Varieties of cable termination: bolt, insert nut, V-terminal
- Design with integration of cabling and all instrument leads in the base for:
  Electronic fuse monitoring ESÜ, Electroic System Monitor ESM,
  electro-mechanic fuse monitoring (galvanic isolation) MZS
  and all measuring devices (e.g. ampere meter and volt meter)
- Integrated measuring transformer (optional) with unchanged installation depth



1.210.000



1.220.900

MULTIVERT® 400A **size 2** **185mm** **3 x single pole switching**

article number	reference number	cable termination components	design	weight kg[1]	package
1.200.000	J1002187A	3 M10 bolts	-	4.60	1 piece
1.210.000	Z1023200A	3 M12 insert nuts	-	4.52	1 piece
1.220.000	A1023201A	V-terminal for V-terminal clamps size 1,2,3	-	4.38	1 piece
1.220.900	B1023202A	V-terminal, 2 terminals per phase for V-terminal clamps size 1,2,3	-	5.45	1 piece
1.200.100	Y1023199A	3 M10 bolts	MULTIVERT® 1.200.000 with cabling of instrument leads	5.10	1 piece
1.200.064	E1023205A	3 M10 bolts	MULTIVERT® 1.200.000 with integrated C.T. 400/5A, 3,75VA, class 1 for single pole measurement (ready fitted in pole 1) with cabling of instrument leads	4.70	1 piece
1.200.064	C1023203A	3 M10 bolts	MULTIVERT® 1.200.000 with integrated C.T. 400/5A, 3,75VA, class 1, calibrated, for single pole measurement (ready fitted in pole 1) with cabling of instrument leads	-	1 piece
1.200.094	F1023206A	3 M10 bolts	MULTIVERT® 1.200.000 with integrated C.T. 400/5A, 3,75VA, class 1 for triple pole measurement with cabling of instrument leads	5.40	1 piece
1.200.074	D1023204A	3 M10 bolts	MULTIVERT® 1.200.000 with integrated C.T. 400/5A, 3,75VA, class 1, calibrated, for triple pole measurement with cabling of instrument leads	-	1 piece
1.230.000	T1023218A	M12 bus bar terminal	MULTIVERT® with lateral bus bar terminals bus bar coupler switch cable terminal connection to right or left side possible	4.46	1 piece

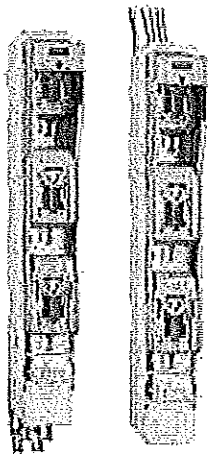
1) weight in kg per piece or set including package

MULTIVERT® 250A, 400A, 630A

MULTIVERT® 400A

ÖVE

NH-vertical fuse switch disconnector, size 2, 400A, 690VAC



1.270.900 1.270.094

1.270.094 rear

MULTIVERT® 400A | size 2 | 185mm | 1 x triple pole switching

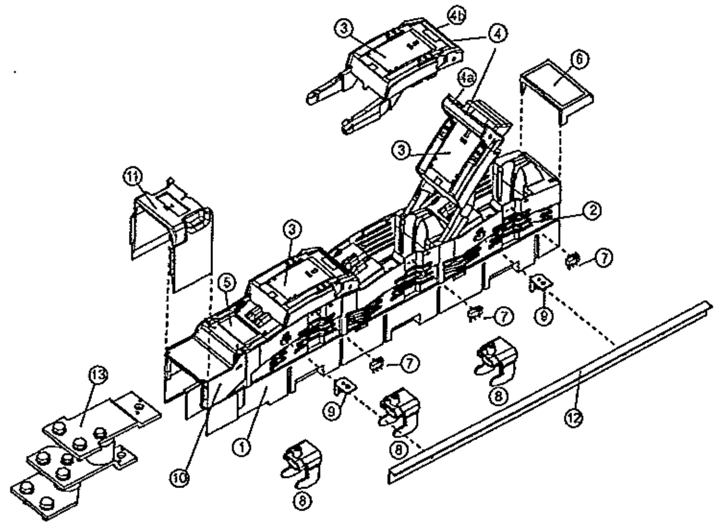
article number	reference number	cable termination components	design	weight kg	package
1.250.000	M1002190A	3 M10 bolts	-	4.76	1 piece
1.260.000	G1023207A	3 M12 insert nuts	-	4.68	1 piece
1.270.000	H1023208A	V-terminal for V-terminal clamps size 1,2,3	-	4.78	1 piece
1.270.600	K1023210A	V-terminal + 3 V-terminal clamps size 1,2,3	-	4.70	1 piece
1.270.900	L1023211A	V-terminal, 2 terminals per phase for V-terminal clamps size 1,2,3	-	6.08	1 piece
1.250.100	X1002199A	3 M10 bolts	MULTIVERT® 1.250.000 with cabling of instrument leads	5.20	1 piece
1.270.100	J1023209A	V-terminal for V-terminal clamps size 1,2,3	MULTIVERT® 1.270.000 with cabling of instrument leads	5.10	1 piece
1.250.084	P1023214A	3 M10 bolts	MULTIVERT® 1.250.000 with integrated C.T. 400/5A, 3,75VA, class 1 for single pole measurement (ready fitted in pole 1) with cabling of instrument leads	4.90	1 piece
1.250.064	M1023212A	3 M10 bolts	MULTIVERT® 1.250.000 with integrated C.T. 400/5A, 3,75VA, class 1, calibrated, for single pole measurement (ready fitted in pole 1) with cabling of instrument leads	-	1 piece
1.250.094	Q1023215A	3 M10 bolts	MULTIVERT® 1.250.000 with integrated C.T. 400/5A, 3,75VA, class 1 for triple pole measurement with cabling of instrument leads	5.60	1 piece
1.250.074	N1023213A	3 M10 bolts	MULTIVERT® 1.250.000 with integrated C.T. 400/5A, 3,75VA, class 1, calibrated, for triple pole measurement with cabling of instrument leads	-	1 piece
1.270.094	S1023217A	V-terminal for V-terminal clamps size 1,2,3	MULTIVERT® 1.270.000 with integrated C.T. 400/5A, 3,75VA, class 1 for triple pole measurement with cabling of instrument leads	5.41	1 piece
1.270.074	R1023216A	V-terminal for V-terminal clamps size 1,2,3	MULTIVERT® 1.270.000 with integrated C.T. 400/5A, 3,75VA, class 1, calibrated, for triple pole measurement with cabling of instrument leads	-	1 piece
1.260.000	V1023219A	M12 bus bar terminal	MULTIVERT® with lateral bus bar terminals bus bar coupler switch cable terminal connection to right or left side possible	4.53	1 piece

1) weight in kg per piece or set including packaging

MULTIVERT® 250A, 400A, 630A 3x single pole switching

MULTIVERT® 250A, 400A, 630A NH-vertical fuse switch disconnector

E 1.002.265

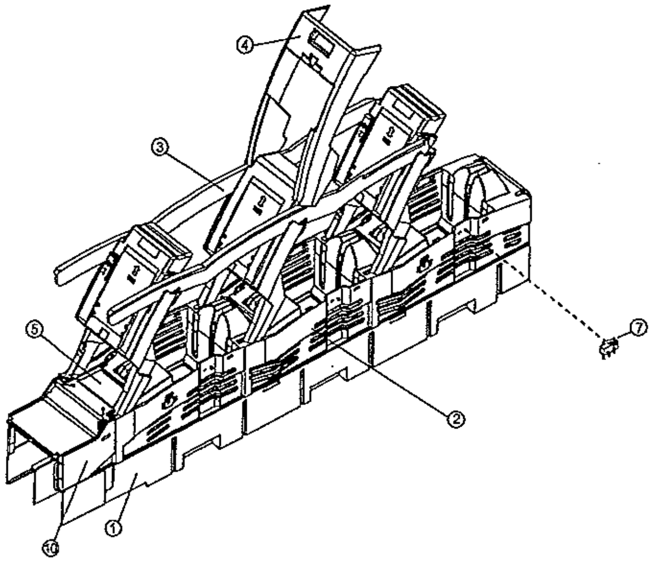


no.	article number	short description
1		Main base
2		Protection cover (removable)
3		Switch operating cover triple pole
4		Combination handle: 4a. open - switching position; 4b. Closed - installation depth 153mm
5		Labelling area (label)
6		Integrated cover shroud
7	1.000.852	Indicator for switch door position
8	1.000.192	Hooked clamp, 1 set = 3 pieces
9	MZAW	Support angle, 1 set = 4 pieces
10	MZBT	Label holder
11	1.002.095	Cover shroud, bottom terminal, 70mm
12	1.001.510	cover shield, length 605mm, set=2 pieces
13	1.002.255	Supplementary set for multiple terminal

MULTIVERT® 250A, 400A, 630A 1x triple pole switching

MULTIVERT® 250A, 400A, 630A NH-vertical fuse switch disconnector

E 1.002.266



no.	article number	short description
1		Main base
2		Protection cover (removable)
3		Switch operating cover triple pole
4		Handle
5		Labelling area (label)
6		Integrated cover shroud
7	1.000.852	indicator for switch door position

MULTIVERT® NH vertical fuse switch disconnector

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

MULTIVERT® 250A, 400A, 630A

MULTIVERT® 250A

NH-vertical fuse switch disconnector, size 1, 250A, 690VAC

Technical data in accordance with EN / IEC 60947

	250A 3 x single pole switching	250A 1 x triple pole switching
Installation mode	bus bar installation	bus bar installation
Size	1	1
Number of poles/phases	3	3
Conventional free air thermal current with NH-fuse links I_{th}	250A	250A
Max. power dissipation of NH-fuse links P_v	23W	23W
Conventional free air thermal current with solid links I_{th}	400A	400A
Max. power dissipation of solid links P_v	2,6W	2,6W
Utilization category to IEC/EN 60947-3		
U_e = AC 400V; I_e = 250A	AC 23 B	AC 23 B
U_e = AC 500V; I_e = 250A	AC 23 B	AC 23 B
U_e = AC 690V; I_e = 250A	AC 22 B	AC 22 B
Rated operational voltage U_e	690V	690V
Rated insulation voltage U_i	1000V	1000V
Rated impulse withstand voltage U_{imp}	8kV	8kV
Rated frequency	50 ... 60Hz	50 ... 60Hz
Degree of protection	IP30	IP30
Degree of pollution	3	3
Rated duty	uninterrupted duty	uninterrupted duty
Rated short circuit making capacity with solid links I_{cm}	16kAsw	16kAsw
Rated short circuit making capacity with fuse links		
U_e = AC 400V; I_e = 250A	120kA	120kA
U_e = AC 500V; I_e = 250A	120kA	120kA
U_e = AC 690V; I_e = 250A	120kA	120kA
Power dissipation by I_e without NH-fuse links	24W	24W
Power dissipation by I_e without solid links	65W	65W
Cable terminal connection		
Standard terminal	M12	M12
for cable lugs Cu max.	300mm²	300mm²
for cable lugs Al max.	300mm²	300mm²
for copper bars with max. dimensions	40x10mm	40x10mm
V-shaped lugs for V-terminal clamps	35 - 240mm²	35 - 240mm²
Bus bar terminal connection		
Standard terminal	M12	M12
Hooked clamp for bus bar with thickness	5 ... 10mm	5 ... 10mm
Bus bar system	185mm	185mm

MULTIVERT® 400A

NH-vertical fuse switch disconnector, size 2, 400A, 690VAC

Technical data in accordance with EN / IEC 60947

	400A 3 x single pole switching	400A 1 x triple pole switching
Installation mode	bus bar installation	bus bar installation
Size	2	2
Number of poles/phases	3	3
Conventional free air thermal current with NH-fuse links I_{th}	400A	400A
Max. power dissipation of NH-fuse links P_v	34W	34W
Conventional free air thermal current with solid links I_{th}	630A	630A
Max. power dissipation of solid links P_v	9W	9W
Utilization category to IEC/EN 60947-3		
U_e = AC 400V; I_e = 400A	AC 23 B	AC 23 B
U_e = AC 500V; I_e = 400A	AC 22 B	AC 22 B
U_e = AC 690V; I_e = 400A	AC 21 B	AC 21 B
Rated operational voltage U_e	690V	690V
Rated insulation voltage U_i	1000V	1000V
Rated impulse withstand voltage U_{imp}	8kV	8kV
Rated frequency	50 ... 60Hz	50 ... 60Hz
Degree of protection	IP30	IP30
Degree of pollution	3	3
Rated duty	uninterrupted duty	uninterrupted duty
Rated short circuit making capacity with solid links I_{cm}	16 kAsw	16 kAsw
Rated short circuit making capacity with fuse links		
U_e = AC 400V; I_e = 400A	120kA	120kA
U_e = AC 500V; I_e = 400A	120kA	120kA
U_e = AC 690V; I_e = 315A	120kA	120kA
U_e = AC 690V; I_e = 400A	100kA	100kA
Power dissipation by I_{th} without NH-fuse links	46W	46W
Power dissipation by I_{th} without solid links	126W	126W
Cable terminal connection		
Standard terminal	M12	M12
for cable lugs Cu max.	300mm²	300mm²
for cable lugs Al max.	300mm²	300mm²
for copper bars with max. dimensions	40x10mm	40x10mm
V-shaped lugs for V-terminal clamps	35 - 240mm²	35 - 240mm²
Bus bar terminal connection		
Standard terminal	M12	M12
Hooked clamp for bus bar with thickness	5 ... 10mm	5 ... 10mm
Bus bar system	185mm	185mm

MULTIVERT® 250A, 400A, 630A

MULTIVERT® 630A

NH-vertical fuse switch disconnector, size 3, 630A, 690VAC

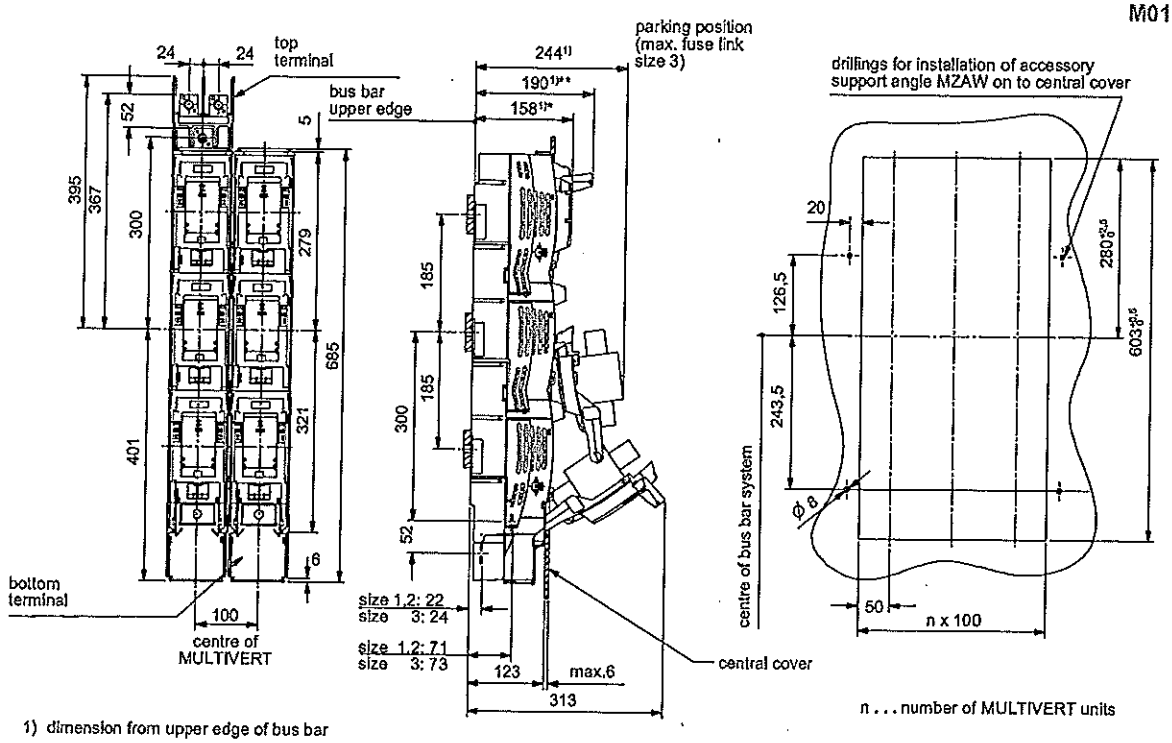
Technical data in accordance with EN / IEC 60947

	630A 3 x single pole switching	630A 1 x triple pole switching
Installation mode	bus bar installation	bus bar installation
Size	3	3
Number of poles/phases	3	3
Conventional free air thermal current with NH-fuse links I_{th}	630A	630A
Max. power dissipation of NH-fuse links P_v	43W	43W
Conventional free air thermal current with solid links I_{th}	800A	800A
Max. power dissipation of solid links P_v	17,5W	17,5W
Utilization category to IEC/EN 60947-3		
U_e = AC 400V; I_e = 630A	AC 23 B	AC 23 B
U_e = AC 500V; I_e = 630A	AC 22 B	AC 22 B
U_e = AC 690V; I_e = 630A	AC 21 B	AC 21 B
Rated operational voltage U_e	690V	690V
Rated insulation voltage U_i	1000V	1000V
Rated impulse withstand voltage U_{imp}	8kV	8kV
Rated frequency	50 .. 60Hz	50 .. 60Hz
Degree of protection	IP30	IP30
Degree of pollution	3	3
Rated duty	uninterrupted duty	uninterrupted duty
Rated short-circuit making capacity with solid links I_{cm}	16kAsw	16kAsw
Rated short circuit making capacity with fuse links		
U_e = AC 400V; I_e = 630A	80kA	80kA
U_e = AC 500V; I_e = 630A	80kA	80kA
U_e = AC 690V; I_e = 500A	80kA	80kA
Power dissipation by I_{th} without NH-fuse links	92W	92W
Power dissipation by I_{th} without solid links	161W	161W
Cable terminal connection		
Standard terminal	M12	M12
for cable lugs Cu max.	300mm²	300mm²
for cable lugs Al max.	300mm²	300mm²
for copper bars with max. dimensions	40x10mm	40x10mm
V-shaped lugs for V-terminal clamps	35 - 240mm²	35 - 240mm²
Bus bar terminal connection		
Standard terminal	M12	M12
Hooked clamp for bus bar with thickness	5 .. 10mm	5 .. 10mm
Bus bar system	185mm	185mm

MULTIVERT® 250A, 400A, 630A single pole switching

MULTIVERT® 250A, 400A, 630A NH-vertical fuse switch disconnector

Dimensions
M01152b



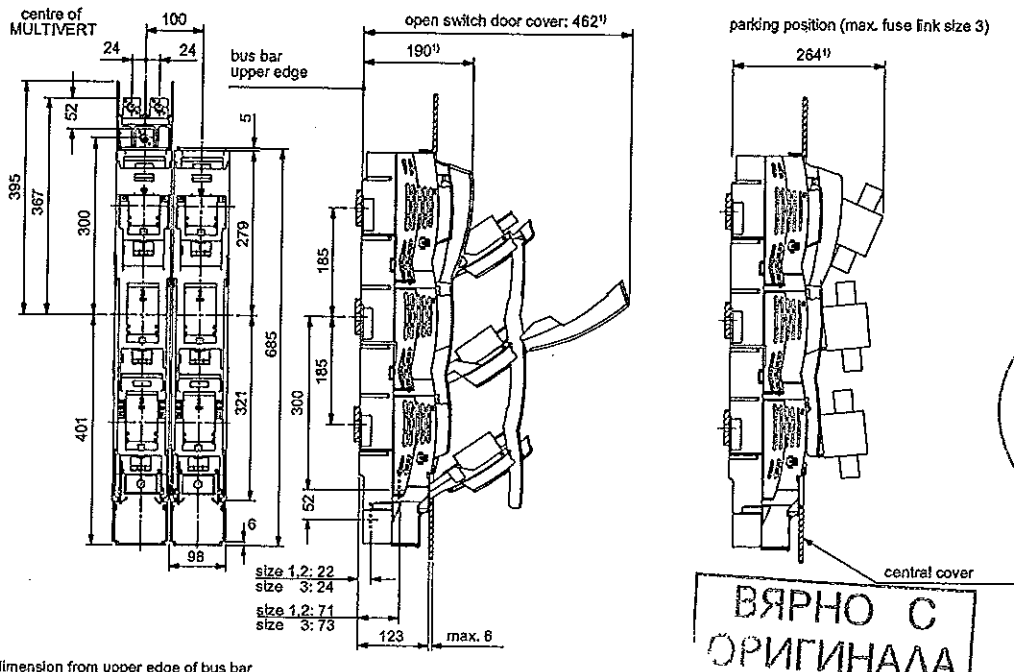
1) dimension from upper edge of bus bar

* 158 mm handle in closed position (folded) = total installation depth of MULTIVERT
** 190 mm handle in open position (fixed) = switching position

MULTIVERT® 250A, 400A, 630A triple pole switching

MULTIVERT® 250A, 400A, 630A NH-vertical fuse switch disconnector

Dimensions
M01153b



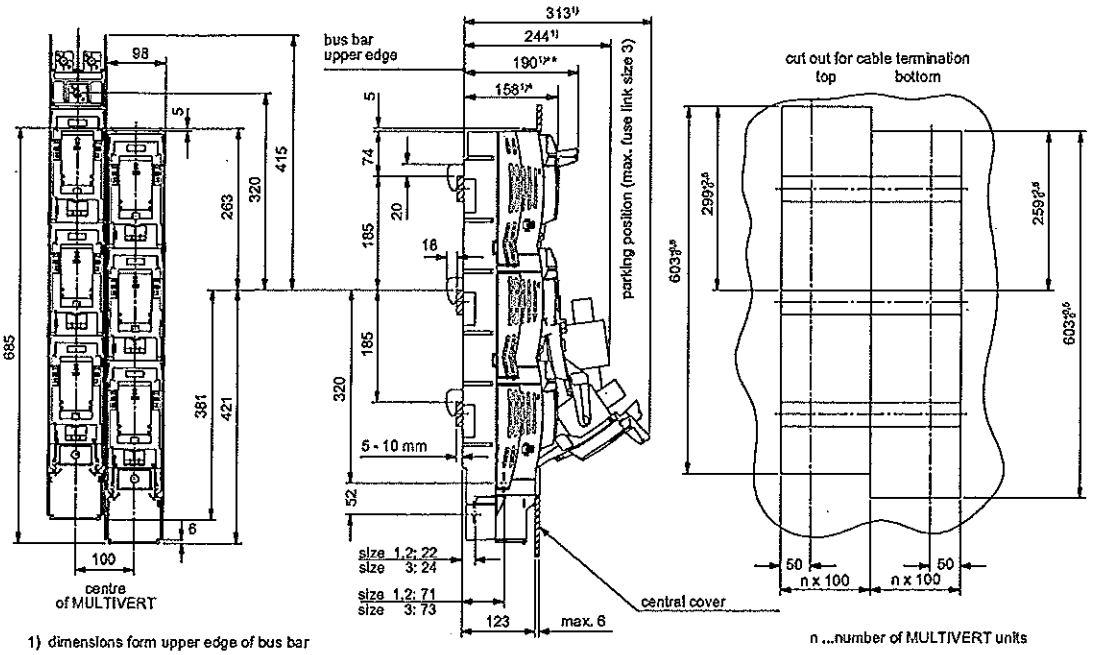
1) dimension from upper edge of bus bar

MULTIVERT® 250A, 400A, 630A

MULTIVERT® 250A, 400A, 630A single pole switching

MULTIVERT® 250A, 400A, 630A NH-vertical fuse switch disconnector

M01154b



1) dimensions form upper edge of bus bar

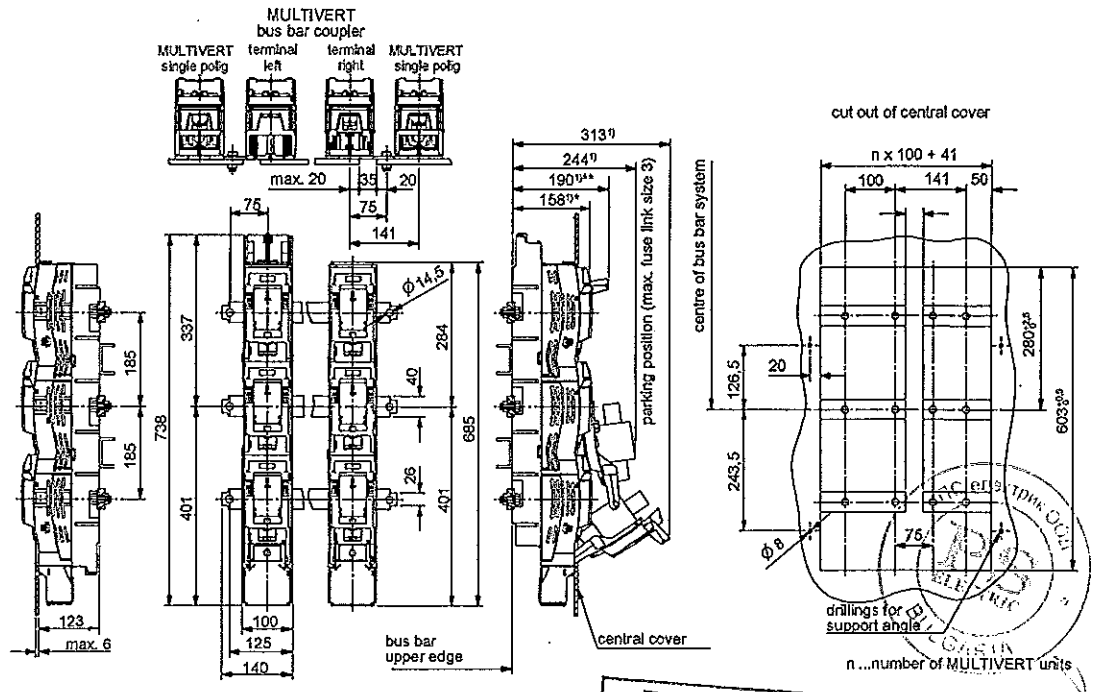
n ...number of MULTIVERT units

* 158 mm handle in closed position (folded) = total installation depth of MULTIVERT
** 190 mm handle in open position (fixed) - switching position

MULTIVERT® 250A, 400A, 630A single pole switching

MULTIVERT® 250A, 400A, 630A bus bar coppler switch with lateral terminals

M01159a



1) dimensions form upper edge of bus bar

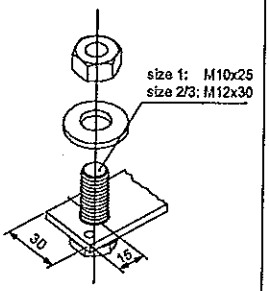
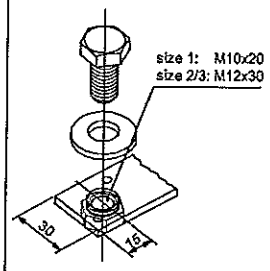
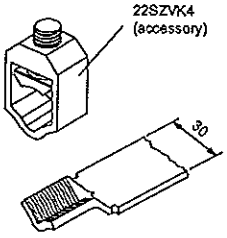
* 158 mm handle in closed position (folded) = total installation depth of MULTIVERT
** 190 mm handle in open position (fixed) - switching position

ВЯРНО С ОРИГИНАЛА

MULTIVERT® 250A, 400A, 630A

Cable termination MULTIVERT® 250A, 400A, 630A

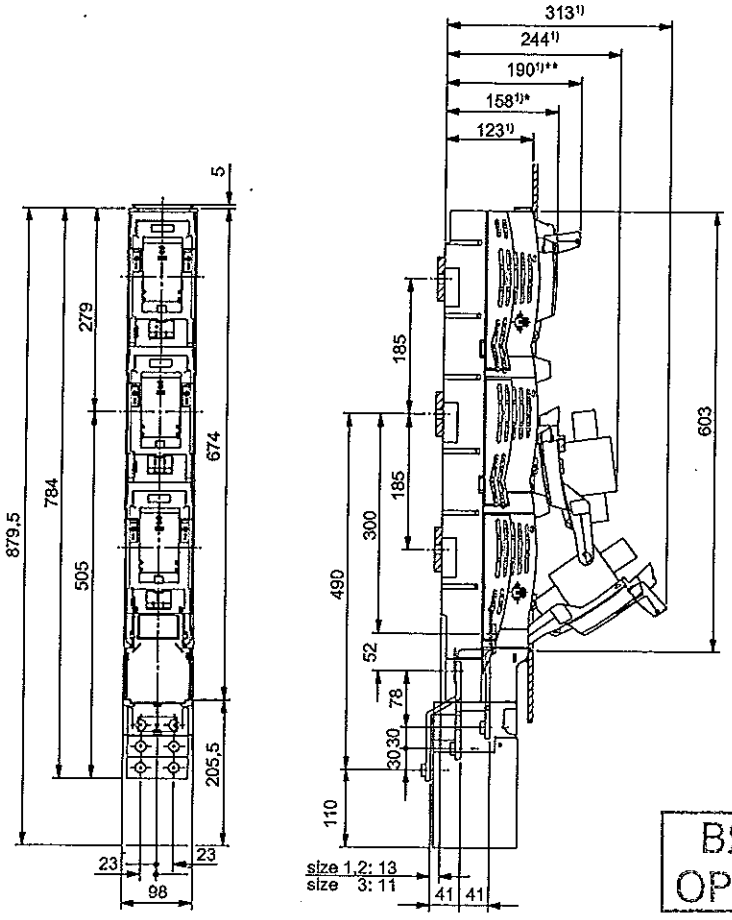
M01105b

reference	B	E	V	
type of terminal	bolt	insert nut	V-terminal	
accessory	cable lug max. width 45 mm	cable lug max. width 45 mm	V-clamp (accessory) 22SZVK4	V-clamp (accessory) 22SZVK41
cross section [mm²]	max. 300	max. 300	50 - 240 sectoral solid 50 - 185 sectoral stranded 35 - 70 round stranded 35 - 50 round solid	95 - 300 sectoral solid 70 - 240 sectoral stranded 50 - 185 round stranded 70 - 240 round solid
M [Nm]	35 ±3	35 ±3	25 ±2	25 ±2
				

MULTIVERT® 240A, 400A, 630A

Cable termination MULTIVERT® 250A, 400A, 630A multiple termination

M01156a



1) dimensions form upper edge of bus bar

* 158 mm handle in closed position (folded) = total installation depth of MULTIVERT
** 190 mm handle in open position (fixed) - switching position

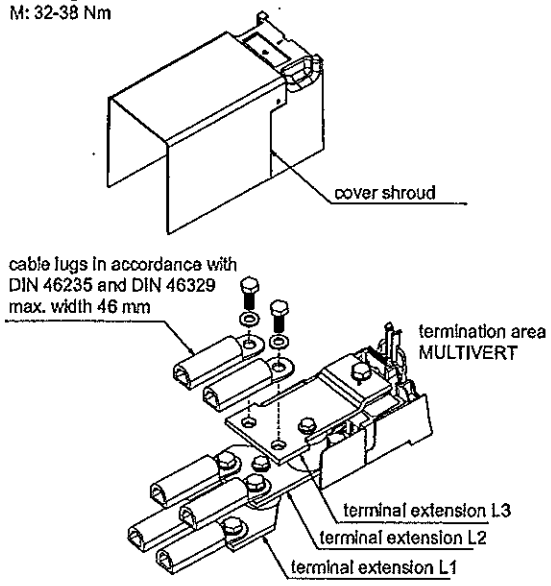
MULTIVERT® 240A, 400A, 630A

Cable termination MULTIVERT® 250A, 400A, 630A multiple termination

MA88f

terminal: 2 cable lugs

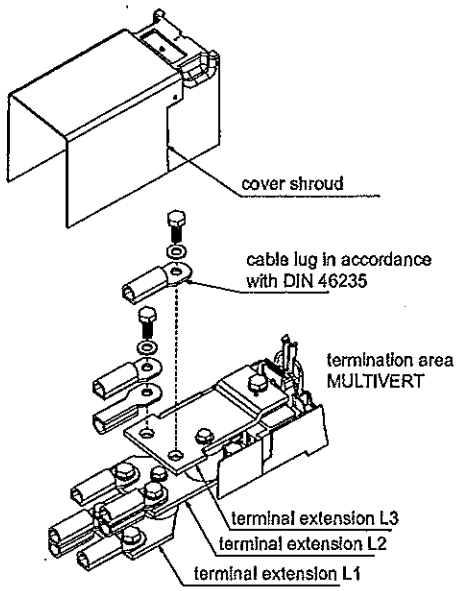
Cu: up to max. 300 mm² round stranded, sectoral stranded
cable lugs in accordance with DIN 46235
Al: up to max. 300 mm2 round stranded, sectoral stranded
cable lugs in accordance with DIN 46329
M: 32-38 Nm



NOTE:
Due to safety precautions we suggest to insulate
the cable lugs (185, 240 und 300 mm²).

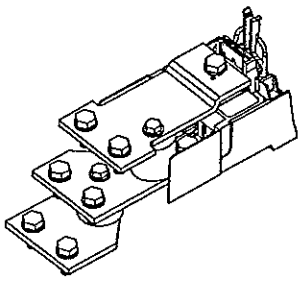
terminal: 3 cable lugs

Cu: up to max. 150 mm² round stranded, sectoral stranded
cable lugs in accordance with DIN 46235
M: 32-38 Nm



NOTE:
Due to safety precautions we suggest to insulate
the cable lugs (95, 120 und 150 mm²).

Position of terminals



tightening torque of screws: 32 - 38 Nm

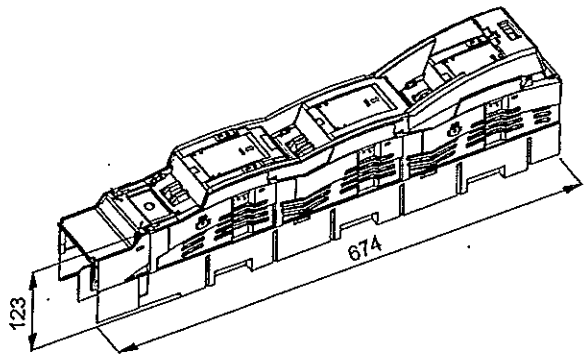
MULTIVERT® 240A, 400A, 630A

Cover shrouds for cable termination bottom terminal MULTIVERT® 250A, 400A, 630A

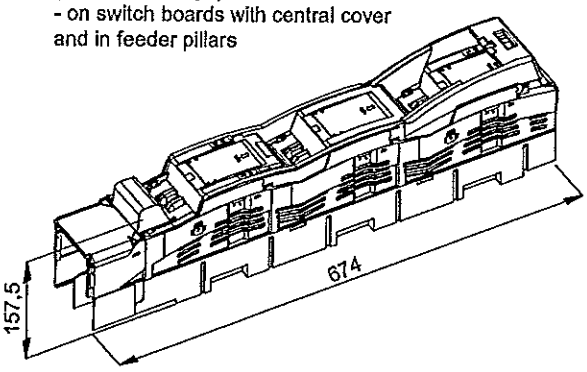
M01160a-1

standarddesign:
integrated shroud for bottom cable termination

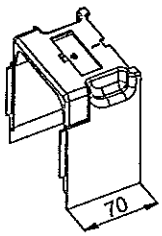
for terminal connections with cable lugs (bolt and insert nut)
- on switch boards with central cover



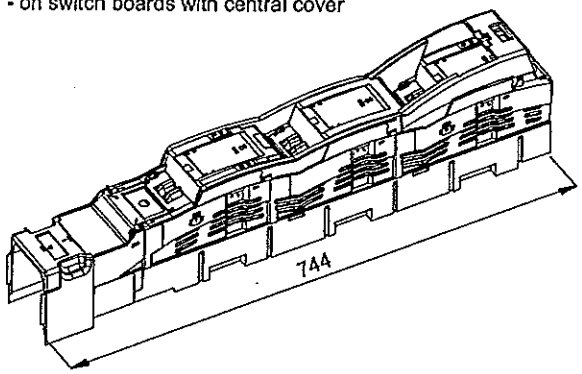
for clamp terminal connections (V-terminal)
for special "high" clamp terminal connections
(double V-clamps)
- on switch boards with central cover
and in feeder pillars



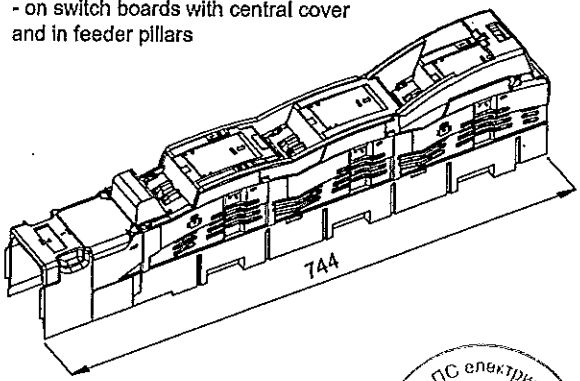
Extension shroud for bottom cable termination
article number 1.002.095 (accessory)



for extended cover
for terminal connections with cable lugs (bolt and insert nut)
- on switch boards with central cover



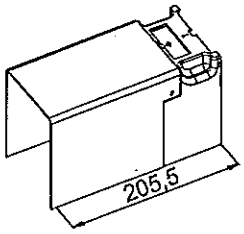
for extended cover
for clamp terminal connections (V-terminal)
for special "high" clamp terminal connections(double V-clamps)
- on switch boards with central cover
and in feeder pillars



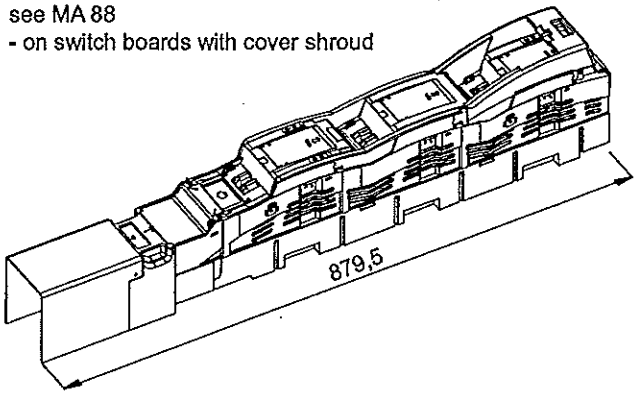
MULTIVERT® 240A, 400A, 630A

Cover shrouds for cable termination bottom terminal MULTIVERT® 250A, 400A, 630A multiple termination

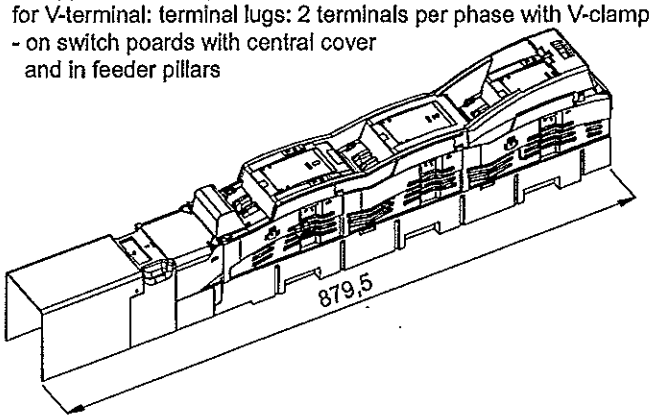
Dimensions
M01160a-2



for application multiple terminationen
for cable termination with 2 or 3 cable lugs/phase
see MA 88
- on switch boards with cover shroud



for application multiple termination
for V-terminal: terminal lugs: 2 terminals per phase with V-clamp
- on switch poards with central cover
and in feeder pillars

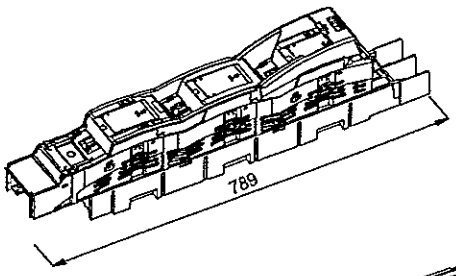


MULTIVERT® 240A, 400A, 630A

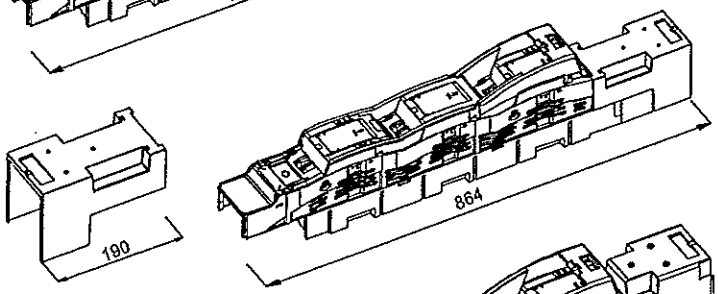
Cover shrouds for cable termination top terminal MULTIVERT® 250A, 400A, 630A

Dimensions
M01160a-3

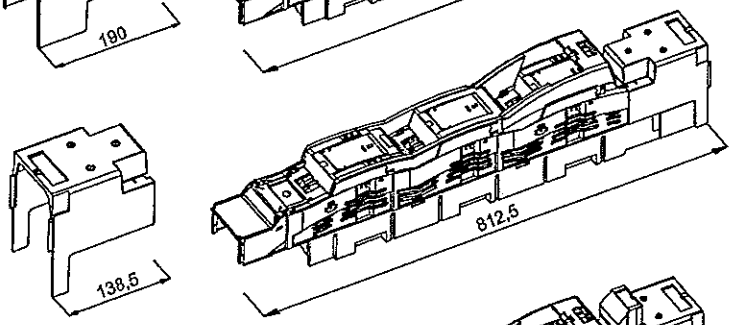
without shroud for cable termination



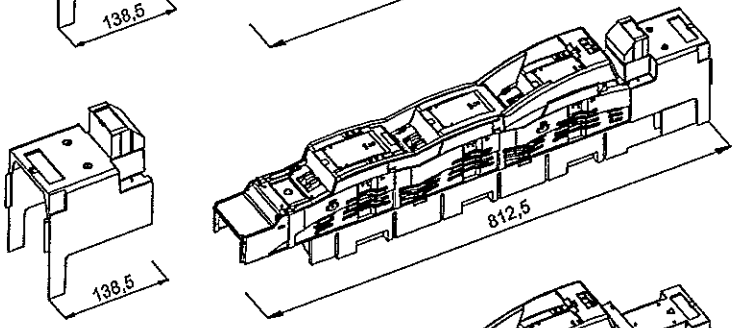
shroud for top cable termination
article number: MZKHO (accessory)
for terminal connections with
cable lugs (bolt and insert nut)
- on switch boards with central cover



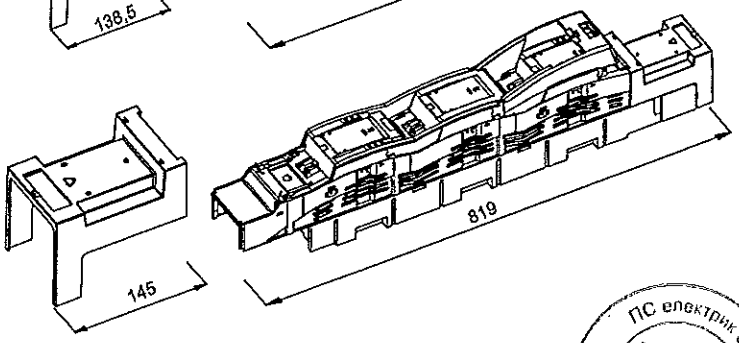
shroud for top cable termination
article number: MZKAB (accessory)
for clamp terminal connections
(V-terminal)
- in feeder pillars



shroud for top cable termination
article number: MZKAB1 (accessory)
for special "high" clamp terminal
connections (double V-clamps)
- in feeder pillars



shroud for top cable termination
article number: MZKHV (accessory)
for terminal connections with cable lugs
for installation in distribution units
with central cover



MULTIVERT® 250A, 400A, 630A

NH-vertical fuse switch disconnector size 1 250A, size 2 400A, size 3 630A, 690VAC

Accessories

Cover/shrouds for cable termination

MULTIVERT® 250A, 400A, 630A

article number	reference number	design	application	weight kg*	package
1.002.095	J1002279A	cover shroud for extended cover length 70mm	bottom terminal	0.12	1 piece
1.002.458	N1023305A	cover shroud for multiple termination length 193,5mm	bottom terminal	0.29	1 piece
MZKAB	J1023301A	cover shroud for clamp terminal connection in feeder pillars length 138,5mm	top terminal	0.19	1 piece
MZKHO	G217655A	cover shroud for cable terminal connections with cable lugs on switchboards with central cover length 190mm	top terminal	0.12	1 piece
MZKAB1	K1023302A	cover shroud for special (high) clamp terminal connection in feeder pillars length 138,5mm	top terminal	0.10	1 piece
MZVHB	L1023303A	extended cover shroud length 257mm	top terminal	0.38	1 piece
MZKHV	A1002202A	cover shroud for installation in distribution units with central cover (height of supporting edge reduced by 16mm) length 145mm	top terminal	1.65	1 piece


1.002.095


1.002.458


MZKAB


MZKHO


MZKAB1

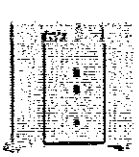

MZVHB


MZKHV

Indication facilities

MULTIVERT® 250A, 400A, 630A

article number	reference number	design	weight kg*	package
1.002.940	Z1023453A	electronic fuse monitoring ESÜ size 1,2,3 for MULTIVERT® 250A, 400A, 630A with cabling of instrument leads	0.08	1 piece
MZESM	J228765A	Electronic System Monitor ESM size 1,2,3 for MULTIVERT® 250A, 400A, 630A with cabling of instrument leads	0.49	1 piece
1.000.829	L1023418A	electro-mechanical fuse monitoring (galvanic isolation) MZS size 1,2,3 for MULTIVERT® 250A, 400A, 630A with cabling of instrument leads	0.57	1 piece
1.000.852	Q1002285A	indicator for switch door position micro switch, 1 change-over contact 5A, 250V	0.00	1 piece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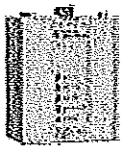
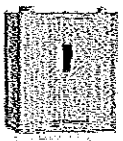

MZESM


1.000.829

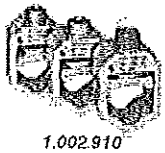

1.000.852

*) weight in kg per piece or set including package

MULTIVERT® 250A, 400A, 630A

NH-vertical fuse switch disconnector size 1 250A, size 2 400A, size 3 630A, 690VAC

1.002.909

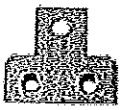


1.002.910

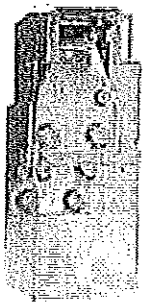
22SZVK42

1.000.099

1.003.286



1.001.667



1.002.255

1.003.377

Varieties of cable termination

MULTIVERT® 250A, 400A, 630A

article number	reference number	design	weight kg[1]	package
1.002.909	K1024613A	V-terminal clamp size 1,2,3, 95-240mm² single solid, 70-240mm² single stranded, 50-185mm² round stranded, 70-240mm² round solid, M = 23-27Nm 1 set = 3 pieces	0.24	1 set
1.002.910	L1024614A	V-terminal clamp size 1,2,3, 95-300mm² single solid, 70-240mm² single stranded, 50-185mm² round stranded, 70-240mm² round solid, M = 23-27Nm 1 set = 3 pieces	0.25	1 set
22SZVK42	Q1024618A	V-terminal clamp size 1,2,3 for 2 Leiter 50–240mm² single solid, 50-185mm² single stranded, 50-185mm² round stranded, 70-240mm² round solid M = 23–27Nm	0.17	1 piece
1.000.099	E1023436A	insulation cap for V-terminal clamp size 1,2,3	0.01	1 piece
1.003.286	Q1024595A	supplementaty set for V-terminal size 1,2,3 set = 3 pieces V-clamps, cover shroud and labels for size 1, 2 and 3	0.30	1 set
1.001.667	F1023275A	adapter for double terminal L3	0.25	1 piece
1.002.255	B1024582A	supplementary set for multiple termination, bottom terminal 2 cable lugs Cu/Al: up to max. 300mm² round stranded, sectoral stranded, 3 cable lugs Cu: up to max. 150mm² round stranded, sectoral stranded, M = 32-39Nm	2.60	1 set
1.003.377	Y1024579A	supplementary set for multiple termination, top terminal 2 cable lugs Cu/Al: up to max. 300mm² round stranded, sectoral stranded, 3 cable lugs Cu: up to max. 150mm² round stranded, sectoral stranded, M = 32-39Nm	2.60	1 set

1) weight in kg per piece or set including package

Приложение 30

IEC IECEE CB SCHEME

Ref. Certif. No.

AT 1959

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

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

CB TEST CERTIFICATE

Product Produit	Low-voltage vertical fuse-switch-disconnector
Name and address of the applicant Nom et adresse du demandeur	M. Schneider Ges.m.b.H. Lienfeldergasse 31, 1160 Wien, Austria
Name and address of the manufacturer Nom et adresse du fabricant	M. Schneider Ges.m.b.H. Lienfeldergasse 31, 1160 Wien, Austria
Name and address of the factory Nom et adresse de l'usine *Note: When more than one factory, please report on page 2* *Note: Lorsqu'il y a plus d'une usine, veuillez utiliser la 2ème page*	M. Schneider CZ s.r.o. Pardubická 437, 53304 Szemice, Czech Republic ☐ Additional Information on page 2
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	AC 400-690 V; 50-60 Hz; 400 A
Trademark (if any) Marque de fabrique (si elle existe)	M. SCHNEIDER
Model / Type Ref. Ref. De type	MULTIVERT 400
Additional Information (if necessary may also be reported on page 2) Les informations complémentaires (si nécessaire, peuvent être indiqués sur la 2ème page	- ☐ Additional Information on page 2
	PUBLICATION / EDITION
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	IEC 60947-1(ed.4) IEC 60947-3(ed.2);am1;am2
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	2.03.00606.1.0/MV400/CB/CCA

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

ПС електрик ООД

OVE

AUSTRIAN ELECTROTECHNICAL ASSOCIATION
Kahlenberger Str. 2A
1190 Wien, Austria

Digitally signed by K. Wallner
on behalf of W. Martin
Email: k.wallner@ove.at

Date: 2007-06-26

Signature: Dipl.-Ing. W. Martin

ZVR: 327279890 DVR: 1055887

ВЯРНО С ОРИГИНАЛА

8.3.3 Тест I: Характеристики при нормален режим на работа.

8.3.3.1 Проверка при нарастване на температурата.

8.3.3.2 Тест на диелектричните свойства.

8.3.3.3 Включвателна и изключвателна способност при ток на късо съединение.

8.3.3.3.5 Поведение на апаратурата по време на тестовете за включвателна и изключвателна способност при ток на късо съединение

8.3.3.3.6 Състояние на апаратурата след приключване на тестовете за включвателна и изключвателна способност при ток на късо съединение

8.3.3.4 Диелектрична проверка

8.3.3.5 Ток на утечка

8.3.3.6 Проверка при нарастване на температурата

8.3.3.7 Издръжливост на задвижващия механизъм

8.2.5.2.1 Зависимо и независимо ръчно управление

8.2.5.2.2 Зависимо моторно задвижване

8.2.5.2.3 Независимо моторно задвижване

8.3.4 Тест II: Издръжливост при номинални условия

8.3.4.1 Тест при номинални условия

8.3.4.2 Диелектрична проверка

8.3.4.3 Ток на утечка

8.3.4.4 Проверка при нарастване на температурата

8.3.5 Тест III: Издръжливост в режим на късо съединение

8.3.5.1 Тест за издръжливост при кратковременно късо съединение

8.3.5.2 Включвателна способност при късо съединение

8.3.5.3 Диелектрична проверка

8.3.5.4 Ток на утечка

8.3.5.5 Проверка при нарастване на температурата

8.3.6 Тест IV: Условен ток на късо съединение

8.3.6.2 Условия за проверка за условен ток на късо съединение

8.3.6.3 Диелектрична проверка

8.3.6.4 Ток на утечка

ПС електрик ООД
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BULGARIA

ВЯРНО С ОРИГИНАЛА

Clause Requirement - Test Result - Remark Verdict

8.3.3 TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS

8.3.3.1 Temperature-rise

8.3.3.2 Test of dielectric properties

8.3.3.3 Making and breaking capacity

8.3.3.3.5 Behaviour of the equipment during making and breaking capacity tests

8.3.3.3.6 Condition of the equipment after making and breaking capacity tests

8.3.3.4 Dielectric verification

8.3.3.5 Leakage current

8.3.3.6 Temperature-rise verification

8.3.3.7 Strength of actuator mechanism

8.2.5.2.1 Dependent and independent manual operation

8.2.5.2.2 Dependent power operation

8.2.5.2.3 Independent power operation

8.3.4 TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY

8.3.4.1 Operational performance test

8.3.4.2 Dielectric verification

8.3.4.3 Leakage current

8.3.4.4 Temperature-rise verification

8.3.5 TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY

8.3.5.1 Short-time withstand current test

8.3.5.2 Short-circuit making capacity

8.3.5.3 Dielectric verification

8.3.5.4 Leakage current

8.3.5.5 Temperature-rise verification

8.3.6 TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT

8.3.6.2 Test conditions for conditional short-circuit current test

8.3.6.3 Dielectric verification

8.3.6.4 Leakage current

8.3.6.5 Temperature-rise verification

ПС електрик ООД
PS ELECTRIC
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ВЯРНО С ОРИГИНАЛА

PÜZ
1

Accredited by BMWA, No. BMWA-92.714/0532-I/12/2006 as test- and inspection body
and according to BGBl. II, No. 244/2005 as certification body for personnel

arsenal research
Ein Unternehmen der Austrian Research Centers.

Test Report

Project Designation

TYPE TEST AT A
LOW-VOLTAGE VERTICAL
FUSE-SWITCH-DISCONNECTOR
TYPE MULTIVERT 400

Client

M.Schneider GmbH
Lienfeldergasse 31-33
A-1160 Wien

Order from / No 08/2006 / ---

Project number 2.03.00606.1.0/MV400 Test Engineer Ing.J.Ainetter

Date of issue	05.04.2007
Total number of issues / No	1 / 1
Number of pages	5
Annex	CB/CCA - Test Report No. 2.03.00606.1.0/MV400/CB/CCA (67 pages)

ПС електрик С
ELECTRIC
BULGARIA

ВЯРНО С ОРИГИНАЛА

Test item

Identification:
Low-voltage vertical single-pole operated or three-pole operated fuse-switch-disconnector type MULTIVERT 400

Manufacturer: M.Schneider GmbH
Trademark: ◆ m.schneider
Rated operational voltage: 400VAC up to 690VAC
Rated operational current: 400A
Rated frequency: 50Hz to 60Hz

Technical data and description:
See page 4

Testing location, Period of testing

Testing location:
Österreichisches Forschungs- und Prüfzentrum Arsenal Ges.m.b.H.
Business Field Monitoring, Energy and Drive Technologies – Power Service Center
Giefinggasse 2
1210 Wien
AUSTRIA

Period of testing:
08 ... 12/2006

Test(s)

Test(s) performed:
Type test

Test standard(s):
IEC 60947-1:2004 (4th Edition) and IEC 60947-3:1999 (2nd Edition)+A1:2001+A2:2005
EN 60947-1:2004 and EN 60947-3:1999+A1:2001+A2:2005

Test procedure(s):
CB Scheme and CCA Scheme

Result

The low-voltage vertical fuse-switch-disconnector type MULTIVERT 400 has passed the type test successfully.

Test Engineer

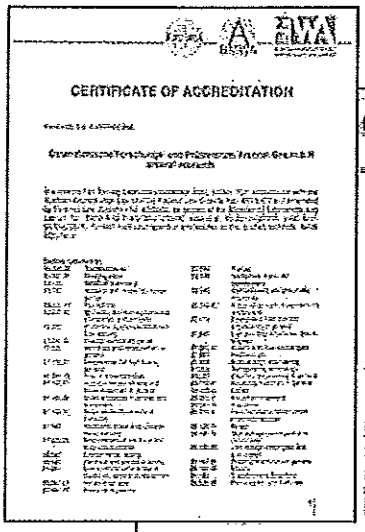
Ing.J.Ainetter

Project Engineer, technical responsibility

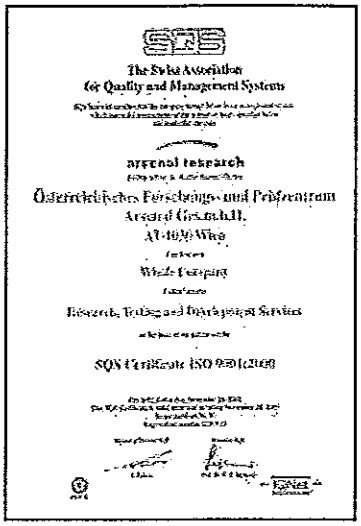
Ing.K.Farthofer

ВЯРНО С ОРИГИНАЛА

Testing laboratory

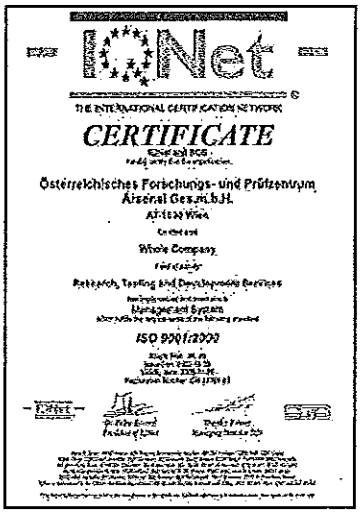


ACCREDITED
according to
EN ISO/IEC 17025
No. BMWA-92.714/0532-I/12/2006

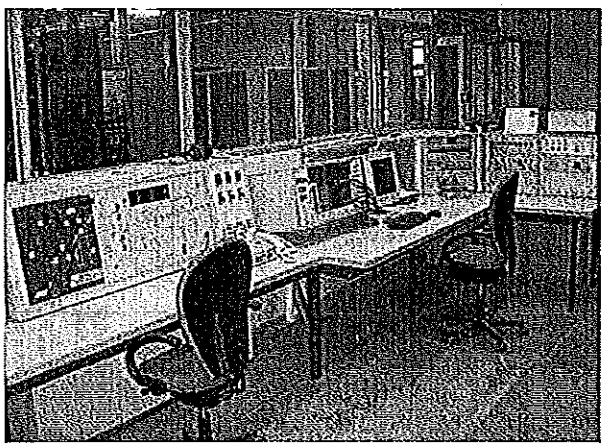


CERTIFICATED
according to
ISO 9001
Reg. No. 12769-03

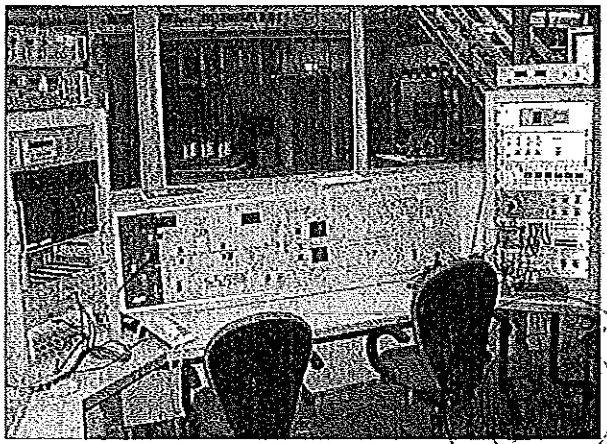
RECOGNIZED
CB TESTING LABORATORY
under the responsibility of OVE
as the National Certification Body



PSC – POWER SERVICE CENTER:



Control station for tests up to 15kA



Control station for tests above 15kA

Technical data and description

Test item	Low-voltage vertical fuse-switch-disconnector
Trademark	m.schneider
Model/Type reference	MULTIVERT 400
Manufacturer	M.Schneider GmbH
Place of manufacture	M.Schneider CZ s.r.o., Czechia
Method of mounting	Busbar mounting
Method of operation	Dependent manual operation (single-pole operated or three-pole operated)
Incoming terminals	Busbar terminals
Outgoing terminals	Lug/Busbar terminals Pillar (V-shaped) terminals
Switching positions	ON / OFF
Number of poles	3
Nature of supply	AC
Utilization category	AC-23B at 400V AC-22B at 500V AC-21B at 690V
Rated operational voltage	400V up to 690V
Rated operational current	400A
Rated frequency	50Hz to 60Hz
Conventional free air thermal current with fuse-links	400A
Conventional free air thermal current with solid-links	630A (for connection of cables, an adapter has to be used)
Rated insulation voltage	1000V
Rated impulse withstand voltage	8kV
Rated short-time withstand current	8000A / 1s
Rated short-circuit making capacity	16000A peak
Rated conditional short-circuit current	120kA at 500V with 400A fuse-links 120kA at 690V with 315A fuse-links
Kind of protective device	Low-voltage fuse-links NH2 – gL/gG
Degree of protection	IP30

ВЯРНО С ОРИГИНАЛА

Measuring equipment

Measured quantity	Device	Manufacturer	Code
Voltage (tests up to 15kA)	Voltage divider 1:2000 Difference amplifier AM 502 Transient recorder SMR II	ÖFPZ Arsenal Tektronix W&W	- AM 502/1...3 SMRII32
Voltage (tests above 15kA)	3-channel insulating measuring amplifier Signal memory recorder SMR II	Rohrer W&W	T908D SMRII64/1
Current (tests up to 15kA)	Lin. current transformer LGSSO Burden 1Ω Transient recorder SMR II	Ritz ÖFPZ Arsenal W&W	WLIN5000/1...3 - SMRII32
Current (tests above 15kA)	Lin. current transformer LGSSO Burden 0,7mΩ Signal memory recorder SMR II	Ritz ÖFPZ Arsenal W&W	WLIN6000/1...3 - SMRII64/1
Current (tests at reduced voltage)	Current transformer GE 4461 Current transformer AETt10 True-RMS amperemeter Kl. 0,5	Goerz Siemens Norma	WI600/1...3 WI4000/1...3 A0,5/1...3
Transient recovery voltage	Adjustment equipment for TRV Oscilloscope G 801.1	ÖFPZ Arsenal Tektronix	- G801.1
Dielectric properties	High-voltage test equipment 90-1F Impulse tester 35 Impulse voltmeter 64M Oscilloscope 9410	Elabo Haefely Haefely Le Croy	HSG5KV G304 G502 G803
Leakage current	High-voltage test equipment 90-1F Digital multimeter Fluke 185 Digital multimeter Fluke 185	Elabo Fluke Fluke	HSG5KV FLUKE185/1 FLUKE185/2
Time	Transient recorder SMR II Stopwatch	W&W Junghans	SMRII32 938-2
Temperature	Temp. recorder Polycomp SK 30 Temperature meter TESTO 901	H & B Testoterm	SK 30 TESTO
Abnormal heat and fire	Glow-wire test device with measuring equipment	ÖFPZ Arsenal	-
Mechanical strength of terminals	Test equipment	ÖFPZ Arsenal	-
Insertability of unprepared conductors	Gauges	ÖFPZ Arsenal	-
Strength of actuator mechanism	Test equipment	Schatz	-
Degree of protection	Test probe	PTL	-
Clearances, creepage distances	Digital slide gauge CD-20D	Mitutoyo	SCHUB

ВЯРНО С ОРИГИНАЛА

Test Report issued under the responsibility of

OVE

TEST REPORT

IEC / EN 60947-3

Low-voltage switchgear and controlgear
Part 3: Switches, disconnectors, switch-disconnectors and fuse combination units

Report Reference No.	2.03.00606.1.0/MV400/CB/CCA
Date of issue.....	05.04.2007
Total number of pages.....	67
CB / CCA Testing Laboratory.....	ÖFPZ Arsenal Ges.m.b.H.
Address	A-1210 Wien, Giefinggasse 2
Applicant's name.....	M.Schneider GmbH
Address	A-1160 Wien, Lienfeldergasse 31-33
Test specification:	
Standard.....	☒ IEC 60947-3:1999 (Second Edition) + A1:2001 + A2:2005 in conjunction with IEC 60947-1:2004 (Fourth Edition)
	☒ EN 60947-3:1999 + A1:2001 + A2:2005 in conjunction with EN 60947-1:2004
Test procedure	CB / CCA
Non-standard test method.....	N/A
Test Report Form No......	IECEN60947_3B
Test Report Form(s) Originator	OVE
Master TRF.....	Dated 2006-08

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.

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

Test item description	Low-voltage vertical fuse-switch-disconnector
Trade Mark	◆ m.schneider
Manufacturer	M.Schneider CZ s.r.o., Czechia
Model/Type reference.....	MULTIVERT 400
Ratings.....	See page 4

ПС електрик ООД BULGARIA

ВЯРНО С ОРИГИНАЛА

Testing procedure and testing location:

☒ **CB / CCA Testing Laboratory:** ÖFPZ Arsenal Ges.m.b.H.

Testing location/ address .....: A-1210 Wien, Giefinggasse 2

☐ **Associated CB Laboratory:**

Testing location/ address .....: ---

Tested by (name + signature).....: Ing.J.Ainetter .....

Approved by (name + signature).....: Ing.K.Farthofer .....

☐ Testing procedure: TMP

Tested by (name + signature).....: --- .....

Approved by (name + signature).....: --- .....

Testing location/ address .....: ---

☐ Testing procedure: WMT

Tested by (name + signature).....: --- .....

Witnessed by (name + signature)....: --- .....

Approved by (name + signature).....: --- .....

Testing location/ address .....: ---

☐ Testing procedure: SMT

Tested by (name + signature).....: --- .....

Approved by (name + signature).....: --- .....

Supervised by (name + signature)..: --- .....

Testing location/ address .....: ---

☐ Testing procedure: RMT

Tested by (name + signature).....: --- .....

Approved by (name + signature).....: --- .....

Supervised by (name + signature)..: --- .....

Testing location/ address .....: ---

ВЯРНО С ОРИГИНАЛА

Summary of testing:

Tests performed (name of test and test clause):

A type test was performed according to

IEC 60947-1:2004 (4th Edition)
IEC 60947-3:1999 (2nd Edition)+A1:2001+A2:2005

and

EN 60947-1:2004
EN 60947-3:1999+A1:2001+A2:2005.

The low-voltage fuse-switch-disconnector type

MULTIVERT 400

has passed the type test successfully.

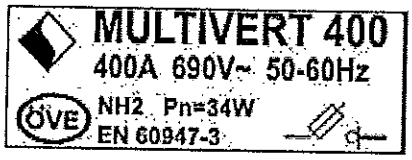
Testing location:

ÖFPZ Arsenal Ges.m.b.H.
Business Field Monitoring, Energy and Drive Technologies – Power Service Center
Giefinggasse 2
1210 Wien
AUSTRIA

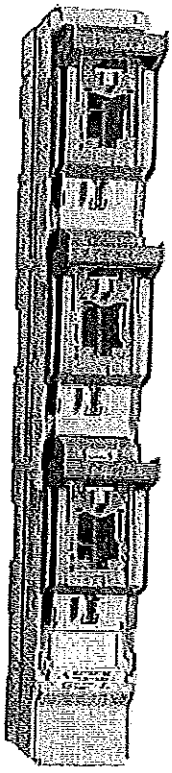
The ÖFPZ Arsenal Ges.m.b.H. is a recognized CB Testing Laboratory under the responsibility of OVE as the National Certification Body.

Summary of compliance with National Differences:

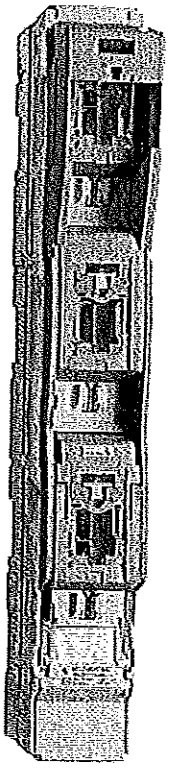
Copy of marking plate:



Picture(s) of the test item:



MULTIVERT 400, single-pole operated



MULTIVERT 400, three-pole operated

Test item particulars:			
- method of mounting	Busbar mounting		
- method of operation	Dependent manual operation (single-pole operated or three-pole operated)		
- incoming terminals	Busbar terminals		
- outgoing terminals	Lug/Busbar terminals Pillar (V-shaped) terminals		
- switching positions	ON / OFF		
- number of poles	3		
- number of phases	3		
- kind of current	AC		
- number of positions of the main contacts	2		
Rated and limiting values, main circuit:			
- rated operational voltage Ue (V)	400	500	690
- rated insulation voltage Ui (V)	1000		
- rated impulse withstand voltage Uimp (kV)	8		
- rated operational current Ie (A)	400	400	400
- conventional free air thermal current Ith with fuse-links (A)	400		
- conventional free air thermal current Ith with solid-links (A)	630 (for connection of cables, an adapter has to be used)		
- rated uninterrupted current Iu (A)	400 (max. power dissipation of the fuse-links must not exceed 34W)		
- rated frequency (Hz)	50 to 60		
- utilization category	AC-23B	AC-22B	AC-21B
Short-circuit characteristic:			
- rated short-time withstand current Icw (A)	8000 / 1s		
- rated short-time making capacity Icm (A)	16000 peak		
- rated conditional short-circuit current (kA)	120 (at 500V with 400A fuse-links) 120 (at 690V with 315A fuse-links)		
Rated and limiting values, auxiliary circuit(s):			
- rated operational voltage (V)	-		
- rated frequency (Hz)	-		
- number of circuits	-		
- number and kind of contact elements	-		
Co-ordination of short-circuit protective devices:			
- kind of protective device	Low-voltage fuse-links NH2 – gL/gG		

Possible test case verdicts:	
- test case does not apply to the test object	N (Not applicable)
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing:	
Date of receipt of test item	08/2006
Date (s) of performance of tests	08...12/2006

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ВЯРНО С ОРИГИНАЛА

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Note: EN Group Differences together with National Differences and Special National Conditions, if any, are stated in the Appendix to the main body of this TRF.

Throughout this report a comma is used as the decimal separator.

Remark for using the fuse-switch-disconnector:

The maximum power dissipation of the fuse-links suitable for use with the low-voltage fuse-switch-disconnector type MULTIVERT 400 is 34W. According to the standard IEC/EN 60269, 690V fuse-links of the appropriate size (NH2) may have a power dissipation exceeding this value.

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

34W

will not be exceeded for use in uninterrupted duty.

General product information:

Low-voltage
vertical
single-pole operated or three-pole operated
fuse-switch-disconnector
for busbar mounting

type

MULTIVERT 400

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
5.2	MARKING		P
	Marking on equipment itself or on nameplate or nameplates attached to the equipment and legible from the front after mounting		P
	- indication of the open and closed position	Visible open and closed position	P
	- suitability for isolation	Yes	P
	- disconnectors AC-20 and DC-20 only: marked "Do not operate under load"		N
	Marking on equipment not needed to be visible after mounting:		P
	- manufacturer's name or trademark	◆ m.schneider	P
	- type designation or serial number	MULTIVERT 400	P
	- rated operational current	400A	P
	- rated operational voltage	690V~	P
	- utilization category	AC-21B, AC-22B, AC-23B	P
	- rated frequency	50-60Hz	P
	- manufacturer's claim for compliance with IEC/EN 60947-3	EN 60947-3	P
	- degree of protection	IP30	P
	Marking on fuse-combination units:		P
	- fuse type	NH2	P
	- maximum rated current	400A	P
	- power loss of the fuse-link	Pn=34W	P
	Identification of terminals:		P
	- line terminals		P
	- load terminals		P
	- neutral pole terminal		N
	- protective earth terminal		N
	Data in the manufacturer's published information:		P
	- rated insulation voltage	Catalogue	P
	- rated impulse withstand voltage for equipment suitable for isolation or when determined	Catalogue	P
	- pollution degree, if different from 3	Catalogue	P
	- rated duty	Catalogue	P
	- rated short-time withstand current and duration	Catalogue	P
	- rated short-circuit making capacity	Catalogue	P
	- rated conditional short-circuit current	Catalogue	P

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict

7.1	CONSTRUCTION		P
7.1.1	Materials		P
7.1.1.1	Resistance to abnormal heat and fire		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11		P
	Parts made of insulating material necessary to retain current-carrying parts in position: test temperature 960 °C		P
	No visible flame and no sustained glowing.....:	No visible flame	P
	Flames and glowing extinguish within 30 s .....:	-	N
	No ignition of the tissue paper		P
	Parts of insulating material not necessary to retain current-carrying parts in position, even though in contact with them: test temperature 650 °C		P
	No visible flame and no sustained glowing.....:	-	N
	Flames and glowing extinguish within 30 s .....:	Extinguishing within 1s	P
	No ignition of the tissue paper		P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances		P
	Rated impulse withstand voltage (kV) .....:	8	—
	Minimum clearances (mm) .....:	8	—
	Measured clearances (mm).....:	8,5 (minimum)	P
	Creepage distances		P
	Pollution degree.....:	3	—
	Comparative tracking index (V) .....:	500	—
	Material group.....:	II	—
	Rated insulation voltage Ui (V) .....:	1000	—
	Minimum creepage distances (mm).....:	14	—
	Measured creepage distances (mm).....:	15 (minimum)	P
7.1.4	Actuator		P
7.1.4.1	Insulation		—
	Actuator insulated from live parts for		—
	- rated insulation voltage	Ui = 1000V	P
	- rated impulse withstand voltage	Uimp = 8kV	P
	Actuator made of metal	No	—
	- connected to a protective conductor or provided with an additional insulation		N

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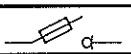
IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Actuator made of or covered by insulating material:	Insulating material	—
	- internal metal parts, which might become accessible in the event of an insulation failure, are also insulated from live parts for the rated insulation voltage		P
7.1.4.2	Direction of movement		P
	The direction of operation for actuators shall where applicable conform to IEC 60447		P
	There is no doubt of the "I" and "O" position and the direction of operation		P
7.1.5 of Part 1	Indication of contact position		P
7.1.5.1	Indicating means	Actuator	P
7.1.5.2	Indication by the actuator	Yes	P
7.1.6	Additional safety requirements for equipment suitable for isolation		P
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		P
	- marking according to 5.2.1b		P
	- indication of the position of the contacts	Visible open and closed position	P
	- construction of the actuating mechanism		P
	- minimum clearances across open contacts (see Table 13, Part 1) (mm) .....:	8	—
	- measured clearances (mm).....:	> 20	P
	- test Uimp across gap (kV) .....:	12,3	P
7.1.6.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N
	Auxiliary switch is rated according to IEC 60947-5-1 (unless the equipment is rated AC-23)		N
	Time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles: ≥ 20 ms.....:	-	—
	Measured time interval (ms) .....:	-	N
	During the closing operation the contacts of the auxiliary switch closes after or simultaneously with the contacts of the main poles		N

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.6.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N
	The locking means is so designed that it cannot be removed with the appropriate padlock(s) installed		N
	Test force F applied to the actuator in an attempt to operate to the closed position (N).....:	-	—
	Rated impulse withstand voltage (kV) .....:	-	—
	Test Uimp on open main contacts at test force (kV).....:	-	N
7.1.7 of Part 1	Terminals		P
7.1.7.1	All parts of terminals which maintain contact and carry current are of metal having adequate mechanical strength	See 8.2.4 below	P
	Terminal connections are such that necessary contact pressure is maintained	See 8.2.4 below	P
	Terminals are so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	See 8.2.4 below	P
	Terminals do not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage is not reduced below the rated value	See 8.2.4 below	P
8.2.4	Mechanical properties of terminals		P
	Mechanical strength of terminals		P
	Maximum cross-sectional area of conductor.....:	2 x 240mm² *) (lug/busbar terminals) 2 x 40mmx10mm (lug/busbar terminals) 2 x 240mm² *) (pillar terminals) *) by means of an adapter	—
	Diameter of thread (mm).....:	12 (lug/busbar terminals) 14 (pillar terminals)	—
	Torque (Nm).....:	38,5 (lug/busbar terminals) 27,5 (pillar terminals)	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		P
	Type of terminals tested.....:	Pillar (V-shaped) terminals	P
	Conductor of the smallest cross-sectional area (mm²).....:	50	—
	Number of conductors of the smallest cross section.....:	1	—
	Diameter of bushing hole (mm)°.....:	15,9	—

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Height between equipment and platen (mm).....:	343	—
	Mass at the conductor(s) (kg) .....:	9,5	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min .....:	236	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest cross-sectional area (mm²).....:	240	—
	Number of conductors of the largest cross section.....:	2	—
	Diameter of bushing hole (mm) .....:	28,6	—
	Height between equipment and platen (mm).....:	464	—
	Mass at the conductor(s) (kg) .....:	20	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Pull-out test		P
	Force (N), applied for 1 min .....:	578	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		P
	Conductor of the largest and smallest cross-sectional area (mm²).....:	-	—
	Number of conductor of the smallest cross section, number of conductor of the largest cross section .. :	-	—
	Diameter of bushing hole (mm) .....:	-	—
	Height between equipment and platen (mm).....:	-	—
	Mass at the conductor(s) (kg) .....:	-	—
	135 continuous revolutions: the conductor neither slips out of the terminal nor breaks near the clamping unit		N
	Pull-out test		N
	Force (N), applied for 1 min. .....:	-	—
	During the test, the conductor neither slips out of the terminal nor breaks near the clamping unit		N
	Test for insertability of unprepared round copper conductors having the maximum specified cross-section		P
	Type of terminals tested.....:	Pillar (V-shaped) terminals	P
	Gauge .....:	A16	P

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.7.2	Connection capacity		P
	Type of conductors .....:	Cables (rigid or flexible) Busbars	—
	Minimum cross-sectional area of conductor.....:	Cables: 1 x 50mm² Busbars: 1 x 30mmx5mm	—
	Maximum cross-sectional area of conductor.....:	Cables: 2 x 240mm² *) Busbars: 2 x 40mmx10mm *) by means of an adapter	—
	Number of conductors simultaneously connectable to the terminal.....:	1 (min. cross-section) 2 (max. cross-section)	—
7.1.7.3	Connection		P
	Terminals for connection to external conductors are readily accessible during installation		P
	Clamping screws and nuts do not serve to fix any other component		P
7.1.7.4	Terminal identification and marking		P
	Terminal intended exclusively for the neutral conductor		N
	Protective earth terminal		N
	Other terminals		P
7.1.8	Additional requirements for equipment provided with a neutral pole		N
	Equipment provided with a pole intended for the connection of neutral, this pole shall be clearly marked by the letter "N"		N
	The switched neutral pole does not break before and does not make after the other poles except		N
	- a pole having the appropriate short-circuit breaking and making capacity is used as neutral pole, all poles may operate together		N
	Conventional thermal current of neutral pole		N
7.1.9	Provisions for protective earthing		N
7.1.9.1	The exposed conductive parts are electrically interconnected and connected to a protective earth terminal		N
7.1.9.2	Protective earth terminal is readily accessible		N
	Protective earth terminal is suitably protected against corrosion		N
	Electrical continuity between exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	Protective earth terminal has no other functions		N
7.1.9.3	Protective earth terminal marking and identification		N

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
7.1.10	Enclosure for equipment		N
7.1.10.1	Design		N
	When the enclosure is opened, all parts requiring access for installation and maintenance are readily accessible		N
	Sufficient space is provided inside the enclosure		N
	The fixed parts of a metal enclosure are electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N
	Under no circumstances a removable metal part of the enclosure is insulated from the part carrying the earth terminal when the removable part is in place		N
	The removable parts of the enclosure are firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N
	If the enclosure is used for mounting push-buttons, it is not possible to remove the buttons from the outside of the enclosure		N
7.1.10.2	Insulation		N
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining is securely fixed to the enclosure		N
7.1.11	Degree of protection of enclosed equipment		P
	Degree of protection .....:	IP30	P

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict

8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		P
8.3.3.1	Temperature-rise		P
	MULTIVERT 400, three-pole operated: 400A with fuse-links		
	ambient temperature 10-40°C .....:	25	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	Main circuits, test conditions:		P
	- conventional thermal current Ith (A) .....:	400	—
	- conventional enclosed thermal current Ithe (A)..:	-	—
	- cable/busbar cross-section (mm²)/(mm x mm)....:	Incoming: 30mmx10mm Outgoing: 240mm²	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details (fuse-combination units only):		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V) .....:	500	
	- rated current (A).....:	400	—
	- power loss (W).....:	< 34	—
	- rated breaking capacity (kA).....:	120	—
	Temperature-rise of phase poles	See appended table 1	P
	Temperature-rise of neutral pole (if applicable)		N
	Temperature-rise of accessible parts	See appended table 1	P
	Auxiliary circuits, test conditions:		N
	- rated operation current (A) .....:	-	—
	- cable cross-section (mm²) .....:	-	—
	Temperature-rise of terminals		N
	Temperature-rise of accessible parts		N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.1	Temperature-rise		P
	MULTIVERT 400, three-pole operated: 630A with solid-links		
	ambient temperature 10-40°C .....:	24,5	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	Main circuits, test conditions:		P
	- conventional thermal current Ith (A) .....:	630	—
	- conventional enclosed thermal current Ithe (A)..:	-	—
	- cable/busbar cross-section (mm²)/(mm x mm)...:	Incoming: 40mmx10mm Outgoing: 2 x 40mmx5mm	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details (fuse-combination units only):		N
	- manufacturer's name, trademark or identification mark.....:	-	—
	- manufacturer's model or type reference.....:	-	—
	- rated voltage (V) .....:	-	
	- rated current (A).....:	-	—
	- power loss (W).....:	-	—
	- rated breaking capacity (kA).....:	-	—
	Temperature-rise of phase poles	See appended table 2	P
	Temperature-rise of neutral pole (if applicable)		N
	Temperature-rise of accessible parts	See appended table 2	P
	Auxiliary circuits, test conditions:		N
	- rated operation current (A) .....:	-	—
	- cable cross-section (mm²) .....:	-	—
	Temperature-rise of terminals		N
	Temperature-rise of accessible parts		N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.1	Temperature-rise		P
	MULTIVERT 400, single-pole operated: 400A with fuse-links		
	ambient temperature 10-40°C .....:	24	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	Main circuits, test conditions:		P
	- conventional thermal current Ith (A) .....:	400	—
	- conventional enclosed thermal current Ithe (A)..:	-	—
	- cable/busbar cross-section (mm²)/(mm x mm)...:	Incoming: 30mmx10mm Outgoing: 240mm²	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details (fuse-combination units only):		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V) .....:	500	
	- rated current (A).....:	400	—
	- power loss (W).....:	< 34	—
	- rated breaking capacity (kA).....:	120	—
	Temperature-rise of phase poles	See appended table 3	P
	Temperature-rise of neutral pole (if applicable)		N
	Temperature-rise of accessible parts	See appended table 3	P
	Auxiliary circuits, test conditions:		N
	- rated operation current (A) .....:	-	—
	- cable cross-section (mm²) .....:	-	—
	Temperature-rise of terminals		N
	Temperature-rise of accessible parts		N

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.1	Temperature-rise		P
	MULTIVERT 400, single-pole operated: 630A with solid-links		
	ambient temperature 10-40°C .....:	24,5	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	Main circuits, test conditions:		P
	- conventional thermal current Ith (A) .....:	630.	—
	- conventional enclosed thermal current Ithe (A)..:	-	—
	- cable/busbar cross-section (mm²)/(mm x mm)...:	Incoming: 40mmx10mm Outgoing: 2 x 40mmx5mm	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details (fuse-combination units only):		N
	- manufacturer's name, trademark or identification mark.....:	-	—
	- manufacturer's model or type reference.....:	-	—
	- rated voltage (V) .....:	-	
	- rated current (A).....:	-	—
	- power loss (W).....:	-	—
	- rated breaking capacity (kA).....:	-	—
	Temperature-rise of phase poles	See appended table 4	P
	Temperature-rise of neutral pole (if applicable)		N
	Temperature-rise of accessible parts	See appended table 4	P
	Auxiliary circuits, test conditions:		N
	- rated operation current (A) .....:	-	—
	- cable cross-section (mm²) .....:	-	—
	Temperature-rise of terminals		N
	Temperature-rise of accessible parts		N

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict

8.3.3.2	Test of dielectric properties		P
	MULTIVERT 400, three-pole operated		
	Rated impulse withstand voltage (kV) .....:	8	—
	- test Uimp main circuits (kV).....:	9,8	P
	- test Uimp auxiliary circuits (kV) .....:	-	N
	- test Uimp on open main contacts (equipment suitable for isolation) (kV).....:	12,3	P
	Power-frequency withstand voltage (V).....:	1000	—
	- main circuits, test voltage for 5 sec. (V).....:	2200	P
	- control and auxiliary circuits, test voltage for 5 sec. (V) .....:	-	N
	Devices, which have been disconnected for the power-frequency withstand voltage test .....:	-	N
	Equipment suitable for isolation, leakage current not exceed 0,5 mA		—
	Test voltage 1,1 Ue (V).....:	760	P
	Measured leakage current (mA).....:	< 0,2	P

8.3.3.2	Test of dielectric properties		P
	MULTIVERT 400, single-pole operated		
	Rated impulse withstand voltage (kV) .....:	8	—
	- test Uimp main circuits (kV).....:	9,8	P
	- test Uimp auxiliary circuits (kV) .....:	-	N
	- test Uimp on open main contacts (equipment suitable for isolation) (kV).....:	12,3	P
	Power-frequency withstand voltage (V).....:	1000	—
	- main circuits, test voltage for 5 sec. (V).....:	2200	P
	- control and auxiliary circuits, test voltage for 5 sec. (V) .....:	-	N
	Devices, which have been disconnected for the power-frequency withstand voltage test .....:	-	N
	Equipment suitable for isolation, leakage current not exceed 0,5 mA		—
	Test voltage 1,1 Ue (V).....:	760	P
	Measured leakage current (mA).....:	< 0,2	P

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	MULTIVERT 400, three-pole operated: AC-23B at 400V/400A		
	- utilization category ..... :	AC-23B	—
	- rated operational voltage Ue (V) ..... :	400	—
	- rated operational current Ie (A) or power (kW) ... :	400A	—
	Conditions for make/break operations or make operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 429 L2: 427 L3: 428	—
	- test current, I = 10 x Ie (A) ..... :	L1: 4032 L2: 4045 L3: 4027	—
	- power factor ..... :	L1: 0,36 L2: 0,35 L3: 0,35	—
	Conditions for break operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 428 L2: 428 L3: 428	—
	- test current, I = 8 x Ie (A) ..... :	L1: 3216 L2: 3227 L3: 3220	—
	- power factor ..... :	L1: 0,34 L2: 0,33 L3: 0,33	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		N
	- test voltage, U = 1,05 Ue (V) ..... :	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A) ..... :	L1: - L2: - L3: -	—
	- power factor/time constant ..... :	L1: - L2: - L3: -	—
	Number of make/break or make and break operations ..... :	3 and 3	P
	- recovery voltage duration (≥ 50 ms) ..... :	Permanent	P
	- current duration (ms) ..... :	320	
	- time interval between operations (s) ..... :	30	P

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:			P
	- oscillatory frequency (kHz) .....:	83,26		—
	- measured oscillatory frequency (kHz).....:	L1: 83,3 L2: 83,3 L3: 83,3		P
	- factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1		P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.3.4	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.3.5	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA) .....:	< 1		P
8.3.3.6	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A) .....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 63	80	P

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Manual operating means: non-metallic	3	35	P
	Parts intended to be touched but not hand-held: non-metallic	24	50	P
	Parts which need not be touched during normal operation: non-metallic	40	60	P
	Supplementary information:			N
8.3.3.7	Strength of actuator mechanism			P
8.2.5	Verification of the strength of actuator mechanism and position indicating device			P
	- actuator type (fig.).....:	One-hand operated (1e)		—
8.2.5.2.1	Dependent and independent manual operation			P
	- actuating force for opening (N).....:	235		—
	- test force with blocked main contacts (N).....:	400		—
	- used method to keep the contact closed.....:	Brazing		—
	During and after the test, open position not indicated.....:	Not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied.....:	No locking means in the open position		N
8.2.5.2.2	Dependent power operation			N
	- main contacts fixed together in the closed position.....:	-		N
	- used method to keep the contact closed.....:	-		N
	- 110% of the rated supply voltage applied to the equipment (3 times).....:	-		N
	During and after the test, open position not indicated.....:	-		N
	Equipment show no damage impairing its normal operation.....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied.....:	-		N
8.2.5.2.3	Independent power operation			N
	- main contacts fixed together in the closed position.....:	-		N
	- used method to keep the contact closed.....:	-		N
	- stored energy of the power operator released (3 times).....:	-		N
	During and after the test, open position not indicated.....:	-		N
	Equipment show no damage impairing its normal operation.....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied.....:	-		N

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict

8.3.3.3	Making and breaking capacity		P
	MULTIVERT 400, three-pole operated: AC-22B at 500V/400A		
	- utilization category.....:	AC-22B	—
	- rated operational voltage Ue (V).....:	500	—
	- rated operational current Ie (A) or power (kW)...:	400A	—
	Conditions for make/break operations or make operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V).....:	L1: 528 L2: 529 L3: 529	—
	- test current, I = 3 x Ie (A).....:	L1: 1224 L2: 1237 L3: 1220	—
	- power factor.....:	L1: 0,65 L2: 0,64 L3: 0,64	—
	Conditions for break operations, AC-23A and AC-23B only:		N
	- test voltage, U = 1,05 Ue (V).....:	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A).....:	L1: - L2: - L3: -	—
	- power factor.....:	L1: - L2: - L3: -	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		N
	- test voltage, U = 1,05 Ue (V).....:	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A).....:	L1: - L2: - L3: -	—
	- power factor/time constant.....:	L1: - L2: - L3: -	—
	Number of make/break or make and break operations.....:	5	P
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms).....:	320	—
	- time interval between operations (s).....:	30	P

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:			P
	- oscillatory frequency (kHz) .....:	57,24		—
	- measured oscillatory frequency (kHz).....:	L1: 57,1 L2: 57,1 L3: 57,1		P
	- factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1		P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.3.4	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.3.5	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.3.6	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 59	80	P

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	22	50	P
	Parts which need not be touched during normal operation: non-metallic	38	60	P
	Supplementary information:			N
8.3.3.7	Strength of actuator mechanism			P
8.2.5	Verification of the strength of actuator mechanism and position indicating device			P
	- actuator type (fig.)....:	One-hand operated (1e)		—
8.2.5.2.1	Dependent and independent manual operation			P
	- actuating force for opening (N)....:	235		—
	- test force with blocked main contacts (N)....:	400		—
	- used method to keep the contact closed....:	Brazing		—
	During and after the test, open position not indicated....:	Not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied....:	No locking means in the open position		N
8.2.5.2.2	Dependent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- 110% of the rated supply voltage applied to the equipment (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N
8.2.5.2.3	Independent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- stored energy of the power operator released (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	MULTIVERT 400, three-pole operated: AC-21B at 690V/400A		
	- utilization category ..... :	AC-21B	—
	- rated operational voltage Ue (V) ..... :	690	—
	- rated operational current Ie (A) or power (kW) ... :	400A	—
	Conditions for make/break operations or make operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 730 L2: 730 L3: 728	—
	- test current, I = 1,5 x Ie (A) ..... :	L1: 612 L2: 619 L3: 610	—
	- power factor ..... :	L1: 0,94 L2: 0,93 L3: 0,94	—
	Conditions for break operations, AC-23A and AC-23B only:		N
	- test voltage, U = 1,05 Ue (V) ..... :	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A) ..... :	L1: - L2: - L3: -	—
	- power factor ..... :	L1: - L2: - L3: -	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		N
	- test voltage, U = 1,05 Ue (V) ..... :	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A) ..... :	L1: - L2: - L3: -	—
	- power factor/time constant ..... :	L1: - L2: - L3: -	—
	Number of make/break or make and break operations ..... :	5	P
	- recovery voltage duration (≥ 50 ms) ..... :	Permanent	P
	- current duration (ms) ..... :	320	—
	- time interval between operations (s) ..... :	30	P

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:			N
	- oscillatory frequency (kHz) .....:	-		—
	- measured oscillatory frequency (kHz) .....:	L1: - L2: - L3: -		N
	- factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1		P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.3.4	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.3.5	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA) .....:	< 1		P
8.3.3.6	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 60	80	P

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	21	50	P
	Parts which need not be touched during normal operation: non-metallic	35	60	P
	Supplementary information:			N
8.3.3.7	Strength of actuator mechanism			P
8.2.5	Verification of the strength of actuator mechanism and position indicating device			P
	- actuator type (fig.)....:	One-hand operated (1e)		—
8.2.5.2.1	Dependent and independent manual operation			P
	- actuating force for opening (N)....:	235		—
	- test force with blocked main contacts (N)....:	400		—
	- used method to keep the contact closed....:	Brazing		—
	During and after the test, open position not indicated....:	Not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied....:	No locking means in the open position		N
8.2.5.2.2	Dependent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- 110% of the rated supply voltage applied to the equipment (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N
8.2.5.2.3	Independent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- stored energy of the power operator released (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	MULTIVERT 400, single-pole operated: AC-23B at 400V/400A Test 1: L1 and L2 closed, L3 subjected to make and break operations		
	- utilization category ..... :	AC-23B	—
	- rated operational voltage Ue (V) ..... :	400	—
	- rated operational current Ie (A) or power (kW) ... :	400A	—
	Conditions for make/break operations or make operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 428 L2: 428 L3: 427	—
	- test current, I = 10 x Ie (A) ..... :	L1: 4030 L2: 4046 L3: 4028	—
	- power factor ..... :	L1: 0,35 L2: 0,35 L3: 0,35	—
	Conditions for break operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 428 L2: 430 L3: 429	—
	- test current, I = 8 x Ie (A) ..... :	L1: 3218 L2: 3225 L3: 3223	—
	- power factor ..... :	L1: 0,33 L2: 0,34 L3: 0,33	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		N
	- test voltage, U = 1,05 Ue (V) ..... :	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A) ..... :	L1: - L2: - L3: -	—
	- power factor/time constant ..... :	L1: - L2: - L3: -	—
	Number of make/break or make and break operations ..... :	3 and 3	P
	- recovery voltage duration (≥ 50 ms) ..... :	Permanent	P
	- current duration (ms) ..... :	300	—
	- time interval between operations (s) ..... :	30	P

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:			P
	- oscillatory frequency (kHz) .....:	83,26		—
	- measured oscillatory frequency (kHz) .....:	L1: 83,3 L2: 83,3 L3: 83,4		P
	- factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1		P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.3.4	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.3.5	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA) .....:	< 1		P
8.3.3.6	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 59	80	P

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	21	50	P
	Parts which need not be touched during normal operation: non-metallic	35	60	P
	Supplementary information:			N
8.3.3.7	Strength of actuator mechanism			P
8.2.5	Verification of the strength of actuator mechanism and position indicating device			P
	- actuator type (fig.)....:	One-hand operated (1e)		—
8.2.5.2.1	Dependent and independent manual operation			P
	- actuating force for opening (N)....:	235		—
	- test force with blocked main contacts (N)....:	400		—
	- used method to keep the contact closed....:	Brazing		—
	During and after the test, open position not indicated....:	Not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied....:	No locking means in the open position		N
8.2.5.2.2	Dependent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- 110% of the rated supply voltage applied to the equipment (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N
8.2.5.2.3	Independent power operation			N
	- main contacts fixed together in the closed position....:	-		N
	- used method to keep the contact closed....:	-		N
	- stored energy of the power operator released (3 times)....:	-		N
	During and after the test, open position not indicated....:	-		N
	Equipment show no damage impairing its normal operation....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied....:	-		N

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity		P
	MULTIVERT 400, single-pole operated: AC-23B at 400V/400A Test 2: L2 closed, L3 open, L1 subjected to make and break operations		
	- utilization category ..... :	AC-23B	—
	- rated operational voltage Ue (V) ..... :	400	—
	- rated operational current Ie (A) or power (kW)... :	400A	—
	Conditions for make/break operations or make operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 427 L2: 428 L3: 427	—
	- test current, I = 10 x Ie (A) ..... :	L1: 4030 L2: 4046 L3: 4028	—
	- power factor ..... :	L1: 0,35 L2: 0,35 L3: 0,35	—
	Conditions for break operations, AC-23A and AC-23B only:		P
	- test voltage, U = 1,05 Ue (V) ..... :	L1: 428 L2: 430 L3: 429	—
	- test current, I = 8 x Ie (A) ..... :	L1: 3218 L2: 3225 L3: 3223	—
	- power factor ..... :	L1: 0,33 L2: 0,34 L3: 0,33	—
	Conditions for make/break operations, other than AC-23A and AC-23B:		N
	- test voltage, U = 1,05 Ue (V) ..... :	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A) ..... :	L1: - L2: - L3: -	—
	- power factor/time constant ..... :	L1: - L2: - L3: -	—
	Number of make/break or make and break operations ..... :	3 and 3	P
	- recovery voltage duration (≥ 50 ms) ..... :	Permanent	P
	- current duration (ms) ..... :	300	—
	- time interval between operations (s) ..... :	30	P

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:			P
	- oscillatory frequency (kHz) .....:	83,26		—
	- measured oscillatory frequency (kHz) .....:	L1: 83,3 L2: 83,3 L3: 83,4		P
	- factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1		P
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.3.4	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.3.5	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.3.6	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 56	80	P

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Clause	Requirement - Test	Result - Remark		Verdict
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	20	50	P
	Parts which need not be touched during normal operation: non-metallic	32	60	P
	Supplementary information:			N
8.3.3.7	Strength of actuator mechanism			P
8.2.5	Verification of the strength of actuator mechanism and position indicating device			P
	- actuator type (fig.).....:	One-hand operated (1e)		—
8.2.5.2.1	Dependent and independent manual operation			P
	- actuating force for opening (N).....:	235		—
	- test force with blocked main contacts (N).....:	400		—
	- used method to keep the contact closed.....:	Brazing		—
	During and after the test, open position not indicated.....:	Not indicated		P
	Equipment with locking mean, no locking in the open position while test force is applied.....:	No locking means in the open position		N
8.2.5.2.2	Dependent power operation			N
	- main contacts fixed together in the closed position.....:	-		N
	- used method to keep the contact closed.....:	-		N
	- 110% of the rated supply voltage applied to the equipment (3 times).....:	-		N
	During and after the test, open position not indicated.....:	-		N
	Equipment show no damage impairing its normal operation.....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied.....:	-		N
8.2.5.2.3	Independent power operation			N
	- main contacts fixed together in the closed position.....:	-		N
	- used method to keep the contact closed.....:	-		N
	- stored energy of the power operator released (3 times).....:	-		N
	During and after the test, open position not indicated.....:	-		N
	Equipment show no damage impairing its normal operation.....:	-		N
	Equipment with locking mean, no locking in the open position while test force is applied.....:	-		N

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Clause	Requirement - Test	Result - Remark	Verdict

8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY		P
8.3.4.1	Operational performance test		P
	MULTIVERT 400, three-pole operated: AC-23B at 400V/400A		
	- utilization category.....:	AC-23B	—
	- rated operational voltage Ue (V).....:	400	—
	- rated operational current Ie (A) or power (kW)....:	400A	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....:	L1: 407 L2: 409 L3: 405	—
	- test current (A).....:	L1: 412 L2: 417 L3: 410	—
	- power factor/time constant .....:	L1: 0,66 L2: 0,65 L3: 0,65	—
	Number of cycles with current .....:	200	P
	Number of cycles without current .....:	800	P
	First test sequence (with/without current).....:	With	—
	Second test sequence (with/without current).....:	Without	—
	- time interval between first and second test sequence .....:	10 minutes	—
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms) .....:	320	—
	- time interval between operations (s).....:	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No breakdown or flashover			P
8.3.4.3	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.4.4	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 62	80	P
	Manual operating means: non-metallic	3	35	P
	Parts intended to be touched but not hand-held: non-metallic	25	50	P
	Parts which need not be touched during normal operation: non-metallic	38	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
8.3.4.1	Operational performance test		P
	MULTIVERT 400, three-pole operated: AC-22B at 500V/400A		
	- utilization category.....:	AC-22B	—
	- rated operational voltage Ue (V).....:	500	—
	- rated operational current Ie (A) or power (kW)...:	400A	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....:	L1: 506 L2: 506 L3: 505	—
	- test current (A).....:	L1: 406 L2: 411 L3: 402	—
	- power factor/time constant .....:	L1: 0,78 L2: 0,77 L3: 0,78	—
	Number of cycles with current .....:	200	P
	Number of cycles without current .....:	800	P
	First test sequence (with/without current).....:	With	—
	Second test sequence (with/without current).....:	Without	—
	- time interval between first and second test sequence .....:	10 minutes	—
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms) .....:	320	—
	- time interval between operations (s).....:	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No breakdown or flashover			P
8.3.4.3	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.4.4	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 56	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	21	50	P
	Parts which need not be touched during normal operation: non-metallic	35	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict

8.3.4.1	Operational performance test		P
	MULTIVERT 400, three-pole operated: AC-21B at 690V/400A		
	- utilization category.....:	AC-21B	—
	- rated operational voltage Ue (V).....:	690	—
	- rated operational current Ie (A) or power (kW)...:	400A	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....:	L1: 697 L2: 699 L3: 697	—
	- test current (A).....:	L1: 411 L2: 417 L3: 408	—
	- power factor/time constant .....:	L1: 0,96 L2: 0,95 L3: 0,95	—
	Number of cycles with current .....:	200	P
	Number of cycles without current .....:	800	P
	First test sequence (with/without current).....:	With	—
	Second test sequence (with/without current).....:	Without	—
	- time interval between first and second test sequence .....:	10 minutes	—
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms) .....:	320	—
	- time interval between operations (s).....:	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No breakdown or flashover			P
8.3.4.3	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.4.4	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 55	80	P
	Manual operating means: non-metallic	3	35	P
	Parts intended to be touched but not hand-held: non-metallic	22	50	P
	Parts which need not be touched during normal operation: non-metallic	36	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict

8.3.4.1	Operational performance test		P
	MULTIVERT 400, single-pole operated: AC-23B at 400V/400A Test 1: L1 and L2 closed, L3 subjected to make and break operations		
	- utilization category.....:	AC-23B	—
	- rated operational voltage Ue (V).....:	400	—
	- rated operational current Ie (A) or power (kW)...:	400A	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....:	L1: 404 L2: 408 L3: 406	—
	- test current (A).....:	L1: 410 L2: 414 L3: 412	—
	- power factor/time constant .....:	L1: 0,65 L2: 0,65 L3: 0,65	—
	Number of cycles with current .....:	200	P
	Number of cycles without current .....:	800	P
	First test sequence (with/without current).....:	With	—
	Second test sequence (with/without current).....:	Without	—
	- time interval between first and second test sequence .....:	10 minutes	—
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms) .....:	300	—
	- time interval between operations (s).....:	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No breakdown or flashover			P
8.3.4.3	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.4.4	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 57	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	24	50	P
	Parts which need not be touched during normal operation: non-metallic	35	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict

8.3.4.1	Operational performance test		P
	MULTIVERT 400, single-pole operated: AC-23B at 400V/400A Test 2: L2 closed, L3 open, L1 subjected to make and break operations		
	- utilization category.....:	AC-23B	—
	- rated operational voltage Ue (V).....:	400	—
	- rated operational current Ie (A) or power (kW)....:	400A	—
	Test conditions for electrical operation cycles:		P
	- test voltage (V).....:	L1: 404 L2: 408 L3: 406	—
	- test current (A).....:	L1: 410 L2: 414 L3: 412	—
	- power factor/time constant .....:	L1: 0,65 L2: 0,65 L3: 0,65	—
	Number of cycles with current .....:	200	P
	Number of cycles without current .....:	800	P
	First test sequence (with/without current).....:	With	—
	Second test sequence (with/without current).....:	Without	—
	- time interval between first and second test sequence .....:	10 minutes	—
	- recovery voltage duration (≥ 50 ms).....:	Permanent	P
	- current duration (ms) .....:	300	—
	- time interval between operations (s).....:	60	P
8.3.4.1.5	Behaviour of the equipment during the operational performance test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.4.1.6	Condition of the equipment after the operational performance test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No breakdown or flashover			P
8.3.4.3	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.4.4	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 59	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	24	50	P
	Parts which need not be touched during normal operation: non-metallic	37	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY		P
	MULTIVERT 400, three-pole operated		
8.3.5.1	Short-time withstand current test		P
	Rated short-time withstand current Icw (A) .....:	8000 / 1s	P
	test voltage (V).....:	L1: 726 L2: 726 L3: 728	—
	r.m.s. test current (A) .....:	L1: 8180 L2: 8270 L3: 8130	—
	peak test current (A) .....:	L1: 16010 L2: 13020 L3: 14100	—
	power factor/time constant.....:	L1: 0,49 L2: 0,49 L3: 0,48	—
	factor *n*.....:	1,96	P
	test duration (ms).....:	1010	P
8.3.5.1.5	Behaviour of the equipment during the test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.5.1.6	Conditions of the equipment after the test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark	Verdict
8.3.5.2	Short-circuit making capacity		P
	Rated short-circuit making capacity Icm (A) .....:	16000 peak	P
	test voltage (1,05 Ue) (V).....:	L1: 726 L2: 726 L3: 728	—
	r.m.s. test current (A) .....:	L1: 8180 L2: 8270 L3: 8130	—
	peak test current (A) .....:	L1: 16010 L2: 13020 L3: 14100	—
	power factor/time constant.....:	L1: 0,49 L2: 0,49 L3: 0,48	P
	factor *n* .....:	1,96	P
	current duration (ms).....:	65	P
	Time interval between the cycles (min) .....:	3	P
	Number of making cycles .....:	2	P
8.3.5.2.5	Behaviour of the equipment during the test		P
	Test performed without:		—
	- endanger to the operator		P
	- cause damage to adjacent equipment		P
	No permanent arcing		P
	No flash over between poles or poles and frame		P
	No melting of the fuse in the detection circuit		P
8.3.5.2.6	Conditions of the equipment after the test		P
	Immediately after the test equipment must work satisfactorily		P
	- required opening force not greater than the test force of 8.2.5.2 and table 8		P
	- equipment is able to carry its rated current after normal closing operation		P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.5.3	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.5.4	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA) .....:	< 1		P
8.3.5.5	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 53	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	20	50	P
	Parts which need not be touched during normal operation: non-metallic	33	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		P
	Conditional short-circuit current test		P
	MULTIVERT 400, three-pole operated: 120kA at 500V with 400A fuse-links		
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V) .....:	500	—
	- rated current (A).....:	400	—
	- rated breaking capacity (kA).....:	120	—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 Ue) (V).....:	L1: 530 L2: 531 L3: 531	—
	test current (A) .....:	L1: 121100 L2: 122600 L3: 121450	—
	rated frequency (Hz) .....:	50	—
	power factor .....:	0,15	P
	time constant (ms) .....:	-	N
	factor *n* .....:	2,24	P
	Fuse protected short-circuit withstand (equipment in closed position)		P
	- max. let-through current (A).....:	L1: 11900 L2: 31870 L3: 39480	—
	- Joule integral I^2dt (A^2s) .....:	L1: 162990 L2: 756860 L3: 1056000	—
	Fuse protected short-circuit making (equipment closed on to short-circuit)		P
	- mean velocity of 15 manually under no-load conditions operations (m/s) .....:	0,80	—
	- point at which the measurement is made.....:	Handle of the actuator	—
	- test speed during the fuse'protected short-circuit making (m/s) .....:	0,81	—
	- max. let-through current (A).....:	L1: 34370 L2: 0 L3: 34370	
	- Joule integral I^2dt (A^2s) .....:	L1: 726200 L2: 0 L3: 726200	

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.6.2.5	Behaviour of the equipment during the test			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.6.2.6	Condition of the equipment after the test			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.6.3	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.6.4	Leakage current			P
	test voltage (1,1 Ue) (V)....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) ....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA)....:	< 1		P
8.3.6.5	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 56	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	24	50	P
	Parts which need not be touched during normal operation: non-metallic	37	60	P
	Supplementary information:			N

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ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Conditional short-circuit current test		P
	MULTIVERT 400, three-pole operated: 120kA at 690V with 315A fuse-links		
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....:	m.schneider EUROFUSE	—
	- manufacturer's model or type reference.....:	372 331	—
	- rated voltage (V) .....:	690	—
	- rated current (A).....:	315	—
	- rated breaking capacity (kA).....:	120	—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 Ue) (V).....:	L1: 727 L2: 729 L3: 728	—
	test current (A) .....:	L1: 120700 L2: 122000 L3: 121100	—
	rated frequency (Hz) .....:	50	—
	power factor .....:	0,14	P
	time constant (ms) .....:	-	N
	factor *n* .....:	2,25	P
	Fuse protected short-circuit withstand (equipment in closed position)		P
	- max. let-through current (A).....:	L1: 35020 L2: 22680 L3: 12760	—
	- Joule integral I^2dt (A^2s) .....:	L1: 1014000 L2: 321610 L3: 215900	—
	Fuse protected short-circuit making (equipment closed on to short-circuit)		P
	- mean velocity of 15 manually under no-load conditions operations (m/s) .....:	0,80	—
	- point at which the measurement is made.....:	Handle of the actuator	—
	- test speed during the fuse protected short-circuit making (m/s) .....:	0,81	—
	- max. let-through current (A).....:	L1: 36420 L2: 0 L3: 36420	—
	- Joule integral I^2dt (A^2s) .....:	L1: 697890 L2: 0 L3: 697890	—

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Clause	Requirement - Test	Result - Remark	Verdict

8.3.6.2.5	Behaviour of the equipment during the test			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.6.2.6	Condition of the equipment after the test			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.6.3	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.6.4	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.6.5	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 58	80	P
	Manual operating means: non-metallic	3	35	P
	Parts intended to be touched but not hand-held: non-metallic	25	50	P
	Parts which need not be touched during normal operation: non-metallic	36	60	P
	Supplementary information:			N

ВЯРНО С ОРИГИНАЛА

IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
	Conditional short-circuit current test		P
	MULTIVERT 400, single-pole operated: 120kA at 500V with 400A fuse-links L1 open, L2 closed, L3 subjected to make operation		
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V).....:	500	—
	- rated current (A).....:	400	—
	- rated breaking capacity (kA).....:	120	—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 Ue) (V).....:	L1: 530 L2: 531 L3: 530	—
	test current (A).....:	L1: 121100 L2: 122600 L3: 121450	—
	rated frequency (Hz).....:	50	—
	power factor.....:	0,15	P
	time constant (ms).....:	-	N
	factor *n*.....:	2,24	P
	Fuse protected short-circuit withstand (equipment in closed position)		N
	- max. let-through current (A).....:	L1: - L2: - L3: -	—
	- Joule integral I^2dt (A^2s).....:	L1: - L2: - L3: -	—
	Fuse protected short-circuit making (equipment closed on to short-circuit)		P
	- mean velocity of 15 manually under no-load conditions operations (m/s).....:	0,80	—
	- point at which the measurement is made.....:	Handle of the actuator	—
	- test speed during the fuse protected short-circuit making (m/s).....:	0,81	—
	- max. let-through current (A).....:	L1: - L2: 34980 L3: 34980	—
	- Joule integral I^2dt (A^2s).....:	L1: - L2: 778830 L3: 778830	—

IEC / EN 60947-3				
Clause	Requirement - Test	Result - Remark		Verdict
8.3.6.2.5	Behaviour of the equipment during the test			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.6.2.6	Condition of the equipment after the test			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.6.3	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.6.4	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.6.5	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (Incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 53	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	22	50	P
	Parts which need not be touched during normal operation: non-metallic	34	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
	Conditional short-circuit current test		P
	MULTIVERT 400, single-pole operated: 120kA at 690V with 315A fuse-links L1 open, L2 closed, L3 subjected to make operation		
	Protective device details:		P
	- manufacturer's name, trademark or identification mark.....:	m.schneider EUROFUSE	—
	- manufacturer's model or type reference.....:	372 331	—
	- rated voltage (V) .....:	690	—
	- rated current (A).....:	315	—
	- rated breaking capacity (kA).....:	120	—
8.3.6.2	Test conditions for conditional short-circuit current test		P
	test voltage (1,05 Ue) (V).....:	L1: 727 L2: 729 L3: 728	—
	test current (A) .....:	L1: 120700 L2: 122000 L3: 121100	—
	rated frequency (Hz) .....:	50	—
	power factor .....:	0,14	P
	time constant (ms) .....:	-	N
	factor *n* .....:	2,25	P
	Fuse protected short-circuit withstand (equipment in closed position)		N
	- max. let-through current (A).....:	L1: - L2: - L3: -	—
	- Joule integral I^2dt (A^2s) .....:	L1: - L2: - L3: -	—
	Fuse protected short-circuit making (equipment closed on to short-circuit)		P
	- mean velocity of 15 manually under no-load conditions operations (m/s) .....:	0,80	—
	- point at which the measurement is made.....:	Handle of the actuator	—
	- test speed during the fuse protected short-circuit making (m/s) .....:	0,81	—
	- max. let-through current (A).....:	L1: - L2: 36750 L3: 36750	—
	- Joule integral I^2dt (A^2s) .....:	L1: - L2: 699140 L3: 699140	—

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.6.2.5	Behaviour of the equipment during the test			P
	Test performed without:			—
	- endanger to the operator			P
	- cause damage to adjacent equipment			P
	No permanent arcing			P
	No flash over between poles or poles and frame			P
	No melting of the fuse in the detection circuit			P
8.3.6.2.6	Condition of the equipment after the test			P
	Immediately after the test equipment must work satisfactorily			P
	- required opening force not greater than the test force of 8.2.5.2 and table 8			P
	- equipment is able to carry its rated current after normal closing operation			P
8.3.6.3	Dielectric verification			P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380		—
	No flashover or breakdown			P
8.3.6.4	Leakage current			P
	test voltage (1,1 Ue) (V).....:	760		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1		P
8.3.6.5	Temperature-rise verification			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 55	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	21	50	P
	Parts which need not be touched during normal operation: non-metallic	33	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		P
8.3.7.1	Overload test		P
	MULTIVERT 400, three-pole operated		
	ambient temperature 10-40 °C .....:	25	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	test current 1,6 x Ithe or 1,6 x Ith (A) .....:	640	—
	- cable/busbar cross-section (mm²)/(mm x mm)...:	Incoming: 40mmx10mm Outgoing: 2 x 40mmx5mm	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V) .....:	500	—
	- rated current (A).....:	400	—
	- power loss (W).....:	< 34	—
	- rated breaking capacity (kA).....:	120	—
	- time duration of the overload test (s).....:	1470	P
	Within 3 to 5 min after the fuse(s) has(have) operated (or 1 h), the equipment has been operated once, i.e. opened and closed		P
	Required opening force not greater than the test force of 8.2.5.2 and table 8		P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage (1,1 Ue) (V).....:	760	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-	N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1	P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.7.4	Temperature-rise verification			P
	Fuse links aged during the overload test are replaced by new fuse-links			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A).....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 50	80	P
	Manual operating means: non-metallic	2	35	P
	Parts intended to be touched but not hand-held: non-metallic	18	50	P
	Parts which need not be touched during normal operation: non-metallic	29	60	P
	Supplementary information:			N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict
8.3.7.1	Overload test		P
	MULTIVERT 400, single-pole operated		
	ambient temperature 10-40 °C .....:	24,5	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure.....:	-	—
	test current 1,6 x Ithe or 1,6 x Ith (A) .....:	640	—
	- cable/busbar cross-section (mm²)/(mm x mm)...:	Incoming: 40mmx10mm Outgoing: 2 x 40mmx5mm	—
	- cable/busbar length (mm)/(mm) .....:	Incoming: 600mm Outgoing: 2000mm	—
	Fuse-link details:		P
	- manufacturer's name, trademark or identification mark.....:	EUROFUSE	—
	- manufacturer's model or type reference.....:	362 240	—
	- rated voltage (V) .....:	500	—
	- rated current (A).....:	400	—
	- power loss (W).....:	< 34	—
	- rated breaking capacity (kA).....:	120	—
	- time duration of the overload test (s).....:	1608	P
	Within 3 to 5 min after the fuse(s) has(have) operated (or 1 h), the equipment has been operated once, i.e. opened and closed		P
	Required opening force not greater than the test force of 8.2.5.2 and table 8		P
	The equipment has not undergone any impairment hindering such operation		P
8.3.7.2	Dielectric verification		P
	test voltage: 2*Ue with a minimum of 1000V~ (V)... :	1380	—
	No flashover or breakdown		P
8.3.7.3	Leakage current		P
	test voltage (1,1 Ue) (V).....:	760	—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-	N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	< 1	P

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.7.4	Temperature-rise verification			P
	Fuse links aged during the overload test are replaced by new fuse-links			P
	- conductor cross-section (mmxmm) / (mm²).....:	30x10 (incoming) / 240 (outgoing)		—
	- test current Ie (A) .....:	400		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	P
	Terminals	≤ 53	80	P
	Manual operating means: non-metallic	3	35	P
	Parts intended to be touched but not hand-held: non-metallic	21	50	P
	Parts which need not be touched during normal operation: non-metallic	34	60	P
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
8.4	ELECTROMAGNETIC COMPATIBILITY TESTS		P
8.4.1	Immunity		P
8.4.1.1	Equipment not incorporating electronic circuits: no tests necessary		P
8.4.1.2	Equipment incorporating electronic circuits:		N
	Equipment utilizing circuits in which all components are passive are not required to be tested		N
	All other equipment, requirements according to 7.3.2.2 and limits according table 6 apply		N
	Performed tests.....:	-	N
	No unintentional separation or closing of contacts has occurred during these tests.....:	-	N
8.4.2	Emission		P
8.4.2.1	Equipment not incorporating electronic circuits: no tests necessary		P
8.4.2.2	Equipment incorporating electronic circuits:		N
	Equipment utilizing circuits in which all components are passive are not required to be tested		N
	All other equipment, requirements according to 7.3.3.2 and limits according table 7 apply		N
	Performed tests.....:	-	N
	No unintentional separation or closing of contacts has occurred during these tests.....:	-	N

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Clause	Requirement - Test	Result - Remark	Verdict

	Annex A (normative)		N
A	Equipment for direct switching of a single motor		N
A.1	Additional rated duties:		—
A.1.1	Intermittent periodic duty.....:	-	N
	Intermittent duty .....:	-	N
A.1.1.1	Classes of intermittent duty .....:	-	N
	- class 1: up to 1 operating cycle per hour		N
	- class 3: up to 3 operating cycles per hour		N
	- class 12: up to 12 operating cycles per hour		N
	- class 30: up to 30 operating cycles per hour		N
	- class 120: up to 120 operating cycles per hour		N
A.1.2	Temporary duty.....:	-	N
A.5	Mechanical durability:		N
	Equipment mounted according to manufacturer's instruction		N
	Preferred number of no-load operating cycles expressed in millions (0,001 – 0,003 – 0,01– 0,03 – 0,1 – 0,3 - 1).....:	-	N
	Number of no-load operating cycles performed ...:	-	N
	If no mechanical endurance is stated by the manufacturer, a minimum mechanical endurance according to the class of intermittent duty shall be tested (corresponding to 8000 h of operation).		N
A.6	Electrical durability:		N
	Test according to manufacturer's instruction		N
	Number of operating cycles performed .....:	-	N

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Clause	Requirement - Test	Result - Remark	Verdict
A.7	Verification of making and breaking capacities:		N
	- utilization category.....:	-	—
	- rated operational voltage Ue (V).....:	-	—
	- rated operational current Ie (A) or power (kW)...:	-	—
	Conditions for make/break operations or make operations:		N
	- test voltage, U= 1,05 Ue (V).....:	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A).....:	L1: - L2: - L3: -	—
	- power factor.....:	L1: - L2: - L3: -	—
	Conditions for make/break operations:		N
	- test voltage, U = 1,05 Ue (V).....:	L1: - L2: - L3: -	—
	- test current, I = ... x Ie (A).....:	L1: - L2: - L3: -	—
	- power factor/ time constant.....:	L1: - L2: - L3: -	—
	Number of make/break or make and break operations.....:	-	N
	- recovery voltage duration (≥ 50 ms)		N
	- current duration (ms).....:	-	—
	- time interval between operations (s).....:	-	N
	Characteristic of transient recovery voltage if necessary:		N
	- oscillatory frequency (kHz).....:	-	—
	- measured oscillatory frequency (kHz).....:	L1: - L2: - L3: -	N
	- factor γ.....:	L1: - L2: - L3: -	N

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests			N
	Test performed without:			—
	- endanger to the operator			N
	- cause damage to adjacent equipment			N
	No permanent arcing			N
	No flash over between poles or poles and frame			N
	No melting of the fuse in the detection circuit			N
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests			N
	Immediately after the test equipment must work satisfactorily			N
	- required opening force not greater than the test force of 8.2.5.2 and table 8			N
	- equipment is able to carry its rated current after normal closing operation			N
8.3.3.4	Dielectric verification			N
	test voltage: 2*Ue with a minimum of 1000V~.....:	-		—
	No flashover or breakdown			N
8.3.3.5	Leakage current			N
	test voltage (1,1 Ue) (V).....:	-		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA).....:	-		N
8.3.3.6	Temperature-rise verification			N
	- conductor cross-section (mm²) / (mm x mm).....:	-		—
	- test current Ie (A).....:	-		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	N
	Terminals	-	-	N
	Manual operating means: non-metallic	-	-	N
	Parts intended to be touched but not hand-held: non-metallic	-	-	N
	Parts which need not be touched during normal operation: non-metallic	-	-	N
	Supplementary information:			N

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Clause	Requirement - Test	Result - Remark	Verdict
A.8	Operational performance test:		N
	- utilization category.....:	-	—
	- rated operational voltage Ue (V).....:	-	—
	- rated operational current Ie (A) or power (kW)...:	-	—
	Test conditions for electrical operation cycles:		N
	- test voltage (V).....:	L1: - L2: - L3: -	—
	- test current (A).....:	L1: - L2: - L3: -	—
	- power factor/time constant .....:	L1: - L2: - L3: -	—
	Number of cycles with current .....:	-	N
	Number of cycles without current .....:	-	N
	First test sequence (with/without current).....:	-	—
	Second test sequence (with/without current).....:	-	—
	- time interval between first and second test sequence .....:	-	—
	- recovery voltage duration (≥ 50 ms)		N
	- current duration (ms) .....:	-	—
	- time interval between operations (s).....:	-	N
8.3.4.1.5	Behaviour of the equipment during the operational performance test		N
	Test performed without:		—
	- endanger to the operator		N
	- cause damage to adjacent equipment		N
	No permanent arcing		N
	No flash over between poles or poles and frame		N
	No melting of the fuse in the detection circuit		N
8.3.4.1.6	Condition of the equipment after the operational performance test		N
	Immediately after the test equipment must work satisfactorily		N
	- required opening force not greater than the test force of 8.2.5.2 and table 8		N
	- equipment is able to carry its rated current after normal closing operation		N

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Clause	Requirement - Test	Result - Remark		Verdict
8.3.4.2	Dielectric verification			N
	test voltage: 2*Ue with a minimum of 1000V~.....:	-		—
	No breakdown or flashover			N
8.3.4.3	Leakage current			N
	test voltage (1,1 Ue) (V).....:	-		—
	Leakage current (utilization categories AC-20A/B, and DC-20A/B): ≤ 0,5 mA / pole (mA) .....:	-		N
	Leakage current (other utilization categories): ≤ 2,0 mA / pole (mA) .....:	-		N
8.3.4.4	Temperature-rise verification			N
	- conductor cross-section (mm²) / (mm x mm).....:	-		—
	- test current Ie (A) .....:	-		—
	Temperature-rise dT of part:	dT (K) measured	dT (K) required	N
	Terminals	-	-	N
	Manual operating means: non-metallic	-	-	N
	Parts intended to be touched but not hand-held: non-metallic	-	-	N
	Parts which need not be touched during normal operation: non-metallic	-	-	N
	Supplementary information:			N
A.9	Special tests:			N
	- performed tests.....:	-		N

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IEC / EN 60947-3			
Clause	Requirement - Test	Result - Remark	Verdict

Annex C (normative)			P
C	Single pole operated three pole switches		P
C.1	Three pole operated switches of fundamentally the same design, already successfully tested are deemed to satisfy the requirements of individually operated three pole devices.		P
C.2	Additional-tests to be performed on single pole operated three pole switches		P
	Test "8.3.3.3 Making and breaking capacities" according to test sequence I with following modifications		P
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle .....:	See pages 27 to 29	P
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle .....:	See pages 30 to 32	P
	Test performed in a three phase circuit		P
	Test "8.3.4.1 Operational performance" according to test sequence II with following modifications		P
	L1 and L2 are closed, L3 is subjected to the required make-break operation cycle .....:	See pages 39 to 40	P
	L2 closed and L3 opened, L1 is subjected to the required make-break operation cycle .....:	See pages 41 to 42	P
	Test performed in a three phase circuit		P
	Test "8.3.6.2 Fuse protected short circuit test" according to test sequence IV with following modifications		P
	For the making test L1 shall be open and L2 closed, L3 is subjected to the required make operation cycle.....:	See pages 50 to 53	P
	Test performed in a three phase circuit		P
C.5	Instructions for use		P
	The product literature includes following statement:		P
	These devices are intended for power distribution systems where switching and/or isolating of an individual phase may be necessary and shall not be used for the switching of the primary circuit of three-phase equipment.		P

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ВЯРНО С ОРИГИНАЛА

Table 1:

Temperature rise measurements at MULTIVERT 400, three-pole operated: 400A with fuse-links			
Temperature rise dT of part:	Phase	Measured dT (K)	Required dT (K)
Incoming terminals: Busbar terminals, tin-plated copper	L1	36	65
	L2	37	
	L3	32	
Outgoing terminals: Lug/Busbar terminals, tin-plated copper	L1	45	65
	L2	51	
	L3	47	
Manual operating means: Non-metallic	---	2	25
Parts intended to be touched but not hand-held: Non-metallic	---	19	40
Parts which need not be touched during normal operation: Non-metallic	---	30	50

Table 2:

Temperature rise measurements at MULTIVERT 400, three-pole operated: 630A with solid-links			
Temperature rise dT of part:	Phase	Measured dT (K)	Required dT (K)
Incoming terminals: Busbar terminals, tin-plated copper	L1	40	65
	L2	40	
	L3	36	
Outgoing terminals: Lug/Busbar terminals, tin-plated copper	L1	55	65
	L2	53	
	L3	49	
Manual operating means: Non-metallic	---	4	25
Parts intended to be touched but not hand-held: Non-metallic	---	24	40
Parts which need not be touched during normal operation: Non-metallic	---	37	50

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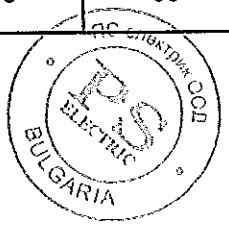
ВЯРНО С ОРИГИНАЛА

Table 3:

Temperature rise measurements at MULTIVERT 400, single-pole operated: 400A with fuse-links			
Temperature rise dT of part:	Phase	Measured dT (K)	Required dT (K)
Incoming terminals: Busbar terminals, tin-plated copper	L1	37	65
	L2	37	
	L3	34	
Outgoing terminals: Lug/Busbar terminals, tin-plated copper	L1	44	65
	L2	51	
	L3	52	
Manual operating means: Non-metallic	---	2	25
Parts intended to be touched but not hand-held: Non-metallic	---	18	40
Parts which need not be touched during normal operation: Non-metallic	---	29	50

Table 4:

Temperature rise measurements at MULTIVERT 400, single-pole operated: 630A with solid-links			
Temperature rise dT of part:	Phase	Measured dT (K)	Required dT (K)
Incoming terminals: Busbar terminals, tin-plated copper	L1	39	65
	L2	40	
	L3	35	
Outgoing terminals: Lug/Busbar terminals, tin-plated copper	L1	51	65
	L2	54	
	L3	46	
Manual operating means: Non-metallic	---	3	25
Parts intended to be touched but not hand-held: Non-metallic	---	22	40
Parts which need not be touched during normal operation: Non-metallic	---	38	50



ВЯРНО С ОРИГИНАЛА

Приложение 31 ч

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

VDE Prüf- und Zertifizierungsinstitut GmbH
Merianstraße 28, 63069 Offenbach

für die Standorte:

Merianstraße 28, 63069 Offenbach
Goethering 43, 63067 Offenbach
Landsberger Straße 378a, 12681 Berlin

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Sicherheit elektrischer Betriebsmittel und deren Komponenten; Bauelemente der Elektronik; industrielle Niederspannungsgeräte und Anlagen; Maschinen und Anlagen; Kabel und Leitungen; Laborgeräte; Lichttechnik; Optik; Energieeffizienz; Photovoltaik; Umweltsimulation und Gebrauchstauglichkeit; Elektromagnetische Verträglichkeit (EMV) und Funkanwendungen; Akustik- und Geräuschemission; Elektrofahrräder (Pedelec); Analytische Chemie

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.04.2013 mit der Akkreditierungsnummer D-PL-12061-01 und ist gültig bis 26.06.2016. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 87 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12061-01-01**

ПС електрик ООД ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Berlin, 25.04.2013

Im Auftrag Ralf Egner
Abteilungsleiter

Siehe Hinweise auf der Rückseite

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Anlage zur Akkreditierungsurkunde D-PL-12061-01-01 nach DIN EN ISO/IEC 17025:2005

Gültigkeitsdauer: 25.04.2013 bis 26.06.2016

Urkundeninhaber:
VDE Prüf- und Zertifizierungsinstitut GmbH
Merianstraße 28, 63069 Offenbach

Für die Standorte:

Merianstraße 28, 63069 Offenbach
Goethering 43, 63067 Offenbach
Landsberger Straße 378a, 12681 Berlin (nur für Niederspannungsgeräte)

Prüfungen in den Bereichen:

Sicherheit elektrischer Betriebsmittel und deren Komponenten; Bauelemente der Elektronik; industrielle Niederspannungsgeräte und Anlagen; Maschinen und Anlagen; Kabel und Leitungen; Laborgeräte; Lichttechnik; Optik; Energieeffizienz; Photovoltaik; Umweltsimulation und Gebrauchstauglichkeit; Akkumulatoren und Batterien; Elektromagnetische Verträglichkeit (EMV) und Funkanwendungen; Akustik- und Geräuschemission; Elektrofahrräder (Pedelec); Analytische Chemie

verwendete Abkürzungen: siehe letzte Seite

ПС ЕЛЕКТРИК ООД
ELECTRIC
BULGARIA

ВЯРНО С
ОРИГИНАЛА

Приложение 32

M.SCHNEIDER WIRD MERSEN

MERSEN

CE – Declaration of Conformity

Document - No. / Month, Year:	MV.02E / 08.2012
Manufacturer :	MERSEN ÖSTERREICH WIEN GMBH formerly M.Schneider Sicherungs-Systeme GmbH
Adress :	Lienfeldergasse 31 - 33 1160 WIEN
Type Designation :	**NH – vertical fuse switch disconnectors** **Type MULTIVERT 690V AC, 1-pole and 3-pole switching** **Size 00 – Multivert 160A, 100mm, 185mm bus bar distance** **Size 1 – Multivert 250A** **Size 2 – Multivert 400A,** **Size 3 – Multivert 630A**

The product described conforms with requirements of the following European standards :

Number **2006 / 95 / EG**

Text Directive of the European Parliament and of the Council for the harmonization of the laws of the Member States regarding electrical equipment designed for the use within certain voltage limits.

Full compliance with the standards listed below proves the conformity of the designated product with Provisions of the above mentioned EC Directive :

Harmonized European Standard:	Reference Number	Edition Date
	EN 60947-3	1999
	EN 60947-3 / A1	2001
	EN 60947-3 / A2	2005
	EN 60947-1	2004
National Standard:	Reference Number	Edition Date
Technical spezification:	Reference Number	Edition Date

CE - Marking since : 1996

Place, Date : Vienna, 06.08.2012

Authorized Signature : .....

ПС електрик ООД ELECTRIC BULGARIA

This declaration certifies the conformity with mentioned Directives, but does not imply any guarantee of characteristics.

MERSEN ÖSTERREICH WIEN GMBH
VORMALS M.SCHNEIDER SICHERUNGS-SYSTEME GMBH
A-1160 WIEN, LIENFELDERGASSE 31-33
T +43 (0)1 890 28 18 F +43 (0)1 890 28 18 815, OFFICE.WIEN@MERSEN.COM
FN 346674s, Wien 3, HG, ATU65801144
UNI CREDIT AUSTRIA AG, KTO-NR. 52948 023 363, BLZ 12000, IBAN: AT26 1200 0529 4802 3363, SWIFT/BIC: BKAUATWW
SOCIÉTÉ GÉNÉRALE ZWEIGNIEDERLASSUNG WIEN, KTO-NR. 10144543000, BLZ 18150, IBAN: AT66 1815 0101 4454 3000, SWIFT/BIC: SGABATWW
www.mersen.com

ВЯРНО С ОРИГИНАЛА

Приложение 33

PS ELECTRIC

"ПС електрик" ООД – гр. Шумен

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният, **"ПС ЕЛЕКТРИК" ООД,**
(име на производителя или неговия упълномощен представител, наименование на дружеството /фирмата производител или негов представител)

9700 гр. Шумен, бул. "Мадара" № 12,
(адрес)

декларирам на собствена отговорност, че продуктът

Триполюсен предпазител-разединител с вертикална конструкция, с обявен работен ток 400 А ,
(наименование и търговска марка, тип или модел, предназначение)

произведен от

Mersen Osterreich Wien GMBH
преди M. Schneider Sicherungs-Systeme GmbH
(място на производство на разглежданият продукт)

за който се отнася тази декларация,

отговаря на приложимите български и международни стандарти или еквиваленти и на техните валидни изменения и поправки:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)"; и
- БДС EN 60947-3:2002 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазители (IEC 60947-3:1999 + поправка юли 1999)"

и е оценен положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Декларирам, че ми е известна отговорността, която нося съгласно чл. 313 от НК.

30.08.2013. год.
гр. Шумен
(място и дата на издаване)

Божидар Маринов
Управител
(фамилия, длъжност и подпис на производителя или на неговия представител)

ВЯРНО С ОРИГИНАЛА

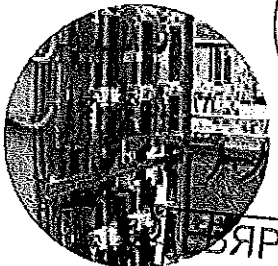
Приложение 234, 35

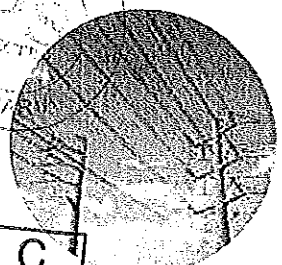
The GUIDE

FERRAZ SHAWMUT IS NOW

MERSEN

Overcurrent Protection/Surge Protection





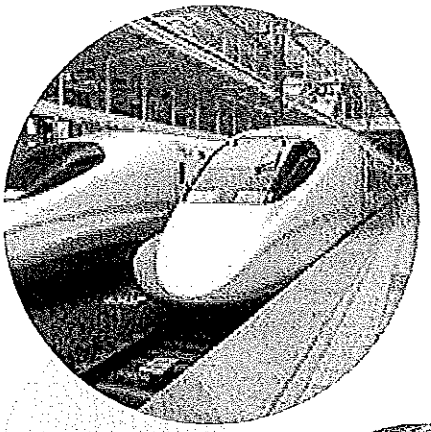
Ferraz Shawmut is now

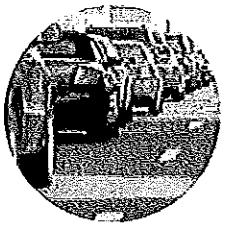
MERSEN

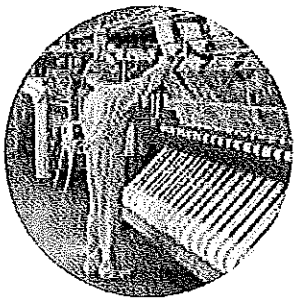
Expertise, our source of energy

Mersen is One Company

Ferraz Shawmut has long benefited from being part of Carbone Lorraine, a large international group which specializes in providing high-performance materials for extreme environments and solutions to enhance the reliability and safety of electrical systems.
The company now consolidates its identity under one name – Mersen.







Mersen is Diversity

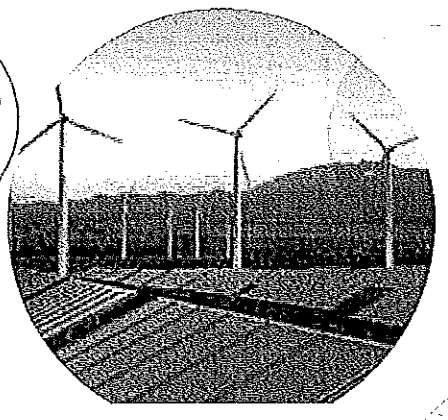
We embrace diversity. Through innovative product development and strategic acquisitions we are positioned to serve a broad range of electrical applications with diverse solutions. We are a recognized leader in diverse markets - energy, transportation, chemical/ pharmaceutical, electronics, process industries with a focus on sustainability. Our people represent every nationality around the globe, with production located to serve local markets across Asia, Europe and the Americas.
We are a diverse company operating under a single mission – Mersen.

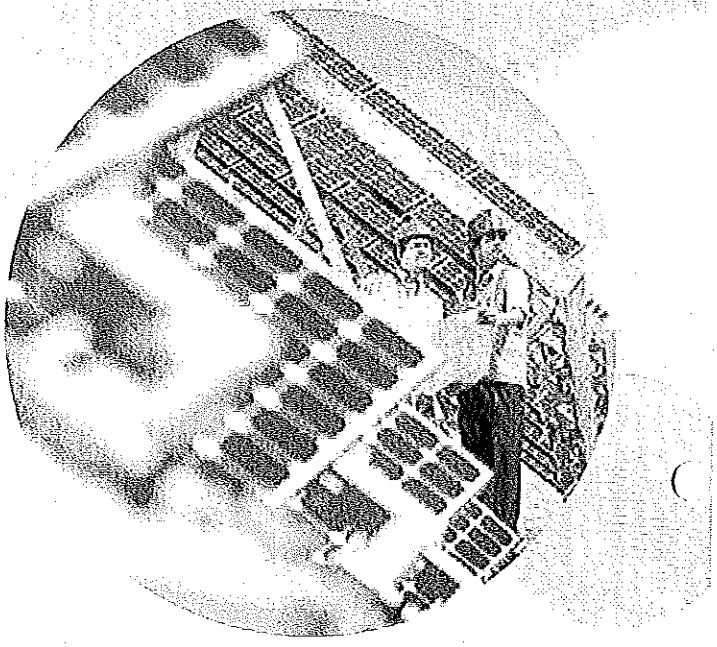
We are Mersen

The name change reflects our history - and more importantly our strategic direction. Ferraz Shawmut is now Mersen.

Mersen is Industry-Leading Expertise

A trusted leader in electrical protection for more than 125 years, we remain fiercely committed to essential research in electrical safety and reliability.
Our people are industry experts providing leading edge design and applications support. Combining a culture of knowledge and curiosity we build on our expertise every day. Expertise is our source of energy – Mersen.





At Mersen Safety & Reliability for Electrical Power, we integrate our product expertise into the customer's application to make it safe, reliable and profitable. Our product expertise includes:

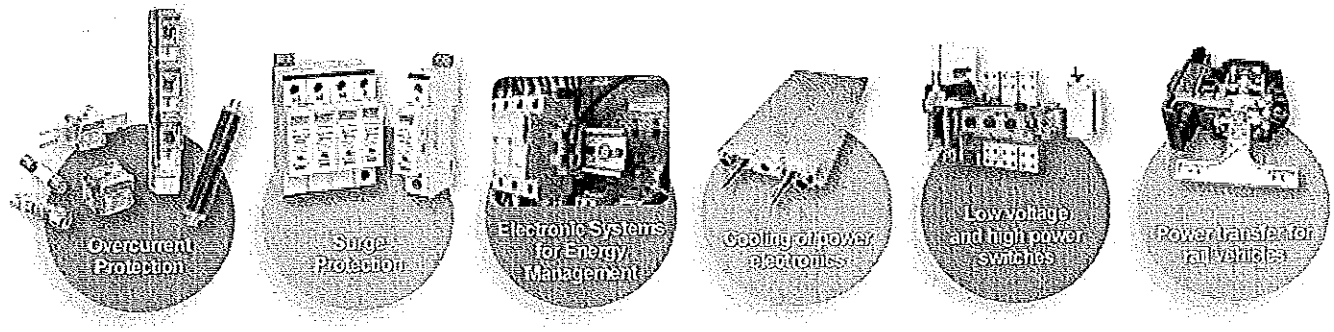
- Overcurrent protection (fuses and fusegear)
- Surge protection
- Electronic Systems for Energy Management
- Cooling of power electronics
- Low voltage and high power switches
- Power transfer for rail vehicles

A trusted team member, Mersen invests early in the projects of customer with research and design support. Our experts offer experienced, attentive and responsive applications support in power low voltage distribution, power controls, power electronics and power transmission & distribution, from the initial design stage, through system implementation and to well after the sale.

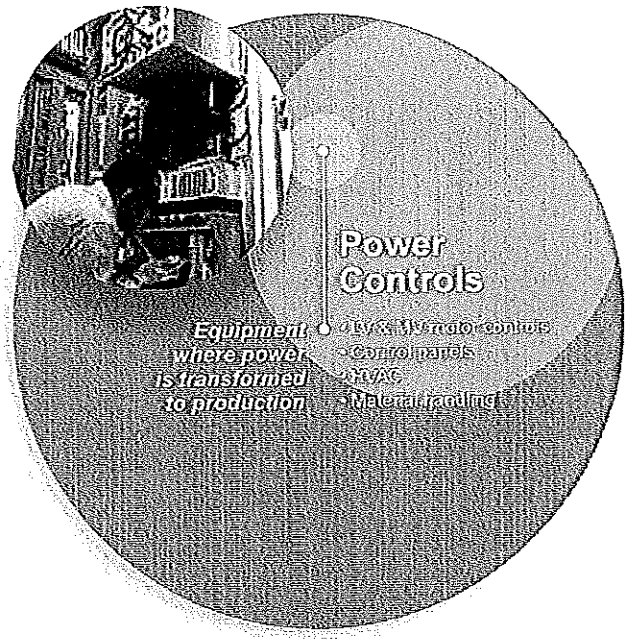
We bring our expertise to you with products designed to meet your standards. Thousands of local sales representatives & distributors, around the globe, provide experienced and attentive customer service.

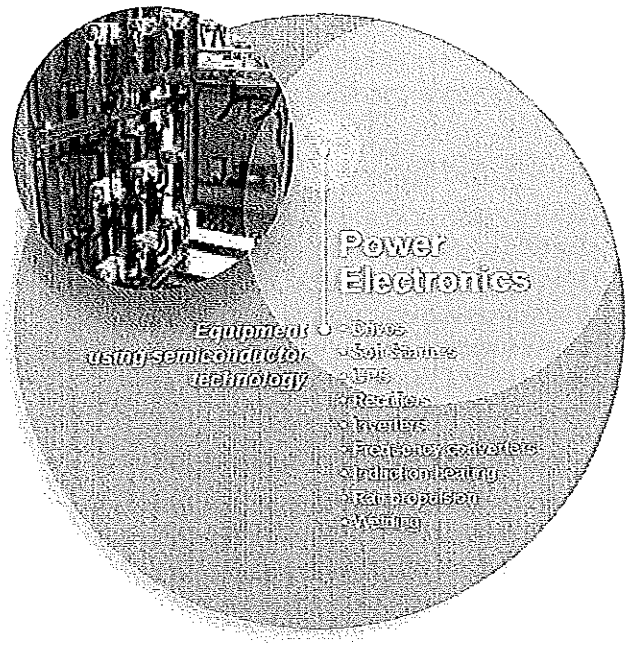
As a global partner, Mersen has an outstanding reputation for helping our customers do more, achieve more and grow more. At OEMs' in terms of increasing system life-time, reducing costs and improving lead times, improving electrical performance and reliability, developing technical solutions that increase the competitiveness, increasing the global capacity and seizing opportunities in emerging markets. At after market in terms of reducing system downtime, protecting electrical systems, people and investment and improving electrical performance and reliability in energy, transportation, electronics, process industries and chemical/pharmaceutical markets.

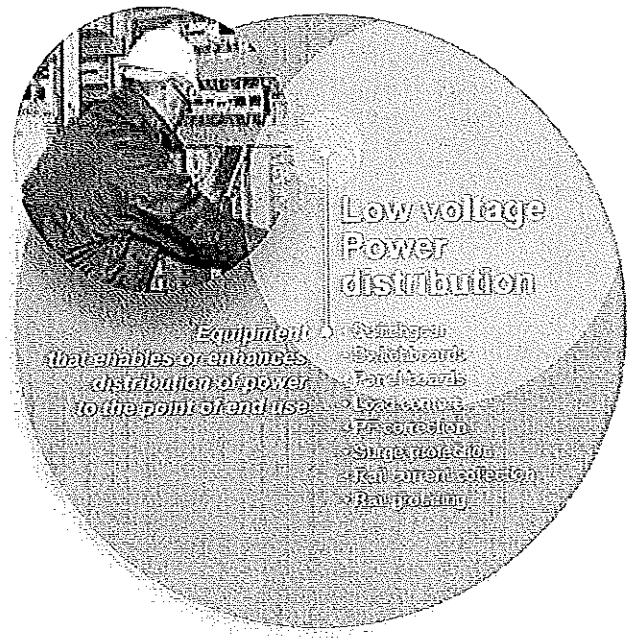
Six product expertises...

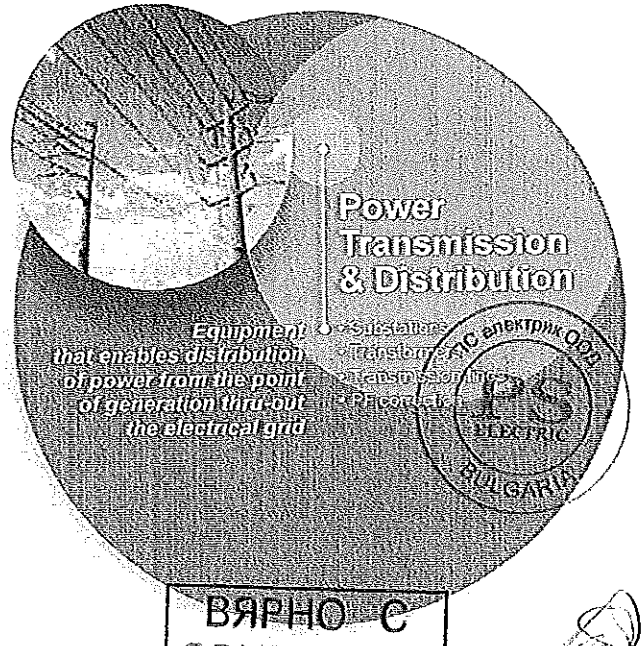


...via four power applications:







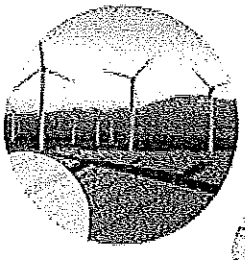


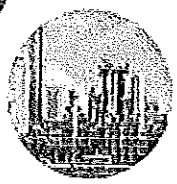
ВЯРНО С ОРИГИНАЛА

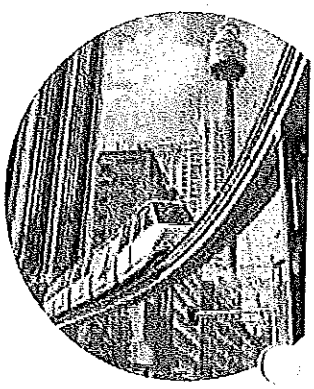
...serve large end markets

Energy

Mersen offers a full basket of high added-value electrical protection solutions for low and medium voltages, AC and DC, for renewable energies (solar PV, wind, hydropower, geothermal), fossil fuel thermal and nuclear.





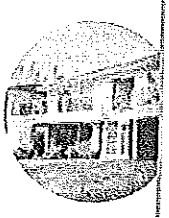


Transport

Mersen is a partner to OEMs in transport, whether rail (tram, train and subway), automobile, aerospace or aeronautic, as well as ports and maritime transport, in designing protection equipment and complete systems to their specifications.

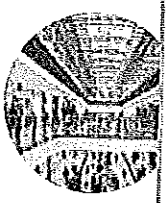
Electronics

Mersen provides industry with energy efficiency solutions for power electronics to use semi-conductors, drives, UPS, converters, inverters, rectifiers, induction heating, welding stations, and more.



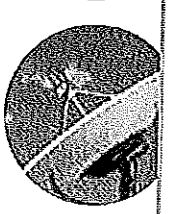
Industrial processes

Manufacturers of steel, pulp & paper, and glass, as well as the food processing and recycling industries, all profit from Mersen's solutions for energy efficiency and control, interchangeable equipment available from any major professional distributor, and services to help streamline their electrical maintenance inventory.



Chemicals/Pharmaceuticals

Mersen is especially attentive to the specific needs of the chemicals (specialty chemicals, inorganic and organic chemicals) and pharmaceuticals industrial sectors.

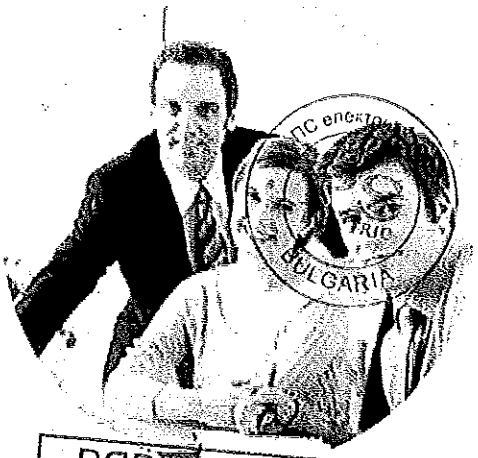


And also:

- **Residential**
  Mersen keeps up with developments to answer the needs of electrical contractors and tradesmen.
- **Service & commercial**
  Mersen proposes standardized power supply solutions in medium and low voltage for main and auxiliary power.
- **Communications**
  Mersen helps ensure the quality of electrical signals with no outage, for communications systems, data centers, cell antennas, radars, etc.

To do more with Mersen:

- Protect electrical systems and the people who use them
- Improve electrical safety, performance and reliability
- Reduce system downtime
- Develop technical solutions that increase your competitiveness
- Reduce investment costs and lead times
- Increase your global capacity
- Seize opportunities in emerging markets



ВЯРНО С ОРИГИНАЛА

Selection guidelines

Ask the right questions to choose the right fuse

What type of application?

- A : MV protection
- B : LV protection
- C : PCB protection
- D : Power electronics protection
- E : Forklift battery protection

What type of fuse?

1 : Ferrule-style fuses
2 : Blade-style fuses
3 : Square body fuses
4 : Special purpose fuses

What operating class?

- Class gG for general purpose use fuses on distribution circuits
- Class aM for back-up fuses on direct-on-line motors
- Class gR, ultrafast fuses (UR), to break all types of overload and short-circuit current
- Class aR, ultrafast fuses (UR), to break all types of short-circuit current requiring an outside device to clear small overloads

What size fuse?

Diameter in mm for fuses with cylindrical bodies

- 8, 10, 14, 22

Cross section in mm for fuses with rectangular bodies

- 40x21 size 000
- 46x30 size 00
- 46x36 size 0
- 52x47 size 1
- 74x60 size 2
- 75x75 size 3
- 107x90 size 4

Cross section in mm for fuses with square bodies

- 40x40 size 30
- 51x51 size 31
- 60x60 size 32
- 75x75 size 33

What operating voltage?

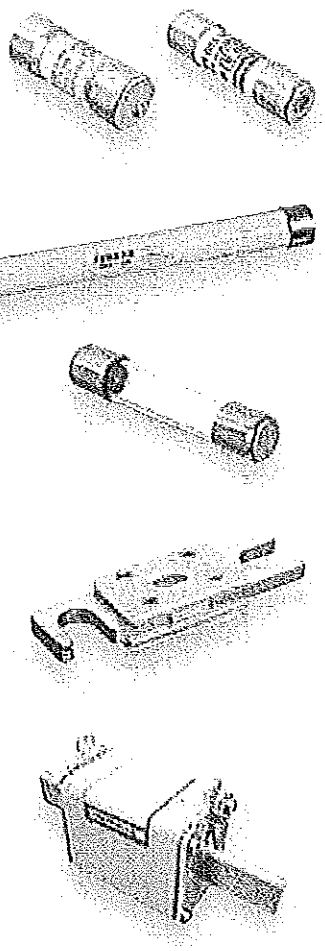
400, 500, 690 ...

What fuse rating in Amperes?

1, 2, 4, 6, 8, 10...

What type of blown fuse indication?

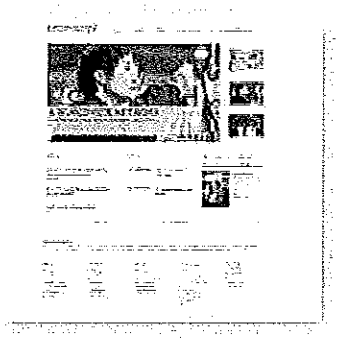
- w/o indicator
- with indicator
- with striker



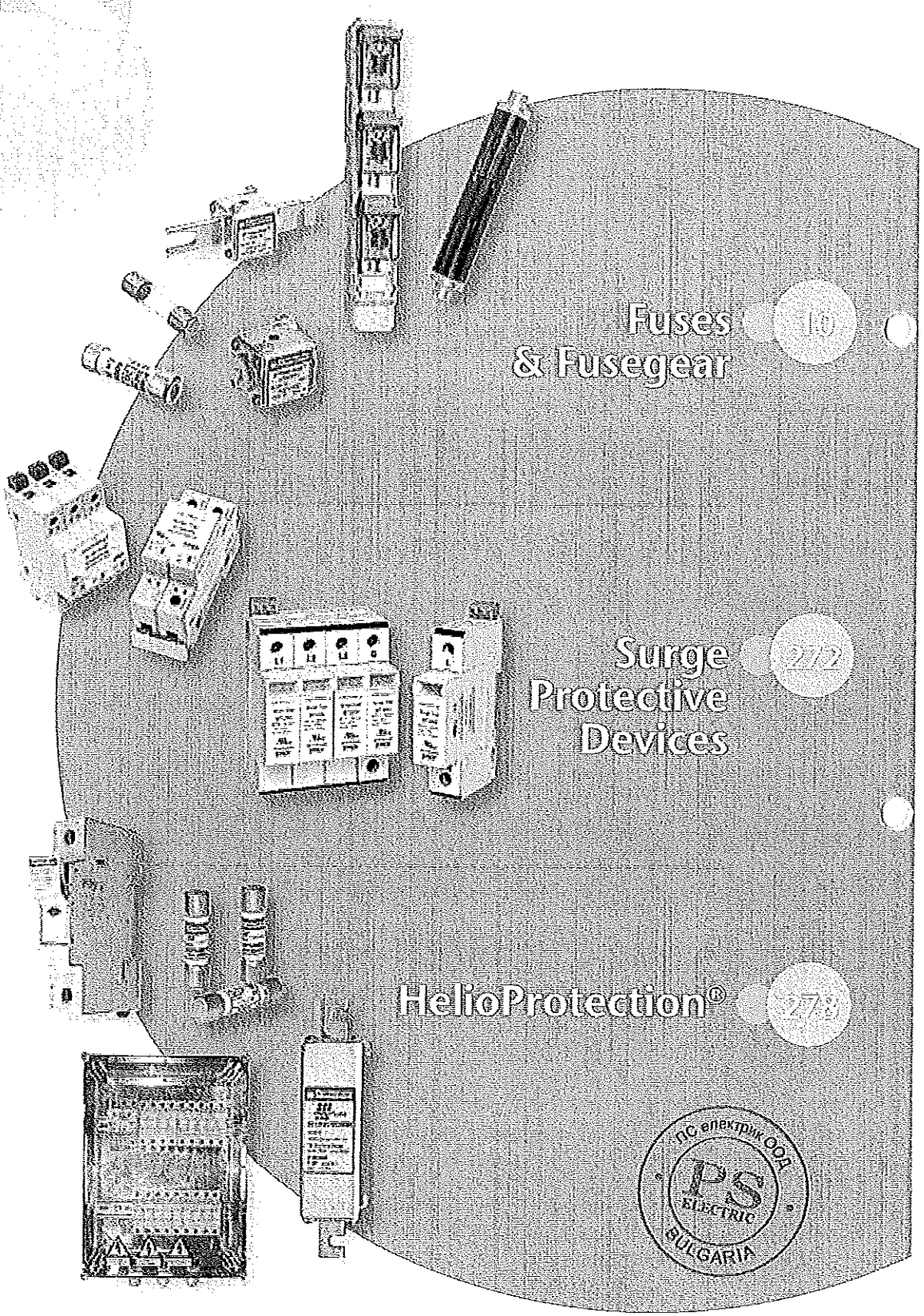
Cross-reference chart at your disposal

If the fuse you've got isn't the Mersen brand, use our cross-reference software SAF/X-Refs on line at the Mersen web site at:

www.mersen.com



Contents



ВЯРНО С ОРИГИНАЛА

Fuses & Fusegear

...електрик ООД ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

MULTIVERT® main incomer 1000A

NH-vertical main incomers 1000A, 690VAC

in accordance with IEC/EN 60 947-3,

- Installation on to 185mm bus bar system
- Suitable for top/bottom cable terminal connection
- With installed cover shroud
- Terminal lugs for cable terminations of large cross sections - multiple termination
- With ready fitted 1000A solid links

1.762.900

MULTIVERT® main incomer 1000A — **1 x triple pole switching**

article number	reference number	cable termination components	design	weight kg[1]	package
1.762.900	P1023122A	M12 multiple termination Al/Cu max. 300mm² round stranded, sectoral stranded (2 cable lugs), Cu max. 150mm² round stranded,sectoral stranded (3 cable lugs), M = 32-38 Nm	with ready fitted NH-solid links 1000A	11.60	1 piece

1.712.900

MULTIVERT® main incomer 1000A — **3 x single pole switching**

article number	reference number	cable termination components	design	weight kg[1]	package
1.712.900	N1023121A	M12 multiple termination Al/Cu max. 300mm² round stranded, sectoral stranded (2 cable lugs), Cu max. 150mm² round stranded,sectoral stranded (3 cable lugs), M = 32-38 Nm	with ready fitted NH-solid links 1000A	11.50	1 piece

MULTIVERT® transformer main incomer 630kVA / 910A

NH-transformer main incomers 630kVA/910A, 690VAC

in accordance with IEC/EN 60 947-3,

- Installation on to 185mm bus bar system
- Suitable for top/bottom cable terminal connection
- With installed cover shroud
- Terminal lugs for cable terminations of large cross sections - multiple termination
- For NH-Fuse links "gTr" in accordance with IEC/EN 60 269-1, VDE 0636

MV6M301K701G

MULTIVERT® transformer main incomer — **630kVA / 910A** — **1 x triple pole switching**

article number	reference number	cable termination components	design	weight kg[1]	package
MV6M301K701G	V1023265A	M12 multiple termination Al/Cu max. 300mm² round stranded, sectoral stranded (2 cable lugs), Cu max. 150mm² round stranded, sectoral stranded (3 cable lugs), M = 32-38Nm	for NH-fuse links "gTr"	1.38	1 piece

1) weight in kg per piece or set including package

MULTIVERT® main incomer

NH-vertical main incomers

Technical data in accordance with EN / IEC 60947

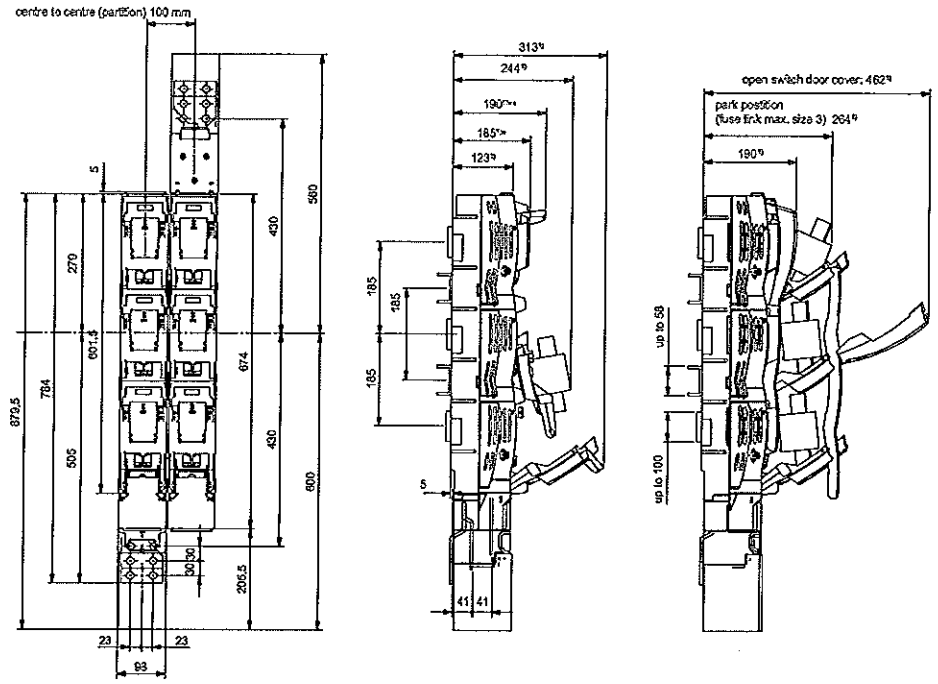
	1000A 3 x triple pole switching	1000A 3 x single pole switching	630kVA / 910A 3 x triple pole switching
Installation mode	bus bar installation	bus bar installation	bus bar installation
Size	3	3	3
Number of poles/phases	3	3	3
Conventional free air thermal current with NH-fuse links I_n	-	-	910A
Max. power dissipation of NH-fuse links P_n	-	-	62W
Conventional free air thermal current with solid links I_n	1000A	1000A	-
Max. power dissipation of solid links P_n	12W	12W	-
Utilization category to IEC/EN 60947-3			
U_e = AC 400V; I_e = 910A	-	-	AC 21 B
U_e = AC 400V; I_e = 1000A	AC 21 B	AC 21 B	-
U_e = AC 690V; I_e = 1000A	AC 20 B	AC 20 B	-
Rated operational voltage U_e	690V	690V	690V
Rated insulation voltage U_i	1000V	1000V	1000V
Rated impulse withstand voltage U_{imp}	8kV	8kV	8kV
Rated frequency	50 ... 60Hz	50 ... 60Hz	50 ... 60Hz
Degree of protection	IP20	IP20	IP20
Degree of pollution	3	3	3
Rated duty	uninterrupted duty	uninterrupted duty	uninterrupted duty
Rated short circuit making capacity with solid links I_{cm}	15kAsw	15kAsw	-
Rated short circuit making capacity with fuse links U_e = AC 400V; I_e = 910A	-	-	35kA
Power dissipation by I_n without NH-fuse links	-	-	125W
Power dissipation by I_n 1000A without solid links	270W	270W	-
Cable terminal connection			
Standard cable terminal	2xM12	2xM12	2xM12
for cable lugs Cu max.	2x300mm²/phase 3x150mm²/phase	2x300mm²/phase 3x150mm²/phase	2x300mm²/phase 3x150mm²/phase
for cable lugs Al max.	2x300mm²	2x300mm²	2x300mm²
for copper bars with max. dimensions	80x10mm	80x10mm	80x10mm

1) weight in kg per piece or set including package

MULTIVERT® 1000A

MULTIVERT® main incomer 1000A

Dimensions
M01163a



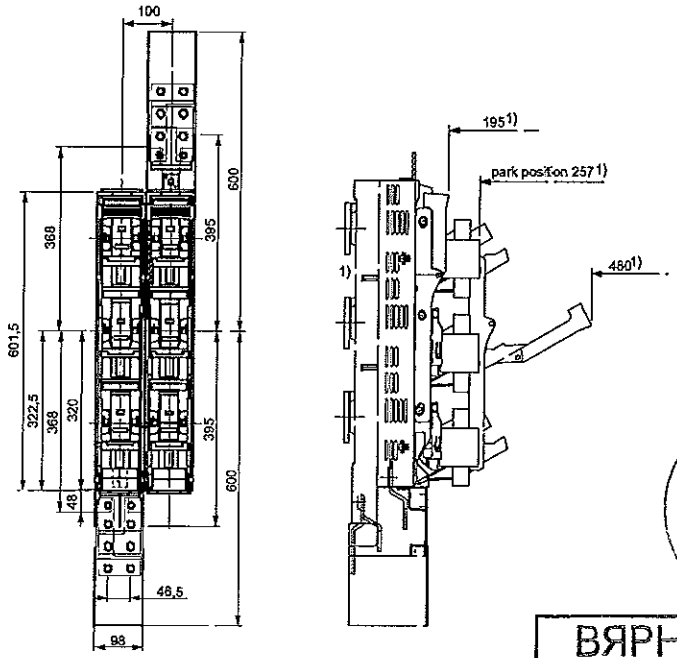
1) dimensions from upper edge of bus bar

* 155mm handle in closed position (folded) = total installation depth of MULTIVERT
** 155mm handle in open position (fixed) - switching position

MULTIVERT® 630 kVA/910A

MULTIVERT® transformer main incomer 630 kVA/910A

Dimensions
M01103b



1) dimensions from upper edge of bus bar

Приложение 36

arsenal research
Ein Unternehmen der Austrian Research Centers

Accredited by BMWA, number GZ 92714/237-IV/9/00

Test Report

Project Designation

TYPE TEST AT A VERTICAL
MAIN INCOMING DISCONNECTOR
TYPE MULTIVERT 1000

Client

M.Schneider
Lienfeldergasse 31
A-1160 Wien

Order from / No 02/2002 / ---

Project number 2.03.00169.1.0/MV1000 Test Engineer Ing.J.Ainetter

Date of Issue	06.05.2002
Total number of Issues / No	1 / 1
Number of pages	1
Annex: number of pages	CCA Report 2.03.00169.1.0/MV1000/CCA

The results relate exclusively to the terms tested.

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ПС електрик ООД
ELECTRIC
BULGARIA

TEST REPORT

EN 60 947-3

Low-voltage switchgear and controlgear

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units

Report

Reference No. ..... : 2.03.00169.1.0/MV1000/CCA

Tested by (+ signature) ..... : Ing.J.Alnetter

Approved by (+ signature) ..... : Ing.K.Farthofer

Date of Issue ..... : 22.04.2002

Contents ..... : 27 pages

This report is based on a blank test report that was prepared by KEMA using information obtained from the TRF originator (see below).

Testing laboratory

Name ..... : ÖFPZ Arsenal Ges.m.b.H.

Address ..... : 1030 Wien, Faradaygasse 3

Testing location ..... : As above

Client

Name ..... : M.Schneider

Address ..... : A-1160 Wien, Lienfeldergasse 31

Test specification

Standard ..... : EN 60 947-1:1999 + A1:2000 + A2:2001
EN 60 947-3:1999 + A1:2001

Test procedure ..... : CCA-scheme

Procedure deviation ..... : N.A.

Non-standard test method ..... : N.A.

Test Report Form/blank test report

Test Report Form No. ..... : 60947-3B/98-09

TRF originator ..... : KEMA

Master TRF ..... : Dated 98-05

Test item

Description ..... : VERTICAL MAIN INCOMING DISCONNECTOR

Trademark ..... : MULTIVERT 1000

Model and/or type reference ..... : MULTIVERT 1000 → 1 x 3pole → size 3
MULTIVERT 1000 → 3 x 1pole → size 3

Manufacturer ..... : M.Schneider

Rating(s) ..... : See page 2

Copy of marking plate and/or picture of test item ..... : See page 3

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

Particulars: test item vs. test requirements	
- method of operation	Dependent manual operation
- switching positions	ON / OFF
- number of poles	3
- variants	1 x 3pole; 3 x 1pole
- size	3
- kind of current	AC
- number of phases	3
- rated frequency (Hz)	50 - 60
- number of positions of the main contacts	2
Rated and limiting values, main circuit	
- rated operational voltage Ue (V)	400
- rated insulation voltage Ui (V)	1000
- rated impulse withstand voltage Uimp (kV)	8
- rated operational current Ie (A)	1000
- conventional free air thermal current Ith (A)	1000
- conventional enclosed thermal current Ithe (A)	-
- rated uninterrupted current Iu (A)	1000
- utilization category	AC-21B
Short-circuit characteristic	
- rated short-time withstand current Icw (kA)	12 / 1s
- rated short-circuit making capacity Icm (kA)	15 peak
- rated conditional short-circuit current (kA)	-
Rated and limiting values, auxiliary circuit(s)	
- rated operational voltage (V)	-
- rated operational current Ie (A)	-
- rated frequency (Hz)	-
- number of circuits	-
- number and kind of contact elements	-
Co-ordination of short-circuit protective devices	
- kind of protective device	-

Test case verdicts	
Test case does not apply to the test object	N(.A.)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement	F(ail)

Testing	
Date of receipt of test item	03/2002
Date(s) of performance of test(s)	03/2002

ВЯРНО С ОРИГИНАЛА

General remarks

This test report shall not be reproduced except in full without the written approval of the testing laboratory.

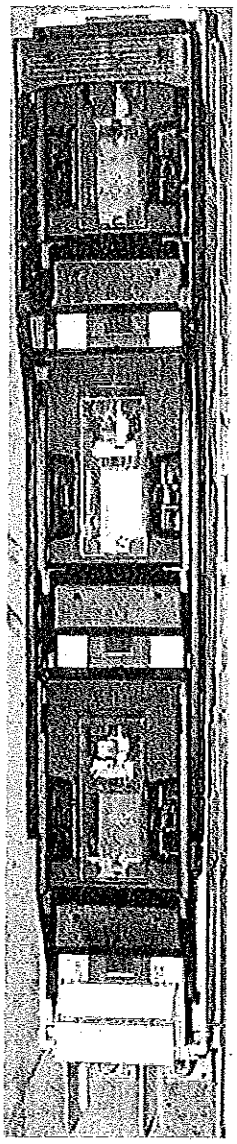
The test results presented in this report relate only to the item tested.

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

Copy of marking plate and/or picture of test item



ПС електрик ООД ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
5.3	MARKING		P
	Marking on equipment itself or on nameplate or nameplates attached to the equipment and legible from the front after mounting:		P
	- indication of the open and closed position	Visible open and closed position	P
	- suitability for isolation	Open position	P
	- disconnectors AC-20 and DC-20 only: marked "Do not open under load"		N
	Marking on equipment not needed to be visible after mounting:		P
	- manufacturer's name or trademark	M.Schneider	P
	- type designation or serial number	MULTIVERT 1000	P
	- rated operational current	1000A	P
	- rated operational voltage	400V~	P
	- utilization category	AC-21B	P
	- rated frequency	50-60Hz	P
	- compliance with EN 60 947-3	EN60947-3	P
	- degree of protection	IP2Lx	P
	Marking on fuse-combination units:		N
	- fuse type	-	N
	- maximum rated current	-	N
	- power loss of the fuse-link	-	N
	Identification of terminals:		P
	- line terminals		P
	- load terminals		P
	- neutral pole terminal		N
	- protective earth terminal		N
	Data in the manufacturer's published information:		P
	- rated insulation voltage	Catalogue	P
	- rated impulse withstand voltage		P
	- pollution degree, if different from 3		P
	- rated duty		P
	- rated short-time withstand current and duration		P
	- rated short-circuit making capacity		P
	- rated conditional short-circuit current		N

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	CONSTRUCTION		P
7.1.2	Current-carrying parts and their connection		P
7.1.3	Clearances and creepage distances:		P
	Pollution degree ..... :	3	—
	Comparative tracking index (V) ..... :	400	—
	Material group ..... :	II	—
	Clearances:		P
	Rated impulse withstand voltage (kV)..... :	8	—
	Minimum clearances (mm) ..... :	8	—
	Measured clearances (mm) ..... :	> 8	P
	In case Uimp is not indicated		N
	Creepage distances:		P
	Rated insulation voltage Ui (V) ..... :	1000	—
	Minimum creepage distances (mm) ..... :	14	—
	Measured creepage distances (mm) ..... :	> 14	P
7.1.4	Actuator:		P
7.1.4.1	Insulation	Insulating material	P
7.1.4.2	Direction of movement	According to IEC 60447	P
7.1.5	Indication of contact position:		P
7.1.5.1	Indicating means	Actuator	P
7.1.5.2	Indication by the actuator	Yes	P
7.1.6	Additional safety requirements for equipment suitable for isolation:		P
7.1.6.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		P
	- marking according to 5.2b		P
	- indication of the position of the contacts		P
	- construction of the actuating mechanism		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) ..... :	8	—
	- measured clearances (mm) ..... :	> 8	P
	- test Uimp across gap (kV) ..... :	12,3	P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
7.1.5.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		N
	auxiliary switch shall be rated according to IEC 60 947-5-1		N
	minimum time interval between opening of the contacts of the auxiliary contact and the contacts of the main poles (ms) .....:	-	—
	measured time interval (ms) .....:	-	—
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N
7.1.5.3	Supplementary requirements for equipment provided with means for padlocking the open position:		N
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N
	test force F applied to the actuator in an attempt to operate to the closed position (N) .....:	-	—
	rated impulse withstand voltage (kV) .....:	-	—
	test Uimp on open main contacts at the test force		N
7.1.7	Terminals:		P
7.1.7.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength	See 8.2.4 below	P
	Terminal connections shall be such that necessary contact pressure is maintained	See 8.2.4 below	P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal	See 8.2.4 below	P
	Terminal shall not allow the conductor to be displaced or to be displaced themselves in a manner detrimental to the operator of equipment and the insulation voltage shall not be reduced below the rated value	See 8.2.4 below	P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.2.4	Mechanical properties of terminals:		P
	Mechanical strength of terminals:		P
	maximum cross-sectional area of conductor (mm²) ..... :	2 x 300	—
	diameter of thread (mm) ..... :	12	—
	torque (Nm) ..... :	14,0	—
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test):		N
	conductor of the smallest cross-sectional area (mm²) ..... :	-	—
	number of conductor of the smallest cross section ..... :	-	—
	diameter of bushing hole (mm) ..... :	-	—
	height between the equipment and the platen ..... :	-	—
	mass at the conductor(s) (kg) ..... :	-	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test:		N
	force (N) ..... :	-	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	conductor of the largest cross-sectional area (mm²) ..... :	-	—
	number of conductor of the largest cross section :	-	—
	diameter of bushing hole (mm) ..... :	-	—
	height between equipment and platen (mm)..... :	-	—
	mass at the conductor(s) (kg) ..... :	-	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test:		N
	force (N) ..... :	-	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N

ПС електрик ООД BULGARIA

ВЯРНО С ОРИГИНАЛА

TRF originator: KEMA

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	conductor of the largest and smallest cross-sectional area (mm²) ..... :	-	—
	number of conductor of the smallest cross section, number of conductor of the largest cross section ..... :	-	—
	diameter of bushing hole (mm) ..... :	-	—
	height between the equipment and the platen ..... :	-	—
	mass at the conductor(s) (kg) ..... :	-	—
	135 continuous revolutions: the conductor shall neither slip out of the terminal nor break near the clamping unit		N
	Pull-out test:		N
	force (N) ..... :	-	—
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N
7.1.2	Connection capacity:		P
	type of conductors ..... :	Rigid and flexible	—
	minimum cross-sectional area of conductor (mm²) ..... :	2 x 150	—
	maximum cross-sectional area of conductor (mm²) ..... :	2 x 300	—
	number of conductors simultaneously connectable to the terminal ..... :	2	—
7.1.3	Connection:		P
	terminals for connection to external conductors shall be readily accessible during installation		P
	clamping screws and nuts shall not serve to fix any other component		P

	EN 60 947-3		
Clause	Requirement – Test	Result - Remark	Verdict
7.1.5	Terminal identification and marking:		P
	terminal intended exclusively for the neutral conductor		N
	protective earth terminal		N
	other terminals		P
7.1.6	Additional requirements for equipment provided with a neutral pole:		N
	Marking of neutral pole		N
	The switched neutral pole shall not break before and shall not make after the other poles		N
	Conventional thermal current of neutral pole		N
7.1.7	Provisions for protective earthing:		N
7.1.7.1	The exposed conductive parts shall be electrically interconnected and connected to a protective earth terminal		N
7.1.7.2	The protective earth terminal shall be readily accessible		N
	The protective earth terminal shall be suitably protected against corrosion		N
	The electrical continuity between the exposed conductive parts of the protective earth terminal and the metal sheathing of connecting conductors		N
	The protective earth terminal shall have no other functions		N
7.1.7.3	Protective earth terminal marking and identification		N
7.1.8	Enclosure for equipment:		N
7.1.8.1	Design:		N
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N
	Sufficient space shall be provided inside the enclosure		N
	The fixed parts of a metal enclosure shall be electrically connected to the other exposed conductive parts of the equipment and connected to a terminal which enables them to be earthed or connected to a protective conductor		N

ПС електрик ООД PS ELECTRIC BULGARIA

ВЯРНО С ОРИГИНАЛА

TRF originator: KEMA

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	Under no circumstances shall a removable metal part of the enclosure be insulated from the part carrying the earth terminal when the removable part is in place		N
	The removable parts of the enclosure shall be firmly secured to the fixed parts by a device such that they cannot be accidentally loosened or detached owing to the effects of operation of the equipment or vibrations		N
	When an enclosure is so designed as to allow the covers to be opened without the use of tools, means shall be provided to prevent loss of the fastening devices		N
	If the enclosure is used for mounting push-buttons, it shall not be possible to remove the buttons from the outside of the enclosure		N
7.1.3.3	Insulation:		N
	If, in order to prevent accidental contact between a metallic enclosure and live parts, the enclosure is partly or completely lined with insulating material, then this lining shall be securely fixed to the enclosure		N
7.1.3.4	Degree of protection of enclosed equipment:		P
	Degree of protection .....:	IP2Lx	P

TRF originator: KEMA

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS		P
8.3.3.1	Temperature-rise:		P
	MULTIVERT 1000 → 1 x 3pole		
	ambient temperature 10-40 °C .....:	23,2	—
	test enclosure W x H x D (mm x mm x mm) .....:	-	—
	material of enclosure .....:	-	—
	Main circuits; test conditions:		P
	- conventional thermal current Ith (A) .....:	1000	—
	- conventional enclosed thermal current Ithe (A) .:	-	—
	- cable/busbar cross-section (mm²) / (mm) .....:	See appended table 1	—
	Fuse-link details (fuse-combination units only):		N
	- manufacturer's name, trademark or identification mark .....:	-	—
	- manufacturer's model or type reference .....:	-	—
	- rated current (A) .....:	-	—
	- power loss (W) .....:	-	—
	- rated breaking capacity (kA) .....:	-	—
	Temperature-rise	See appended table 1	P
	Auxiliary circuits: temperature rise of connecting terminals (K) .....:	-	N
	- idem, requirement (K) .....:	-	—
	- rated operation current (A) .....:	-	—
	- cross-section (mm²) .....:	-	—
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		P
	- rated impulse withstand voltage (kV) .....:	8	—
	- test Uimp main circuits (kV) .....:	9,8	P
	- test Uimp auxiliary circuits (kV) .....:	-	N
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) .....:	12,3	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		P
	- rated insulation voltage (V) .....:	1000	—
	- main circuits, test voltage for 1 min (V) .....:	3500	P
	- control and auxiliary circuits, test voltage for 1 min (V) .....:	-	N

TRF originator: KEMA

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.1	Temperature-rise:		P
	MULTIVERT 1000 – 3 x 1pole		
	ambient temperature 10-40 °C ..... :	23,5	–
	test enclosure W x H x D (mm x mm x mm) ..... :	-	–
	material of enclosure ..... :	-	–
	Main circuits, test conditions:		P
	- conventional thermal current Ith (A) ..... :	1000	–
	- conventional enclosed thermal current Ithe (A) ..... :	-	–
	- cable/busbar cross-section (mm²) / (mm) ..... :	See appended table 2	–
	Fuse-link details (fuse-combination units only):		N
	- manufacturer's name, trademark or identification mark ..... :	-	–
	- manufacturer's model or type reference ..... :	-	–
	- rated current (A) ..... :	-	–
	- power loss (W) ..... :	-	–
	- rated breaking capacity (kA) ..... :	-	–
	Temperature-rise	See appended table 2	P
	Auxillary circuits: temperature rise of connecting terminals (K) ..... :	-	N
	- idem, requirement (K) ..... :	-	–
	- rated operation current (A) ..... :	-	–
	- cross-section (mm²) ..... :	-	–
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		P
	- rated impulse withstand voltage (kV) ..... :	8	–
	- test Uimp main circuits (kV) ..... :	9,8	P
	- test Uimp auxiliary circuits (kV) ..... :	-	N
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) ..... :	12,3	P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		P
	- rated insulation voltage (V) ..... :	1000	–
	- main circuits, test voltage for 1 min (V) ..... :	3500	P
	- control and auxiliary circuits, test voltage for 1 min (V) ..... :	-	N

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity:		P
	MULTIVERT 1000 → 1 x 3pole		
	utilization category .....:	AC-21B	—
	rated operational voltage Ue (V) .....:	400	—
	rated operational current Ie (A) or power (kW) ....:	1000	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		P
	- test voltage U/Ue = 1,05 (V) .....:	L1: 423 L2: 425 L3: 424	—
	- test current I/Ie = 1,5 (A) .....:	L1: 1509 L2: 1512 L3: 1511	—
	- power factor/time constant .....:	L1: 0,94 L2: 0,93 L3: 0,94	—
	Conditions, break operation AC-23A and AC-23B only:		N
	- test voltage U/Ue = (V) .....:	L1: - L2: - L3: -	—
	- test current I/Ie = (A) .....:	L1: - L2: - L3: -	—
	- power factor .....:	L1: - L2: - L3: -	—
	recovery voltage (V) .....:	L1: 423 L2: 425 L3: 424	—
	current duration (ms) .....:	350	—
	time interval between operations (s) .....:	30	—
	Number of make/break operations .....:	5	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:		N
	oscillatory frequency (kHz) .....:	-	—
	Measured oscillatory frequency (kHz) .....:	L1: - L2: - L3: -	N
	Factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1	P

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) .....:	2000	—
	No flashover or breakdown		P
8.3.3.5	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2 mA) .....:	< 2	P
	test voltage (1,1 Ue) (V) .....:	440	—
8.3.3.6	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	conductor cross-sectional area (mm²) .....:	See clause 8.3.3.1	—
	test current Ie (A) .....:	1000	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only):		P
	actuator type (fig.) .....:	One hand operated (e)	—
	actuating force for opening (N) .....:	155	—
	test force with blocked main contacts (N) .....:	400	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts .....:	-	N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.3	Making and breaking capacity:		P
	MULTIVERT 1000 → 3 x 1pole (L1 and L2 closed, L3 operated)		
	utilization category .....:	AC-21B	—
	rated operational voltage Ue (V) .....:	400	—
	rated operational current Ie (A) or power (kW) ...:	1000	—
	Conditions, make/break operations or make operation AC-23A and AC-23B only:		P
	- test voltage U/Ue = 1,05 (V) .....:	L1: 424 L2: 425 L3: 424	—
	- test current I/Ie = 1,5 (A) .....:	L1: 1510 L2: 1512 L3: 1511	—
	- power factor/time constant .....:	L1: 0,94 L2: 0,94 L3: 0,94	—
	Conditions, break operation AC-23A and AC-23B only:		N
	- test voltage U/Ue = (V) .....:	L1: - L2: - L3: -	—
	- test current I/Ie = (A) .....:	L1: - L2: - L3: -	—
	- power factor .....:	L1: - L2: - L3: -	—
	recovery voltage (V) .....:	L1: 424 L2: 425 L3: 424	—
	current duration (ms) .....:	360	—
	time interval between operations (s) .....:	30	—
	Number of make/break operations .....:	5	P
	Characteristic of transient recovery voltage for AC-22 and AC-23 only:		N
	oscillatory frequency (kHz) .....:	-	—
	Measured oscillatory frequency (kHz) .....:	L1: - L2: - L3: -	N
	Factor γ .....:	L1: 1,1 L2: 1,1 L3: 1,1	P

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.3.3.5	Behaviour of the equipment during making and breaking capacity tests		P
8.3.3.3.6	Condition of the equipment after making and breaking capacity tests		P
8.3.3.4	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) .....:	2000	—
	No flashover or breakdown		P
8.3.3.5	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2 mA) .....:	< 2	P
	test voltage (1,1 Ue) (V) .....:	440	—
8.3.3.6	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	conductor cross-sectional area (mm²) .....:	See clause 8.3.3.1	—
	test current Ie (A) .....:	1000	—
8.3.3.7	Strength of actuator mechanism (switch-disconnectors and Ue > 50 V only):		P
	actuator type (fig.) .....:	One hand operated (e)	—
	actuating force for opening (N) .....:	205	—
	test force with blocked main contacts (N) .....:	400	—
	Lockability of driving mechanism in OFF-position at test force and blocked main contacts .....:	-	N
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY		P
8.3.4.1	Operational performance test:		P
	MULTIVERT 1000 → 1 x 3pole		
	utilization category ..... :	AC-21B	—
	rated operational voltage (V) ..... :	400	—
	rated operational current (A) ..... :	1000	—
	Test conditions electrical operation cycles:		P
	test voltage (V) ..... :	L1: 404 L2: 406 L3: 404	—
	test current (A) ..... :	L1: 1010 L2: 1012 L3: 1009	—
	power factor/time constant ..... :	L1: 0,94 L2: 0,94 L3: 0,95	—
	Number of cycles with current ..... :	100	P
	Number of cycles without current ..... :	500	P
	First test sequence (with/without current) ..... :	With	—
	Second test sequence (with/without current) ..... :	Without	—
	time interval between first and second test sequence ..... :	No time interval	—
	current duration (ms) ..... :	350	—
	time interval between operations (s) ..... :	180	—
	Factor y ..... :	1,1	—
8.3.4.2	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) ..... :	2000	—
	No breakdown or flashover		P
8.3.4.3	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA ..... :	-	N
	Leakage current (other utilization categories) ≤ 2 mA ..... :	< 2	P
	test voltage (1,1 Ue) (V) ..... :	440	—
8.3.4.4	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	conductor cross-sectional area (mm²) ..... :	See clause 8.3.3.1	—
	test current Ie (A) ..... :	1000	—

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EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.4.1	Operational performance test:		P
	MULTIVERT 1000 → 3 x 1pole (L1 and L3 closed, L2 operated)		
	utilization category .....:	AC-21B	—
	rated operational voltage (V) .....:	400	—
	rated operational current (A) .....:	1000	—
	Test conditions electrical operation cycles:		P
	test voltage (V) .....:	L1: 405 L2: 406 L3: 404	—
	test current (A) .....:	L1: 1011 L2: 1012 L3: 1009	—
	power factor/time constant .....:	L1: 0,94 L2: 0,94 L3: 0,95	—
	Number of cycles with current .....:	100	P
	Number of cycles without current .....:	500	P
	First test sequence (with/without current) .....:	With	—
	Second test sequence (with/without current) .....:	Without	—
	time interval between first and second test sequence .....:	No time interval	—
	current duration (ms) .....:	360	—
	time interval between operations (s) .....:	180	—
	Factor y .....:	1,1	—
8.3.4.2	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) .....:	2000	—
	No breakdown or flashover		P
8.3.4.3	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2 mA .....:	< 2	P
	test voltage (1,1 Ue) (V) .....:	440	—
8.3.4.4	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	conductor cross-sectional area (mm²) .....:	See clause 8.3.3.1	—
	test current Ie (A) .....:	1000	—

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY		P
	Short-circuit performance capability test		P
	MULTIVERT 1000 → 1 x 3pole		
8.3.5.1	Short-time withstand current test:		P
	Rated short-time withstand current Icw (kA) .....:	12 / 1s	P
	test voltage (V) .....:	L1: 428 L2: 430 L3: 429	—
	r.m.s. test current (A) .....:	L1: 12050 L2: 12200 L3: 12150	—
	peak test current (A) .....:	L1: 24300 L2: 25740 L3: 17600	—
	power factor/time constant .....:	L1: 0,28 L2: 0,28 L3: 0,28	—
	test duration (ms) .....:	1010	—
	Equivalent with .....:	12,2 kA / 1s	P
8.3.5.1.5	Behaviour of the equipment during the test		P
8.3.5.1.6	Conditions of the equipment after the test		P
8.3.5.2	Short-circuit making capacity:		P
	Rated short-circuit making capacity Icm (kA) .....:	15 peak	P
	test voltage (V) .....:	L1: 429 L2: 430 L3: 429	—
	r.m.s. test current (A) .....:	L1: 8160 L2: 8400 L3: 8210	—
	peak test current (A) .....:	L1: 13860 L2: 15100 L3: 12200	—
	power factor/time constant .....:	L1: 0,49 L2: 0,49 L3: 0,49	—
	current duration (ms) .....:	65	—
	number of making cycles .....:	2	—
8.3.5.2.5	Behaviour of the equipment during the test		P
8.3.5.2.6	Conditions of the equipment after the test		P

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.5.3	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) .....:	2000	—
	No flashover or breakdown		P
8.3.5.4	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2,0 mA .....:	< 2	P
	test voltage (1,1 Ue) (V) .....:	440	—
8.3.5.5	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	cross-sectional area (mm²) .....:	See clause 8.3.3.1	—
	test current Ie (A) .....:	1000	—

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
	Short-circuit performance capability test		P
	MULTIVERT 1000 → 3 x 1pole (L1 and L2 closed, L3 operated)		
8.3.5.1	Short-time withstand current test:		P
	Rated short-time withstand current Icw (kA) .....:	12 / 1s	P
	test voltage (V) .....:	L1: 428 L2: 430 L3: 429	—
	r.m.s. test current (A) .....:	L1: 12050 L2: 12200 L3: 12160	—
	peak test current (A) .....:	L1: 24300 L2: 25740 L3: 17620	—
	power factor/time constant .....:	L1: 0,28 L2: 0,28 L3: 0,28	—
	test duration (ms) .....:	1010	—
	Equivalent with .....:	12,2 kA / 1s	P
8.3.5.1.5	Behaviour of the equipment during the test		P
8.3.5.1.6	Conditions of the equipment after the test		P
8.3.5.2	Short-circuit making capacity:		P
	Rated short-circuit making capacity Icm (kA) .....:	15 peak	P
	test voltage (V) .....:	L1: 428 L2: 430 L3: 429	—
	r.m.s. test current (A) .....:	L1: 8150 L2: 8400 L3: 8210	—
	peak test current (A) .....:	L1: 13850 L2: 15100 L3: 12200	—
	power factor/time constant .....:	L1: 0,49 L2: 0,49 L3: 0,49	—
	current duration (ms) .....:	68	—
	number of making cycles .....:	2	—
8.3.5.2.5	Behaviour of the equipment during the test		P
8.3.5.2.6	Conditions of the equipment after the test		P

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.5.3	Dielectric verification:		P
	test voltage (2 Ui) for 1 min (V) .....:	2000	—
	No flashover or breakdown		P
8.3.5.4	Leakage current (switch-disconnectors and Ue > 50 V only):		P
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2,0 mA .....:	< 2	P
	test voltage (1,1 Ue) (V) .....:	440	—
8.3.5.5	Temperature-rise verification:		P
	Temperature rise of main circuit terminals ≤ 80 K :	< 80	P
	cross-sectional area (mm²) .....:	See clause 8.3.3.1	—
	test current Ie (A) .....:	1000	—

EN 60 947-3			
Clause	Requirement – Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT		N
	Conditional short-circuit current test:		N
	Protective device details:		N
	- manufacturer's name, trademark or identification mark .....:	-	—
	- manufacturer's model or type reference .....:	-	—
	- rated voltage (V) .....:	-	—
	- rated current (A) .....:	-	—
	- rated breaking capacity (kA) .....:	-	—
8.3.6.2	Conditional short-circuit test values:		N
	test voltage (1,05 Ue) (V) .....:	L1: - L2: -, L3: -	—
	test current (A) .....:	L1: - L2: - L3: -	—
	rated frequency (Hz) .....:	-	—
	power factor .....:	-	—
	factor n .....:	-	—
	Fuse protected short-circuit withstand:		N
	- max. let-through current (A) .....:	L1: - L2: - L3: -	—
	- Joule integral I^2dt (A^2s) .....:	L1: - L2: - L3: -	
	Fuse protected short-circuit making:		N
	- mean velocity of 15 manually under no-load conditions operations (m/s) .....:	-	—
	- point at which the measurement is made .....:	-	—
	- test speed during the fuse protected short-circuit making (m/s) .....:	-	—
	- max. let-through current (A) .....:	L1: - L2: - L3: -	—
	- Joule integral I^2dt (A^2s) .....:	L1: - L2: - L3: -	—

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.6.2.5	Behaviour of the equipment during the test		N
8.3.6.2.6	Conditions of the equipment after the test		N
8.3.6.3	Dielectric verification:		N
	test voltage (2 Ui) for 1 min (V) .....:	-	—
	No flashover or breakdown		N
8.3.6.4	Leakage current (switch-disconnectors and Ue > 50 V only):		N
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA .....:	-	N
	Leakage current (other utilization categories) ≤ 2,0 mA .....:	-	N
	test voltage (1,1 Ue) (V) .....:	-	—
8.3.6.5	Temperature-rise verification:		N
	Temperature rise of main circuit terminals ≤ 80 K :	-	N
	cross-sectional area (mm²) .....:	-	—
	test current Ie (A) .....:	-	—

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Clause	Requirement – Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY		N
8.3.7.1	Overload test:		N
	ambient temperature 10-40 °C ..... :	-	—
	test enclosure W x H x D (mm x mm x mm) ..... :	-	—
	material of enclosure ..... :	-	—
	test current 1,6 Ithe or 1,6 Ith (A) ..... :	-	—
	cable/busbar cross-section (mm²) / (mm) ..... :	-	—
	Fuse-link details:		N
	- manufacturer's name, trademark or identification mark ..... :	-	—
	- manufacturer's model or type reference ..... :	-	
	- rated voltage (V) ..... :	-	
	- rated current (A) ..... :	-	—
	- power loss (W) ..... :	-	—
	- rated breaking capacity (kA) ..... :	-	—
	Time duration of the overload test (s) ..... :	-	N
	Within 3 min after the fuse(s) has(have) operated (or 1 h), the equipment shall be operated once, i.e. opened and closed		N
	The equipment shall not have undergo any impairment hindering such operation		N
8.3.7.2	Dielectric verification:		N
	test voltage (2 Ui) for 1 min (V) ..... :	-	—
	No flashover or breakdown		N
8.3.7.3	Leakage current (switch-disconnectors and Ue > 50 V only):		N
	Leakage current (utilization categories AC-20A, AC-20B, DC-20A and DC-20B) ≤ 0,5 mA ..... :	-	N
	Leakage current (other utilization categories) ≤ 2 mA) ..... :	-	N
	test voltage (1,1 Ue) (V) ..... :	-	—
8.3.7.4	Temperature-rise verification:		N
	Temperature rise of main circuit terminals ≤ 80 K (K) ..... :	-	N
	cross-sectional area (mm²) ..... :	-	—
	test current Ie (A) ..... :	-	—

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Clause	Requirement – Test	Result - Remark	Verdict

	TABLE 1: Temperature rise measurements MULTIVERT 1000 → 1 x 3pole			P
Temperature rise dT of part:		Phase	dT (K)	Required dT (K)
Cable terminals (copper bars 2 x 60mm x 5mm)		L1	55	60
		L2	58	
		L3	54	
Busbar terminals (copper bars 60mm x 10mm)		L1	51	60
		L2	52,5	
		L3	50,5	
Manual operating means (non-metallic)		---	8,5	25
Parts intended to be touched but not hand-held (non-metallic)		---	23	40
Parts which need not be touched during operation (non-metallic)		---	42	50

	TABLE 2: Temperature rise measurements MULTIVERT 1000 → 3 x 1pole			P
Temperature rise dT of part:		Phase	dT (K)	Required dT (K)
Cable terminals (copper bars 2 x 60mm x 5mm)		L1	54	60
		L2	58,5	
		L3	56	
Busbar terminals (copper bars 60mm x 10mm)		L1	51	60
		L2	53	
		L3	52	
Manual operating means (non-metallic)		---	10	25
Parts intended to be touched but not hand-held (non-metallic)		---	23,5	40
Parts which need not be touched during operation (non-metallic)		---	43	50

Remarks

TRF originator: KEMA

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8.3.6.5 Проверка при нарастване на температурата

8.3.7 Тест V: Издръжливост в режим на претоварване

8.3.7.1 Тест при претоварване

8.3.7.2 Диелектрична проверка

8.3.7.3 Ток на утечка

8.3.7.4 Проверка при нарастване на температурата

8.4 Тест V: Тестове за електромагнитна съвместимост

8.4.1 Имунитет

8.4.2 Емисии

8.3.3 Тест I: Характеристики при нормален режим на работа.

8.3.3.1 Проверка при нарастване на температурата.

8.3.3.2 Тест на диелектричните свойства.

8.3.3.3 Включвателна и изключвателна способност при ток на късо съединение.

8.3.3.3.5 Поведение на апаратурата по време на тестовете за включвателна и изключвателна способност при ток на късо съединение

8.3.3.3.6 Състояние на апаратурата след приключване на тестовете за включвателна и изключвателна способност при ток на късо съединение

8.3.3.4 Диелектрична проверка

8.3.3.5 Ток на утечка

8.3.3.6 Проверка при нарастване на температурата

8.3.3.7 Издръжливост на задвижващия механизъм

8.2.5.2.1 Зависимо и независимо ръчно управление

8.2.5.2.2 Зависимо моторно задвижване

8.2.5.2.3 Независимо моторно задвижване

8.3.4 Тест II: Издръжливост при номинални условия

8.3.4.1 Тест при номинални условия

8.3.4.2 Диелектрична проверка

8.3.4.3 Ток на утечка

8.3.4.4 Проверка при нарастване на температурата

8.3.5 Тест III: Издръжливост в режим на късо съединение

8.3.5.1 Тест за издръжливост при кратковременно късо съединение

8.3.5.2 Включвателна способност при късо съединение

8.3.5.3 Диелектрична проверка

8.3.5.4 Ток на утечка

8.3.5.5 Проверка при нарастване на температурата

8.3.6 Тест IV: Условен ток на късо съединение

8.3.6.2 Условия за проверка за условен ток на късо съединение

8.3.6.3 Диелектрична проверка

8.3.6.4 Ток на утечка

ВЯРНО С ОРИГИНАЛА

8.3.7 TEST SEQUENCE V: OVERLOAD PERFORMANCE CAPABILITY

8.3.7.1 Overload test

8.3.7.2 Dielectric verification

8.3.7.3 Leakage current

8.3.7.4 Temperature-rise verification

8.4 ELECTROMAGNETIC COMPATIBILITY TESTS

8.4.1 Immunity

8.4.2 Emission

Clause Requirement - Test Result - Remark Verdict

8.3.3 TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS

8.3.3.1 Temperature-rise

8.3.3.2 Test of dielectric properties

8.3.3.3 Making and breaking capacity

8.3.3.3.5 Behaviour of the equipment during making and breaking capacity tests

8.3.3.3.6 Condition of the equipment after making and breaking capacity tests

8.3.3.4 Dielectric verification

8.3.3.5 Leakage current

8.3.3.6 Temperature-rise verification

8.3.3.7 Strength of actuator mechanism

8.2.5.2.1 Dependent and independent manual operation

8.2.5.2.2 Dependent power operation

8.2.5.2.3 Independent power operation

8.3.4 TEST SEQUENCE II: OPERATIONAL PERFORMANCE CAPABILITY

8.3.4.1 Operational performance test

8.3.4.2 Dielectric verification

8.3.4.3 Leakage current

8.3.4.4 Temperature-rise verification

8.3.5 TEST SEQUENCE III: SHORT-CIRCUIT PERFORMANCE CAPABILITY

8.3.5.1 Short-time withstand current test

8.3.5.2 Short-circuit making capacity

8.3.5.3 Dielectric verification

8.3.5.4 Leakage current

8.3.5.5 Temperature-rise verification

8.3.6 TEST SEQUENCE IV: CONDITIONAL SHORT-CIRCUIT CURRENT

8.3.6.2 Test conditions for conditional short-circuit current test

8.3.6.3 Dielectric verification

8.3.6.4 Leakage current

8.3.6.5 Temperature-rise verification

ПС електрик ТЕСТИС BULGARIA

ВЯРНО С ОРИГИНАЛА

Приложение 37

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Beliehene gemäß § 8 Absatz 1 AkkStelleG i.V.m. § 1 Absatz 1 AkkStelleGBV
Unterzeichnerin der Multilateralen Abkommen
von EA, ILAC und IAF zur gegenseitigen Anerkennung

Akkreditierung

Die Deutsche Akkreditierungsstelle GmbH bestätigt hiermit, dass das Prüflaboratorium

VDE Prüf- und Zertifizierungsinstitut GmbH
Merianstraße 28, 63069 Offenbach

für die Standorte:

Merianstraße 28, 63069 Offenbach
Goethering 43, 63067 Offenbach
Landsberger Straße 378a, 12681 Berlin

die Kompetenz nach DIN EN ISO/IEC 17025:2005 besitzt, Prüfungen in folgenden Bereichen durchzuführen:

Sicherheit elektrischer Betriebsmittel und deren Komponenten; Bauelemente der Elektronik; industrielle Niederspannungsgeräte und Anlagen; Maschinen und Anlagen; Kabel und Leitungen; Laborgeräte; Lichttechnik; Optik; Energieeffizienz; Photovoltaik; Umweltsimulation und Gebrauchstauglichkeit; Elektromagnetische Verträglichkeit (EMV) und Funkanwendungen; Akustik- und Geräuschemission; Elektrofahrräder (Pedelec); Analytische Chemie

Die Akkreditierungsurkunde gilt nur in Verbindung mit dem Bescheid vom 25.04.2013 mit der Akkreditierungsnummer D-PL-12061-01 und ist gültig bis 26.06.2016. Sie besteht aus diesem Deckblatt, der Rückseite des Deckblatts und der folgenden Anlage mit insgesamt 87 Seiten.

Registrierungsnummer der Urkunde: **D-PL-12061-01-01**

Berlin, 25.04.2013

Im Auftrag Ralf Egner
Abteilungsleiter

ВЯРНО С ОРИГИНАЛА

Siehe Hinweise auf der Rückseite

DAkkS
Deutsche
Akkreditierungsstelle

Deutsche Akkreditierungsstelle GmbH

Anlage zur Akkreditierungsurkunde D-PL-12061-01-01 nach DIN EN ISO/IEC 17025:2005

Gültigkeitsdauer: 25.04.2013 bis 26.06.2016

Urkundeninhaber:
VDE Prüf- und Zertifizierungsinstitut GmbH
Merianstraße 28, 63069 Offenbach

Für die Standorte:

Merianstraße 28, 63069 Offenbach
Goethering 43, 63067 Offenbach
Landsberger Straße 378a, 12681 Berlin (nur für Niederspannungsgeräte)

Prüfungen in den Bereichen:

Sicherheit elektrischer Betriebsmittel und deren Komponenten; Bauelemente der Elektronik; industrielle Niederspannungsgeräte und Anlagen; Maschinen und Anlagen; Kabel und Leitungen; Laborgeräte; Lichttechnik; Optik; Energieeffizienz; Photovoltaik; Umweltsimulation und Gebrauchstauglichkeit; Akkumulatoren und Batterien; Elektromagnetische Verträglichkeit (EMV) und Funkanwendungen; Akustik- und Geräuschemission; Elektrofahrräder (Pedelec); Analytische Chemie

verwendete Abkürzungen: siehe letzte Seite

Приложение 38.

M.SCHNEIDER WIRD MERSEN

MERSEN

CE – Declaration of Conformity

Document - No. / Month, Year:	MV.03E / 06.2014
Manufacturer :	MERSEN ÖSTERREICH WIEN GMBH formerly M.Schneider Sicherungs-Systeme GmbH
Adress :	Lienfeldergasse 31 - 33 1160 WIEN
Type Designation :	**NH – vertical fuse switch disconnectors** **Type MULTIVERT 690V AC, 1-pole and 3-pole switching** **Size 00 – Multivert 160A, 100mm, 185mm bus bar distance** **Size 1 – Multivert 250A** **Size 2 – Multivert 400A** **Size 3 – Multivert 630A** **Size 3 – Multivert 1000A**

The product described conforms with requirements of the following European standards :

Number **2006 / 95 / EG**

Text Directive of the European Parliament and of the Council for the harmonization of the laws of the Member States regarding electrical equipment designed for the use within certain voltage limits.

Full compliance with the standards listed below proves the conformity of the designated product with Provisions of the above mentioned EC Directive :

Harmonized European Standard:	Reference Number	Edition Date
	EN 60947-3	**1999**
	EN 60947-3 / A1	**2001**
	EN 60947-3 / A2	**2005**
	EN 60947-1	**2004**
National Standard:	Reference Number	Edition Date
Technical spezification:	Reference Number	Edition Date

CE - Marking since : **1996**

Place, Date : Vienna, 26.06.2014

Authorized Signature : .....

This declaration certifies the conformity with mentioned Directives, but does not imply any guarantee of characteristics.

MERSEN ÖSTERREICH WIEN GMBH
VORMALS M.SCHNEIDER SICHERUNGS-SYSTEME GMBH
A-1160 WIEN, LIENFELDERGASSE 31-33
T +43 (0)1 890 28 18 F +43 (0)1 890 28 18 815, OFFICE.WIEN@MERSEN.COM
FN 346674s, Wien 3, HG, ATU65801144
UNI CREDIT AUSTRIA AG, KTO-NR. 52948 023 363, BLZ 12000, IBAN: AT26 1200 0529 4802 3363, SWIFT-BIC: BKAUATWW
SOCIÉTÉ GÉNÉRALE ZWEIGNIEDERLASSUNG WIEN, KTO-NR. 10144543000, BLZ 18150, IBAN: AT66 1815 0101 4454 3000, SWIFTBIC: SGABATWW
www.mersen.com

ВЯРНО С ОРИГИНАЛА

Приложение 39

"ПС електрик" ООД – гр. Шумен

ДЕКЛАРАЦИЯ ЗА СЪОТВЕТСТВИЕ

Долуподписаният, **"ПС ЕЛЕКТРИК" ООД,**
(име на производителя или неговия упълномощен представител, наименование на дружеството /фирмата производител или негов представител)

9700 гр. Шумен, бул. "Мадара" № 12,
(адрес)

декларирам на собствена отговорност, че продуктът

Триполюсен предпазител-разединител с вертикална конструкция, с обявен работен ток 1000 А ,
(наименование и търговска марка, тип или модел, предназначение)

произведен от

Mersen Osterreich Wien GMBH
преди M. Schneider Sicherungs-Systeme GmbH
(място на производство на разглеждания продукт)

за който се отнася тази декларация,

отговаря на приложимите български и международни стандарти или еквиваленти и на техните валидни изменения и поправки:

- БДС EN 60947-1:2007 „Комутационни апарати за ниско напрежение. Част 1: Общи правила (IEC 60947-1:2007)"; и
- БДС EN 60947-3:2002 „Комутационни апарати за ниско напрежение. Част 3: Товарови прекъсвачи, разединители, товаров прекъсвач-разединители и апарати, комбинирани с предпазители (IEC 60947-3:1999 + поправка юли 1999)"

и е оценён положително по реда и при условията на Наредбата за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението, приета с ПМС № 182 от 6.07.2001 г., обн., ДВ, бр. 62 от 13.07.2001 г.

Декларирам, че ми е известна отговорността, която нося съгласно чл. 313 от НК.

30.08.2013. год.
гр. Шумен
(място и дата на издаване)

Божидар Маринов
Управител
(фамилия, длъжност и подпис на производителя или на неговия представител)

ВЯРНО С ОРИГИНАЛА

Приложение 46,2,6 45

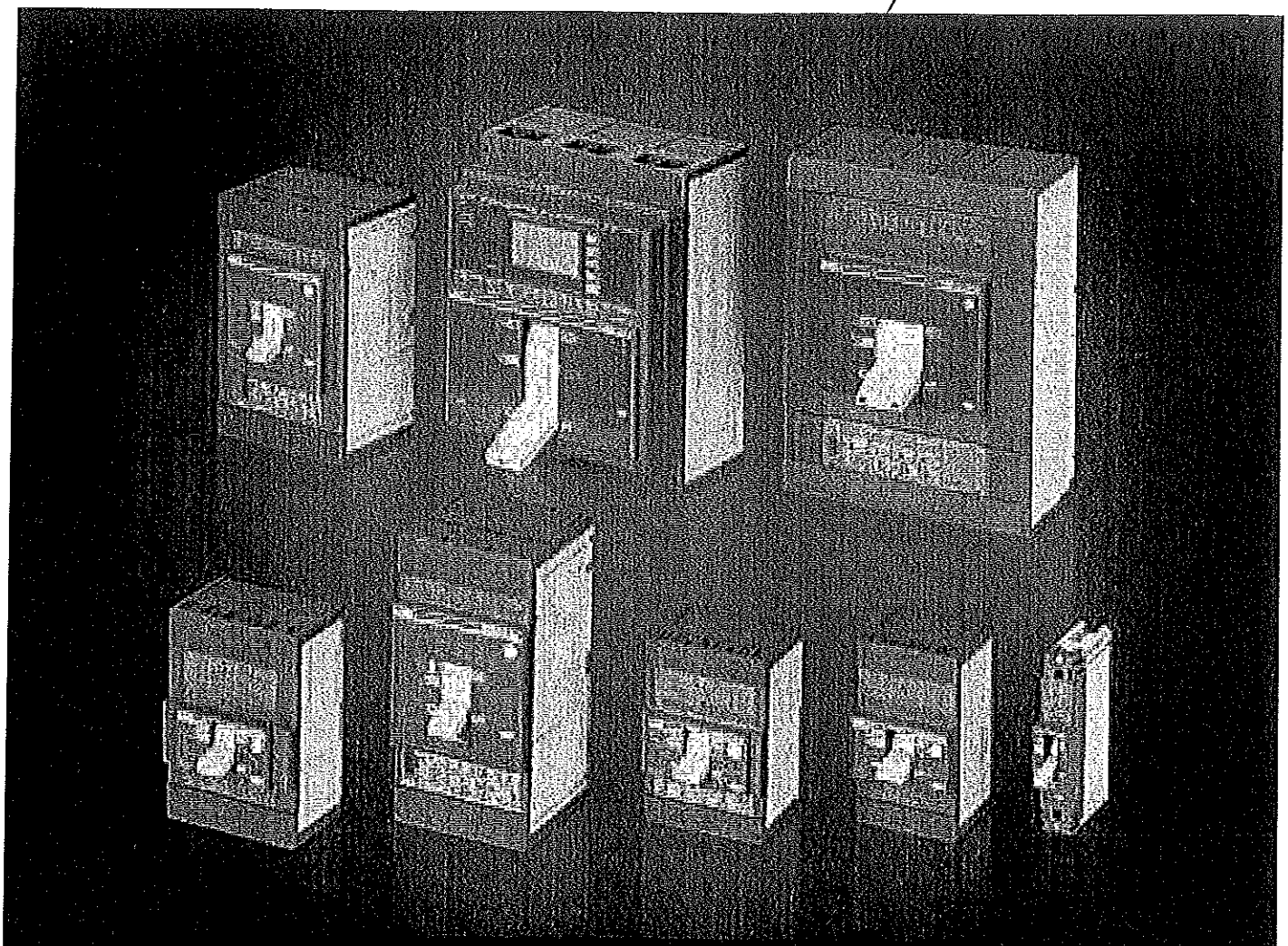

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ABB

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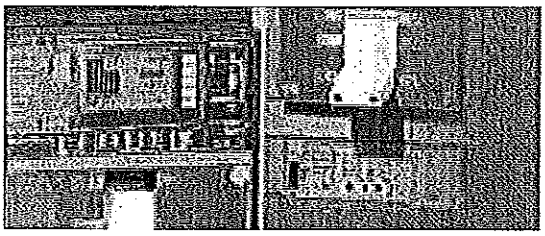
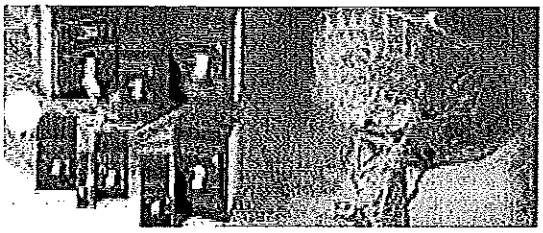


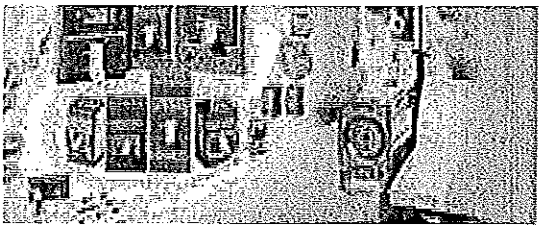
Main characteristics

1



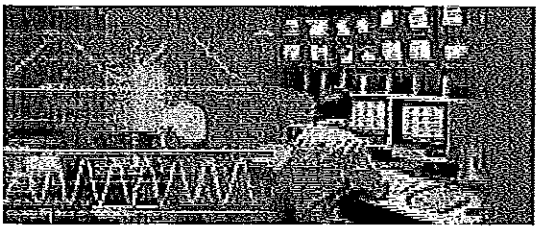
The ranges

2



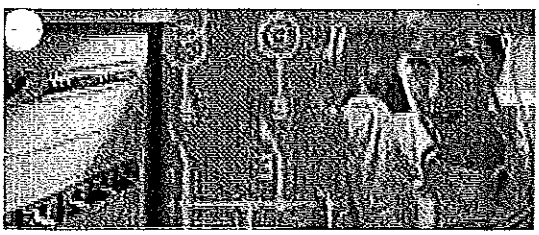
Accessories

3



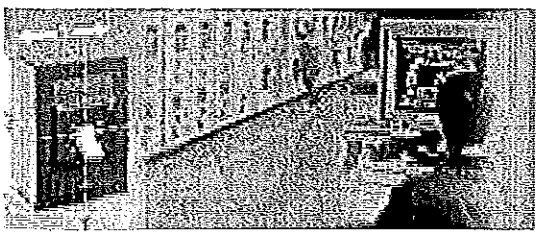
Characteristic curves
and technical information

4



Wiring diagrams

5



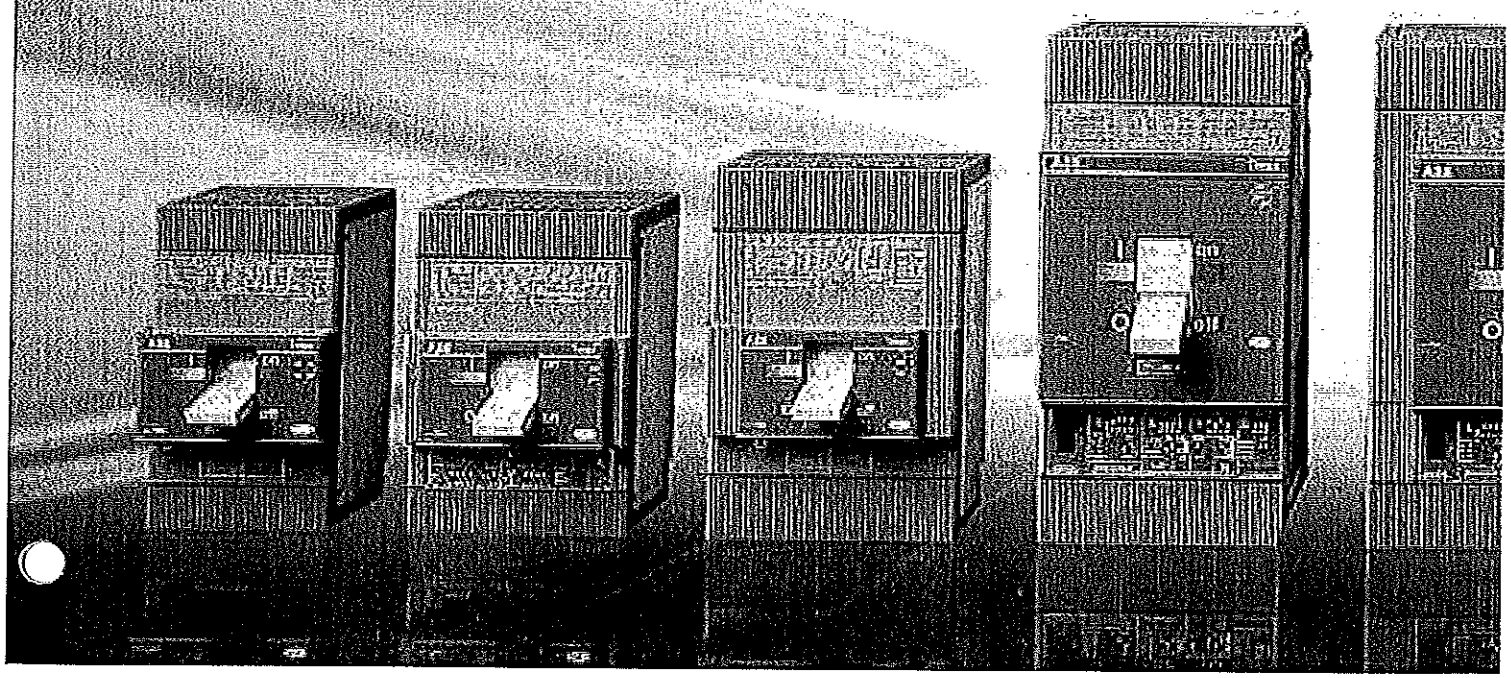
Overall dimensions

6

Ordering codes

7

TMAX. COMPLETE FREEDOM.



Tmax is freedom. Freedom now reaching up to 1600 A with the new Tmax T7 circuit-breaker. There's a boundless and highly diversified world of differing types of installations, requirements, needs and problems from 0 to 1600 A. With T Generation everything becomes simple and rational – seven sizes to find the solutions you're looking for.

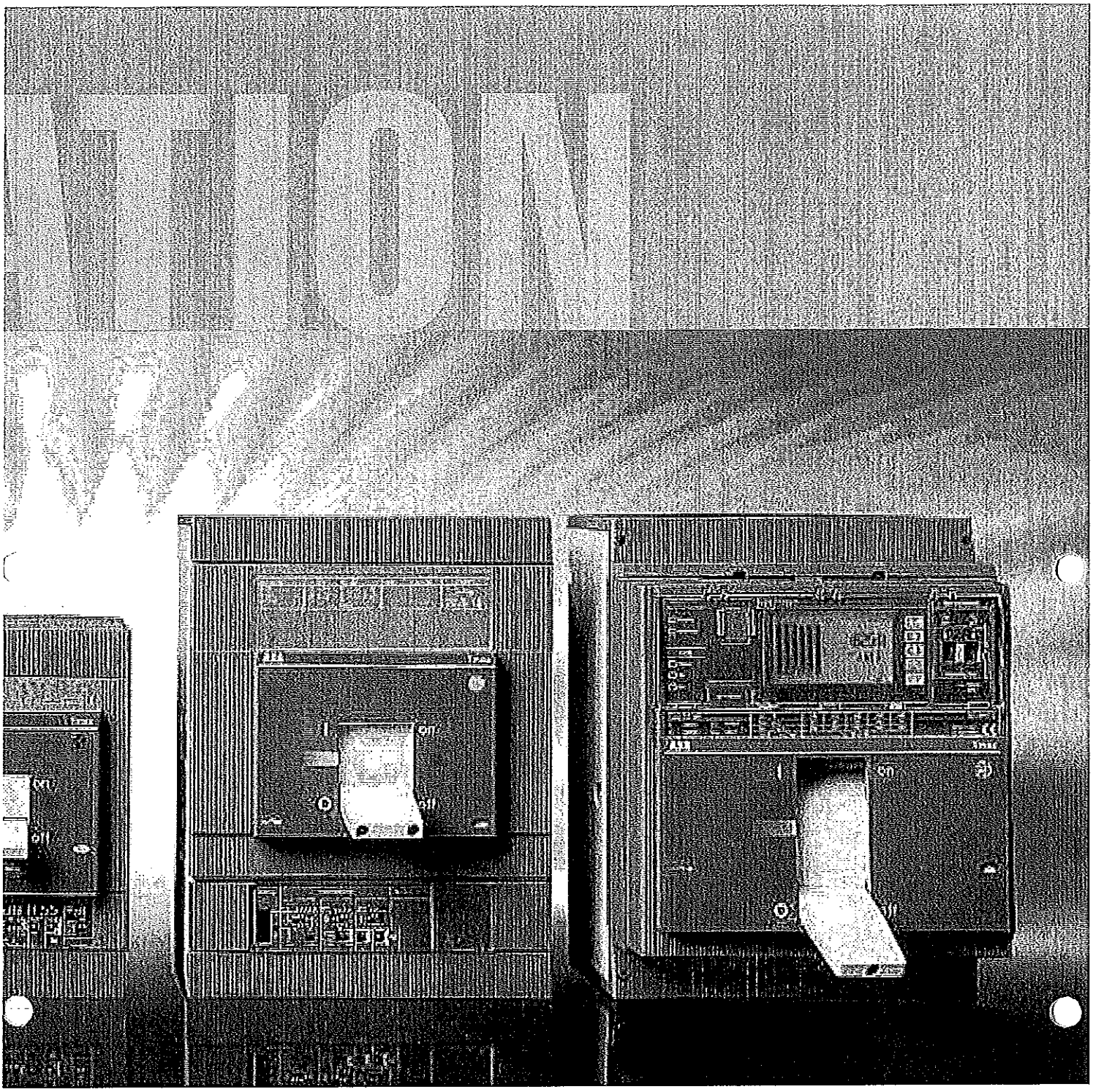
BE FREE TO SIZE ANY TYPE OF INSTALLATION IN AN IDEAL WAY AT ALL TIMES.

Thanks to the seven sizes and a complete series of magnetic only, thermomagnetic and electronic trip units.

And also a wide range of accessories and the possibility of selecting dedicated ranges for all market applications, even the most specific and advanced ones.

BE FREE TO INSTALL ALL THE SIZES WITHOUT ANY DIFFICULTY.

T Generation is undeniably the family of moulded-case circuit-breakers with the top performance/size ratio available on the market, so can you imagine how much more space there is for cabling and how simply you'll be able to carry it out? And further, what about the reduced dimensions of the switchboard?



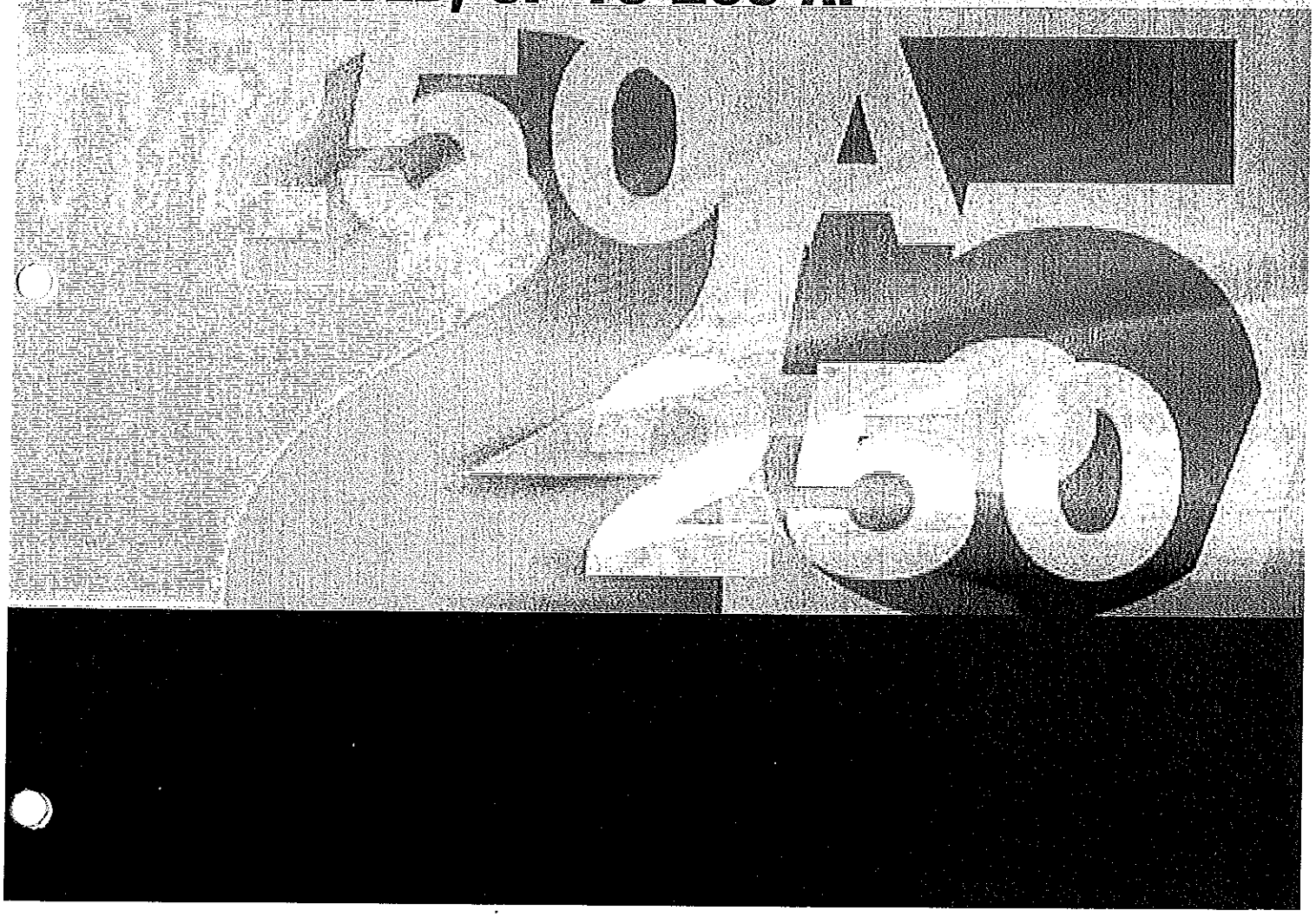
BE FREE TO RIDE THE MOST ADVANCED TECHNOLOGY.

It is thanks to this technology that T Generation offers you performances which were out of the question until now in circuit-breakers with these dimensions. And there are some exclusive technical solutions which only ABB SACE can offer you, such as the brand new electronic trip units designed for the new Tmax T7 or the new rapid accessory fitting system.

FREEDOM OF TOTALLY SAFE SELECTION.

The safety of knowing that behind Tmax there's ABB SACE's strong and constant commitment to continually search for excellence of quality at the base of each product and service. ABB quality.

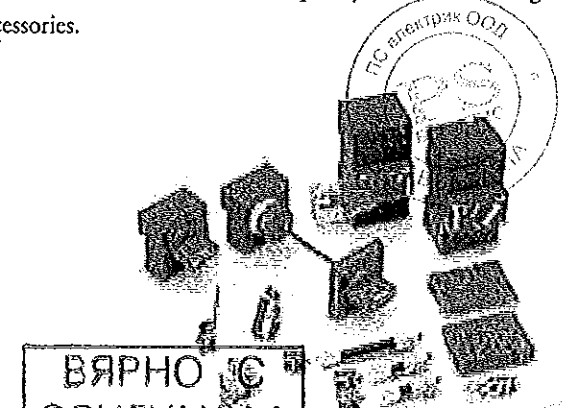
TMAX T1, T2 AND T3. ALL SOLUTIONS PERFECTLY COORDINATED, UP TO 250 A.

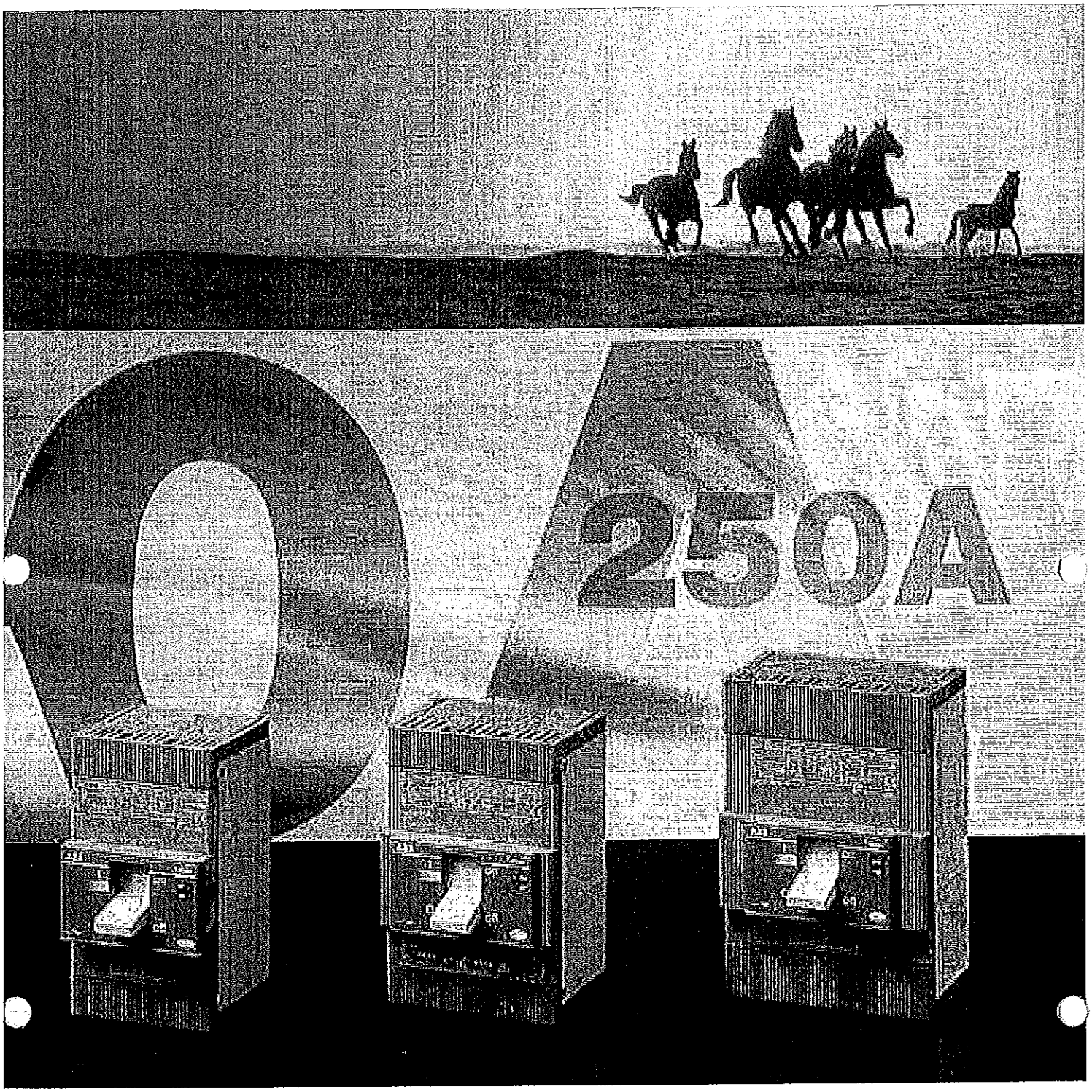


Tmax T1, T2 and T3 – the three "little ones" of the Tmax family - were thought up from the beginning to work together. You can select functions and performances which until now couldn't be found in circuit-breakers with these dimensions. Perfect up to 250 A.

There are so many characteristics common to the three sizes. The single depth (70 mm) of the three pieces of apparatus making installation truly simpler, the new arcing chambers produced with a gasifying material, and an innovative construction system allowing the arc extinction time to be reduced.

All three sizes are fitted with adjustment of the thermal threshold as standard and have new - three-pole and four-pole - residual current releases, designed and constructed to optimise space in the switchboard and simplify coupling with the circuit-breaker. Tmax T1, T2 and T3 have a completely standardised range of accessories.

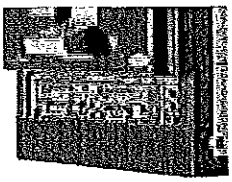




TMAX T1. THE LITTLE ONE THAT'S REALLY BIG.

Thanks to its extremely compact dimensions, Tmax T1 is a unique circuit-breaker in its category. Compared with any other circuit-breaker with the same performance (160 A – up to 36 kA at 415 V AC), the overall dimensions of the apparatus are notably smaller.

TMAX T2. INTELLIGENCE AND HIGH PERFORMANCE IN THE PALM OF YOUR HAND.



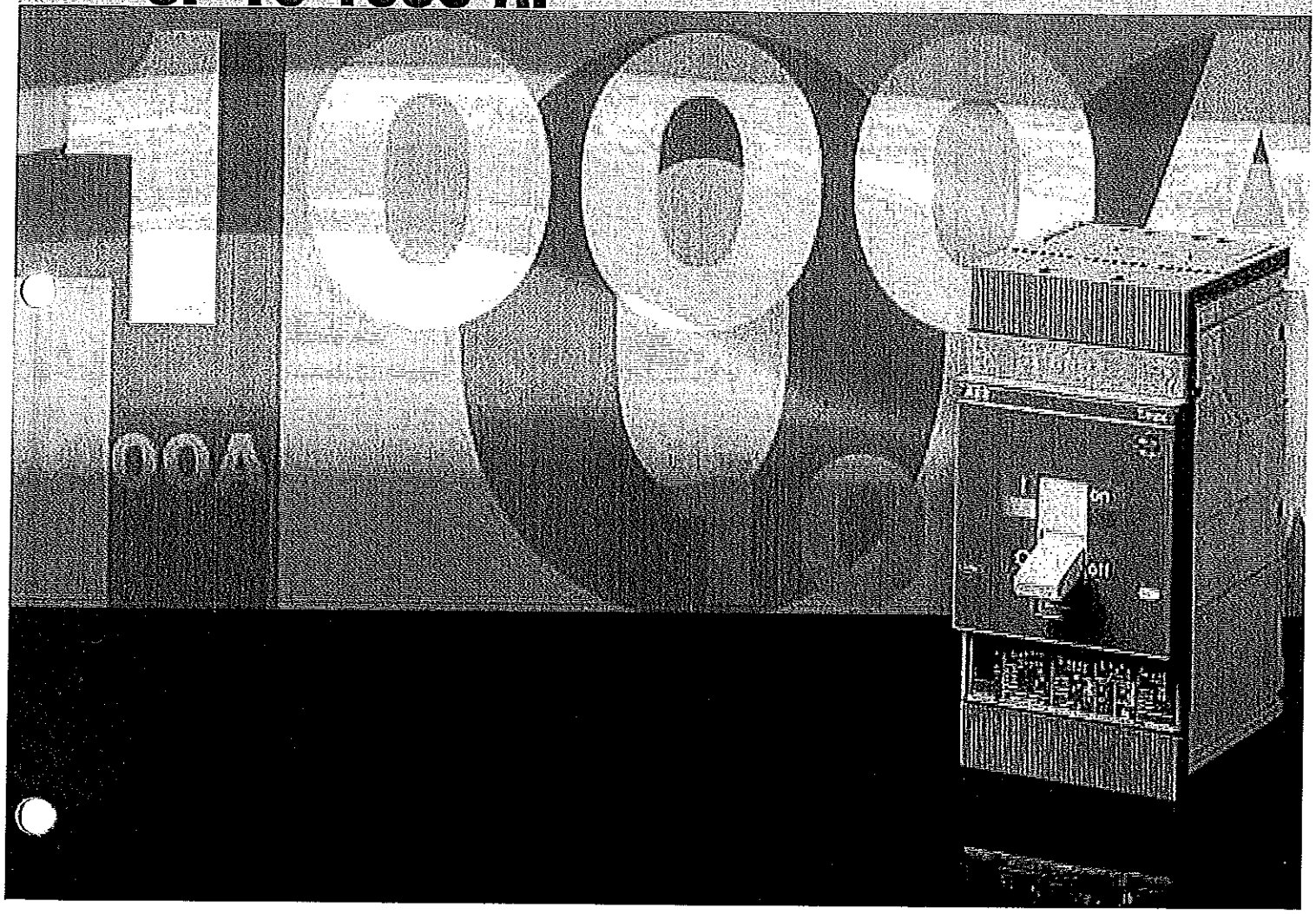
Tmax T2 is the only 160 A circuit-breaker available with such high performances in such very limited overall dimensions. A breaking capacity of 85 kA at 415 V AC can be achieved. Tmax T2 can be fitted with a latest generation electronic trip unit.

TMAX T3. 250 A IN A DEPTH OF 70 MM FOR THE FIRST TIME.

Tmax T3 is the first circuit-breaker which carries 250 A in considerably limited overall dimensions compared with any other similar apparatus – a really large step forward for this type of equipment.

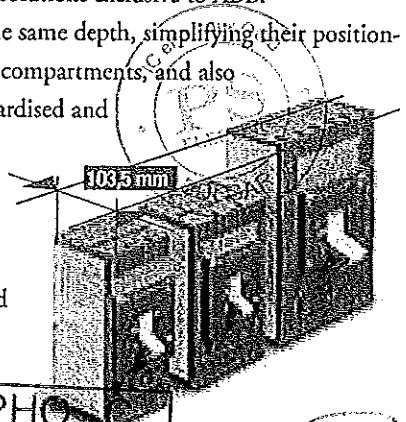
Tmax T3 allows coordinations for motor protection to be made up to a power of 90 kW at 415 V AC.

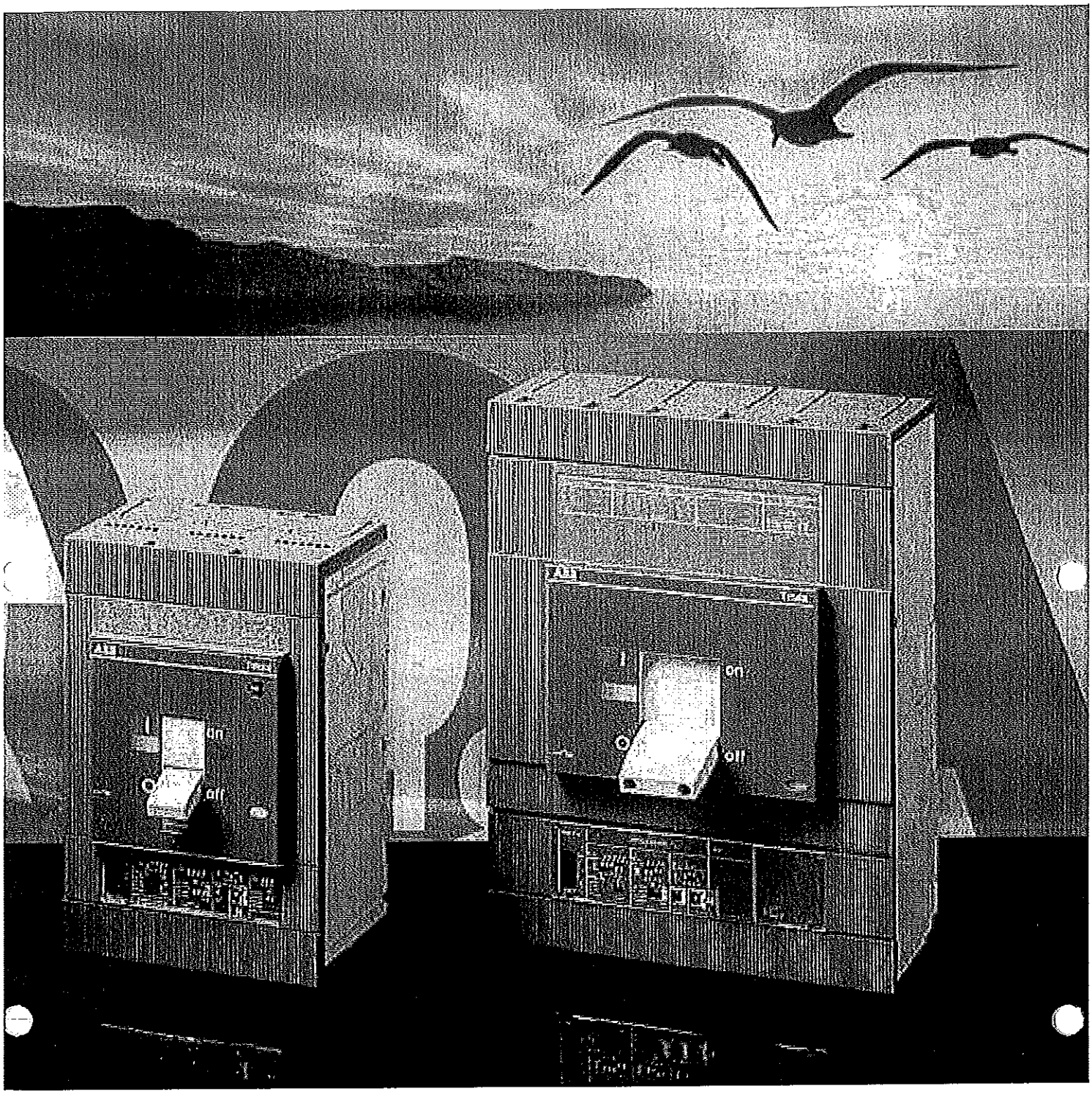
TMAX T4, T5 AND T6. BE FREE TO CHOOSE UP TO 1000 A.



Tmax T4, T5 and T6 are the moulded-case circuit-breakers with the best performance/size ratio on the market.
Their application possibilities are practically unlimited, thanks to their dedicated and specific ranges, advanced electronics, as well as a complete and standardised range of accessories.
The top quality materials and innovative construction techniques used by ABB SACE mean Tmax circuit-breakers can guarantee truly exceptional performances, with a really high rated current/volume ratio. For example, T4 and T5 guarantee a breaking capacity up to 200 kA at 415 V AC and an extraordinary 80 kA at 690 V AC. Moreover, they complete the range of applications up to 1150 V in alternating current and 1000 V in direct current.

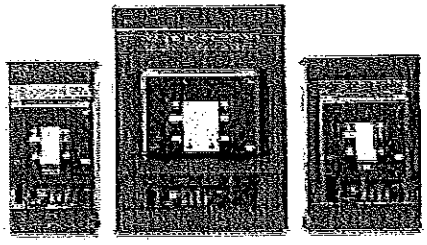
The series of electronic trip units, equipped with latest generation technology, offers solutions exclusive to ABB.
T4, T5 and T6 have the same depth, simplifying their positioning in the switchboard compartments, and also have a complete, standardised and unified range of accessories available, simplifying selection, making them flexible to use and reducing stocks.





NEW PR223EF TRIP UNIT. THIS IS WHERE THE EXCLUSIVE INNOVATION IS TO BE FOUND.

The new PR223EF trip unit with the EFDP system offers two characteristics which until now were antithetic: selectivity and rapid tripping. With the new PR223EF, a new range up to 1000 A has been conceived for specific needs requiring high selectivity values: rapid detection of the fault and no limit to the number of hierarchical levels of the distribution plant. With the EFDP system, the size of the apparatus inside the installation can be reduced and cable and busbar sizing can be optimised. And the outcome? Considerable reductions in plant costs.



NEW PR223DS TRIP UNIT. FREEDOM OF CONTROL.

The new PR223DS trip unit has been conceived and built for power distribution circuit-breakers.

Now all the different electrical values of the installation can be measured. And that's not all – there are LEDs available on the front of the trip unit which signal some configurations and the presence of any alarms (overload, incorrect connections, etc.).

TMAX T7. FREEDOM TO THE NTH POWER.

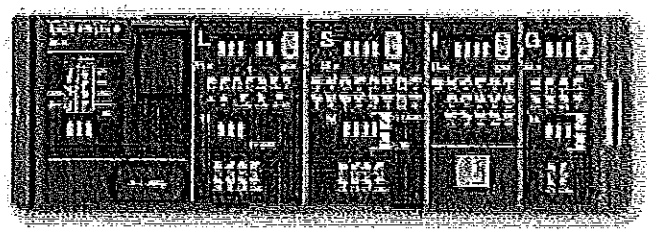
The new Tmax T7, available in two versions up to 1600 A either with manual operating mechanism or motor operator, was conceived with a really revolutionary design for circuit-breakers of this type: advanced electronics, exceptional performances and new installation and accessory fitting solutions.

Flexibility is absolutely exceptional with Tmax T7: they can be installed both vertically and horizontally (in the withdrawable version, too), there are all types of terminals (among which, flat orientated rear terminals) and a new, faster and safer racking-out system for the moving part. Moreover, cabling is considerably facilitated by the reduced height.

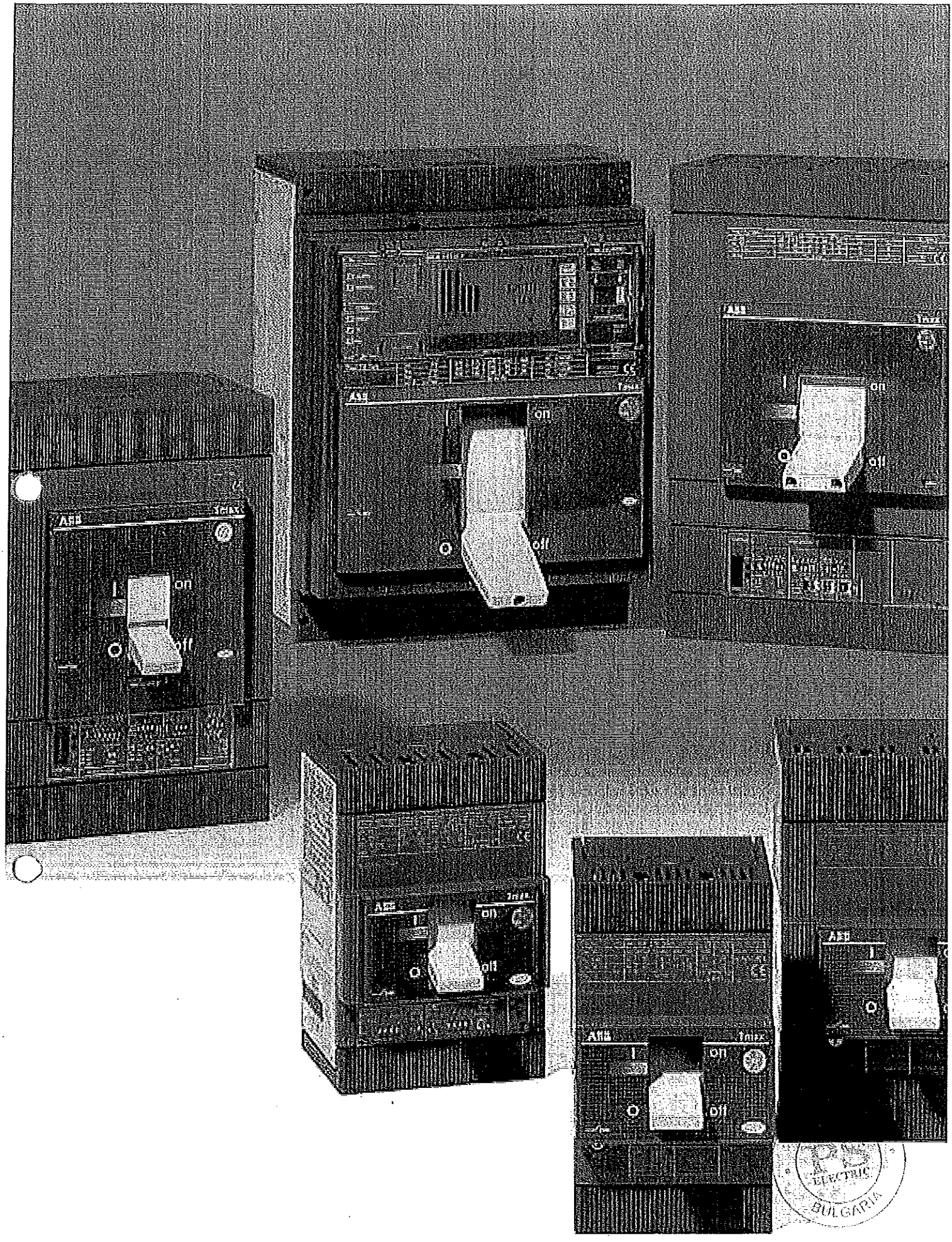
A great news is the new rapid accessory wiring system. No wires inside the circuit-breaker, rapid, simple and safe connection to the external circuit, and no screws for fixing the external power supply cables.

The exclusive news of the new cable interlock provides notable benefits in terms of optimal sizing. By using this accessory it is possible to interlock two circuit-breakers in any position and, above all, to interlock a T7 with an air circuit-breaker as well. Impossible until today, this answer is ideal for automatic transfer switch solutions.

Special attention has been paid to the electronics and the results are there to be seen ... PR231, PR232, PR331 and PR332 are the new interchangeable electronic trip units, with modularity and rating-plugs which can be replaced by the customer.



The PR231 and PR232 trip units, with dip-switches for setting the protection thresholds, offer LEDs to signal protection tripped for each protection function: this means the reason for circuit-breaker tripping can always be found.
The PR332 is decidedly ahead of its time in the present reference panorama: fitted with a large graphic display, it allows all the information needed to be displayed simply and clearly. It also offers advanced protection functions (as well as the "classic" protection functions). For example, the exclusive data logger function allowing all the events and values before the fault to be recorded for later analysis.



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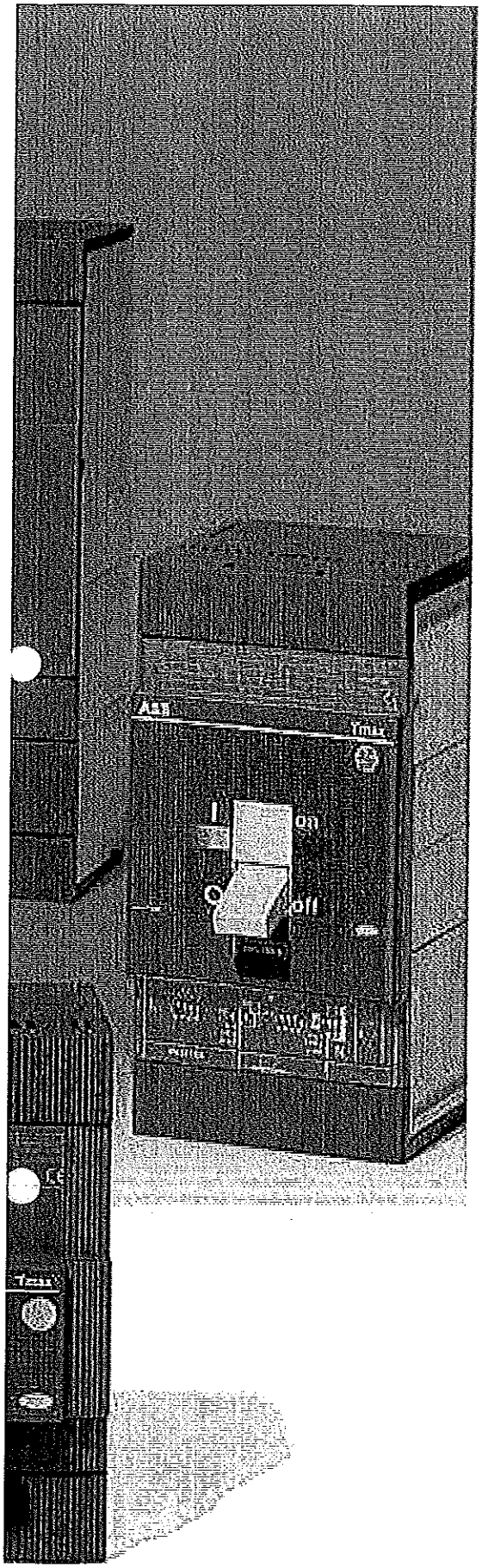


Main characteristics

1

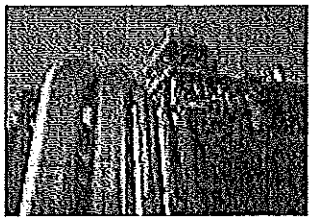
Index

Overview of the Tmax family

1

Circuit-breakers for AC-DC distribution

			T1 1p	T1	
Size	[A]		160	160	
In	[A]		16...160	16...160	
Poles	[Nr]		1	3/4	
Ue	[V]	(AC) 50 - 60 Hz	240	690	
	[V]	(DC)	125	500	
Icu (380-415 V AC)	[kA]	B	25* (220/230 V AC)	16	
	[kA]	C		25	
	[kA]	N		36	
	[kA]	S			
	[kA]	H			
	[kA]	L			
	[kA]	V			

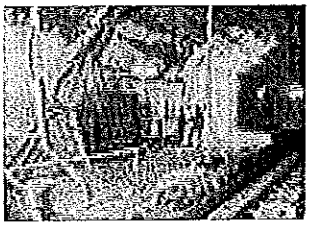


Circuit-breakers for zone selectivity

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

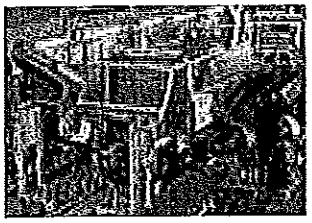
Circuit-breakers for motor protection

Size	[A]				
Poles	[Nr]				
Ue	[V]	(AC) 50 - 60 Hz			
Magnetic only trip unit, IEC 60947-2					
PR221DS-I trip unit, IEC 60947-2					
PR222MP trip unit, IEC 60947-4-1					
PR231/P-I trip unit, IEC 60947-2					



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

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



Switch-disconnectors

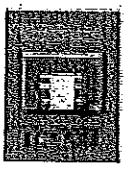
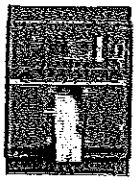
			T1D	
Ith	[A]		160	
Ie	[A]		125	
Poles	[Nr]		3/4	
Ue	[V]	(AC) 50 - 60 Hz	690	
	[V]	(DC)	500	
Icm	[kA]		2.8	
Icw	[kA]		2	

* For In 16 A and In 20 A: Icu @ 220/230 V AC = 16 kA

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





	T2	T3	T4	T5	T6	T7
	160	250	250/320	400/630	630/800/1000	800/1000/1250/1600
	1.6...160	63...250	20...320	320...630	630...1000	200...1600
	3/4	3/4	3/4	3/4	3/4	3/4
	690	690	690	690	690	690
	500	500	750	750	750	
	36	36	36	36	36	
	50	50	50	50	50	50
	70		70	70	70	70
	85		120	120	100	120
			200	200		150

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

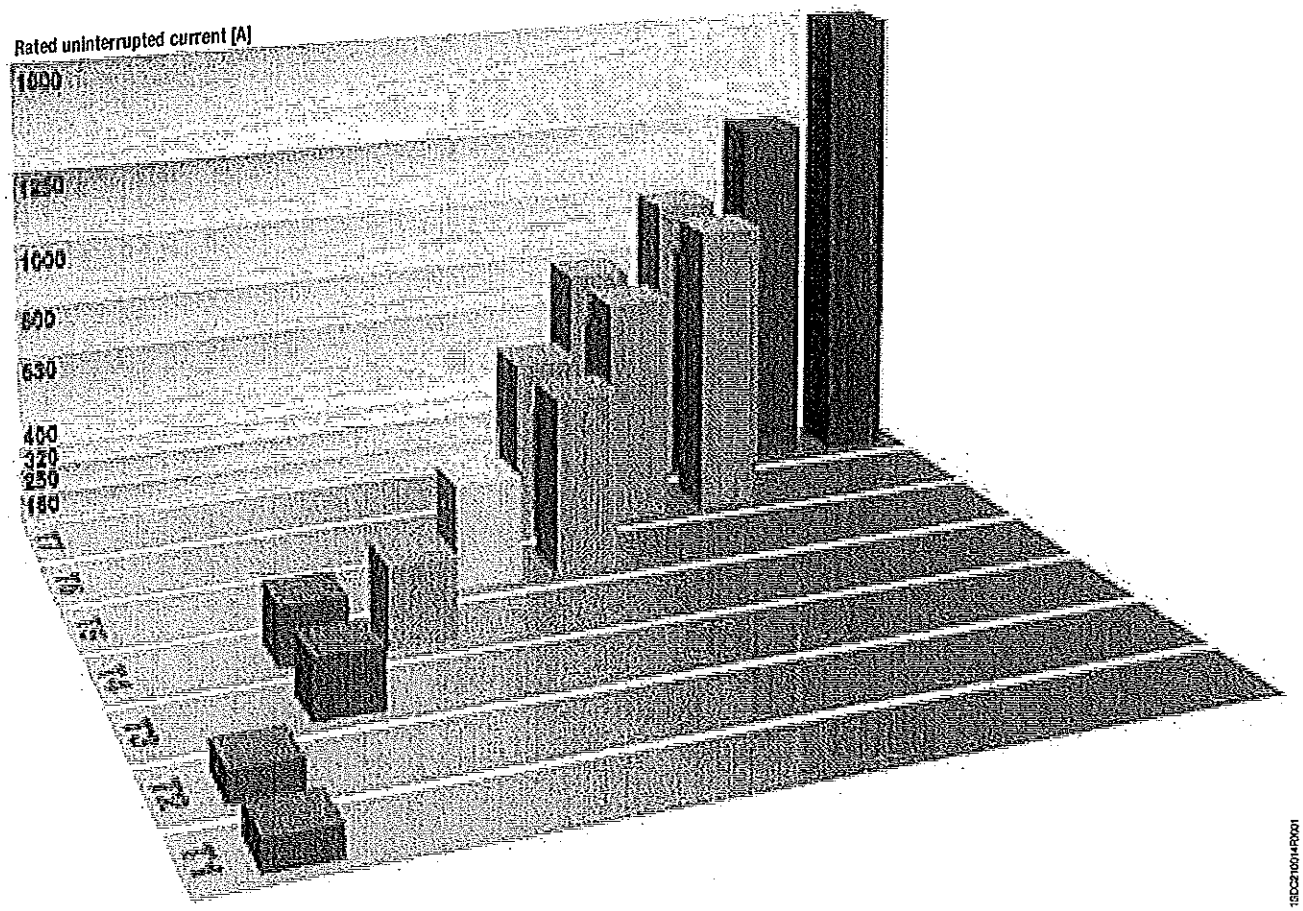
	T2	T3	T4	T5	T6	T7
	160	250	250/320	400/630	800	800/1000/1250
	3	3	3	3	3	3
	690	690	690	690	690	690
	■	■	■			
	■		■	■	■	
			■	■	■	
						■

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

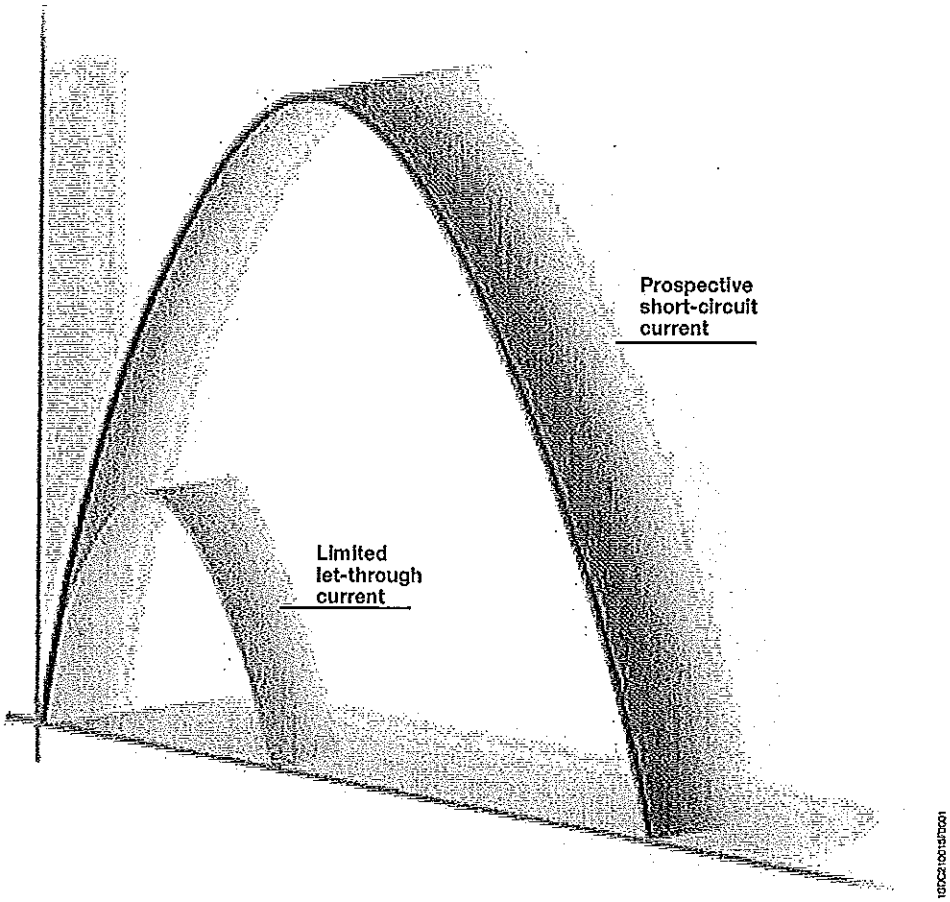
		T3D	T4D	T5D	T6D	T7D
		250	250/320	400/630	630/800/1000	1000/1250/1600
		200	250/320	400/630	630/800/1000	1000/1250/1600
		3/4	3/4	3/4	3/4	3/4
		690	690	690	690	690
		500	750	750	750	750
		5.3	5.3	11	30	52.2
		3.6	3.6	6	15	20

General

Tmax family is now available as a complete range of moulded case circuit-breakers up to 1600 A. All the circuit-breakers, both three-pole and four-pole, are available in the fixed version; the sizes T2, T3, T4 and T5 in the plug-in version and T4, T5, T6 and T7 in the withdrawable one as well.
With the same frame size, the circuit-breakers in the Tmax family, are available with different breaking capacities and different rated uninterrupted currents.

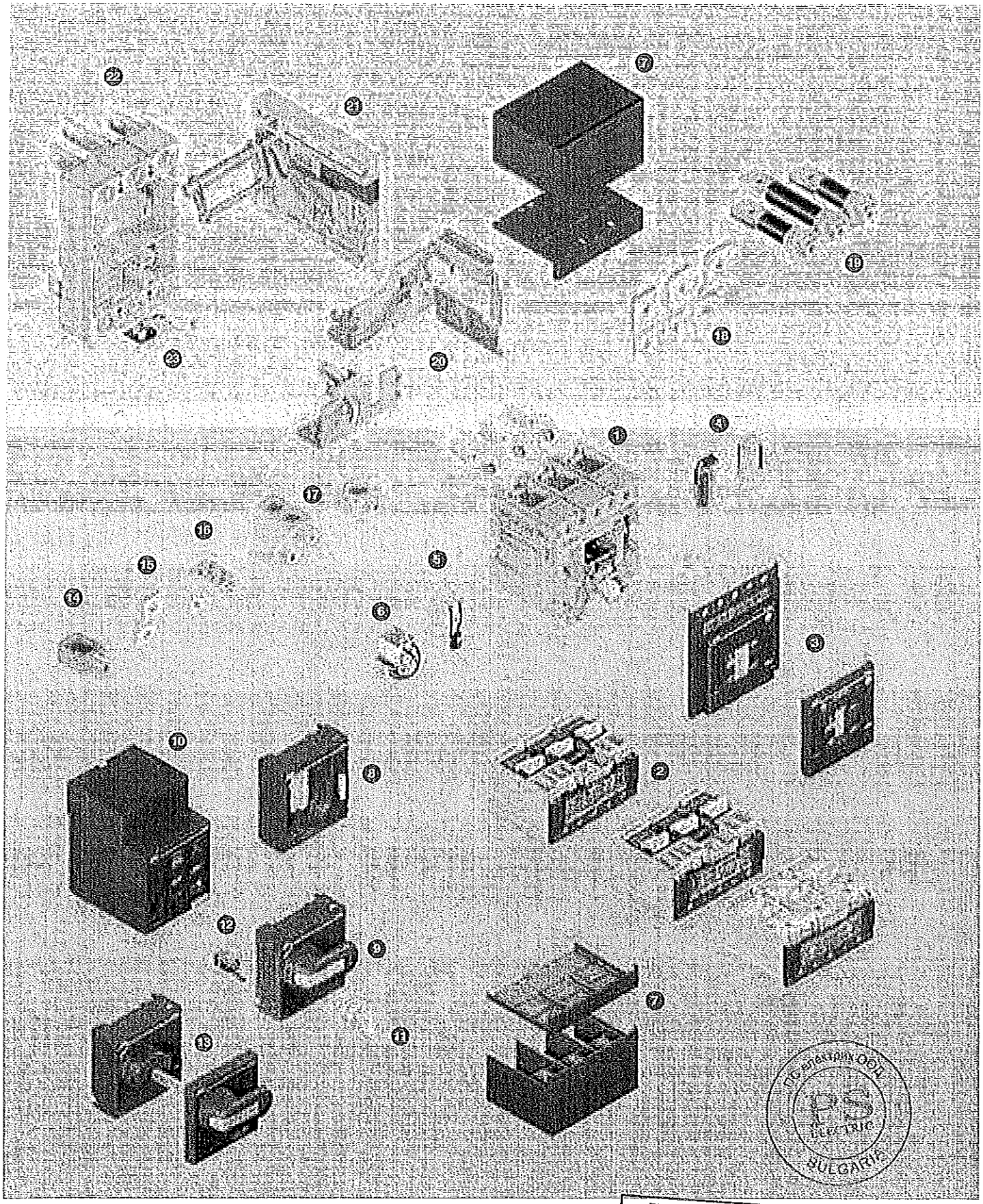


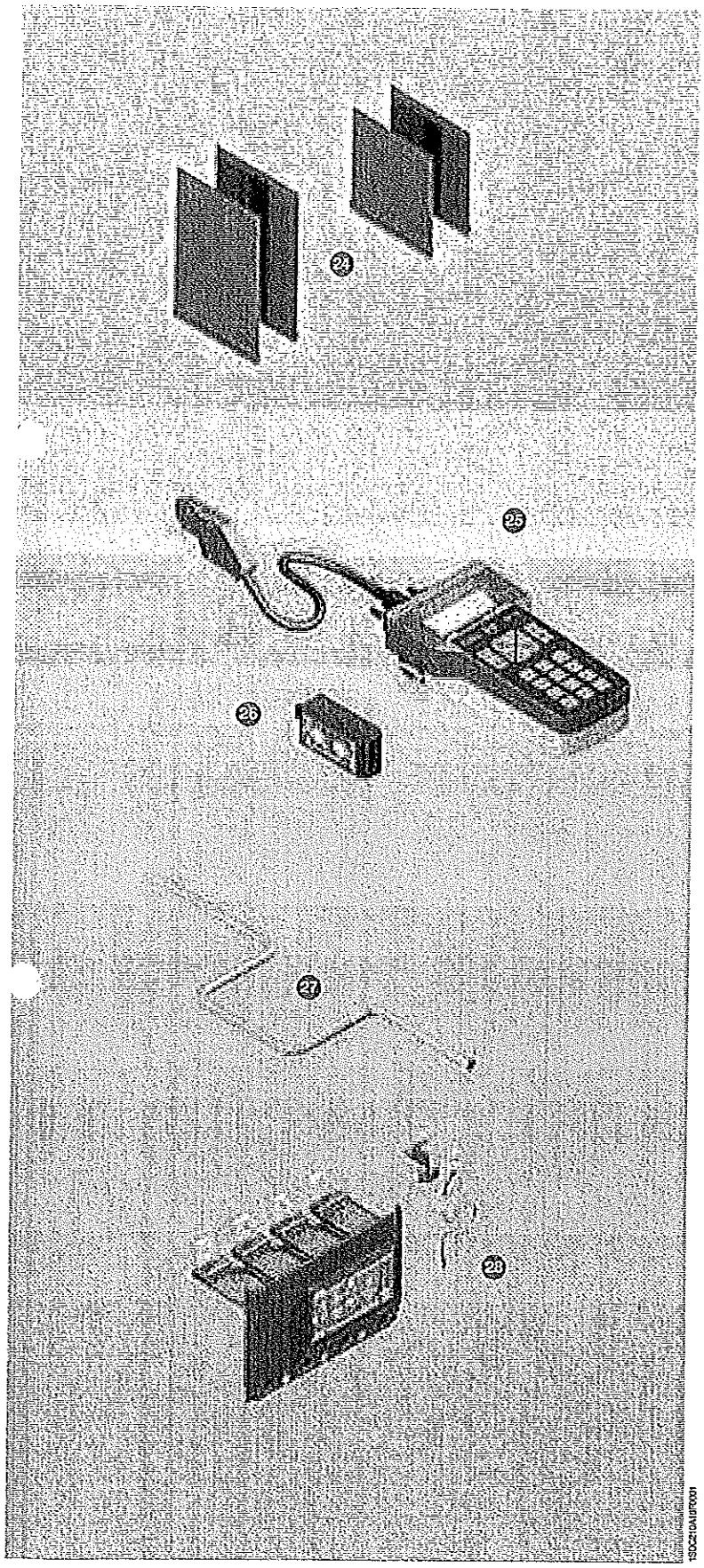
The electric arc interruption system used on the Tmax circuit-breakers allows the short-circuit currents of very high value to be interrupted extremely rapidly. The considerable opening speed of the contacts, the dynamic blasting action carried out by the magnetic field and the structure of the arcing chamber contribute to extinguishing the arc in the shortest possible time, notably limiting the value of the specific let-through energy I^2t and the current peak.



Construction characteristics

Modularity of the series



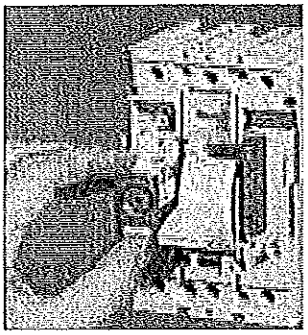


Starting from the fixed version circuit-breaker, all the other versions used for various requirements are obtained by means of mounting conversion kits.
The following are available:
- kit for converting a fixed circuit-breaker into the moving part of a plug-in and withdrawable one
- circuit-breaker fixed parts for plug-in and withdrawable circuit-breakers
- conversion kit for the connection terminals.

Various accessories are also available:
1. Breaking unit
2. Trip units
3. Front
4. Auxiliary contacts - AUX and AUX-E
5. Undervoltage release - UVR
6. Shunt opening release - SOR and P-SOR
7. Terminal covers
8. Front for lever operating mechanism - FLD
9. Direct rotary handle - RHD
10. Stored energy motor operator - MOE
11. Key lock - KLF
12. Early auxiliary contact - AUE
13. Transmitted rotary handle - RHE
14. Front terminal for copper cable - FC Cu
15. Front extended terminal - EF
16. Multi-cable terminal (only for T4) - MC
17. Front terminal for copper-aluminium - FC CuAl
18. Front extended spread terminal - ES
19. Rear orientated terminal - R
20. Conversion kit for plug-in/withdrawable versions
21. Guide of fixed part in the withdrawable version
22. Fixed part - FP
23. Auxiliary position contact - AUP
24. Phase separators
25. PR010T
26. TT1
27. Racking out crank handle
28. Residual current release.

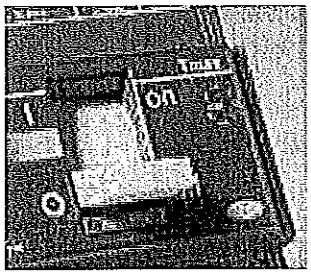
Construction characteristics

Distinguishing features of the series



Double insulation

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

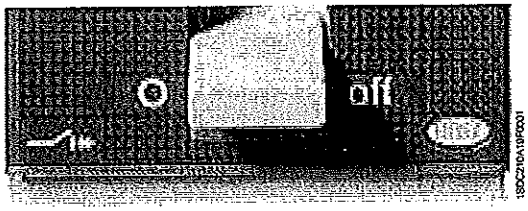


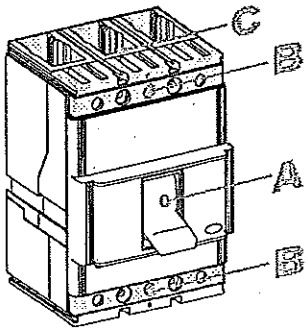
Positive operation

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

Isolation behaviour

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





Degrees of protection

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

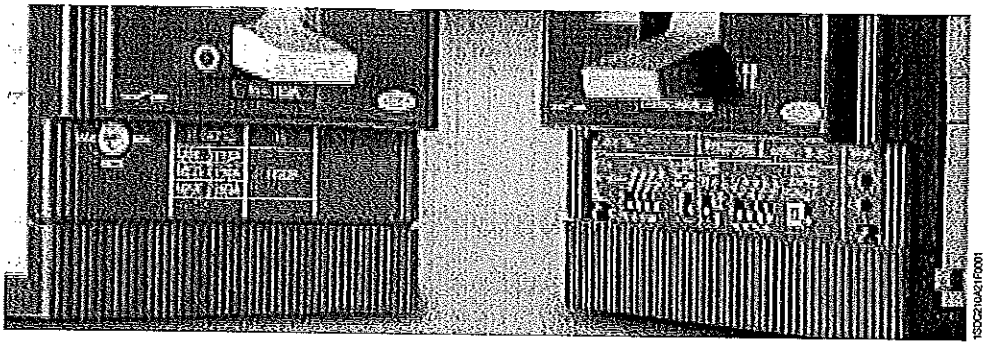
	With front	Without front [2]	Without terminal covers	With high terminal covers	With low terminal covers	With IP40 protection kit on the front
A	IP 40[3]	IP 20	-	-	-	-
B[4]	IP 20	IP 20	IP 20	IP 40	IP 40	IP 40
C	-	-	-	IP 40[1]	IP 30[5]	-

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

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

Operating temperature

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



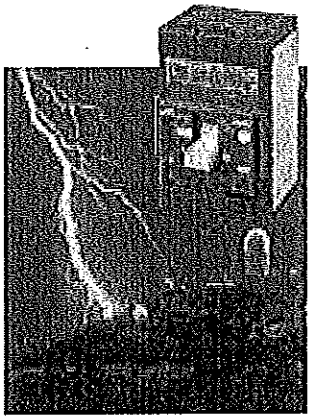
Altitude

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

Altitude	[m]	2000	3000	4000	5000
Rated service voltage, Ue	[V~]	690	600	500	440
Rated uninterrupted current	%	100	98	93	90

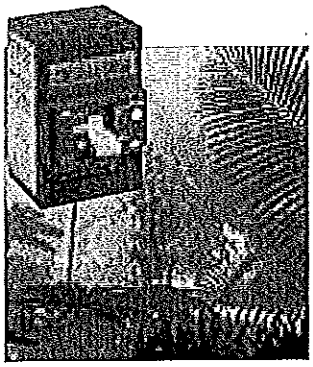
Construction characteristics

Distinguishing features of the series



Electromagnetic compatibility

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



Tropicalisation

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

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

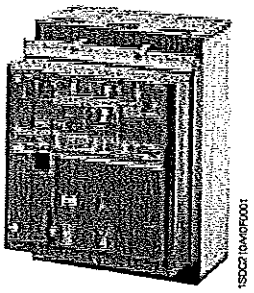
Resistance to shocks and vibrations

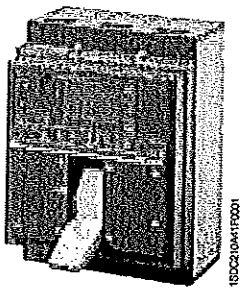
The circuit-breakers are unaffected by vibrations generated mechanically and due to electromagnetic effects, in compliance with the IEC 60068-2-6 Standards and the regulations of the major classification organisations[1]:

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

The T1-T5 Tmax circuit-breakers are also tested, according to the IEC 60068-2-27 Standard, to resist shocks up to 12g for 11 ms. Please ask ABB SACE for higher performances in terms of resistance to shocks.

[1] Ask to ABB for Tmax certificates of approval.





Versions and types

All the Tmax circuit breakers are available in fixed versions, T2, T3, T4 and T5 in the plug-in version and T4, T5, T6(1) and T7 also in the withdrawable one.
All the circuit breakers can be manually operated, by the operating lever or the rotary handle (direct or transmitted), and electrically operated. For this issue different solutions are available:

- The solenoid operator for T1, T2 and T3
- The stored energy motor operator for T4, T5 and T6
- T7 with the stored energy operating mechanism, gear motor for the automatic charging of the closing springs and shunt opening and closing releases.

Installation

Tmax circuit-breakers can be installed in the switchboards, mounted in any horizontal, vertical or lying down position on the back plate or on rails, without undergoing any derating of their rated characteristics. Tmax circuit-breakers can be installed easily in all types of switchboards, above all thanks to the possibility of being supplied either by top or bottom terminals, without jeopardizing the apparatus functionality(2).
Apart from fixing on the base plate, T1, T2 and T3 can also be installed on DIN 50022 rails, thanks to the special fixing brackets.
Furthermore, the depth of 70 mm takes Tmax T3 to the same standard as the two smaller sizes, making assembly of circuit-breakers up to 250 A in standard switchboards even simpler. In fact, it is possible to prepare standardised support structures, facilitating the design stage and construction of the switchboard metalwork.

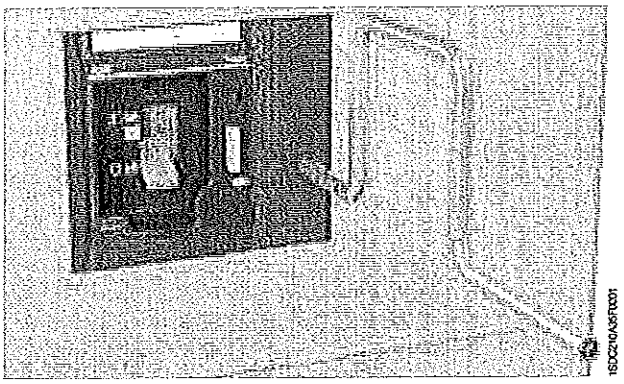
(1) Not available on the 1000 A version.
(2) For uses at a voltage of 1000 V, T4V250 and T5V400 in the fixed version, and T4L250 and T5L400 in the plug-in version must be supplied from above.

Construction characteristics

Distinguishing features of the series

Racking-out with the door closed

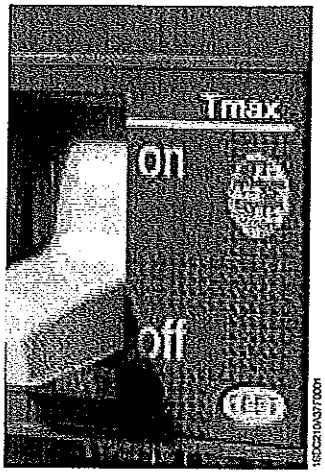
With Tmax T4, T5, T6 and T7 circuit-breakers, in the withdrawable version, the circuit-breaker can be racked-in and out with the compartment door closed, thereby increasing operator safety and allowing rationalisation of low voltage arc proof switchboards.
Racking out can only be carried out with the circuit-breaker open (for obvious safety reasons), using a special racking-out crank handle supplied with the conversion kit from fixed circuit-breaker to moving part of withdrawable circuit-breaker.



Range of accessories

The completeness and installation rationality of the Tmax series is also achieved thanks to innovative solutions in development of the accessories:

- single range of accessories for T1, T2 and T3; one for T4, T5 and T6, and one for T7, characterised by completeness and simplicity for installation. Harmonisation of the accessories allows reduction in stocks and greater service flexibility, offering increasing advantages for users of the Tmax series;
- new system of rapid assembly for internal electrical accessories of Tmax T7 without cables for the connections to the terminal box;
- same possibility of equipping with accessories, in terms of connection devices (terminals, terminal covers and phase separators), between fixed circuit-breakers and fixed parts of plug-in circuit-breakers for Tmax T2 and T3.
- moreover, Tmax offers a wide choice of residual current releases:
  - three-pole and four-pole RC221 and RC222 up to 250 A with T1, T2 and T3;
  - RC222 placed below, four-pole up to 500 A for T4 and T5;
  - RC223 (type B) also sensitive to currents with continuous slowly variable components (IEC 60947-2 Annex M), four-pole for T3 and T4, up to 250 A;
  - integrated residual current protection for PR332/P-LSIRc trip unit available for Tmax T7.



Compliance with Standards and company quality system

Tmax circuit-breakers and their accessories comply with the international IEC 60947-2 Standards and the EC directive:

- "Low Voltage Directives" (LVD) no. 2006/95/CE (replaces 72/23/EEC and subsequent amendments)
- Electromagnetic Compatibility Directive (EMC) no. 89/336 EEC.

Certification of compliance with the product Standards mentioned above is carried out, in accordance with the European EN 45011 Standard, by the Italian certification organisation ACAE (Association for Certification of Electrical Apparatus), member of the European organization LOVAG (Low Voltage Agreement Group) and by the Swedish certification organization SEMKO.

The Test Room at ABB SACE is accredited by SINAL (certificate No. 062). The Tmax series also has a range which has undergone certification according to the severe American UL 489 and CSA C22.2 Standards. Furthermore, the Tmax series is certified by the Russian GOST (Russia Certificate of Conformity) certification organisation. The pieces of apparatus comply with the prescriptions for on-board shipping installations and are approved by the major Naval Registers - Lloyd's Register of Shipping, Germanischer Lloyd, Bureau Veritas, Rina, Det Norske Veritas, Russian Maritime Register of Shipping, and ABS (please ask ABB SACE for confirmation about the versions available).

ABB SACE's Quality System complies with the international ISO 9001-2000 Standard (model for quality assurance in design, development, construction, installation and service assistance) and with the equivalent European EN ISO 9001 and Italian UNI EN ISO 9001 Standards.

The third certifying Organisation is RINA-QUACER. ABB SACE received the first certification in 1990 with three-year validity and this has now reached its fifth confirmation.

The new Tmax series has a hologram on the front, obtained using special anti-imitation techniques - a guarantee of the quality and genuineness of the circuit-breaker as an ABB SACE product. Attention to protection of the environment is another priority commitment for ABB SACE, and, as confirmation of this, the environmental management system has been certified by RINA. ABB SACE - the first industry in the electromechanical sector in Italy to obtain this recognition - thanks to a revision of the production process with an eye to ecology - has been able to reduce the consumption of raw materials and waste from processing by 20%. ABB SACE's commitment to safeguarding the environment is also shown in a concrete way by Life Cycle Assessments (LCA) of the products, carried out directly by ABB SACE's Research and Development in collaboration with the ABB Research Centre. Selection of materials, processes and packing materials is made optimising the true environmental impact of the product, also foreseeing the possibility of its being recycled.

Furthermore, in 1997 ABB SACE developed its Environmental Management system and got it certified in conformity with the international ISO14001 Standard, integrating it in 1999 with the Management System for Health and Safety in the workplace according to OHSAS 18001 (Swedish National Testing and Research Institute).

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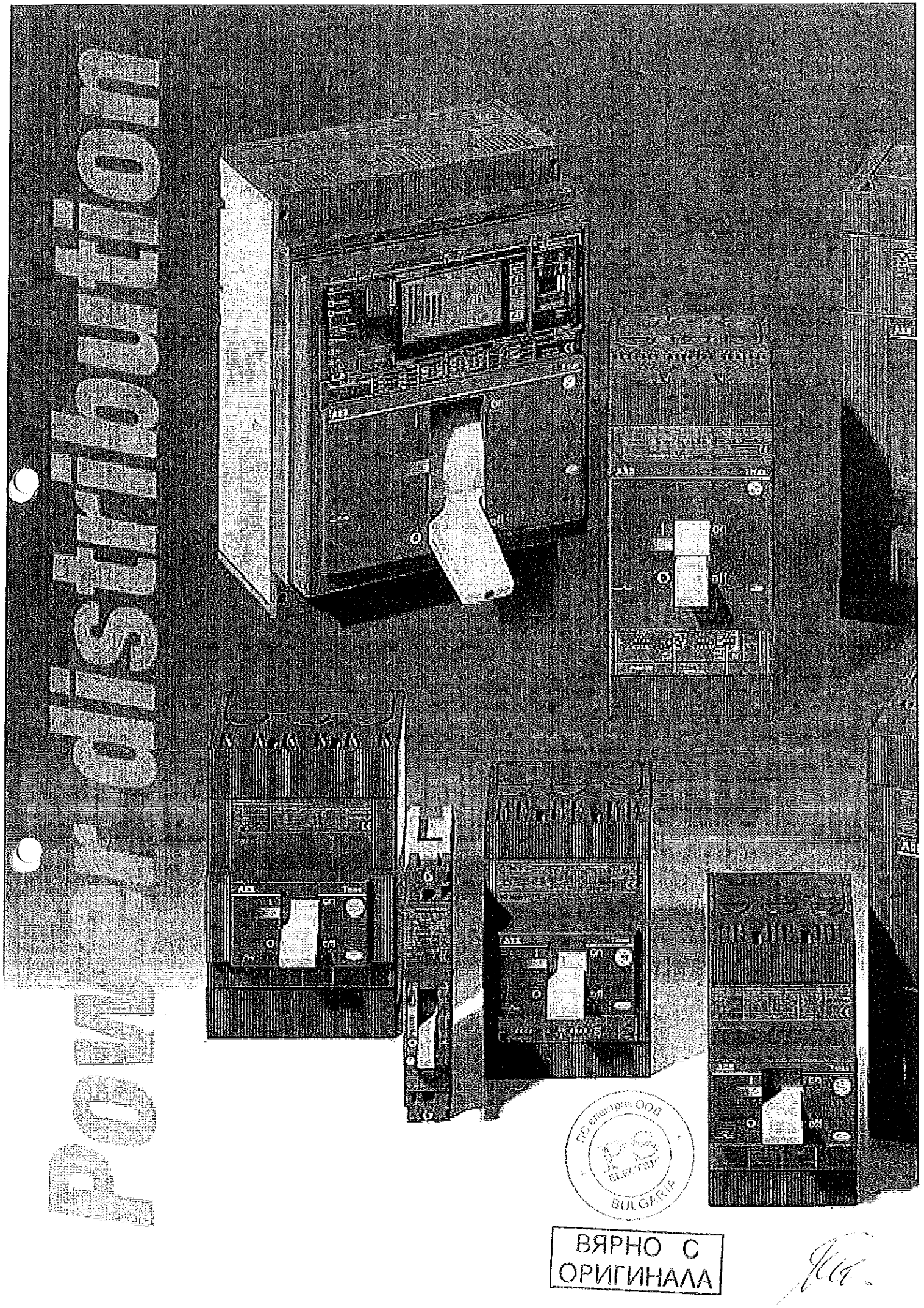

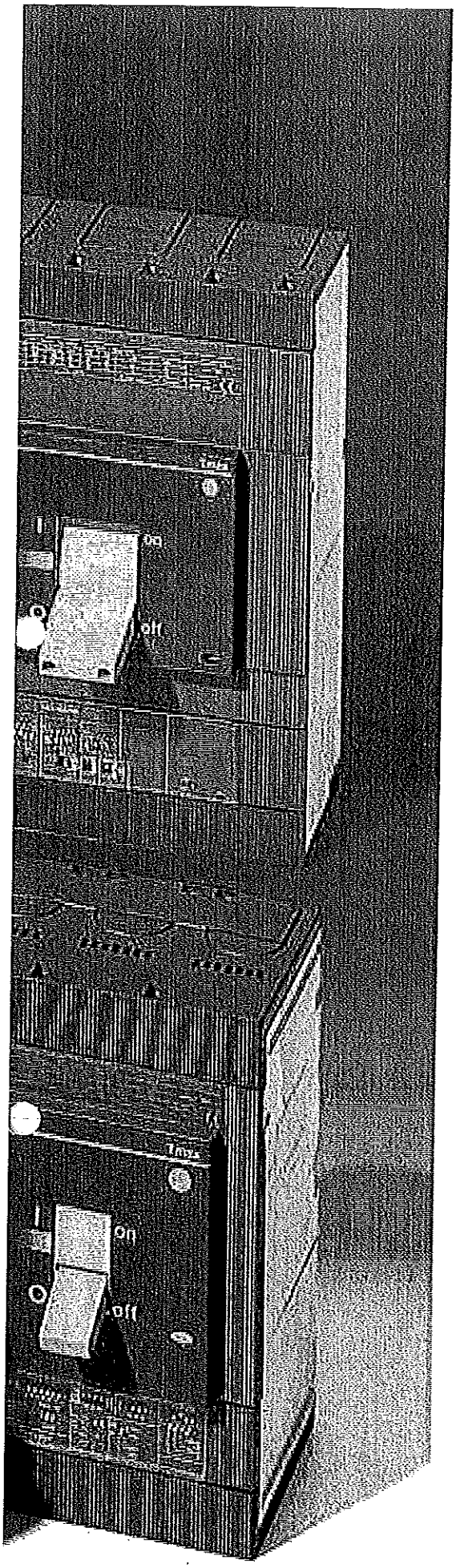

Circuit-breakers for power distribution

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Circuit-breakers for power distribution

Electrical characteristics

				Tmax T1 1P	Tmax T1			Tmax T2			
Rated uninterrupted current			[A]	160	160			160			
Poles			[No.]	1	3/4			3/4			
Rated service voltage, **Ue**	(AC) 50-60 Hz		[V]	240	690			690			
	(DC)		[V]	125	500			500			
Rated impulse withstand voltage, **Uimp**			[kV]	8	8			8			
Rated insulation voltage, **Ui**			[V]	500	800			800			
Test voltage at industrial frequency for 1 min.			[V]	3000	3000			3000			
Rated ultimate short-circuit breaking capacity, **Icu**				B	B	C	N	N	S	H	L
(AC) 50-60 Hz 220/230 V			[kA]	25*	25	40	50	65	85	100	120
(AC) 50-60 Hz 380/400/415 V			[kA]	–	16	25	36	36	50	70	85
(AC) 50-60 Hz 440 V			[kA]	–	10	15	22	30	45	55	75
(AC) 50-60 Hz 500 V			[kA]	–	8	10	15	25	30	36	50
(AC) 50-60 Hz 690 V			[kA]	–	3	4	6	6	7	8	10
(DC) 250 V - 2 poles in series			[kA]	25 (at 125 V)	16	25	36	36	50	70	85
(DC) 250 V - 3 poles in series			[kA]	–	20	30	40	40	55	85	100
(DC) 500 V - 2 poles in series			[kA]	–	–	–	–	–	–	–	–
(DC) 500 V - 3 poles in series			[kA]	–	16	25	36	36	50	70	85
(DC) 750 V - 3 poles in series			[kA]	–	–	–	–	–	–	–	–
Rated service short-circuit breaking capacity, **Ics**											
(AC) 50-60 Hz 220/230 V			[%Icu]	75%	100%	75%	75%	100%	100%	100%	100%
(AC) 50-60 Hz 380/400/415 V			[%Icu]	–	100%	100%	75%	100%	100%	100%	75% (70 kA)
(AC) 50-60 Hz 440 V			[%Icu]	–	100%	75%	50%	100%	100%	100%	75%
(AC) 50-60 Hz 500 V			[%Icu]	–	100%	75%	50%	100%	100%	100%	75%
(AC) 50-60 Hz 690 V			[%Icu]	–	100%	75%	50%	100%	100%	100%	75%
Rated short-circuit making capacity, **Icm**											
(AC) 50-60 Hz 220/230 V			[kA]	52.5	52.5	84	105	143	187	220	264
(AC) 50-60 Hz 380/400/415 V			[kA]	–	32	52.5	75.6	75.6	105	154	187
(AC) 50-60 Hz 440 V			[kA]	–	17	30	46.2	63	94.5	121	165
(AC) 50-60 Hz 500 V			[kA]	–	13.6	17	30	52.5	63	75.6	105
(AC) 50-60 Hz 690 V			[kA]	–	4.3	5.9	9.2	9.2	11.9	13.6	17
Opening time (415 V)			[ms]	7	7	6	5	3	3	3	3
Utilisation category (IEC 60947-2)				A	A			A			
Reference Standard				IEC 60947-2	IEC 60947-2			IEC 60947-2			
Isolation behaviour				■	■			■			
Trip units: thermomagnetic											
T fixed, M fixed		TMF		■	–			–			
T adjustable, M fixed		TMD		–	■			■			
T adjustable, M adjustable (5...10 x In)		TMA		–	–			–			
T adjustable, M fixed (3 x In)		TMG		–	–			■[3]			
T adjustable, M adjustable (2.5...5 x In)		TMG		–	–			–			
magnetic only		MA		–	–			■ (MF up to In 12.5 A)			
electronic		PR221DS		–	–			■			
		PR221GP/PR221MP		–	–			■			
		PR222DS		–	–			–			
		PR223DS		–	–			–			
		PR231/P		–	–			–			
		PR232/P		–	–			–			
		PR331/P		–	–			–			
		PR332/P		–	–			–			
Interchangeability				–	–			–			
Versions				F	F			F-P			
Terminals fixed				FC Cu	FC Cu-EF-FC CuAl-HR			F-FC Cu-FC CuAl-EF-ES-R			
plug-in				–	–			F-FC Cu-FC CuAl-EF-ES-R			
withdrawable				–	–			–			
Fixing on DIN rail				–	DIN EN 50022			DIN EN 50022			
Mechanical life			[No. operations]	25000	25000			25000			
			[No. Hourly operations]	240	240			240			
Electrical life @ 415 V AC			[No. operations]	8000	8000			8000			
			[No. Hourly operations]	120	120			120			
Basic dimensions - fixed version		3 poles	W [mm]	25.4 (1 pole)	76			90			
		4 poles	W [mm]	–	102			120			
			D [mm]	70	70			70			
			H [mm]	130	130			130			
Weight fixed		3/4 poles	[kg]	0.4 (1 pole)	0.9/1.2			1.1/1.5			
plug-in		3/4 poles	[kg]	–	–			1.5/1.9			
withdrawable		3/4 poles	[kg]	–	–			–			

TERMINAL CAPTION
F = Front
EF = Front extended
ES = Front extended spread
FC Cu = Front for copper cables
FC CuAl = Front for copper-aluminium cables
R = Rear orientated
HR = Rear flat horizontal
VR = Rear flat vertical
HR/VR = Rear flat orientated
MC = Multicable
F = fixed circuit-breakers
P = plug-in circuit-breakers
W = withdrawable circuit-breakers
[3] The breaking capacity for settings In = 16 A and In = 20 A is 16 kA

	Tmax T3		Tmax T4					Tmax T5					Tmax T6				Tmax T7			
	250		250/320					400/630					630/800/1000				800/1000/1250/1600			
	3/4		3/4					3/4					3/4				3/4			
	690		690					690					690				690			
	500		750					750					750				–			
	8		8					8					8				8			
	800		1000					1000					1000				1000			
	3000		3500					3500					3500				3500			
	N	S	N	S	H	L	V	N	S	H	L	V	N	S	H	L	S	H	L	V[3]
	50	85	70	85	100	200	200	70	85	100	200	200	70	85	100	200	85	100	200	200
	36	50	36	50	70	120	200	36	50	70	120	200	36	50	70	100	50	70	120	150
	25	40	30	40	65	100	180	30	40	65	100	180	30	45	50	80	50	65	100	130
	20	30	25	30	50	85	150	25	30	50	85	150	25	35	50	65	40	50	85	100
	5	8	20	25	40	70	80	20	25	40	70	80	20	22	25	30	30	42	50	60
	36	50	36	50	70	100	150	36	50	70	100	150	36	50	70	100	–	–	–	–
	40	55	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	25	36	50	70	100	25	36	50	70	100	20	35	50	65	–	–	–	–
	36	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	–	–	16	25	36	50	70	16	25	36	50	70	16	20	36	50	–	–	–	–
	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
	75%	50% (27 kA)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	75%	100%	100%	100%	100%
	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%[1]	100%[2]	100%	100%	100%	75%	100%	100%	75%	100%
	75%	50%	100%	100%	100%	100%	100%	100%	100%	100%[1]	100%[2]	100%[2]	75%	75%	75%	75%	100%	75%	75%	75%
	105	187	154	187	220	440	660	154	187	220	440	660	154	187	220	440	187	220	440	440
	75.6	105	75.6	105	154	264	440	75.6	105	154	264	440	75.6	105	154	220	105	154	264	330
	52.5	84	63	84	143	220	396	63	84	143	220	396	63	94.5	105	176	105	143	220	286
	40	63	52.5	63	105	187	330	52.5	63	105	187	330	52.5	73.5	105	143	84	105	187	220
	7.7	13.6	40	52.5	84	154	176	40	52.5	84	154	176	40	46	52.5	63	63	88.2	105	132
	7	6	5	5	5	5	5	6	6	6	6	6	10	9	8	7	15	10	8	8
	A		A					B (400 A)[3] - A (630 A)					B (630A - 800A)[3] - A (1000A)				B[7]			
	IEC 60947-2		IEC 60947-2					IEC 60947-2					IEC 60947-2				IEC 60947-2			
	■		■					■					■				■			
	–		–					–					–				–			
	■		■ (up to 50 A)					–					–				–			
	–		■ (up to 250 A)					■ (up to 500 A)					■ (up to 800 A)[5]				–			
	■		–					–					–				–			
	–		–					■ (up to 500 A)					–				–			
	■		■					–					–				–			
	–		■					■					■				–			
	–		–					–					–				–			
	–		■					■					■				–			
	–		■					■					■				–			
	–		–					–					–				■			
	–		–					–					–				■			
	–		–					–					–				■			
	–		–					–					–				■			
	–		■					■					■				■			
	F-P		F-P-W					F-P-W					F-W[4]				F-W			
	F-FC Cu-FC Cu Al-EF-ES-R		F-FC Cu-FC CuAl-EF-ES-R-MC					F-FC CuAl-EF-ES-R-RC					F-FC CuAl-EF-ES-R-RC				F-EF-ES-FC CuAl-HR/VR			
	F-FC Cu-FC Cu Al-EF-ES-R		EF-ES-HR-VR-FC Cu-FC CuAl					EF-ES-HR-VR-FC Cu-FC CuAl					–				–			
	–		EF-ES-HR-VR-FC Cu-FC CuAl					EF-ES-HR-VR-FC Cu-FC CuAl					EF-HR-VR				EF-HR/VR-RS-ES			
	DIN EN 50022		–					–					–				–			
	25000		20000					20000					20000				10000			
	240		240					120					120				60			
	8000		8000 (250 A) - 6000 (320 A)					7000 (400 A) - 5000 (630 A)					7000 (630A) - 5000 (800A) - 4000 (1000A)				2000 (S, H, L versions) / 3000 (V version)			
	120		120					60					60				60			
	105		105					140					210				210			
	140		140					186					280				280			
	70		103.5					103.5					103.5				154 (manual) / 178 (motorizable)			
	150		205					205					268				268			
	1.5/2		2.35/3.05					3.25/4.15					9.5/12				9.7/12.5 (manual) - 11/14 (motorizable)			
	2.7/3.7		3.6/4.65					5.15/6.65					–				–			
	–		3.85/4.9					5.4/6.9					12.1/15.1				29.7/39.6 (manual) - 32/42.6 (motorizable)			

[1] 75% for T5 630
[2] 50% for T5 630
[3] Icw = 5 kA
[4] W version is not available on T6 1000 A
[5] Icw = 7.6 kA (630 A) - 10 kA (800 A)
[6] Only for T7 800/1000/1260 A
[7] Icw = 20 kA (S,H,L versions) - 15 kA (V version)
[8] For availability, please ask ABB SACE

Notes: In the plug-in version of T2, T3 and T5 630 and in the withdrawable version of T5 630 the maximum rated current available is derated by 10% at 40 °C.

Circuit-breakers for power distribution

General characteristics

The series of Tmax moulded-case circuit-breakers - complying with the IEC 60947-2 Standard - is divided into seven basic sizes, with an application range from 1 A to 1600 A and breaking capacities from 16 kA to 200 kA (at 380/415 V AC).
For protection of alternating current networks, the following are available:

- T1B 1p circuit-breaker, equipped with TMF thermomagnetic trip units with fixed thermal and magnetic threshold (I_3 = 10 x In);
- T1, T2, T3 and T4 (up to 50 A) circuit-breakers equipped with TMD thermomagnetic trip units with adjustable thermal threshold (I_1 = 0.7...1 x In) and fixed magnetic threshold (I_3 = 10 x In);
- T2, T3 and T5 circuit-breakers, fitted with TMG trip units for long cables and generator protection with adjustable thermal threshold (I_1 = 0.7...1 x In) and fixed magnetic threshold (I_3 = 3 x In) for T2 and T3 and adjustable magnetic threshold (I_3 = 2.5...5 x In) for T5;
- T4, T5 and T6 circuit-breakers with TMA thermomagnetic trip units with adjustable thermal threshold (I_1 = 0.7...1 x In) and adjustable magnetic threshold (I_3 = 5...10 x In);
- T2 with PR221DS electronic trip unit;
- T4, T5 and T6 with PR221DS, PR222DS/P, PR222DS/PD and PR223DS electronic trip units;
- the T7 circuit-breaker, which completes the Tmax family up to 1600 A, fitted with PR231/P, PR232/P, PR331/P and PR332/P electronic trip units. The T7 circuit-breaker is available in the two versions: with manual operating mechanism or motorizable with stored energy operating mechanism[1].

The field of application in alternating current of the Tmax series varies from 1 A to 1600 A with voltages up to 690 V. The Tmax T1, T2, T3, T4, T5 and T6 circuit-breakers equipped with TMF, TMD and TMA thermomagnetic trip units can also be used in direct current plants, with a range of application from 1 A to 800 A and a minimum operating voltage of 24 V DC, according to the appropriate connection diagrams.
The three-pole T2, T3 and T4 circuit-breakers can also be fitted with MF and MA adjustable magnetic only trip units, both for applications in alternating current and in direct current, in particular for motor protection (see page 2/45 and following).
For all the circuit-breakers in the series, fitted with thermomagnetic and electronic trip units, the single-phase trip current is defined (see page 4/57).

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

Interchangeability

The Tmax T4, T5 and T6 circuit-breakers can be equipped either with TMF, TMD, TMG or TMA thermomagnetic trip units, MA magnetic only trip units or PR221DS, PR222DS/P, PR222DS/PD, PR222MP and PR223DS electronic trip units.
Similarly, Tmax T7 can also mount the latest generation PR231/P, PR232/P, PR331/P[1] and PR332/P[1] electronic trip units.

Trip units

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

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

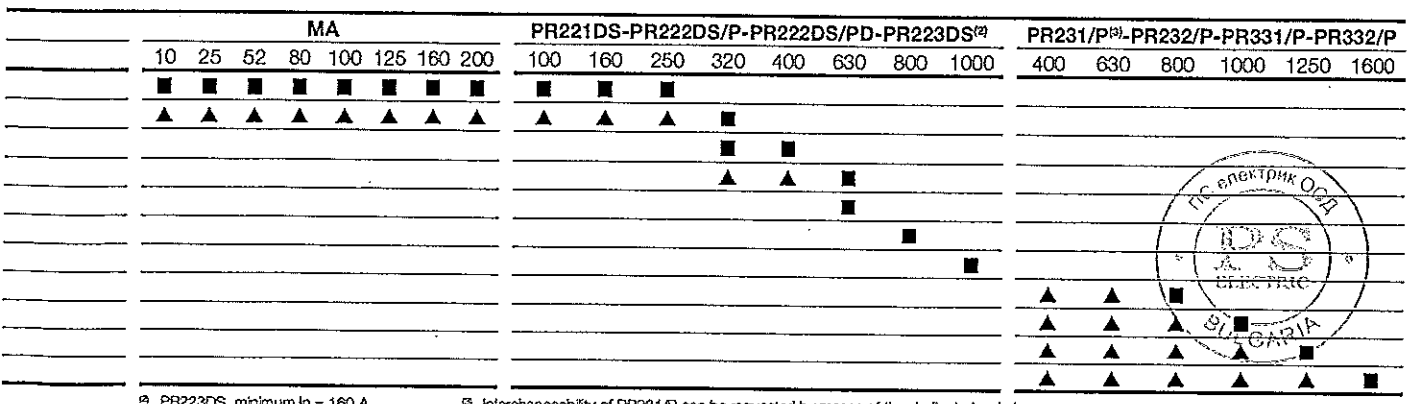
[1] If ordered loose PR331/P and PR332/P must be completed with the "trip unit adapters" (see page 3/42)

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

AC	Trip unit	Range [A]
T1 1p 160	TMF	16...160
T1 160	TMD	16...160
T2 160	TMD	1.6...160
	TMG	16...160
	MF/MA	1...100
	PR221DS	10...160
	PR221GP	63...160
	PR221MP	40...100
T3 250	TMG	63...250
	TMD	63...250
	MA	100...200
T4 250/320	TMD	20...50
	TMA	80...250
	MA	10...200
	PR221DS	100...320
	PR222DS/P-PR222DS/PD	100...320
	PR223DS	160...320
T5 400/630	TMG	320...500
	TMA	320...500
	PR221DS	320...630
	PR222DS/P-PR222DS/PD	320...630
	PR223DS	320...630
T6 630/800/1000	TMA	630...800
	PR221DS	630...1000
	PR222DS/P-PR222DS/PD	630...1000
	PR223DS	630...1000
T7 800/1000/1250/1600	PR231/P-PR232/P	400...1600
	PR331/P-PR332/P	400...1600
DC		
T1 1p 160	TMF	16...160
T1 160	TMD	16...160
T2 160	TMD	1.6...160
	MF/MA	1...100
T3 250	TMD/TMG	63...250
	MA	100...200
T4 250/320	TMD	20...50
	TMA	80...250
	MA	10...200
T5 400/630	TMA/TMG	320...500
T6 630/800/1000	TMA	630...800

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

Thanks to their simplicity of assembly, the end customer can change the type of trip unit extremely rapidly, according to their own requirements and needs: in this case, correct assembly is the customer's responsibility. Above all, this means into increased flexibility of use of the circuit-breakers with considerable savings in terms of costs thanks to better rationalisation of stock management.



[2] PR223DS, minimum In = 160 A.

[3] Interchangeability of PR231/P can be requested by means of the dedicated ordering code 1SDA063140R1.

The Tmax T2, T4, T5, T6 and T7 circuit-breakers, for use in alternating current, can be equipped with overcurrent releases constructed using electronic technology. This allows protection functions to be obtained which guarantee high reliability, tripping precision and insensitivity to temperature and to the electromagnetic components in conformity with the standards on the matter.
The power supply needed for correct operation is supplied directly by the current sensors of the release, and tripping is always guaranteed, even under single-phase load conditions and in correspondence with the minimum setting.

Characteristics of the Tmax electronic trip units

Operating temperature	-25 °C ... +70 °C
Relative humidity	98%
Self-supply	0.2 x In (single phase)
Auxiliary power supply (where applicable)	24 V DC
Operating frequency	45...66 Hz
Electromagnetic compatibility (LF and HF)	IEC 60947-2 Annex F

For Tmax T2, T4, T5 and T6 the protection trip unit consists of:
- 3 or 4 current sensors (current transformers)
- external current sensors (e.g. for the external neutral), when available
- a trip unit
- a trip coil (for T2 housed in the right slot, for T4, T5 and T6 integrated in the electronic trip unit).

For Tmax T7 the protection trip unit consists of:
- 3 or 4 current sensors (Rogowski coils and current transformers)
- external current sensors (e.g. for the external neutral)
- interchangeable rating plug
- a trip unit
- a trip coil housed in the body of the circuit-breaker.

Rating plugs

Circuit-breaker	CS Rated current	In [A]					
		400	630	800	1000	1250	1600
T7	800	■	■	■			
	1000	■	■	■	■		
	1250	■	■	■	■	■	
	1600	■	■	■	■	■	■

The current sensors supply the electronic trip unit with the energy needed for correct operation of the trip unit and the signal needed to detect the current.
The current sensors are available with rated primary current as shown in the table.

Current sensors

	In [A]	10	25	63	100	160	250	320	400	630	800	1000	1250	1600
PR221DS	T2	■	■	■	■	■								
	T4				■	■	■	■						
	T5							■	■	■				
	T6									■	■	■		
PR222DS/P, PR222DS/PD, PR223DS[1]	T4				■	■	■	■						
	T5							■	■	■				
	T6									■	■	■		
PR231/P, PR232/P, PR331/P, PR332/P	T7								■	■	■	■	■	■

[1] For PR223DS, the minimum rated current is In=160 A.

When a protection function trips, the circuit-breaker opens by means of the trip coil, which changes over a contact (AUX-SA, supplied on request, see chapter "Accessories" at page 3/20 and following) to signal trip unit tripped. Signalling reset is of mechanical type and takes place with resetting of the circuit-breaker.

Circuit-breakers for power distribution

Electronic trip units

Basic protection functions

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

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

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

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

Advanced protection functions

The PR332/P trip unit makes it possible to carry out highly developed protection against the most varied types of fault. In fact, it adds the following advanced protection functions to the basic protection functions.

IEC 60255-3

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

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

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

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

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

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

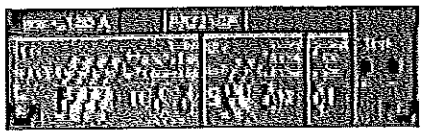
(RP) Protection against reversal of power
The protection against reversal power causes tripping of the breaker, with constant time-delay trip, when the flow of power reverses sign and exceeds, as an absolute value, the set threshold. It is particularly suitable for protection of large machines such as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

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

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

Electronic trip units for power distribution

SACE PR221DS

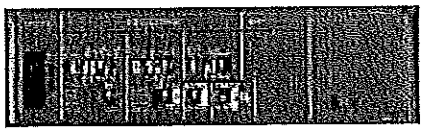


Protection functions	PR221DS	PR221DS	PR221GP
	L S /	I	L S

SACE PR222DS/P

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

SACE PR222DS/PD

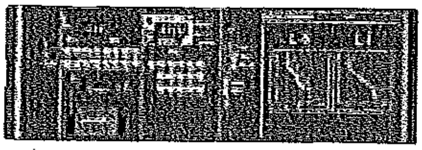


Protection functions	PR222DS/PD	PR222DS/PD
	L S	L S G

SACE PR223DS

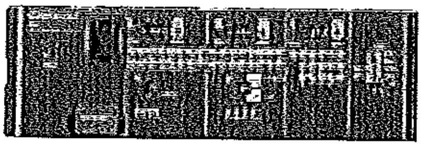
Protection functions	PR223DS
	L S G

SACE PR231/P



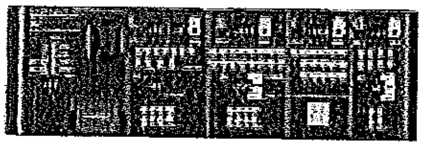
	PR231/P	PR231/P
Protection functions	L S / I	I

SACE PR232/P



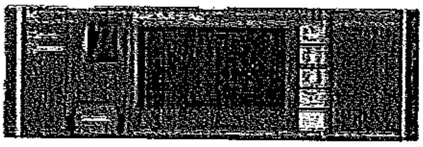
	PR232/P
Protection functions	L S I

SACE PR331/P



	PR331/P
Protection functions	L S I G

SACE PR332/P



	PR332/P	PR332/P	PR332/P	PR332/P
Protection functions	L I	L S I	L S I G(*)	L S I Rc
Advanced protection function(*)	L(*) U OT	L(*) U OT	L(*) U OT	L(*) U OT
Opt.(*)	UV OV RV RP UF OF	UV OV RV RP UF OF	UV OV RV RP UF OF	UV OV RV RP UF OF

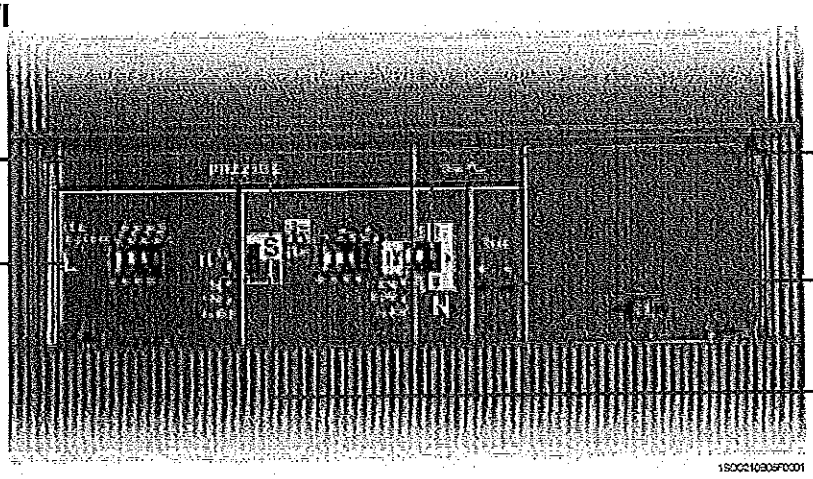
(*) In alternative to Rc (with external toroid).
(*) For all versions.
(*) Available with PR330/V. Measurement module.
(*) According to IEC 60255-3.

ВЯРНО С ОРИГИНАЛА

PR221DS

The PR221DS trip unit, available for T2,T4, T5 and T6, provides protection functions against overload L and short-circuit S/I (version PR221DS-LS/I): with this version, by moving the dedicated dip-switch, you can choose whether to have inverse time-delay S or instantaneous I protection against short-circuit. Alternatively, the version with only the protection function against instantaneous short-circuit I is available (version PR221DS-I, also see page 2/45 and following).
There is a single adjustment for the phases and the neutral. However, for the neutral it can be decided whether to request the protection threshold of the functions at 50 - 100% of that of the phases for Tmax T2 In = 160 A (T2 In<160 A, N = 100%), whereas for T4, T5 and T6 it is possible to select the protection threshold OFF, 50% or 100% directly from the front of the trip unit by means of the specific dip switch.
The trip coil is always supplied with the PR221DS trip unit for Tmax T2 and is housed in the right-hand slot of the circuit-breaker. Dedicated auxiliary contacts are available for T2 with electronic trip unit (see page 3/22).
For Tmax T4, T5 and T6, the opening solenoid is housed internally and therefore, by not using the right-hand slot of the circuit-breaker, all the auxiliary contacts available can be used.

PR221DS-LS/I



PR221DS - Protection functions and parameterisations

Protection functions[1]		Trip threshold	Trip curves	Excludability	Relation t = f(I)
L	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve ($I^2t=k$) according to IEC 60947-2 Standard	I_1 = 0.40 - 1 x In step = 0.04 x In Trip between 1.1...1.30 x I_1 (T4,T5,T6) Trip between 1.05...1.30 x I_1 (T2)	at 6 x I_1 t_1 = 3-6 (only for T2) - 12s (only for T4,T5,T6) Tolerance: ± 10% up to 6 x In (T4,T5,T6) ± 10% up to 2 x In (T2) ± 20% above 6 x In (T4,T5,T6) ± 20% above 2 x In (T2)	–	$t = k/I^2$
S	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time ($I^2t=k$) (selectable as an alternative to protection function I)	I_2 = 1-1.5-2-2.5-3-3.5-4-5-5.5-6.5-7-7.5-8-8.5-9-10 x In[2] Tolerance: ± 10% (T4,T5,T6) ± 10% up to 2 x In (T2) ± 20% above 2 x In (T2)	at 8 x In t_2 = 0.1 - 0.25s Tolerance: ± 10% up to 6 x In (T4,T5,T6) ± 20% above 6 x In (T4,T5,T6) ± 20% (T2)	■	$t = k/I^2$
I	Against short-circuit with instantaneous trip (selectable as an alternative to protection function S)	I_3 = 1-1.5-2-2.5-3-3.5-4-5-5.5-6.5-7-7.5-8-8.5-9-10 x In[2] Tolerance: ± 10% (T4,T5,T6) ± 20% (T2)	instantaneous	■	t = k

[1] These tolerances hold in the following conditions:
– self-powered trip unit at full power (without start-up)
– two or three-phase power supply
In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 20%	± 20%
I	± 20%	≤ 40ms

[2] For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A ⇒ I_3max = 9.5 x In, I_2max = 9.5 x In.
The setting at 10 x In corresponds to 9.5 x In.

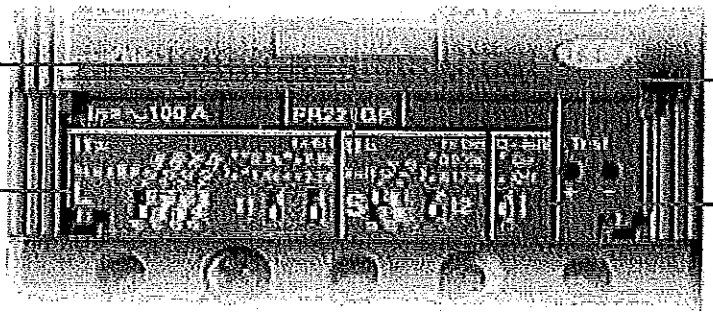
PR221GP

The PR221GP electronic release, only available on Tmax T2, is specific for protection of generators with the following rated currents: In = 63 A, In = 100 A, In = 160 A.
It allows wide adjustment of the protection against overload L, I_1 = 0.4...1 x In and above all provides the possibility of selecting four trip curves.
Generator protection typically requires low trip thresholds with regard to protection against short-circuit. Thanks to the PR221GP protection with time delay adjustable up to 2.5 times the rated current, I_2 = 1...2.5 x In is guaranteed, with the possibility of selecting between two trip curves.
It is also possible to set an instantaneous protection again short-circuit (I) fixed at 4 times the trip threshold of the protection against delayed short-circuit (S).
The S and I protection functions are not alternative to each other.
As for Tmax T2 PR221DS, it is necessary to house the opening solenoid (SA) in the right-hand slot of the circuit-breaker. Tmax T2 PR221GP can be fitted with the same electrical accessories available with PR221DS.
The functions present on this release allow the requirements imposed by the major naval registers, such as LLRRS, ABS and RINA to be satisfied.

PR221GP

Protection S
Against short-circuit with delayed trip

Protection L
Against overload



Socket for TT1 test unit

Protection I
Against short-circuit with instantaneous trip

1SDC210B3SF0001

PR221GP – Protection and parameterisation functions

Protection function[1]		Trip threshold	Trip curves	Excludability	Relation t = f(I)
L	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve (I^2t=constant) according to IEC 60947-2 Standard	I_1 = 0.40 - 1 x In step = 0.04 x In	at 6 x I_1 t_1 = 0.7 - 1.4 - 2.8 - 5.5 s Tolerance: ± 10% up to 2 x In ± 20% over 2 x In	–	–
S	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time (I^2t=constant)	I_2 = 1...2.5 x In step = 0.5 x In Tolerance: ± 10%	at 5 x In t_2 = 0.07 - 0.175 s Tolerance: ± 10% up to 2 x In	–	t = k/I
I	Against short-circuit with instantaneous trip with adjustable threshold	I_3 = 4 x I_2 fixed Tolerance: ± 20%	instantaneous	■	t = k

[1] The tolerances are valid with these hypotheses:
- self-supplied release at full power and/or auxiliary power supply (without start up)
- two-phase or three-phase power supply

For all the cases not foreseen in the above hypotheses, the following tolerance values are valid:

	Trip threshold	Trip time
S	± 20%	± 20%
I	± 20%	≤ 40ms

PR222DS/P

The PR222DS/P trip unit, available for T4, T5 and T6, has protection functions against overload L, delayed S and instantaneous I short-circuit (version PR222DS/P-LSI). Alternatively, as well as the functions L; S, I, it also has protection against earth fault G (version PR222DS/P-LSIG).
Setting of the PR222DS trip unit can be carried out by means of dip switches on the front of the circuit-breaker or electronically, using the PR010/T programming and control unit (see page 3/46) or the BT030 wireless communication unit (see page 3/42).
There is a single setting for the phases and neutral, for which one can decide whether to set the threshold of the protection functions to OFF, to 50% or to 100% that of the phases by means of two dedicated dip switches.
Furthermore, on the front of the PR222DS/P (or PR222DS/PD) trip units, signalling of pre-alarm and alarm of protection L is available. The pre-alarm threshold value, signalled by the red LED fixed, is equal to 0.9 x I1. It is also possible to transmit remotely the alarm of protection L, simply connecting connector X3 to the dedicated contact.

PR222DS/PD

Apart from the protection functions available for the PR222DS/P trip unit (for the settings see page 2/20), the PR222DS/PD trip unit, available for T4, T5 and T6 also has the dialogue unit integrated with Modbus® RTU protocol.
The Modbus® RTU protocol has been known and used worldwide for many years and is now a market standard thanks to its simplicity of installation, configuration and to its integration in the various different supervision, control and automation systems, as well as good level performances.
The PR222DS/PD trip units allow the Tmax T4, T5 and T6 circuit-breakers to be integrated in a communication network based on the Modbus® RTU protocol. Modbus® RTU provides a Master-Slave system architecture where a Master (PLC, PC...) cyclically interrogates several Slaves (field devices). The devices use the EIA RS485 standard as the physical means for data transmission at a maximum transmission speed of 19.2 kbps.
Again for this trip unit, the power supply needed for correct operation of the protection functions is supplied directly by the current transformers of the trip unit, and tripping is always guaranteed, even under conditions of single-phase load down. Nevertheless, communication is only possible with an auxiliary power supply of 24 V DC.

PR222DS/PD - Electrical characteristics

Auxiliary power supply (galvanically insulated)	24 V DC ± 20%
Maximum ripple	± 5%
Inrush current @ 24 V	1 A for 30 ms
Rated current @ 24 V	100 mA
Rated power @ 24 V	2.5 W

The PR222DS/PD release, with integrated communication and control functions, allows a wide range of information to be acquired and transmitted remotely, opening and closing commands to be carried out by means of the electronic version motor operator, the configuration and programming parameters of the unit to be stored, such as the current thresholds of the protection functions and the protection curves.
All the information can be consulted both locally, directly on the front of the circuit-breaker with the front display unit FDU or on the HMI030 switchgear multi-meter, and remotely by means of supervision and control systems.
Moreover, by means of the BT030 external module, to be connected to the test connector of the PR222DS/PD trip unit, wireless communication to a PDA or Notebook is possible through a Bluetooth port.
The PR222DS/PD trip units can be associated with the AUX-E auxiliary contacts in electronic version, to know the state of the circuit-breaker (open/closed), and with MOE-E motor operator (the AUX-E are compulsory when MOE-E is to be used) to remotely control circuit- breaker opening and closing as well.
If the circuit-breaker fitted with the PR222DS/PD trip unit is inserted in a supervision system, during the test phases with the PR010/T unit, communication is automatically abandoned and starts again on completion of this operation.

Circuit-breakers for power distribution

Electronic trip units

Communication functions	PR222DS/P	PR222DS/PD	PR223DS
Protocol		Modbus RTU standard	Modbus RTU standard
Physical medium		EIA RS485	EIA RS485
Speed (maximum)		19.2 kbps	19.2 kbps
Measurement functions			
Phase currents	■ [1]	■	■
Neutral current	■ [1]	■	■
Ground current	■ [1]	■	■
Voltages (phase to phase, phase to earth)			■ [5]
Powers (active, reactive, apparent)			■ [5]
Power factors			■ [5]
Energies			■ [5]
Peak factor			■
Frequency			■ [5]
Signalling functions			
L pre-alarm and alarm LED	■ [5]	■ [5]	■
L alarm output contact [2]	■	■	■
Available data			
Circuit-breaker status (open, closed) [3]		■	■
Mode (local, remote)		■	■
Protection parameters set	■ [1]	■	■
Alarms			
Protections: L, S, I, G	■ [1]	■	■
Failed tripping under fault conditions	■ [1]	■	■
Maintenance			
Total number of operations		■	■
Total number of trips		■	■
Number of trip tests		■	■
Number of manual operations		■	■
Number of trips for each individual protection function		■	■
Record of last trip data	■ [1]	■	■
Commands			
Circuit-breaker opening/closing (with motor operator)		■	■
Alarm reset	■ [1]	■	■
Circuit-breaker reset (with motor operator)		■	■
Setting the curves and protection thresholds	■ [1]	■	■
Safety function			
Automatic opening in the case of failed Trip command fail (with motor operator) [4]		■	■
Events			
Changes in circuit-breaker state, in the protections and all the alarms		■	■

[1] With PR010/T unit or BT030 unit
[2] Typical contact: MOS photo Vmax: 48 V DC/30 V AC
Rmax = 35 ohm
[3] Available with AUX-E electronic auxiliary contacts
[4] The motor operator must be in electronic version (MOE-E) and electronic auxiliary contacts (AUX-E) have to be used
[5] Signals: – Pre-alarm L - permanently lit
– Alarm L - flashing (0.5 s ON / 0.5 s OFF)
– Incongruent manual setting (L > S / S > I) - flashing (1 s ON / 2 s OFF)
– WINK (remote control to identify the relay) - flashing (0.125 s ON / 0.125 s OFF)
[6] With VM210

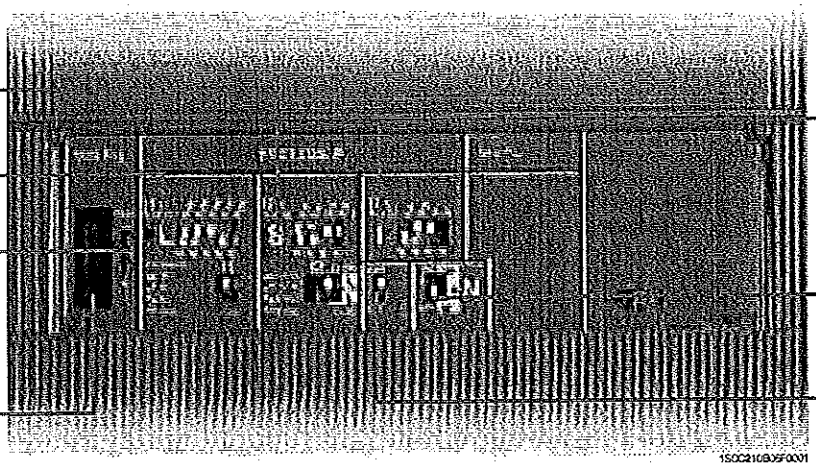
PR222DS/P

Protection S
Against short-circuit with delayed trip

Protection L
Against overload

Socket for TT1 test unit

Socket for connection of PR010/T test unit and BT030 wireless communication unit



Protection I
Against short-circuit with instantaneous trip

Dip-switch for neutral setting

Selection for electronic or manual setting

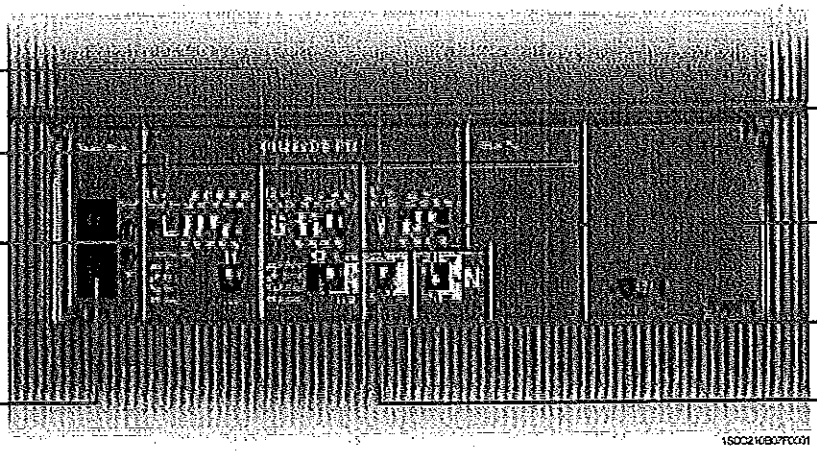
PR222DS/PD

Protection S
Against short-circuit with delayed trip

Protection L
Against overload

Socket for TT1 test unit

Socket for connection of PR010/T test unit and BT030 wireless communication unit



Protection I
Against short-circuit with instantaneous trip

Dip-switch for neutral setting

Enablement of remote operations

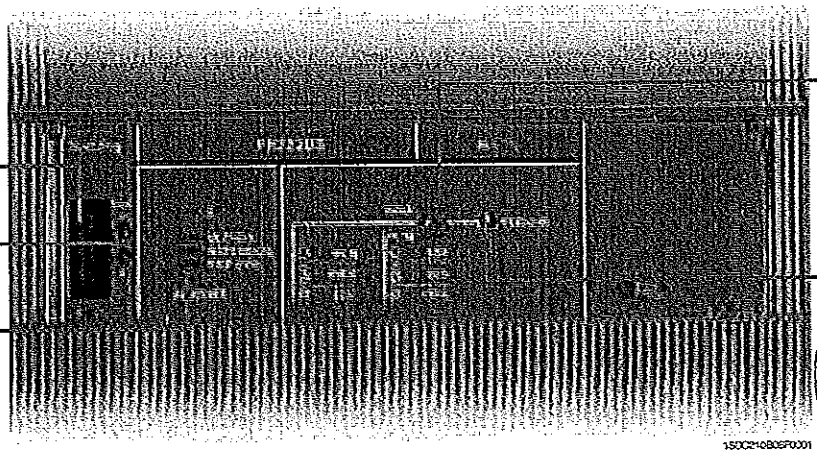
Selection for electronic or manual setting

PR223DS

Socket for connection of PR010/T test unit and BT030 wireless communication unit

Socket for TT1 test unit

LED signalling alarm of the circuit-breaker



LED signalling the status of the circuit-breaker

Push botton for operation mode selection (local/remote) and on-board diagnosis system

PR222DS/P, PR222DS/PD and PR223DS[5] - Protection functions and parameterisations

Protection functions		Trip threshold	Trip curves[1]	Excludability	Relation t = f(I)
L	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve ($I^2t = k$) according to IEC 60947-2 Standard	**Manual setting** I_1 = 0.40....1 x In step = 0.02 x In	**Manual setting** at 6 x I_1 t_1 = 3 - 6 - 9 - 18s[2]	-	$t = k/I^2$
		Electronic setting I_1= 0.40...1 x In step 0.01 x In Trip between 1.1...1.3 x I_1	**Electronic setting** at 6 x I_1 t_1 = 3...18s step 0.5s[2] Tolerance: ± 10%		
S	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time ($I^2t = k$) or definite time	**Manual setting** I_2 = 0.6-1.2-1.8-2.4-3-3.6-4.2-5.8-6-7-7.6-8.2-8.8-9.4-10 x In[3]	**Manual setting** at 8 x In t_2 = 0.05 - 0.1 - 0.25 - 0.5s	■	$t = k/I^2$
		Electronic setting I_2 = 0.60...10 x In step 0.1 x In Tolerance: ± 10%	**Electronic setting** at 8 x In t_2 = 0.05...0.5s step 0.01s Tolerance: ± 10%[4]		
		Manual setting I_2 = 0.6-1.2-1.8-2.4-3-3.6-4.2-5.8-6-7-7.6-8.2-8.8-9.4-10 x In[3]	**Manual setting** t_2 = 0.05 - 0.1 - 0.25 - 0.5s	■	$t = k$
		Electronic setting I_2 = 0.60...10 x In step 0.1 x In Tolerance: ± 10%	**Electronic setting** t_2 =0.05...0.5s step 0.01s Tolerance: ± 10%[4]		
I	Against short-circuit with instantaneous trip	**Manual setting** I_3 = 1.5-2.5-3-4-4.5-5-5.5-6.5-7-7.5-8-9-9.5-10.5-12 x In[3]	Instantaneous	■	$t = k$
		Electronic setting I_3 = 1.5...12 x In[3] step 0.1 x In Tolerance: ± 10%			
G	Against earth fault with inverse short time delay trip and trip characteristic according to an inverse time curve ($I^2t = k$)	**Manual setting** I_4 = 0.2-0.25-0.45-0.55-0.75-0.8-1 x In	**Manual setting** up to 3.15 x I_4 t_4 = 0.1s; up to 2.25 x I_4 t_4 = 0.2s; up to 1.6 x I_4 t_4 = 0.4s; up to 1.10 x I_4 t_4 = 0.80s	■	$t = k/I^2$[6]
		Electronic setting I_4 = 0.2...1 x In step 0.1 x In Tolerance: ± 10%	**Electronic setting** t_4 = 0.1...0.8s step 0.01s Tolerance: ± 15%		

[1] These tolerances hold in the following conditions:
- self-powered trip unit at full power and/or auxiliary supply
- two or three-phase power supply

In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 20%	± 20%
I	± 20%	≤ 50ms
G	± 20%	± 20%

[2] For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A ⇒ t_1 = 10.5s
[3] For T4 In = 320 A and T5 In = 630 A, T6 In = 1000 A ⇒ I_2max = 9.5 x In and I_3max = 9.5 x In
For T6 In = 800 A ⇒ I_3max = 10.5 x In
[4] Tolerance: ± 10 ms
[5] The setting of the PR223DS trip unit is electronic only (local/remote)
The L protection can be set at I_1 = 0.18...1 x In. For I_1 < 0.4 x In the neutral setting must be at 100% of that of the phases
[6] $t = k/I^2$ up to the current value indicated, $t = k$ (equating to the chosen setting) beyond the current value indicated

PR223DS

Apart from the traditional L, S, I, and G protection functions, the PR223DS release, available on T4, T5 and T6, also offers the possibility of measuring the main electrical values. In fact, using the accessory VM210, and without using any voltage transformers, the user has access not only to the current values but also to the voltage, power and energy values, both locally, directly on the front of the circuit-breaker with the front display unit FDU, or on the interface for the front of the switchboard HMI030, and remotely via a supervisor and control system.
Setting the PR223DS release can only be carried out electronically, using the PR010/T test unit (setting in local mode) or the dialogue (setting in remote mode). For the protection function adjustments, see page 2/20.
For the neutral, it is possible to set the protection threshold of the functions to OFF, to 50% and to 100% of that of the phases (for protection L settings below 0.4 x In, it is obligatory to set the neutral to 100%). The pre-alarm and alarm signalling of protection L are also available by means of a dedicated LED on the front of the release. The pre-alarm threshold value is equal to 0.9 x I_1.
Still on the front of the release, the LEDs signalling the following information are available: state of the connection to the opening solenoid, use of the default parameters, mode (local or remote), presence of auxiliary power supply and setting the neutral.

PR223DS - Measurements

Measurements	With distributed N	Without distributed N
Effective current values	I_1, I_2, I_3, I_{ne}	I_1, I_2, I_3
Effective voltage values	V_1, V_2, V_3, V_{12}, V_{23}, V_{31}	V_{12}, V_{23}, V_{31}
Apparent powers	S_{tot}, S_1, S_2, S_3	S_{tot}
Active powers	P_{tot}, P_1, P_2, P_3	P_{tot}
Reactive powers	Q_{tot}, Q_1, Q_2, Q_3	Q_{tot}
Power factors	cos φ	cos φ
Energies	E_{TOT}	E_{TOT}
Phase peak factor	■	■
Frequency	*f*	*f*

The PR223DS trip unit, with integrated ModBus RTU protocol based dialogue unit, allows a wide range of information to be acquired and transmitted remotely and to carry out opening and closing commands.
The PR223DS trip unit can be associated with the AUX-E auxiliary contacts, to know the state of the circuit-breaker (open, closed), and with MOE-E motor operator (the AUX-E are compulsory when MOE-E is to be used) to remotely control circuit-breaker opening and closing as well.
If the PR223DS trip unit is inserted in a supervision system, during the test and configuration with the PR010/T unit, communication is automatically abandoned and starts again on completion of these operations.
The unit is self-supplied by means of current sensors housed in the electronic release. Operation of the electronic release is also guaranteed when there is a single-phase load and in correspondence with the minimum setting. An external power supply must be connected to activate the dialogue function and the measurement functions.

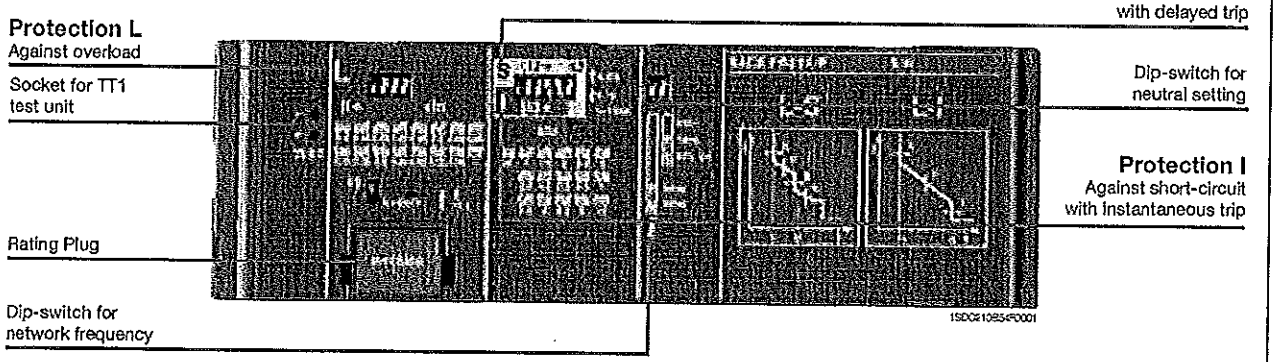
Auxiliary power supply - Electrical characteristics

	PR223DS
Auxiliary power supply (galvanically insulated)	24 V DC ± 20%
Maximum ripple	± 5%
Inrush current @ 24 V	~ 4 A for 0.5 ms
Rated current @ 24 V	~ 80 mA
Rated power @ 24 V	~ 2 W

PR231/P

The PR231/P trip unit is the basic trip unit for Tmax T7. It provides protection functions against overload L and short-circuit S/I (version PR231/P-LS/I): with this version, by moving the dedicated dip-switch, you can choose whether to have protection S or protection I. Alternatively the version with only the protection function against instantaneous short-circuit I is available (version PR231/P-I see also page 2/45 and following).
Setting the trip parameters of the PR231/P trip unit is made directly on the front of the circuit-breaker by means of dip switches, and there is only one for the phases and the neutral, so it is possible to set the protection threshold, at 50% or at 100% of the phase protection.
To guarantee protection of the installation by means of the PR231/P protection trip unit, it is necessary to select the rated network frequency (50/60 Hz), by means of the special dip-switch.
Interchangeability of PR231/P can be requested by means of the dedicated ordering code 1SDA063140R1.

PR231/P



PR231/P - Protection functions and parameterisations

Protection functions		Trip threshold	Trip curves[1]	Excludability	Relation t = f(I)
L	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve (I^2t= k) according to IEC 60947-2 Standard	I_1 = 0.40...1 x In step = 0.04 x In Trip between 1.1...1.3 x I_1	at 6 x I_1 at 6 x I_1 t_1 = 3 - 12s Tolerance: ±10%	-	$t = k/I^2$
S	Against short-circuit with long inverse time delay trip and trip characteristic with inverse time (I^2t= k) (selectable as an alternative to protection function I)	I_2 = 1-1.5-2-2.5-3-3.5-4-5-5.5-6.5-7-7.5-8-8.5-9-10 x In Tolerance: ±10%	at 10 x In at 10 x In t_2 = 0.1 - 0.25s Tolerance: ±10%	■	$t = k/I^2$
I	Against short-circuit with istantaneous trip (selectable as an alternative to protection function S)	I_3 = 1-1.5-2-2.5-3-3.5-4.5-5.5-6.5-7-7.5-8-8.5-9-10 x In Tolerance: ±10%	instantaneous	-	t = k

[1] These tolerances hold in the following conditions:
- self-powered trip unit at full power
- two or three-phase power supply

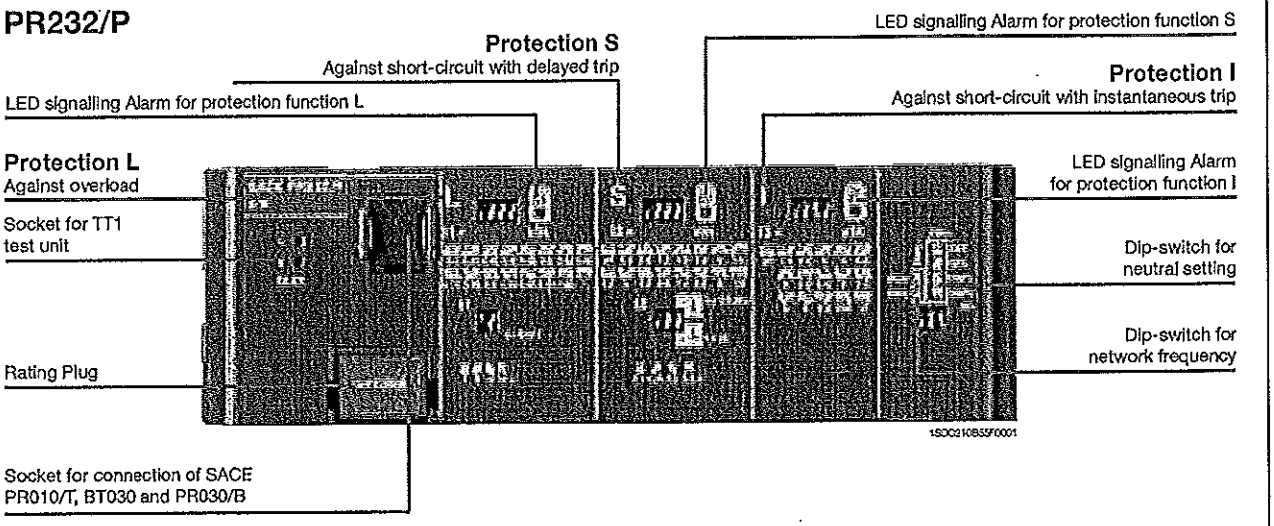
In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 10%	± 20%
I	± 15%	≤ 60ms

PR232/P

The PR232/P release, available for T7, provides protection functions against overload L, delayed short-circuit S and instantaneous short-circuit I (version PR232/P-LSI).
Setting the trip parameters (see table) of the PR232/P release can be carried out by means of the dip-switches, and is unique for the phases and the neutral, for which it is possible to set the protection threshold to OFF, to 50%, 100% or 200% of the threshold of the phases directly from the front of the release by means of a special dip-switch. In particular, adjustment of the neutral to 200% of the phase current requires setting protection L to respect the current-carrying capacity of the circuit-breaker.
To guarantee protection of the installation by means of the PR232/P protection release, it is necessary to select the rated network frequency (50/60 Hz), by means of the special dip-switch.

PR232/P



PR232/P - Protection functions and parameterisations

Protection functions		Trip threshold	Trip curves[1]	Thermal memory[2]	Excludability	Relation t = f(I)
L	Against overload with long inverse time delay trip and trip characteristic according to an inverse time curve (I^2t= k) according to IEC 60947-2 Standard	I_1 = 0.40...1 x In step = 0.04 x In Trip between 1.1...1.3 x I_1	at 6 x I_1 t_1 = 3s t_1 = 6s t_1 = 12s t_1 = 18s Tolerance: ±10%	■	–	$t = k/I^2$
S	Against short-circuit with inverse short time delay trip and trip characteristic with inverse time (I^2t = k) or definite time	I_2 = 0.6 - 0.8 - 1.2 - 1.8 - 2.4 - 3 - 3.6 - 4.2 - 5 - 5.8 - 6.6 - 7.4 - 8.2 - 9 - 10 x In Tolerance: ±10%	at 10 x In t_2=0.1s t_2=0.25s t_2=0.5s t_2=0.8s Tolerance: ±10%	■	■	$t = k/I^2$
		I_2 = 0.6 - 0.8 - 1.2 - 1.8 - 2.4 - 3 - 3.6 - 4.2 - 5 - 5.8 - 6.6 - 7.4 - 8.2 - 9 - 10 x In Tolerance: ±10%	I > I_2 t_2=0.1s t_2=0.25s t_2=0.5s t_2=0.8s Tolerance: ±10%	–	■	t = k
I	Against short-circuit with istantaneous trip	I_3 = 1.5 - 2.5 - 3 - 4 - 4.5 - 5 - 5.5 - 6.5 - 7 - 7.5 - 8 - 9 - 9.5 - 10.5 - 12 x In Tolerance: ±10%	instantaneous	–	■	t = k

[1] These tolerances hold in the following conditions:
– self-powered trip unit at full power (without start-up)
– two or three-phase power supply
In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
S	± 10%	± 20%
I	± 15%	≤ 60ms

[2] Active up to 7 min. after tripping of the breaker (ON/OFF setting by means of PR010/T test unit).

There are three red LEDs available on the front of the PR232/P trip unit dedicated to signalling alarm of protections L, S, and I. Furthermore, a yellow flashing LED allows the state of pre-alarm of function L to be signalled, which is activated when 90% of the set trip threshold is reached.
The yellow flashing LED every 3s indicates the normal operation.

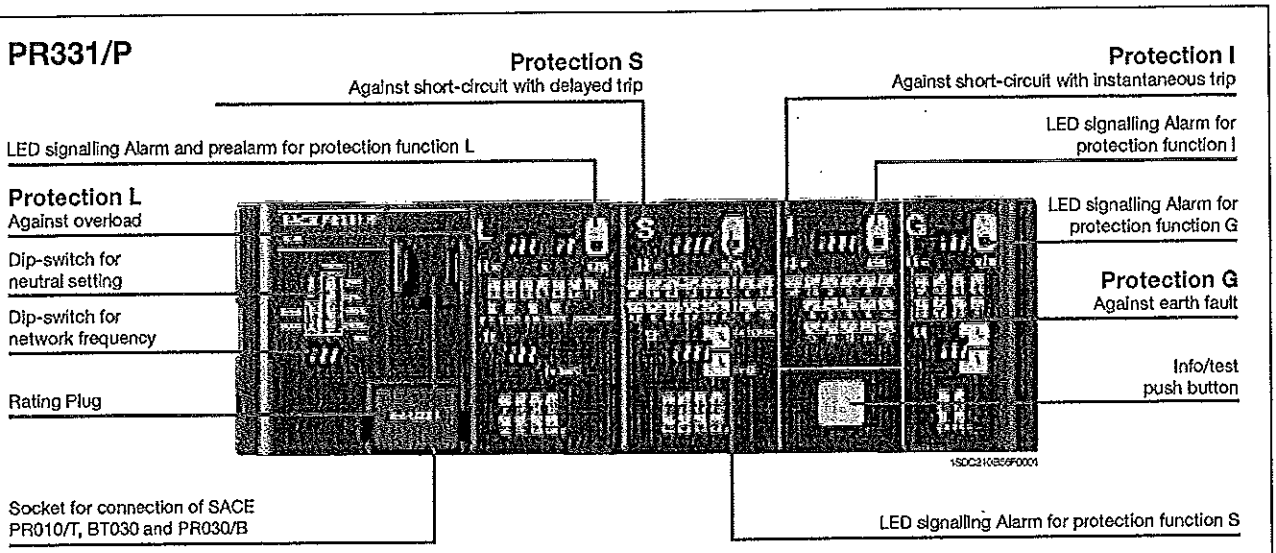
PR232/P - Alarm and Pre-alarm LED

Protection	Colour	Pre-alarm	Alarm	Last trip
	Yellow	■	–	–
	Red	–	■	■
	Red	–	■	■
	Red	–	■	■

Following circuit-breaker opening, it is possible to know which protection function made the release trip by connecting the PR030/B battery unit onto the front of the release. This is also possible thanks to the PR010/T test and configuration unit.
By means of the BT030 wireless communication unit the PR232/P can be connected to a PDA or to a personal computer, extending the range of information available for the user. Infact, by means of the ABB SACE's SD-Pocket communication software, it is possible to read the values of the currents flowing through the circuit-breaker, the value of the last 20 interrupted currents, and the protection settings.

PR331/P

The PR331/P, available for Tmax T7 in the PR331/P-LSIG version, with its complete range of protection functions together with the wide combination of thresholds and trip times offered is it suitable for protecting a wide range of alternating current installations. In addition to protection functions the unit is provided with multifunction LED indicators. Furthermore, PR331/P allows connection to external devices enhancing its advanced characteristics like remote signalling and monitoring, or interface from front of HMI030 panel.



PR331/P - Protection functions and parameterisations

Protection functions		Trip threshold	Trip curves[1]	Excludability	Relation t = f(I)
L	Against overload with long inverse time-delay trip and trip characteristic according to an inverse time curva (I^2t=k) according to the IEC 60947-2 Standard	I_1 = 0.40....1 x In step = 0.025 x In Trip between 1.05 ... 1.2 x I_1	at 3 x I_1 t_1 = 3 - 12 - 24 - 36 - 48 - 72 - 108 - 144s Tolerance: ±10% up to 6 x In ±20% above 6 x In	--	$t = k/I^2$
S	Against short-circuit with short inverse time-delay trip and trip characteristic with inverse time (I^2t=k) or with definite time	I_2 = 0.6 - 0.8 - 1.2 - 1.8 - 2.4 - 3 - 3.6 - 4.2 - 5 - 5.8 - 6.6 - 7.4 - 8.2 - 9 - 10 x In Tolerance: ±7% up to 6 x In ±10% above 6 x In	at 10 x In t_2 = 0.1....0.8s step = 0.1s Tolerance: min (±10%, ±40ms)	■	$t = k/I^2$
		I_2 = 0.6 - 0.8 - 1.2 - 1.8 - 2.4 - 3 - 3.6 - 4.2 - 5 - 5.8 - 6.6 - 7.4 - 8.2 - 9 - 10 x In Tolerance: ±7% up to 6 x In ±10% above 6 x In	I > I_2 t_2 = 0.1....0.8s step = 0.1s Tolerance: ±15% up to 6 x In ±20% above 6 x In	■	t = k
I	Against short-circuit with adjustable instantaneous trip	I_3 = 1.5-2-3-4-5-6-7-8-9-10-11-12-13-14-15 x In[2] Tolerance: ±10%	≤ 30 ms	■	t = k
G	Against earth fault with short inverse time-delay trip and trip characteristic according to an inverse time curve (I^2t=k) or with definite time	I_4 = 0.2-0.3-0.4-0.6-0.8-0.9-1 x In Tolerance: ±7%	4.47 x I_4 3.16 x I_4 2.24 x I_4 1.58 x I_4 t_4 = 0.1s t_4 = 0.2s t_4 = 0.4s t_4 = 0.80s Tolerance: ±15%	■	$t = k/I^2$[3]
		I_4 = 0.2-0.3-0.4-0.6-0.8-0.9-1 x In Tolerance: ±7%	t_4 = 0.1s t_4 = 0.2s t_4 = 0.4s t_4 = 0.80s Tolerance: min (±10%, ±40ms)	■	t = k

[1] These tolerances hold in the following conditions:
- self-powered trip unit at full power and/or auxiliary supply
- two or three-phase power supply

In conditions other than those considered, the following tollerances hold:

	Trip threshold	Trip time
L	Release between 1.05 and 1.25 x I_1	± 20%
S	± 10%	± 20%
I	± 15%	≤ 60ms
G	± 15%	± 20%

[2] For T7 In = 1250 A/1600 A ⇒ Imax = 12 x In

[3] $t = k/I^2$ up to the current value indicated, t = k equating to the chosen setting beyond the current value indicated

User interface

The user communicates directly with the trip unit by means of the dip switches. Up to four LEDs (according to the version) are also available for signalling. These LEDs (one for each protection) are active when:

- a protection is timing. For protection L the pre-alarm status is also shown;
- a protection has tripped (the corresponding LED is activated by pressing the "Info/Test" pushbutton);
- a failure in connection of a current sensor or in the trip coil is detected. The indication is active when the unit is powered (through current sensors or an auxiliary power supply);
- wrong rating plug for the circuit-breaker.

The protection tripped indication works even with the circuit-breaker open, without the need for any internal or external auxiliary power supply. This information is available for 48 hours of inactivity after the trip and is still available after reclosing. If the query is made more than 48 hours later it is sufficient to connect a PR030/B battery unit, PR010/T, or a BT030 wireless communication unit.

Setting the neutral

Protection of the neutral can be set at 50%, 100% or 200% of the phase currents. In particular, adjustment of the neutral at 200% of the phase current is possible if the following inequality is respected: $I_1 \times In \times \%Ne \leq Iu$. The user can also switch the neutral protection OFF.

Test function

The Test function is carried out by means of the Info/Test pushbutton and the PR030/B battery unit (or BT030) fitted with a polarized connector housed on the bottom of the box, which allows the device to be connected to the test connector on the front of PR331/P trip units. The PR331/P electronic trip unit can be tested by using the SACE PR010/T test and configuration unit by connecting it to the TEST connector.

Power supply

The unit does not require an external power supply either for protection functions or for alarm signalling functions. It is self-supplied by means of the current sensors installed on the circuit-breaker. For operation, it is required for the three phases to be passed through by a current of 70 A. An external power supply can be connected in order to activate additional features, and in particular for connection to external devices: HMI030 and PR021/K.

PR331/P - Electrical characteristics

Auxiliary power supply (galvanically insulated)	24 V DC ± 20%
Maximum ripple	5%
Inrush current @ 24 V	3 A for 5 ms
Rated power @ 24 V	1 W

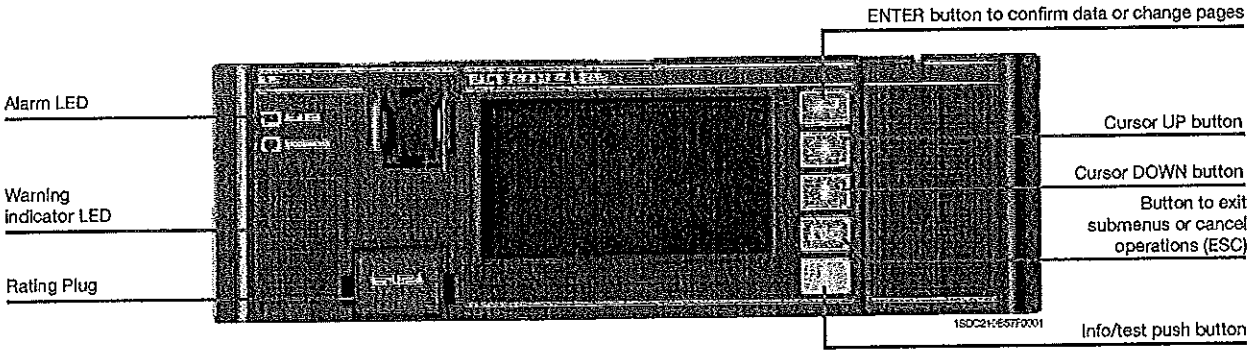
Communication

By means of the BT030 wireless communication unit, PR331/P can be connected to a PDA or to a personal computer, extending the range of information available for the user. In fact, by means of ABB SACE's SD-Pocket communication software, it is possible to read the values of the currents flowing through the circuit-breaker, the value of the last 20 interrupted currents, and the protection settings.
PR331/P can also be connected to the optional external PR021/K signalling unit, for the remote signalling of protections alarms and trips, and to HMI030, for the remote user interfacing.

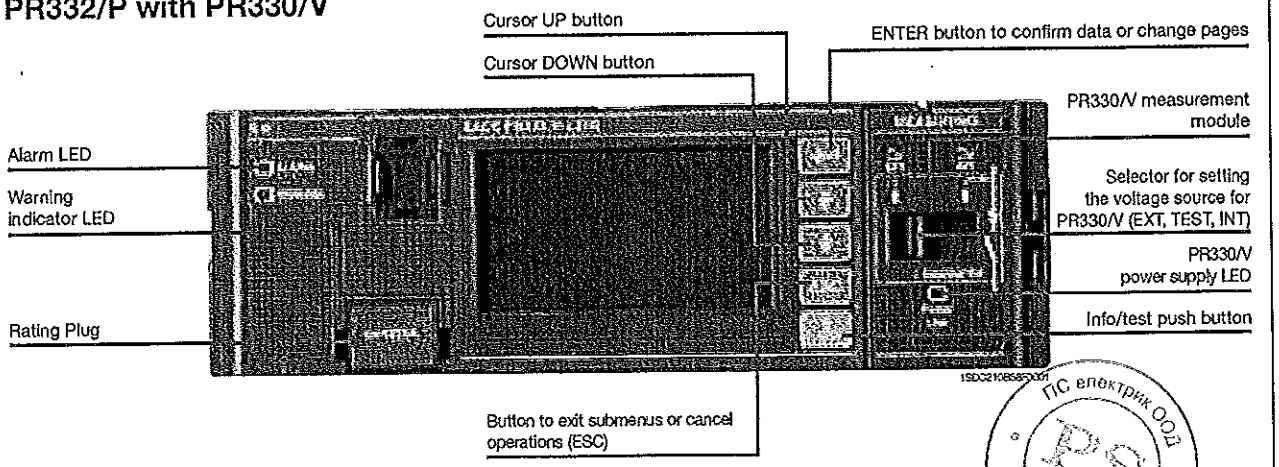
PR332/P

The SACE PR332/P trip unit for Tmax T7 (available in four versions: PR332/P-LI, PR332/P-LSI, PR332/P-LSIG and PR332/P-LSIRc) is a sophisticated and flexible protection system based on a state-of-the art microprocessor and DSP technology. Fitted with the optional internal PR330/D-M dialogue unit, PR332/P turns into an intelligent protection, measurement and communication device, based on the Modbus® RTU protocol. By means of the PR330/D-M, PR332/P can also be connected to the ABB EP010 Fieldbus plug adapter, which makes it possible to choose among several different networks, such as Profibus and DeviceNet.
The new PR332/P is the result of ABB SACE's experience in designing protection trip units. The exhaustive range of settings makes this protection unit ideal for general use in power distribution. Access to information and programming using a keyboard and graphic liquid crystal display is extremely simple and intuitive. An integrated ammeter and many other additional features are provided over and above the protection functions. These additional functions can be further increased with addition on board of the dialogue, signalling, measurement, and wireless communication units. All the thresholds and trip curve delays of the protection functions are stored in special memories which retain the information even when no power is supplied.

PR332/P



PR332/P with PR330/V



PR332/P - Protection functions and parameterisations

Protection functions		Trip threshold	Trip curves[1]	Excludability	Relation t = f(I)	Thermal memory[2]	Zone selectivity[2]
L	Against overload with inverse long-time delay trip according to IEC 60947-2 Standard ($I^2t=k$) or in accordance with the IEC 60255-3 Standard ($t=f(\alpha)^{[3]}$)	I_1 = 0.4...1 x In step = 0.01 x In Trip between 1.05...1.2 x I_1	at 3 x I_1 t_2 = 3...144s step = 3s Tolerance: ±10% up to 6 x In ±20% above 6 x In	–	$t = k/I^2$	■	–
		I_1 = 0.4...1 x In step = 0.01 x In Trip between 1.05...1.2 x I_1	at 3 x I_1 t_2 = 3...144s step = 3s Tolerance: ±10% up to 6 x In ±20% above 6 x In	■	$t = f(\alpha)^{[3]}$ α = 0.02-1-2	■	–
S	Against short-circuit with short inverse time-delay trip and trip characteristic with inverse time ($I^2t=k$) or with definite time	I_2 = 0.6...10 x In step = 0.1 x In Tolerance: ±7% up to 6 x In ±10% above 6 x In	at 10 x In t_2 = 0.05...0.8s step = 0.01s Tolerance: ±15% up to 6 x In ±20% over 6 x In	■	$t = k/I^2$	■	–
		I_2 = 0.6...10 x In step = 0.1 x In Tolerance: ±7% up to 6 x In ±10% above 6 x In	t_2 = 0.05...0.8s step = 0.01s t_2 sel = 0.04...0.2s step = 0.01s Tolerance: min (±10%; ±40ms)	■	t = k	–	■
I	Against short-circuit with adjustable instantaneous trip	I_3 = 1.5...15 x In step = 0.1 x In Tolerance: ±10%	≤ 30 ms	■	t = k	–	–
G	Against earth fault with short inverse time-delay trip and trip characteristic according to an inverse time curve ($I^2t=k$) or with definite time	I_4 = 0.2...1 x In step = 0.02 x In Tolerance: ±7%	t_4 = 0.1...1s step = 0.05s Tolerance: ±15%	■	$t = k/I^{2[4]}$	–	–
		I_4 = 0.2...1 x In step = 0.02 x In Tolerance: ±7%	t_4 = 0.1...1s step = 0.05s t_4 sel = 0.04...0.2s step = 0.05s Tolerance: min (±10%; ±40ms)	■	t = k	–	■
Rc	Against residual current fault with definite time-delay trip	IΔ = 3-5-7-10-20-30 A Tolerance: 0-20%	tΔ = 0.06-0.1-0.2-0.3-0.4-0.5-0.8s Tolerance: ±20%	■	t = k	–	–
OT	Against overtemperature of the trip unit with instantaneous trip	Trip unit temperature over 85 °C	instantaneous	–	temp = k	–	–
U	Against unbalanced phase with definite time-delay trip	I_6 = 2%...90% x I_1 step = 1% x I_1 Tolerance: ±10%	t_6 = 0.5...60 s step = 0.5s Tolerance: min (±20%; ±100ms)	■	t = k	–	–

PR332/P with PR330/V - Advanced protection functions and parameterisations

Advanced protection functions		Trip threshold	Trip curves[1]	Excludability	Relation t = f(I)	Thermal memory[2]	Zone selectivity
UV	Against undervoltage with adjustable constant time	U_8 = 0.5...0.95 x Un step = 0.01 x Un Tolerance: ±5%	t_8 = 0.1...5s step = 0.1s Tolerance: min (±20% ±100ms)	■	t = k	–	–
OV	Against overvoltage with adjustable constant time	U_9 = 1.05...1.2 x Un step = 0.01 x Un Tolerance: ±5%	t_9 = 0.1...5s step = 0.1s Tolerance: min (±20% ±100ms)	■	t = k	–	–
RV	Against residual voltage with adjustable constant time	U_{10} = 0.1...0.4 x Un step = 0.01 x Un Tolerance: ±5%	t_{10} = 0.5...30s step = 0.5s Tolerance: min (±10% ±100ms)	■	t = k	–	–
RP	Against reversal of power with adjustable constant time	P_{11} = -0.3...-0.1 x Pn step = 0.02xPn Tolerance: ±10%	t_{11} = 0.5...25s step = 0.1s Tolerance: min (±10% ±100ms)	■	t = k	–	–
UF	Against underfrequency with adjustable constant time	f_{12} = 0.90...0.99 x fn step = 0.01 x fn Tolerance:±5%	t_{12} = 0.5...3s step = 0.1s Tolerance: min (±10% ±100ms)	■	t = k	–	–
OF	Against overfrequency with adjustable constant time	f_{13} = 1.01...1.10 x fn step = 0.01 x fn Tolerance:±5%	t_{13} = 0.5...3s step = 0.1s Tolerance: min (±10% ±100ms)	■	t = k	–	–

[1] These tolerances are valid under the following conditions:
- trip unit self-supplied at full power and/or auxiliary supply
- two or three-phase power supply

In conditions other than those considered, the following tolerances hold:

	Trip threshold	Trip time
L	Release between 1.05 and 1.25 x I_1	± 20%
S	± 10%	± 20%
I	± 15%	≤ 60ms
G	± 15%	± 20%
Other	± 10%	± 20%

[2] Active with 24V auxiliary power supply

[3] $t = \frac{(3^{\alpha} - 1)}{\left(\frac{I}{I_1}\right)^{\alpha} - 1} t_2 \ (3 \times I_1)$

[4] For T7 In = 1250 A/1600 A ⇒ Imax = 12 x In

[5] $k = (2s) \cdot (I_1)^2$

Setting the neutral

In PR332/P, the neutral protection is 50% of the value set for phase protection in the standard version. The neutral protection can be excluded or set to 100%.
In installations where very high harmonics occur, the resulting current at the neutral can be higher than that of the phases. Therefore it is possible to set the neutral protection at 150% or 200% of the value set for the phases. In this case it is necessary to reduce the setting of protection L accordingly. The table below lists the neutral settings for the various possible combinations between type of circuit-breaker and the threshold I_1 setting.

Adjustable neutral protection settings

Threshold I_1 settings (overload protection)

Circuit-breaker model	$0.4 < I_1 < 0.5$	$0.5 < I_1 < 0.66$	$0.66 < I_1 < 1$ [1]
T7	0-50-100-150-200%	0-50-100-150%	0-50-100%

[1] The setting I_1 =1 indicates the maximum overload protection setting. The actual maximum setting allowable must take into account any derating based on temperature, the terminals used and the altitude (see the "Installations" chapter)

Start-up function

The start-up function allows protections S, I and G to operate with higher trip thresholds during the start-up phase. This avoids untimely tripping caused by the high inrush currents of certain loads (motors, transformers, lamps).
The start-up phase lasts from 100 ms to 30 s, in steps of 0.01 s. It is automatically recognized by the PR332/P trip unit when the peak value of the maximum current exceeds the threshold that can be set by the user. A new start-up becomes possible after the current has fallen down to 0.1 x In, if the trip unit is supplied from an external source.

Protection against overtemperature

The user has the following signals or commands available for the protection against overtemperature:
- lighting up of the "Warning" LED when the temperature is higher than 70 °C or lower than -20 °C (temperature at which the microprocessor is still able to operate correctly);
- lighting up of the "Alarm" LED when the temperature is higher than 85 °C or lower than -25 °C (temperature above which the microprocessor can no longer guarantee correct operation) and, when decided during the unit configuration stage, simultaneous opening of the circuit-breaker with indication of the trip directly on the display, as for the other protections.

Self-diagnosis

The PR332/P range of trip units contains an electronic circuit which periodically checks the continuity of internal connections (trip coil and each current sensor, including the Source Ground Return when present).
In the case of a malfunction an alarm message appears directly on the display. The Alarm is highlighted by the Alarm LED as well.

Residual Current

Different solutions are available for integrated residual current protection. The basic choice is PR332/P-LSIRc, which has all the characteristics of PR332/P-LSI and residual current protection as well. When additional features are required, the solution is PR332/P-LSIG with an additional PR330/V module (see next paragraph). Using this configuration, residual current protection is added to a powerful unit, having the features of PR332/P-LSI and all the add-ons described for the PR330/V module, such as voltage protection and advanced measurement functions.
Residual current protection acts by measuring the current by means the external dedicated toroid.

Test Functions

Once enabled from the menu, the "Info/Test" pushbutton on the front of the trip unit allows correct operation of the chain consisting of the microprocessor, trip coil and circuit-breaker tripping mechanism to be checked.
The control menu also includes the option of testing correct operation of the display, signalling LEDs.
By means of the front multi-pin connector it is possible to apply a SACE PR010/T Test unit which allows the functions of the PR222DS/P, PR222DS/PD, PR223DS, PR223EF, PR232/P, PR331/P and PR332/P ranges of trip units to be tested and checked.

User interface

The human-machine interface (HMI) of the device is made up of a wide graphic display, LEDs, and browsing pushbuttons. The interface is designed to provide maximum simplicity.
The language can be selected from among five available options: Italian, English, German, French and Spanish.
As in the previous generation of trip units, a password system is used to manage the "Read" or "Edit" modes. The default password, 0001, can be modified by the user.
The protection parameters (curves and trip thresholds) can be set directly via the HMI of the device. The parameters can only be changed when the trip unit is operating in "Edit" mode, but the information available and the parameter settings can be checked at any time in "Read" mode.
When a communication device (internal PR330/D-M module or external BT030 device) is connected, it is possible to set parameters simply by downloading them into the unit (over the network for PR330/D-M, by using the SD-Pocket software and a PDA or a notebook for BT030). Parameterisation can then be carried out quickly and automatically in an error-free way by transferring data directly from DocWIn.

Indicator LEDs

LEDs on the front panel of the trip unit are used to indicate all the pre-alarms ("WARNING") and alarms ("ALARM"). A message on the display always explicitly indicates the type of event concerned.
Example of events indicated by the "WARNING" LED:
- unbalance between phases;
- pre-alarm for overload (L1>90% x I_1);
- first temperature threshold exceeded (70 °C);
- contact wear beyond 80%;
- phase rotation reversed (with optional PR330/V).

Example of events indicated by the "ALARM" LED:
- timing of function L;
- timing of function S;
- timing of function G;
- second temperature threshold exceeded (85 °C);
- contact wear 100%;
- timing of Reverse Power flow protection (with optional PR330/V).

Data logger

By default PR332/P, is provided with the Data Logger function that automatically records in a wide memory buffer the instantaneous values of all the currents and voltages. Data can be easily downloaded from the unit by means of SD-Pocket or SD-TestBus2 applications and can be transferred to any personal computer for elaboration. The function freezes the recording whenever a trip occurs or in case of other events, so that a detailed analysis of faults can be easily performed. SD-Pocket and SD-TestBus2 allow also reading and downloading of all the others trip information.
- Number of analog channels: 8
- Maximum sampling rate: 4800 Hz
- Maximum sampling time: 27 s (@ sampling rate 600 Hz)
- 64 events tracking.

Trip information and opening data

In case a trip occurs PR332/P store all the needed information:

- Protection tripped
- Opening data (current)
- Time stamp (guaranteed with auxiliary supply or self-supply with power failure no longer than 48h).

By pushing the "Info/Test" pushbutton the trip unit shows all these data directly on display.
No auxiliary power supply is needed. The information is available to user for 48 hours with the circuit breaker open or without current flowing.
The information of the latest 20 trips are stored in memory.
If the information can be furthermore retrieved more than 48 hours later, it is sufficient to connect a PR030/B battery unit or a BT030 wireless communication unit.

Load control

Load control makes it possible to engage/disengage individual loads on the load side before the overload protection L is tripped, thereby avoiding unnecessary trips of the circuit-breaker on the supply side. This is done by means of contactors or switch-disconnectors (externally wired to the trip unit), controlled by the PR332/P through PR021/K unit.
Two different Load Control schemes can be implemented:

- disconnection of two separate loads, with different current thresholds
- connection and disconnection of a load, with hysteresis.

Current thresholds and trip times are smaller than those available for selection with protection L, so that load control can be used to prevent overload tripping. External PR021/K accessory unit is required for Load Control. The function is only active when an auxiliary power supply is available.

PR330/V Measurement Module

This optional internal module, installed in PR332/P, allows the trip unit to measure the phase and neutral voltages and to process them in order to achieve a series of features, in terms of protection and measurement.
PR330/V module, when is ordered mounted on the circuit-breaker, does not require any external connection or voltage transformers since it is connected internally to the upper terminals of Tmax T7 (selector in "INT" position) through the internal voltage sockets. When necessary, the connection of voltage pick-ups can be moved to any other point (i.e. lower terminals), by using the alternative connection located in the terminal box and switching the selector to the "EXT" position. For the dielectric test of the circuit-breaker the selector must be switched to the "Insulating TEST" position.
PR330/V is able to energize the PR332/P while line voltage input is above 85 V. The use of Voltage Transformers is mandatory for rated voltages higher than 690 V.
Voltage transformers shall have burdens between 5 VA and 10 VA and accuracy class 0.5 or better.
Additional Protections with PR330/V:

- Undervoltage (UV) protection
- Overvoltage (OV) protection
- Residual voltage (RV) protection
- Reversal of power (RP) protection
- Underfrequency (UF) protection
- Overfrequency (OF) protection.

All the above indicated protections can be excluded, although it is possible to leave only the alarm active when required: in this case the trip unit will indicate the "ALARM" status. With the circuit-breaker closed, these protections also operate when the trip unit is self-supplied. With the circuit-breaker open, they operate when the auxiliary power supply (24 V DC or PR330/V) is present.

Measurement function

The current measurement function (ammeter) is present on all versions of the PR332/P trip unit. The display shows histograms showing the currents of the three phases and neutral on the main page. Furthermore, the most loaded phase current is indicated in numerical format. Earth fault current, where applicable, is shown on a dedicated page.
The latter current value takes on two different meanings depending on whether the external toroidal transformer for the "Source Ground Return" function or the internal transformer (residual type) is connected.

The ammeter can operate either with self-supply or with an auxiliary power supply voltage. The display is rear-lit and the ammeter is active even at current levels lower than 160 A.
Accuracy of the ammeter measurement chain (current sensor plus ammeter) is no more than 1.5% in the 0.3-6 x In current interval of In.
- Currents: three phases (L1, L2, L3), neutral (Ne) and earth fault;
- Instantaneous values of currents during a period of time (data logger);
- Maintenance: number of operations, percentage of contact wear, opening data storage (last 20 trips and 20 events).

When the optional PR330/V is connected the following additional measurement function are present:
- Voltage: phase-phase, phase-neutral and residual voltage
- Instantaneous values of voltages during a period of time (data logger)
- Power: active, reactive and apparent
- Power factor
- Frequency and peak factor
- Energy: active, reactive, apparent, counter.

Communication

PR332/P electronic trip unit can be fitted with communication modules, which make possible to exchange data and information with other industrial electronic devices by means of a network.
The basic communication protocol implemented is Modbus RTU, a well-known standard of widespread use in industrial automation and power distribution equipment. A Modbus RTU communication interface can be connected immediately and exchange data with the wide range of industrial devices featuring the same protocol. ABB SACE has developed a complete series of accessories for electronic trip unit PR332/P:

- PR330/D-M is the communication module for PR332/P protection trip units. It is designed to allow easy integration of the Tmax circuit-breakers in a Modbus network. The Modbus RTU protocol is of widespread use in the power as well as the automation industry. It is based on a master/slave architecture, with a bandrate of up to 19.2 kbps. A standard Modbus network is easily wired up and configured by means of an RS485 physical layer. ABB SACE trip units work as slaves in the field bus network. All information required for simple integration of PR330/D-M in an industrial communication system are available on the ABB Web page.
- BT030 is a device to be connected to the Test connector of PR222DS/P, PR222DS/PD, PR223DS, PR223EF, PR232/P, PR331/P and PR332/P trip units. It allows Bluetooth communication between the trip unit and a PDA or a Notebook with a Bluetooth port. This device is dedicated to use with the SD-Pocket or SD-TestBus2 application. It can provide the auxiliary supply needed to energize the protection trip unit by means of rechargeable batteries.
- EP010-FBP-PDP22 is the Fieldbus Plug interface allows connection of ABB SACE trip units with Modbus communication to a Profibus, DeviceNet, or AS-I field bus network.

Furthermore, a new generation of software dedicated to installation, configuration, supervision and control of protection trip units and circuit- breakers is now available:
- SD-View 2000
- SD-Pocket
- SD-TestBus2.

All information required for simple integration of PR330/D-M in an industrial communication system are available on the ABB Web page (http://www.abb.com).

Measurement, signalling and available data functions

Details about functions available on PR332/P, trip units with PR330/D-M and EP010 – FBP – PDP22 are listed in the table below:

Communication functions	**PR332/P +PR330/D-M**	**PR332/P+PR330/D-M and EP010**
Protocol	Modbus RTU standard	FBP-PDP22
Physical means	RS485	Profibus-DP or DeviceNet cable
Speed (maximum)	19.2 kbps	115 kbps
Measurement functions		
Phase currents	■	■
Neutral current	■	■
Ground current	■	■
Voltage (phase-phase, phase-neutral, residual)	opt.[1]	opt.[1] [2]
Power (active, reactive, apparent)	opt.[1]	opt.[1] [3]
Power factor	opt.[1]	[4]
Frequency and peak factor	opt.[1]	[4]
Energy (active, reactive, apparent)	opt.[1]	[4]
Harmonic analysis	–	–
Signalling functions		
LED: auxiliary power supply, pre-alarm, alarm, transmission, reception	■	■
Temperature	■	■
Indication for L, S, I, G and other protection	■	■
Available data		
Circuit-breaker status (open, closed)	■	■
Circuit-breaker position (racked-in, racked-out)	■	■
Mode (local, remote)	■	■
Protection parameters set	■	■
Load control parameters	■	■
Alarms		
Protections: L, S, I, G	■	■
Undervoltage, overvoltage and residual voltage protection (timing and trip)	opt.[1]	opt.[1]
Reverse power protection (timing and trip)	opt.[1]	opt.[1]
Directional protection (timing and trip)	–	–
Underfrequency/overfrequency protection (timing and trip)	opt.[1]	opt.[1]
Phases rotation	–	–
Failed.tripping under fault conditions	■	■
Maintenance		
Total number of operations	■	■
Total number of trips	■	■
Number of trip tests	■	■
Number of manual operations	■	■
Number of separate trips for each protection function	■	■
Contact wear (%)	■	■
Record data of last trip	■	■
Commands		
Circuit-breaker open/close	■	■
Alarms reset	■	■
Setting of curves and protection thresholds	■	■
Synchronize system time	■	■
Events		
Status changes in circuit-breaker, protections and all alarms	■	■

[1] with PR330/V
[2] no residual voltage
[3] no apparent power available
[4] please ask ABB for further details

Power supply

The PR332/P trip unit does not normally require any external power supplies, being self-supplied from the current sensors (CS): to activate the protection and ammeter functions, it is sufficient for at least one phase to have a current load higher than 80 A.
The unit ensures fully self-supplied operation. When an auxiliary power supply is present, it is also possible to use the unit with the circuit-breaker either open or closed with very low current flowing through (<80 A).
It is also possible to use an auxiliary power supply provided by the PR030/B portable battery unit (always supplied), which allows the protection functions to be set when the trip unit is not self supplied.
PR332/P stores and shows all the information needed after a trip (protection tripped, trip current, time, date). No auxiliary supply is required for this functionality.

	PR332/P	PR330/D-M
Auxiliary power supply (galvanically insulated)	24 V DC ± 20%	from PR332/P
Maximum ripple	5%	± 5%
Inrush current @ 24 V	3 A for 5 ms	~0.5 A for 5 ms
Rated power @ 24 V	2 W	+1 W
Inrush current @ 24 V when modules connected	5 A for 5 ms	
Rated power @ 24 V when modules connected	3 W	

[1] PR330/V can give power supply to the trip unit when at least one line voltage is equal or higher to 85V RMS.

Characteristic curves and technical information

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Characteristic curves

Technical information

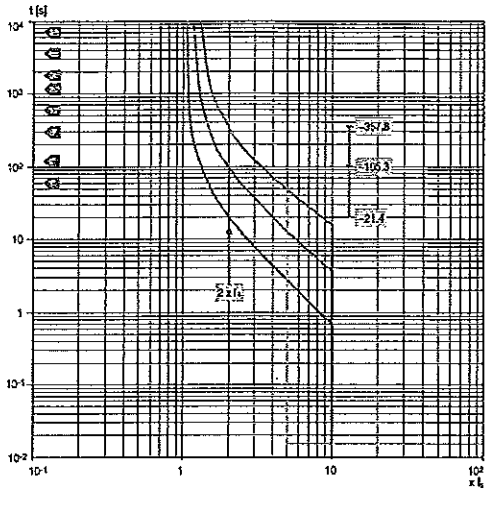
[1] For T1 1p and T2 with PR221DS, please ask ABB SACE directly.

Examples of curve readout

Example 1 - T4N 250

Trip curves for power distribution (thermomagnetic trip unit)

Considering a T4N 250 In = 250 A circuit-breaker. By means of the thermal adjustment trimmer, the current threshold I_1 is selected, for example at 0.9 x In (225 A); the magnetic trip threshold I_3, adjustable from 5 to 10 x In, we select at 10 x In, equal to 2500 A.
It can be noted that, on the basis of the conditions in which the overload is presented, i.e. with the circuit-breaker at thermal running or not, the thermal relay trip varies considerably. For example, for an overload current of 2 x I_1, the trip time is between 21.4 and 105.3 s for hot trip, and between 105.3 and 357.8 s for cold trip.
For fault current values higher than 2500 A, the circuit-breaker trips instantaneously with the magnetic protection.

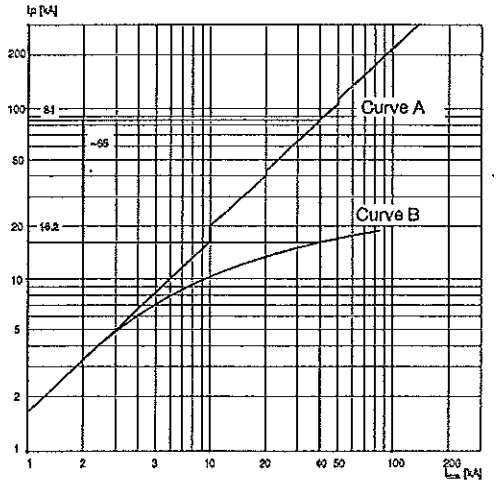


1SDC210D1F0001

Example 2 - T2S 160

Limitation curves

The following figure shows the trend of the Tmax T2S 160, In = 160 A circuit-breaker current-limiting curve. The r.m.s. of the prospective symmetrical short-circuit current is indicated on the abscissa of the diagram, whereas the peak short-circuit current value is indicated on the ordinates. The current-limiting effect can be assessed by comparing - at the same symmetrical short-circuit current value, the corresponding peak value at the prospective short-circuit current (curve A) with the limited peak value (curve B). The T2S 160 circuit-breaker with thermomagnetic trip unit In = 160 A at a voltage of 400 V limits the short-circuit current to 16.2 kA for a fault current of 40 kA, with a reduction of about 68 kA compared with the peak value of the 84 kA prospective short-circuit current.



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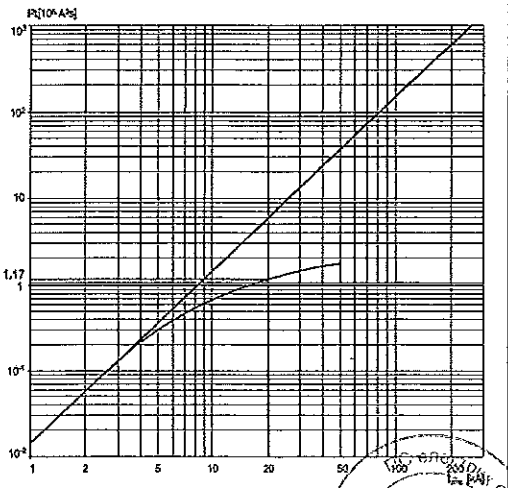
Example 3 - T3S 250

Specific let-through energy curves

An example of reading the graph of the specific let-through energy curve of the T3S 250 In = 160 A circuit-breaker at a voltage of 400 V is given below.
The prospective symmetrical short-circuit current is indicated on the abscissa of the diagram, whereas the ordinates show the specific let-through energy values expressed in A^2s.
In correspondence with a short-circuit current of 20 kA, the circuit-breaker lets through a value of I^2t equal to $1.17 \cdot 10^6 \cdot A^2s$.



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Abbreviations used
In = rated current of the thermomagnetic or electronic trip unit
I_1 = set trip current for overload
I_3 = trip current for short-circuit
I_{rms} = prospective symmetrical short-circuit current

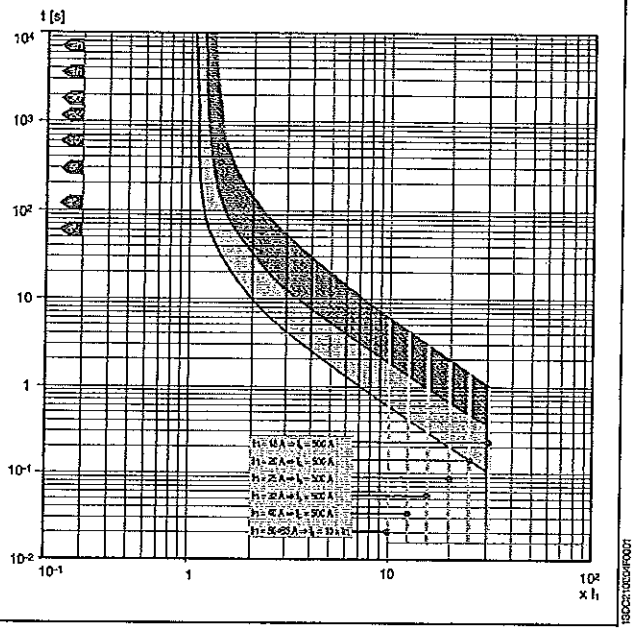
Trip curves for power distribution

Circuit-breakers with thermomagnetic trip units

T1 160 – TMD

I_3 = 500 A

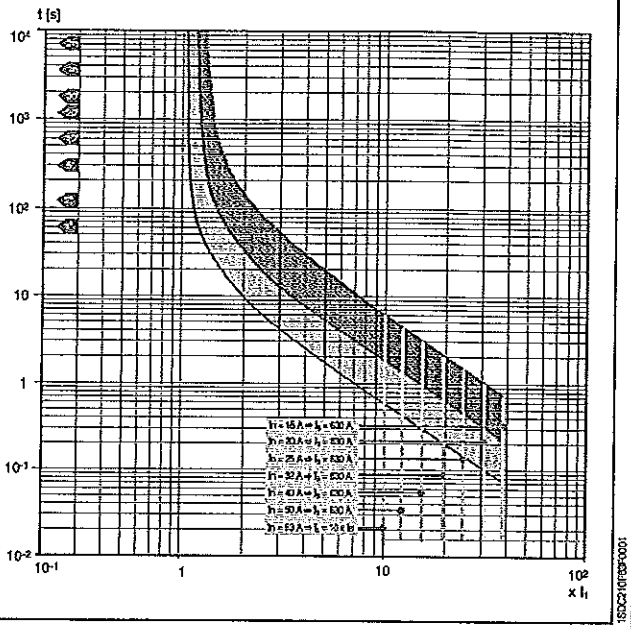
In = 16÷63 A



T1 160 – TMD

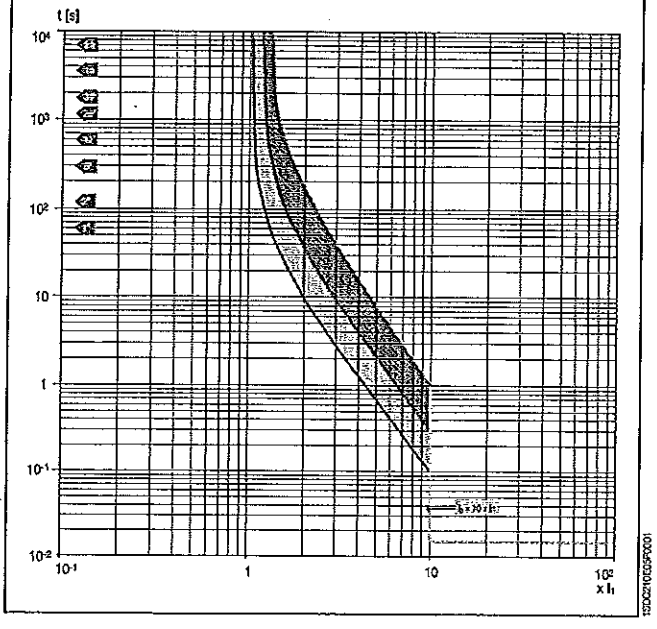
I_3 = 630 A

In = 16÷63 A



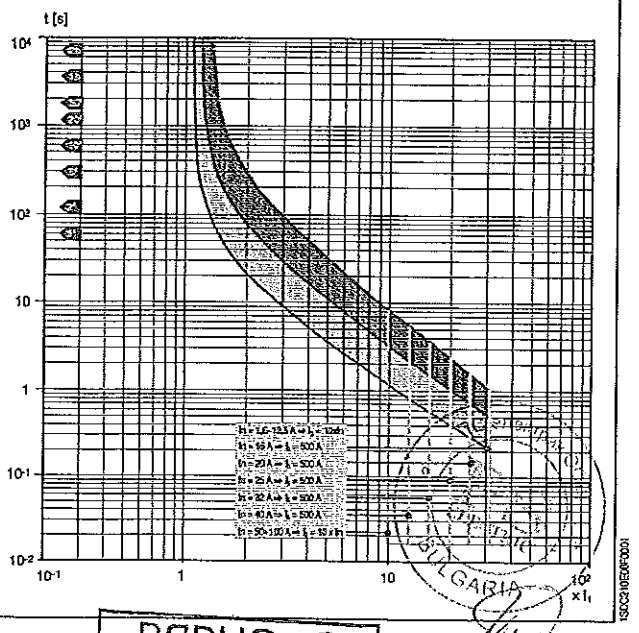
T1 160 – TMD

In = 80÷160 A



T2 160 – TMD

In = 1.6÷100 A



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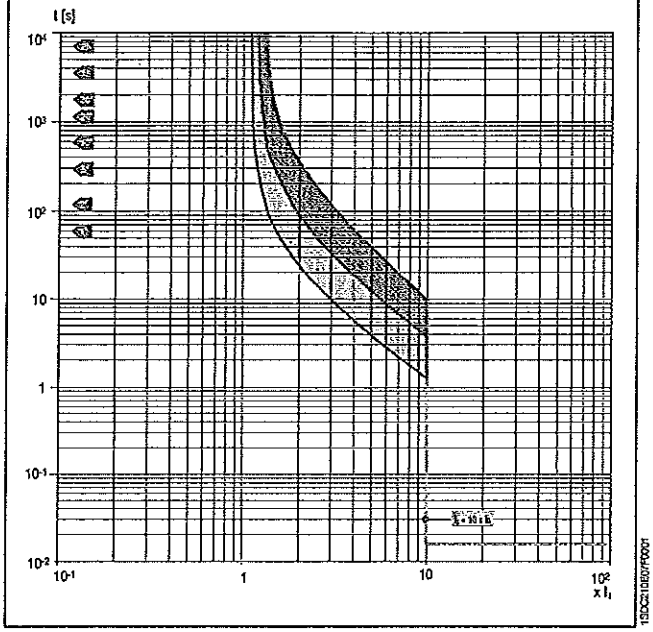
ВЯРНО С ОРИГИНАЛА

Trip curves for power distribution

Circuit-breakers with thermomagnetic trip units

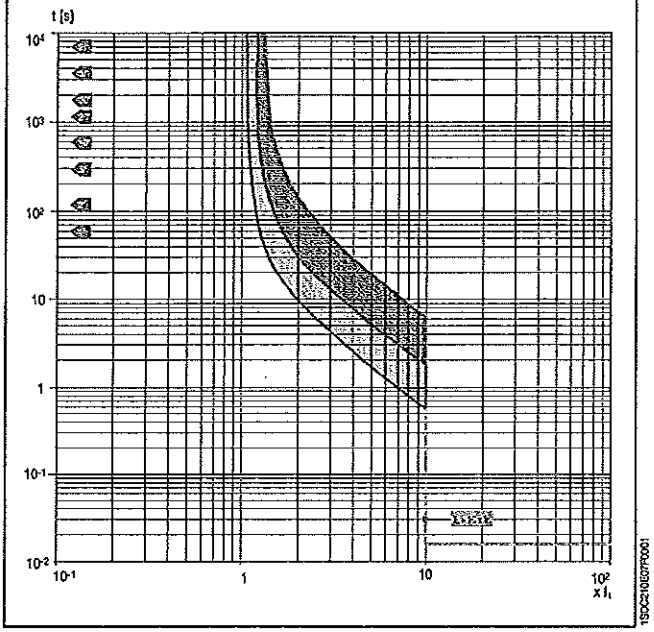
T2 160 – TMD

In = 125 A

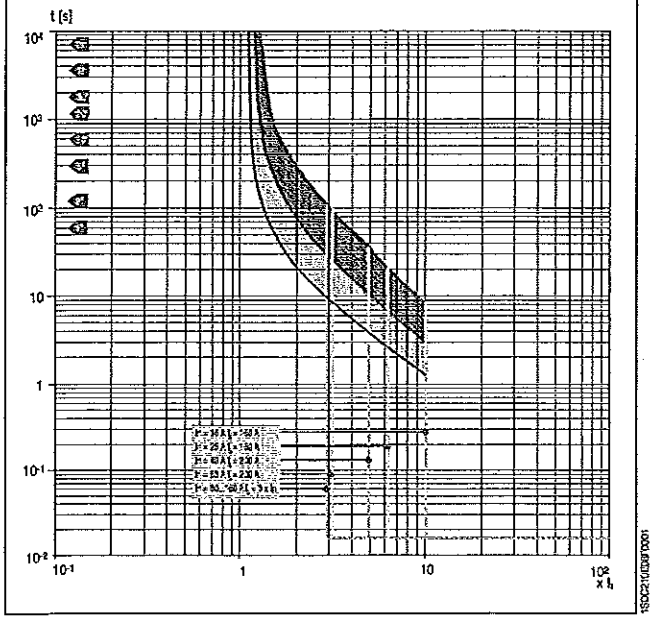


T2 160 – TMD

In = 160 A

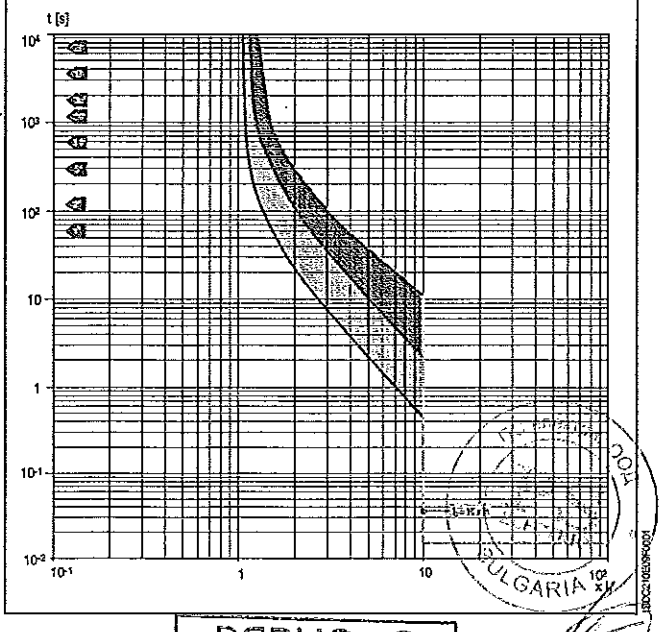


T2 160 – TMG



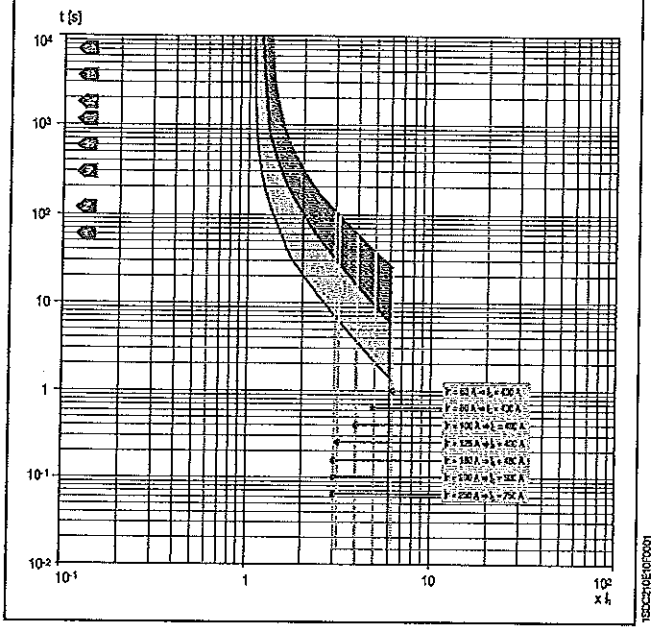
T3 250 – TMD

In = 63÷250 A



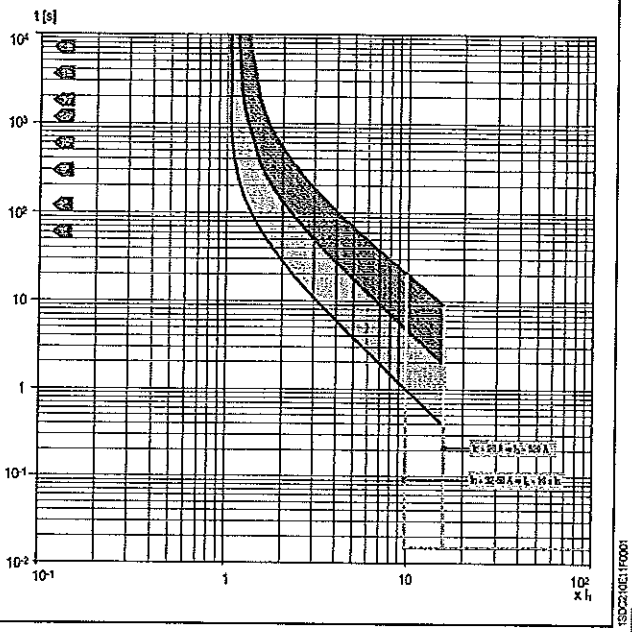
T3 250 – TMG

In = 63÷250 A



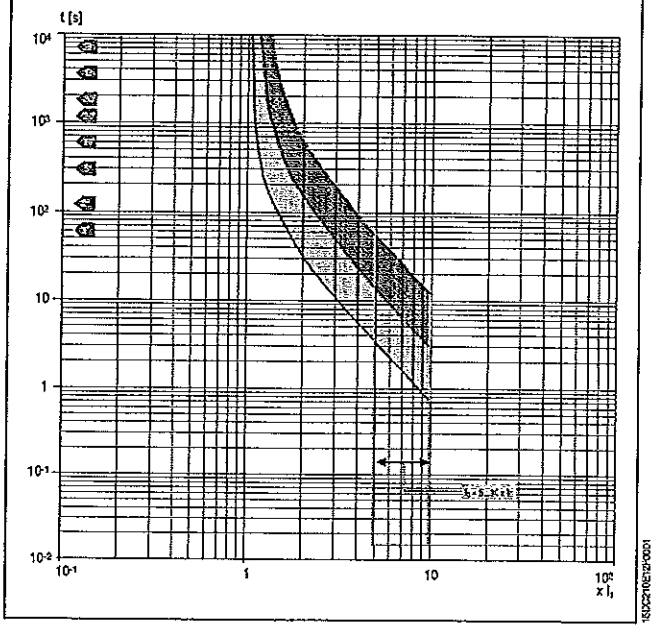
T4 250 – TMD

In = 20÷50 A



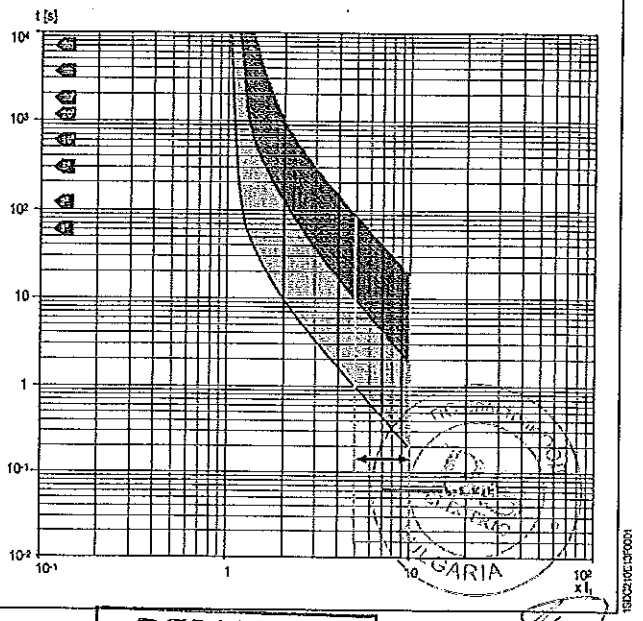
T4 250/320 – TMA

In = 80÷250 A



T5 400/630 – TMA

In = 320÷500 A



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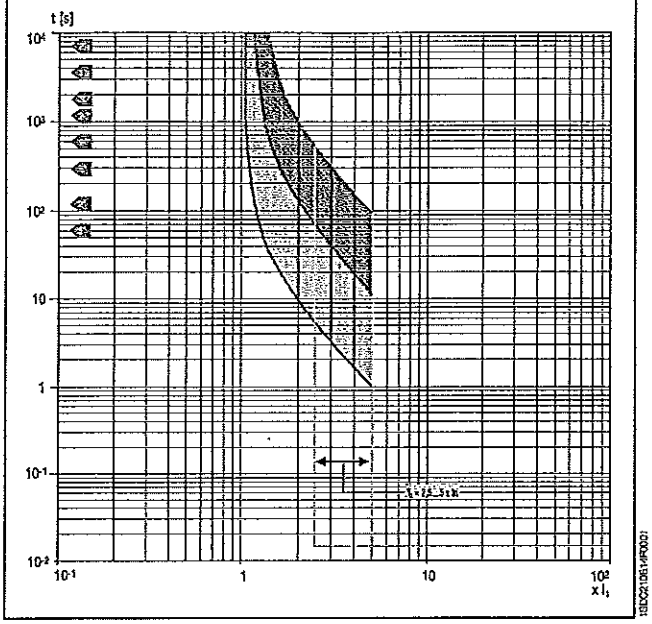
ВЯРНО С ОРИГИНАЛА

Trip curves for power distribution

Circuit-breakers with thermomagnetic trip units

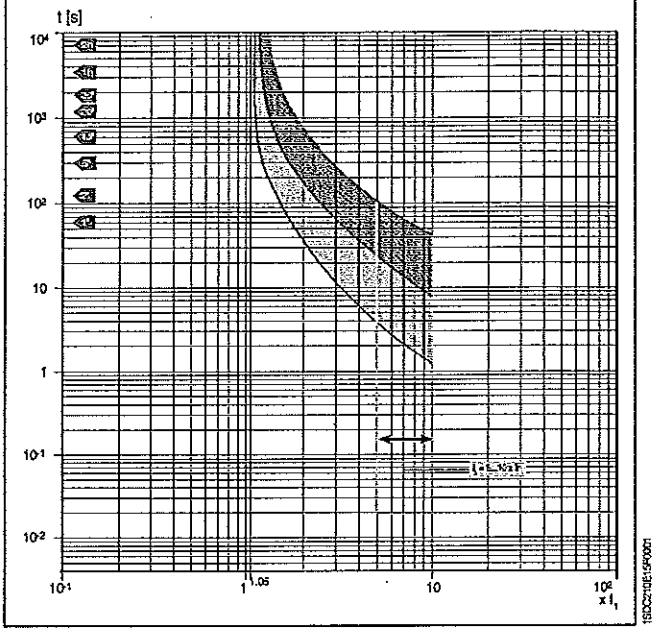
T5 400/630 – TMG

In = 320÷500 A



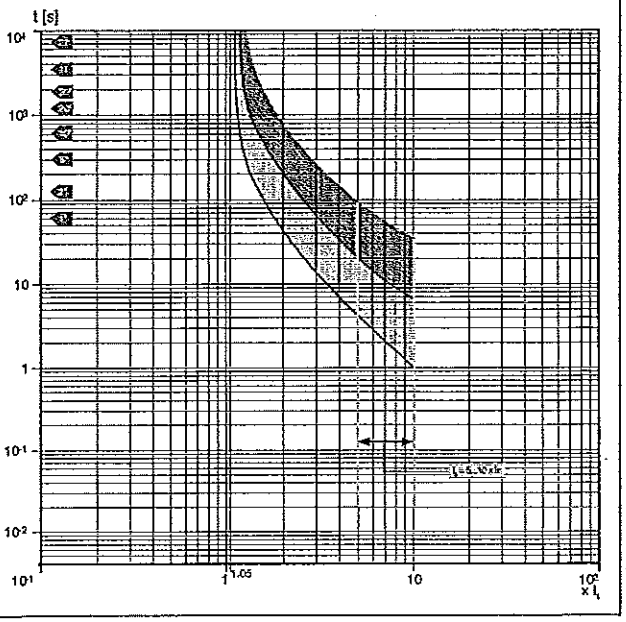
T6 630 – TMA

In = 630 A



T6 800 – TMA

In = 800 A

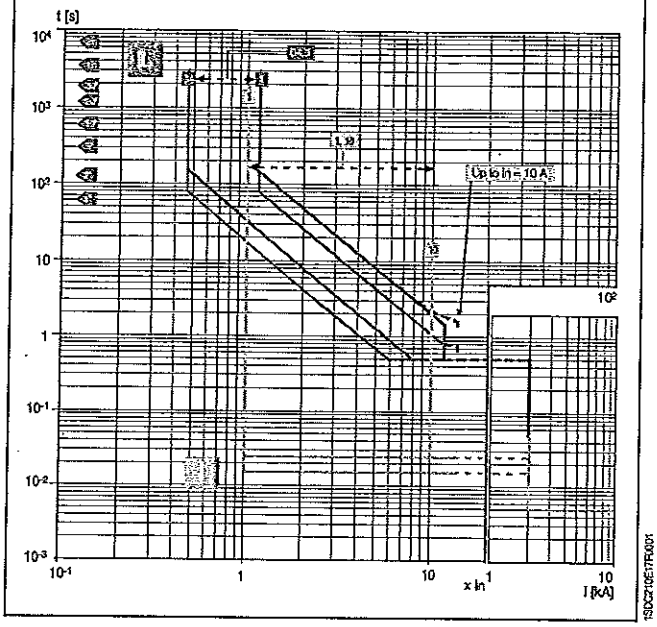


Trip curves for power distribution

Circuit-breakers with electronic trip units

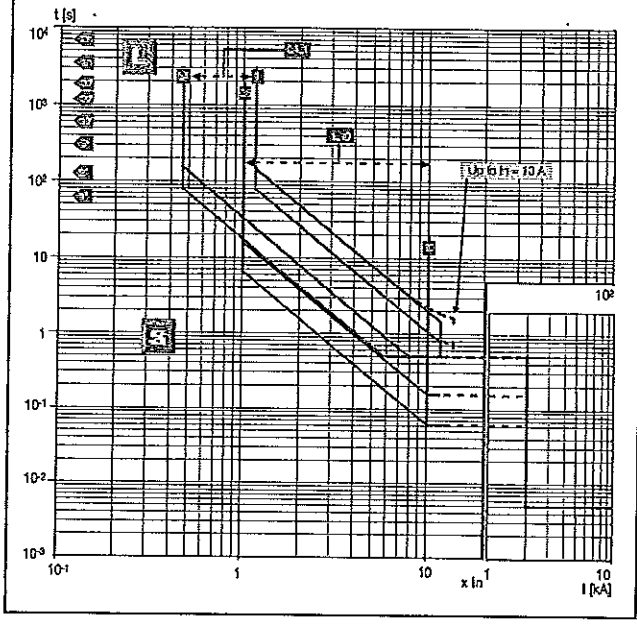
T2 160 – PR221DS

L-I Functions



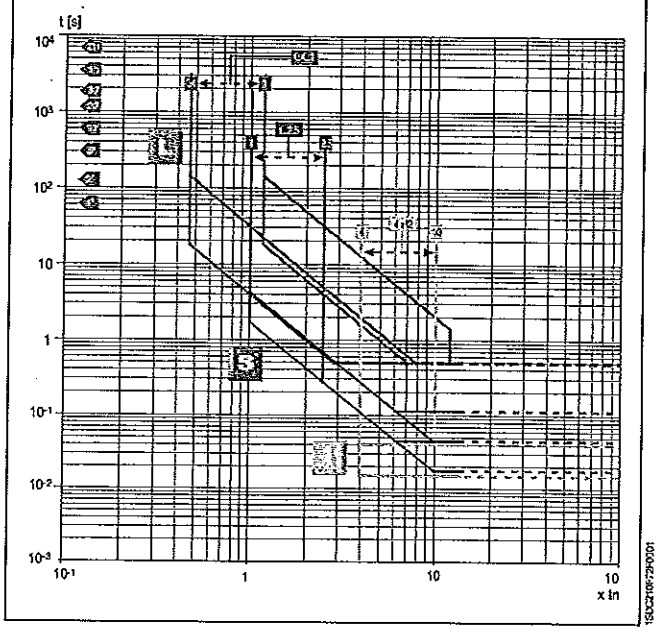
T2 160 – PR221DS

L-S Functions



T2 160 – PR221GP

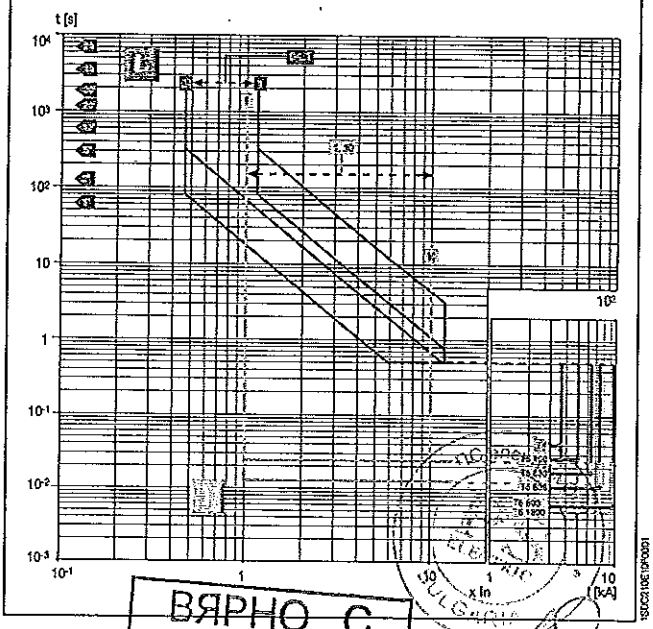
L-S-I Functions



T4 250/320 - T5 400/630 - T6 630/800/1000 PR221DS

L-I Functions

Note: For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A ⇒ I_3max = 9.5 x In



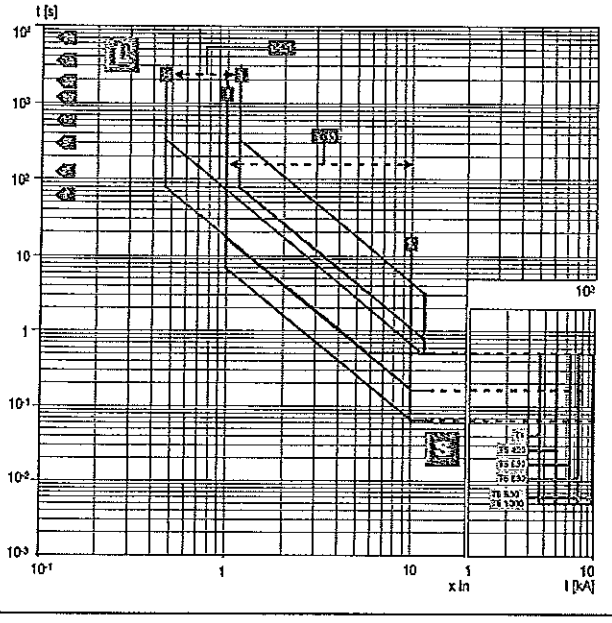
Trip curves for power distribution

Circuit-breakers with electronic trip units

T4 250/320 - T5 400/630 - T6 630/800/1000
PR221DS

L-S Functions

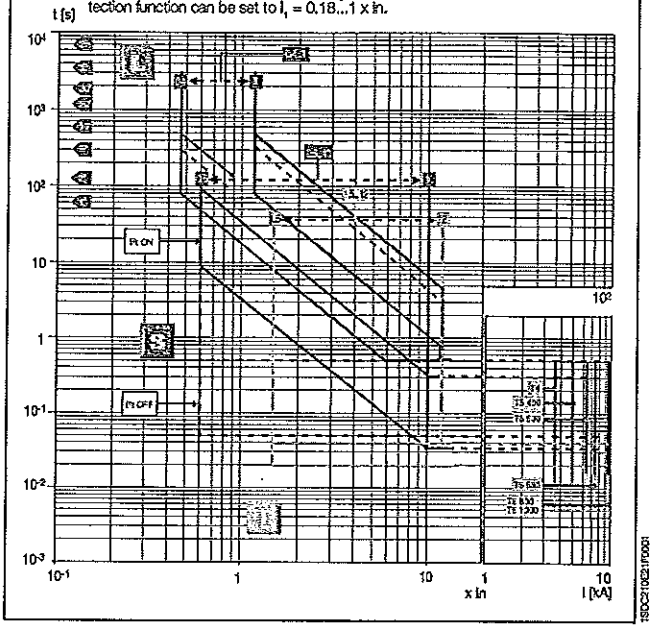
Note: For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A ⇒ I_2max = 9.5 x In



T4 250/320 - T5 400/630 - T6 630/800/1000
PR222DS - PR222DS/PD - PR223DS

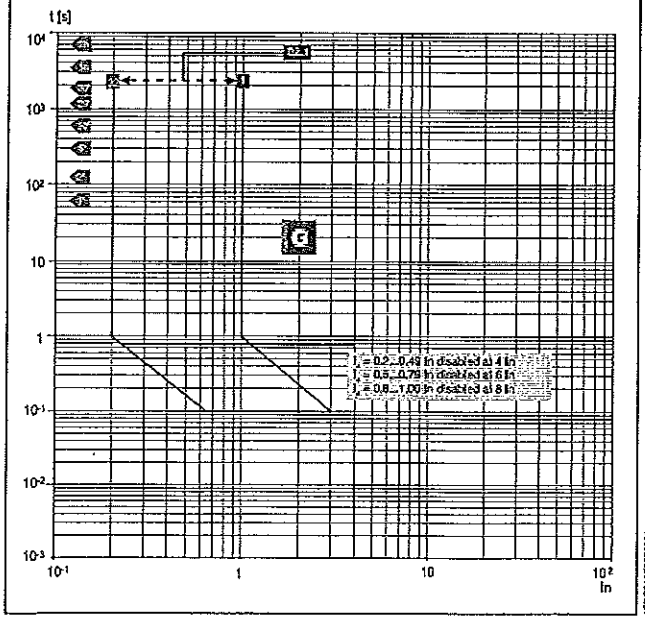
L-S-I Functions

Note: The dotted curve of function L corresponds to the maximum delay (t_2) which can be set at 6 x I_1, in the case where 320 A CTs are used for T4 and 630 A for T5. For all the CT sizes t_1 = 18s except with 320 A CT (T4), 630 A CT (T5) and 1000 A CT (T6) where t_1 = 10.5s. For T4 In = 320 A, T5 In = 630 A and T6 In = 1000 A ⇒ I_2max = 9.5 x In, I_2max = 9.5 x In. For T6 In = 800 A ⇒ I_2max = 10.5 x In. For PR223DS the L protection function can be set to I_1 = 0.18...1 x In.



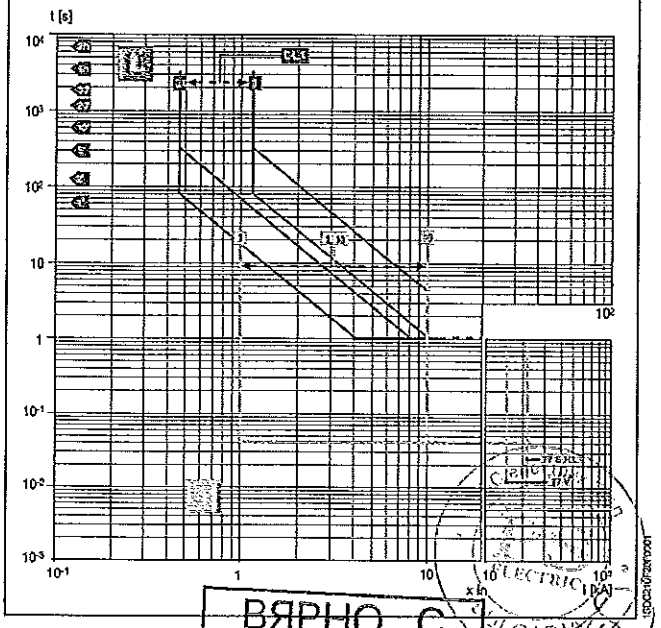
T4 250/320 - T5 400/630 - T6 630/800/1000
PR222DS - PR222DS/PD - PR223DS

G Function



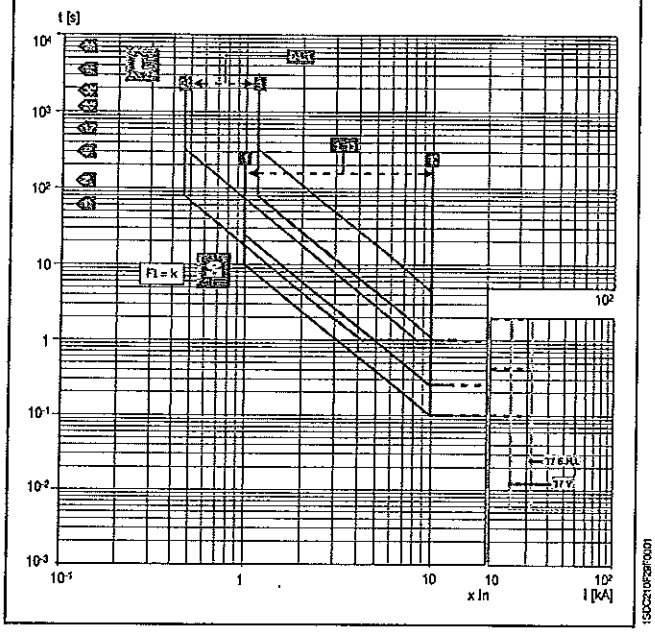
T7 800/1000/1250/1600 – PR231/P

L-I Functions



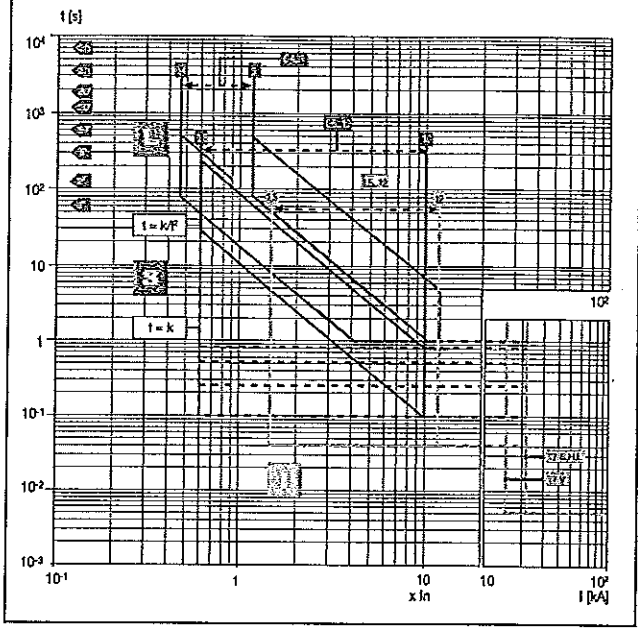
T7 800/1000/1250/1600 – PR231/P

L-S Functions



T7 800/1000/1250/1600 – PR232/P

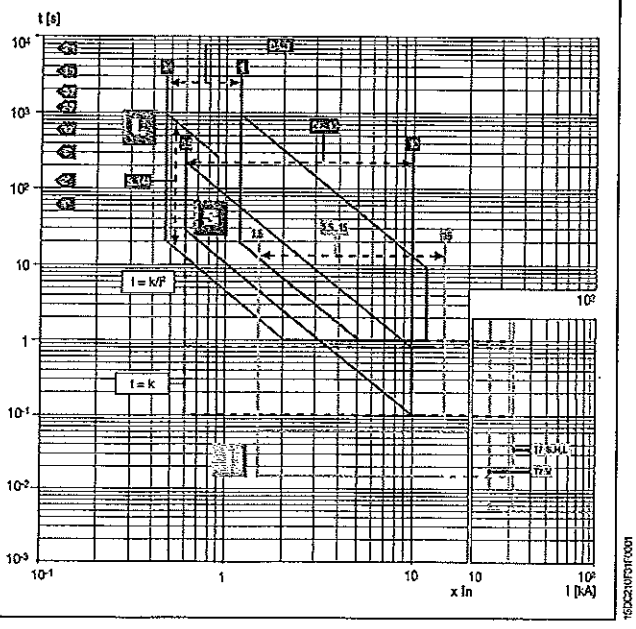
L-S-I Functions



T7 800/1000/1250/1600 – PR331/P

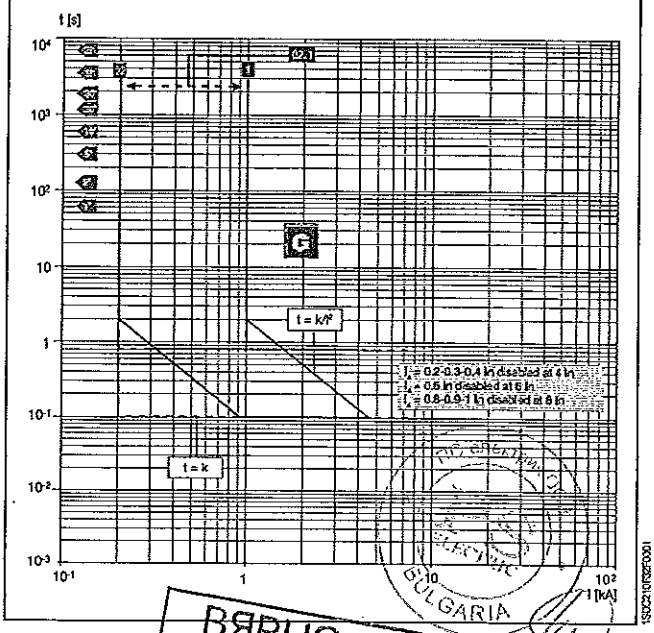
L-S-I Functions

Note: For T7 In = 1250 A, 1600 A ⇒ I3max = 12 x In



T7 800/1000/1250/1600 – PR331/P

G Function



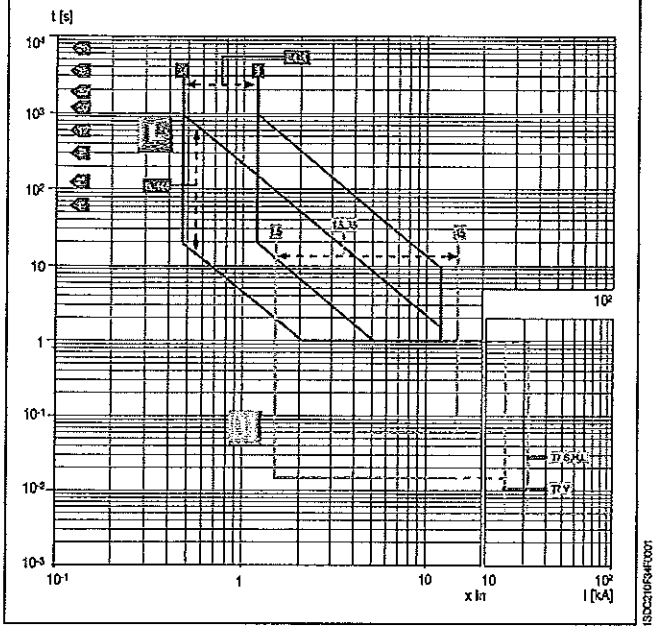
Trip curves for power distribution

Circuit-breakers with electronic trip units

T7 800/1000/1250/1600 – PR332/P

L-I Functions

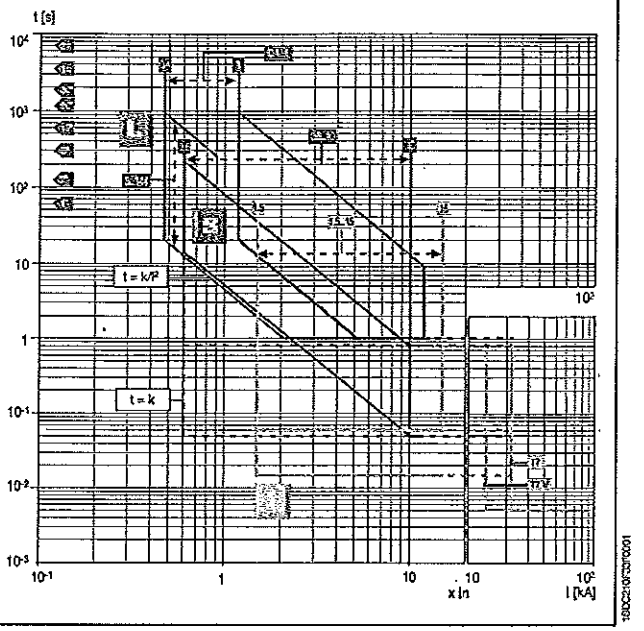
Note: For T7 In = 1250 A, 1600 A ⇒ I_3max = 12 x In



T7 800/1000/1250/1600 – PR332/P

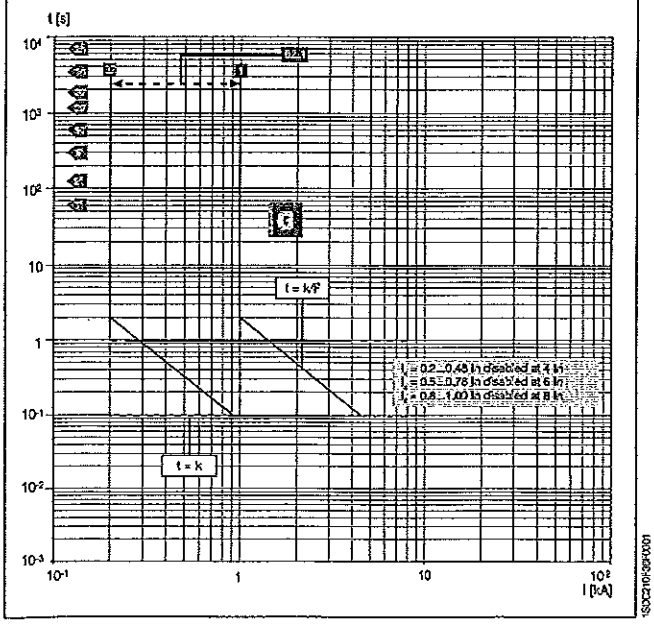
L-S-I Functions

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



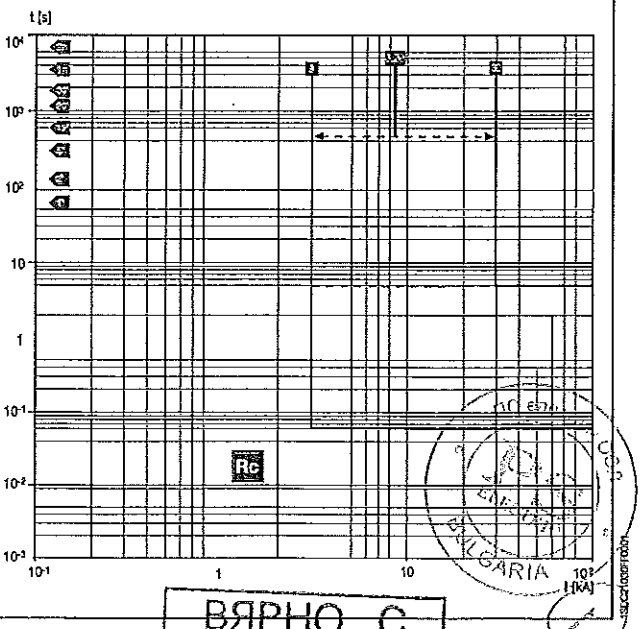
T7 800/1000/1250/1600 – PR332/P

G Function



T7 800/1000/1250/1600 – PR332/P

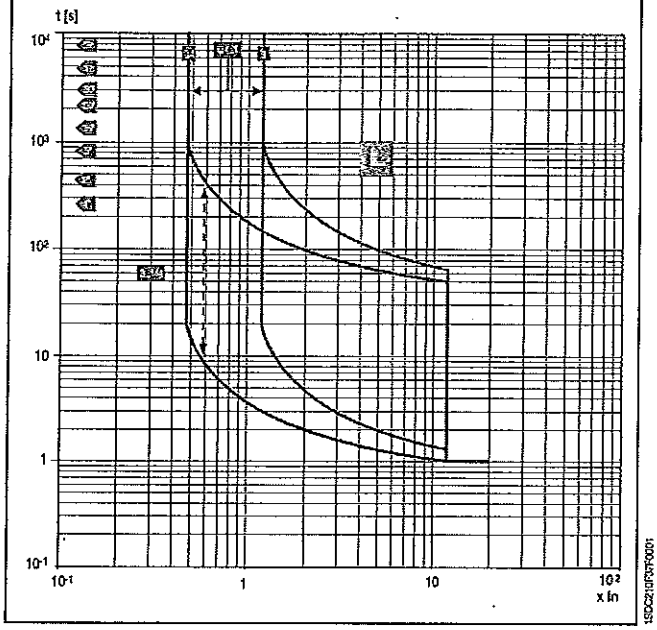
Rc Function



T7 800/1000/1250/1600 – PR332/P

L Function according to IEC 60255-3

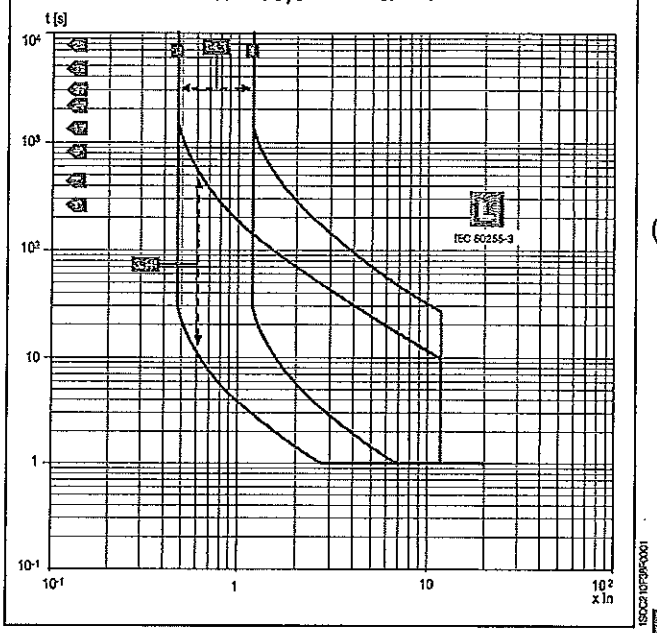
k = 0,14 α = 0,02



T7 800/1000/1250/1600 – PR332/P

L Function according to IEC 60255-3

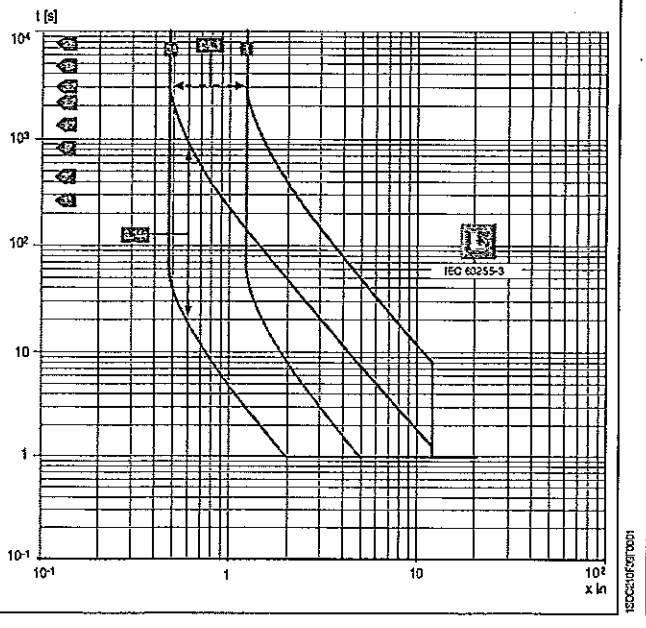
k = 13,5 α = 1



T7 800/1000/1250/1600 – PR332/P

L Function according to IEC 60255-3

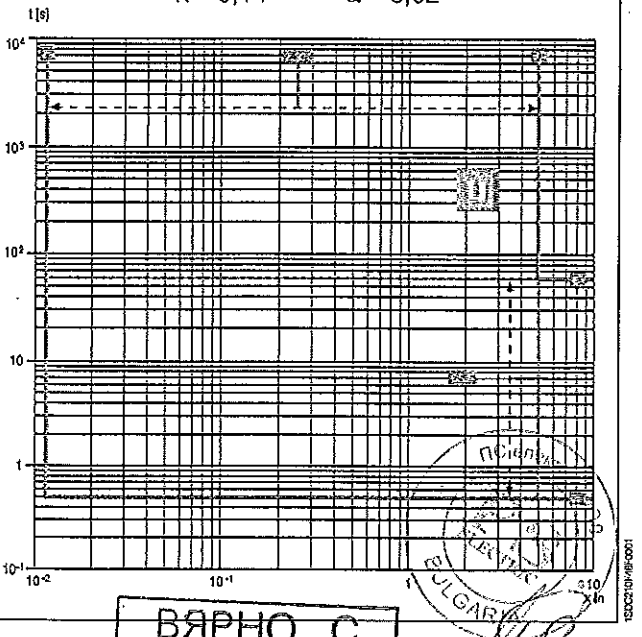
k = 80 α = 2



T7 800/1000/1250/1600 – PR332/P

U Function

k = 0,14 α = 0,02



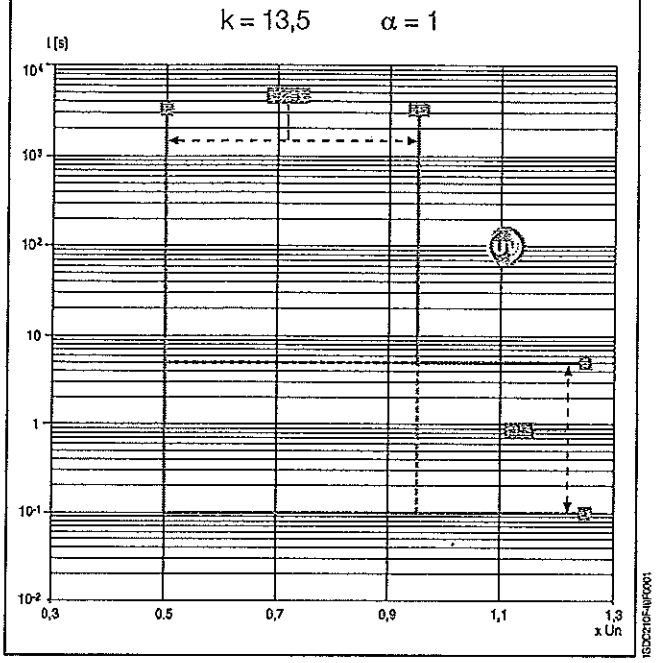
4

Trip curves for power distribution

Circuit-breakers with electronic trip units

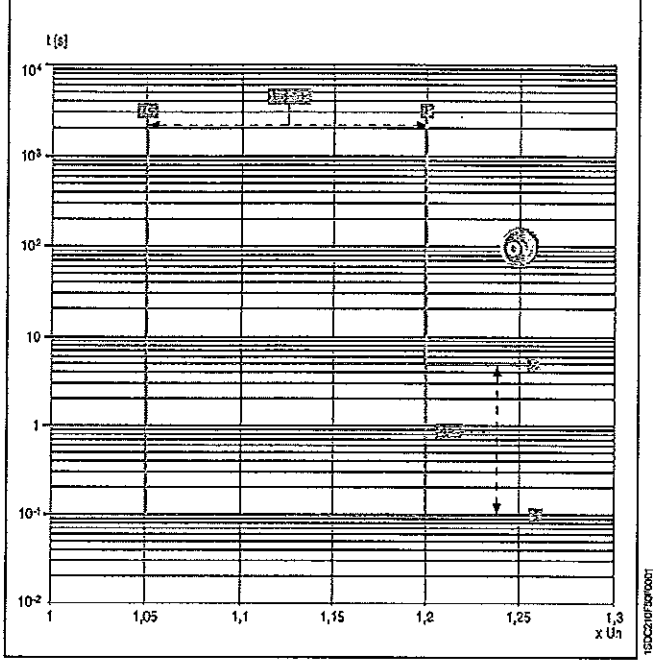
T7 800/1000/1250/1600
PR332/P with PR330/V

UV Function



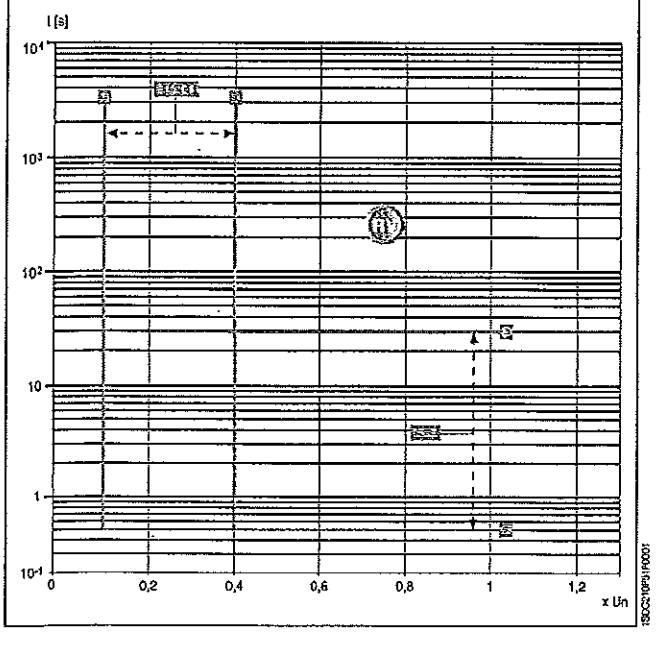
T7 800/1000/1250/1600
PR332/P with PR330/V

OV Function



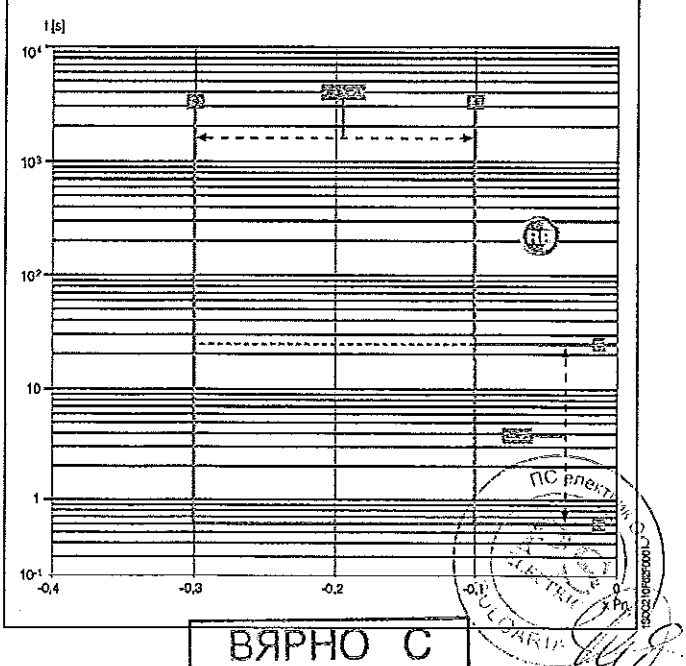
T7 800/1000/1250/1600
PR332/P with PR330/V

RV Function



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

RP Function



Temperature performances

Circuit-breakers with magnetic only or electronic trip units and switch-disconnectors

T5 630 and T5D 630

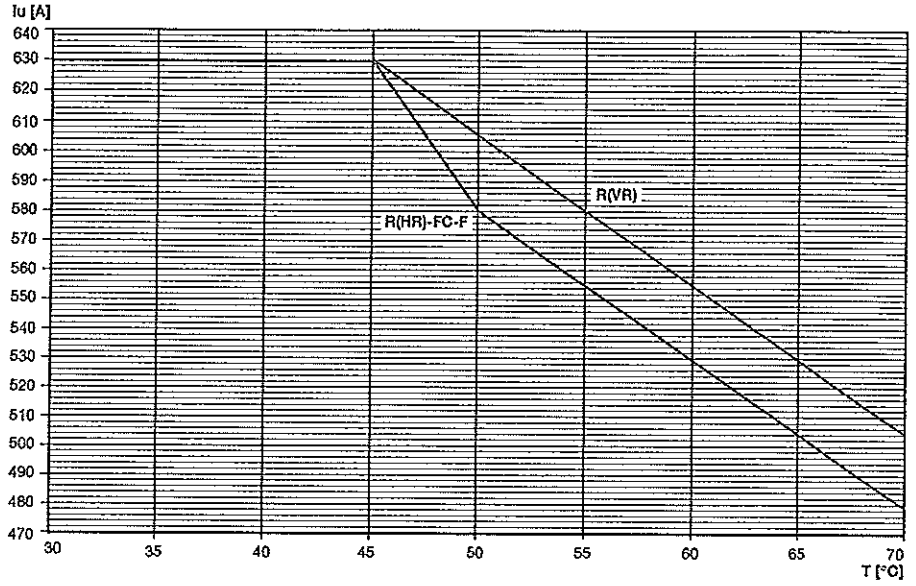
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t
FC	630	1	580	0.92	529	0.84	479	0.76
F	630	1	580	0.92	529	0.84	479	0.76
R (HR)	630	1	580	0.92	529	0.84	479	0.76
R (VR)	630	1	605	0.96	554	0.88	504	0.80

FC = Front cables terminals
R (VR) = Rear terminals (vertical)

F = Front flat terminals

R (HR) = Rear terminals (horizontal)



T5 630 and T5D 630

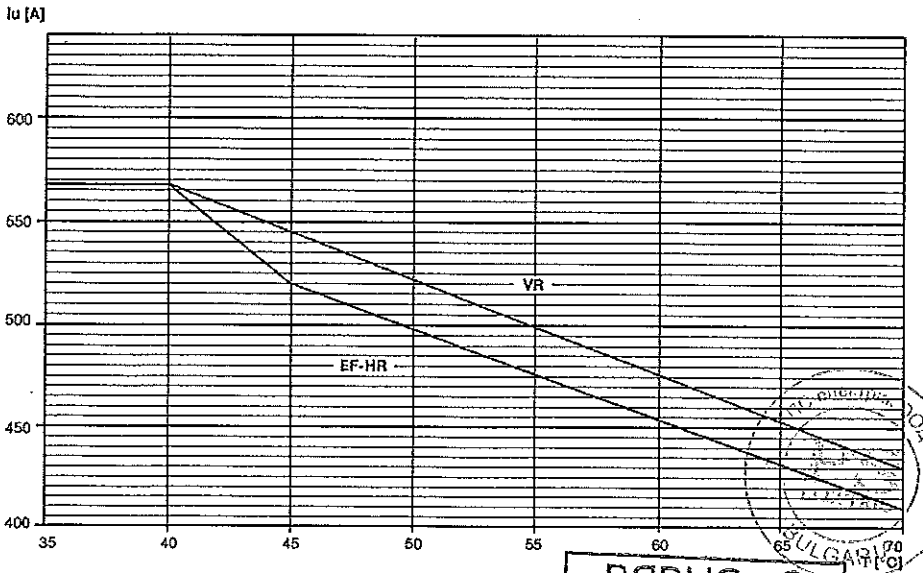
Plug-in / Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t
EF	567	0.9	502	0.80	458	0.72	409	0.64
HR	567	0.9	502	0.80	458	0.72	409	0.64
VR	567	0.9	526	0.82	480	0.76	429	0.68

EF = Front extended terminals

HR = Rear flat horizontal terminals

VR = Rear flat vertical terminals

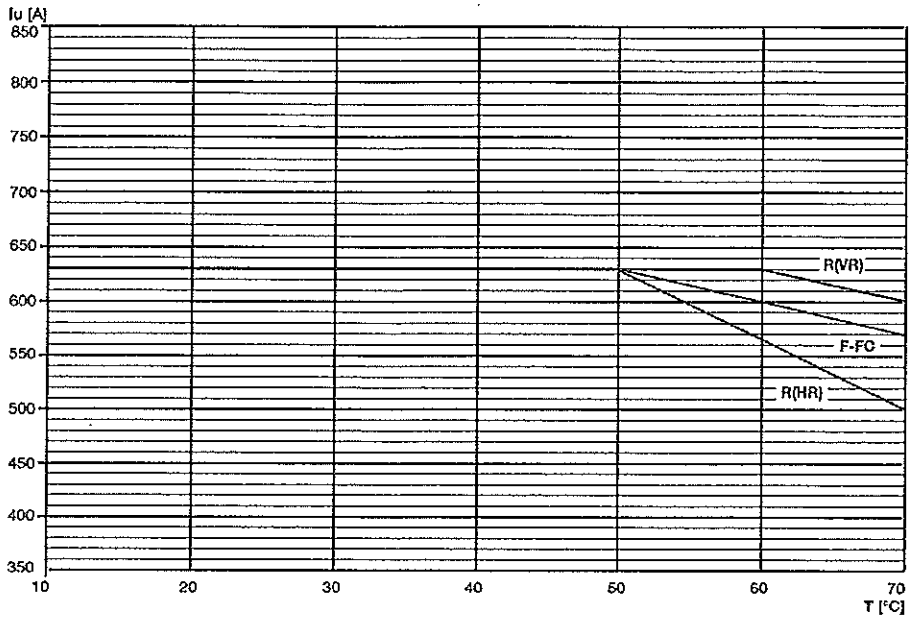


T6 630 and T6D 630

Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
FC - F	630	1	630	1	598.5	0.95	567	0.9
R (VR)	630	1	630	1	630	1	598.5	0.95
R (HR)	630	1	630	1	567	0.9	504	0.8

FC = Front cables terminals
R (VR) = Rear terminals (vertical)
F = Front flat terminals
R (HR) = Rear terminals (horizontal)



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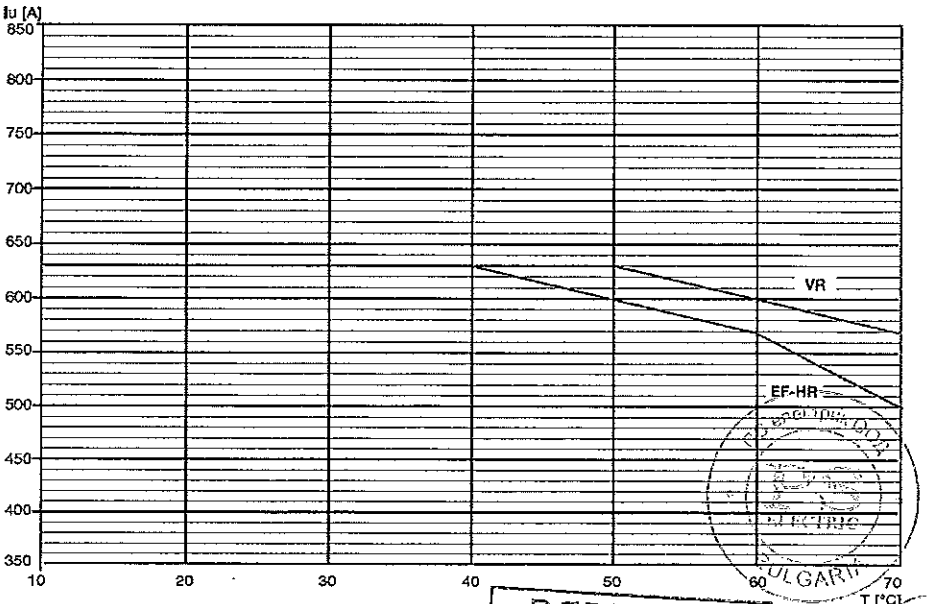
T6 630 and T6D 630

Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
EF	630	1	598.5	0.95	567	0.9	504	0.8
VR	630	1	630	1	598.5	0.95	567	0.9
HR	630	1	598.5	0.95	567	0.9	504	0.8

EF = Front extended terminals
HR = Rear flat horizontal terminals
VR = Rear flat vertical terminals



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Temperature performances

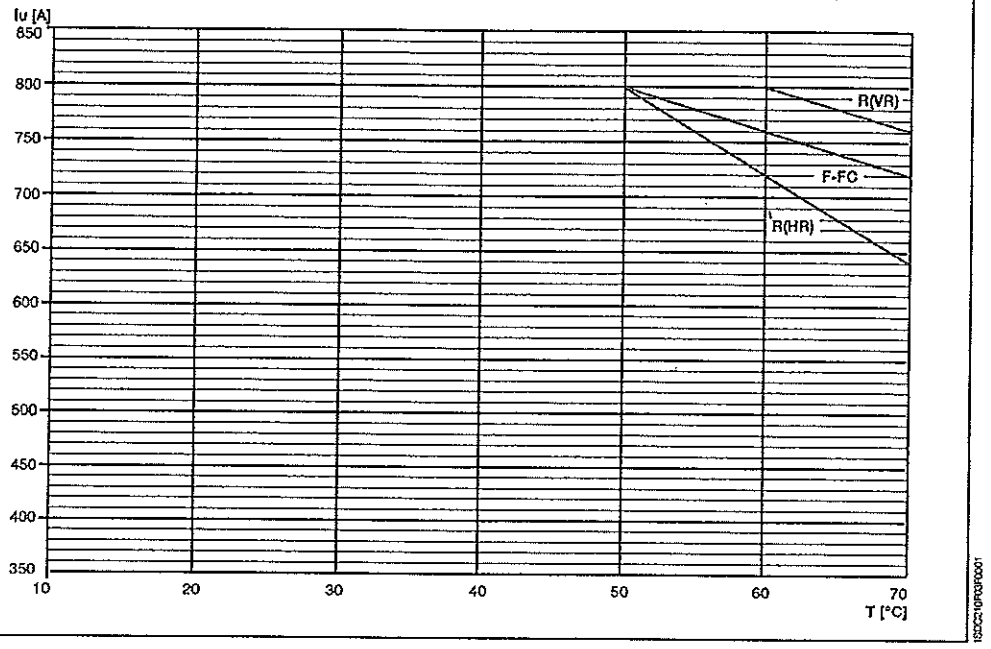
Circuit-breakers with magnetic only or electronic trip units and switch-disconnectors

T6 800 and T6D 800

Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
FC - F	800	1	800	1	760	0.95	720	0.9
R (VR)	800	1	800	1	800	1	760	0.95
R (HR)	800	1	800	1	720	0.9	640	0.8

FC = Front cables terminals
R (VR) = Rear terminals (vertical)
F = Front flat terminals
R (HR) = Rear terminals (horizontal)

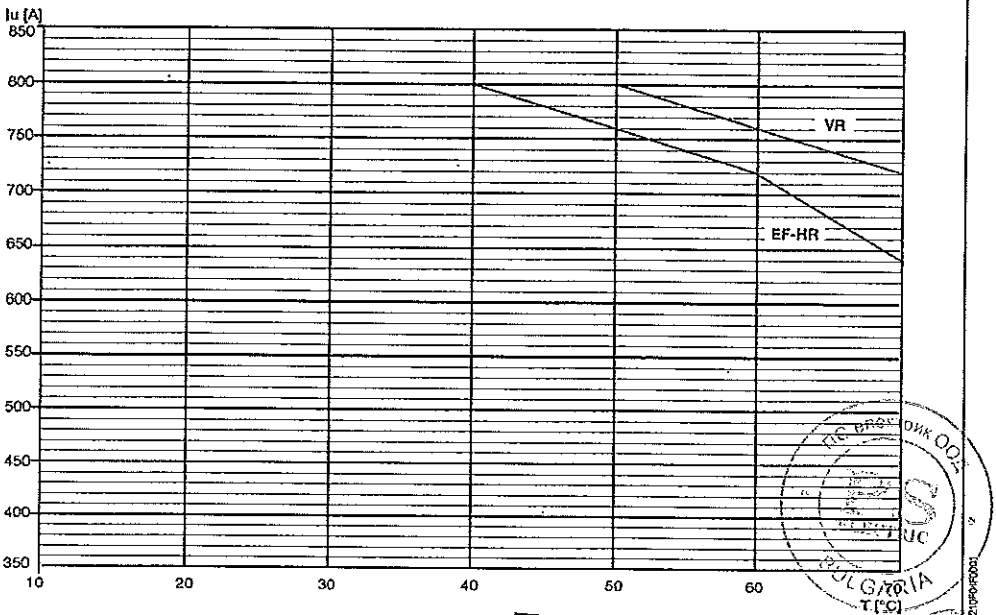


T6 800 and T6D 800

Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
EF	800	1	760	0.95	720	0.9	640	0.8
VR	800	1	800	1	760	0.95	720	0.9
HR	800	1	760	0.95	720	0.9	640	0.8

EF = Front extended terminals
HR = Rear flat horizontal terminals
VR = Rear flat vertical terminals



T6 1000 and T6D 1000

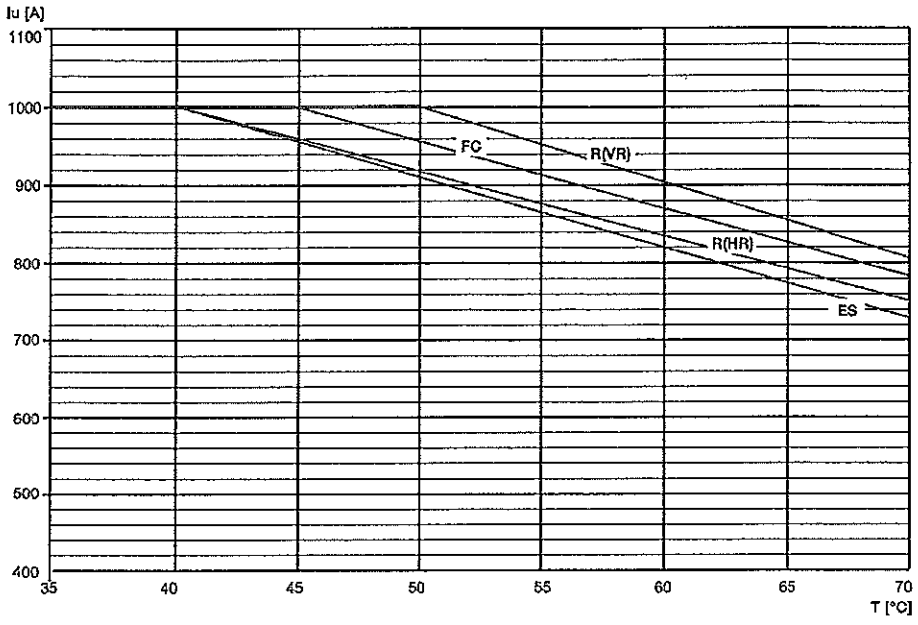
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t	Imax [A]	I_t
FC	1000	1	960	0.96	877	0.88	784	0.78
R (HR)	1000	1	926	0.93	845	0.85	756	0.76
R (VR)	1000	1	1000	1	913	0.91	817	0.82
ES	1000	1	900	0.90	820	0.82	720	0.72

FC = Front cables terminals
ES = Front extended spread terminals

R (HR) = Rear terminals (horizontal)

R (VR) = Rear terminals (vertical)



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4

Temperature performances

Circuit-breakers with magnetic only or electronic trip units and switch-disconnectors

T7 S,H,L 800 and T7D 800

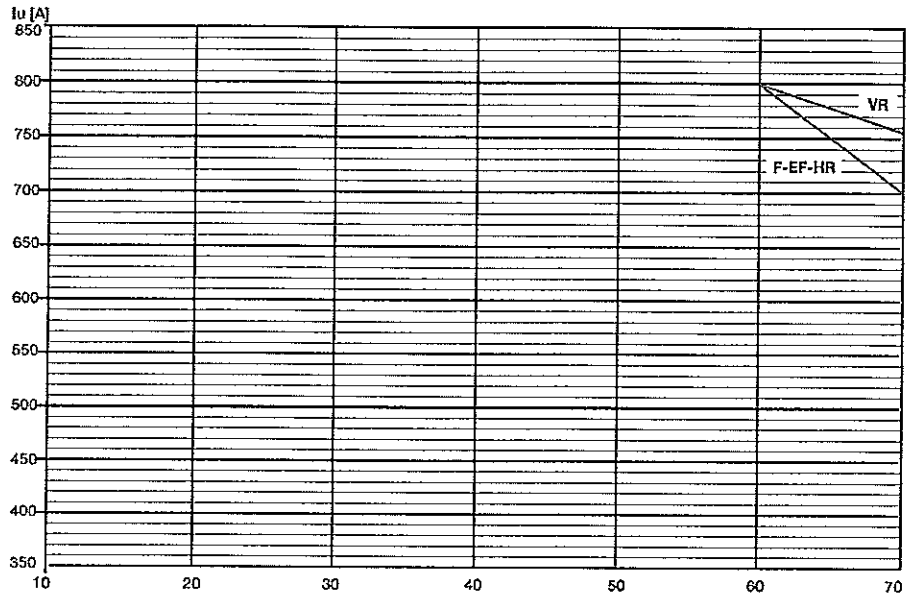
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	800	1	800	1	800	1	755	0.94
F-EF-HR	800	1	800	1	800	1	700	0.87

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front



T7 V 800

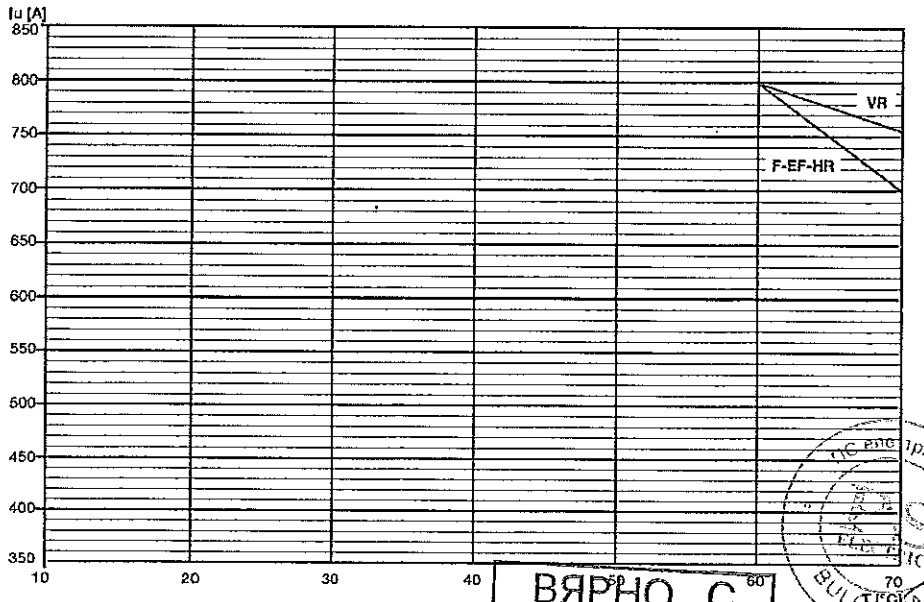
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	800	1	800	1	800	1	755	0.94
F-EF-HR	800	1	800	1	800	1	700	0.87

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front



T7 S,H,L 800 and T7D 800

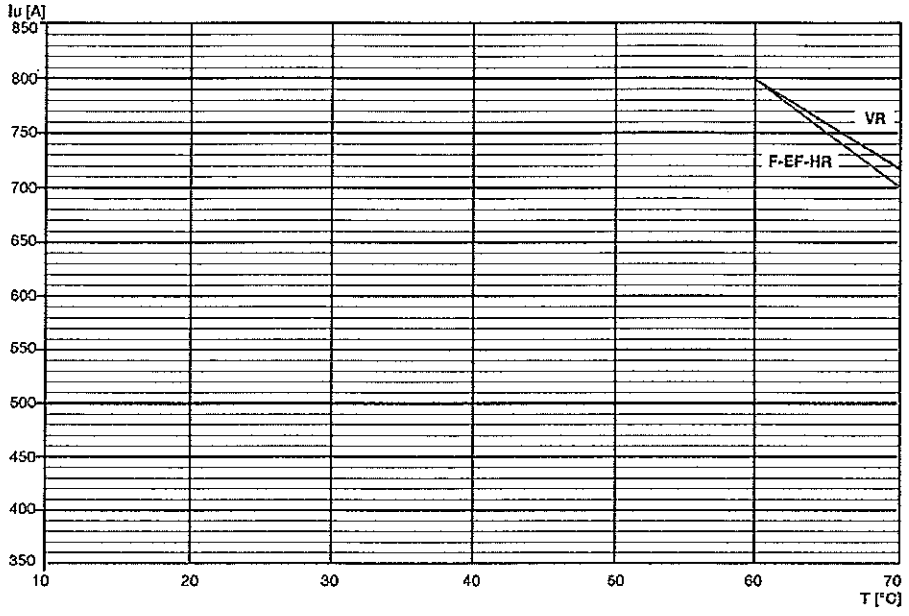
Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	800	1	800	1	800	1	716	0.89
F-EF-HR	800	1	800	1	800	1	700	0.87

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front



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T7 V 800

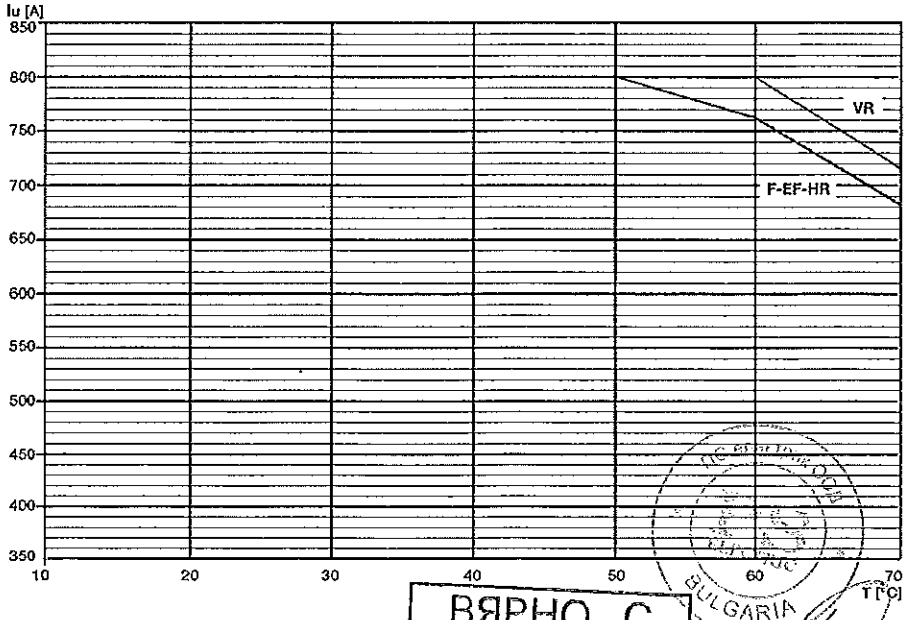
Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	800	1	800	1	800	1	716	0.89
F-EF-HR	800	1	800	1	763	0.95	682	0.85

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front



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Temperature performances

Circuit-breakers with magnetic only or electronic trip units and switch-disconnectors

T7 S,H,L 1000 and T7D 1000

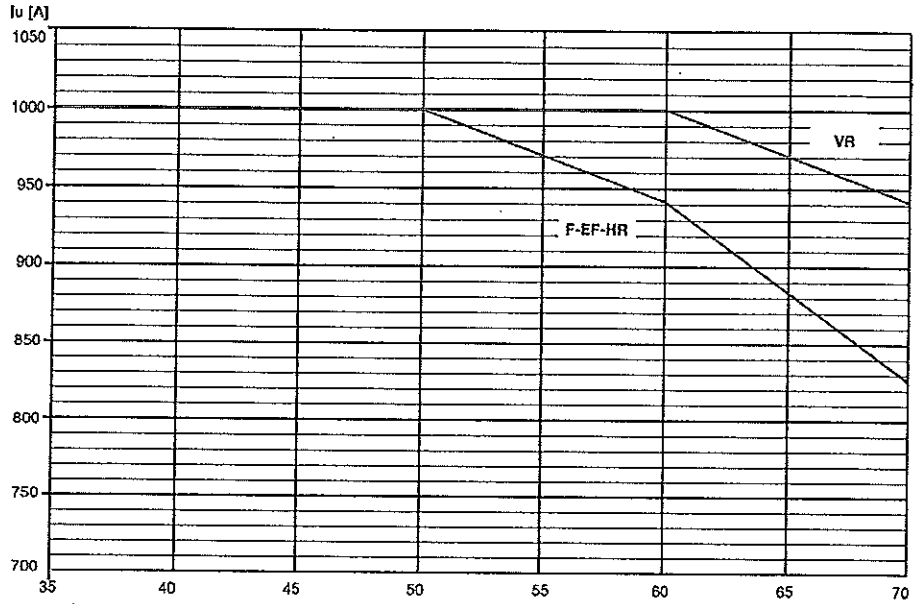
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1000	1	1000	1	1000	1	942	0.94
F-EF-HR	1000	1	1000	1	942	0.94	827	0.83

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front



T7 S,H,L 1000 and T7D 1000

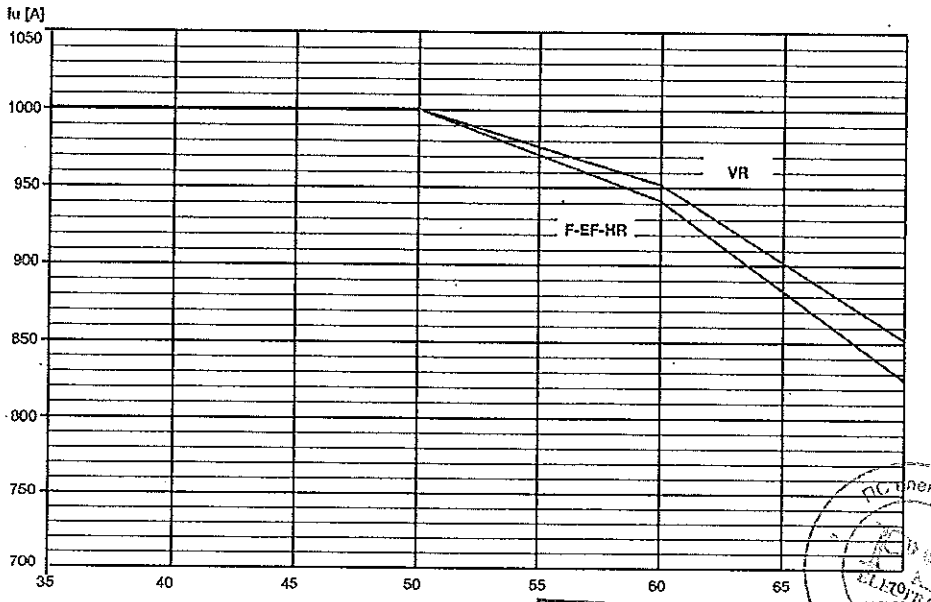
Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1000	1	1000	1	952	0.95	852	0.85
F-EF-HR	1000	1	1000	1	942	0.94	827	0.83

VR = Rear flat vertical
HR = Rear flat horizontal

F = Front flat terminals

EF = Extended front

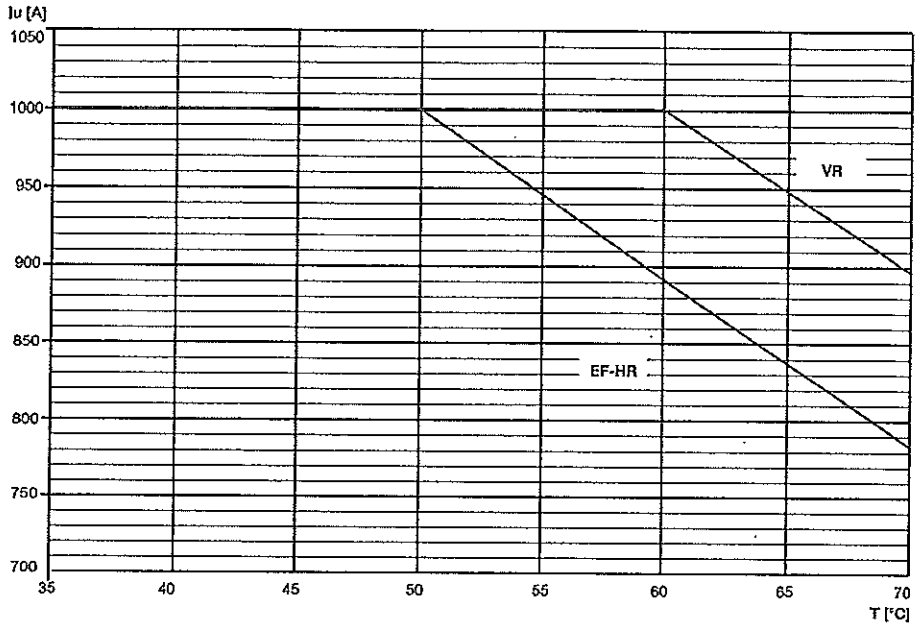


T7 V 1000
Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1000	1	1000	1.00	1000	1.00	894	0.89
EF-HR	1000	1	1000	1.00	895	0.89	784	0.78

EF = Extended front VR = Rear flat vertical HR = Rear flat horizontal

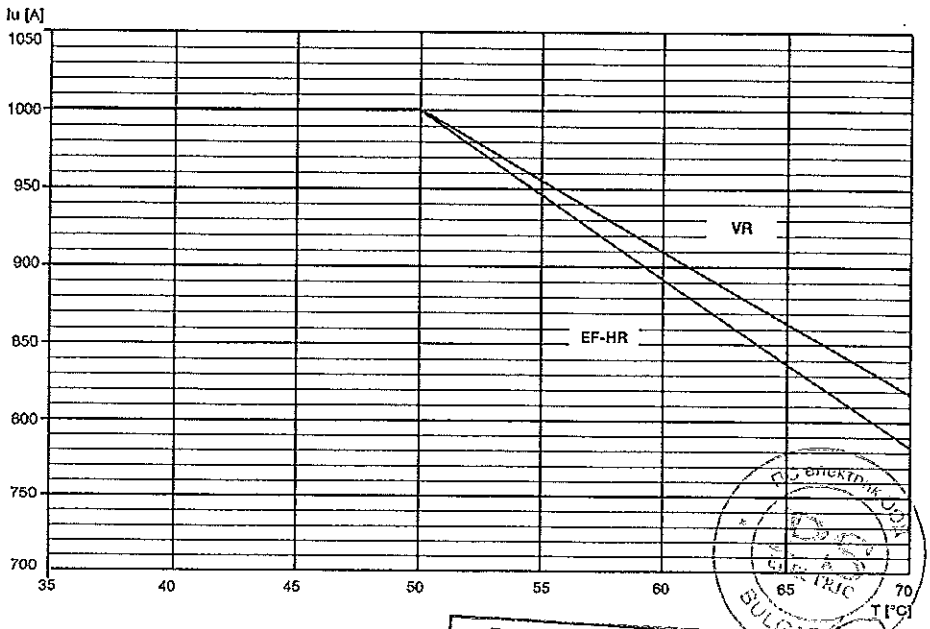
Note: For ratings below 1000 A Tmax T7 does not undergo any thermal derating.



T7 V 1000
Withdrawable

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1000	1	1000	1.00	913	0.91	816	0.82
EF-HR	1000	1	1000	1.00	895	0.89	784	0.78

EF = Extended front VR = Rear flat vertical HR = Rear flat horizontal



Temperature performances

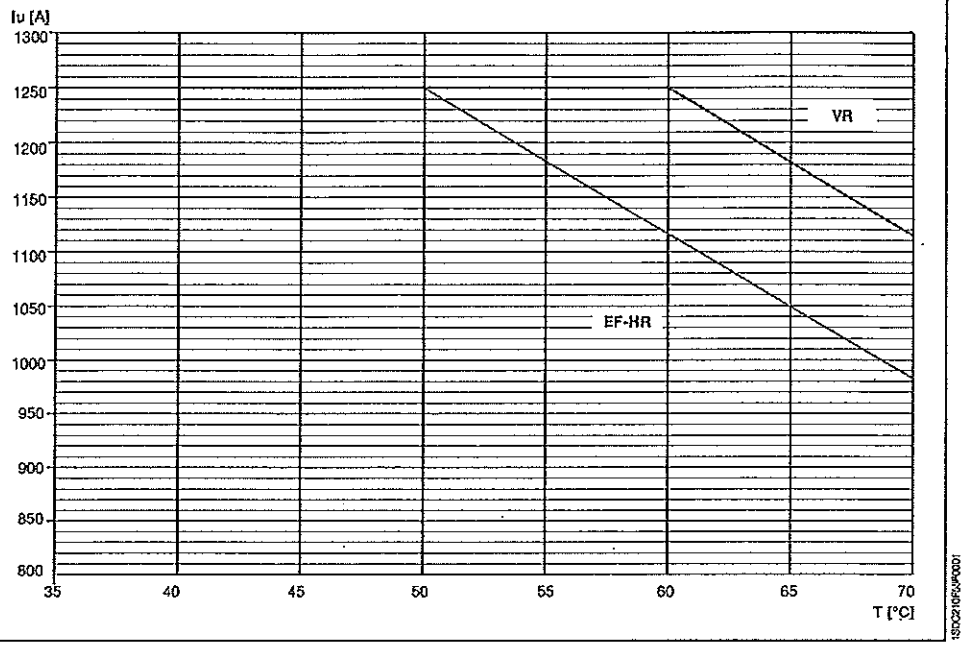
Circuit-breakers with magnetic only or electronic trip units and switch-disconnectors

T7 S,H,L, 1250 and T7D 1250

Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1250	1	1250	1.00	1250	1.00	1118	0.89
EF-HR	1250	1	1250	1.00	1118	0.89	980	0.78

EF = Extended front VR = Rear flat vertical HR = Rear flat horizontal



T7 V 1250

Fixed

	up to 40 °C		50 °C		60 °C		70 °C	
	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1	Imax [A]	I_1
VR	1250	1	1201	0.96	1096	0.88	981	0.78
EF-HR	1250	1	1157	0.93	1056	0.85	945	0.76

EF = Extended front VR = Rear flat vertical HR = Rear flat horizontal