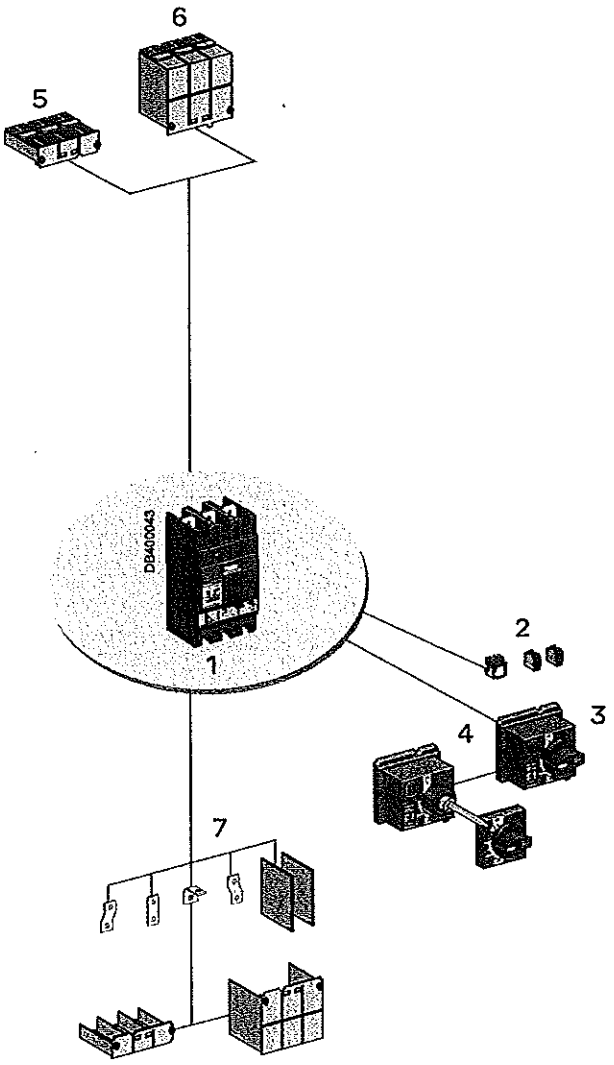
Optimal Combination

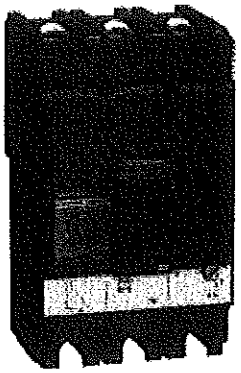
Modularized System

As shown below, wide range of modules or accessories are available.



1. breaking unit
2. MN and MX voltage releases
3. Direct rotary handle
4. Extended rotary handle
5. Short terminal shield
6. Long terminal shield
7. Connection accessorie

General characteristics



EasyPact CVS100BS

Compliance with standards

- IEC 947-1: General rules (GB/T 14048.1)
- IEC 947-2: Circuit Breakers (GB/T 14048.2)
- IEC 947-4: Contactors and Motor Starters (GB 14048.4)
- IEC 946-5.1: Control circuit Devices and Switching elements; automatic Control Components (GB 14048.5)

Tropicalisation

EasyPact CVS100BS circuit breakers have successfully passed the tests prescribed by following standards for extreme atmospheric conditions:

- IEC 68-2-30, damp heat(95% relative humidity at 55°C)
- QIEC 68-2-52 Salt mist (severity level 2)

Positive contact indication

All EasyPact CVS100BS circuit breakers are suitable for isolation as defined in IEC standard 60947-2:

- the isolation position corresponds to the O (OFF) position
- the operating handle cannot indicate the "OFF" position unless the contacts are effectively open
- padlocks may not be installed unless the contacts are open

Installation of a rotary handle or a motor mechanism does not alter the reliabilityof the position-indication system.

The isolation function is certified by tests guaranteeing:

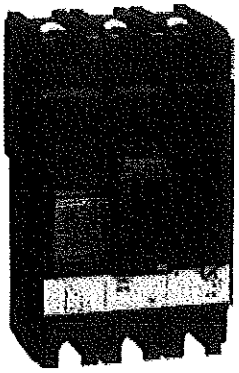
- the mechanical reliability of the position indication system
- the absence of leakage currents
- overvoltage withstand capacity between upstream and downstream connections

EasyPact CVS100BS (Protection of distribution system)

Selection guide

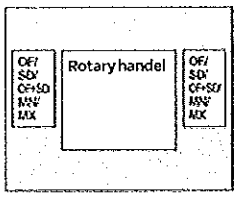
CVS	100	BS	/	3P	100	MX
Range name	current 100	Breaking capacity BS: 25 kA		3P: 3 poles	Rated current: 16, 20, 25, 32, 40, 50, 63, 80, 100	Accessories

Protection of LV Power Distribution System
EasyPact CVS100BS



EasyPact CVS100BS

EasyPact circuit breaker					CVS100BS
Number of Poles					3, 4
Control	Manual		Toggle		■
			Direct or extended rotary handle		■
Connection	Fixed		Front connection		■
	Plug-in		Front connection		■
Electrical characteristics as per IEC 60947-2 and EN 60947-2					
Rated current (A)		In	40 °C		100
Rated insulation voltage (V)		Ui			690
Rated impulse withstand voltage (kV)		Uimp			6
Rated operational voltage (V)		Ue	AC 50/60 Hz		440
			DC		
Circuit breaker type					BS
Ultimate breaking capacity (kA rms)		Icu	AC 50/60 Hz	220/240 V	50
				380/400 V	25
				440 V	20
				500 V	10
				525 V	10
				660/690 V	-
Service breaking capacity (kA)		Ics		220/230 V	25kA
				380/400 V	17kA
Suitability for Isolation					■
Utilisation category					A
Durability (C-O cycles)	Mechanical				13000
	Electrical	415 V	In		4000
Protection					
Trip units					Thermal-magnetic
Overload protection		Long time	Ir (In x ...)		0.8 to 1xIn
Short-circuit protection		Short time	Isd (Ir x ...)		-
		Instantaneous	Ii (In x ...)		■
Indication and control auxiliaries					
Auxiliary switch					■
MX shunt release					■
MN under-voltage release					■
Installation					
Accessories		Terminal extensions and spreaders			-
		Terminal shields			■
		interphase barriers			■
Dimensions (mm) W×H×D		Fixed, front connection 3P/4P			75x130x60/ 100x130x60
Weight (kg)		Fixed, front connection 3P/4P			0.78/1.0

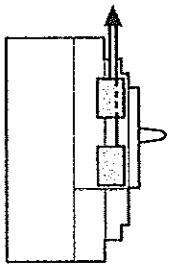


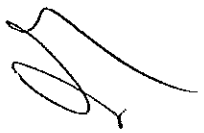
EasyPact CVS100BS

Connection of electrical auxiliaries

Fixed configuration

Auxiliary circuits exit the device through a knock-out in the front cover.





Each auxiliary device is equipped with a terminal block with numbered terminals for connection of wires up to:
- *1.5mm² for auxiliary contacts and voltage releases*

EasyPact CVS100BS auxiliary contacts

EasyPact CVS100BS auxiliary switch

This auxiliary contacts can display status of circuit breakers remotely, and therefore can be used for indications electrical interlocking, relay control. etc.

Functions

- OF (On/off): Indicate position of circuit breaker contacts.
- SD (Trip indication): Indicate trip conditions of circuit breakers due to: overload, short-circuit,under-voltage or operation of the "push to trip" button. It returns to de-energised state when the circuit breaker is reset.

EasyPact CVS100BS multifunctional auxiliary switch

- OF/SD (Auxiliary + alarm): Indicateposition of circuit breaker contacts and trip condi- Qtions of circuit breakers.

Standard

This auxiliary contacts comply with IEC 947-5.

Installation and connection

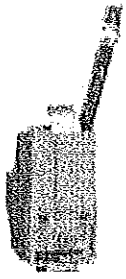
- This auxiliary contacts clip into slot behind the front cover of the circuit breaker.
- The conductor connected to the central terminal block has a cross section up to 1.0mm².

All auxiliary contacts can be used to switch on/off electronic loads.

Electrical characteristics		In: 100A	
Rated thermal current (A)		5	
Minimum load		10mA, 24V	
Utilisation (IEC 947-4-1)		AC12	AC15
Operating current (A)	110V	5	3
	220~240V	3	2
	380~440V	-	-

Voltage tripping

The voltage releases can trip the circuit breaker.



EasyPact CVS100BS Voltage Release

Under-voltage release (MN) trips the circuit breaker:

- When the tripping threshold drops below the rated voltage of the trip unit.
- The tripping threshold is 0.35 to 0.7 times the rated voltage.
- If the circuit breaker can be closed when the voltage exceeds 0.85 times the rated voltage.

Circuit breaker tripping by an MN release meets the requirements of standard IEC60947-2.

Shunt releases (MX)

The circuit breaker will trip by this release if the control voltage exceeds 0.7 × Un.

Control signals can be of the impulse type (≥20 ms) or maintained.

Operation

- The circuit breaker can be reset locally or remotely after tripping by a MN or MX release.
- MN or MX tripping is faster than manual tripping (or trip by electric mechanism). In the presence of a standing trip order, other operations will not be executed.
- Endurance:
  - EasyPact CVS100BS circuit breaker, typically 50% of the rated mechanical endurance of the circuit breaker

Installation and connection

- The circuit breaker panel has MX and MN releases at the rear part.
- Connection using wires up to 1.5mm².

For EasyPact CVS100BS		EasyPact CVS100BS	
		AC	DC
Consumption	Pick-up (MX)	< 10VA	< 10W
	Seal-in (MN, MNR)	< 5VA	< 5W
Response time (ms)		< 50	< 50

Note: 1. CVS100BS: select any two from three auxiliary switches (OF, SD, OF/SD).

Rotary handle

Two types of rotary handle are available:

- Direct rotary handle
- Extended rotary handle

EasyPact CVS100BS with a direct rotary handle

Direct rotary handle

Protection degree: IP40, IK07, IP54

Operation

- Function:
  - Suitability for isolation
  - Indications of three positions including O (OFF), I (ON) and Tripped
  - Access to "push-to-trip" button
- Circuit breaker locking capability in the OFF position by 1 to 3 padlocks, with a shackle diameter 5 to 8 mm (not supplied)

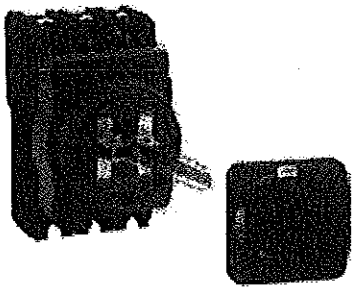
Installation

The front cover of the circuit breaker can be removed and replaced by the extended handle.

EasyPact CVS100BS series

The direct rotary handle is used in the following cases:

- Switchboards in motor control center (MCC):
  - Circuit-breaker closing is disabled if the door is open.
  - Door opening is disabled when the circuit breaker is ON.
  - Protection degree: IP43, IK07 (IP54, IK08)
  - Machine tool control, in compliance with CNOMO E03.81.501N, with a protection degree of IP54, IK08



EasyPact CVS100BS with an extended rotary handle

Extended rotary handle

The circuit breaker on the switch cabinet can be operated with the rotary handle on the front.

Protection degree: IP55, IK08, IP54

OperationFunctions:

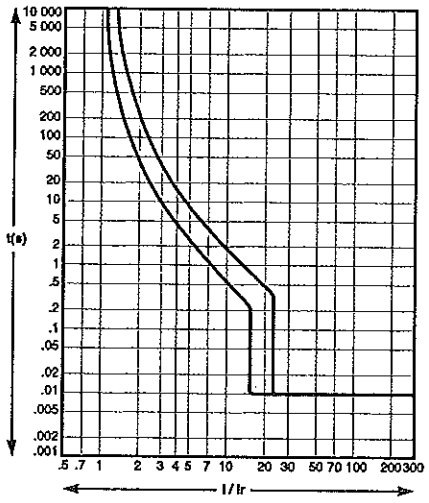
- Suitability for isolation
  - Indications of three positions including O (OFF), I (ON) and Tripped
  - Access to trip unit settings, when the switchboard door is open.
- Circuit breaker closing is disabled if the door is open.
- Circuit breaker locking capability in the OFF position by 1 to 3 padlocks, with a shackle diameter 5 to 8 mm (not supplied). These are used to prevent the door from being opened.

The extended rotary handle is made up of:

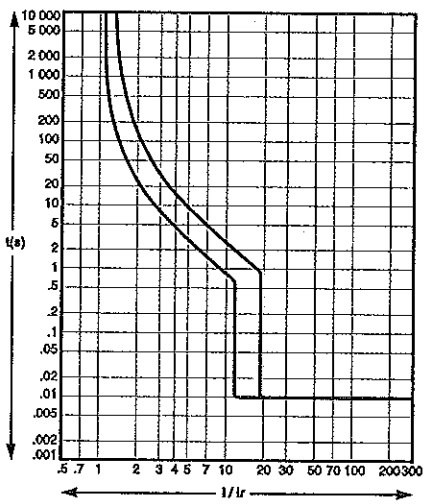
- A unit that replaces the front cover of the circuit breaker [1].
- An assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is horizontally or vertically installed.
- An extension shaft that must be adjusted to the distance. The distance between the back of the circuit breaker and door is:
  - EasyPact CVS100BS: 145~422mm

Tripping Curve EasyPact CVS100BS
Power Distribution Protection System

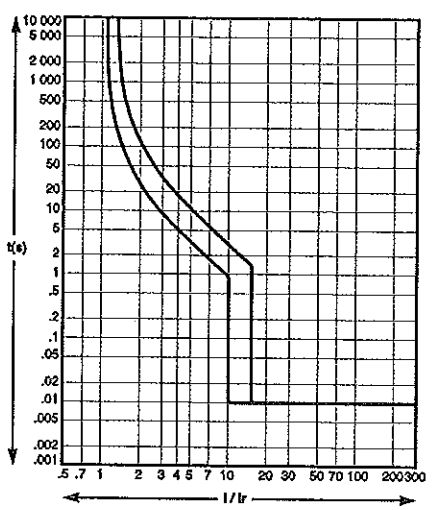
16 A



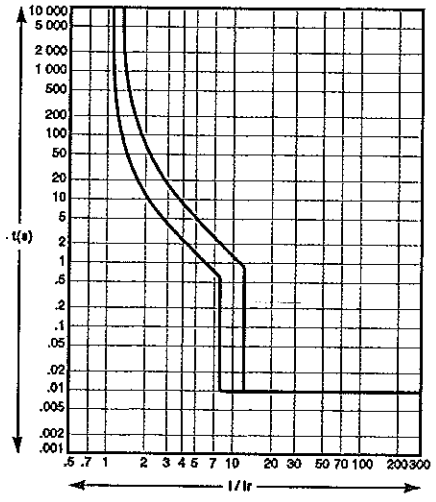
20 A



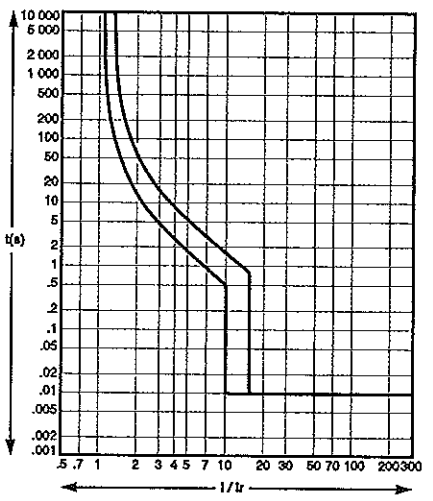
25 A



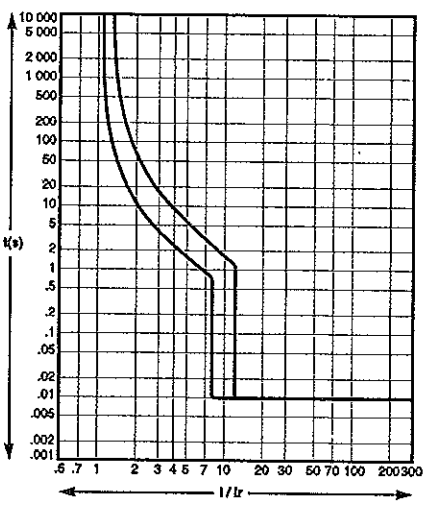
32 A



40 A

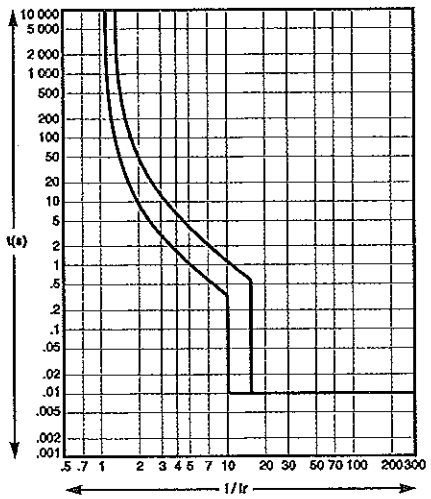


50 A

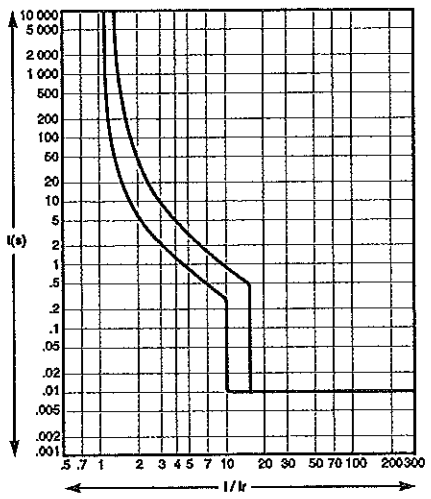


Tripping Curve EasyPact CVS100BS
Power Distribution Protection System

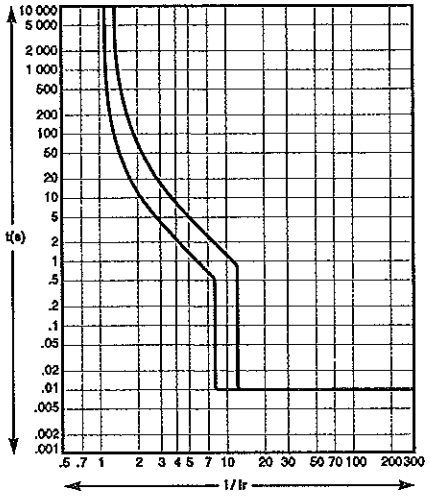
63 A



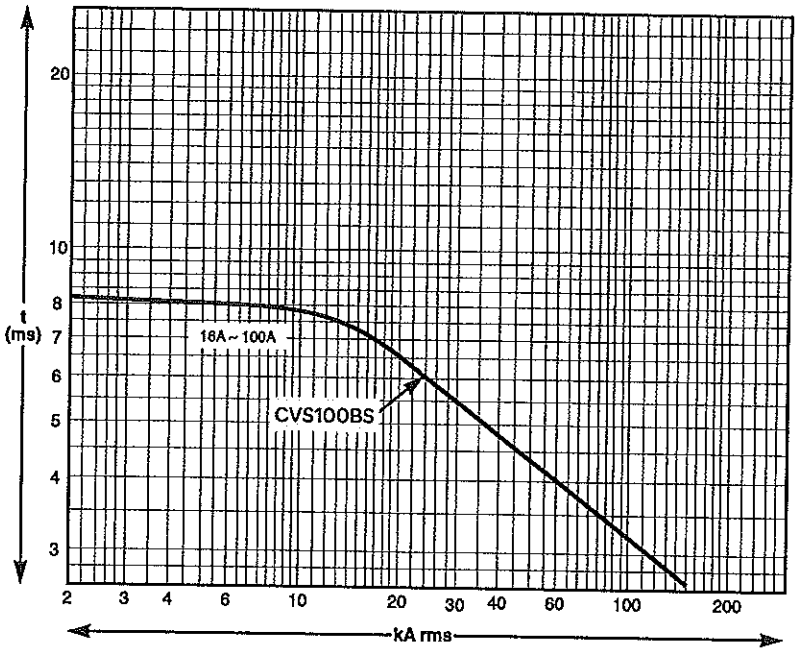
80 A



100 A



Tripping Curve Reflex tripping



EasyPact CVS devices incorporate the exclusive reflex-tripping system. This system breaks very high fault currents by mechanically tripping the device via a "piston" actuated directly by the pressure produced in the breaking units resulting from a short-circuit.

For high short-circuits. this system provides a faster break and a trip guarantee. as well as natural total discrimination. Reflex-tripping curves are exclusively a function of the circuit-breaker rating.

Temperature derating of trip units

EasyPact CVS100BS

Rating (A)	40°C	45°C	50°C	55°C	60°C	65°C	70°C
16	16.7	16.3	16.0	15.7	15.6	15.1	14.7
20	20.4	20.2	20.0	19.7	19.2	18.9	18.5
25	25.7	25.3	25.0	24.7	24.5	24.3	24.0
32	33.5	32.7	32.0	31.4	31.0	30.4	29.9
40	40.9	40.4	40.0	39.5	38.0	37.6	37.1
50	52.1	51.0	50.0	49.3	48.1	47.3	46.6
63	64.9	63.9	63.0	62.0	60.4	59.4	58.5
80	82.2	81.1	80.0	78.6	77.3	76.7	76.1
100	103.0	101.0	100.0	99.0	94.0	94.0	93.0

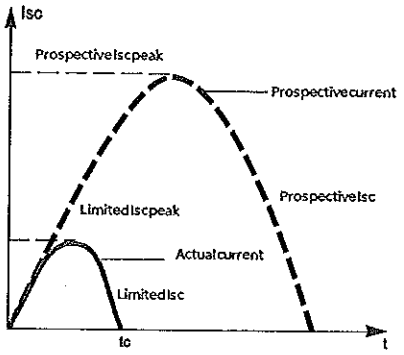
Altitude Derating of trip units

Altitude does not significantly affect circuit-breaker characteristics up to 2000 m. Above this altitude, it is necessary to take into account the decrease in the dielectric strength an cooling capacity of air. It should be noted that the breaking capacity remained unchanged.

EasyPact CVS100BS

Height (m)	2000	2600	3900
Dielectric strength (V)	3000	2850	2400
Maximum operation voltage (V)	690	655.5	552
Nominal current at 40°C(A)	1 x In	0.95 x In	0.8 x In

Current-limiting capacity refers to the ability of a circuit breaker to limit short-circuit current.



Ics 17kA

Current-limiting performance of EasyPact CVS100BS series helps lower power generated by fault current, and consequently improves breaking capacity of the circuit-breaker. Ics 17kA.

Extension of service life of electrical installation

Circuit breaker current-limiting technology greatly reduces damage to installation caused by short-circuit current.

Thermal effect
lowers temperature rise and extend service life of cable.

Mechanical effect
Risks of contact and busbar distortion and damage are greatly reduced since the electrodynamic force is decreased.

Electromagnetic effect
Disturbance on surrounding measurement instrument is relieved.

Current-limiting curve

Current-limiting capacity of a circuit breaker can be represented by two curves. It varies with the value of prospective short-circuit current (short-circuit current without any protective device).

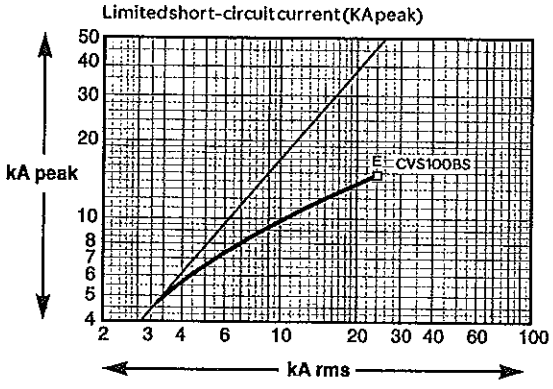
- Actual peak current (current-limiting)
- Thermal effect (A^2s), which means energy loss of a 1Ω conductor carrying the short-circuit current.

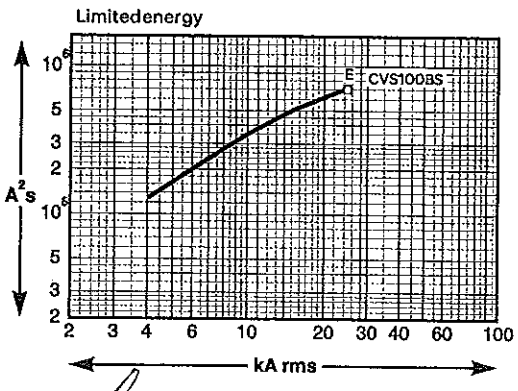
Maximum allowable thermal stress of cable

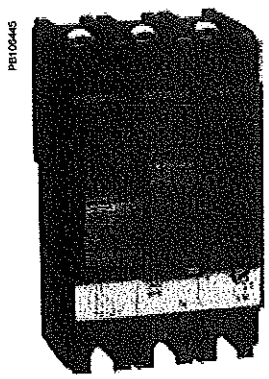
The maximum allowable overheat values (in A^2s), dependent on cable insulation material (Cu or Al) and cross section (mm^2), are listed in the following table.

Cross section (mm^2)		1.5	2.5	4	6	10
PVC	Copper	2.97×10^4	8.26×10^4	2.12×10^5	4.76×10^5	1.32×10^6
	Aluminum					5.41×10^5
PRC	Copper	4.10×10^4	1.39×10^5	2.92×10^5	6.56×10^5	1.82×10^6
	Aluminum					7.52×10^5
Cross section (mm^2)		**16**	**25**	**35**	**50**	
	Copper	3.4×10^5	8.26×10^6	1.62×10^7	3.31×10^7	
	Aluminum	1.39×10^6	3.38×10^5	6.64×10^6	1.35×10^7	
PRC	Copper	4.69×10^6	1.39×10^7	2.23×10^7	4.56×10^7	
	Aluminum	1.93×10^6	4.70×10^6	9.23×10^6	1.88×10^7	

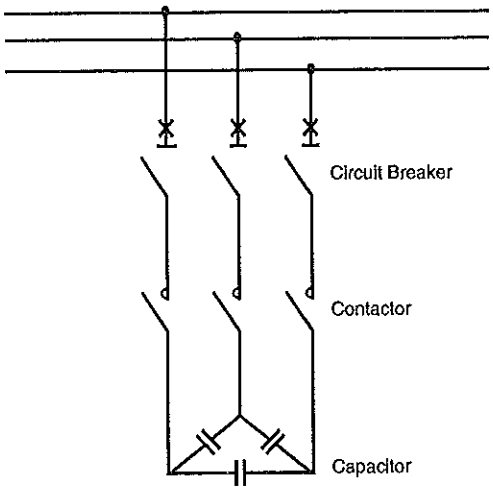
Current-limiting curves of EasyPact CVS100BS







EasyPact CVS100BS



EasyPact CVS100BS circuit breaker is suitable for capacitor protection following the rules below:

■ **Inc = Nominal current of the capacitor**

$$Inc = \frac{Qc}{U\sqrt{3}}$$

Inc = Nominal Current Capacitor (A)
Qc = Reactive power (kVAR)
U = Nominal Voltage (V)

■ **Inb = Nominal current of the circuit breaker**
□ Inb = 1.36 x Inc for standard equipment
□ Inb = 1.5 x Inc for overrated type equipment
□ Inb = 1.12 x Inc for detuned type equipment: 2.7 tuning
□ Inb = 1.19 x Inc for detuned type equipment: 3.8 tuning
□ Inb = 1.31 x Inc for detuned type equipment: 4.3 tuning
□ the short-circuit (magnetic) protection-setting thresholds must enable passage of the energising transients: 10 x Inc for standard, overrated and detuned type equipment.

■ **Icu = Ultimate breaking capacity of the circuit breaker**
Icu short-circuit level is given by the installation.

Example:

Table at 400 V AC - 3 phases 50 Hz for standard equipment.

Reactive power (kVAR)	Inc (A)	Inb (A)	Breaking capacity to Circuit Breaker 30 kA
7.5	11	16	CVS100BS3016
10	14	20	CVS100BS3020
15	22	30	CVS100BS3030
20	29	40	CVS100BS3040
30	43	60	CVS100BS3060
40	58	80	CVS100BS3080
50	72	100	CVS100BS3100

EasyPact CVS100BS

Product specification	In	Catalogue number	
		3P3D	4P3D
CVS100BS			
	16	LV510930	LV510950
	20	LV510931	LV510951
	25	LV510932	LV510952
	32	LV510933	LV510953
	40	LV510934	LV510954
	50	LV510935	LV510955
	63	LV510936	LV510956
	80	LV510937	LV510957
	100	LV510938	LV510958

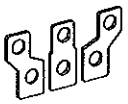
Connection accessories

Cable lugs

≤ 50 A	Cables from 2.5 to 16 mm²	Set of 2	**EZALUG0502**
		Set of 3	**EZALUG0503**

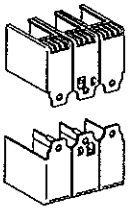
> 50 A	Cables from 10 to 50 mm²	Set of 2	**EZALUG1002**
		Set of 3	**EZALUG1003**

Spreaders



Spreaders for 3P breaker	Set of 3	**EZASPDR3P**
Spreaders for 4P breaker	Set of 4	**EZASPDR4P**

Terminal shields

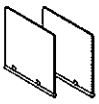


Terminal shields for 3P breaker	Set of 2	**EZATSHD3P**
Terminal shields for 4P breaker	Set of 2	**EZATSHD4P**

Sealing screws

Sealing screws	Set of 2	**EZASSCR**

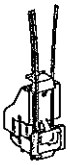
Phase barriers



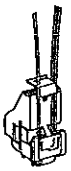
Phase barriers	Set of 2	**EZAFASB2**

Electrical auxiliaries

Indication contacts



Auxiliary switch (AX)	**EZAUX10**

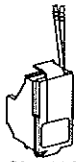


Alarm switch (AL)	**EZAUX01**

Auxiliary switch + alarm switch (AX + AL)	**EZAUX11**

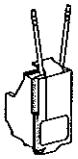
Electrical auxiliaries (cont.)

Voltage releases



Shunt trip (SHT)

	Voltage	MX/SHT
AC	100-130 V	EZASHT100AC
	200-277 V	EZASHT200AC
	380-480 V	EZASHT380AC
DC	24 V	EZASHT024DC
	48 V	EZASHT048DC

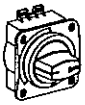


Under voltage release (UVR)

	Voltage	MN/UVR
AC	110-130 V	EZAUVR110AC
	200-240 V	EZAUVR200AC
	277 V	EZAUVR277AC
	380-415 V	EZAUVR380AC
	440-480 V	EZAUVR440AC
DC	24 V	EZAUVR024DC
	48 V	EZAUVR048DC
	125 V	EZAUVR125DC

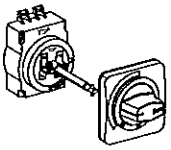
Rotary handles

Direct rotary handle (for 3/4P breaker)



Direct rotary handle (black)	EZAROTDS
Direct rotary handle (red/yellow)	EZAROTDSRY

Extended rotary handle (for 3/4P breaker)



Extended rotary handle (black)	EZAROTE
Extended rotary handle (red/yellow)	EZAROTERY

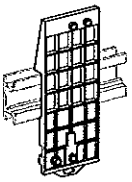
Locks

Padlocking system

Padlocking system	EZALOCK

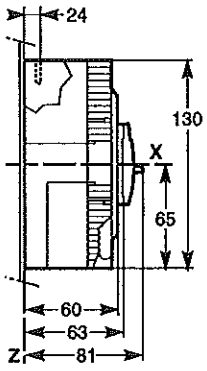
Installation accessory

DIN rail adaptor

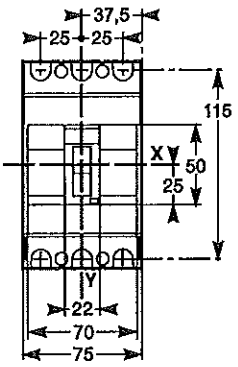


For 2 x 1P or 1 x 2P or 1 x 3P breaker	EZADINR
Note: for 4P breaker, use 2 adaptors	

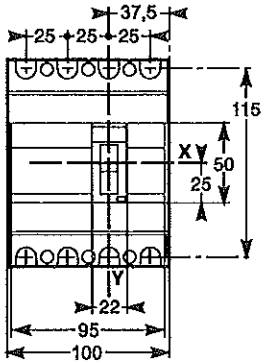
Dimensions



3P

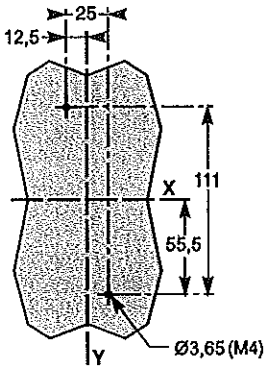


4P



Backplate mounting

3P



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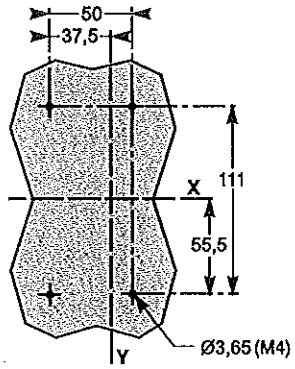
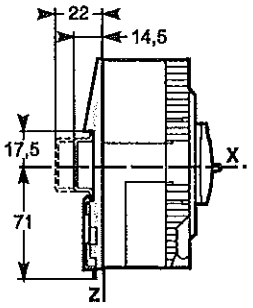
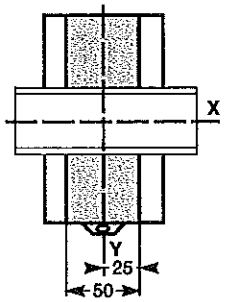
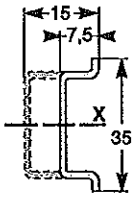


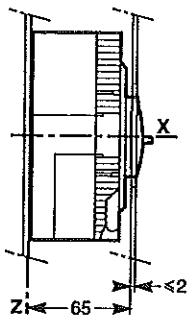
DIN rail mounting



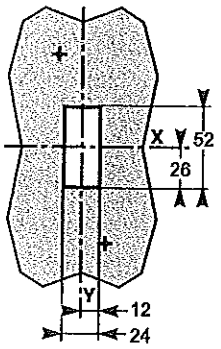




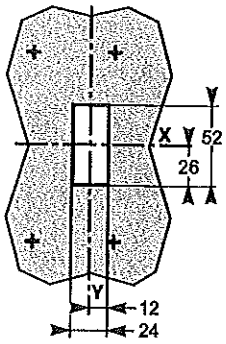
Front panel cutout (small)



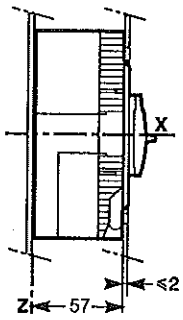
3P



4P



Front panel cutout (large)



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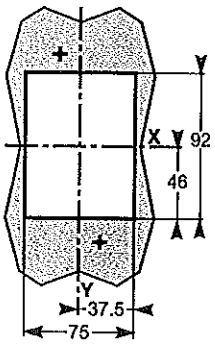
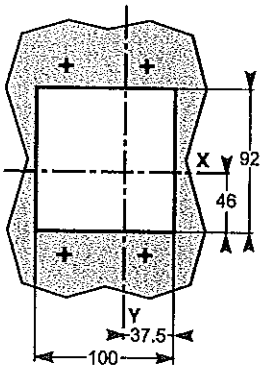
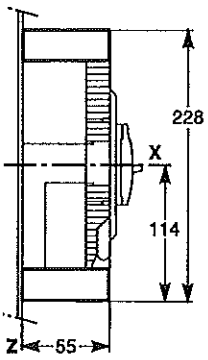


4P



Accessories EasyPact CVS100BS

Terminal shield



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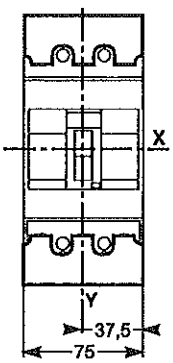

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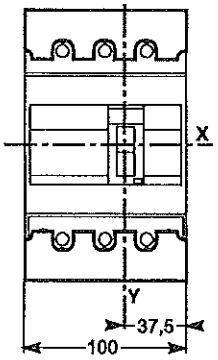
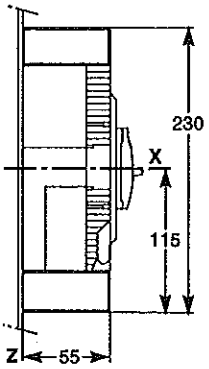


Interphase barrier



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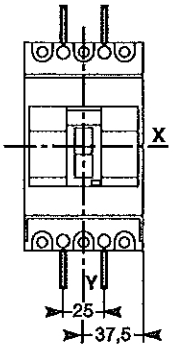

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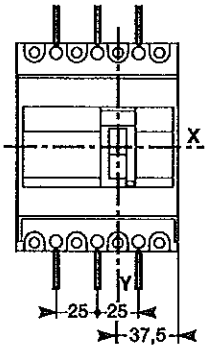
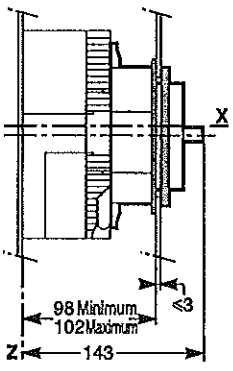


Direct rotary handle



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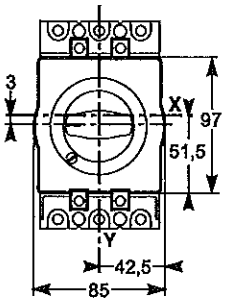

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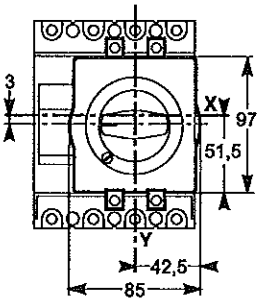
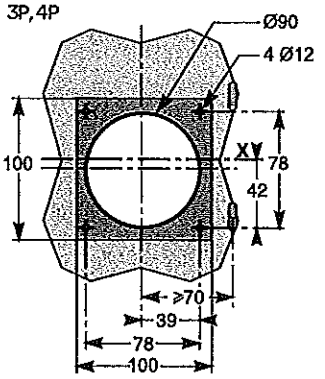
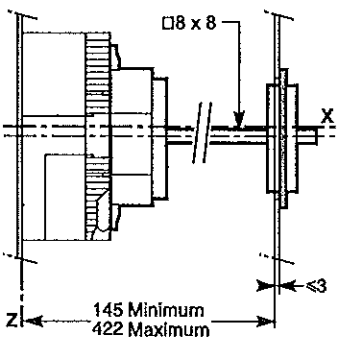


3P, 4P



Extended rotary handle



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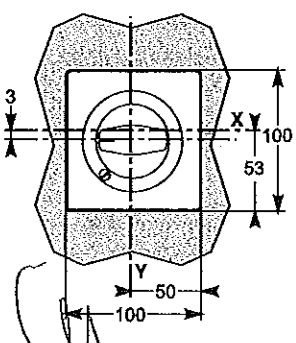

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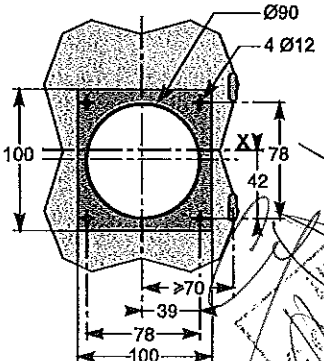

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LVED210011EN

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

This document has been printed on ecological paper

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Photos: Schneider Electric
Printed:

05-2013

Декларация

Шнайдер Електрик България ЕООД

Продуктова група: **Easypact CVS**

Декларация за съответствие

Долуподписаният, фирма Шнайдер Електрик България ЕООД с адрес София 1766, Бизнес Парк София, сграда 4, ЕИК по Булстат 121587769, тел. 02/9329320 декларира на собствена отговорност, че продуктите:
Автоматични прекъсвачи Easypact CVS, както и спомагателните устройства към тях с търговска марка Schneider Electric са в съответствие с:

- Наредба 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., в сила от 14.01.2003 г., изм. и доп., бр. 74 от 22.08.2003 г., бр. 24 от 21.03.2006 г., в сила от 21.03.2006 г., изм., бр. 40 от 16.05.2006 г., в сила от 5.05.2006 г., изм. и доп., бр. 37 от 8.05.2007 г.

- Наредба за съществените изисквания и оценяване на съответствието за електромагнитна съвместимост. Приета с ПМС № 203 от 29.08.2001 г., обн., ДВ, бр. 78 от 11.09.2001 г., изм., бр. 13 от 11.02.2003 г., изм. и доп., бр. 65 от 27.07.2004 г.

Гореспоменатите продукти съответстват на изискванията на стандарти
БДС EN 60947-1, БДС EN 60947-2, които въвеждат съответните хармонизирани европейски стандарти.

Кристоф де Лафарж
Управител

ШНАЙДЕР ЕЛЕКТРИК БЪЛГАРИЯ ЕООД София

София
04.02.2014

Катина Александрова
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129

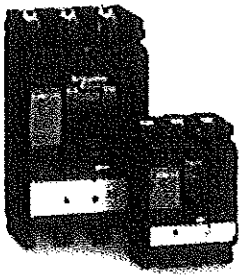
Power Business Unit

Schneider Electric

Low Voltage Line of Business

Déclaration de conformité CE
CE Declaration of Conformity

Référence / *Reference* /:LV_easypactCVS_2012/05/29



Produit : **Easypact CVS de 16 à 630 A,**
Product :Easypact CVS from 16 to 630A

Déclarons que les disjoncteurs, marque Schneider Electric, référence commerciale Easypact
hereby declare that the circuit breakers, trademark Schneider Electric, commercial reference Easypact

Modeles / Models :
CVS100-160-250 B/F
CVS400-630F/N

et tous ses auxiliaires / *and all their auxiliaries*

Répondent de par leur conception et leur construction aux exigences des Directives européennes et normes applicables

Through their design and construction meet the requirements of the European Directives and applicable standards

Directives / *Directives*
Basse Tension 2006/95/CE – *Low Voltage 2006/95/EC-*
CEM 2004/108/CE - *EMC 2004/108/EC*

Normes / *Standards*
IEC/EN 60947-1, IEC/EN60947-2

Sous réserve d'installation, d'entretien et d'utilisation conformes à leur destination, à la réglementation et aux normes applicables au sein du pays d'installation, aux instructions du constructeur et aux règles de l'art.

When subject to correct installation, maintenance and use conforming to their intended purpose, according to applicable regulations and standards in the country where they are installed, to the supplier's instructions and to accepted rules of the art.

Le marquage CE sur le(les) produits et/ou son (leur) emballage signifie que Schneider Electric tient à la disposition des autorités de l'Union Européenne le(s) dossier(s) technique(s) de référence.

The CE mark on the product(s) and/or its (their) packaging signifies that Schneider Electric holds the reference technical file(s) available to the European authorities.

Eric Bouvier
Directeur LV Qualité / Support technique pays.
LV Quality / Countries Technical Support Director

Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Reference No. ..... :	3302408.51
Date of issue ..... :	2012-03-20
Total number of pages	149
CB Testing Laboratory..... :	DEKRA Testing Services (Zhejiang) Co., Ltd.
Address ..... :	No. 5, Changjiang Road, Great Bridge Industrial Park, North Baixiang 325603, Wenzhou, Zhejiang, China
Applicant's name..... :	Schneider Electric Industries SAS
Address ..... :	35, Rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Test specification:	
Standard..... :	IEC 60947-2:2006 (4th Edition) + amendment 1: 2009
Test procedure ..... :	CB
Non-standard test method..... :	N/A
Test Report Form No. ..... :	IEC60947_2F
Test Report Form(s) Originator..... :	KEMA Quality BV
Master TRF ..... :	Dated 2010-01

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

Test item description ..... :	Moulded-Case Circuit-Breaker
Trade Mark..... :	Schneider Electric
Manufacturer ..... :	Schneider Electric Industries SAS
	35, Rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Model/Type reference ..... :	EasyPact series
	CVS400F/400N/630F/630N
Ratings ..... :	Electronic or Thermo-magnetic (TM)
	EasyPact CVS400F/N: 320, 400 A (TM type)
	EasyPact CVS630F/N: 500, 600 A (TM type)
	EasyPact CVS400F/N: 400 A (Electronic type)
	EasyPact CVS630F/N: 630 A (Electronic type)
	Ue = 220 / 240 V, 380 / 415 V, 440 V, 50 / 60 Hz
	3 poles and 4 poles (3P+N, N marked, N has overcurrent protection)
	see further rating on page 6 to 11

Testing procedure and testing location:	
☒ **CB Testing Laboratory:**	DEKRA Testing Services (Zhejiang) Co., Ltd.
Testing location/ address ..... :	No. 5, Changjiang Road, Great Bridge Industrial Park, North Baixiang, 325603 Wenzhou, Zhejiang, China
☐ **Associated CB Laboratory:**	N/A
Testing location/ address ..... :	N/A
Tested by (name + signature)..... :	Fred Fu
Approved by (+ signature)..... :	Eric Wang
☐ Testing procedure: TMP	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A
☒ Testing procedure: WMT	Clab, Shanghai Branch Schneider Electric (China) Investment Co. Ltd
Tested by (name + signature)..... :	Pan Chen
Witnessed by (+ signature) ..... :	Fred Fu
Approved by (+ signature)..... :	Eric Wang
Testing location/ address ..... :	333 Banqiao Eastern Road, 201508 Jinshan, Shanghai, China
☐ Testing procedure: SMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: RMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A

Summary of testing:

Tests performed (name of test and test clause):

Number of poles	Rated current	Electronic / TM	Test voltage	Seq II+III (3 phase test)	Seq III (3 phase test)	Seq IV (3 phase test)	Annex F 7/8/9	Annex F EMC	Annex H
4P	630 A	Electronic	440 V		X*	X	X		X
	400 A	Electronic						X	
	600 A	TM			X*				X
	630 A	Electronic	240 V	X					
	400 A	Electronic			X				
	600 A	TM		X					
	400 A	TM			X				
	320 A	TM			X				
	630 A	Electronic	415 V		X				
	600 A	TM			X				
3P	630 A	Electronic	440 V		X*				
	600 A	TM			X*				
	630 A	Electronic	240 V		X				
	400 A	Electronic			X				
	600 A	TM			X				
	400 A	TM			X				
	320 A	TM			X				
	630 A	Electronic	415 V		X				
	600 A	TM			X				

Testing location:

Tests of short-circuit sequence II / III / B.10 and EMC tests were conducted in:
Shanghai testing & inspection institute for electrical equipment
No.505 Wu Ning Road,
Shanghai,
China

All other tests were conducted in:
DEKRA Testing Services (Zhejiang) Co., Ltd.
No.5 Changjiang Road, Great Bridge Industrial Park,
North Baixiang,
Wenzhou,
Zhejiang,
China

Note:

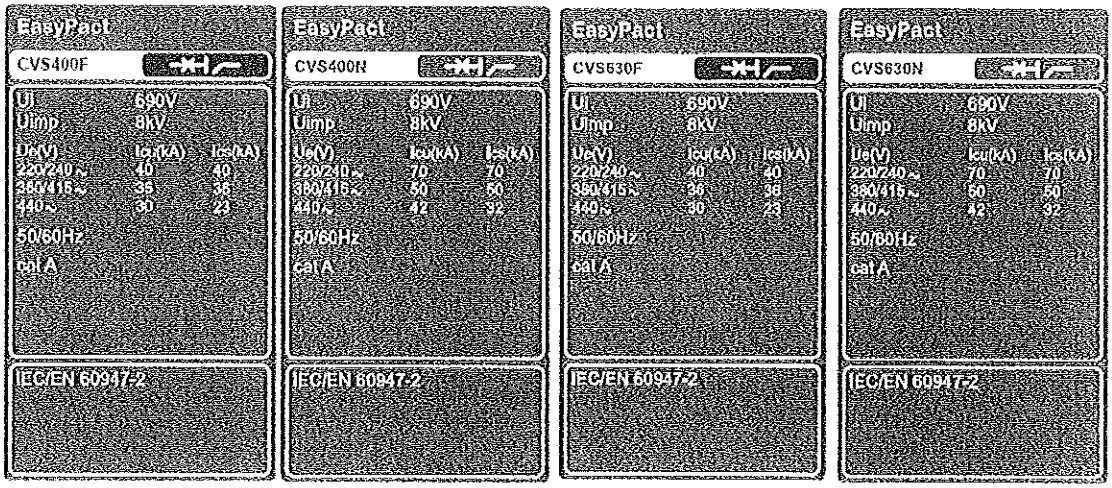
"X" means the test is applicable.

"*" test with supply reversed

The electronic MCCB from 400 - 630 A is within one frame, there are 2 construction breaks:

400 A, 630 A The Thermo-magnetic MCCB from 320 - 600 A is within one frame, there are 2 construction breaks: 320 A ~ 400 A, 630 A	
Summary of compliance with National Differences: N/A	

Copy of marking plate



Note:

The markings for circuit breakers are same except the type reference, the rated current, short-circuit capacity and the number of poles may be different.

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). :	A
3.2. Interruption medium: (air, vacuum, gas Break) :	Air
3.3. Design: (open construction, moulded case) :	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) :	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable) :	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable) :	Non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable :	Fixed
3.8. Degree of protection: (IP code) :	IP40 for front cover
4.7. Type of release (thermo-magnetic / electronic) :	Electronic or Thermo-magnetic (TM)
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD :	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B :	A and B for TM type
	A for electronic type
Circuit-breaker for use on phase-earthed systems :	N/A
Circuit-breaker for use in IT systems :	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V) :	220 / 240 V, 380 / 415 V, 440 V
- rated insulation voltage: Ui (V) :	690 V
- rated impulse withstand voltage: Uimp (kV) :	8 kV
- rated operational current: Ie (A) :	0,7 ~ 1,0 In for TM type
	0,5 ~ 1,0 In for electronic type
- kind of current :	AC
- conventional free air thermal current: Ith (A) :	Equal to In
- conventional enclosed thermal current: Ithe (A) :	N/A
- current rating for four-pole circuit-breakers: (A) :	N/A
- number of poles :	3 or 4
- rated frequency: (Hz) :	50 / 60 Hz
- integral fuses (rated values) :	N/A

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Rated duty :		
- eight-hour duty	:	N/A
- uninterrupted duty: Iu (A)	:	Equal to In
Short-circuit characteristic :		
rated short-time making capacity: Icm (kA)	:	EasyPact CVS400/630F: 84 kA at 220 / 240 V, 75,6 kA at 380 / 415 V, 63 kA at 440 V EasyPact CVS400/630N: 154 kA at 220 / 240 V 105 kA at 380 / 415 V 88,2 kA at 440 V
rated ultimate short-circuit breaking capacity: Icu (kA)	:	EasyPact CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V EasyPact CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V
rated service short-circuit breaking capacity: Ics (kA)	:	EasyPact CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V EasyPact CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V
rated short-time withstand current: Icw (kA/s)	:	10 In at 220 / 240 / 380 / 415 / 440 V

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Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) ..... :	N/A
- rated frequency: (Hz) ..... :	N/A
- rated control circuit voltage: Uc (nature, frequency, V) ... :	N/A
- rated control supply voltage: Us (nature, frequency V) ... :	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	N/A
- rated pressure and its limit ..... :	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation ..... :	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits ..... :	N/A
- rated operational voltage Ue (V) ..... :	N/A
- rated insulation voltage: Ui (V) ..... :	N/A
- rated operational current: Ie (A) ..... :	N/A
- kind of current ..... :	N/A
- rated frequency: (Hz) ..... :	N/A
- number of circuits ..... :	N/A
- number and kind of contact elements ..... :	N/A
- rated uninterrupted current: Iu (A) ..... :	N/A
- utilization category: (AC, DC, current and voltage) ..... :	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA) ..... :	N/A
- kind of protective device ..... :	N/A

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Releases :	
1) shunt release	: N/A
2) Over-current release	: Yes
a) instantaneous	: Yes
b) definite time delay	: N/A
c) inverse time delay	: Yes
- independent of previous load	: Electronic type
- dependent on previous load; (for example thermal type release)	: Thermo-magnetic (TM) type
3) Undervoltage release (for opening)	: N/A
4) Other releases	: N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V) ...	: N/A
- kind of current	: N/A
- rated frequency: (if AC)	: N/A
2) Over-current release	
- rated current	: EasyPact CVS400F/N: 320, 400 A (TM type) EasyPact CVS630F/N: 500, 600 A (TM type) EasyPact CVS400F/N: 400 A (Electronic type) EasyPact CVS630F/N: 630 A (Electronic type)
- kind of current	: AC
- rated frequency: (if AC)	: 50 / 60 Hz

- current setting (or range of settings)..... :	**Inverse time delay (Ir):** TM type: 320 A, 290 A, 255 A, 225 A for In = 320 A 400 A, 360 A, 320 A, 280 A for In = 400 A 500 A, 450 A, 400 A, 350 A for In = 500 A 600 A, 540 A, 480 A, 420 A for In = 600 A Electronic type: 200 A, 250 A, 280 A, 320 A, 360 A, 400 A for In = 400 A 315 A, 370 A, 440 A, 505 A, 565 A, 630 A for In = 630 A **Instantaneous tripping (Ii):** TM type for 2 phase poles in series 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 600 A 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 500 A 2000 A, 2400 A, 2800 A, 3200 A, 3600 A, 4000 A for In = 400 A 1500 A, 1920 A, 2240 A, 2560 A, 2880 A, 3200 A for In = 320 A TM type for single pole 1,2 Ii Electronic type for 2 phase poles in series 11 In Electronic type for single pole Ii **Definite time delay for electronic type (Isd):** 2 ~ 10 Ir with step of 1 Ir

- time settings (or range of settings) ..... :	Inverse time delay: fixed Instantaneous tripping: fixed Definite time delay Tsd = 60 ms with tolerance of - 40 / 0 ms

Classification of installation and use..... :	Fixed
Supply Connection ..... :	3 phase or 3 phase with Neutral
Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing	
Date of receipt of test item ..... :	2011-6
Date (s) of performance of tests ..... :	2011-7 ~ 2011-12

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.

EasyPact CVS series F type and EasyPact CVS series N type are fully identical except the different short-circuit capacity on the marking.

Therefore, EasyPact CVS series F type was subjected to full test program with the rating of N type to cover both types.

EasyPact CVS series MCCB and Vigi CVS series MCCB in report 3302408.51 are identical except that Vigi CVS series MCCB is equipped with additional residual current unit.

Except the tests mentioned on page 3, all ther other tests conducted on Vigi CVS MCCB are deemed to cover the EasyPact CVS series MCCB. The test results are laid down in report 3302408.50.

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

Though it is not mentioned on the first page, the following standard was also taken into consideration. No deviation was found:

EN 60947-2:2006 +A1:2009

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General product information:

The products of TM type for testing are a series of moulded- case circuit-breakers in one frames with 1 construction break:

EasyPact CVS400F/N: 320, 400 A

EasyPact CVS630F/N: 500, 600 A

The products of electronic type for testing are a series of moulded- case circuit-breakers in one frames with 1 construction break:

EasyPact CVS400F/N: 400 A

EasyPact CVS630F/N: 630 A

For other technical data, refer to page 6 to 11 of this report.

Factory location 1: Schneider (Beijing) Medium & Low Voltage Co., Ltd.
No.2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing, China

Factory location 2: Schneider Electric India Private Limited
Survey #215, Gagillapur Village, Medak Road, Hyderabad, Andhra Pradesh, India

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	630 A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used		P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	Schneider Electric	P
	- type designation or serial number	EasyPact CVS630N	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN 60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	220 / 240 V, 380 / 415 V, 440 V	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	Suitable for IT systems	N/A
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50 / 60 Hz	P
	- rated service short-circuit breaking capacity. Ics	70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V	P
	- rated ultimate short-circuit breaking capacity. Icu	70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	connection is immaterial	N/A
	- neutral pole terminals, if applicable, by the letter N		P
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C	40 °C	P
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	690 V	P
	- rated impulse withstand voltage (Uimp), when declared.	8 kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:	IP40 for front cover only	N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B	A	P
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal		N/A
	- load terminal		N/A
	- neutral pole terminal "N"		P
	- protective earth terminal ⏚		N/A
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1	CONSTRUCTION		P
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	8 kV	
	- max. value of rated operational voltage to earth	600 V	
	- nominal voltage of supply system:	220 / 240 V, 380 / 415 V, 440 V	
	- overvoltage category:	III	
	- pollution degree:	3	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	8 mm	
	- measured clearances (mm):	≥ 10 mm See table 8	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1	CONSTRUCTION		P
7.1.1	Withdrawable circuit-breaker		N/A
	In the disconnected position (main- and auxiliary circuits)		
	Isolating distances for circuit-breaker suitable for isolating warranted:		N/A
	Mechanism fitted with a reliable indicating device with indicates the position of the isolating contacts.		N/A
	Mechanism fitted with interlocks which only permit the isolating contacts to be separate or re-closed when main contacts are open		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when the isolating contacts are fully closed.		N/A
	Mechanism fitted with interlock, which only permit the main contacts to be closed when in disconnected position.		N/A
	The isolating distances between the isolating contacts cannot be inadvertently reduced.		N/A
7.1.2.1 part 1	Resistance to abnormal heat and fire		P
7.1.3 part 1	Current-carrying parts and their connection		P
7.1.4	Clearances and creepage distances:		
	For circuit-breakers for which the manufacturer has declared a value of rated impulse withstand voltage. (Uimp.)		
	Clearances distances:		
	- Uimp is given as:	8 kV	
	- max. value of rated operational voltage to earth	600 V	
	- nominal voltage of supply system:	220 / 240 V, 380 / 415 V, 440 V	
	- overvoltage category:	III	
	- pollution degree:	3	
	- field-in or homogeneous:	Inhomogeneous	
	- minimum clearances (mm):	8 mm	
	- measured clearances (mm):	≥ 10 mm See table 8	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Creepage distances:		
	- rated insulation voltage Ui (V)	690 V	
	- pollution degree	3	
	- comparative tracking index (V)	175 V	
	- material group	IIIa	
	- minimum creepage distances (mm)	10 mm	
	- measured creepage distances (mm)	≥ 16 mm See table 8	P
7.1.5 part 1	Actuator		
7.1.5.1 part 1	Insulation		
	The actuator of the equipment shall be insulated from the live parts for the rated insulation voltage and, if applicable, the rated impulse withstand voltage		P
	If it is made of metal, it shall be capable of being satisfactorily connected to a protective conductor unless it is provided with additional reliable insulation		N/A
	If it is made of or covered by insulating material, any internal metal part, which might become accessible in the event of insulation failure, shall also be insulated from live parts for the rated insulation voltage		P
7.1.5.2	Direction of movement		
	The direction of operation for actuators of devices shall normally conform to IEC 60447.		P
	Where devices cannot conform to these requirements, e.g. due to special applications or alternative mounting positions, they shall be clearly marked such that there is no doubt as to the "I" and "O" positions and the direction of operation		P
7.1.6 part 1	Indication of contact position		
7.1.6.1 part 1	Indicating means		
	When an equipment is provided with means for indicating the closed and open positions, these positions shall be unambiguous and clearly indicated		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	This is done by means of a position indicating device (see 2.3.18)		P
	If symbols are used, they shall indicate the closed and open position respectively, in accordance with IEC 60417-2:		
	- 60417-2-IEC-5007 I On (power)		P
	- 60417-2-IEC-5007 O Off (power)		P
	For equipment operated by means of two push-buttons, only the push-button designated for the opening operation shall be red or marked with the symbol "O"		N/A
	Red colour shall not be used for any other push-button		N/A
	The colours of other push-buttons, illuminated push-buttons and indicator lights shall be in accordance with IEC 60073		N/A
7.1.6.2 part 1	Indication by the actuator		
	When the actuator is used to indicate the position of the contacts, it shall automatically take up or stay, when released, in the position corresponding to that of the moving contacts; in this case, the actuator shall have two distinct rest positions corresponding to those of the moving contacts, but for automatic opening a third distinct position of the actuator may be provided		P
7.1.7	Additional safety requirements for equipment suitable for isolation		
7.1.7.1	Additional constructional requirements for equipment suitable for isolation (Ue > 50 V):		
	Equipment suitable for isolation shall provide in the open position an isolation distance in acc. with the requirements necessary to satisfy the isolating function. Indication of the main contacts shall be provide by one or more of the following means:		
	- the position of the actuator		P
	- a separate mechanical indicator		N/A
	- visibility of the moving contacts		N/A
	When means are provided or to lock the equipment in the open position, locking only be possible when contacts are in the open position		N/A
	Actuator front-plate fitted to the equipment in a manner which ensures correct contact position indication and locking		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	The indicated open position is the only position in which the specified isolation distances between the contacts is ensured.		P
	- minimum clearances across open contacts (see Table XIII, Part 1) (mm) :	8 mm	
	- measured clearances (mm) :	39 mm	P
	- test Uimp across gap (kV) :	12,3 kV	P
7.1.7.2	Supplementary requirements for equipment with provision for electrical interlocking with contactors or circuit-breakers:		
	auxiliary switch shall be rated according to IEC 60 947-5-1		N/A
	If equipment suitable for isolation is provided with an auxiliary switch for the purpose of electrical interlocking with contactor (s) or circuit-breaker(s) and intended to be used in motor circuits, the following requirements shall apply unless the equipment is rated for AC-23 utilization category		N/A
	The time interval between the opening of the contacts of the auxiliary switch and the contacts of the main poles shall be sufficient to ensure that the associated contactor or circuit-breaker interrupts the current before the main poles of the equipment open		N/A
	Unless otherwise stated in the manufacturer's technical literature, the time interval shall be not less than 20 ms when the equipment is operated according to the manufacturer instructions		N/A
	Compliance shall be verified by measuring the time interval between the instant of opening of the auxiliary switch and the instant of opening of the main poles under no-load conditions when the equipment is operated according to the manufacturer's instructions		N/A
	During the closing operation the contacts of the auxiliary switch shall close after or simultaneously with the contacts of the main poles		N/A
	A suitable opening time interval may also be provided by an intermediate position (between the ON and OFF position) at which the interlocking contact(s) is (are) open and the main poles remain closed		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.7.3	Supplementary requirements for equipment provided with means for padlocking the open position:		
	the locking means shall be designed in such a way that it cannot be removed with the appropriate padlock(s) installed		N/A
	Alternatively, the design may provide padlockable means to prevent access to the actuator		N/A
	test force F applied to the actuator in an attempt to operate to the closed position (N) :		N/A
	rated impulse withstand voltage (kV) :		N/A
	test Uimp on open main contacts at the test force		N/A
7.1.8	Terminals		
7.1.8.1	All parts of terminals which maintain contact and carry current shall be of metal having adequate mechanical strength		P
	Terminal connections shall be such that necessary contact pressure is maintained		P
	Terminals shall be so constructed that the conductor is clamped between suitable surfaces without damage to the conductor and terminal		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		P
7.1.8.2	Connection capacity		
	type of conductors :	Prepared conductors (with lug)	P
	minimum cross-sectional area of conductor (mm^2) :	According to the standard, the terminal is suitable for conductors of the same type at least two sizes smaller than the max cross-sectional: 120 mm^2	P
	maximum cross-sectional area of conductor (mm^2) :	185 mm^2 x 2	P
	number of conductors simultaneously connectable to the terminal :	2	P
7.1.8.3	Connection		
	terminals for connection to external conductors shall be readily accessible during installation		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	clamping screws and nuts shall not serve to fix any other component		P
7.1.8.4	Terminal identification and marking		
	terminal intended exclusively for the neutral conductor		P
	protective earth terminal		N/A
	other terminals		N/A
7.1.9 part 1	Additional requirements for equipment provided with a neutral pole		
	When equipment is provided with a pole intended only for connecting the neutral, this pole shall be clearly identified to that effect by the letter N (see 7.1.7.4.).		P
	A switched neutral pole shall break not before and shall make not after the other poles		P
	For equipment having a value of conventional thermal current (free air or enclosed, see 4.3.2.1 and 4.3.2.2) not exceeding 63 A, this value shall be identical for all poles	Same as In	P
	For higher conventional thermal current values, the neutral pole may have a value of conventional thermal current different from that of the other poles, but not less than half that value or 63 A, whichever is the higher	Same as In	P
	if a pole with an appropriate making and breaking capacity is used as a neutral pole, then all poles, incl. the neutral pole, shall operate substantially together.		P
7.1.10	Provisions for protective earthing		
7.1.10.1	The exposed conductive parts (e.g. chassis, framework and fixed parts of metal enclosures) other than those which cannot constitute a danger shall be electrically interconnected and connected to a protective earth terminal for connection to an earth electrode or to an external protective conductor		N/A
part 1	This requirement can be met by the normal structural parts providing adequate electrical continuity and applies whether the equipment is used on its own or incorporated in an assembly		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Exposed conductive parts are considered not to constitute a danger if they cannot be touched on large areas or grasped with the hand or if they are of small size (approximately 50 mm x 50 mm) or are so located as to exclude any contact with live parts		N/A
7.1.10.2 part 1	Protective earth terminal		
	The protective earth terminal shall be readily accessible and so placed that the connection of the equipment to the earth electrode or to the protective conductor is maintained when the cover or any other removable part is removed		N/A
	The protective earth terminal shall be suitably protected against corrosion		N/A
	In the case of equipment with conductive structures, enclosures, etc., means shall be provided, if necessary, to ensure electrical continuity between the exposed conductive parts the equipment and the metal sheathing of connecting conductors		N/A
	The protective earth terminal shall have no other function, except when it is intended to be connected to a PEN conductor (see 2.1.1.5 – Note). In this case, it shall also have the function of a neutral terminal in addition to meeting the requirements applicable to the protective earth terminal		N/A
7.1.10.3	Protective earth terminal marking and identification		
	The protective earth terminal shall be clearly and permanently identified by its marking		N/A
	The identification shall be achieved by colour (green-yellow mark) or by the notation PE, or PEN, as applicable, in accordance with IEC 60445, subclause 5.3, or, in the case of PEN, by a graphical symbol for use on equipment		N/A
	Graphical symbol to be used: 60417-2-IEC-5019 ⏚ Protective earth (ground) in accordance with IEC 60417-2		N/A
7.1.11	Enclosure for equipment		
7.1.11.1	Design		
	The enclosure, when it is opened: all parts requiring access for installation and maintenance are readily accessible		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Sufficient space shall be provided inside the enclosure		N/A
	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/A
	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/A
	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/A
	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/A
	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/A
7.1.11.2	Insulation		
	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/A
7.1.12	Degree of protection of enclosed equipment		
	Degree of protection.	IP40 for front cover only	
	Test for first characteristic.		
	Test for first numeral ..... :	4 for front cover only This clause is for enclosed equipment and is not applicable to this product. However, the test was conducted on the front cover of the product with positive result	N/A
	Test for second characteristic		

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Clause	Requirement + Test	Result - Remark	Verdict
	Test for second numeral .....:		N/A
7.1.13 part 1	Conduit pull-out, torque and bending with metallic conduits		
	Polymeric enclosures of equipment, whether integral or not, provided with threaded conduit entries, intended for the connection of extra heavy duty, rigid threaded metal conduits complying with IEC 60981, shall withstand the stresses occurring during its installation such as pull-out, torque, bending		N/A
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		P
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

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Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals		
	Mechanical strength of terminals		
	maximum cross-sectional area of conductor (mm^2) :	185 mm^2 x 2	
	diameter of thread (mm) :	M10	
	torque (Nm) :	1,1 x 50 Nm = 55 Nm	
	5 times on 2 separate clamping units		P
	Testing for damage to and accidental loosening of conductor (flexion test)		
	conductor of the smallest cross-sectional area (mm^2) :		
	number of conductors 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/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A
	conductor of the largest cross-sectional area (mm^2) :		
	number of conductors 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/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	conductor of the largest and smallest cross-sectional area (mm²) :		
	number of conductors of the smallest cross section, number of conductors 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/A
	Pull-out test		
	force (N) :		
	1 min, the conductor shall neither slip out of the terminal nor break near the clamping unit		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS	Covered by the tests in report No. 3302408.50	P
8.3.4	TEST SEQUENCE II	Covered by the tests in report No. 3302408.50	P
8.3.4	TEST SEQUENCE II/III	Covered by the tests in both this report and report No. 3302408.50	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II/III: EasyPact CVS630F, TM type, 4 poles, 600 A		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#18	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated service short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside/upside)	upside	P
	Tightening torques: (Nm)	50 Nm	P
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	548 s 534 s 529 s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P
	- peak test current (A) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 15,8 kA 30,6 kA 21,9 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 254 kA^2s 1,4 MA^2s 637 kA^2s	P
	Pause, t: (min)	3 min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 29,5 kA 27,9 kA 10,1 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 1,38 MA^2s 1,11 MA^2s 75,4 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 13,3 kA 27,4 kA 26,9 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 130 kA^2s 1,32 MA^2s 1,1 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	600 A	
	Maximum rated operational voltage: Ue (V)	240 V	
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	
	Number of operating cycles per hour	60	P
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)	50	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	Overload: 1,0 In Short-circuit: min	P
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) ..... L1-L2: ..... L2-L3: L3-L1:	241 V 242 V 240 V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	 601 A 602 A 600 A	P
	- power factor/time constant:	0,8	P
	- frequency: (Hz)	50 Hz	P
	- on-time (ms):	Min 259 ms	P
	- off-time (s):	Max 59,7 s	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 55 K see table 1	P
	conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	test current Ie (A) :	600 A	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	870 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	9 min 28 s	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	334 s 270 s 312 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II/III: EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#19	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated service short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt release: Uc (V)		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm² x 2	P
	If terminals unmarked: line connected at: (underside/upside)	upside	P
	Tightening torques: (Nm)	50 Nm	P
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	59 s 51 s 58 s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P
	- peak test current (A) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 16,0 kA 30,7 kA 23,0 kA	P
	- Joule integral I²dt (A²s) .....L1: .....L2: L3:	 249 kA²s 1,46 MA²s 708 kA²s	P
	Pause, t: (min)	3 min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside/upside)	upside	P
	Tightening torques: (Nm)	50 Nm	P
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	59 s 51 s 58 s	P
8.3.4.1	Test of rated service short-circuit breaking capacity		P
	Test sequence of operation: O – t – CO – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) .....L1: .....L2: L3:	 73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P
	- peak test current (A) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 16,0 kA 30,7 kA 23,0 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 249 kA^2s 1,46 MA^2s 708 kA^2s	P
	Pause, t: (min)	3 min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 26,0 kA 35,3 kA 15,2 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 1,35 MA^2s 1,73 MA^2s 641 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .....L1: .....L2: L3:	 8,6 kA 31,8 kA 28,3 kA	P
	- Joule integral I^2dt (A^2s) .....L1: .....L2: L3:	 61,3 kA^2s 1,49 MA^2s 1,1 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.4.2	Operational performance capability with current.		
	Rated current: In (A)	630 A	
	Maximum rated operational voltage: Ue (V)	240 V	
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	
	Number of operating cycles per hour	60	P
	Number (5% of the number given in column 4, tab. 8) of cycles with current (total) (closing mechanism energized at the rated Uc)	50	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	Overload: 1,0 In Short-circuit: min	P
	Conditions, make/break operations:		
	- test voltage U/Ue = 1,0 (V) .....L1-L2: .....L2-L3: L3-L1:	241 V 242 V 240 V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	 631 A 632 A 630 A	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50 Hz	P
	- on-time (ms):	Min 313 ms	P
	- off-time (s):	Max 59,7 s	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 56 K see table 2	P
	conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	test current Ie (A) :	630 A	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	914 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1 min 47 s	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	 631 A 632 A 630 A	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50 Hz	P
	- on-time (ms):	Min 313 ms	P
	- off-time (s):	Max 59,7 s	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 56 K see table 2	P
	conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	test current Ie (A) :	630 A	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	914 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1 min 47 s	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current I/Ie = 1,0 (A) .....L1: .....L2: L3:	 631 A 632 A 630 A	P
	- power factor/time constant:	0,81	P
	- frequency: (Hz)	50 Hz	P
	- on-time (ms):	Min 313 ms	P
	- off-time (s):	Max 59,7 s	P
8.3.4.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<2mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.4.4	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 56 K see table 2	P
	conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	test current Ie (A) :	630 A	P
8.3.4.5	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	914 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	1 min 47 s	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	34 s 33 s 31 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu)	Covered by the tests in both this report and report No. 3302408.50	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 4 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#33	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	415 V	
	Rated ultimate short-circuit breaking capacity: (kA)	36 kA, tested at 50 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	453 s 545 s 464 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	451 V 451 V 451 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	51,0 kA 50,5 kA 50,8 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	108 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	18,2 kA 34,3 kA 20,3 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	895 kA^2s 2,5 MA^2s 709 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	26,3 kA 16,9 kA 35,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,29 MA^2s 562 kA^2s 2,57 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	457 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	299 s 369 s 272 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	299 s 369 s 272 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 4 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#34	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA, tested at 42 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	544 s 516 s 529 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	466 V 466 V 466 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,5 kA 42,8 kA 42,4 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	466 V 466 V 466 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,5 kA 42,8 kA 42,4 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	88,8 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	25,4 kA 15,9 kA 31,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,32 MA^2s 512 kA^2s 2,29 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	20,8 kA 27,5 kA 31,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	976 kA^2s 2,3 MA^2s 2,01 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	311 s 269 s 276 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, TM type, 4 poles, 400 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#35	
	Rated current: In (A)	400 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on two-poles (with RCD)..		
	Time specified by the manufacturer:	70 s ≤ tripping time ≤ 800 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	334 s 344 s 341 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	240 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,9 kA 24,4 kA 18,9 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	177 kA^2s 877 kA^2s 420 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,3 kA 21,5 kA 24,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	383 kA^2s 1,03 MA^2s 832 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	196 s 177 s 199 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, TM type, 4 poles, 320 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#36	
	Rated current: In (A)	320 A (set at 0,7 x 320 A)	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	60 s ≤ tripping time ≤ 800 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	400 s 422 s 424 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,6 kA 24,0 kA 19,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	172 kA^2s 858 kA^2s 423 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	24,0 kA 12,1 kA 28,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	734 kA^2s 184 kA^2s 1,23 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	168 s 209 s 228 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 3 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#37	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	316 s 279 s 331 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	256 V 257 V 256 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	71,0 kA 70,9 kA 71,8 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	158 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	27,3 kA 22,9 kA 18,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,43 MA^2s 767 kA^2s 350 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	20,3 kA 29,6 kA 26,3 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	587 kA^2s 2,01 MA^2s 1,23 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 16,4 µA 13,2 µA 10,5 µA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	214 s 179 s 196 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 3 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#38	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	415 V	
	Rated ultimate short-circuit breaking capacity: (kA)	36 kA, tested at 50 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	504 s 541 s 553 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	446 V 446 V 446 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	50,8 kA 50,1 kA 51,3 kA	P
	power factor/time constant :	0,24	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	110 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	17,6 kA 33,8 kA 20,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	767 kA^2s 2,33 MA^2s 681 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	26,2 kA 33,1 kA 24,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,35 MA^2s 1,95 MA^2s 1,28 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	457 V 0,05 mA 0,03 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	317 s 446 s 332 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 3 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#39	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA, tested at 42 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	130 s ≤ tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	488 s 343 s 413 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	477 V 476 V 476 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,4 kA 43,8 kA 42,8 kA	P
	power factor/time constant :	0,22	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	477 V 476 V 476 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,4 kA 43,8 kA 42,8 kA	P
	power factor/time constant :	0,22	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	92,2 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	28,2 kA 29,6 kA 11,4 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,71 MA^2s 3,48 MA^2s 226 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	24,9 kA 30,7 kA 16,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,79 MA^2s 1,92 MA^2s 638 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 117,6 µA 0,45 mA 0,66 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	254 s 236 s 241 s	P

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Clause	Requirement + Test	Result - Remark	Verdict

8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, TM type, 3 poles, 400 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#40	
	Rated current: In (A)	400 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	70 s ≤ tripping time ≤ 800 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	311 s 307 s 284 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	240 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	258 V 258 V 258 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	70,8 kA 70,7 kA 70,0 kA	P
	power factor/time constant :	0,2	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	157 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,1 kA 23,8 kA 18,2 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	169 kA^2s 865 kA^2s 401 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	20,1 kA 12,5 kA 20,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	541 kA^2s 210 kA^2s 875 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,03 mA 0,02 mA 0,05 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	204 s 223 s 169 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, TM type, 3 poles, 320 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#41	
	Rated current: In (A)	320 A (set at 0,7 x 320 A)	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	60 s ≤ tripping time ≤ 800 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	509 s 430 s 422 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	256 V 257 V 256 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	71,0 kA 70,9 kA 71,8 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	158 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	18,0 kA 13,2 kA 8,73 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	482 kA^2s 228 kA^2s 133 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,1 kA 20,0 kA 19,6 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	260 kA^2s 997 kA^2s 600 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) ..... L1: ..... L2: ..... L3: ..... N:	264 V 8,62 µA 9,01 µA 8,42 µA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	206 s 182 s 192 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#44	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	415 V	
	Rated ultimate short-circuit breaking capacity: (kA)	36 kA, tested at 50 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	58 s 54 s 55 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	451 V 451 V 451 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	51,0 kA 50,5 kA 50,8 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	108 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	30,3 kA 31,5 kA 28,3 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	3,77 MA^2s 8,93 MA^2s 3,56 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	16,2 kA 30,8 kA 29,7 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	480 kA^2s 2,03 MA^2s 1,61 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	457 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	39 s 41 s 31 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#45	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA, tested at 42 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	58 s 57 s 54 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	466 V 466 V 466 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,5 kA 42,8 kA 42,4 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	88,8 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	26,5 kA 16,3 kA 30,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,44 MA^2s 509 kA^2s 2,23 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	20,4 kA 34,1 kA 19,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,72 MA^2s 2,63 MA^2s 1,36 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	28 s 34 s 33 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, electronic type, 4 poles, 400 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#46	
	Rated current: In (A)	400 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	52 s 51 s 51 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	240 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	257 V 257 V 257 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	73,0 kA 71,5 kA 72,2 kA	P
	power factor/time constant :	0,18	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	164 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	12,9 kA 25,2 kA 18,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	193 kA^2s 905 kA^2s 395 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	17,4 kA 14,9 kA 25,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	367 kA^2s 262 kA^2s 1,01 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,02 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	31 s 31 s 34 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, electronic type, 3 poles, 630 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#47	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	59 s 52 s 51 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	258 V 258 V 258 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	70,8 kA 70,7 kA 70,0 kA	P
	power factor/time constant :	0,2	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	157 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	14,7 kA 30,4 kA 19,9 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	262 kA^2s 1,41 MA^2s 533 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	25,9 kA 13,0 kA 30,6 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	973 kA^2s 158 kA^2s 1,52 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,04 mA 0,05 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	35 s 34 s 34 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, electronic type, 3 poles, 630 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#48	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	415 V	
	Rated ultimate short-circuit breaking capacity: (kA)	36 kA, tested at 50 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on two-poles (with RCD)..		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	58 s 52 s 56 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	446 V 446 V 446 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	50,8 kA 50,1 kA 51,3 kA	P
	power factor/time constant :	0,24	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	110 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	15,5 kA 32,8 kA 21,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	551 kA^2s 2,14 MA^2s 817 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	15,6 kA 28,9 kA 31,2 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	454 kA^2s 1,88 MA^2s 1,82 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	457 V 0,04 mA 0,02 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	37 s 39 s 38 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, electronic type, 3 poles, 630 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#49	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA, tested at 42 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	58 s 50 s 59 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	466 V 466 V 466 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,8 kA 42,7 kA 42,6 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	90,1 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	16,5 kA 32,1 kA 20,6 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	700 kA^2s 2,34 MA^2s 822 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	19,6 kA 20,3 kA 32,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,3 MA^2s 1,66 MA^2s 2,28 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,04 mA 0,02 mA 0,06 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	31 s 29 s 32 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	31 s 29 s 32 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, electronic type, 3 poles, 400 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#50	
	Rated current: In (A)	400 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	50 s 53 s 58 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	240 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	258 V 258 V 258 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	70,8 kA 70,7 kA 70,0 kA	P
	power factor/time constant :	0,2	P
	- Factor "n"	2,2	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- peak test current (Amax) :	157 kA	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	11,7 kA 23,1 kA 18,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	146 kA^2s 828 kA^2s 430 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	14,0 kA 21,8 kA 19,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	214 kA^2s 879 kA^2s 461 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,03 mA 0,02 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Operation time: (s) ..... L1: ..... L2: L3:	34 s 27 s 33 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV	Covered by the tests in both this report and report No. 3302408.50	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Rated short-time withstand current		
	Except where the combined test sequence applies, this test sequence applies to circuit-breakers of utilization category B and to those circuit-breaker of category A covered by note 3 of table 4, and comprises the following tests:		
	Where integrally fused circuit-breaker are of utilization category B, they shall meet the requirements of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#79	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	Max 440 V	
	Rated short-time withstand current: (kA/s)	6,3 kA / 60 ms	
	Rated frequency: (Hz)	50 Hz	
8.3.6.1	Verification of overload releases		
	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	50 s ≤ tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	53 s 51 s 52 s	P
8.3.6.2	Test of rated short-time withstand current.		
	For this test, any over-current release, including the instantaneous override, if any, likely to operate during the test, shall be rendered inoperative.		
	- duration of the test: (s)	77,5 ms	P
	- test frequency: (Hz)	50 Hz	P
	- power factor / time constant (ms):	0,48	P
	- factor "n"	1,7	P
	- test voltage: (V) ..... L1-L2: ..... L2-L3: L3-L1:	478 V 479 V 479 V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- r.m.s. test current: (kA) ..... L1: ..... L2: L3:	6,4 kA 6,4 kA 6,4 kA	P
	- highest peak current: (kA)	11,3 kA	P
8.3.6.3	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals. ≤ 80 K (K) :	Max 67 K See table 3	P
	conductor cross-sectional area (mm²) :	185 mm² x 2	P
	test current Ie (A) :	630 A	P
8.3.6.4	Test of short-circuit breaking capacity at the max. short-time withstand current.		
	Rated short-time withstand current: (kA/s)		
	Test sequence: O – t – CO		
	max. available time setting of the short–time delay short-circuit release. (s)	60 ms	P
	- test voltage: (V) ..... L1: ..... L2: L3:	478 V 479 V 479 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	6,4 kA 6,4 kA 6,4 kA	P
	- highest peak current: (kA)	11,3 kA	P
	- test frequency: (Hz)	50 Hz	P
	- power factor / time constant (ms):	0,48	P
	- factor "n"	1,7	P
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	9,5 kA 9,1 kA 9,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,5 MA^2s 2,1 MA^2s 2,3 MA^2s	P
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short–time delay short-circuit release and -		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- the instantaneous override, if any, shall not operate.		P
	-pause: t (s)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	9,5 kA 9,8 kA 9,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,2 MA^2s 2,4 MA^2s 2,3 MA^2s	P
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short–time delay short-circuit release and -		P
	- the instantaneous override, if any, shall not operate.		P
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		N/A
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No holes	P
	Cracks observed	No cracks	P
8.3.6.5	Verification of dielectric withstand		P
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	
	- no breakdown or flashover		P
	- For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA. ..... L1: ..... L2: ..... L3: ..... N:	484 V 0,005 mA 0,005 mA 0,005 mA	P
8.3.6.6	Verification of overload releases		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- the instantaneous override, if any, shall not operate.		P
	-pause: t (s)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	9,5 kA 9,8 kA 9,1 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,2 MA^2s 2,4 MA^2s 2,3 MA^2s	P
	- the circuit-breaker shall remain closed for the short-time corresponding to the max. available time setting of the short–time delay short-circuit release and -		P
	- the instantaneous override, if any, shall not operate.		P
	- if the circuit-breaker has a making current release, this requirement does not apply to the CO operation, if the prospective current exceeds the pre-determined value, since it will then operate.		N/A
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No holes	P
	Cracks observed	No cracks	P
8.3.6.5	Verification of dielectric withstand		P
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	
	- no breakdown or flashover		P
	- For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA. ..... L1: ..... L2: ..... L3: .....N:	484 V 0,005 mA 0,005 mA 0,005 mA	P
8.3.6.6	Verification of overload releases		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the maximum value stated by the manufacturer for twice the value of the current setting, at the reference temperature, on a pole singly.		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	 14 s 23 s 9 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.7	TEST SEQUENCE V		N/A
8.3.8	TEST SEQUENCE VI		N/A
Annex B	Circuit-breakers incorporating residual current protection		N/A
Annex C	Individual pole short-circuit test sequence		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex F	Additional tests for circuit-breakers with electronic over-current protection		P
F4 and F5	Verification of electromagnetic compatibility (EMC)		
	The current setting shall be set at minimum.....:	Ir = 0,5 In	P
	Short-time and instantaneous release settings shall each, if applicable, be adjusted to minimum value but to not less than 2,5 times Ir.....:	Instantaneous release: 2 Ir	P
	Current was applied on two-phases chosen at random according to Figure F.2		P
F4	Immunity test		P
F.4.1	Harmonic currents		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	The tests shall be performed at the rated frequency(Hz)	50 Hz	P
F.4.1.2	Test of option b)		P
	Amplitude of third harmonic > 60%.....:	71,3%	P
	Amplitude of fifth harmonic > 14%.....:	17,6%	P
	Amplitude of seventh harmonic > 7%.....:	7,43%	P
	Peak factor Ip/Irms ≥ 2,1.....:	2,29	P
	Current conduction time, for each half-wave is ≤21% of the period.....:	21%	P
F.4.1.3	First, test current at 0,9 Ir.....:	180 A	P
	Test duration, 10 times of the tripping time at 2 Ir.:	1800 s	P
	No tripping was observed		P
	Then, test current at 2Ir.....:	400 A	P

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Clause	Requirement + Test	Result - Remark	Verdict
	The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	102 s	P
F.4.2	Electrostatic discharges		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	Discharge test voltage.....:	8 kV contact 8 kV air	P
	Polarity of discharges.....:	positive/negative	P
	10 positive and 10 negative discharge with interval time of 1s		P
	During the test, the current 0,9 Ir.....:	180 A	P
	After the test, test current at 2,0 Ir.....:	400 A	P
	The operating time shall be within the value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	117 s	P
F.4.3	Radiated radio-frequency electromagnetic fields		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	Test level.....:	10 V/m	P
	Frequency range.....:	80 MHz – 1 GHz 1,4 -2,0 GHz	P
	During test, the current 0,9 Ir.....:	180 A	P
	Sweeping the frequency range, the dwell time of the amplitude modulated carrier for each frequency shall be between 500ms and 1000ms, and the step size shall be 1% of the precious frequency.		P
	No tripping was observed		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Then, test current at 2Ir.....:	400 A	P
	the test shall be performed at each of the following frequencies: 80; 100; 120; 180; 240; 320; 480; 640; 960; 1400 and 1920MHz, the operation being verified after the field at each frequency has stabilized.		P
	The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	Horizontal. : 117; 119; 121; 117; 112; 118; 125; 128; 125; 125; 112 s. Vertical.: 119; 121; 129; 122; 128; 118; 118; 117; 121; 125; 117 s	P
F.4.4	Electrical fast transients/bursts (EFT/B)		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	Test level.....:	4 kV	P
	Tr/Th:5/50ns		P
	Repetition frequency.....:	5 KHz	P
	Test duration.....:	1 min	P
	During test, the current 0,9 Ir.....:	180 A	P
	No tripping was observed		P
	Then, test current at 2Ir.....:	400 A	P
	The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	Positive: 120 s Negative: 118 s	P
F.4.5	Surges		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	

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Clause	Requirement + Test	Result - Remark	Verdict
	Rated current: In (A)	400 A	
	Test level.....:	4 kV (line to earth) 2 kV (line to line)	P
	Tr/Th:1,2/50 µs		P
	Pulses with both positive and negative polarity shall be applied, the phase angles being 0° and 90°.		P
	A series of five pulses is applied for each polarity and each phase angel(total number of pulses:20), the interval between two pulses being approximately 1min.		P
	During the test, the current 0,9 Ir.....:	180 A	P
	After the test, test current at 2,0 Ir.....:	400 A	P
	The operating time shall be within the value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	116 s (line to earth) 115 s (line to line)	P
F.4.6	Conducted disturbances induced by radio-frequency fields (common mode)		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	Test level.....:	10 V	P
	Frequency range.....:	0,15 – 80 MHz	P
	During test, the current 0,9 Ir.....:	180 A	P
	Sweeping the frequency range, the dwell time of the amplitude modulated carrier for each frequency shall be between 500ms and 1000ms, and the step size shall be 1% of the precious frequency.		P
	No tripping was observed		P
	Then, test current at 2Ir.....:	400 A	P
	the test shall be performed at each of the following frequencies: 0,150; 0,300; 0,450; 0,600; 0,900; 1,20; 1,80; 2,40; 3,60; 4,80; 7,20; 9,60; 12,0; 19,2; 27,0; 49,4; 72,0 and 80,0MHz, the operation being		P

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Clause	Requirement + Test	Result - Remark	Verdict
	verified after the level of the disturbing voltage at each frequency has stabilized.		
	The operating time shall be within 0,9 times the minimum value and 1,1 times the maximum value stated by the manufacturer for twice the current setting		
	Time specified by the manufacturer.....:	50 – 180 s	P
	Trip time.....:	122; 117; 119; 125; 117; 118; 124; 119; 127; 121; 128; 117; 124; 113; 117; 121; 127; 120 s.	P
F.4.7	Current dips		P
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#73	
	Rated current: In (A)	400 A	
	Initial test current 0,9 Ir.....:	180 A	P
	I_D is dip the test current, T is period of the sinusoidal current		P
	Test duration, 3-4 times of the tripping time at 2 Ir or 10 min, whichever is lower.....:	540 s	P
	Test no. 1 with $I_D = 0$ and $\Delta t = 0,5T$		P
	No tripping was observed		P
	Test no. 2 with $I_D = 0$ and $\Delta t = 1T$		P
	No tripping was observed		P
	Test no. 3 with $I_D = 0$ and $\Delta t = 5T$		P
	No tripping was observed		P
	Test no. 4 with $I_D = 0$ and $\Delta t = 25T$		P
	No tripping was observed		P
	Test no. 5 with $I_D = 0$ and $\Delta t = 50T$		P
	No tripping was observed		P
	Test no. 6 with $I_D = 0,4 \times Ir$ and $\Delta t = 10T$		P
	No tripping was observed		P
	Test no. 7 with $I_D = 0,4 \times Ir$ and $\Delta t = 25T$		P
	No tripping was observed		P
	Test no. 8 with $I_D = 0,4 \times Ir$ and $\Delta t = 50T$		P
	No tripping was observed		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test no. 9 with I_D = 0,7×Ir and Δt = 10T		P
	No tripping was observed		P
	Test no. 10 with I_D = 0,7×Ir and Δt = 25T		P
	No tripping was observed		P
	Test no. 11 with I_D = 0,7×Ir and Δt = 50T		P
	No tripping was observed		P
F.5	Emission tests		P
F.5.1	Harmonics		N/A
	The electronic control circuits operate at very low power and hence create negligible disturbances; therefore no tests are required.		N/A
F.5.2	Voltage fluctuations		N/A
	The electronic control circuits operate at very low power and hence create negligible disturbances; therefore no tests are required.		N/A
F.5.3	Conducted RF disturbances (150 kHz – 30 MHz)		N/A
	Circuit-breakers covered by this annex are independent of line voltage or of any auxiliary supply and have no direct coupling to the supply; the electronic circuits operate at very low power. These circuit-breakers create negligible disturbances and therefore no tests are required.		N/A
F.5.4	Radiated RF disturbances (30 MHz – 1 GHz)		P
	Type designation or serial number	EasyPact CVS630F	P
	Sample no:	#73	P
	Rated current: In (A)	400 A	P
	Limits of Class A of CISPR11 / CISPR22		P
	Limits of Class B of CISPR11 / CISPR22		N/A
	The product does not exceed the limits		P
F6	Suitability for multiple frequencies		N/A
	The tests shall be performed at each rated frequency or, when a range of rated frequencies is declared, at the lowest and the highest rated frequencies.		N/A
F.6.2	Tests shall be performed on any pair of phase-poles chosen at random at any convenient voltage. Under-voltage releases, if any, shall either be energized or disabled. All other auxiliaries shall be disconnected during the test.		N/A
	The short-time and instantaneous trip current settings shall each, if relevant, be adjusted to		

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Clause	Requirement + Test	Result - Remark	Verdict
	2,5 times the current setting. If this setting is not available, the next closest higher setting shall be used.		
	A current of 0,95 times the conventional non-tripping current (see Table 6) is applied for a time equal to 10 times the tripping time which corresponds to 2,0 times the current setting.		
	Immediately following the test of a), a current of 1,05 times the conventional tripping current (see Table 6) is applied.		
	A further test starting from the cold state is made at 2,0 times the current setting.		
	For each test frequency, the overload tripping characteristics shall comply with the following requirements: – for test a) no tripping shall occur; – for test b) tripping shall occur within the conventional time (see Table 6); – for test c) tripping shall occur within 1,1 times the maximum and 0,9 times the minimum values of the manufacturer's stated time-current characteristic.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
F.7.	Dry heat test		P
F.7.1	The test shall be performed on the circuit-breaker in accordance with 7.2.2 at the maximum rated current for a given frame size, on all phase poles, at an ambient temperature of 40 °C	630 A	
	The duration of the test, once temperature equilibrium is reached, shall be 168 h		
	Tightening torques applied to the terminals shall be in accordance with the manufacturers' instructions. In absence of such instructions, table 4 of IEC 60947-1 shall apply	50 Nm	
	As an alternative, the test may be performed as follows:		
	- measure and record the highest temperature rise of the air surrounding the electronic components, during the temperature rise verification of test sequence 1		
	- install the electronic controls in the chamber		
	- supply the electronic controls which there input energizing value		
	- adjust the temperature of the test chamber to a value of 40 K above the temperature rise recorded for the surrounding the electronic components and maintain this temperature for 168 h		
	Test carried out.....:	☒ normal ☐ alternative	
F.7.2	Test results		P
	The circuit-breaker and the electronic controls shall meet the following requirements:		
	- no tripping of the circuit-breaker shall occur		P
	- no operating of the electronic controls which would cause the circuit-breaker to trip shall occur		P
F.7.3	Verification of the overload releases		P
	Following the test F.7.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).		P
7.2.1.2.4	Opening by over-current releases		P
b)	Opening under overload conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	662 A (Ir = In) 331 A (Ir = 0,5 In) 2 h non-tripping	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	819 A (Ir = In) 410 A (Ir = 0,5 In) 41 s (Ir = In) 31 s (Ir = 0,5 In)	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
F.8.	Damp heat test		P
F.8.1	Test procedure		P
	The test shall be performed according to IEC 60068-2-30 (12 +12 hours cycle)		
	Test Db temperature cycle between 25°C and upper temperature		
	The upper temperature shall be 55°C ± 2 °C (variant 1) and number of cycles shall be six.		
	The relative humidity is maintained at a high level at the upper temperature		
	The test may be performed with only the electronic controls in the test chamber		
	Test result.....:		P
F.8.2	Verification of the overload releases		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).		P
7.2.1.2.4	Opening by over-current releases		P
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	662 A (Ir = In) 331 A (Ir = 0,5 In) 2 h non-tripping	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	819 A (Ir = In) 410 A (Ir = 0,5 In) 43 s (Ir = In) 35 s (Ir = 0,5 In)	P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A
F.9.	Temperature variation cycles at a specified rate of change		P
F.9.1	Test conditions		P
	Each design of electronic controls shall be submitted to temperature variation cycles in according with figure F.15		
	The rise and fall of temperature during the rate of variation shall be 1 K/min ± 0,2 K/min.		
	Their temperature, once reached, shall be maintained for at least 2 h.		

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Clause	Requirement + Test	Result - Remark	Verdict
	The number of cycles shall be 28.		
F.9.2	Test procedure		P
	The test shall be carried out according IEC 60068-2-14.		
	For the these test, the electronic controls may be mounted inside the circuit-breaker or separately.		
	The electronic controls shall be energized to simulate service conditions.		
	Where the electronics controls are mounted inside the circuit-breaker, the main circuit shall not be energized.		
F.9.3	Test results		P
	The electronic controls shall meet the following requirement.		P
	No operation of the electronic controls which would cause the circuit-breaker to trip during the 28 cycles shall occur.		P
F.9.4	Verification of overload releases		P
	Following the test F.8.1, the operation of the overload releases of the circuit-breaker shall be verified in accordance with 7.2.1.2.4, item b).		P
7.2.1.2.4	Opening by over-current releases		P
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of + 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse timer-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature	662 A (Ir = In) 331 A (Ir = 0,5 In) 2 h non-tripping	P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later	819 A (Ir = In) 410 A (Ir = 0,5 In) 23 s (Ir = In)	P

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Clause	Requirement + Test	Result - Remark	Verdict
		25 s (Ir = 0,5 In)	
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex H	Individual pole short-circuit test sequence	Covered by the tests in both this report and report No. 3302408.50	P

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Clause	Requirement + Test	Result - Remark	Verdict

Annex H	Individual pole short-circuit test sequence EasyPact CVS630F, TM type, 4 poles, 600 A		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{IT}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#64	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²):	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside/upside)	upside	P
	Tightening torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	Test circuit according figure: 9		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	469 V 469 V 469 V	P
	Short-circuit test current (I_{rr}): equal to 1,2 times the max. setting of the short-time delay release tripping current,		N/A
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,	6,0 kA	P
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		N/A
	- r.m.s. test current AC/DC: (A)	6,03 kA	P
	power factor/time constant:	0,7	P
	- Factor "n"	1,53	P
	- peak test current (Amax) :	9,39 kA	P
	Test sequence "O" L1		
	- max. let-through current: (kApeak) L1:	9,83 kA	P
	- Joule integral I²dt (A²s) L1:	562 kA^{2}s	P
	Pause, t: (min)	3 min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) L1:	12,2 kA	P
	- Joule integral I^2dt (A^2s) L1:	889 kA^2s	P
	Test sequence "O" L2		
	- max. let-through current: (kApeak) L2:	9,9 kA	P
	- Joule integral I^2dt (A^2s) L2:	575 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) L2:	12,0 kA	P
	- Joule integral I^2dt (A^2s) L2:	860 kA^2s	P
	Test sequence "O" L3		
	- max. let-through current: (kApeak) L3:	9,68 kA	P
	- Joule integral I^2dt (A^2s) L3:	562 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) L3:	10,1 kA	P
	- Joule integral I^2dt (A^2s) L3:	617 kA^2s	P
	For 4-pole circuit-breakers with a protected neutral pole, the test voltage for that pole shall be phase-to-phase voltage divided by $\sqrt{3}$. This test is applicable only where the construction of the protected neutral pole differs from that of the phase poles.		N/A
	Test sequence "O" N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I^2dt (A^2s) .....N:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I^2dt (A^2s) .....N:		N/A
	Melting of the fusible element		N/A
	Holes in the PE-sheet for test sequence "O"		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Cracks observed		N/A
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,02 mA 0,02 mA 0,02 mA	P
H.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	328 s 374 s 303 s	P
H.5	Marking		
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by the symbol ⊗ which shall be market on the circuit-breaker immediately following these values of rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex H	Individual pole short-circuit test sequence EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{IT}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#65	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
Annex H	Individual pole short-circuit test sequence EasyPact CVS630F, electronic type, 4 poles, 630 A		
	Circuit-breaker for use in IT systems		
H.2	Test of individual pole short-circuit breaking capacity		
	A short-circuit test is made on the individual poles of a multipole circuit-breaker at a value of prospective current (I_{nT}) equal to 1,2 times the max. setting of the short-time delay release tripping current or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release, or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#65	
	Rated current: In (A)	630 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	The test sequence of operations is O – t - CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2):	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside/upside)	upside	P
	Tightening torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	Test circuit according figure: 9		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	469 V 469 V 469 V	P
	Short-circuit test current (I_{nr}): equal to 1,2 times the max. setting of the short-time delay release tripping current,	Tested at 8,32 kA as per manufacturer's request	P
	or, in the absence of such a release, 1,2 time the max. setting of the tripping current of the instantaneous release,		N/A
	or, where relevant 1,2 times the max. setting of the definite time delay release tripping current, but not exceeding 50kA.		N/A
	- r.m.s. test current AC/DC: (A)	8,59 kA	P
	power factor/time constant:	0,5	P
	- Factor "n"	1,7	P
	- peak test current (Amax) :	14,2 kA	P
	Test sequence "O" L1		
	- max. let-through current: (kApeak) L1:	14,9 kA	P
	- Joule integral I^{2}dt (A^{2}s) L1:	1,19 MA^{2}s	P
	Pause, t: (min)	3 min	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "CO" L1		
	- max. let-through current: (kApeak) L1:	12,2 kA	P
	- Joule integral I^2dt (A^2s) L1:	955 kA^2s	P
	Test sequence "O" L2		
	- max. let-through current: (kApeak) L2:	14,2 kA	P
	- Joule integral I^2dt (A^2s) L2:	1,06 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L2		
	- max. let-through current: (kApeak) L2:	15,7 kA	P
	- Joule integral I^2dt (A^2s) L2:	1,4 MA^2s	P
	Test sequence "O" L3		
	- max. let-through current: (kApeak) L3:	14,6 kA	P
	- Joule integral I^2dt (A^2s) L3:	1,22 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO" L3		
	- max. let-through current: (kApeak) L3:	13,5 kA	P
	- Joule integral I^2dt (A^2s) L3:	1,22 kA^2s	P
	For 4-pole circuit-breakers with a protected neutral pole, the test voltage for that pole shall be phase-to-phase voltage divided by $\sqrt{3}$. This test is applicable only where the construction of the protected neutral pole differs from that of the phase poles.		N/A
	Test sequence "O" N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I^2dt (A^2s) .....N:		N/A
	Pause, t: (min)		N/A
	Test sequence "CO" N		
	- max. let-through current: (kApeak) .....N:		N/A
	- Joule integral I^2dt (A^2s) .....N:		N/A
	Melting of the fusible element		N/A
	Holes in the PE-sheet for test sequence "O"		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Cracks observed		N/A
H.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,02 mA 0,02 mA 0,02 mA	P
H.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2.5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 180 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	33 s 27 s 34 s	P
H.5	Marking		
	Circuit-breaker for which all values of rated voltage have not been tested according to this annex or are not covered by such testing, shall be identified by the symbol ⊗ which shall be market on the circuit-breaker immediately following these values of rated voltage		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex L	Circuit-breakers not fulfilling the requirements for overcurrent protection		N/A
Annex M	Modular residual current devices (without integral current breaking device)		N/A
Annex N	Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M		N/A
Annex O	Instantaneous trip circuit-breakers (ICB)		N/A

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	TABLE 1: Heating Test (Seq II/III, clause 8.3.4.4, sample #18)		P
	Test current (A):	600 A	—
	Ambient (°C):	22 °C	—

Thermocouple Locations	max temperature-rise measured, (K)	temperature-rise limit, (K)
Top left pole	54	80
Top centre pole	55	80
Top right pole	48	80
Bottom left pole	49	80
Bottom centre pole	52	80
Bottom right pole	47	80
supplementary information: N/A		

	TABLE 2: Heating Test (Seq II/III, clause 8.3.4.4, sample #19)		P
	Test current (A):	630 A	—
	Ambient (°C):	23 °C	—

Thermocouple Locations	max temperature-rise measured, (K)	temperature-rise limit, (K)
Top left pole	54	80
Top centre pole	56	80
Top right pole	53	80
Bottom left pole	53	80
Bottom centre pole	55	80
Bottom right pole	52	80
supplementary information: N/A		

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	TABLE 3: Heating Test (Seq IV, clause 8.3.6.3, sample #79)		P
	Test current (A):	630 A	—
	Ambient (°C):	22 °C	—

Thermocouple Locations	max temperature-rise measured, (K)	temperature-rise limit, (K)
Top left pole	48	80
Top centre pole	66	80
Top right pole	66	80
Bottom left pole	51	80
Bottom centre pole	60	80
Bottom right pole	59	80
supplementary information: N/A		

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	TABLE 4: dielectric strength (Seq II/III, clause 8.3.4.3, sample #18, #19)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1000 V	No
supplementary information: N/A			

	TABLE 5: dielectric strength (Seq III, clause 8.3.5.3, sample #32 ~ #41, #43 ~ #50)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1000 V	No
supplementary information: N/A			

	TABLE 6: dielectric strength (Seq IV, clause 8.3.6.5, sample #79)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1000 V	No

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supplementary information: N/A

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	TABLE 7: dielectric strength (Annex H, clause H.3, sample #64, #65)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1000 V	No
supplementary information: N/A			

	TABLE 8: clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Between line and load when contacts are open	8 kV	690 V	8 mm	39 mm	10 mm	39 mm
Between terminals	8 kV	690 V	8 mm	10 mm	10 mm	16 mm
Between live part and handle	8 kV	690 V	8 mm	>> 20 mm	10 mm	>> 20 mm
supplementary information: N/A						

	TABLE 9: threaded part torque test		P
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)
Screws terminal	10 mm	III	55 Nm
supplementary information: N/A			

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	TABLE 10: Resistance to fire (Glow wire test)						P
No.	Description	Colour	Temp. °C	extinguish within 30s after removal of the glow-wire	drops	support burning	—
1	Base	Black	650 °C	3,5 s	N	N	P
2	Middle Cover	Black	650 °C	1,1 s	N	N	P
3	Enclosure of pole	White	960 °C	0 s	N	N	P
4	Cover of trip unit	Black	650 °C	4,6 s	N	N	P
5	Operating means	Black	960 °C	6,2 s	N	N	P
6	Trip lever	White	650 °C	2,7 s	N	N	P
supplementary information: N/A							

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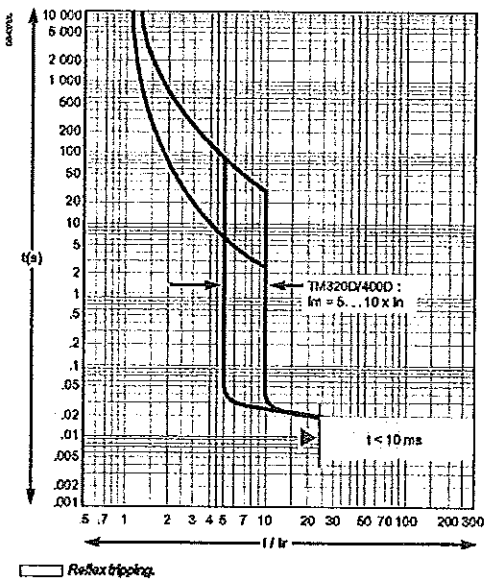
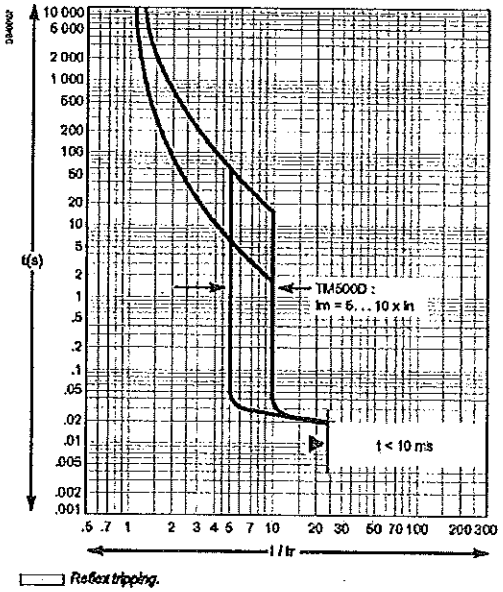
Time current characteristics

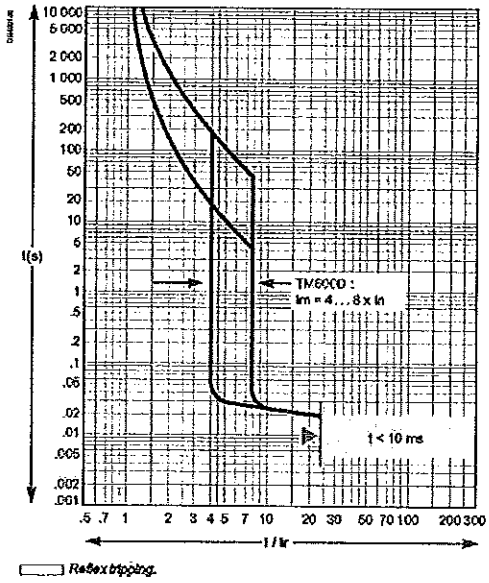
TM320D/400D



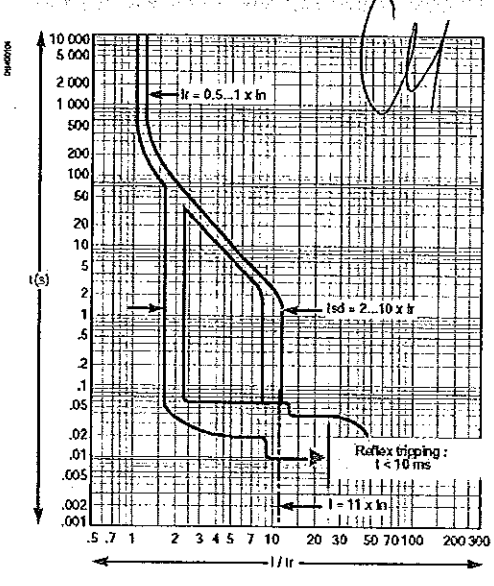
TM500D



TM600D



ETS 2.3 electronic trip units



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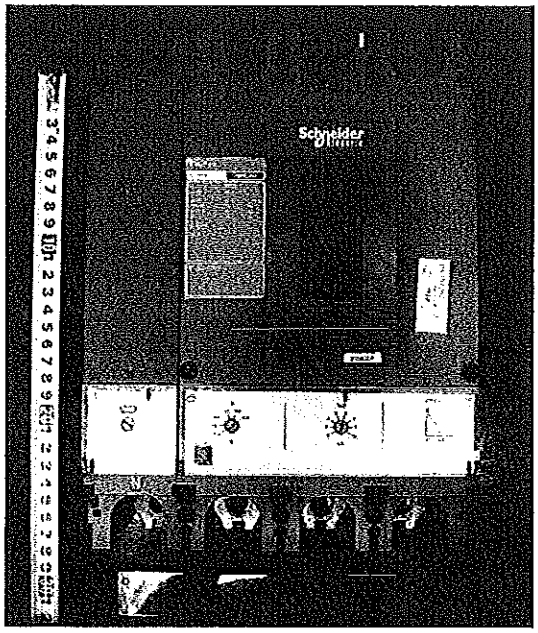
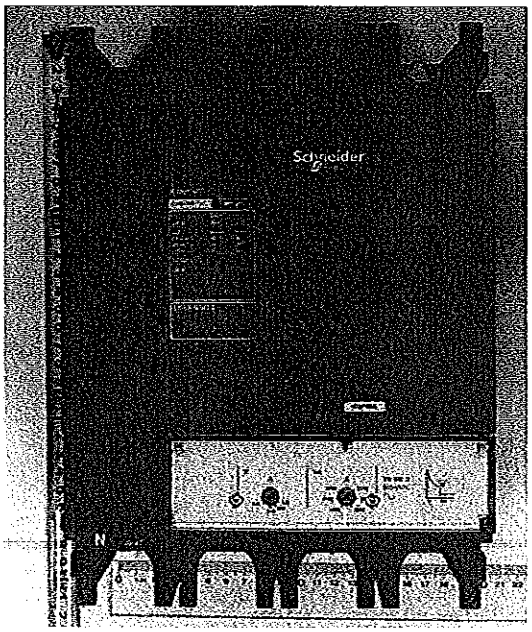
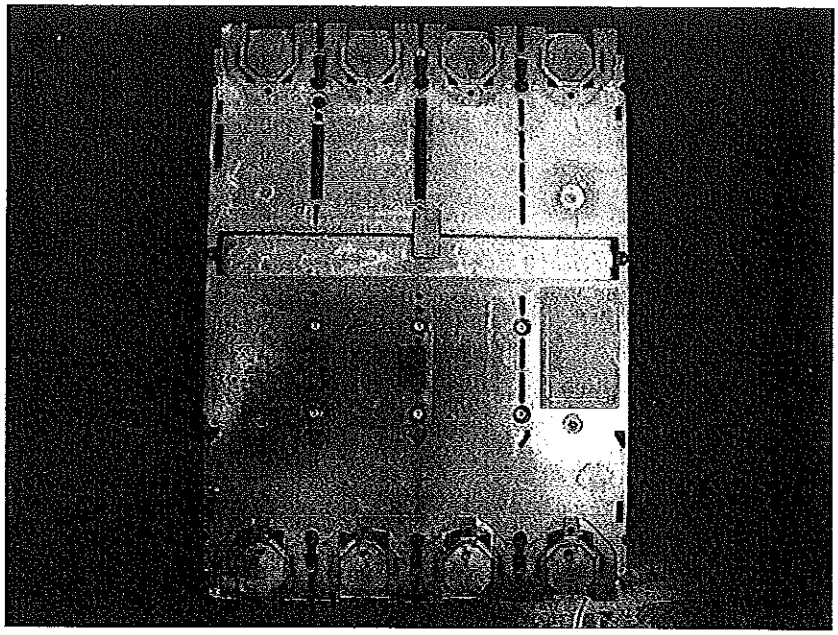
Photographs



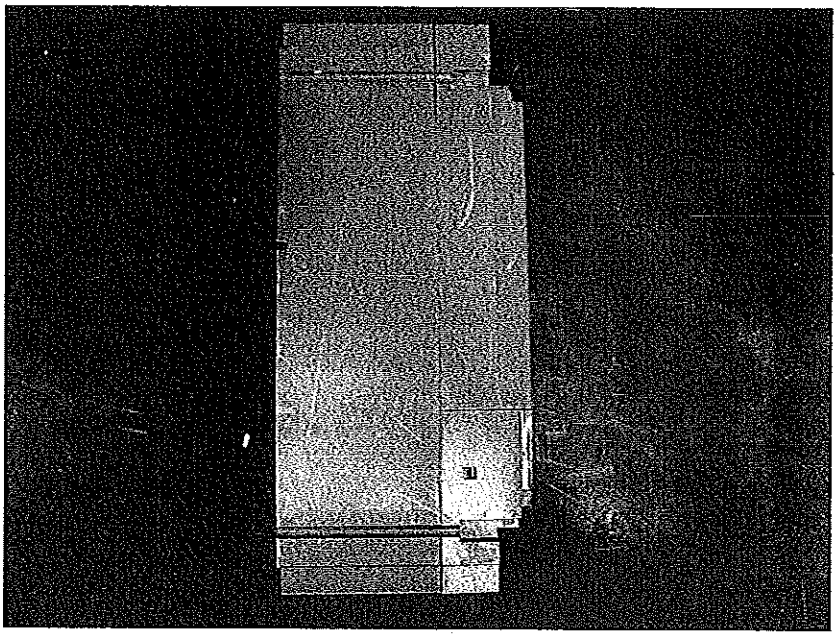
Front view, electronic type



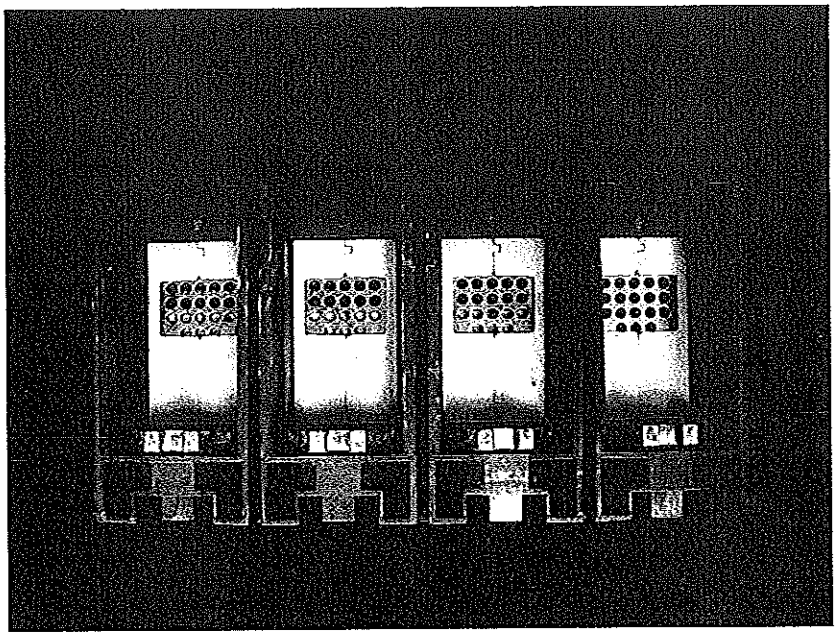
Front view, TM type



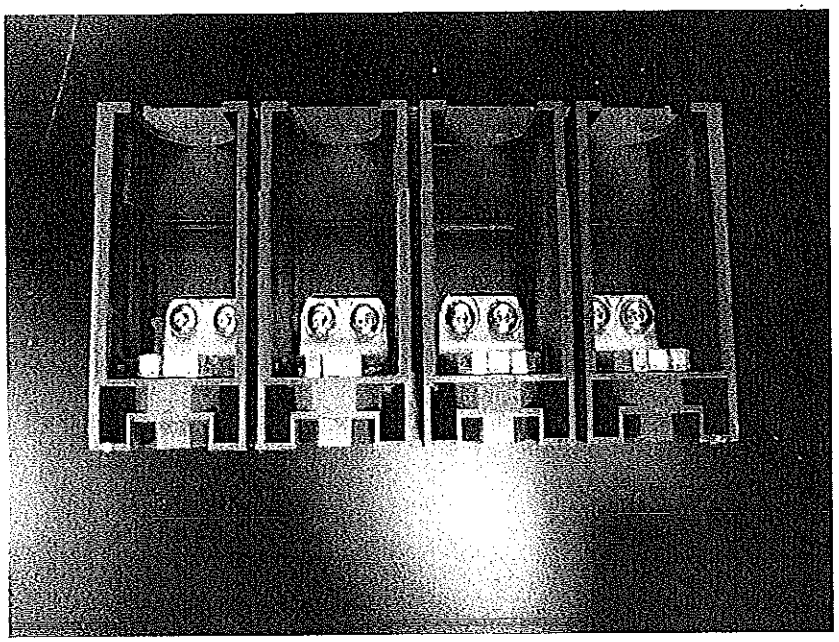
Back view



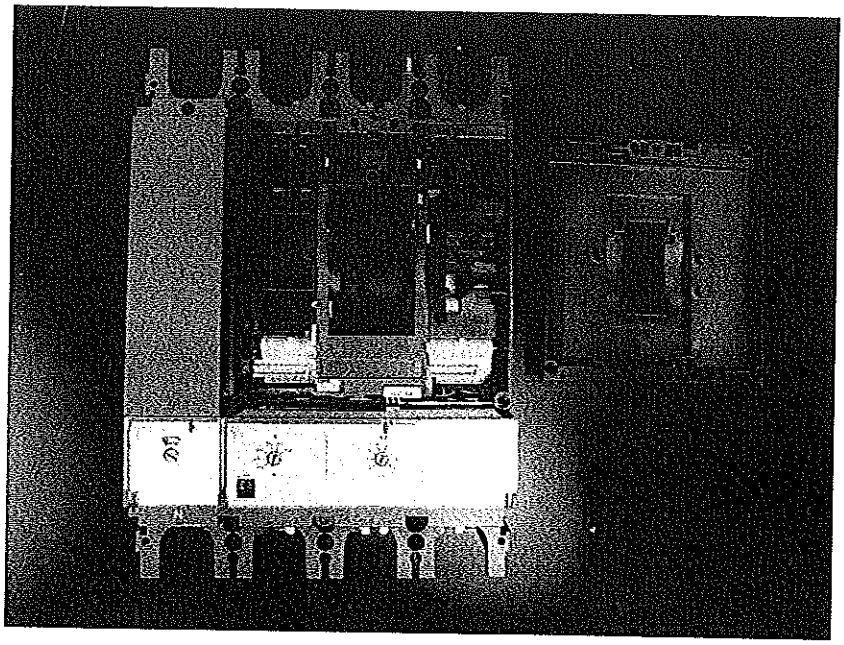
Side view



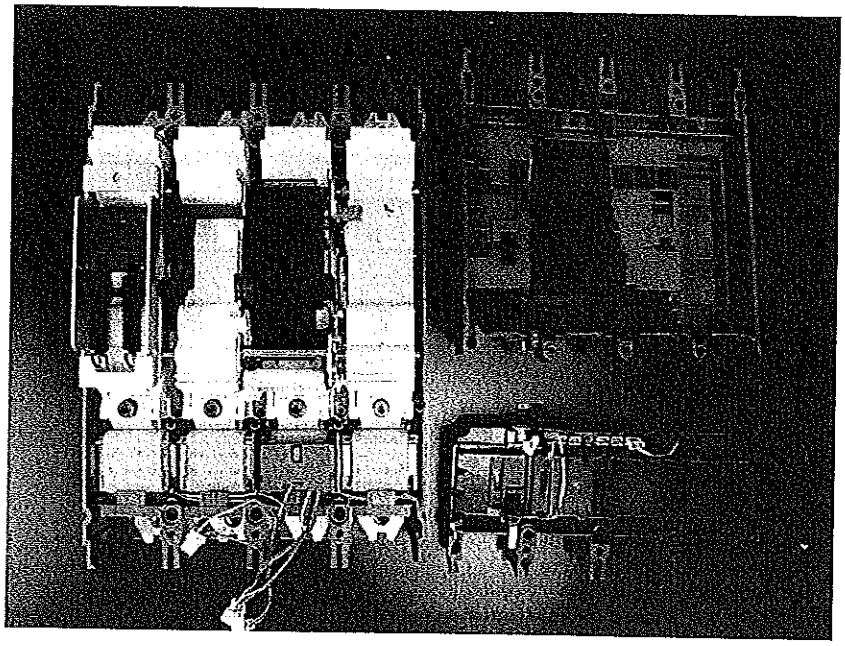
Terminal view



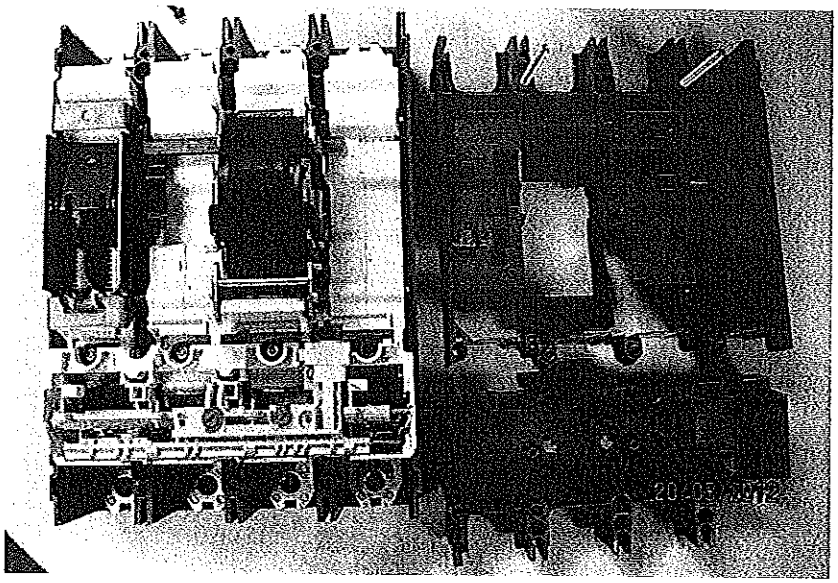
Terminal view



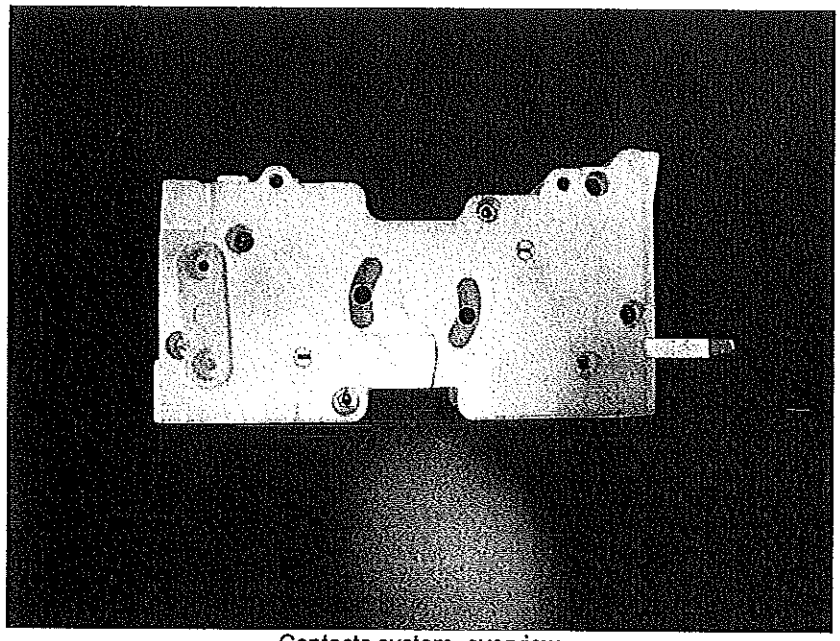
Open view



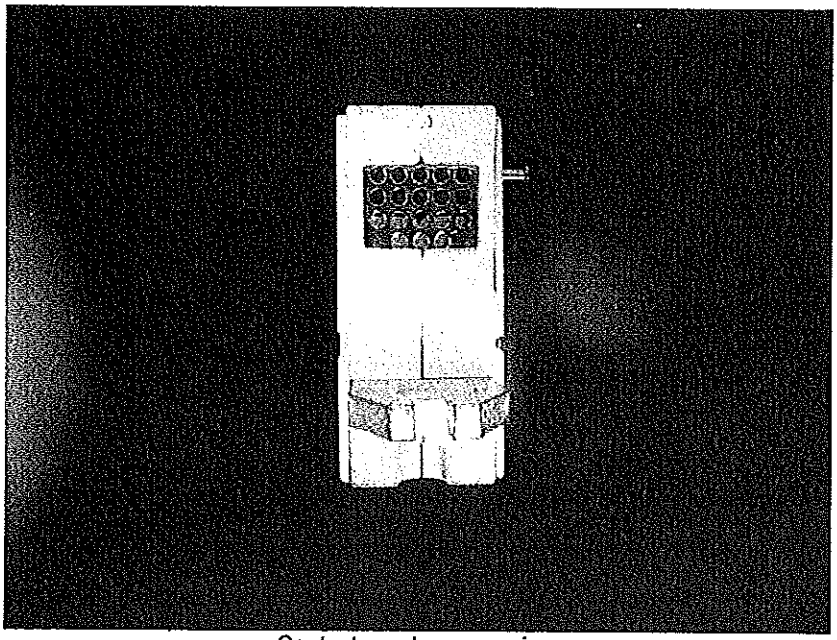
Open view, electronic type



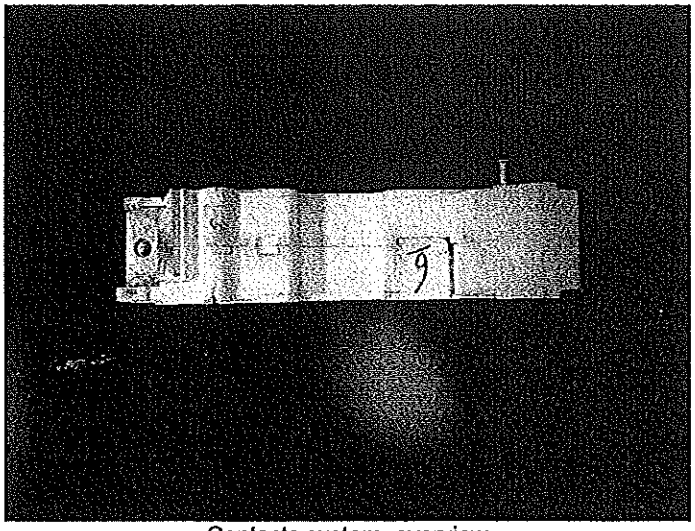
Open view, TM type



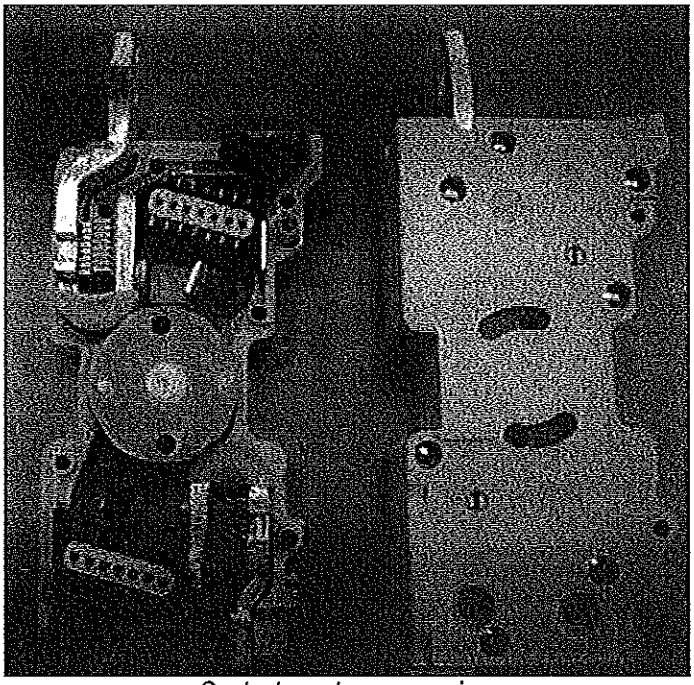
Contacts system, overview



Contacts system, overview



Contacts system, overview



Contacts system, open view

Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Reference No. ..... :	3303613.50
Date of issue ..... :	2012-09-12
Total number of pages	62
CB Testing Laboratory ..... :	DEKRA Testing Services (Zhejiang) Co., Ltd.
Address ..... :	No. 5, Changjiang Road, Great Bridge Industrial Park, North Baixiang 325603, Wenzhou, Zhejiang, China
Applicant's name ..... :	Schneider Electric Industries SAS
Address ..... :	35, Rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Test specification:	
Standard ..... :	IEC 60947-2:2006 (4th Edition) + amendment 1: 2009
Test procedure ..... :	CB
Non-standard test method ..... :	N/A
Test Report Form No ..... :	IEC60947_2F
Test Report Form(s) Originator ..... :	KEMA Quality BV
Master TRF ..... :	Dated 2010-01

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

Test item description ..... :	Moulded Case Circuit Breaker
Trade Mark ..... :	Schneider Electric
Manufacturer ..... :	Schneider Electric Industries SAS 35, Rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Model/Type reference ..... :	EasyPact series CVS400F/400N/630F/630N
Ratings ..... :	EasyPact CVS400F/N: 320, 400 A EasyPact CVS630F/N: 500, 600 A TM type, reference temperature 50 °C Ue = 220 / 240 V, 380 / 415 V, 440 V, 50 / 60 Hz 3 poles and 4 poles (3P+N, N marked, N has overcurrent protection) see further rating on page 5 to 9

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Testing procedure and testing location:	
☐ **CB Testing Laboratory:**	N/A
Testing location/ address ..... :	N/A
☐ **Associated CB Laboratory:**	N/A
Testing location/ address ..... :	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
☐ Testing procedure: TMP	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A
☒ Testing procedure: WMT	Clab, Shanghai Branch, Schneider Electric (China) Co., Ltd.
Tested by (name + signature)..... :	Pan Chen
Witnessed by (+ signature) ..... :	Fred Fu
Approved by (+ signature)..... :	Eric Wang
Testing location/ address ..... :	No. 333 Banqiao Eastern Road, 201508 Jinshan, Shanghai, China
☐ Testing procedure: SMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: RMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A

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Summary of testing:

Tests performed (name of test and test clause):

No	Current	Number of poles	Type	Voltage	Test sequence
#01	600 A	4P	CVS630F	440 V	I
#02	600 A	4P	CVS630F	240 V	III
#03	600 A	4P	CVS630F	415 V	III
#04	400 A	4P	CVS400F	240 V	III
#05	600 A	4P	CVS630F	440 V*	III
#06	600 A	3P	CVS630F	240 V	III

Note:

1. "*" test with supply reversed
2. Thermo-magnetic MCCBs from 320 - 600 A are within one frame with construction break. See more details in 'General product information' on page 10
3. This test program is based on report no. 3302408.50 and 3302408.51 issued on 2012-02-23. The MCCBs in this report are identical to TM (thermal-magetic, without RCD unit) type MCCBs in report 3302408.50 and 3302408.51, while the reference temperature is changed from 40 °C to 50 °C.

Testing location:

Tests of sequence I were conducted at:
Clab, Shanghai Branch, Schneider Electric (China) Co. Ltd
No. 333, Banqiao Eastern Road, Jinshan,
Shanghai,
China

Tests of sequence III were conducted at:
Shanghai testing & inspection institute for electrical equipment
No.505 Wu Ning Road,
Shanghai,
China

Summary of compliance with National Differences:

N/A

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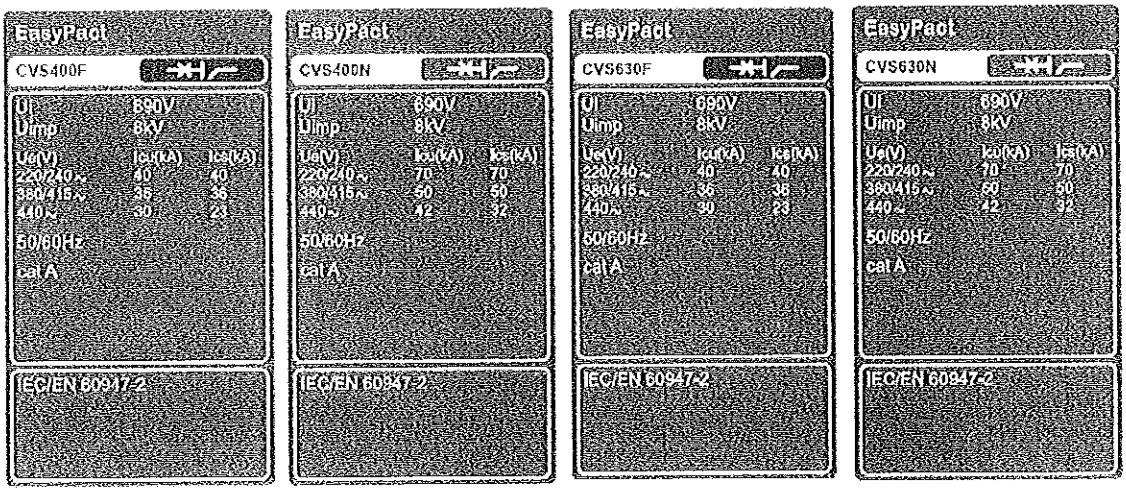
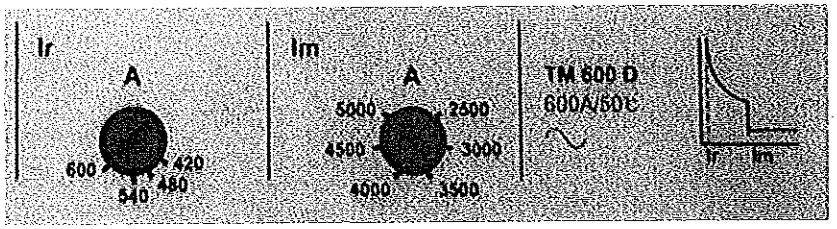
Copy of marking plate





Note:

The markings for circuit breakers are same except the type reference, the rated current, short-circuit capacity and the number of poles may be different.

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Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). ..... :	A
3.2. Interruption medium: (air, vacuum, gas Break) ..... :	Air
3.3. Design: (open construction, moulded case) ..... :	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) ..... :	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable) ..... :	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable) ..... :	Non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable..... :	Fixed
3.8. Degree of protection: (IP code) ..... :	IP40 for front
4.7. Type of release (thermo-magnetic / electronic) ..... :	Thermo-magnetic (TM)
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD ..... :	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B ..... :	A and B
Circuit-breaker for use on phase-earthed systems ..... :	N/A
Circuit-breaker for use in IT systems ..... :	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V) ..... :	220 / 240 V, 380 / 415 V, 440 V
- rated insulation voltage: Ui (V) ..... :	690 V
- rated impulse withstand voltage: Uimp (kV) ..... :	8 kV
- rated operational current: Ie (A) ..... :	0,7 - 1,0 In
- kind of current ..... :	AC
- conventional free air thermal current: Ith (A) ..... :	Equal to In
- conventional enclosed thermal current: Ithe (A) ..... :	N/A
- current rating for four-pole circuit-breakers: (A) ..... :	N/A
- number of poles ..... :	3 or 4
- rated frequency: (Hz) ..... :	50 / 60 Hz
- integral fuses (rated values) ..... :	N/A

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Rated duty :	
- eight-hour duty..... :	N/A
- uninterrupted duty: Iu (A) ..... :	Equal to In
Short-circuit characteristic :	
rated short-time making capacity: Icm (kA) ..... :	EasyPact CVS400/630F: 84 kA at 220 / 240 V, 75,6 kA at 380 / 415 V, 63 kA at 440 V EasyPact CVS400/630N: 154 kA at 220 / 240 V 105 kA at 380 / 415 V 88,2 kA at 440 V
rated ultimate short-circuit breaking capacity: Icu (kA) ..... :	EasyPact CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V EasyPact CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V
rated service short-circuit breaking capacity: Ics (kA)..... :	EasyPact CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V EasyPact CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V
rated short-time withstand current: Icw (kA/s) ..... :	N/A

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Control circuits :	
Electrical control circuits :	
- kind of current: (AC, DC) ..... :	N/A
- rated frequency: (Hz) ..... :	N/A
- rated control circuit voltage: Uc (nature, frequency, V) .. :	N/A
- rated control supply voltage: Us (nature, frequency V) .. :	N/A
Air supply control circuits: (pneumatic or electro-pneumatic) :	N/A
- rated pressure and its limit..... :	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation..... :	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits..... :	N/A
- rated operational voltage Ue (V) ..... :	N/A
- rated insulation voltage: Ui (V) ..... :	N/A
- rated operational current: Ie (A)..... :	N/A
- kind of current..... :	N/A
- rated frequency: (Hz) ..... :	N/A
- number of circuits..... :	N/A
- number and kind of contact elements ..... :	N/A
- rated uninterrupted current: Iu (A) ..... :	N/A
- utilization category: (AC, DC, current and voltage)..... :	N/A
Short-circuit characteristic :	
- Rated conditional short-circuit current (kA)..... :	N/A
- kind of protective device ..... :	N/A

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Releases :	
1) shunt release	: N/A
2) Over-current release	: Yes
a) instantaneous	: Yes
b) definite time delay	: N/A
c) inverse time delay	: Yes
- independent of previous load	: N/A
- dependent on previous load; (for example thermal type release)	: Thermo-magnetic (TM) type
3) Undervoltage release (for opening)	: N/A
4) Other releases	: N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V)	: N/A
- kind of current	: N/A
- rated frequency: (if AC)	: N/A
2) Over-current release	
- rated current	: EasyPact CVS400F/N: 320, 400 A (TM type) EasyPact CVS630F/N: 500, 600 A (TM type)
- kind of current	: AC
- rated frequency: (if AC)	: 50 / 60 Hz

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- current setting (or range of settings) ..... :	**Inverse time delay (Ir):** 320 A, 290 A, 255 A, 225 A for In = 320 A 400 A, 360 A, 320 A, 280 A for In = 400 A 500 A, 450 A, 400 A, 350 A for In = 500 A 600 A, 540 A, 480 A, 420 A for In = 600 A **Instantaneous tripping (Ii):** 2 phase poles in series 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 600 A 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 500 A 2000 A, 2400 A, 2800 A, 3200 A, 3600 A, 4000 A for In = 400 A 1500 A, 1920 A, 2240 A, 2560 A, 2880 A, 3200 A for In = 320 A Single pole 1,2 Ii
- time settings (or range of settings) ..... :	Inverse time delay: fixed Instantaneous tripping: fixed

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Classification of installation and use..... :	Fixed
Supply Connection ..... :	3 phase or 3 phase with Neutral
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)
Testing	
Date of receipt of test item ..... :	2012-04
Date (s) of performance of tests ..... :	2012-05 to 2012 - 06

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.

EasyPact CVS series F type and EasyPact CVS series N type are fully identical except the different short-circuit break capacity on the marking. Therefore, EasyPact CVS series F type was subjected to full test program with the rating of N type to cover both types.

This report shall be read in conjunction with reports 3302408.50 and 3302408.51.

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

Though it is not mentioned on the first page, the following standard was also taken into consideration. No deviation was found:
EN 60947-2:2006 +A1:2009

General product information:

The MCCBs are within one frames with 1 construction break because of the different materials of the contacts:
EasyPact CVS400F/N: 320, 400 A
EasyPact CVS630F/N: 500, 600 A

For other technical data, refer to page 5 to 9 of this report.

Factory location 1: Schneider (Beijing) Medium & Low Voltage Co., Ltd.
No.2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing, China

Factory location 2: Schneider Electric India Private Limited
Survey #215, Gagillapur Village, Medak Road, Hyderabad, Andhra Pradesh, India

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	630 A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used		P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	Schneider Electric	P
	- type designation or serial number	EasyPact CVS630F	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN 60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	220 / 240 V, 380 / 415 V, 440 V	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol Ⓘ which shall be marked on the circuit-breaker immediately following these values of rated voltage	Suitable for IT systems	N/A
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50 / 60 Hz	P
	- rated service short-circuit breaking capacity. Ics	40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V	P
	- rated ultimate short-circuit breaking capacity. Icu	40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- line and load terminals, unless their connection is immaterial	connection is immaterial	N/A
	- neutral pole terminals, if applicable, by the letter N		P
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C	50 °C	P
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	690 V	P
	- rated impulse withstand voltage (Uimp), when declared.	8 kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:	IP40 for front cover only	N/A
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm	P
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B	A	P
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A

ВЯРНО С ОРИГИНАЛА

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Clause	Requirement + Test	Result - Remark	Verdict
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal		N/A
	- load terminal		N/A
	- neutral pole terminal "N"		P
	- protective earth terminal ⏚		N/A
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.1	CONSTRUCTION	See test reports No. 3302408.50 and 3302408.51	P
7.2	Performance requirements		
7.2.1	Operating condition		
7.2.1.1	Closing		
	For a circuit-breaker to be closed safely on to the making current corresponding to its rated short-circuit making capacity, it is essential that it should be operated with the same speed and the same firmness as during the type test for proving the short-circuit making capacity		P
7.2.1.1.1	Dependent manual closing		
	For a circuit-breaker having a dependent manual closing mechanism, it is not possible to assign a short-circuit making capacity rating irrespective of the conditions of mechanical operation		N/A
	Such a circuit-breaker should not be used in circuits having a prospective peak making current exceeding 10 kA		N/A
	However, this does not apply in the case of a circuit-breaker having a dependent manual closing mechanism and incorporating an integral fast-acting opening release which causes the circuit-breaker to break safely, irrespective of the speed and firmness with which it is closed on to prospective peak currents exceeding 10 kA; in this case, a rated short-circuit making capacity can be assigned		N/A
7.2.1.1.2	Independent manual closing		
	A circuit-breaker having an independent manual closing mechanism can be assigned a short-circuit making capacity rating irrespective of the conditions of mechanical operation		P
7.2.1.1.3	Dependent power closing		
	At 110% of the rated control supply voltage, the closing operation performed on no-load shall not cause any damage to the circuit-breaker.		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	At 85% of the rated control supply voltage, the closing operation shall be performed when the current established by the circuit-breaker is equal to its rated making capacity within the limits allowed by the operation of its relays or releases and, if a maximum time is stated for the closing operation, in a time not exceeding this maximum time limit.		N/A
7.2.1.1.4	Independent power closing		
	A circuit-breaker having an independent power closing operation can be assigned a rated short-circuit making capacity irrespective of the conditions of power closing		N/A
	Means for charging the operating mechanism, as well as the closing control components, shall be capable of operating in accordance with the manufacturer's specification		N/A
7.2.1.1.5	Stored energy closing		
	Capable ensuring closing of the circuit-breaker in any condition between no-load and its rated making capacity		N/A
	- when the stored energy is retained within the circuit-breaker, a device is provided which indicates when the storing mechanism is fully charged.		N/A
	- means for charging the operating mechanism and closing control components operates when auxiliary supply voltage is between 85% and 110% of the rated control supply voltage.		N/A
	- not possible for the moving contacts to move from the open position, unless the charge is sufficient for satisfactory completion of the closing operation.		N/A
	- by manually operated circuit-breaker is the direction of operation indicated. (not for circuit-breaker with an independent manual closing operation.)		N/A
	- For trip free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the release is in the position to trip the circuit-breaker.		N/A

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.2	Opening		
7.2.1.2.1	Circuit-breakers which open automatically shall be trip-free and, unless otherwise agreed between manufacturer and user, shall have their energy for the tripping operation stored prior to the completion of the closing operation		
7.2.1.2.2	Opening by undervoltage releases		
7.2.1.3. a part 1	Operating voltage		
	An under-voltage relay or release, when associated with a switching device, shall operate to open the equipment even on a slowly falling voltage within the range between 70% and 35% of its rated voltage		N/A
	An under-voltage relay or release shall prevent the closing of the equipment when the supply voltage is below 35% of the rated voltage of the relay or release; it shall permit closing of the equipment at supply voltages equal to or above 85% of its rated value		N/A
	Unless otherwise stated in the relevant product standard, the upper limit of the supply voltage shall be 110% of its rated value		N/A
7.2.1.3. b part 1	Operating time		
	For a time-delay under-voltage relay or release, the time-lag shall be measured from the instant when the voltage reaches the operating value until the instant when the relay or release actuates the tripping device of the equipment		N/A
7.2.1.2.3	Opening by shunt releases		N/A
7.2.1.4 part 1	Limits of operation of shunt releases		
	A shunt release for opening shall cause tripping under all operating conditions of an equipment when the supply voltage of the shunt release measured during the tripping operation remains between 70% and 110% of the rated control supply voltage and, if a.c., at the rated frequency		N/A
7.2.1.5 part 1	Limits of operation of current operated relays and released		
	Limits of operation of current operated relays and releases shall be stated in the relevant product standard		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.1.2.4	Opening by over-current releases		
a)	Opening under short-circuit conditions		
	The short-circuit release shall cause tripping of the circuit-breaker with an accuracy of 20% of the tripping current value of the current setting for all values of the current setting of the short-circuit current release		P
	Where necessary for over-current co-ordination the manufacturer shall provide information (usually curves) showing		N/A
	- maximum cut-off (let-through) peak current as a function of prospective current (r.m.s. symmetrical)		N/A
	- I^2t characteristics for circuit-breakers of utilization category A and, if applicable, B for circuit-breakers with instantaneous override (see note to 8.3.5)		N/A
b)	Opening under overload conditions		
1)	Instantaneous or definite time-delay operation		N/A
	The release shall cause tripping of the circuit-breaker with an accuracy of ± 10% of the tripping current value of the current setting for all values of current setting of the overload release		N/A
2)	Inverse time-delay operation		
	At the reference temperature and at 1,05 times the current setting with the conventional non-tripping current, the opening release being energized on all poles, tripping shall not occur in less than the conventional time from the cold state, i.e. with the circuit-breaker at the reference temperature		P
	Moreover, when at the end of the conventional time the value of current is immediately raised to 1,30 times the current setting, i.e. with the conventional tripping current, tripping shall then occur in less than the conventional time later		P
	If a release is declared by the manufacturer as substantially independent of ambient temperature, the current values of table 6 shall apply within the temperature band declared by the manufacturer, within a tolerance of 0,3%/K		N/A
	The width of the temperature band shall be at least 10 K on either side of the reference temperature		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
7.2.4.2	Operational performance capability		
7.2.4.2 part 1	The operational performance off-load for which the tests are made with the control circuits energized and the main circuit not energized, in order to demonstrate that the equipment meets the operating conditions specified at the upper and lower limits of supply voltage and/or pressure specified for the control circuit during closing and opening operations		P
	The operational performance on-load during which the equipment shall make and break the specified current corresponding, where relevant, to its utilization category for the number of operations stated in the relevant product standard		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8	TESTS		
8.2.4	Mechanical properties of terminals	See test reports No. 3302408.50 and 3302408.51	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS EasyPact CVS630F, TM type, 4 poles, 600 A		
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	Schneider Electric	
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#01	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V, 440 V tested at 440 V	
	Rated current: In (A)	600 A	
	Ambient temperature 10-40 °C :	24 °C	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	Max: 6000 A Min: 3000 A	P
	Range of adjustable setting current. (A)	Ii: 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A	P
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic overcurrent releases		
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A) .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 2040 A 2047 A 2053 A 2038 A	P
	Operating time: >0,2s in case of instantaneous releases: .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 0,2 s no trip 0,2 s no trip 0,2 s no trip 0,2 s no trip	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases: .....L1-L2: .....L2-L3: .....L3-L1: L3-N:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A) .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 3058 A 3049 A 3042 A 3073 A	P
	Operating time: <0,2s in case of instantaneous releases: .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 22,6 ms 11,2 ms 13,4 ms 11,9 ms	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1-L2: .....L2-L3: .....L3-L1: L3-N:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A) .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 4041 A 4045 A 4047 A 4055 A	P
	Operating time: >0,2s in case of instantaneous releases: .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 0,2 s no trip 0,2 s no trip 0,2 s no trip 0,2 s no trip	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1-L2: .....L2-L3: .....L3-L1: L3-N:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A) .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 6028 A 6032 A 6066 A 6039 A	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: <0,2s in case of instantaneous releases .....L1-L2: .....L2-L3: .....L3-L1: L3-N:	 20,5 ms 16,9 ms 16,4 ms 18,1 ms	P
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1-L2: .....L2-L3: .....L3-L1: L3-N:		N/A
	Test current: tripping current declared for single pole operation (A) .....L1: .....L2: .....L3: .....N: .....L1: .....L2: .....L3: .....N:	3000 A (min setting) 3019 A 3009 A 3022 A 3015 A 6000 A (max setting) 6024 A 6011 A 6029 A 6022 A	P
	Operating time: < 0,2 s in case of instantaneous release: ..... L1: .....L2: .....L3: .....N: .....L1: .....L2: .....L3: .....N:	Min setting: 34,3 ms 34,1 ms 40,0 ms 43,7 ms Max setting: 39,5 ms 38,5 ms 41,6 ms 46,3 ms	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases .....L1: .....L2: .....L3: .....N:		N/A
	Electronic overcurrent releases		
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases..... L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.....L1: .....L2: L3:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases.....L1: .....L2: L3:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.....L1: .....L2: L3:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases.....L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.....L1: .....L2: L3:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases.....L1: .....L2: L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.....L1: .....L2: L3:		N/A
8.3.3.1.3	Opening under overload conditions		
a)	Instantaneous or definite time-delay releases		
	Manufacturer's name or trademark		
	Type designation or serial number		
	Sample no:		
	Rated operational voltage: Ue (V)		
	Rated current: In (A)		
	Ambient temperature 10-40 °C :		N/A
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.		N/A
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the rated, or minimum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 90% of the maximum adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the rated, or minimum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Test current: 110% of the maximum adjustable setting current: (A) circuit-breaker with neutral pole: 1,2x110% (A)		N/A
	Operating time: <0,2s in case of instantaneous releases		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
b)	Inverse time delay releases		
	Manufacturer's name or trademark	Schneider Electric	
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#01	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V 440 V	
	Rated current: In (A)	600 A	
	For releases dependent of ambient air temperature: Reference temperature	50 °C	P
	Test ambient temperature (°C)	51 °C	P
	For releases dependent on ambient air temperature, the operating characteristics shall be verified at the reference temperature, the release being energized on all phase poles. If the test made at a different ambient temperature, a correction shall be made in accordance with the manufacturer's correction temperature/current data		P
	For thermal-magnetic releases independent of ambient temperature: Tests shall be made at 30°C and 20°C or 40°C, the release being energized on all phase poles		N/A
	For electronic releases, the operating characteristic shall be verified at the ambient temperature of the test room (see 6.1.1 of IEC 60947-1), the release being energised on all phase poles.		N/A
	Range of adjustable setting current: (A)	0,7 - 1,0 In (420 - 600 A)	P
	Thermal Magnetic releases, independent of ambient air temperature: at 30°C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)	447 A	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	2 h no trip	P
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)	548 A	P
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.	445 A 2 h no trip 660 A tripping time: 332 s	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	197 s	P
	Test current: 105% of the **maximum** adjustable setting current: (A)	637 A	P
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A	2 h no trip	P
	Test current: 130% of the **maximum** adjustable setting current: (A)	783 A	P
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.	631 A 2 h no trip 939 A tripping time: 208 s	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	58 s	P
	Thermal Magnetic releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: 105% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the rated, or **minimum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Test current: 105% of the **maximum** adjustable setting current: (A)		N/A
	Conventional non-tripping time: 1h when In < 63A, 2h when In > 63 A		N/A
	Test current: 130% of the **maximum** adjustable setting current: (A)		N/A
	For circuit-breakers having an identified neutral pole provided with an overload release (see 8.3.3.1.1), the test current at the conventional tripping current shall be multiplied by the factor 1,2.		N/A
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A		N/A
	An additional test, at a current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer		
	Releases, dependent of ambient air temperature: Reference temperature (°C)	50 °C	P
	Releases, independent of ambient air temperature: at 30°C		N/A
	Test ambient air temperature:	51 °C	P
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)	2 Ir Max setting: 1214 A (2 x 600 A) Min setting: 848 A (2 x 420 A)	P
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)	Max setting: 648 s Min setting: 726 s (Time declared by the manufacturer: 130 s ≤ tripping time ≤ 1200 s)	P
	Releases, independent of ambient air temperature: at 20°C or 40°C		
	Test ambient air temperature:		N/A
	Test current: at current specified by the manufacturer to verify the time/current characteristic of the releases conform to the curves provided by the manufacturer. % at the rated, or minimum adjustable setting current: (% or A)		N/A
	Tripping time acc. time/current characteristic of the releases conform to the curves provided by the manufacturer. (within the stated tolerances)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.1.4	Additional test for definite time-delay releases		N/A
a)	Time delay		
	Test is made at a current equal to 1,5 times the current setting. If the test current overlaps with another tripping characteristic (e.g. an instantaneous tripping characteristic), the trip setting and the test current shall be reduced as necessary to prevent premature tripping.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Test current: 1,5 times of the **maximum** adjustable setting current: (A)		N/A
	Operating time, overload releases: (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electromagnetic): (s) L1-L2: L1-L3: L2-L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Time-delay: between the limits stated by the manufacturer:		N/A
	Operating time, short-circuit releases (electronic): (s)		N/A
	Time-delay: between the limits stated by the manufacturer:		N/A
b)	Non-tripping duration		
	Firstly, the test current equal to 1,5 times the current setting is maintained for a time interval equal to the non-tripping duration stated by the manufacturer.		
	Then, the current is reduced to the rated current and maintained at this value for twice the time-delay stated by the manufacturer. The circuit-breaker shall not trip.		
	overload releases: (all phase poles loaded)		N/A
	for circuit-breakers having an identified neutral pole provided with an overload release, the test current for this release shall be 1,5 times the current setting;		N/A
	short-circuit releases		N/A
	Electromagnetic release: two poles in series carrying the test current, using successively all possible combinations of poles having a short-circuit release.		N/A
	Electronic releases: on one pole chosen at random.		N/A
	Test current: 1,5 times of the **minimum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Operating time, short-circuit releases (electronic), shall not trip: (s)		N/A
	Test current: 1,5 times of **maximum** adjustable setting current: (A)		N/A
	non-tripping duration stated by the manufacturer for overload release: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release thermal magnetic: (s)		N/A
	non-tripping duration stated by the manufacturer for short-circuit release electronic: (s)		N/A
	Time duration of current when reduced to the rated current: shall be twice the delay-time stated by the manufacturer: (s)		N/A
	Rated current		N/A
	Operating time, overload releases: the circuit-breaker does not trip:		N/A
	Operating time, short-circuit releases (electromagnetic), shall not trip: (s) L1-L2: L1-L3: L2-L3:		N/A
	Operating time, short-circuit releases (electronic), shall not trip: (s)		N/A
8.3.3.2	Test of dielectric properties, impulse withstand voltage (Uimp indicated):		
8.3.3.4 part1	The 1,2/50µs impulse voltage shall be applied five times for each polarity at intervals of 1s minimum		
	- rated impulse withstand voltage (kV) :	8 kV	P
	- sea level of the laboratory:	Sea level	P
	- test Uimp main circuits (kV) :	9,8 kV	P
	- test Uimp auxiliary circuits (kV) :		N/A
	- test Uimp control circuits (kV) :		N/A
	- test Uimp on open main contacts (equipment suitable for isolating) (kV) :	12,3 kV	P
a)	Application of test voltage		P
	i) Between all terminals of the main circuit connected together (incl. control and auxiliary circuits connected to the main circuit) and the enclosure or mounting plate, with the contacts in all normal positions of operation.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	ii) Between each pole of the main circuit and the other poles connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation.		P
	iii) Between each control and auxiliary circuit not normally connected to the main circuit and: - the main circuit		N/A
	- other circuits		N/A
	- exposed conductive parts		N/A
	- enclosure of mounting plate		N/A
	iv) equipment suitable for isolation		P
	equipment not suitable for isolation		N/A
	- no unintentional disruptive discharge during the test's		P
	Test of dielectric properties, dielectric withstand voltage (Uimp not indicated):		
	- rated insulation voltage (V) :	690 V	P
	- main circuits, test voltage for 1 min (V)	1924 V / 5 s	P
	- auxiliary circuits, test voltage for 1 min (V)		N/A
	- control circuits, test voltage for 1 min (V)		N/A
8.3.3.2.2	Application of test voltage		
1)	with circuit-breaker in the closed position		
	- between all live parts of all poles connected together and the frame of the circuit-breaker .		P
	- between each pole and all the other poles connected to the frame of the circuit-breaker		P
2)	with the circuit-breaker in the open position and, additionally, in the tripped position, if any.		P
	- between all live parts of all poles connected together and the frame of the circuit-breaker.		P
	- between the terminals of one side connected together and the terminals of the other side connected together.		P
b)	Control and auxiliary circuits		
1)	- between all the control and auxiliary circuits which are not normally connected to the main circuit, connected together, and the frame of the circuit-breaker.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2)	- where appropriate, between each part of the control an auxiliary circuits which may be isolated from the other parts during normal operation and all the other parts connected together.		N/A
	No unintentional disruptive discharge during the tests		N/A
8.3.3.2	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 0,5mA. .....L1: .....L2: .....L3: .....N:	491 V Nil Nil Nil Nil	P
8.3.3.3	Mechanical operation and operational performance capability		
8.3.3.3.2	Construction and mechanical operation		
a)	Construction		
	A withdrawable circuit-breaker shall be checked for the requirements stated in 7.1.1		N/A
	A circuit-breaker with stored energy operation shall be checked for compliance with 7.2.1.1.5, regarding the charge indicator and the direction of operation of manual energy storing		N/A
b)	Mechanical operation		
	A circuit-breaker with dependent power operation shall comply with the requirements stated in 7.2.1.1.3		N/A
	A circuit-breaker with dependent power operation shall operate with the operating mechanism charged to the minimum and maximum limits stated by the manufacturer		N/A
	A circuit-breaker with stored energy operation shall comply with the requirements stated in 7.2.1.5 with the auxiliary supply voltage at 85% and 110% of the rated control supply voltage.		N/A
	It shall also be verified that the moving contacts cannot be moved from the open position when the operating mechanism is charged to slightly below the full charge as evidenced by the indicating device		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For a trip-free circuit-breaker it shall not be possible to maintain the contacts in the touching or closed position when the tripping release is in the position to trip the circuit-breaker		P
	If the closing and opening times of a circuit-breaker are stated by the manufacturer, such times shall comply with the stated values		N/A
c)	Undervoltage releases		
	Undervoltage releases shall comply with the requirements of 7.2.1.3 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum current rating for which the release is suitable		N/A
i)	Drop out voltage		
	It shall be verified that the release operates to open the circuit-breaker between the voltage limits specified		N/A
	The voltage shall be reduced from rated voltage at a rate to reach 0 V in approximately 30 s		N/A
	The test for the lower limit is made without current in the main circuit and without previous heating of the release coil		N/A
	In the case of a release with a range of rated voltages, this test applies to the maximum voltage of the range		N/A
	The test for the upper limit is made starting from a constant temperature corresponding to the application of rated control supply voltage to the release and rated current in the main poles of the circuit-breaker		N/A
	This test may be combined with the temperature-rise test of 8.3.3.6		N/A
	In the case of a release with a range of rated voltages, this test is made at both the minimum and maximum rated control supply voltages		N/A
ii)	Test for limits of operation		
	Starting with the circuit-breaker open, at the temperature of the test room, and with the supply voltage at 30% rated maximum control supply voltage, it shall be verified that the circuit-breaker cannot be closed by the operation of the actuator		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	When the supply voltage is raised to 85% of the minimum control supply voltage, it shall be verified that the circuit-breaker can be closed by the operation of the actuator		N/A
iii)	Performance under overvoltage conditions		
	With the circuit-breaker closed and without current in the main circuit, it shall be verified that the undervoltage release will withstand the application of 110% rated control supply voltage for 4 h without impairing its functions		N/A
d)	Shunt releases		
	Shunt releases shall comply with the requirements of 7.2.1.4 of Part 1. For this purpose, the release shall be fitted to a circuit-breaker having the maximum rated current for which the release is suitable		N/A
	It shall be verified that the release will operate to open the circuit-breaker at 70% rated control supply voltage when tested at an ambient temperature of + 55 °C ± 2 °C without current in the main poles of the circuit-breaker		N/A
	In the case of a release having a range of rated control supply voltages, the test voltage shall be 70% of the minimum rated control supply voltage		N/A
8.3.3.3.3	Operational performance capability without current.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#01	
	Rated current In (A)	600 A	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V 440 V	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt releases: Uc (V)		
	Rated control supply voltage undervoltage releases: Uc (V)		
	Ambient temperature 10-40 °C :	22 °C	P
	Number of operating cycles per hour	120	P
	Number of cycles without current (total) (closing mechanism energized at the rated Uc)	4000	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Number of cycles without current (without releases)	4000	P
	Applied voltage: closing mechanism (V)		N/A
	10% of total cycles for circuit-breaker with fitted shunt release: (50% at the beginning- and 50% at the end of the test.) Energized at the rated Uc		N/A
	Applied voltage: shunt releases (V)		N/A
	10% of total cycles for circuit-breaker with undervoltage releases: (50% at the beginning- and 50% at the end of the test.) Energized at the minimum rated Uc		N/A
	10 cycles without applied voltage at the undervoltage releases. (Shall not possible to close the circuit-breaker.)		N/A
	Applied voltage: undervoltage releases (V)		N/A
	Electrical components do not exceed the value indicated in tab. 7.		P
8.3.3.3.4	Operational performance capability with current.		
	Rated current: In (A)	600 A	
	Maximum rated operational voltage: Ue (V)	440 V	
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	Number of operating cycles per hour	60	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)	1000	P
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload setting at maximum and short-circuit setting at minimum.	Overload: max Short-circuit: min	P
	Conditions, make/break operations:		P
	- test voltage U/Ue = 1,0 (V) ..... L1: ..... L2: L3:	447 V 447 V 446 V	P
	- test current I/Ie = 1,0 (A) ..... L1: ..... L2: L3:	601 A 607 A 606 A	P
	- power factor/time constant:	0,81	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- frequency: (Hz)	50 Hz	P
	- on-time (ms):	Min 1,26 s	P
	- off-time (s):	Max 58,7 s	P
	Electrical components do not exceed the value indicated in tab. 7.		P
8.3.3.3.5	Additional test of operational performance capability without current for withdrawable circuit-breaker.		N/A
8.3.3.4	Overload performance		
	this test applies to circuit-breaker of rated current up to and including 630 A		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#01	
	Rated current In (A)	600 A	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V 440 V	
	Rated control supply voltage of closing mechanism: Uc (V)		
	Rated control supply voltage of shunt releases: Uc (V)		
	Rated control supply voltage undervoltage releases: Uc (V)		
	Ambient temperature 10-40 °C :	23 °C	P
	Number of operating cycles per hour	60	P
	Maximum rated operational voltage: Ue (V)	440 V	P
	Number of cycles with current (total) (closing mechanism energized at the rated Uc)		N/A
	Applied voltage: closing mechanism (V)		N/A
	For circuit-breaker fitted with adjustable releases, test shall be made with the overload/short-circuit settings at maximum.	Overload: max Short-circuit: max	P
	Conditions, overload operations:		P
	- test voltage U/Ue = 1,05 (V) ..... L1: ..... L2: L3:	472 V 472 V 472 V	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- test current AC/DC: I/Ie = 6,0/2.5 (A) ..... L1: ..... L2: L3:	 3688 A 3652 A 3743 A	P
	- power factor/time constant:	0,51	P
	- Number of cycles manually opened: 9	12 operations under 1,05 Ue	P
	- Number of cycles automatically opened by an overload release: 3	3 operations under convenient voltage	P
	- frequency: (Hz)	50 Hz	P
	- on-time max 2s:	Min 29,7 ms	P
8.3.3.5	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1027 V / 5 s	P
	- no breakdown or flashover		P
	For circuit-breaker suitable for isolation, the leakage current shall be measured through each pole with the contacts in the open position, at a test voltage of 1,1 Ue, and shall not exceed 2 mA. .....L1: .....L2: .....L3: .....N:	492 V Nil Nil Nil Nil	P
8.3.3.6	Verification of temperature-rise		
	- the values of temperature-rise do not exceed those specified in tab. 7.		P
	Temperature rise of main circuit terminals ≤ 80 K (K) :	Max 58 K (3P test) Max 63 K (P + N test) see table 1	P
	conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	test current Ie (A) :	600 A	P
8.3.3.7	Verification of overload releases		
	Test current: 1.45 times the value of their current setting at the reference temperature: (A)	870 A	P
	Conventional tripping time: <1h when In < 63A, <2h when In > 63 A	237 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.3.8	Verification of undervoltage and shunt releases		
	Circuit-breaker fitted with undervoltage releases. The release shall not operate at 70% of the minimum control supply voltage -		N/A
	and shall operate at 35% of the maximum control supply voltage.		N/A
	Circuit-breaker fitted with shunt releases. The release shall operate at 70% of the minimum rated control supply voltage. Test made at room temperature.		N/A
8.3.3.9	Verification of the main contact position for circuit-breakers for isolation		P
	actuating force for opening (N) .....:	99 N	—
	test force with blocked main contacts for 10 s (N) .:	298 N	—
	Dependent power operation		N/A
	Supply voltage of 110% of rated voltage (V).....:		N/A
	Three attempts of 5 s to operate the equipment at intervals of 5 min.		N/A
	Independent power operation		N/A
	Three attempts to operate the equipment by the stored energy.		N/A
	Lock ability of driving mechanism in OFF-position at test force and blocked main contacts .....:		N/A
	Position indicator does not show OFF-position after capture of test force at blocked main contacts		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	TEST SEQUENCE II	See test reports No. 3302408.50 and 3302408.51	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 4 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#02	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	437 s 411 s 403 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	253 V 253 V 253 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	71,8 kA 72,8 kA 72,6 kA	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	160 kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	28,3 kA 13,9 kA 22,7 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,16 MA^2s 471 kA^2s 1,21 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	28,2 kA 19,0 kA 23,5 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,31 MA^2s 937 kA^2s 1,44 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,01 mA 0,02 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	178 s 194 s 186 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 4 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#03	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	415 V	
	Rated ultimate short-circuit breaking capacity: (kA)	36 kA, tested at 50 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	396 s 321 s 474 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	439 V 439 V 439 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	52,0 kA 50,9 kA 52,0 kA	P
	power factor/time constant :	0,25	P
	- Factor "n"	2,1	P
	- peak test current (Amax) :	106 kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	32,5 kA 20,4 kA 20,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	2,09 MA^2s 1,46 MA^2s 1,54 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	20,5 kA 19,7 kA 32,3 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	751 kA^2s 729 kA^2s 2,25 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	457 V 0,01 mA 0,02 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	215 s 237 s 222 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS400F, TM type, 4 poles, 400 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS400F	
	Sample no:	#04	
	Rated current: In (A)	400 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on two-poles (with RCD)..		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	318 s 309 s 383 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	240 mm^2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	253 V 253 V 253 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	71,8 kA 72,8 kA 72,6 kA	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	160 kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) .... L1: .... L2: L3:	24,2 kA 10,4 kA 18,4 kA	P
	- Joule integral I^2dt (A^2s) .... L1: .... L2: L3:	787 kA^2s 414 kA^2s 849 kA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) .... L1: .... L2: L3:	22,1 kA 12,1 kA 16,7 kA	P
	- Joule integral I^2dt (A^2s) .... L1: .... L2: L3:	813 kA^2s 601 kA^2s 876 kA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) ....L1: ....L2: ....L3: ....N:	264 V 0,01 mA 0,02 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 800 s	P
	- Operation time: (s) .... L1: .... L2: L3:	312 s 289 s 297 s	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 4 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#05	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	440 V	
	Rated ultimate short-circuit breaking capacity: (kA)	30 kA, tested at 42 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	370 s 332 s 412 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm^2) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	underside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	477 V 477 V 477 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	42,8 kA 43,4 kA 43,2 kA	P
	power factor/time constant :	0,24	P
	- Factor "n"	2,1	P
	- peak test current (Amax) :	88,9 kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	21,5 kA 31,6 kA 18,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,61 MA^2s 1,93 MA^2s 1,04 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	22,8 kA 32,4 kA 23,8 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,73 MA^2s 2,42 MA^2s 2,08 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	484 V 0,01 mA 0,02 mA 0,01 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	218 s 199 s 206 s	P

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IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.5	TEST SEQUENCE III (Icu) EasyPact CVS630F, TM type, 3 poles, 600 A		
	Rated ultimate short-circuit breaking		
	Except where the combined test sequence applies, this test sequence applies to circuit-breaker of utilization category A and to circuit-breaker of utilization B having a rated ultimate short-circuit breaking capacity higher than the rated short-time withstand current.		
	For circuit-breakers of utilization B having a rated short-time withstand current equal to their rated ultimate short-circuit breaking capacity, this test sequence need not be made, since, in this case, the ultimate short-circuit breaking capacity, is verified when carrying out test sequence IV.		
	For integrally fused circuit-breakers, test sequence V applies in place of this sequence.		
	Type designation or serial number	EasyPact CVS630F	
	Sample no:	#06	
	Rated current: In (A)	600 A	
	Rated operational voltage: Ue (V)	240 V	
	Rated ultimate short-circuit breaking capacity: (kA)	40 kA, tested at 70 kA	
	Rated control supply voltage of closing mechanism: Uc (V)	N/A	
	Rated control supply voltage of shunt release: Uc (V)	N/A	
	This test sequence need not be made when Icu = Ics		
8.3.5.1	The operation of overload releases shall be verified at twice the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	396 s 349 s 377 s	P
8.3.5.2	Test of rated ultimate short-circuit breaking capacity		
	The test sequence of operations is O – t – CO		
	For circuit-breaker fitted with adjustable releases, test shall be made with the current and time settings at maximum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	closing mechanism energized with 85% at the rated Uc: (V)		N/A
	The circuit-breaker is mounted complete on its own support or an equivalent support.		P
	Test made in free air:		P
	Distances of the metallic screen's: (all sides)	Up / Down: 60 mm Left / Right: 5 mm Front / Back: 0 mm	P
	The characteristics of the metallic screen:		
	- woven wire mesh		N/A
	- perforated metal		P
	- expanded metal		N/A
	- ratio hole area/total area: 0,45-0,65		P
	- size of hole: <30mm^2		P
	- finish: bare or conductive plating		P
	Test made in specified individual enclosure: Details of these tests, including the dimensions of the enclosure:		N/A
	Fuse "F": copper wire: diameter 0,8 mm, 50 mm long		P
	Circuit is earthed at: (load-star- or supply-star point)	Load-star	P
	Conductor cross-sectional area (mm²) :	185 mm^2 x 2	P
	If terminals unmarked: line connected at: (underside /upside)	upside	P
	Tightening, torques: (Nm)	50 Nm	P
	Test sequence of operation: O – t – CO		P
	- test voltage U/Ue = 1,05 (V) ..... L1-L2: ..... L2-L3: L3-L1:	253 V 253 V 253 V	P
	- r.m.s. test current AC/DC: (A) ..... L1: ..... L2: L3:	71,8 kA 72,8 kA 72,6 kA	P
	power factor/time constant :	0,20	P
	- Factor "n"	2,2	P
	- peak test current (Amax) :	160 kA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test sequence "O"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	28,6 kA 13,6 kA 22,0 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	1,19 MA^2s 413 kA^2s 1,08 MA^2s	P
	Pause, t: (min)	3 min	P
	Test sequence "CO"		
	- max. let-through current: (kApeak) ..... L1: ..... L2: L3:	21,2 kA 23,1 kA 29,2 kA	P
	- Joule integral I^2dt (A^2s) ..... L1: ..... L2: L3:	971 kA^2s 1,56 MA^2s 1,33 MA^2s	P
	Melting of the fusible element	No melting	P
	Holes in the PE-sheet for test sequence "O"	No hole	P
	Cracks observed	No crack	P
8.3.5.3	Verification of dielectric withstand		
	- equal to twice the rated operational voltage with a minimum of 1000 V for 5 seconds	1000 V / 5 s	P
	- no breakdown or flashover		P
	- the leaking current for circuit-breaker suitable for isolation: (<6mA / 1,1 Ue) .....L1: .....L2: .....L3: .....N:	264 V 0,01 mA 0,01 mA 0,02 mA	P
8.3.5.4	Verification of overload releases		
	The operation of overload releases shall be verified at 2,5 times the value of their current setting on each pole separately.		
	The operating time shall not exceed the max. value stated by the manufacturer for twice the current setting at the reference temperature, on a pole singly		
	Time specified by the manufacturer:	tripping time ≤ 1200 s	P
	- Operation time: (s) ..... L1: ..... L2: L3:	217 s 237 s 226 s	P

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Clause	Requirement + Test	Result - Remark	Verdict
8.3.6	TEST SEQUENCE IV		N/A
8.3.7	TEST SEQUENCE V		N/A
8.3.8	TEST SEQUENCE VI		N/A
Annex B	Circuit-breakers incorporating residual current protection		N/A
Annex C	Individual pole short-circuit test sequence		N/A
Annex F	Additional tests for circuit-breakers with electronic over-current protection		N/A
Annex H	Individual pole short-circuit test sequence	See test reports No. 3302408.50 and 3302408.51	P
Annex L	Circuit-breakers not fulfilling the requirements for overcurrent protection		N/A
Annex M	Modular residual current devices (without integral current breaking device)		N/A
Annex N	Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M		N/A
Annex O	Instantaneous trip circuit-breakers (ICB)		N/A

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	TABLE 1: Heating Test (Seq I, clause 8.3.3.6, sample no. #01)		P
	Test current (A):	600 A	—
	Ambient (°C):	22 °C	—

Thermocouple Locations	max temperature-rise measured, (K)	temperature-rise limit, (K)
Top left terminal	58	80
Top centre terminal	52	80
Top right terminal	53	80
Bottom left terminal	50	80
Bottom centre terminal	52	80
Bottom right terminal	52	80
Side enclosure	28	60
Front enclosure	17	50
Knob	11	35
Test on neutral and adjacent terminal		
Top left terminal	63	80
Top N terminal	50	80
Bottom left terminal	51	80
Bottom N terminal	50	80
supplementary information: N/A		

	TABLE 2: dielectric strength (Seq I, clause 8.3.3.2, sample no. #01)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		9,8 kV	No
Between each terminal of the main circuit and the other terminals connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		9,8 kV	No
Between the incoming and outgoing terminals with the circuit-breaker open		12,3 kV	No
supplementary information: N/A			

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	TABLE 3: dielectric strength (Seq I, clause 8.3.3.2, sample no. #01)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1924 V	No
Between each terminal of the main circuit and the other terminals connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1924 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1924 V	No
supplementary information: N/A			

	TABLE 4: dielectric strength (Seq III, clause 8.3.5.3, sample no. #02 - #06)		P
test voltage applied between:		test potential applied (V)	breakdown / flashover (Yes/No)
Between all the terminals of the main circuit connected together and the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between each terminal of the main circuit and the other terminals connected together and to the enclosure or mounting plate, with the contacts in all normal positions of operation		1000 V	No
Between the incoming and outgoing terminals with the circuit-breaker open		1000 V	No
supplementary information: N/A			

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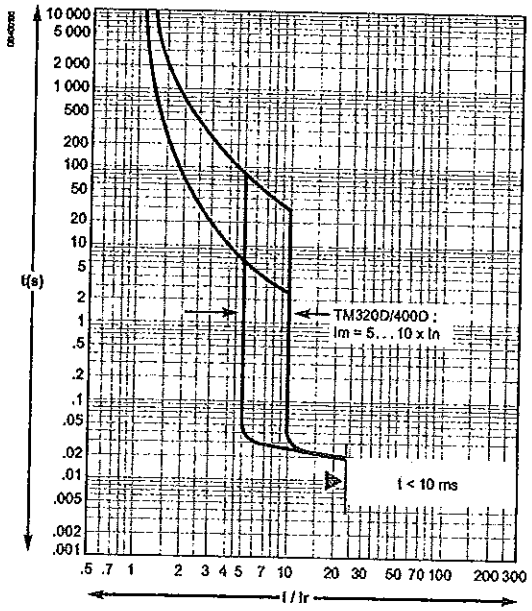
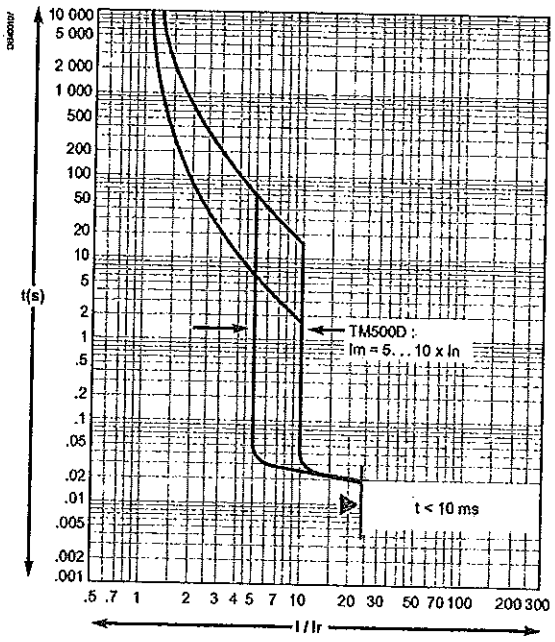
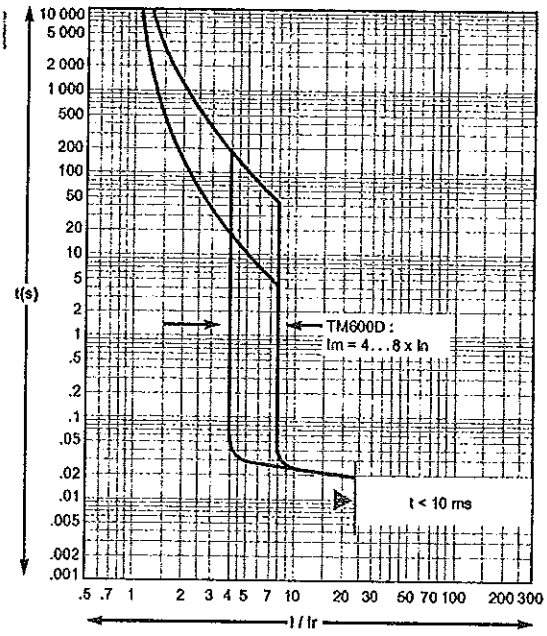
Time current characteristics



TM320D & TM400D

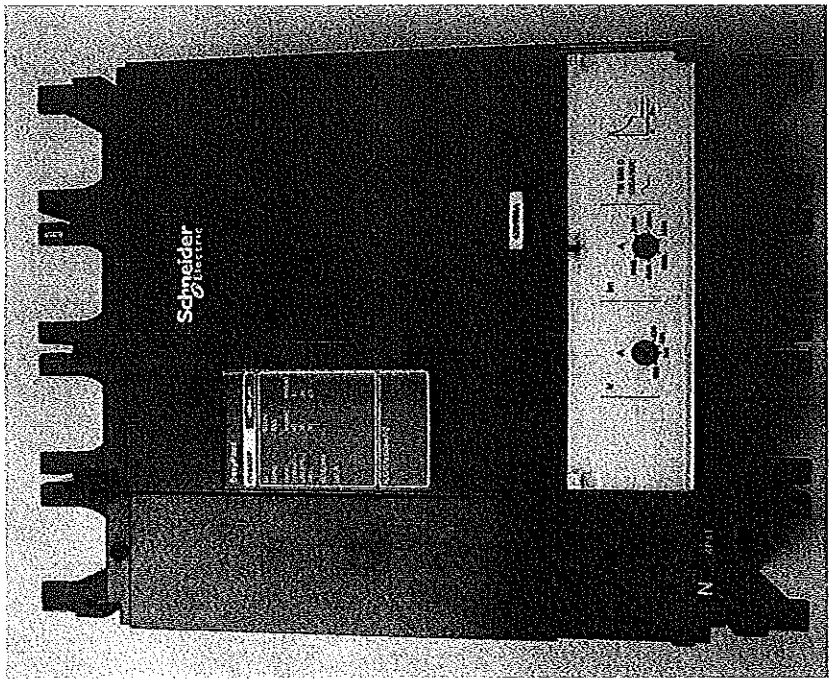


TM500D

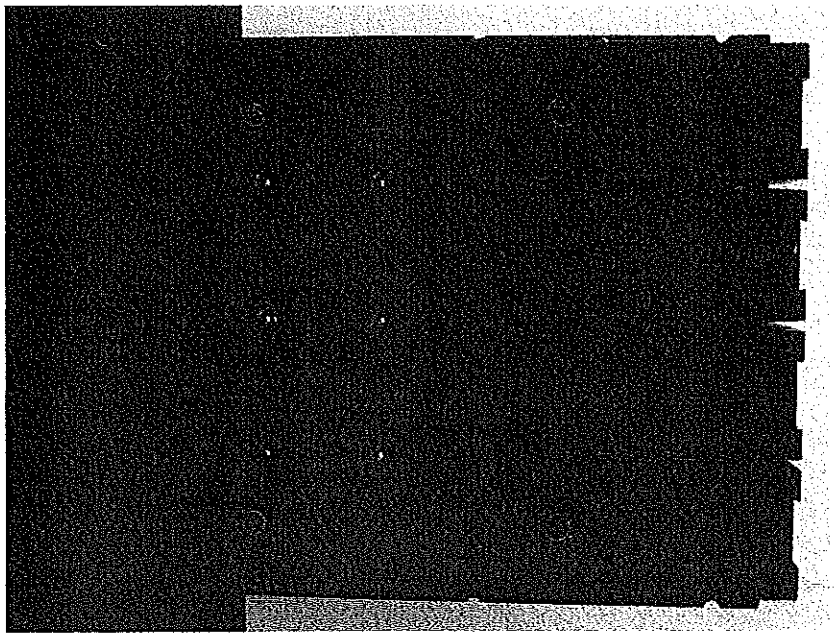

10 000
5 000
2 000
1 000
500
200
100
50
20
10
5
2
1
.5
.2
.1
.05
.02
.01
.005
.002
.001
t(s)
TM600D :
Im = 4...8 x In
t < 10 ms
.5 .7 1 2 3 4 5 7 10 20 30 50 70 100 200 300
I / Ir

TM600D

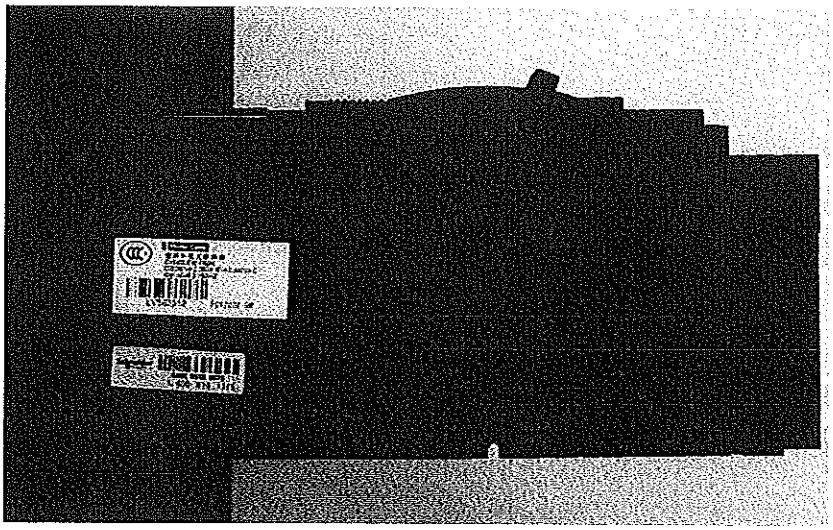
Photographs



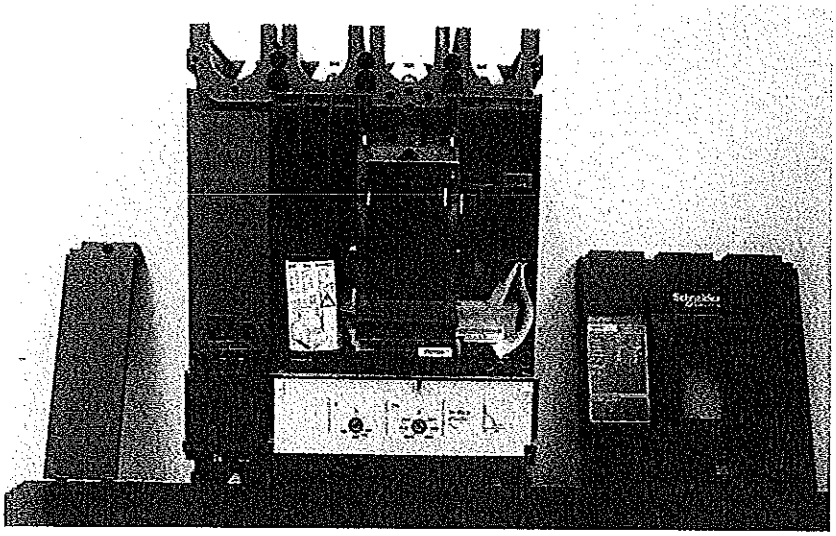
Front view



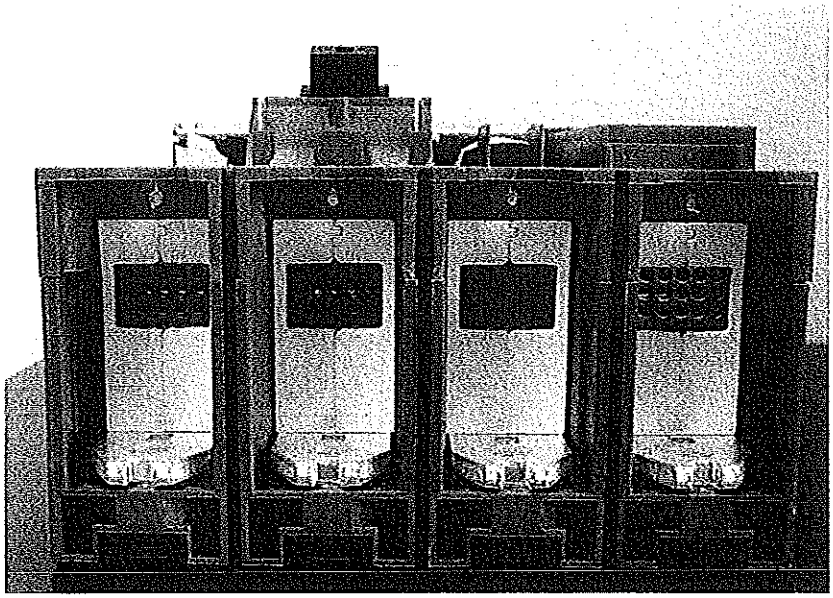
Back view



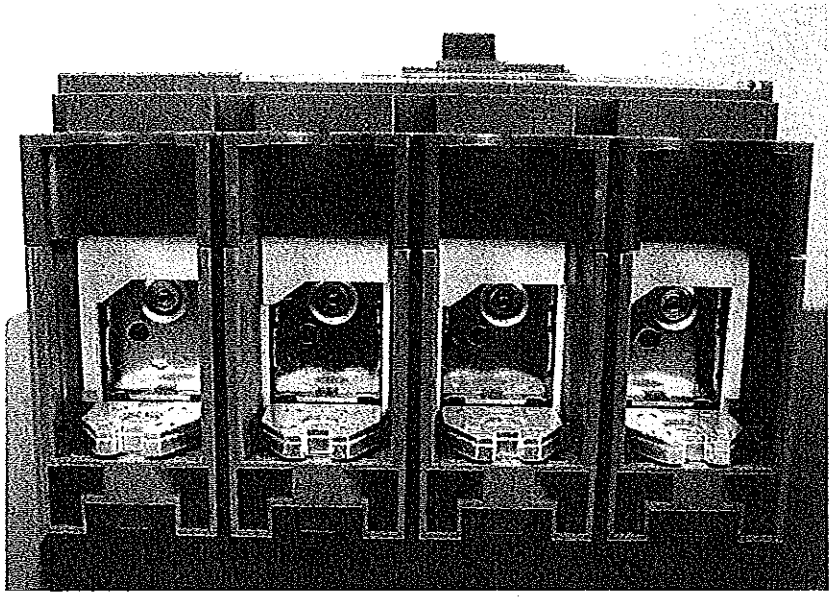
Side view



Open view



Terminal view



Terminal view

Test Report issued under the responsibility of:

DEKRA

TEST REPORT
IEC 60947-2
Low-voltage switchgear and controlgear - Part 2: Circuit-breakers

Report Reference No. :	3306559.50
Date of issue :	2014-06-26
Total number of pages	25
CB Testing Laboratory :	DEKRA Testing Services (Zhejiang) Co., Ltd.
Address :	No. 5, Changjiang Road, Great Bridge Industrial Park, North Baixiang 325603, Wenzhou, Zhejiang, China
Applicant's name :	Schneider Electric Industries SAS
Address :	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Test specification:	
Standard :	IEC 60947-2:2006 (4th Edition) + amendment 1: 2009
Test procedure :	CB
Non-standard test method :	N/A
Test Report Form No. :	IEC60947_2F
Test Report Form(s) Originator :	KEMA Quality BV
Master TRF :	Dated 2010-01

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.
This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description :	Moulded-Case Circuit Breaker
Trade Mark :	Schneider Electric
Manufacturer :	Schneider Electric Industries SAS 35, rue Joseph Monier FR-92500 RUEIL-MALMAISON, France
Model/Type reference :	EasyPact CVS160B/250B (TMG)
Ratings :	EasyPact CVS160B: 80, 100, 125, 160 A EasyPact CVS250B: 200, 250 A Ue: 220 / 240 V, 380 / 415 V, 440 V, 50 / 60 Hz Ui: 690 V, Uimp: 8 kV Icu: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 20 kA at 440 V Ics: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 15 kA at 440 V 3 poles and 4 poles (3P+N, N marked, N has no protection) see further ratings on page 5 to 8

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Testing procedure and testing location:	
☒ **CB Testing Laboratory:**	DEKRA Testing Services (Zhejiang) Co., Ltd.
Testing location/ address ..... :	No. 5, Changjiang Road, Great Bridge Industrial Park, North Baixiang, 325603 Wenzhou, Zhejiang, China
☐ **Associated CB Laboratory:**	N/A
Testing location/ address ..... :	N/A
Tested by (name + signature)..... :	Lucky Fan
Approved by (+ signature)..... :	Eric Wang
☐ Testing procedure: TMP	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: WMT	
Tested by (name + signature)..... :	
Witnessed by (+ signature)..... :	
Approved by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: SMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature) ..... :	N/A
Testing location/ address ..... :	N/A
☐ Testing procedure: RMT	N/A
Tested by (name + signature)..... :	N/A
Approved by (+ signature)..... :	N/A
Supervised by (+ signature) ..... :	N/A
Testing location/ address ..... :	N/A

Summary of testing:

- 8.3.3.1 Test of tripping limits and characteristics
  - 8.3.3.1.2 Opening under short-circuit conditions

Tests performed (name of test and test clause):

No.	Current	Number of poles	Type	Voltage	Release	Test sequence
#01	160 A	3P+N	CVS160B	415 Vac	TMG	I (only clause 8.3.3.1.2)
#02	250 A	3P+N	CVS250B	415 Vac	TMG	I (only clause 8.3.3.1.2)

Note:

1. This report is based on and shall be read in conjunction with reports 3302407.50 and 3302407.51.
2. This report is issued due to that: new types EasyPact CVS160B/250B (TMG) are added and based on the types of products EasyPact CVS160B/250B (TMD) in original report 3302407.50 with lower instantaneous current setting.
3. Since only the instantaneous current settings are different from the original products, only clause 8.3.3.1.2, opening under short-circuit conditions is tested in this report.
4. Detail technical data refer to page 5 to 8 of this report.

Testing location:

DEKRA Testing Services (Zhejiang) Co., Ltd.

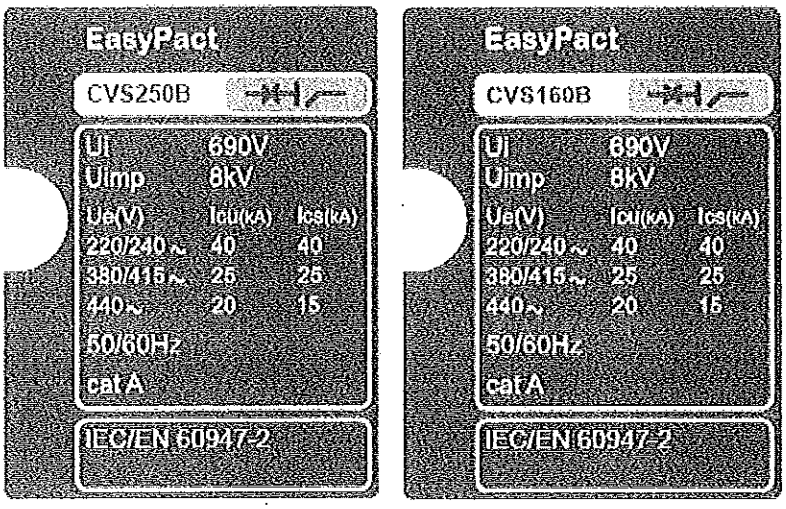
No. 5,Changjiang Road, Great Bridge Industrial Park, North Baixiang, 325603 Wenzhou, Zhejiang, China

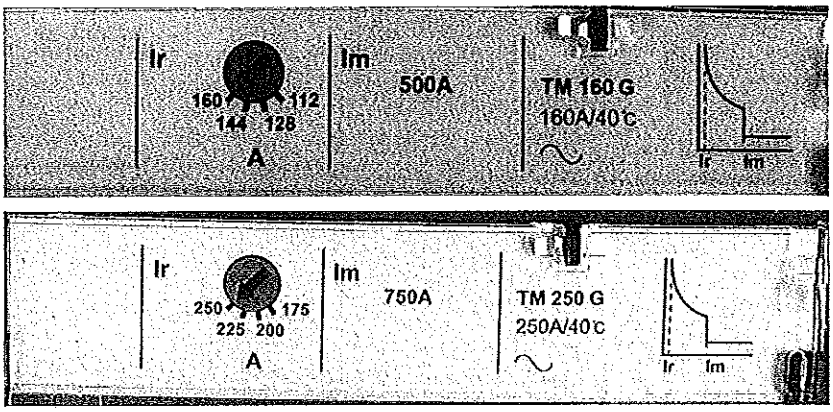
Summary of compliance with National Differences:

N/A

Copy of marking plate

Example of marking





Note:

The markings for circuit breakers are same except the type reference, the rated current, short-circuit capacity and the number of poles may be different.

Test item particulars: test item vs. test requirements	
3. Classification	
3.1. Utilization category: (A or B). .....:	A
3.2. Interruption medium: (air, vacuum, gas Break).....:	Air
3.3. Design: (open construction, moulded case)..... .....:	Moulded case
3.4. Method of controlling the operation mechanism: (dependent manual, independent manual, dependent power, independent power) .....:	Independent manual
3.5. Suitability for isolation: (suitable, not -suitable)... .....:	Suitable
3.6. Provision for maintenance: (maintainable, non maintainable) .....:	Non maintainable
3.7. Method of installation: (fixed, plug in, withdrawable):	Fixed
3.8. Degree of protection: (IP code) .....:	IP40 for front cover
4.7. Type of release (thermo-magnetic / electronic) .....:	Thermo-magnetic
4.8. Integral fuses (integrally fused circuit-breakers) Type and characteristics of SCPD.....:	N/A
7.3 Electromagnetic compatibility (EMC) Environment A or B .....:	A and B
Circuit-breaker for use on phase-earthed systems.....:	N/A
Circuit-breaker for use in IT systems.....:	Yes
Rated and limiting values, main circuit	
- rated operational voltage: Ue (V) .....:	220 / 240 V, 380 / 415 V, 440 V
- rated insulation voltage: Ui (V).....:	690 V
- rated impulse withstand voltage: Uimp (kV) .....:	8 kV
- rated operational current: Ie (A) .....:	0,7 ~ 1,0 In
- kind of current.....:	AC
- conventional free air thermal current: Ith (A).....:	Equal to In
- conventional enclosed thermal current: Ithe (A) .....:	N/A
- current rating for four-pole circuit-breakers: (A).....:	N/A
- number of poles.....:	3 or 4
- rated frequency: (Hz).....:	50 / 60 Hz
- integral fuses (rated values).....:	N/A
Rated duty :	
- eight-hour duty.....:	N/A
- uninterrupted duty: Iu (A) .....:	Equal to In
Short-circuit characteristic :	

rated ultimate short-circuit breaking capacity: Icu (kA)	CVS160/250B: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 20 kA at 440 V
rated service short-circuit breaking capacity: Ics (kA).....:	CVS160/250B: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 15 kA at 440 V
rated short-time withstand current: Icw (kA/s).....:	N/A
Control circuits : Electrical control circuits :	
- kind of current: (AC, DC) .....:	N/A
- rated frequency: (Hz).....:	N/A
- rated control circuit voltage: Uc (nature, frequency, V) :	N/A
- rated control supply voltage: Us (nature, frequency V) :	N/A
Air supply control circuits: (pneumatic or electro-pneumatic):	N/A
- rated pressure and its limit.....:	N/A
- volumes of air, at atmospheric pressure, required for each closing and each opening operation.....:	N/A
Auxiliary circuits :	
Rated and limiting values, auxiliary circuits.....:	N/A
- rated operational voltage Ue (V) .....:	N/A
- rated insulation voltage: Ui (V).....:	N/A
- rated operational current: Ie (A) .....:	N/A
- kind of current.....:	N/A
- rated frequency: (Hz).....:	N/A
- number of circuits.....:	N/A
- number and kind of contact elements .....:	N/A
- rated uninterrupted current: Iu (A).....:	N/A
- utilization category: (AC, DC, current and voltage).....:	N/A

Short-circuit characteristic :	
- Rated conditional short-circuit current (kA)..... :	N/A
- kind of protective device..... :	N/A
Releases :	
1) shunt release ..... :	N/A
2) Over-current release..... :	Yes
a) instantaneous ..... :	Yes
b) definite time delay ..... :	N/A
c) inverse time delay..... :	Yes
- independent of previous load..... :	N/A
- dependent on previous load; (for example thermal type release)..... :	Thermal type
3) Undervoltage release (for opening)..... :	N/A
4) Other releases ..... :	N/A
Characteristics :	
1) Shunt release and undervoltage release (for opening)	
- rated control circuit voltage: Uc (nature, frequency, V) :	N/A
- kind of current..... :	N/A
- rated frequency: (if AC)..... :	N/A
2) Over-current release	
- rated current ..... :	EasyPact CVS160B: 80, 100, 125, 160 A EasyPact CVS250B: 200, 250 A
- kind of current..... :	AC
- rated frequency: (if AC)..... :	50 / 60 Hz
- current setting (or range of settings)..... :	Inverse time delay: 0,7 ~ 1 In Instantaneous tripping: Ii (In): 200 A (80 A) / 320 A (100 A) / 440 A (125 A) / 500 A (160 A) / 600 A (200 A) / 750 A (250 A) for 2 phase poles in series, 1,2 Ii for single pole
- time settings (or range of settings) ..... :	Inverse time delay: fixed Instantaneous tripping: fixed

Classification of installation and use..... :	Fixed
Supply Connection..... :	3 phase or 3 phase with Neutral
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing	
Date of receipt of test item.....:	2014-5
Date (s) of performance of tests.....:	2014-6

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.

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

Though it is not mentioned on the first page, the following standard was also taken into consideration. No deviation was found:

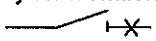
EN 60947-2:2006 +A1:2009

General product information:

The products in this report are a series of moulded - case circuit breakers in one frame with 2 construction breaks and 1 type of thermo-magnetic release TMG:
EasyPact CVS160B: 80, 100, 125, 160 A
EasyPact CVS250B: 200, 250 A

For other technical data, refer to page 5 to 8 of this report.

Factory location:
Schneider (Beijing) Medium & Low Voltage Co., Ltd
No. 2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing
China

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
5.2	MARKING		
a)	The following data shall be marked on the circuit-breaker itself or on a name plate or nameplates attached to the circuit-breaker, and located in a place such that they are visible and legible when the circuit-breaker is installed.		
	- rated current:	250 A	P
	- suitability for isolation, if applicable, with the symbol 		P
	- indication of the open and closed position: with O and I respectively, if symbols are used		P
b)	Marking on equipment not needed to be visible after mounting:		
	- manufacturer's name or trademark	Schneider Electric	P
	- type designation or serial number	EasyPact CVS250B	P
	- IEC 60947-2 if the manufacturer claims compliance with this standard.	IEC/EN 60947-2	P
	- utilization category	A	P
	- rated operational voltage(s) Ue	220 / 240 V, 380 / 415 V, 440 V	P
	- Circuit-breaker for use in IT systems: Circuit-breaker for which all values of rated voltage have not been tested according to annex H or are not covered by such testing, shall be identified by the symbol  which shall be marked on the circuit-breaker immediately following these values of rated voltage	Suitable for IT systems	P
	- value (or range) of the rated frequency and/or the indication DC (or symbol)	50 / 60 Hz	P
	- rated service short-circuit breaking capacity. Ics	40 kA at 220 / 240 V 25 kA at 380 / 415 V 15 kA at 440 V	P
	- rated ultimate short-circuit breaking capacity. Icu	40 kA at 220 / 240 V 25 kA at 380 / 415 V 20 kA at 440 V	P
	- rated short-time withstand current, (Icw) and associated short-time delay, for utilization category B		N/A
	- line and load terminals, unless their connection is immaterial	Connection is immaterial	N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	- neutral pole terminals, if applicable, by the letter N	N	P
	- protective earth terminal, where applicable, by the symbol acc. 7.1.9.3 of part 1		N/A
	- ref. temperature for non-compensated thermal releases, if different from 30°C	40 °C	P
c)	Marked on the circuit-breaker as specified in item b), or shall be made available in the manufacturer's published information:		
	- rated short-circuit making capacity (Icm) (if higher than specified in 4.3.5.1)		N/A
	- rated insulation voltage. (Ui) if higher than the maximum rated operational voltage)	690 V	P
	- rated impulse withstand voltage (Uimp), when declared.	8 kV	P
	- pollution degree if other than 3		N/A
	- conventional enclosed thermal current (Ithe) if different from the rated current:		N/A
	- IP Code, where applicable:	IP40 for front cover	P
	- minimum enclosure size and ventilation data (if any) to which marked ratings apply:		N/A
	- details of minimum distance between circuit-breaker and earthed metal parts for circuit-breaker intended for use without enclosure:	Up / down: 35 mm Left / right: 5 mm Front / back: 0 mm	P
	- r.m.s sensing if applicable, according to F.4.1.1		N/A
	- suitability for environment A or B	A and B	P
d)	The following data concerning the opening and closing devices of the circuit-breaker shall be placed either on their own nameplates or on the nameplate of the circuit-breaker:		
	- rated control circuit voltage of the closing device, and rated frequency for AC:		N/A
	- rated control circuit voltage of the shunt release and/or of the under-voltage release, and rated frequency:		N/A
	- rated current of indirect over-current releases:		N/A
	- number and type of auxiliary contacts and kind of current, rated frequency (if AC) and rated voltages of the auxiliary switches, if different from those of the main circuit.		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
e)	Terminal shall be clearly and permanently identified in acc. with IEC 60445 and annex L :		
	- line terminal		N/A
	- load terminal		N/A
	- neutral pole terminal "N"		N/A
	- protective earth terminal ⏚		N/A
	- terminal of coils (A/B)		N/A
	- terminal of shunt release (B)		N/A
	- terminals of under-voltage release (D)		N/A
	- terminals of interlocking electromagnets (E)		N/A
	- terminals of indicated light devices (X)		N/A
	- terminals of contact elements for switching devices (no)		N/A
7.1	CONSTRUCTION	Refer to test report No. 3302407.50	P
8	TESTS		
8.2.4	Mechanical properties of terminals	Refer to test report No. 3302407.50	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS EasyPact CVS160B, 4 poles, 160 A, sample no.#01		P
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	Schneider Electric	
	Type designation or serial number	EasyPact CVS160B	
	Sample no:	#01	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V, 440 V	
	Rated current: In (A)	160 A	
	Ambient temperature 10-40 °C :	24,5	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	600 A	P
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic overcurrent releases		
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)	L1-L2: 420 A L1-L3: 417 A L2-L3: 410 A	P
	Operating time: >0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:	 0,2 s no trip 0,2 s no trip 0,2 s no trip -	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)	L1-L2: 591 A L1-L3: 588 A L2-L3: 575 A	P
	Operating time: <0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:	 35 ms 34 ms 35 ms -	P

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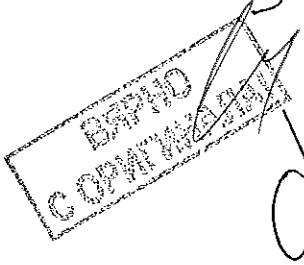
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	L1: 585 A L2: 580 A L3: 586 A	P
	Operating time: < 0,2 s in case of instantaneous release ..... L1: ..... L2: ..... L3: ..... N:	 35 ms 35 ms 55 ms -	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases ..... L1: ..... L2: L3:		N/A
	Electronic overcurrent releases		

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.		N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1: ..... L2: L3:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I: GENERAL PERFORMANCE CHARACTERISTICS EasyPact CVS250B, 4 poles, 250 A, sample no.#02		P
8.3.3.1	Tripping limits and characteristic		
8.3.3.1.2	Opening under short-circuit conditions		
	Manufacturer's name or trademark	Schneider Electric	
	Type designation or serial number	EasyPact CVS250B	
	Sample no:	#02	
	Rated operational voltage: Ue (V)	220 / 240 V, 380 / 415 V, 440 V	
	Rated current: In (A)	250 A	
	Ambient temperature 10-40 °C :	24,5	P
	Value of the tripping current declared by the manufacturer for a single pole, at which value they shall operate.	900 A	P
	Range of adjustable setting current. (A)		N/A
	Time delay stated by the manufacturer, in the case of definite time delay releases.		N/A
	Electromagnetic overcurrent releases		
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)	L1-L2: 615 A L1-L3: 639 A L2-L3: 646 A	P
	Operating time: >0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:	 0,2 s no trip 0,2 s no trip 0,2 s no trip -	P
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)	L1-L2: 882 A L1-L3: 869 A L2-L3: 886 A	P
	Operating time: <0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:	 48 ms 28 ms 26 ms -	P

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases ..... L1-L2: ..... L1-L3: ..... L2-L3: N-L1:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases ..... L1-L2: ..... L1-L3: L2-L3:		N/A
	Test current: tripping current declared for single pole operation (A)	L1: 880 A L2: 894 A L3: 865 A	P
	Operating time: < 0,2 s in case of instantaneous release ..... L1: ..... L2: ..... L3: ..... N:	 38 ms 134 ms 29 ms -	P
	Operating time: < twice time delay stated by manufacturer in case of definite time delay releases ..... L1: ..... L2: L3:		N/A
	Electronic overcurrent releases		



IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	For circuit-breakers with an electronic overcurrent release, the operation of the short-circuit releases shall be verified by one test only on each pole individually.		N/A
	Test current: 80% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 120% of the rated, or **minimum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 80% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: >0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A
	Operating time: > twice time delay stated by the manufacturer, in the case of definite time delay releases .....L1: .....L2: L3:		N/A
	Test current: 120% of the **maximum** adjustable setting current: (A)		N/A
	Operating time: <0,2s in case of instantaneous releases .....L1: .....L2: L3:		N/A

IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Operating time: < twice time delay stated by the manufacturer, in the case of definite time delay releases .... L1: .... L2: L3:		N/A

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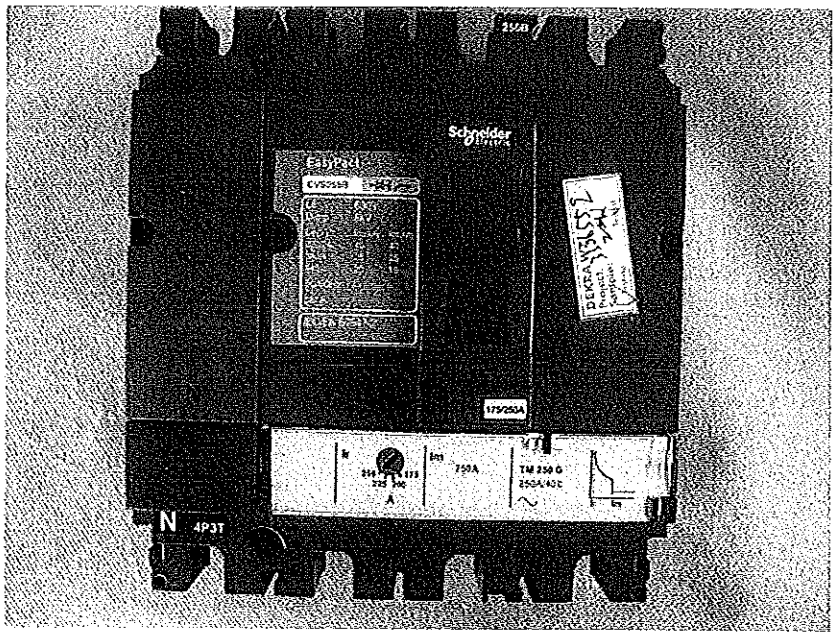
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.3	TEST SEQUENCE I:	Other test results refer to test report No. 3302407.51	P
8.3.4	TEST SEQUENCE II (Ics):	Refer to test report No. 3302407.51	P
8.3.4	TEST SEQUENCE II/III (Ics=Icu):	Refer to test report No. 3302407.50 and 3302407.51	P
8.3.5	TEST SEQUENCE III (Icu)	Refer to test report No. 3302407.50 and 3302407.51	P
8.3.6	TEST SEQUENCE IV		N/A
8.3.7	TEST SEQUENCE V		N/A
8.3.8	TEST SEQUENCE VI: Combined test sequence		N/A

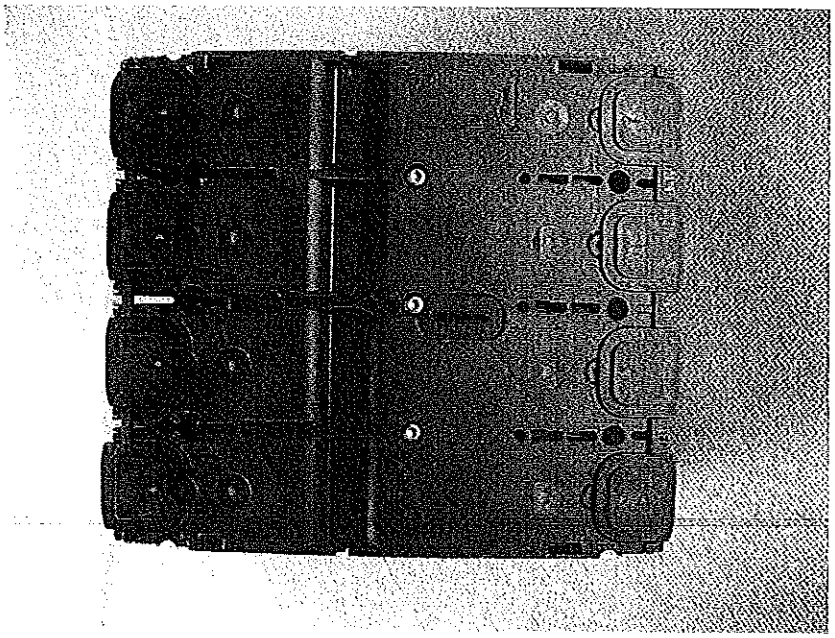
IEC 60947-2			
Clause	Requirement + Test	Result - Remark	Verdict
Annex B	Circuit-breakers incorporating residual current protection		N/A
Annex C	Individual pole short-circuit test sequence		N/A
Annex F	Additional tests for circuit-breakers with electronic over-current protection		N/A
Annex H	Individual pole short-circuit test sequence	Refer to test report No. 3302407.50 and 3302407.51	P
Annex J	Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers		N/A
Annex L	Circuit-breakers not fulfilling the requirements for overcurrent protection		N/A
Annex M	Modular residual current devices (without integral current breaking device)		N/A
Annex N	Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M		N/A
Annex O	Instantaneous trip circuit-breakers (ICB)		N/A

IEC 60947-2

Photographs

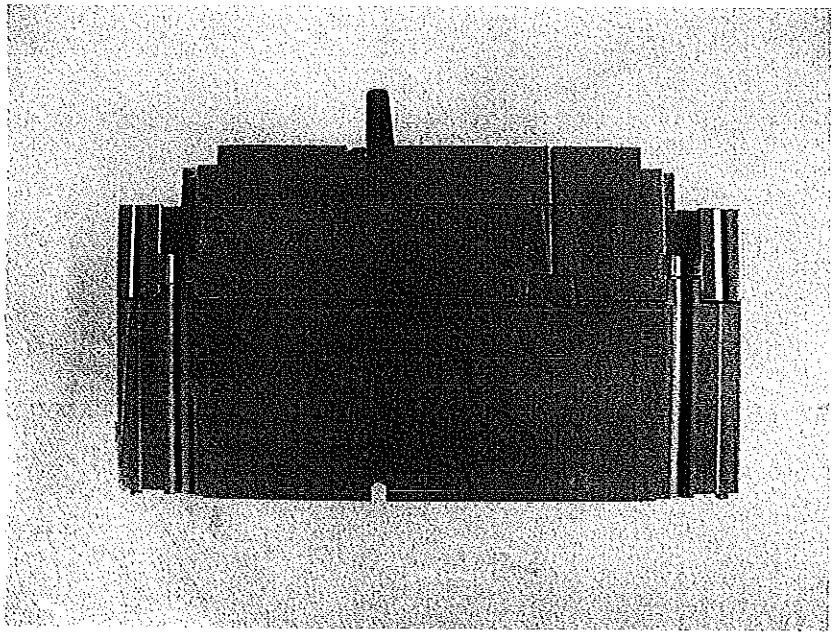


Front view

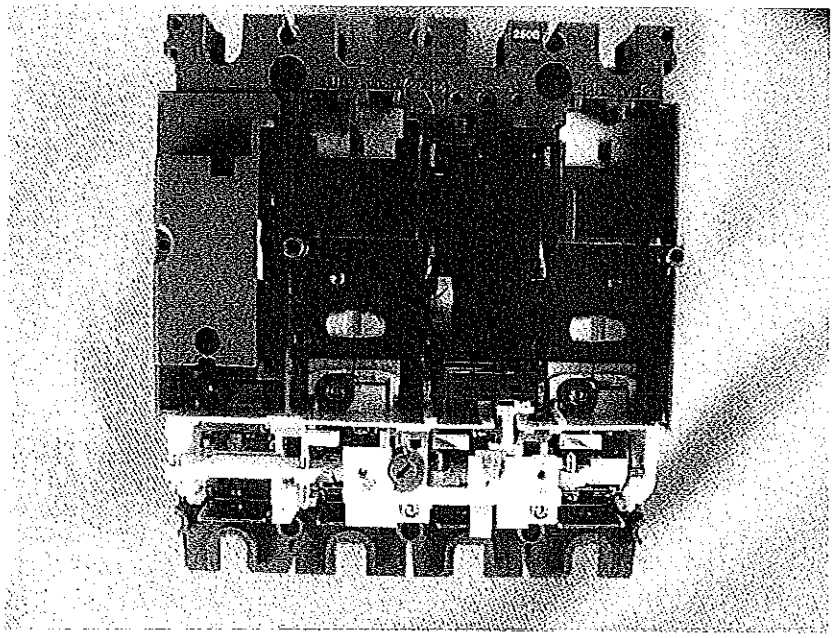


Back view

IEC 60947-2



Side view



Open view

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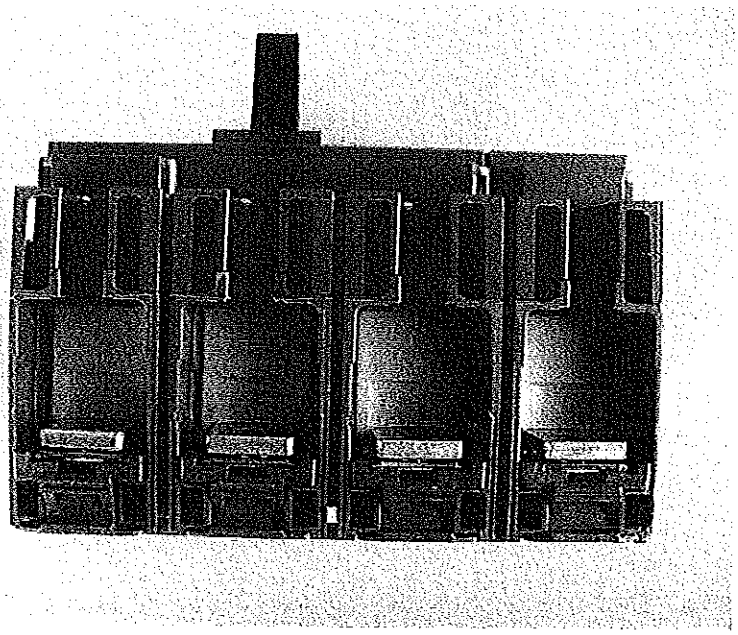
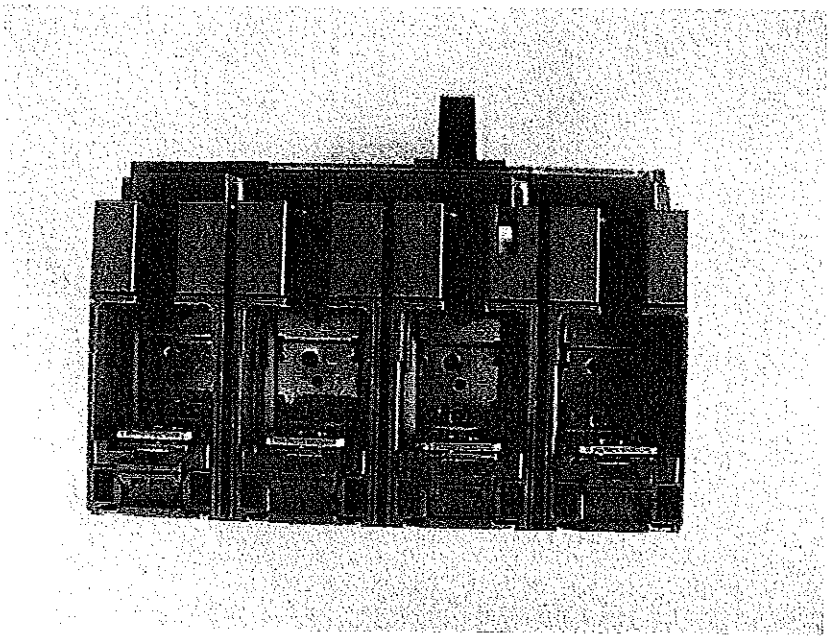
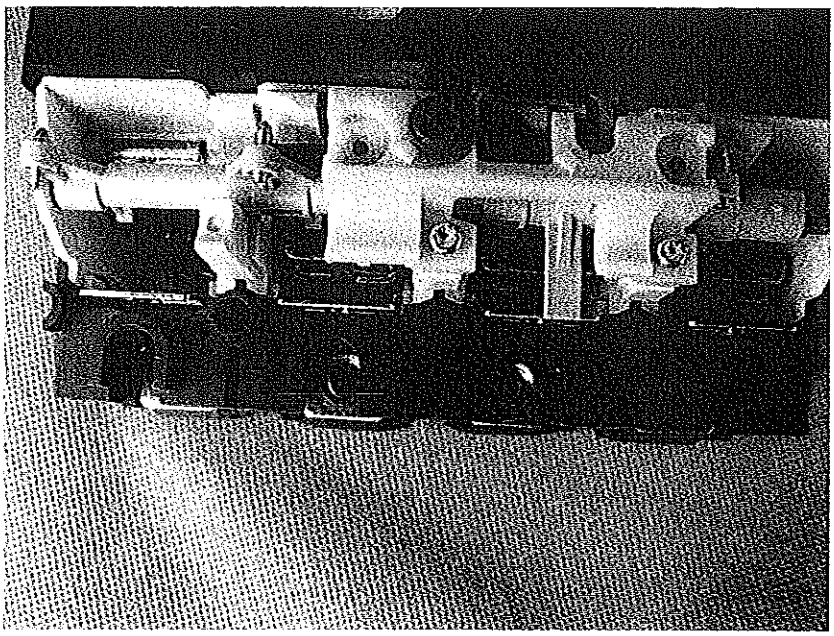


Terminal view



Terminal view

IEC 60947-2



TMG open view

CB TEST CERTIFICATE

Ref. Certificate No.

NL-22778-M1

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

Issued by:	DEKRA Certification B.V.		
Product:	Moulded-Case Circuit Breaker		
Applicant:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Manufacturer:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Factory: nb: Additional factory information on page 2	Schneider (Beijing) Medium & Low Voltage Co., Ltd.	No.2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing	China
Rating and principal characteristics:	Ue: 220 / 240 V, 380 / 415 V, 440 V Ui: 690 V Uimp: 8 kV EasyPact CVS100B/F: 16, 25, 32, 40, 50, 63, 80, 100 A EasyPact CVS160B/F: 125, 160 A EasyPact CVS250B/F: 200, 250 A 3 poles and 4 poles (3P+N, N marked, N has overcurrent protection) Reference temperature 50 °C See annex for further ratings		
Trade mark (if any):	Schneider Electric		
Type of Manufacturer's Testing Laboratories used:	WMT		
Model/Type reference:	EasyPact CVS100B/100F/160B/160F/250B/250F		
Additional information:	M1: reference temperature changed from 40 °C to 50 °C; date of first issue 2012-02-22.		
Sample of product tested to be in conformity with IEC:	60947-2(ed.4) 60947-2(ed.4);am1		
Test Report Ref. No:	3302407.50, 3302407.51 and 3303614.50		

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

Signed by: F.S.Strikwerda

Date of issue: 2012-10-09

IEC SYSTEM FOR CONFORMITY TESTING TO STANDARDS FOR SAFETY OF ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Ref. Certificate No.

NL-22778-M1

Schneider Electric India Private Limited
Survey #215, Gagillapur Village, Medak Road,
Hyderabad Andhra Pradesh
India

Additional information (if necessary)

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

Signed by: F.S.Strikwerda

Date of issue: 2012-10-09

ВЯРНО С ОРИГИНАЛА!

DEKRA

ANNEX to CB Certificate NL-22778-M1

Product data

product	:	Moulded-Case Circuit Breaker
type(s)	:	EasyPact CVS100B/100F/160B/160F/250B/250F
trade name(s)	:	Schneider Electric
number of poles	:	3 poles and 4 poles (3P+N, N marked)
protected poles	:	3 poles or 4 poles (N has overcurrent protection)
rated operational voltage (Ue)	:	220 / 240 V, 380 / 415 V, 440 V
rated insulation voltage (Ui)	:	690 V
rated impulse withstand voltage (Uimp)	:	8 kV
rated frequency	:	50 / 60 Hz
rated current (In)	:	EasyPact CVS100B/F: 16, 25, 32, 40, 50, 63, 80, 100 A EasyPact CVS160B/F: 125, 160 A EasyPact CVS250B/F: 200, 250 A
rated operational current (Ie)	:	0,7 ~ 1,0 In
conventional thermal current (Ith)	:	Equal to In
rated ultimate short-circuit breaking capacity (Icu)	:	CVS100/160/250B: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 20 kA at 440 V CVS100/160/250F: 70 kA at 220 / 240 V, 36 kA at 380 / 415 V, 36 kA at 440 V
rated service short-circuit breaking capacity(Ics)	:	CVS100/160/250B: 40 kA at 220 / 240 V, 25 kA at 380 / 415 V, 15 kA at 440 V CVS100/160/250F: 70 kA at 220 / 240 V, 36 kA at 380 / 415 V, 18 kA at 440 V
suitable for isolation	:	Suitable
utilization category	:	A
method of mounting	:	Fixed
EMC Environment	:	A and B
circuit-breaker for use on phase-earthed systems	:	N / A
circuit-breaker for use in IT systems	:	Yes
reference temperature		50 °C
connection	:	Prepared conductors (with lug)
safety distance	:	Up / down: 35 mm Left / right: 5 mm Front / back: 0 mm
inverse time delay release	:	Thermal type, 175 A, 200 A, 225 A, 250 A for In = 250 A 140 A, 160 A, 180 A, 200 A for In = 200 A 112 A, 128 A, 144 A, 160 A for In = 160 A 88 A, 100 A, 113 A, 125 A for In = 125 A 70 A, 80 A, 90 A, 100 A for In = 100 A 56 A, 64 A, 72 A, 80 A for In = 80 A 44 A, 50 A, 57 A, 63 A for In = 63 A 35 A, 40 A, 45 A, 50 A for In = 50 A 28 A, 32 A, 36 A, 40 A for In = 40 A 22 A, 26 A, 29 A, 32 A for In = 32 A 18 A, 20 A, 23 A, 25 A for In = 25 A 11 A, 13 A, 14 A, 16 A for In = 16 A

instantaneous release	:	Magnetic type, fixed, for 2 phase poles in series: Ii (In): 190 A (16 A) / 300 A (25 A) / 400 A (32 A) / 500 A (40 A) / 500 A (50 A) / 500 A (63 A) / 640 A (80 A) / 800 A (100 A) / 1250 A (125 A) / 1250 A (160 A) / 2000 A (200 A) / 2500 A (250 A) for single pole: 1,2 Ii
time settings (or range of settings)	:	Inverse time delay: fixed Instantaneous tripping: fixed

CB TEST CERTIFICATE

Ref. Certificate No.

NL-22971-M1

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

Issued by:	DEKRA Certification B.V.		
Product:	Moulded-Case Circuit Breaker		
Applicant:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Manufacturer:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Factory: nb: Additional factory information on page 2	Schneider (Beijing) Medium & Low Voltage Co., Ltd.	No.2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing	China

Rating and principal characteristics:
Ue: 220 / 240 V, 380 / 415 V, 440 V
Ui: 690 V
Uimp: 8 kV
EasyPact CVS400F/N: 320, 400 A (TM type),
Reference temperature 50 °C
EasyPact CVS630F/N: 500, 600 A (TM type),
Reference temperature 50 °C
3 poles and 4 poles (3P+N, N marked, N has overcurrent protection)
See annex for further ratings

Trade mark (if any): Schneider Electric

Type of Manufacturer's Testing Laboratories used: WMT

Model/Type reference: EasyPact CVS400F/400N/630F/630N

Additional information: M1: reference temperature changed from 40 °C to 50 °C; date of first issue 2012-02-23.

Sample of product tested to be in conformity with IEC: 60947-2(ed.4)
60947-2(ed.4);am1

Test Report Ref. No: 3302408.50, 3302408.51 and 3303613.50

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

Signed by: F.S.Strikwerda

Date of issue: 2012-10-09

ВЯРНО С ОРИГИНАЛА

IEC SYSTEM FOR CONFORMITY TESTING TO STANDARDS FOR SAFETY OF ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Ref. Certificate No.

NL-22971-M1

Schneider Electric India Private Limited
Survey #215, Gagillapur Village, Medak Road,
Hyderabad Andhra Pradesh
India

Additional information (if necessary)

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

Signed by: F.S.Strikwerda

Date of issue: 2012-10-09

ВЯРНО
С ОРИГИНАЛА

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ANNEX to CB Certificate NL-22971-M1

Product data

product	:	Moulded-Case Circuit Breaker
type(s)	:	EasyPact CVS400F/N (TM type) EasyPact CVS630F/N (TM type)
trade name(s)	:	Schneider Electric
number of poles	:	3 poles and 4 poles (3P+N, N marked)
protected poles	:	3 poles or 4 poles (N has overcurrent protection)
rated operational voltage (Ue)	:	220 / 240 V, 380 / 415 V, 440 V
rated insulation voltage (Ui)	:	690 V
rated impulse withstand voltage (Uimp)	:	8 kV
rated frequency	:	50 / 60 Hz
rated current (In)	:	EasyPact CVS400F/N: 320, 400 A (TM type) EasyPact CVS630F/N: 500, 600 A (TM type)
rated operational current (Ie)	:	0,7 ~ 1,0 In for TM type
conventional thermal current (Ith)	:	Equal to In
rated ultimate short-circuit breaking capacity (Icu)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V
rated service short-circuit breaking capacity(Ics)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V
suitable for isolation	:	Suitable
utilization category	:	A
method of mounting	:	Fixed
EMC Environment	:	A and B
circuit-breaker for use on phase-earthed systems	:	N / A
circuit-breaker for use in IT systems	:	Yes
reference temperature		50 °C
connection	:	Prepared conductors (with lug)
safety distance	:	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm

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inverse time delay release	:	Ir 320 A, 290 A, 255 A, 225 A for In = 320 A 400 A, 360 A, 320 A, 280 A for In = 400 A 500 A, 450 A, 400 A, 350 A for In = 500 A 600 A, 540 A, 480 A, 420 A for In = 600 A
instantaneous release	:	Ii For 2 phase poles in series 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 600 A 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 500 A 2000 A, 2400 A, 2800 A, 3200 A, 3600 A, 4000 A for In = 400 A 1500 A, 1920 A, 2240 A, 2560 A, 2880 A, 3200 A for In = 320 A For single pole 1,2 Ii
time settings (or range of settings)	:	Inverse time delay: fixed Instantaneous tripping: fixed definite time delay: fixed

CB TEST CERTIFICATE

Ref. Certificate No.

NL-22971

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

Issued by:	DEKRA Certification B.V.		
Product:	Moulded case circuit-breaker		
Applicant:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Manufacturer:	Schneider Electric Industries SAS	35, rue Joseph Monier FR-92500 RUEIL-MALMAISON	France
Factory: nb: Additional factory information on page 2	Schneider (Beijing) Medium & Low Voltage Co., Ltd.	No.2 Liang Shui He 2nd Street, Beijing Economic Technological Development Area, Beijing	China
Rating and principal characteristics:	Ue 220/240 V, 380/415 V, 440 V; Ui 690 V; Uimp 8 kV EasyPact CVS400F/N: 320, 400 A (Thermo magnetic type) EasyPact CVS630F/N: 500, 600 A (Thermo magnetic type) EasyPact CVS400F/N: 400 A (Electronic type) EasyPact CVS630F/N: 630 A (Electronic type) 3- and 4-pole (N marked, N with overcurrent protection) See annex for further ratings		
Trade mark (if any):	Schneider Electric		
Type of Manufacturer's Testing Laboratories used:	WMT		
Model/Type reference:	EasyPact CVS400F/400N/630F/630N		
Additional information:			
Sample of product tested to be in conformity with IEC:	60947-2(ed.4);am1		
Test Report Ref. No:	3302408.50 and .51		

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

DEKRA Certification is former KEMA Quality

Signed by: F.S.Strikwerda

Date of issue: 2012-04-13

ВЕРНО С ОРИГИНАЛОМ

27

IEC SYSTEM FOR CONFORMITY TESTING TO STANDARDS FOR SAFETY OF ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

Ref. Certificate No.

NL-22971

Schneider Electric India Private Limited
Survey #215, Gagillapur Village, Medak Road,
Hyderabad Andhra Pradesh
India

Additional information (if necessary)

This CB Test Certificate is issued by the National Certification Body:

DEKRA Certification B.V.
Utrechtseweg 310
P.O. Box 5185
6802 ED Arnhem
The Netherlands

DEKRA

DEKRA Certification is former KEMA Quality

Signed by: F.S.Strikwerda

Date of issue: 2012-04-13

ВЯРНО С ОРИГИНАЛА

DEKRA

ANNEX to CB Certificate NL-22971 page 1 of 2

Product data

product	:	Moulded-Case Circuit Breaker
type(s)	:	EasyPact CVS400F/N (TM type) EasyPact CVS630F/N (TM type) EasyPact CVS400F/N (Electronic type) EasyPact CVS630F/N (Electronic type)
trade name(s)	:	Schneider Electric
number of poles	:	3 poles and 4 poles (3P+N, N marked)
protected poles	:	3 poles or 4 poles (N has overcurrent protection)
rated operational voltage (Ue)	:	220 / 240 V, 380 / 415 V, 440 V
rated insulation voltage (Ui)	:	690 V
rated impulse withstand voltage (Uimp)	:	8 kV
rated frequency	:	50 / 60 Hz
rated current (In)	:	EasyPact CVS400F/N: 320, 400 A (TM type) EasyPact CVS630F/N: 500, 600 A (TM type) EasyPact CVS400F/N: 400 A (Electronic type) EasyPact CVS630F/N: 630 A (Electronic type)
rated operational current (Ie)	:	0,7 ~ 1,0 In for TM type 0,5 ~ 1,0 In for electronic type
conventional thermal current (Ith)	:	Equal to In
rated ultimate short-circuit breaking capacity (Icu)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V
rated service short-circuit breaking capacity(Ics)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V
suitable for isolation	:	Suitable
utilization category	:	A
method of mounting	:	Fixed
EMC Environment	:	A and B for TM type A for electronic type
circuit-breaker for use on phase-earthed systems	:	N / A
circuit-breaker for use in IT systems	:	Yes
reference temperature		40 °C for TM type
connection	:	Prepared conductors (with lug)
safety distance	:	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm

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DEKRA

ANNEX to CB Certificate NL-22971 page 1 of 2

Product data

product	:	Moulded-Case Circuit Breaker
type(s)	:	EasyPact CVS400F/N (TM type) EasyPact CVS630F/N (TM type) EasyPact CVS400F/N (Electronic type) EasyPact CVS630F/N (Electronic type)
trade name(s)	:	Schneider Electric
number of poles	:	3 poles and 4 poles (3P+N, N marked)
protected poles	:	3 poles or 4 poles (N has overcurrent protection)
rated operational voltage (Ue)	:	220 / 240 V, 380 / 415 V, 440 V
rated insulation voltage (Ui)	:	690 V
rated impulse withstand voltage (Uimp)	:	8 kV
rated frequency	:	50 / 60 Hz
rated current (In)	:	EasyPact CVS400F/N: 320, 400 A (TM type) EasyPact CVS630F/N: 500, 600 A (TM type) EasyPact CVS400F/N: 400 A (Electronic type) EasyPact CVS630F/N: 630 A (Electronic type)
rated operational current (Ie)	:	0,7 ~ 1,0 In for TM type 0,5 ~ 1,0 In for electronic type
conventional thermal current (Ith)	:	Equal to In
rated ultimate short-circuit breaking capacity (Icu)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 30 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 42 kA at 440 V
rated service short-circuit breaking capacity(Ics)	:	CVS400/630F: 40 kA at 220 / 240 V, 36 kA at 380 / 415 V, 23 kA at 440 V CVS400/630N: 70 kA at 220 / 240 V, 50 kA at 380 / 415 V, 32 kA at 440 V
suitable for isolation	:	Suitable
utilization category	:	A
method of mounting	:	Fixed
EMC Environment	:	A and B for TM type A for electronic type
circuit-breaker for use on phase-earthed systems	:	N / A
circuit-breaker for use in IT systems	:	Yes
reference temperature		40 °C for TM type
connection	:	Prepared conductors (with lug)
safety distance	:	Up / down: 60 mm Left / right: 5 mm Front / back: 0 mm

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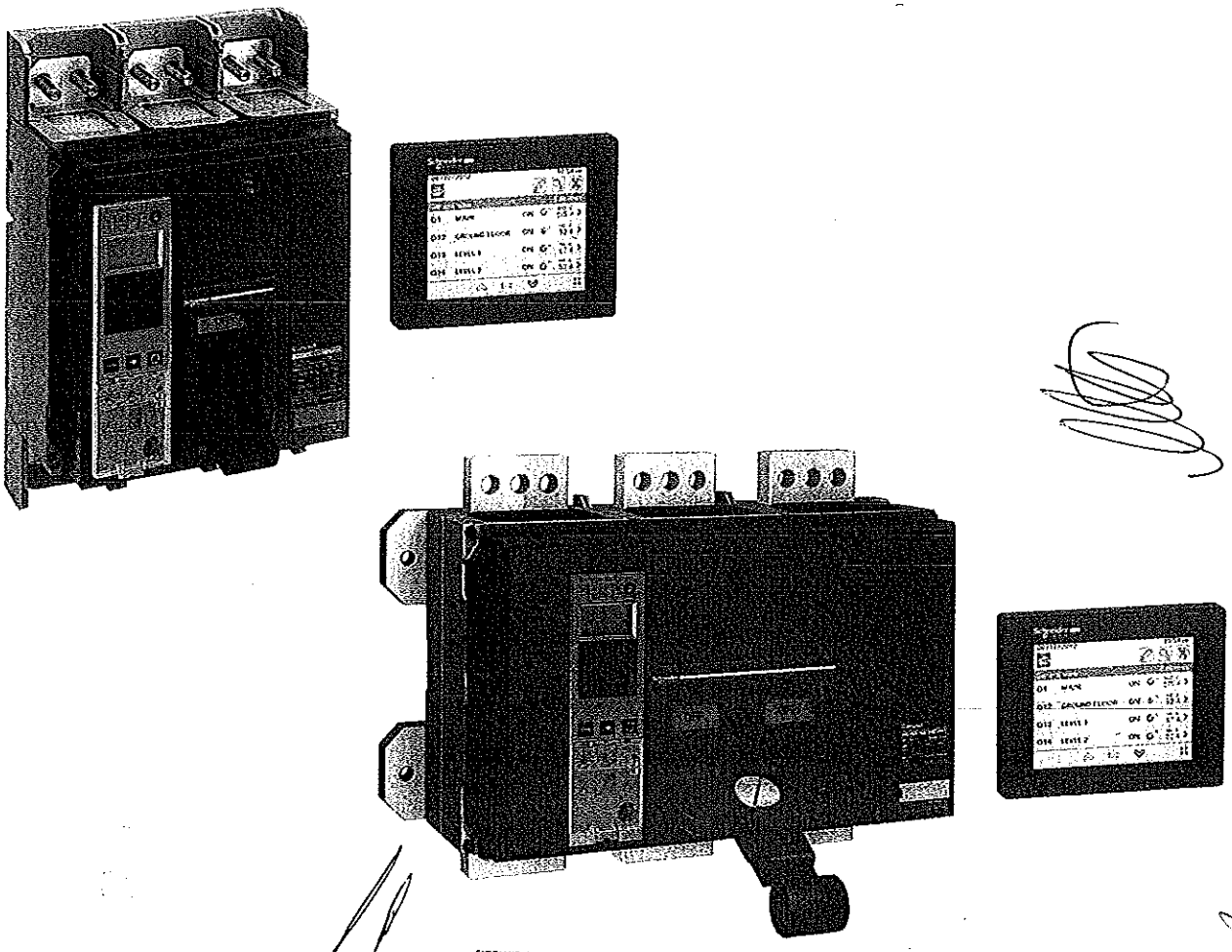
inverse time delay release	:	Ir TM type: 320 A, 290 A, 255 A, 225 A for In = 320 A 400 A, 360 A, 320 A, 280 A for In = 400 A 500 A, 450 A, 400 A, 350 A for In = 500 A 600 A, 540 A, 480 A, 420 A for In = 600 A Electronic type: 200 A, 250 A, 280 A, 320 A, 360 A, 400 A for In = 400 A 315 A, 370 A, 440 A, 505 A, 565 A, 630 A for In = 630 A
instantaneous release	:	Ii TM type for 2 phase poles in series 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 600 A 2500 A, 3000 A, 3500 A, 4000 A, 4500 A, 5000 A for In = 500 A 2000 A, 2400 A, 2800 A, 3200 A, 3600 A, 4000 A for In = 400 A 1500 A, 1920 A, 2240 A, 2560 A, 2880 A, 3200 A for In = 320 A TM type for single pole 1,2 Ii Electronic type for 2 phase poles in series 11 In Electronic type for single pole Ii
definite time delay release	:	2 ~ 10 Ir with step of 1 Ir
time settings (or range of settings)	:	Inverse time delay: fixed Instantaneous tripping: fixed definite time delay: fixed, 60 ms

ВЯРНО
С ОРИГИНАЛА!

Low Voltage
Catalogue | 2014

Compact NS

Circuit breakers and switch-disconnectors
from 630b to 3200 A



Schneider Electric

Compact NS

Setting the standard, once again...

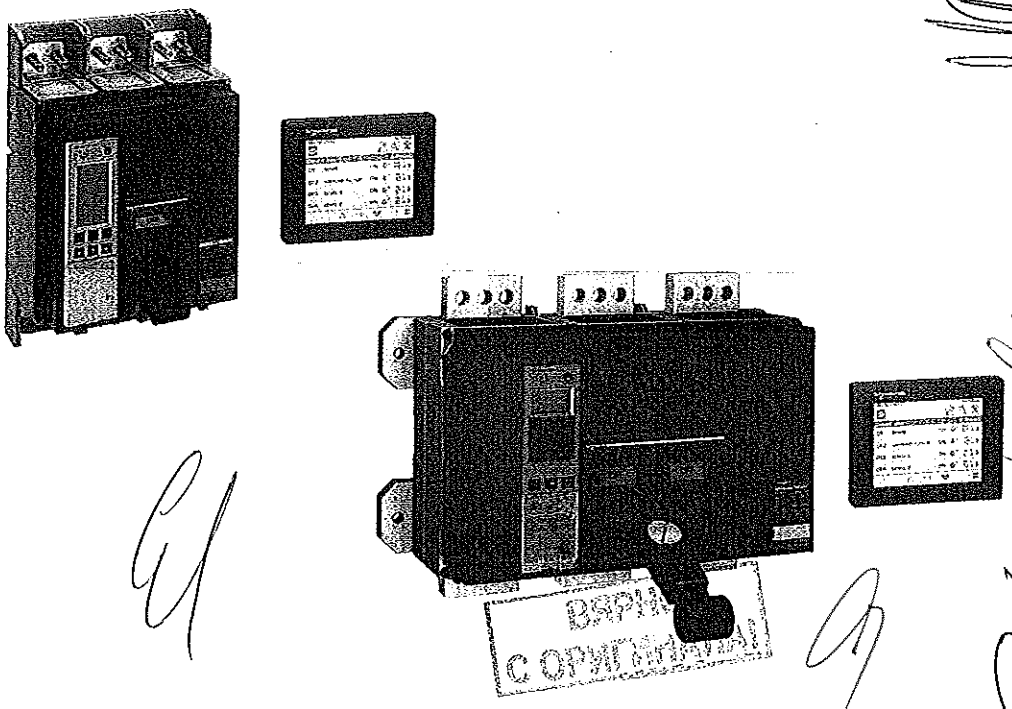
The launch of Schneider Electric Compact NS in 1994 revolutionised the world of moulded-case circuit breakers. Innovative, flexible and attractive, Compact NS rapidly set the standard in its field.

Today, Schneider Electric continues to innovate, extending the Compact NS range to high power ratings to offer a comprehensive and consistent range from 630b to 3200 A.

Equipped with the new generation of Micrologic control units, Compact NS630b to 3200 circuit breakers now offer built-in power and energy metering in addition to electrical measurement and analysis functions.

The communications option makes it possible to control power consumption, simplify maintenance and improve operating comfort. A wide range of optimised auxiliaries and accessories is also available to meet the needs of even more applications.

Compact NS, simply a step ahead...



Schneider Electric

Compact NS range

More than 10 years of techniques and technologies...

Inventor of the unique system-block concept, Schneider Electric proposes a range of circuit breakers to meet the concerns of panel builders and contractors. The result of 30 years of experience in the field of electrical distribution, the Compact NS range is still today the international reference on the moulded case circuit breaker market.

Consistency

The Compact NS range is available in 2 sizes only in order to homogenise installation dimensions, thus reducing switchboard dimensions and facilitating their installation: volume, depth, pole pitch and fastening points are the same for each size.

Efficiency

The Compact NS technology satisfies all your needs from 630b to 3200 A, with a breaking capacity from 50 to 200 kA.

Equipped with electronic control units, the Compact NS circuit breakers guarantee protection and measurement of your electrical installation.

Flexibility

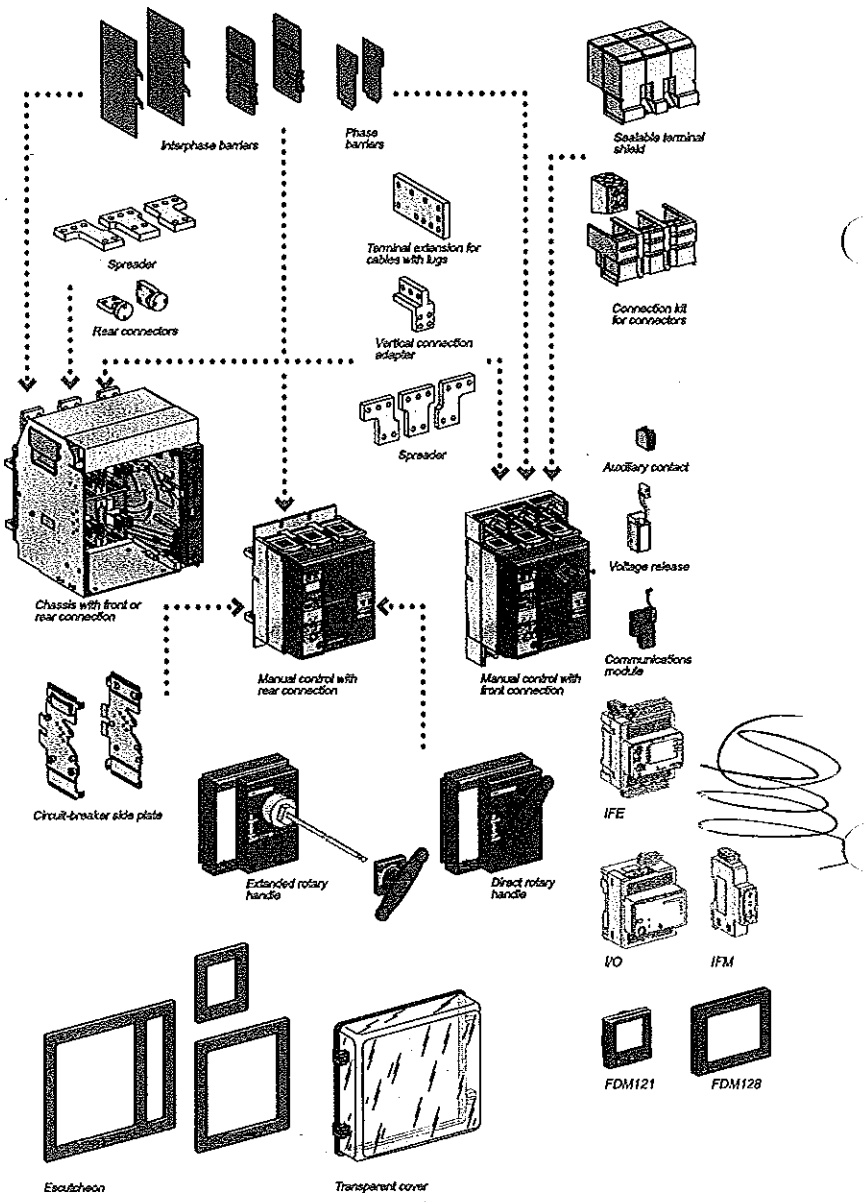
Compact NS adapts to all your applications: protection of AC installations, generator protection, motor protection, applications in 1000 V, switch-disconnectors, source changeover switches.

With Compact NS you have the choice.

Open-endedness

Compact NS evolves together with your installation: interchangeable trip units, standardised accessories, changing of rating without disassembling the device and addition of indication and control functions make Compact NS the most flexible solution on the market.

> Compact NS field installable devices



An answer for each type of solutions:

Marine

Airports

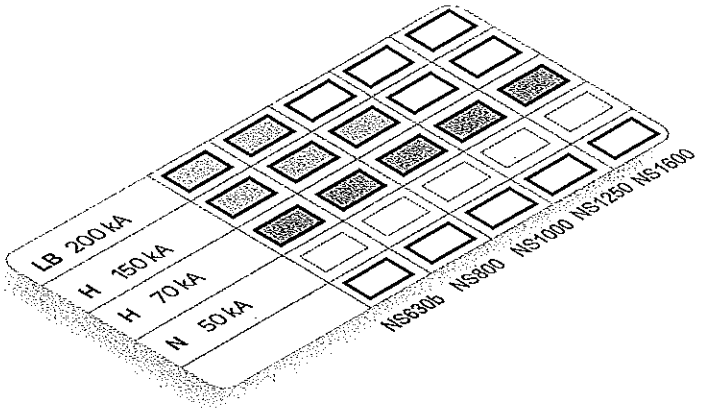
Oil and gas

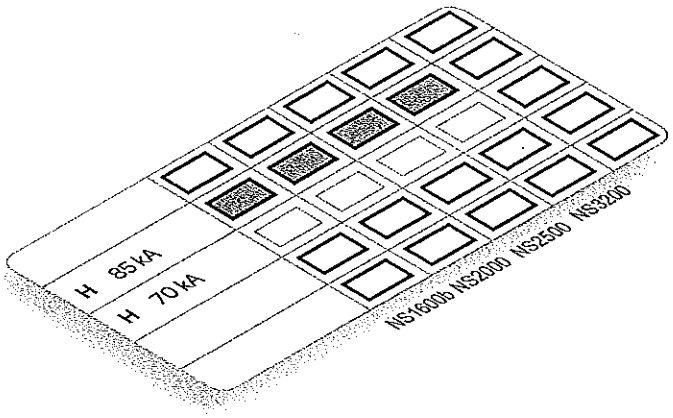
Wind-mills

... ahead quite simply

The Compact NS range covers all ratings from 630b to 3200 A:

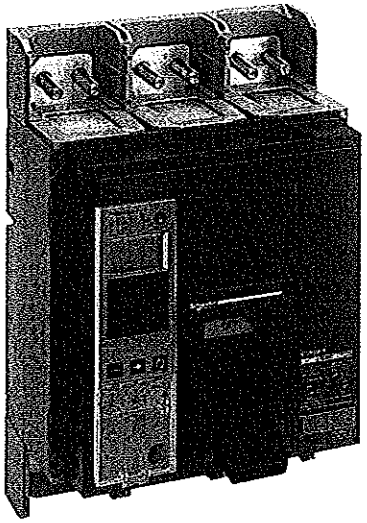
- Compact NS from 630b to 1600 A, fixed or withdrawable, front or rear connection, manual operating mechanism or motor mechanism.
  A new 200 kA performance now completes the Compact NS range.
- Compact NS from 1600 to 3200 A, fixed, front connection, with manual operating mechanism.



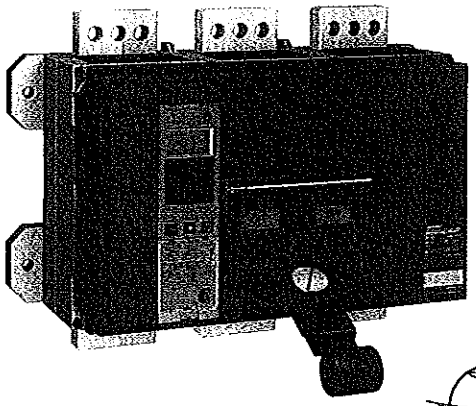


2 sizes:

from 630b to 3200 A

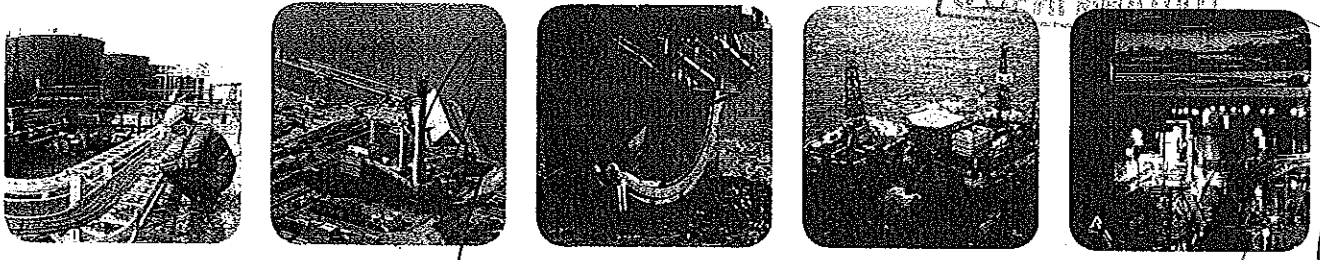


Compact NS630b to 1600



Compact NS1600b to 3200

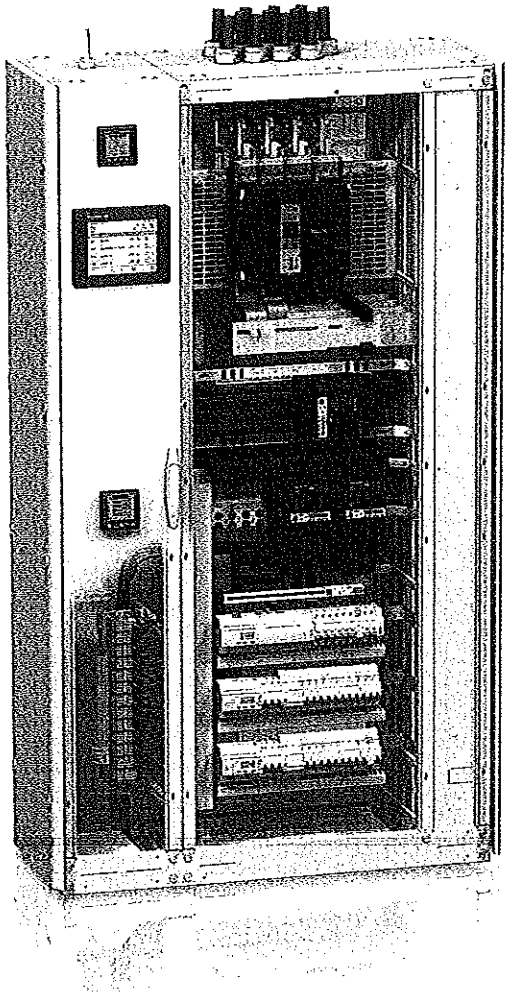
Even in the hardest conditions, Compact NS is the circuit breaker to choose



Energy management has never been simpler

Simple-to-install Smart Panels connect your building to real savings in 3 steps

Smart Panels digitized by
Enerlin'X



1 Measure

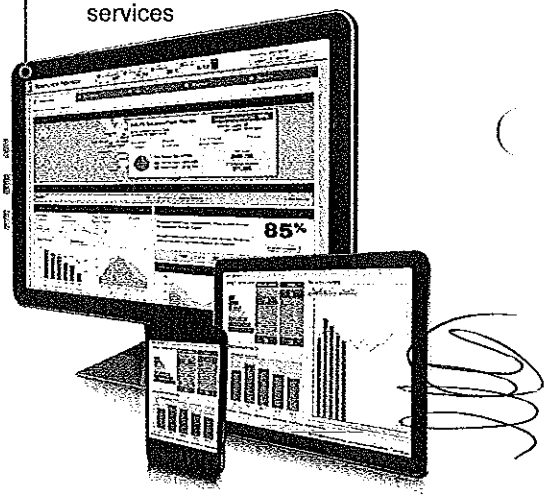
Embedded and stand-alone metering & control capabilities

2 Connect

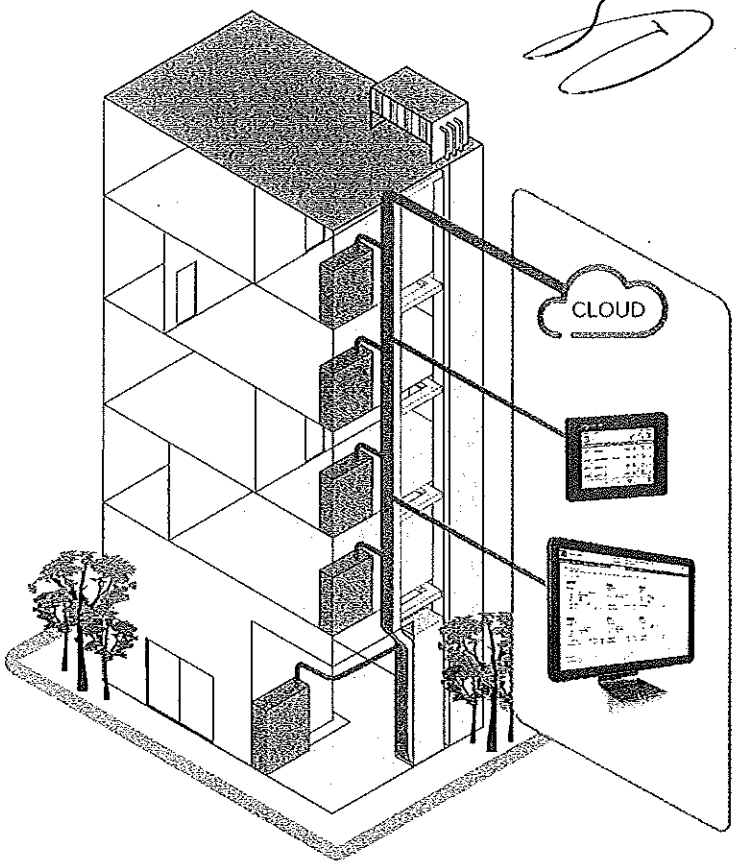
> Integrated communication interfaces
> Ready to connect to energy management platforms

3 Save

> Data-driven energy efficiency actions
> Real time monitoring and control
> Access to energy and site information through on-line services



Smart Panels connect you to energy savings



1 MEASURE

"Smart Panels" mean visible information

Grouping most of the electrical protection, command and metering components, the switchboards are now significant sources of data locally displayed and sent via communication networks.

2 CONNECT

... and ready to be linked to expertise

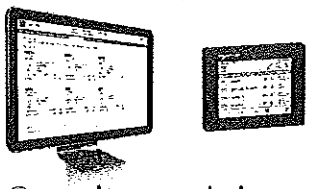
Smart Panels use reliable, simple to install and use displays, and Ethernet and Modbus interfaces on the Enerlin'X communication system.

Information is safely transmitted through the most efficient networks:

- Modbus SL inside switchboards, between components
- Ethernet, on cable or WiFi, inside the building and connecting switchboards, computers,
- Ethernet on DSL or GPRS, for access to on-line services by Schneider Electric.

Energy experts, wherever they are, are now able to provide advises based on permanently updated data of the building.

3 SAVE



On-site real time monitoring and control

On a touch screen display connected to Ethernet

- shows essential electrical information and alarms concerning the electrical network,
- allows control (open, close, reset...) of various equipments.

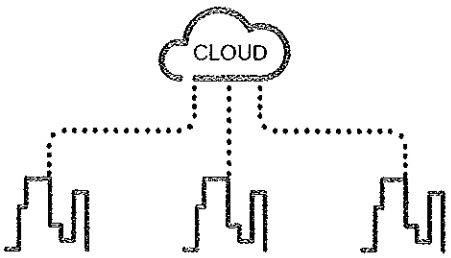
This touch screen is well appreciated for real time value checking and control, directly on the front panel of the main switchboard.

On a PC display with common browser

- shows monitoring web pages hosted into the local Ethernet interface,
- alarm events generate automatic email notifications,
- allows control (open, close, reset...) of various equipments.

Data displayed on graphics or recorded into files are of a great interest for optimizing the use of energy in the building.

As an example, they definitely help validating the change of temperature settings, time scheduling in a Building Management System or other automated devices.



On-line Energy Management services

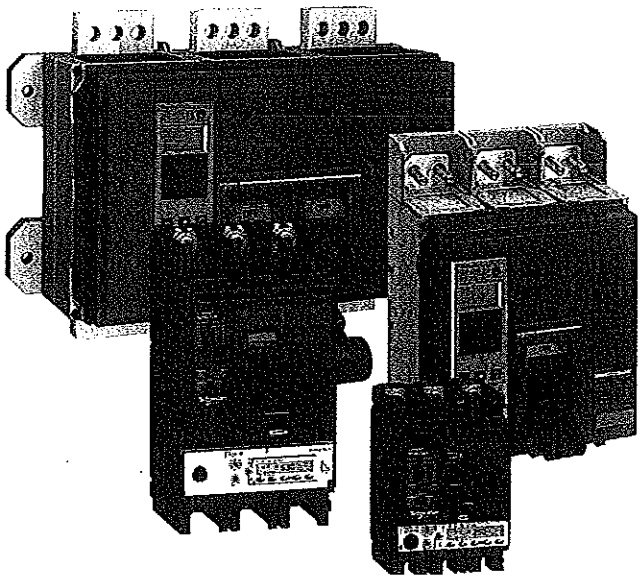
StruXureWare Energy Operation automates data collection via an open, scalable, and secure energy management information system.

With the help of the Schneider Electric energy management services team, data is then turned into actionable information to enable customers to understand their facilities' performance on an ongoing basis.

Energy Operation leverages companies' current investments in their existing systems, and can be used to communicate advanced results and performance to a broad audience for a shared understanding throughout an organization.

A solution for all application types:

Compact NS and Compact NSX



Source changeover

The Compact range proposes interlocking solutions between two devices to perform the source changeover switch function.
As from 100 A, a motor mechanism ensures automatic replacement of the main source by a secondary source in order to ensure permanent availability of energy.

Applications are numerous: operating theatres, emergency lighting systems, computer rooms, bank security, etc.

Motor applications

Associated with specific control units, the Compact range ensures motor protection functions up to 750 kW, and includes a dedicated product, Compact NS80H-MA, for applications up to 37 kW.

DC applications

A specific range from 100 to 630 A with performance **up to 100 kA and 750 V** for battery or traction network type applications.

1000 V / 400 Hz applications

The Compact range **covers 1000 V / 400 Hz applications up to 630 A**: road and rail tunnels, mines, wind turbines (1000 V) and aircraft facilities (400 Hz).

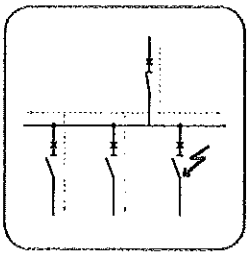
Building
- Hotels
- Hospitals
- Offices
- Retail

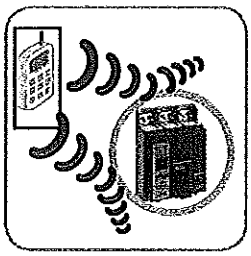
Data Centres and Networks

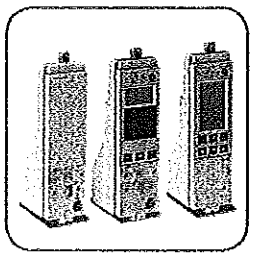
Industry
- Mining and minerals
- Automotive
- Food and beverage
- Chemical industry

Energy and Infrastructures
- Airports
- Oil and gas
- Water
- Electrical energy
- Marine

...for an installation with a longer service life







Total control of discrimination
for optimum continuity of supply

The result of a technology that has since inspired all major manufacturers, Compact NS offers an unparalleled discrimination level on the electrical distribution market.

Fully incorporated in product design, discrimination is available as standard on all the range devices, without addition of any extra accessories.

Should a fault occur, only the circuit breaker placed immediately upstream from the fault trips.

Continuity of supply is thus guaranteed for the other feeders.

Highly immune protection system insensitive to disturbances
for more reliable operation

Insensitive to external disturbances, the Compact NS range complies with the strictest requirements defined by standard IEC 60947-2 (Appendix F).

Devices are able to operate in their electromagnetic environment without generating disturbances that could result in loss of quality, create a malfunction or a failure in the electrical installation.

A comprehensive range of trip units and control units
to combine measurement and protection

The trip unit becomes a genuine control unit for the Compact NS circuit breaker. It combines various types of measurement with various types of protection.

It measures accurately network parameters, immediately calculates values, memorises, logs, reports, communicates, acts, etc. It is both an extremely reliable protection device and an accurate measuring instrument.

With the Micrologic E and P power measurement and advanced protection functions are now available in the Compact NS range.

Electrical Energy

Industry

Building, shopping malls

Data centres and networks

Hospitals

All the guarantees of a leading brand

IEC JIS CE c UL us LISTED

Certification

The reliability of the Compact NS range circuit breakers must be total.

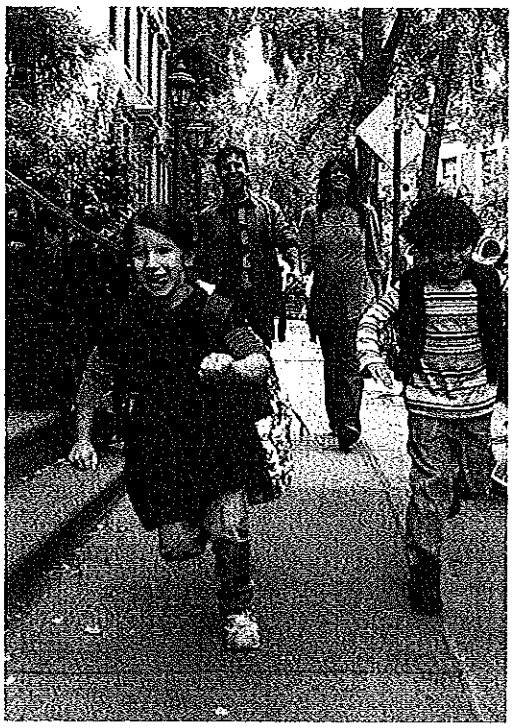
Such reliability is obtained thanks to faultless quality at all stages, from design to operation, in complete compliance with international standards and local certification.

Tools for easy design

Full documentation, CAD software and a library are available to assist you in all stages of installation design.

Distribution and service network

With more than 5000 sales outlets in 130 countries, you are guaranteed to find world-wide the range of products complying with your needs and satisfying user country standards perfectly.



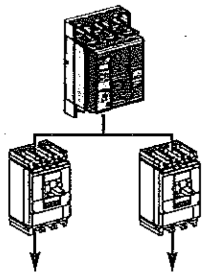
Environmentally friendly products

Schneider Electric commits itself to an environmental approach, manufacturing products in keeping with the requirements of European Directive RoHS (Restriction of Hazardous Substances) in non-polluting ISO 14001 certified manufacturing units.

General contents

Compact NS, even more applications...

Applications



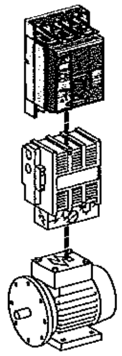
Protection of LV distribution systems

> pages A-2 et A-25

Protection for:
- distribution systems supplied by transformers
- distribution systems supplied by engine generator sets
- long cables in IT and TN systems.

Installation :
- in power switchboards.

All circuit breakers in the Compact NS range offer positive contact indication and are suitable for isolation in compliance with standards IEC 60947-1 and 2.

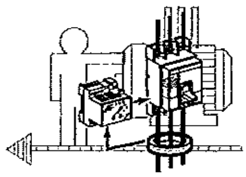


Protection of motors feeders (AC 220/690 V)

> page A-44

When combined with a motor starter, Compact NS circuit breakers protect the cables and the starter against short-circuits.
Equipped with an electronic trip unit, Compact NS circuit breakers also protect the cables, starter and motor against overloads.

The exceptional current-limiting capacity of Compact NS circuit breakers automatically ensures type-2 coordination with the motor starter, in compliance with standard IEC 60947-4-1.

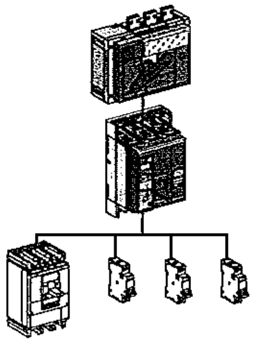


Earth-leakage

> page A-45

Additional earth-leakage protection protects life and property against the risks of faulty insulation in the installation.

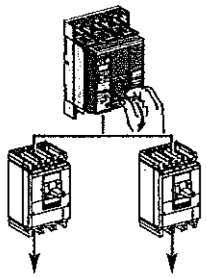
Depending on the circuit breaker, earth-leakage protection is provided by:
- using a specific Micrologic control unit
- using a Vigirex relay and separate toroids.



Service connection

Compact NS service connection circuit breakers are specially designed for the service-connection function:
- lead seals and locking systems
- tripping curves certified by utilities
- fast overload curves to limit the power supplied, etc.

Compact INV switch-disconnectors offering visible break (see the corresponding catalogue) can be combined with Compact NS circuit breakers to constitute the various types of service connections and meet the needs of all installation configurations.

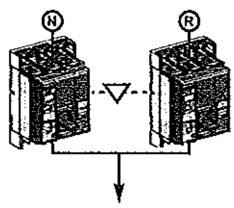


Control and isolation using switch-disconnectors

> page A-46

A switch-disconnector version of Compact NS circuit breakers exists for circuit control and isolation.
All the additional functions may be combined with the basic switch-disconnector function, including:
- earth-leakage protection
- motor mechanism.

For information on other switch-disconnector ranges, see the Compact INS/INV (offering positive contact indication and visible break) and Fupact (fuse switch) catalogues.



Source-changeover systems

> page A-52

To ensure a continuous supply of power, some electrical installations are connected to two power sources:
- a source "S1"
- a source "S2" to supply the installation when the source "S1" is not available.

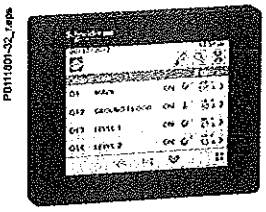
A mechanical and/or electrical interlocking system between two circuit breakers or switch-disconnectors avoids all risk of parallel connection of the sources during switching.

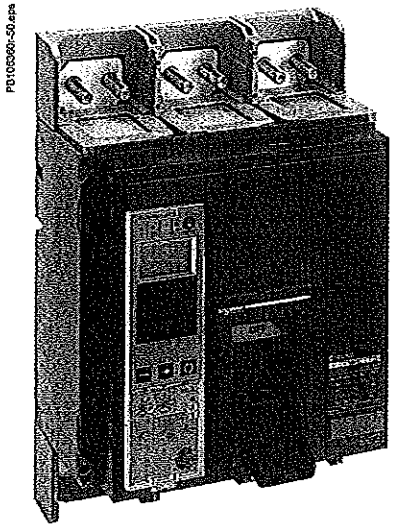
A source-changeover system can be:
- manual with mechanical device interlocking
- remote controlled with mechanical and/or electrical device interlocking
- automatic by adding a controller to manage switching from one source to the other on the basis of external parameters.

(See Source-changeover catalogue for dimensions, connections and electrical drawings).

Functions

They can be combined with the FDM121 switchboard display unit to provide all the functions of a Power Meter as well as operating assistance.





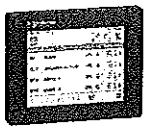
Power Meter functions

›page A-18

All Compact circuit breakers are equipped with a Micrologic control unit that can be changed on site. Control units are designed to protect Power circuits and loads. Alarms may be programmed for remote indications.
In addition to protection functions, Micrologic S/A/E/P control units offer all the functions of Power Meter products as well as operating-assistance for the circuit breaker.

Operating-assistance functions

›page A-20



Integration of measurement functions provides operators with operating assistance functions including alarms tripped by user-selected measurement values, time-stamped event tables and histories, and maintenance indicators.

Switchboard-display unit functions

›page A-21

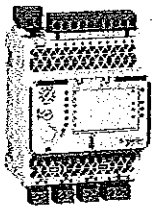
The main measurements can be read on the built-in screen of Micrologic 2 / 5 / 6 / 7 trip units.
They can also be displayed on the FDM switchboard display unit along with pop-up windows signalling the main alarms.

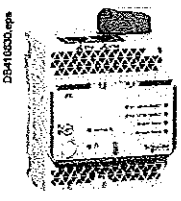
Communication

›page A-28

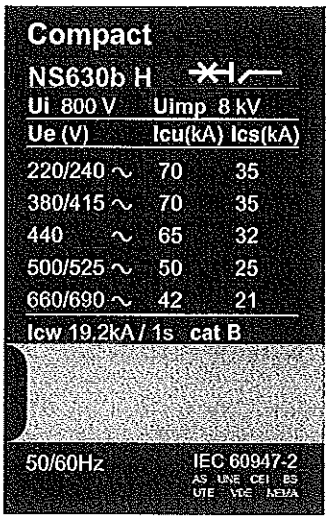
Compact NS equipped with Micrologic provide communication capabilities. Simple RJ45 cords connect to a Modbus interface module.

- IFM: Modbus interface module.
- IFE: Ethernet interface module.
- I/O application module.
- Electrical Asset Manager software.





Introduction
General characteristics for NS630b to 3200 range



Standardised characteristics indicated on the rating plate:

Ui:	*rated insulation voltage*
Uimp:	*rated impulse withstand voltage*
Icu:	*ultimate breaking capacity, for various values of the rated operational voltage Ue*
cat:	*utilisation category*
Icw:	*rated short-time withstand current*
Ics:	*service breaking capacity*
In:	*rated current*
	suitable for isolation

Compliance with standards
Compact NS circuit breakers and auxiliaries comply with the following:
- ■ international recommendations:
- □ IEC 60947-1 - general rules
- □ IEC 60947-2 - circuit breakers
- □ IEC 60947-3 - switches, disconnectors, switch-disconnectors, etc.
- □ IEC 60947-4 - contactors and motor starters
- □ IEC 60947-5.1 and following - control circuit devices and switching elements; automatic control components
- ■ European (EN 60947-1 and EN 60947-2) and the corresponding national standards:
- □ France NF
- □ Germany VDE
- □ U.K. BS
- □ Australia AS
- □ Italy CEI
- ■ the specifications of the marine classification companies (Veritas, Lloyd's Register of Shipping, Det Norske Veritas, etc.)
- ■ French standard NF C 79-130 and the recommendations issued by the CNOMO organisation for the protection of machine tools.

For U.S. UL, Canadian CSA, Mexican NOM and Japanese JIS standards, please consult us.

Pollution degree
Compact NS circuit breakers are certified for operation in pollution-degree 3 environments as defined by IEC standard 60947 (industrial environments).

Tropicalisation
Compact NS circuit breakers have successfully passed the tests prescribed by the following standards for extreme atmospheric conditions:
- ■ IEC 60068-2-1 - dry cold (-55 °C)
- ■ IEC 60068-2-2 - dry heat (+85 °C)
- ■ IEC 60068-2-30 - damp heat (95 % relative humidity at 55 °C)
- ■ IEC 60068-2-52 - salt mist (severity level 2).

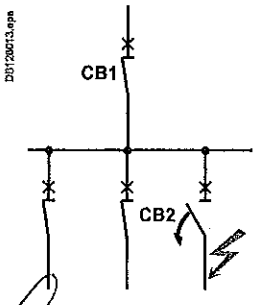
Environmental protection
Compact NS circuit breakers take into account important concerns for environmental protection. Most components are recyclable and the parts of Compact NS630b to NS3200 circuit breakers are marked as specified in applicable standards.

Ambient temperature
- ■ Compact NS circuit breakers may be used between -25 °C and +70 °C.

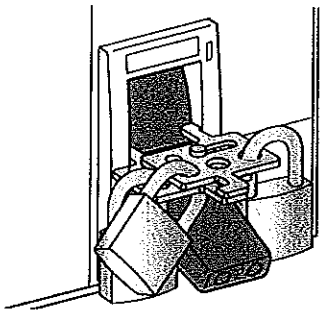
For temperatures higher than 40 °C (65 °C for circuit breakers used to protect motor feeders), devices must be derated as indicated in the documentation.
- ■ circuit-breakers should be put into service under normal ambient operating-temperature conditions. Exceptionally, the circuit breaker may be put into service when the ambient temperature is between -35 °C and -25 °C.

the permissible storage-temperature range for Compact NS circuit breakers in the original packing is -50 °C (1) to +85 °C.

Discrimination
As standard, the Compact NS range ensures discrimination between two circuit breakers positioned in series in an installation.



(1) -40 °C for Micrologic control units with an LCD screen.



Positive contact indication

All Compact NS circuit breakers are suitable for isolation as defined in IEC standard 60947-2:

- the isolation position corresponds to the O (OFF) position
- the operating handle cannot indicate the "OFF" position unless the contacts are effectively open
- padlocks may not be installed unless the contacts are open.

Installation of a rotary handle or a motor mechanism does not alter the reliability of the position-indication system.

The isolation function is certified by tests guaranteeing:

- the mechanical reliability of the position indication system
- the absence of leakage currents
- overvoltage withstand capacity between upstream and downstream connections.

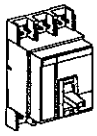
Installation in class II switchboards

All Compact NS circuit breakers are class II front face devices. They may be installed through the door of class II switchboards (as per IEC standard 60664), without downgrading switchboard insulation. Installation requires no special operations, even when the circuit breaker is equipped with a rotary handle or a motor mechanism.

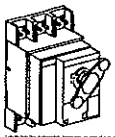
Degree of protection

As per standards IEC 60529 (IP degree of protection) and EN 50102 (IK degree of protection against external mechanical impacts).

Bare circuit breaker with terminal shields

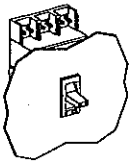


With toggle	IP40	IK07

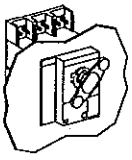


With direct rotary handle standard / VDE	IP40	IK07

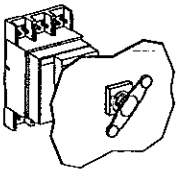
Circuit breaker installed in a switchboard



With toggle	IP40	IK07



With direct rotary handle standard / VDE	IP40	IK07
MCC	IP435	
CNOMO	IP547	

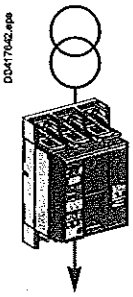


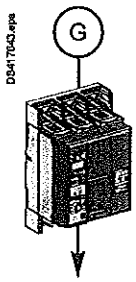
With extended rotary handle	IP55	IK08

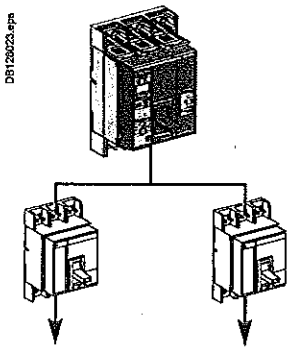
Protection of distribution systems

Overview of solutions

Protection of distribution systems means protection of:
- systems supplied by a transformer
- systems supplied by an engine generator set
- long cables in IT and TN systems.



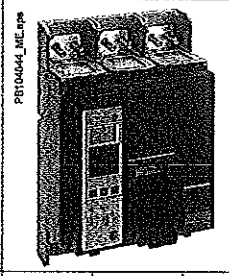




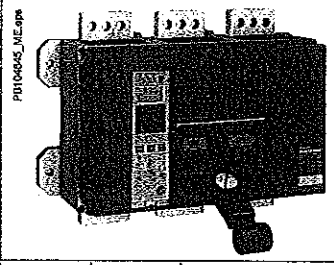
Power distribution

Selection of circuit breakers from 630 to 3200 A page A-2

Rated current (A)		250 ... 630	320 ... 800	400 ... 1000	500... 1250	640... 1600
Compact		NS630b	NS800	NS1000	NS1250	NS1600



Breaking capacity (kA rms) 380/415 V	N	50	50	50	50	50
	H	70	70	70	70	70
	L	150	150	150	-	-
	LB	200	200	-	-	-
Rated current (A)		640 ... 1600	800 ... 2000	1000 ... 2500	1250 ... 3200	
Compact		NS1600b	NS2000	NS2500	NS3200	



Breaking capacity (kA rms) 380/415 V	N	70	70	70
	H	85	85	85

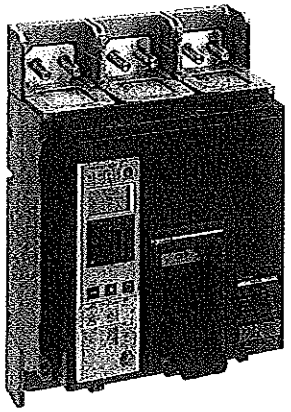
Accompanying control units up to 3200 A page A-20

Micrologic electronic control units may be used on all Compact NS630b to NS3200 circuit breakers and can be changed on site.

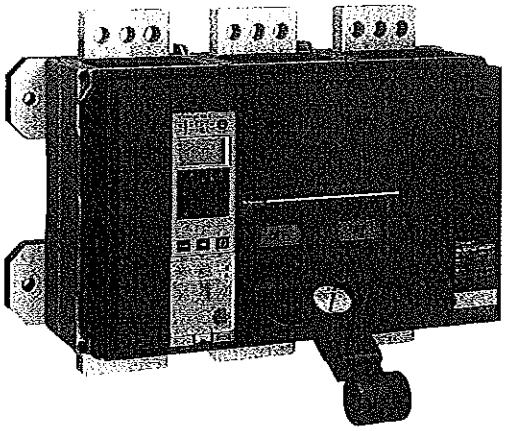
Functions and characteristics

Protection of distribution systems

Compact NS circuit breakers from 630b up to 3200 A



Compact NS800L.



Compact NS2000H.

Compact circuit breakers				
Number of poles				
Control	manual		toggle direct or extended rotary handle	
	electric			
Type of circuit breaker				
Connections	fixed		front connection rear connection front connection with bare cables	
	withdrawable (on chassis)		front connection rear connection	
Electrical characteristics as per Nema AB1				
Breaking capacity at 60 Hz (kA)				240 V 480 V 600 V
Electrical characteristics as per IEC 60947-2 and EN 60947-2				
Rated current (A)		In	50 °C 65 °C (1)	
Rated insulation voltage (V)		Ui		
Rated impulse withstand voltage (kV)		Uimp		
Rated operational voltage (V)		Ue	AC 50/60 Hz	
Type of circuit breaker				
Ultimate breaking capacity (kA rms)	**Manual**	Icu	AC 50/60 Hz	220/240 V 380/415 V 440 V 500/525 V 660/690 V
		Ics	AC 50/60 Hz	220/240 V 380/415 V 440 V 500/525 V 660/690 V
	Electrical	Icu	AC 50/60 Hz	220/240 V 380/415 V 440 V 500/525 V 660/690 V
		Ics	AC 50/60 Hz	220/240 V 380/415 V 440 V 500/525 V 660/690 V
Short-time withstand current (kA rms)		Icw	AC 50/60 Hz	1 s 3 s
Integrated instantaneous protection			kA peak ±10 %	
Suitability for isolation				
Utilisation category				
Durability (C-O cycles)	mechanical			
	electrical		440 V	In/2 In
			690 V	In/2 In
Pollution degree				

(1) 65 °C with vertical connections. See the temperature derating tables for other types of connections.
(2) Ics: 100 % Icu for breaking capacity 440V/500V/660V
Ics: 75 % Icu for breaking capacity 220V/380V.

396

	NS630b		NS800		NS1000			NS1250		NS1600		NS1600b		NS2000	NS2500	NS3200
	3, 4				3, 4			3, 4		3, 4		3, 4				
	■				■			■		■		■				
	■				■			■		■		-				
	■ (except LB)				■			■		■		-				
	N	H	L	LB	N	H	L	N	H	N	H	N	H			
	■	■	■	-	■	■	■	■	■	■	■	■	■			
	■	■	■	■	■	■	■	■	■	■	■	-	-			
	■	■	-	-	■	■	-	■	■	-	-	-	-			
	■	■	■	■	■	■	■	■	■	■	■	-	-			
	■	■	■	■	■	■	■	■	■	■	■	-	-			
	N	H	L	LB	N	H	L	N	H	N	H	N	H			
	50	65	125	200	50	65	125	50	65	50	65	85	125			
	35	50	100	200	35	50	100	35	50	35	50	65	85			
	25	50	-	100	25	50	-	25	50	25	50	50	-			
	630		800		1000			1250		1600		1600		2000	2500	3200
	630		800		1000			1250		1510		1550		1900	2500	2970
	800				800			800		800		800				
	8				8			8		8		8				
	690				690			690		690		690				
	N	H	L	LB	N	H	L	N	H	N	H	N	H			
	85	85	150	200	85	85	150	85	85	85	85	85	125			
	50	70	150	200	50	70	150	50	70	50	70	70	85			
	50	65	130	200	50	65	130	50	65	50	65	65	85			
	40	50	100	100	40	50	100	40	50	40	50	65	-			
	30	42	-	75	30	42	-	30	42	30	42	65	-			
	50	52	150	200	50	52	150	50	52	37	35	65	94			
	50	52	150	200	50	52	150	50	52	37	35	52	64			
	50	48	130	200	50	48	130	50	48	37	32	65	64			
	40	37	100	100	40	37	100	40	37	30	25	65	-			
	30	31	-	75	30	31	-	30	31	22	21	65	-			
	50	70	150	-	50	70	150	50	70	50	70	-				
	50	70	150	-	50	70	150	50	70	50	70					
	50	65	130	-	50	65	130	50	65	50	65					
	40	50	100	-	40	50	100	40	50	40	50					
	30	42	-	-	30	42	-	30	42	30	42					
	37	35	150	-	37	35	150	37	35	37	35	-				
	37	35	150	-	37	35	150	37	35	37	35					
	37	32	130	-	37	32	130	37	32	37	32					
	30	25	100	-	30	25	100	30	25	30	25					
	22	21	-	-	22	21	-	22	21	22	21					
	19.2	19.2	-	-	19.2	19.2	-	19.2	19.2	19.2	19.2	-				
	-	-	-	-	-	-	-	-	-	-	-	32				
	40	40	-	-	40	40	-	40	40	40	40	130				
	■				■			■		■		■				
	B	B	A	A	B	B	A	B	B	B	B	B				
	10000				10000			10000		10000		5000				
	6000	6000	4000	4000	6000	6000	4000	5000		5000		3000				
	5000	5000	3000	3000	5000	5000	3000	4000		2000		2000				
	4000	4000	3000	3000	4000	4000	3000	3000		2000		2000				
	2000	2000	2000	2000	2000	2000	2000	2000		1000		1000				
	3				3			3		3		3				

Protection of distribution systems

Compact NS circuit breakers from 630b up to 3200 A

Compact circuit breakers		
Protection and measurements		
Interchangeable control units		
Overload protection	long time	Ir (In x ...)
Short-circuit protection	short time	Isd (Ir x ...)
	instantaneous	Ii (In x ...)
Earth-fault protection		Ig (In x ...)
Residual earth-leakage protection		IΔn
Zone selective interlocking		ZSI
Protection of the fourth pole		
Current measurements		
Power measurements		
Advanced protection		
Quick view		
Remote communication by bus		
Device-status indication		
Device remote operation (2)		
Transmission of settings		
Indication and identification of protection devices and alarms		
Transmission of measured current values		

Compact circuit breakers		
Additional indication and control auxiliaries		
Indication contacts		
Voltage releases	MX shunt release/MN undervoltage release	
Installation		
Accessories	terminal extensions and spreaders terminal shields and interphase barriers escutcheons	
Dimensions fixed devices, front connections (mm) H x W x D		3P 4P
Weight fixed devices, front connections (kg)		3P 4P
Source changeover system (see section on "source changeover systems")		
Manual, remote-operated and automatic source changeover systems		

(1) Except 1600b-3200.
(2) With NS630b...NS1600, remote operation is possible with electrically operated device. With NS1600...NS3200, remote operation is not possible.

	NS630b		NS800		NS1000		NS1250		NS1600		NS1600b		NS2000	NS2500			NS3200
	Micrologic																
	2.0	5.0	6.0	2.0A	5.0A	6.0A	7.0A	2.0E	5.0E	6.0E	5.0P (1)	6.0P (1)	7.0P (1)				
	■	■	■	■	■	■	■	■	■	■	■	■	■				
	-	■	■	-	■	■	■	-	■	■	■	■	■				
	■	■	■	■	■	■	■	■	■	■	■	■	■				
	-	-	■	-	-	■	-	-	-	■	-	■	-				
	-	-	-	-	-	-	■	-	-	-	-	-	■				
	-	-	-	■	■	■	■	■	■	■	■	■	■				
	■	■	■	■	■	■	■	■	■	■	■	■	■				
	-	-	-	■	■	■	■	■	■	■	■	■	■				
	-	-	-	-	-	-	-	■	■	■	■	■	■				
	-	-	-	-	-	-	-	-	-	-	■	■	■				
	-	-	-	-	-	-	-	■	■	■	-	-	-				
	■	■	■	■	■	■	■	■	■	■	■	■	■				
	■	■	■	■	■	■	■	■	■	■	■	■	■				
	-	-	-	■	■	■	■	■	■	■	■	■	■				
	-	-	-	■	■	■	■	■	■	■	■	■	■				
	-	-	-	■	■	■	■	■	■	■	■	■	■				

	NS630b	NS800	NS1000	NS1250	NS1600	NS1600b	NS2000	NS2500	NS3200
	■					■			
	■					■			
	■					-			
	■					■			
	■					■			
	327 x 210 x 147					350 x 420 x 160			
	327 x 280 x 147					350 x 535 x 160			
	14					24			
	18					36			
	■					-			

Micrologic control units
Overview of functions

All Compact circuit breakers are equipped with a Micrologic control unit that can be changed on site. Control units are designed to protect Power circuits and loads. Alarms may be programmed for remote indications.
Measurements of current, voltage, frequency, power and power quality optimise continuity of service and energy management.

Dependability
Integration of protection functions in an ASIC electronic component used in all Micrologic control units guarantees a high degree of reliability and immunity to conducted or radiated disturbances.
On Micrologic A, E and P control units, advanced functions are managed by an independent microprocessor.

Accessories
Certain functions require the addition of Micrologic control unit accessories, described on page A-28.
The rules governing the various possible combinations can be found in the documentation accessible via the Products and services menu of the www.schneider-electric.com web site.

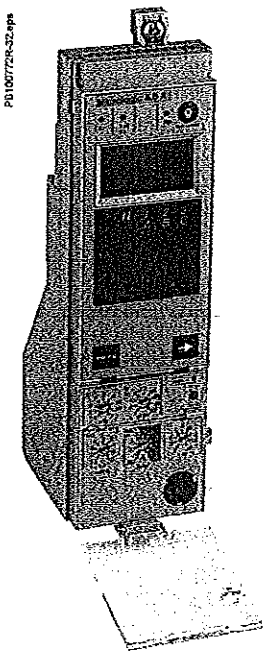
Micrologic name codes

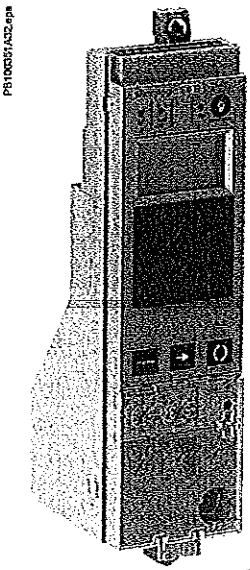
2.0 E
X Y Z

X: type of protection
- 2 for basic protection
- 5 for selective protection
- 6 for selective + earth-fault protection
- 7 for selective + earth-leakage protection.

Y: control-unit generation
Identification of the control-unit generation.
"0" signifies the first generation.

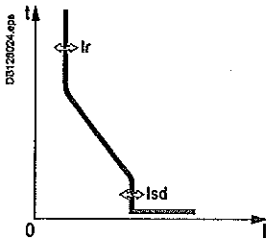
Z: type of measurement
- A for "ammeter"
- E for "energy"
- P for "power meter"





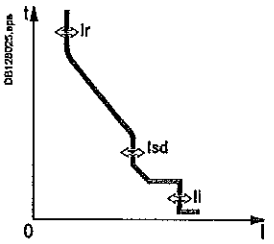
Current protection

Micrologic 2: basic protection



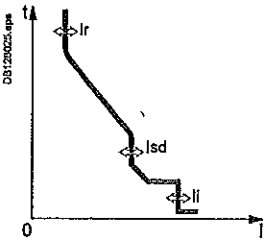
Protection:
long time
+ instantaneous

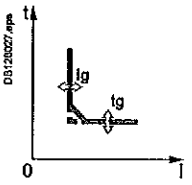
Micrologic 5: selective protection



Protection:
long time
+ short time
+ instantaneous

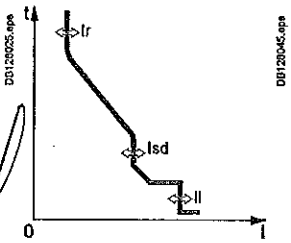
Micrologic 6: selective + earth-fault protection

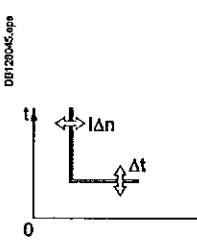




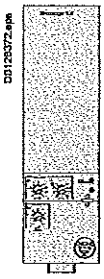
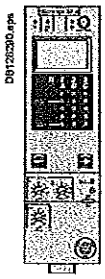
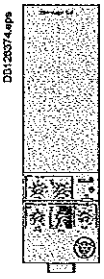
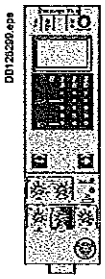
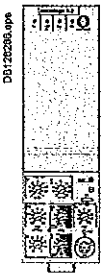
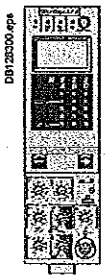
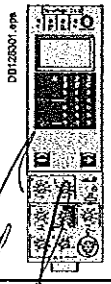
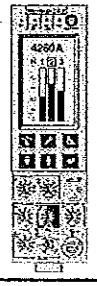
Protection:
long time
+ short time
+ instantaneous
+ earth fault

Micrologic 7: selective + earth-leakage



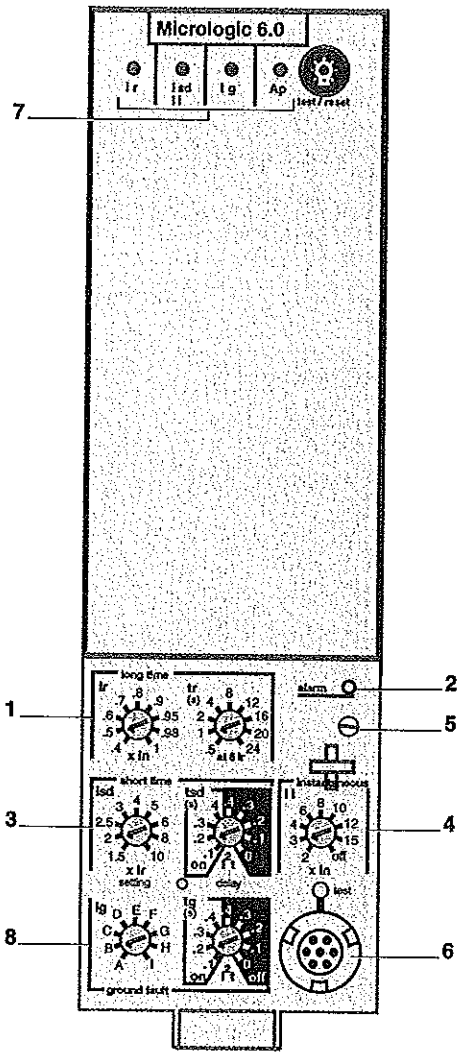


Protection:
long time
+ short time
+ instantaneous
+ earth leakage up to 3200A

Micrologic without measurement	Measurements and programmable protection		
	A: ammeter ■ I_1, I_2, I_3, I_N, $I_{earth-fault}$, $I_{earth-leakage}$ and maximeter for these measurements ■ fault indications ■ settings in amperes and in seconds.		
		E: Energy ■ incorporates all the rms measurements of Micrologic A, plus voltage, power factor, power and energy metering measurements. □ calculates the current demand value □ "Quickview" function for the automatic cyclical display of the most useful values (as standard or by selection).	**P: A + power meter + programmable protection** ■ measurements of V, A, W, VAR, VA, Wh, VARh, VAh, Hz, V_{peak}, A_{peak}, power factor and maximeters and minimeters ■ IDMTL long-time protection, minimum and maximum voltage and frequency, voltage and current imbalance, phase sequence, reverse power ■ load shedding and reconnection depending on power or current ■ measurements of interrupted currents, differentiated fault indications, maintenance indications, event histories and time-stamping, etc.
2.0 	**2.0 A** 	**2.0 E** 	
5.0 	**5.0 A** 	**5.0 E** 	**5.0 P** 
6.0 	**6.0 A** 	**6.0 E** 	**6.0 P** 
	7.0 A 		**7.0 P** 

Micrologic control units
For Compact NS630b to 3200

Micrologic 2.0, 5.0 and 6.0 control units protect power circuits. Micrologic 5.0 and 6.0 offers time discrimination for short-circuits as well.



1 long-time threshold and tripping delay
2 overload alarm (LED)
3 short-time pick-up and tripping delay
4 instantaneous pick-up
5 fixing screw for long-time rating plug
6 test connector
7 indication of tripping cause
8 earth-leakage or earth-fault pick-up and tripping delay

Protection
Protection thresholds and delays are set using the adjustment dials.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

Earth-fault protection
Residual or source ground return earth fault protection.
Selection of I^2t type (ON or OFF) for delay.

Neutral protection
On three-pole circuit breakers, neutral protection is not possible.
On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2) or neutral protection at Ir (4P 4d).

Indications
Overload indication by alarm LED on the front; the LED goes on when the current exceeds the long-time trip threshold.

Test
A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation after installing the trip unit or accessories.

Fault indications (only for micrologic 6.0)
LEDs indicate the type of fault:
- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault or earth leakage (Ig)
- internal fault (Ap).

Battery power
The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Note: Micrologic control units are equipped with a transparent lead-seal cover as standard.

Protection — Micrologic 2.0

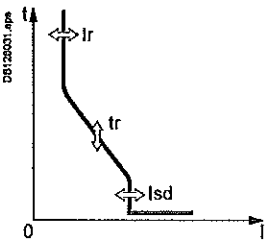
Long time

Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
tripping between 1.05 and 1.20 x Ir			other ranges or disable by changing long-time rating plug								
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	accuracy: 0 to -20 %	6 x Ir	0.7 (1)	1	2	4	8	12	16	20	24
	accuracy: 0 to -20 %	7.2 x Ir	0.7 (2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								

(1) 0 to -40 % - (2) 0 to -60 %

Instantaneous

Pick-up (A)	Isd = Ir x ...	1.5	2	2.5	3	4	5	6	8	10
accuracy: ±10 %										
Time delay		max. resettable time: 20 ms; max break time: 80 ms								



Protection — Micrologic 5.0 / 6.0

Long time

Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								

(1) 0 to -40 % - (2) 0 to -60 %

Short time

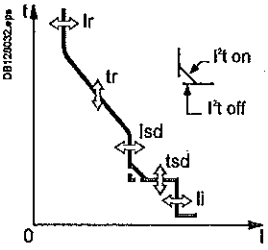
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	tsd (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	tsd (max break time)		80	140	200	320	500				

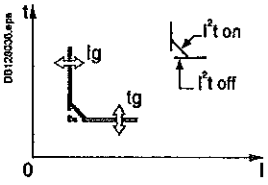
Instantaneous

Pick-up (A)	Ii = In x ...	2	3	4	6	8	10	12	15	off
Accuracy: ±10 %										
Time delay		Max resettable time: 20 ms Max break time: 50 ms								

Earth fault — **Micrologic 6.0**

Pick-up (A)	Ig = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ≤ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ≥ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	tg (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	tg (max break time)		80	140	200	320	500				

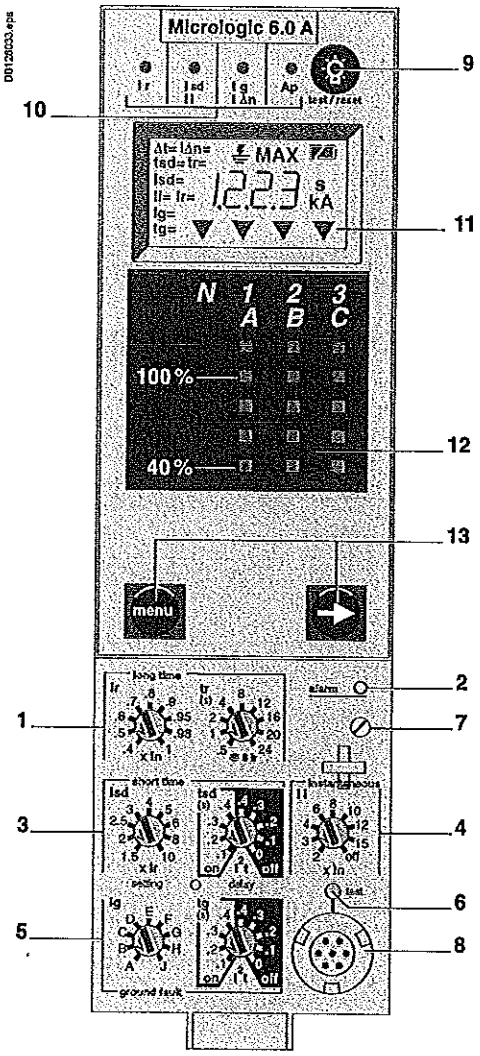




Note: all current-based protection functions require no auxiliary source.
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic control units
Micrologic A "ammeter"

Micrologic A control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection, version 7 provides earth-leakage protection.



1 long-time threshold and tripping delay
2 overload alarm (LED) at 1.125 Ir
3 short-time pick-up and tripping delay
4 instantaneous pick-up
5 earth-leakage or earth-fault pick-up and tripping delay
6 earth-leakage or earth-fault test button
7 long-time rating plug screw
8 test connector
9 lamp test, reset and battery test
10 indication of tripping cause
11 digital display
12 three-phase bargraph and ammeter
13 navigation buttons

Note: Micrologic A control units come with a transparent lead-seal cover as standard.

"Ammeter" measurements
Micrologic A control units measure the true (rms) value of currents.
They provide continuous current measurements from 0.2 to 1.2 In and are accurate to within 1.5 % (including the sensors).
A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I_1, I_2, I_3, I_N, I_g, $I\Delta_n$, stored-current (maximeter) and setting values by successively pressing the navigation button.
The optional external power supply makes it possible to display currents < 20 % In. Below 0.1 In, measurements are not significant. Between 0.1and 0.2 In, accuracy changes linearly from 4 % to 1.5 %.

Communication option
In conjunction with the COM communication option, the control unit transmits the following:
- settings
- all "ammeter" measurements
- tripping causes
- maximeter readings.

Protection
Protection thresholds and delays are set using the adjustment dials.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.
Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

Earth-fault protection
Residual or source ground return earth fault protection.
Selection of I^2t type (ON or OFF) for delay.

Residual earth-leakage protection (Vigi).
Operation without an external power supply.
⎍ Protected against nuisance tripping.
⎓ DC-component withstand class A up to 10 A.

Neutral protection
On three-pole circuit breakers, neutral protection is not possible.
On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

Zone selective interlocking (ZSI)
A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

Overload alarm
A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

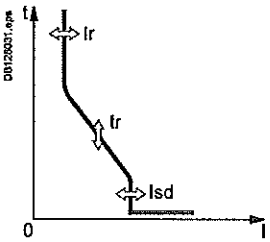
Fault indications
LEDs indicate the type of fault:
- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault or earth leakage (Ig or IΔn)
- internal fault (Ap).

Battery power
The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Test
A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 A and 7.0 A control units, the operation of earth-fault or earth-leakage protection can be checked by pressing the test button located above the test connector.

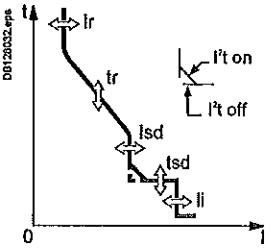
Protection — Micrologic 2.0 A

Long time	**ANSI Code 49**										
Current setting (A)			0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous	**ANSI Code 50**										
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								

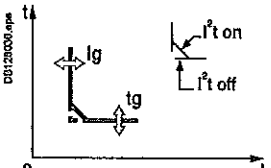


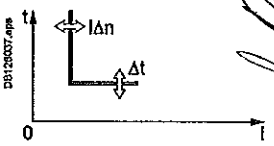
Protection — Micrologic 5.0 / 6.0 / 7.0 A

Long time	**ANSI Code 49**		**Micrologic 5.0 / 6.0 / 7.0 A**								
Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		**tr (s)**	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Short time	**ANSI Code 51**										
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	tsd (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	tsd (max break time)		80	140	200	320	500				
Instantaneous	**ANSI Code 50**										
Pick-up (A)	Ii = In x ...		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 50 ms								



Earth fault	**ANSI Code 51N**		**Micrologic 6.0 A**								
Pick-up (A)	Ig = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ≤ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ≥ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	tg (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	tg (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)	**ANSI Code 51G**		**Micrologic 7.0 A**								
Sensitivity (A)	IΔn		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Δt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				





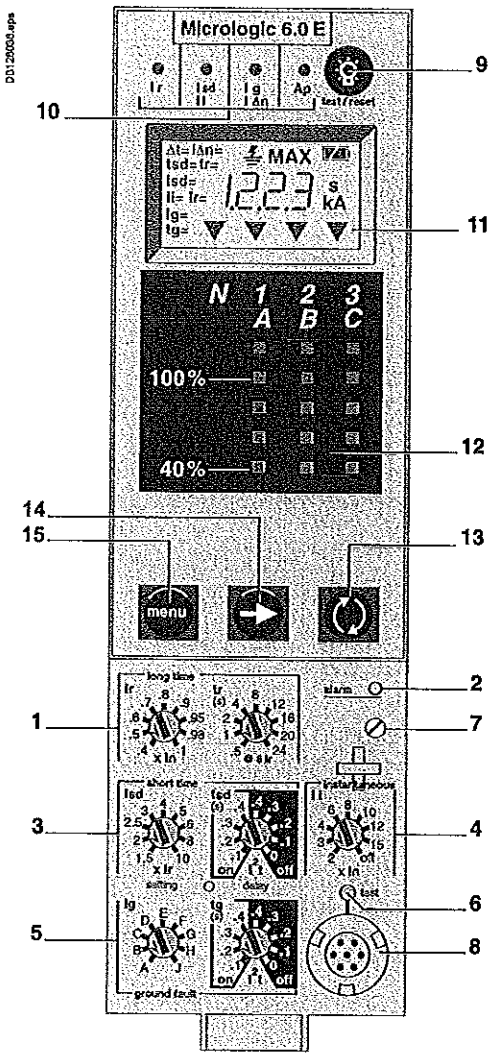
Ammeter — Micrologic 2.0 / 5.0 / 6.0 / 7.0 A

Type of measurements		**Range**	**Accuracy**
Instantaneous currents	I1, I2, I3, IN	0.2 x In to 1.2 x In	±1.5 %
	Ig (6.0 A)	0.2 x In to In	±10 %
	IΔn (7.0 A)	0 to 30 A	±1.5 %
Current maximeters of	I1, I2, I3, IN	0.2 x In to 1.2 x In	±1.5 %

Note: all current-based protection functions require no auxiliary source.
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic control units
Micrologic E "energy"

Micrologic E control units protect power circuits. They also offer measurements, display, communication and current maximeters. Version 6 provides earth-fault protection.



1 *long-time threshold and tripping delay*
2 *overload alarm (LED) at 1.125 Ir*
3 *short-time pick-up and tripping delay*
4 *instantaneous pick-up*
5 *earth-leakage or earth-fault pick-up and tripping delay*
6 *earth-leakage or earth-fault test button*
7 *long-time rating plug screw*
8 *test connector*
9 *lamp test, reset and battery test*
10 *indication of tripping cause*
11 *digital display*
12 *three-phase bargraph and ammeter*
13 *navigation button "quick View" (only with Micrologic E)*
14 *navigation button to view menu contents*
15 *navigation button to change menu*

(1) Display on FDM121 only.

Note: Micrologic E control units come with a transparent lead-seal cover as standard.

"Energy meter" measurements

In addition to the ammeter measurements of Micrologic A
Micrologic E control units measure and display:
- current demand
- voltages: phase to phase, phase to neutral, average (1) and unbalanced (1)
- instantaneous power: P, Q, S
- power factor: PF
- power demand: P demand
- energy: Ep, Eq (1), Es (1).

Accuracy of active energy Ep is 2 % (including the sensors). The range of measurement is the same as current with Micrologic A, depending of an external power supply module (24 V DC).

Communication option

In conjunction with the COM communication option, the control unit transmits the following:
- settings
- all "ammeter" and "energy" measurements
- enable connection to FDM121
- tripping causes
- maximeter / minimeter readings.

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug. Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

Earth-fault protection
Source ground return earth fault protection.
Selection of I^2t type (ON or OFF) for delay.

Neutral protection
On three-pole circuit breakers, neutral protection is not possible.
On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d).

Zone selective interlocking (ZSI)
A ZSI terminal block may be used to interconnect a number of control units to provide total discrimination for short-time and earth-fault protection, without a delay before tripping.

Overload alarm

A yellow alarm LED goes on when the current exceeds the long-time trip threshold.

Programmable contacts

The programmable contacts may be used to signal events (Ir, Isd, Alarm Ir, Alarm Ig, Ig). They can be programmed using the keypad on the Micrologic E control unit or remotely using the COM option (BCM ULP) and RSU software.

Fault indications

LEDs indicate the type of fault:
- overload (long-time protection Ir)
- short-circuit (short-time Isd or instantaneous Ii protection)
- earth fault (Ig)
- internal fault (Ap).

Trip history
The trip history displays the list of the last 10 trips. For each trip, the following indications are recorded and displayed:
- the tripping cause: Ir, Isd, Ii, Ig or Auto-protection (Ap) trips
- the date and time of the trip (requires communication option).

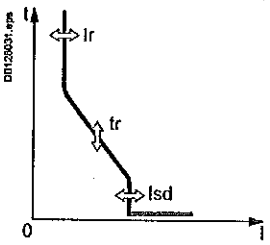
Battery power
The fault indication LEDs remain on until the test/reset button is pressed. Under normal operating conditions, the battery supplying the LEDs has a service life of approximately 10 years.

Test

A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation. For Micrologic 6.0 E control units, the operation of earth-fault or earth-leakage protection can be checked by pressing the test button located above the test connector.

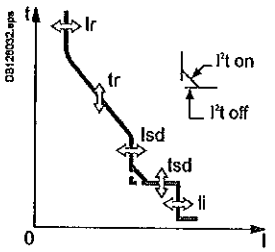
Protection — Micrologic 2.0 E

Long time	ANSI Code 49										
Current setting (A)			0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous	**ANSI Code 50**										
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 80 ms								

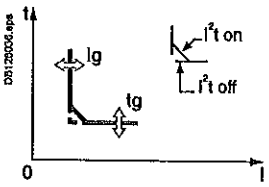


Protection — Micrologic 5.0 / 6.0 E

Long time	ANSI Code 49		Micrologic 5.0 / 6.0 E								
Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		tr (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Short time	**ANSI Code 51**										
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting tsd (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x Ir	tsd (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	tsd (max break time)		80	140	200	320	500				
Instantaneous	**ANSI Code 50**										
Pick-up (A)	Ii = In x ...		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 50 ms								



Earth fault	ANSI Code 51N		Micrologic 6.0 E								
Pick-up (A)	Ig = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ≤ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ≥ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting tg (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	tg (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	tg (max break time)		80	140	200	320	500				



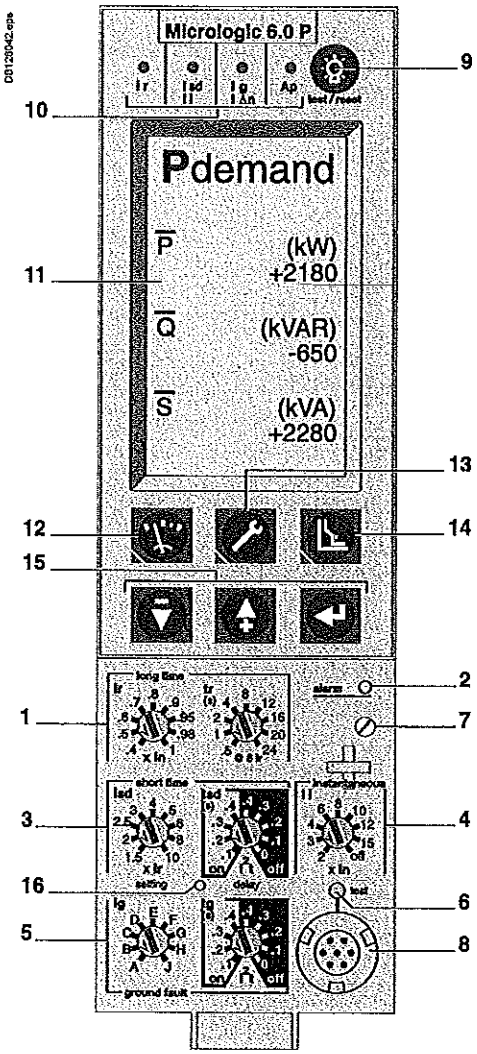
Energy — Micrologic 2.0 / 5.0 / 6.0 E

Type of measurements		Range	Accuracy
Instantaneous currents	I1, I2, I3, IN	0.2 x In to 1.2 x In	±1.5 %
	Ig (6.0 E)	0.05 x In to In	±10 %
Current maximeters of	I1, I2, I3, IN	0.2 x In to 1.2 x In	±1.5 %
Demand currents of I1, I2, I3, Ig		0.2 x In to 1.2 x In	±1.5 %
Voltages	V12, V23, V31, V1N, V2N, V3N	100 to 690 V	±0.5 %
Active power	P	30 to 2000 kW	±2 %
Power factor	PF	0 to 1	±2 %
Demand power	P demand	30 to 2000 kW	±2 %
Active energy	Ep	-10^{10} GWh to 10^{10} GWh	±2 %

Note: all current-based protection functions require no auxiliary source.
The test / reset button resets maximeters, clears the tripping indication and tests the battery.

Micrologic control units
Micrologic P "power"

Micrologic P control units include all the functions offered by Micrologic A.
In addition, they measure voltages and calculate power and energy values.
They also offer new protection functions based on currents, voltages, frequency and power reinforce load protection in real time.



1 Long-time current setting and tripping delay.
2 Overload signal (LED).
3 Short-time pick-up and tripping delay.
4 Instantaneous pick-up.
5 Earth-leakage or earth-fault pick-up and tripping delay.
6 Earth-leakage or earth-fault test button.
7 Long-time rating plug screw.
8 Test connector.
9 Lamp + battery test and indications reset.
10 Indication of tripping cause.
11 High-resolution screen.
12 Measurement display.
13 Maintenance indicators.
14 Protection settings.
15 Navigation buttons.
16 Hole for settings lockout pin on cover.

Protection

Protection settings
The adjustable protection functions are identical to those of Micrologic A (overloads, short-circuits, earth-fault and earth-leakage protection).

Fine adjustment
Within the range determined by the adjustment dial, fine adjustment of thresholds (to within one ampere) and time delays (to within one second) is possible on the keypad or remotely using the COM option.

IDMTL (Inverse Definite Minimum Time Lag) setting
Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

Neutral protection
On three-pole circuit breakers, neutral protection may be set using the keypad or remotely using the COM option, to one of four positions: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d) and neutral protection at 1.6 Ir (4P 3d + 1.6N). Neutral protection at 1.6 Ir is used when the neutral conductor is twice the size of the phase conductors (major load imbalance, high level of third order harmonics).
On four-pole circuit breakers, neutral protection may be set using a three-position switch or the keypad: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d). Neutral protection produces no effect if the long-time curve is set to one of the IDMTL protection settings.

Programmable alarms and other protection
Depending on the thresholds and time delays set using the keypad or remotely using the COM option, the Micrologic P control unit monitors currents and voltage, power, frequency and the phase sequence. Each threshold overrun is signalled remotely via the COM option. Each threshold overrun may be combined with tripping (protection) or an indication carried out by an optional M6C programmable contact (alarm), or both (protection and alarm).

Load shedding and reconnection
Load shedding and reconnection parameters may be set according to the power or the current flowing through the circuit breaker. Load shedding is carried out by a supervisor via the COM option or by an M6C programmable contact.

Indication option via programmable contacts
The M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option (BCM ULP) and RSU software.

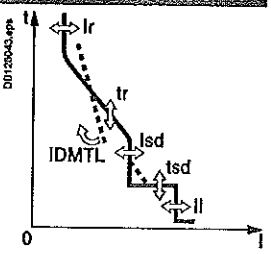
Communication option (COM)
The communication option may be used to:
- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register
- maximeter reset.

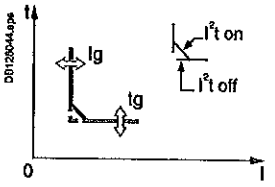
An event log and a maintenance register, stored in control-unit memory but not available locally, may be accessed in addition via the COM option.

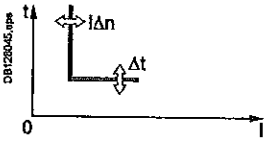
Note: Micrologic P control units come with a non-transparent lead-seal cover as standard.

Protection — Micrologic 5.0 / 6.0 / 7.0 P

Long time (rms)	**ANSI Code 49**		**Micrologic 5.0 / 6.0 / 7.0 P**								
Current setting (A)	Ir = In x ...		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 x Ir			Other ranges or disable by changing long-time rating plug								
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	Accuracy: 0 to -30 %	1.5 x Ir	12.5	25	50	100	200	300	400	500	600
	Accuracy: 0 to -20 %	6 x Ir	0.7(1)	1	2	4	8	12	16	20	24
	Accuracy: 0 to -20 %	7.2 x Ir	0.7(2)	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
IDMTL setting	Curve slope		SIT	VIT	EIT	HVFuse	DT				
Thermal memory			20 minutes before and after tripping								
(1) 0 to -40 % - (2) 0 to -60 %											
Short time (rms)	**ANSI Code 51**										
Pick-up (A)	Isd = Ir x ...		1.5	2	2.5	3	4	5	6	8	10
Accuracy: ±10 %											
Time setting t_{sd} (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms) at 10 Ir	t_{sd} (max resettable time)		20	80	140	230	350				
(I^2t Off or I^2t On)	t_{sd} (max break time)		80	140	200	320	500				
Instantaneous	**ANSI Code 50**										
Pick-up (A)	Ii = In x ...		2	3	4	6	8	10	12	15	off
Accuracy: ±10 %											
Time delay			Max resettable time: 20 ms Max break time: 50 ms								
Earth fault	**ANSI Code 50N**		**Micrologic 6.0 P**								
Pick-up (A)	Ig = In x ...		A	B	C	D	E	F	G	H	J
Accuracy: ±10 %	In ≤ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In < 1250 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	In ≥ 1250 A		500	640	720	800	880	960	1040	1120	1200
Time setting t_g (s)	Settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On	-	0.1	0.2	0.3	0.4				
Time delay (ms)	t_g (max resettable time)		20	80	140	230	350				
at In or 1200 A (I^2t Off or I^2t On)	t_g (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)	**ANSI Code 51G**		**Micrologic 7.0 P**								
Sensitivity (A)	IΔn		0.5	1	2	3	5	7	10	20	30
Accuracy: 0 to -20 %											
Time delay Dt (ms)	Settings		60	140	230	350	800				
	Δt (max resettable time)		60	140	230	350	800				
	Δt (max break time)		140	200	320	500	1000				

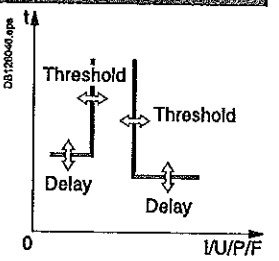






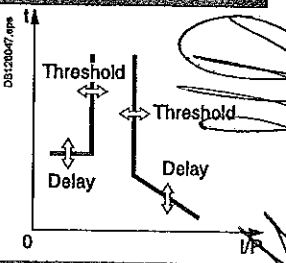
Alarms and other protection — Micrologic 5.0 / 6.0 / 7.0 P

Current	**ANSI Code 46**		**Threshold**	**Delay**
Current unbalance	Iunbalance		0.05 to 0.6 Iaverage	1 to 40 s
Max. demand current	Imax demand : I1, I2, I3, IN,		0.2 In to In	15 to 1500 s
Earth fault alarm				
	I⏚		10 to 100 % In(3)	1 to 10 s
Voltage		**ANSI Code**		
Voltage unbalance	Uunbalance	47	2 to 30 % x Uaverage	1 to 40 s
Minimum voltage	Umin	27	100 to Umax between phases	1.2 to 10 s
Maximum voltage(4)	Umax	59	Umin to 1200 between phases	1.2 to 10 s
Power				
Reverse power	rP	32P	5 to 500 kW	0.2 to 20 s
Frequency				
Minimum frequency	Fmin	81L	45 to Fmax	1.2 to 5 s
Maximum frequency	Fmax	81H	Fmin to 440 Hz	1.2 to 5 s
Phase sequence				
Sequence (alarm)	ΔØ		Ø1/2/3 or Ø1/3/2	0.3 s



Load shedding and reconnection — Micrologic 5.0 / 6.0 / 7.0 P

Measured value		**Threshold**	**Delay**
Current	I	0.5 to 1 Ir per phases	20 % tr to 80 % tr
Power	P	200 kW to 10 MW	10 to 3600 s



Power — Micrologic 5.0 / 6.0 / 7.0 P

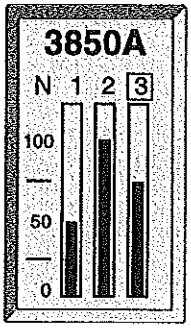
Type of measurements		Range	Accuracy
Current maximeters of	I1, I2, I3, IN	0.2 x In to 1.2 x In	± 1.5 %
Voltages	V12, V23, V31, V1N, V2N, V3N	100 to 690 V	± 0.5 %
Power factor	PF	0 to 1	± 2 %
Frequency (Hz)			0.1 %

(3) In ≤ 400 A 30 %
400 A < In < 1250 A 20 %
In ≥ 1250 A 10 %

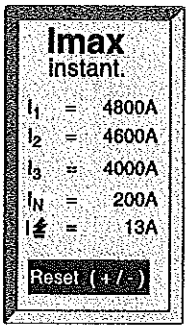
(4) For 690 V applications, a step-down transformer must be used if the voltage exceeds the nominal value of 690 V by more than 10 %.

Note: all current-based protection functions require no auxiliary source.
Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

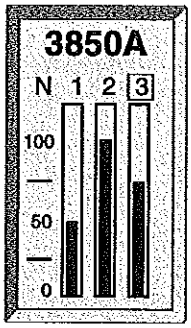
Micrologic control units
Micrologic P "power"



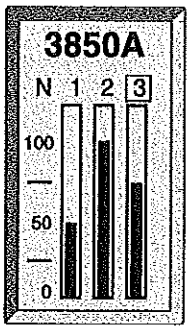
Default display.



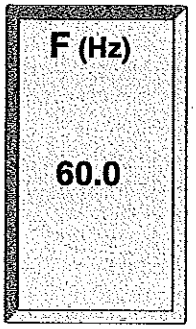
Display of a maximum current.



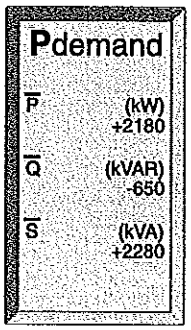
Display of a voltage.



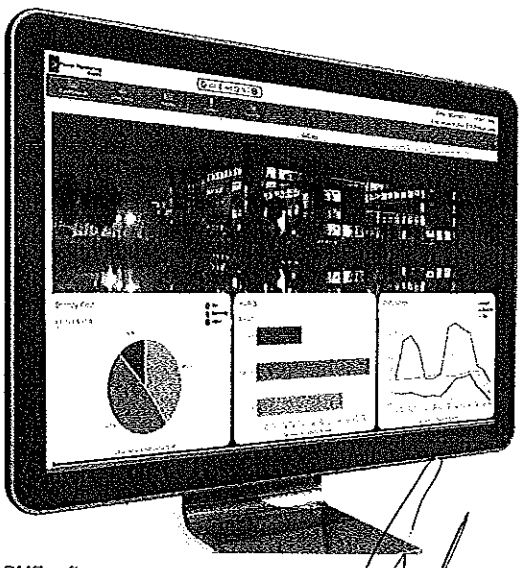
Display of a power.



Display of a frequency.



Display of a demand power.


PME software.

Measurements

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and cosφ factors.
The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.
In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

Instantaneous values

The value displayed on the screen is refreshed every second.
Minimum and maximum values of measurements are stored in memory (minimeters and maximeters).

Currents					
I rms	A	1	2	3	N
	A	E-fault		E-leakage	
I max rms	A	1	2	3	N
	A	E-fault		E-leakage	
Voltages					
U rms	V	12	23	31	
V rms	V	1N	2N	3N	
U average rms	V	(U12 + U23 + U31) / 3			
U unbalance	%				
Power, energy					
P active, Q reactive, S apparent	W, Var, VA	Totals			
E active, E reactive, E apparent	Wh, VARh, VAh	Totals consumed - supplied Totals consumed Totals supplied			
Power factor	PF	Total			
Frequencies					
F	Hz				

Demand metering

The demand is calculated over a fixed or sliding time window that may be programmed from 5 to 60 minutes. According to the contract signed with the power supplier, an indicator associated with a load shedding function makes it possible to avoid or minimise the costs of overrunning the subscribed power. Maximum demand values are systematically stored and time stamped (maximeter).

Currents					
I demand	A	1	2	3	N
	A	E-fault		E-leakage	
I max demand	A	1	2	3	N
	A	E-fault		E-leakage	
Power					
P, Q, S demand	W, Var, VA	Totals			
P, Q, S max demand	W, Var, VA	Totals			

Minimeters and maximeters

Only the current and power maximeters may be displayed on the screen.

Time-stamping

Time-stamping is activated as soon as time is set manually or by a supervisor. No external power supply module is required (max. drift of 1 hour per year).

Reset

An individual reset, via the keypad or remotely, acts on alarms, minimum and maximum data, peak values, the counters and the indicators.

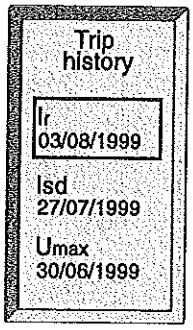
Additional measurements accessible with the COM option (BCM ULP)

Some measured or calculated values are only accessible with the COM communication option:
- I peak / $\sqrt{2}$, $(I_1 + I_2 + I_3)/3$, I unbalance
- load level in % Ir
- total power factor.

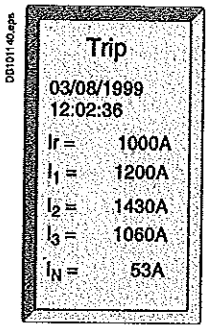
The maximeters and minimeters are available only via the COM option (BCM ULP) for use with a supervisor.

Additional info

Accuracy of measurements (including sensors):
- *voltage (V) 0.5 %*
- *current (A) 1.5 %*
- *frequency (Hz) 0.1 %*
- *power (W) and energy (Wh) 2 %.*



Display of a tripping history.



Display after tripping.

Histories and maintenance indicators .....

The last ten trips and alarms are recorded in two separate history files that may be displayed on the screen:

- ■ tripping history:
  - □ type of fault
  - □ date and time
  - □ values measured at the time of tripping (interrupted current, etc.)
- ■ alarm history:
  - □ type of alarm
  - □ date and time
  - □ values measured at the time of the alarm.

All the other events are recorded in a third history file which is only accessible through the communication network.

- ■ Event log history (only accessible through the communication network)
  - □ modifications to settings and parameters
  - □ counter resets
  - □ system faults
  - □ fallback position
  - □ thermal self-protection
  - □ loss of time
  - □ overrun of wear indicators
  - □ test-kit connections
  - □ etc.

Note: all the events are time stampled: time-stamping is activated as soon as time is set manually or by a supervisor. No external power supply module is required (max. drift of 1 hour per year).

Maintenance indicators with COM option (BCM ULP)

A number of maintenance indicators may be called up on the screen to better plan for device maintenance:

- ■ contact wear
- ■ operation counter:
  - □ cumulative total
  - □ total since last reset.

Additional maintenance indicators are also available through the COM network, and can be used as an aid in troubleshooting:

- ■ highest current measured
- ■ number of test-kit connections
- ■ number of trips in operating mode and in test mode.

Additional technical characteristics

Safety

Measurement functions are independent of the protection functions.
The high-accuracy measurement module operates independently of the protection module.

Simplicity and multi-language

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc.
Micrologic is also multi-language, including the following languages: English, Spanish, Portuguese, Russian, Chinese, French, German...

Intelligent measurement

Measurement-calculation mode:

- ■ energies are calculated on the basis of the instantaneous power values, in two manners:
  - □ the traditional mode where only positive (consumed) energies are considered
  - □ the signed mode where the positive (consumed) and negative (supplied) energies are considered separately
- ■ measurement functions implement the new "zero blind time" concept which consists in continuously measuring signals at a high sampling rate. The traditional "blind window" used to process samples no longer exists. This method ensures accurate energy calculations even for highly variable loads (welding machines, robots, etc.).

Always powered

All current-based protection functions require no auxiliary source. Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.

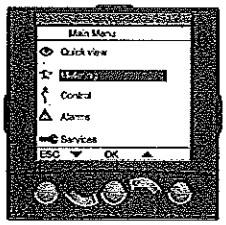
Stored information

The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

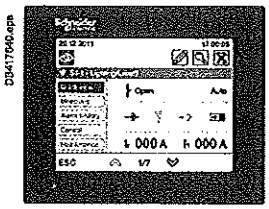
Power Meter functions

Micrologic A/E/P control unit with COM option (BCM ULP) and COM Ethernet gateway

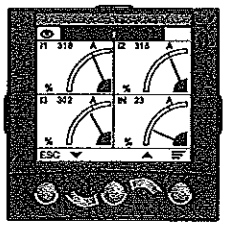
In addition to protection functions, Micrologic A/E/P control units offer all the functions of Power Meter products as well as operating-assistance for the circuit breaker.



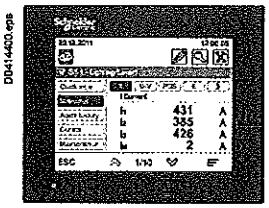
FDM121 display: navigation.



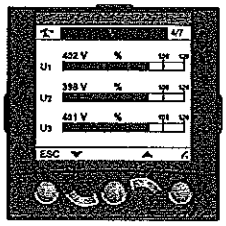
FDM128 display: navigation.



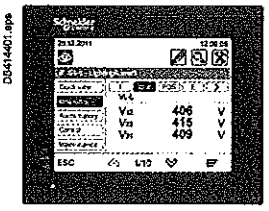
FDM121 display: current.



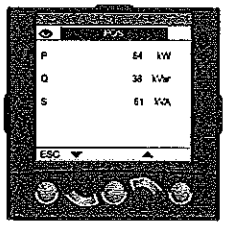
FDM128 display: current.



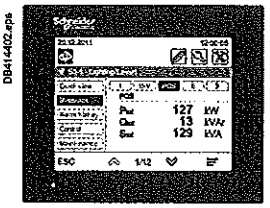
FDM121 display: voltage.



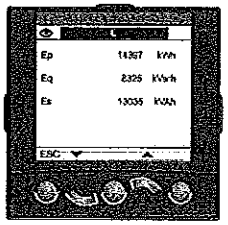
FDM128 display: voltage.



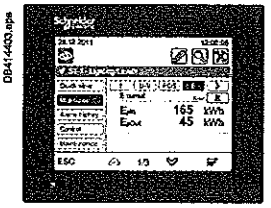
FDM121 display: power.



FDM128 display: power.



FDM121 display: consumption. Examples of measurement screens on the FDM121 display unit.



FDM128 display: consumption.

Micrologic A/E/P measurement functions are made possible by Micrologic intelligence and the accuracy of the sensors. They are handled by a microprocessor that operates independent of protection functions.

Display

FDM121 display unit (one to one)

The FDM121 switchboard display unit can be connected to a COM option (BCM ULP) using a breaker ULP cord to display all measurements on a screen (1). The result is a veritable 96 x 96 mm Power Meter.
The FMD121 display unit requires a 24 V DC power supply. The COM option (BCM ULP) unit is supplied by the same power supply via the breaker ULP cord connecting it to the FDM121.

(1) See page D-10.

FDM128 display unit (one to eight)

Using an IFE Ethernet interface for LV breakers.

For all FDM, in addition to the information displayed on the Micrologic LCD, the FDM screen shows demand, power quality and maximeter/minimeter values along with histories and maintenance indicators.

Measurements

Instantaneous rms measurements

The Micrologic continuously display the RMS value of the highest current of the three phases and neutral (Imax). The navigation buttons can be used to scroll through the main measurements.
In the event of a fault trip, the trip cause is displayed.
The Micrologic A measures phase, neutral, ground fault currents.
The Micrologic E offers voltage, power, Power Factor, measurements in addition to the measurements provided by Micrologic A.
The Micrologic P offer frequency, cos.φ in addition to the measurements provided by Micrologic E.

Maximeters / minimeters

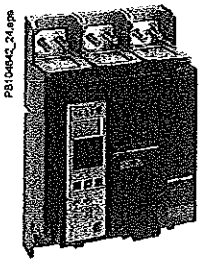
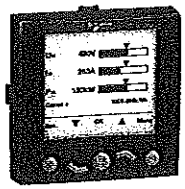
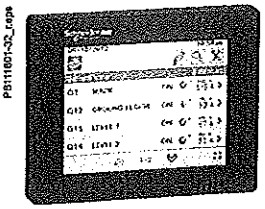
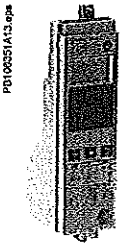
Every instantaneous measurement provided by Micrologic A or E can be associated with a maximeter/minimeter. The maximeters for the highest current of the 3 phases and neutral, the demand current and power can be reset via the FDM display unit or the communication system.

Energy metering

The Micrologic E/P also measures the energy consumed since the last reset of the meter. The active energy meter can be reset via Micrologic keypad or the FDM display unit or the communication system.

Demand and maximum demand values

Micrologic E/P also calculates demand current and power values. These calculations can be made using a block or sliding interval that can be set from 5 to 60 minutes in steps of 1 minute. The window can be synchronised with a signal sent via the communication system. Whatever the calculation method, the calculated values can be recovered on a PC via Modbus communication.
Ordinary spreadsheet software can be used to provide trend curves and forecasts based on this data. They will provide a basis for load shedding and reconnection operations used to adjust consumption to the subscribed power.

Micrologic A/E/P integrated Power Meter functions			Type		Display	
			A/E	P	Micrologic LCD	FDM display
Display of protection settings						
Pick-ups (A) and delays	All settings can be displayed	Ir, tr, Isd, tsd, Ii, Ig, tg	A/E	P	■	-
Measurements						
Instantaneous rms measurements						
Currents (A)	Phases and neutral	I1, I2, I3, IN	A/E	P	■	■
	Average of phases	Iavg = (I1 + I2 + I3) / 3	A/E	P	-	■
	Highest current of the 3 phases and neutral	Imax of I1, I2, I3, IN	A/E	P	■	■
	Ground fault (Micrologic 6)	% Ig (pick-up setting)	A/E	P	■	■
	Current unbalance between phases	% Iavg	- /E	P	-	■
Voltages (V)	Phase-to-phase	V12, V23, V31	- /E	P	■	■
	Phase-to-neutral	V1N, V2N, V3N	- /E	P	■	■
	Average of phase-to-phase voltages	Vavg = (V12 + V23 + V31) / 3	- /E	P	-	■
	Average of phase-to-neutral voltages	Vavg = (V1N + V2N + V3N) / 3	- /E	P	-	■
	Ph-Ph and Ph-N voltage unbalance	% Vavg and % Vavg	- /E	P	-	■
	Phase sequence	1-2-3, 1-3-2	- / -	P	■	■ *(3)*
Frequency (Hz)	Power system	f	- / -	P	■	■
Power	Active (kW)	P, total	- /E	P	■	■
		P, per phase	- /E	P	■ *(2)*	■
	Reactive (kVAR)	Q, total	- /E	P	■	■
		Q, per phase	- / -	P	■	■
	Apparent (kVA)	S, total	- /E	P	■	■
		S, per phase	- / -	P	■	■
	Power Factor	PF, total	- /E	P	■	■
		PF, per phase	- / -	P	■	■
	Cos.φ	Cos.φ, total	- / -	P	■	■
		Cos.φ, per phase	- / -	P	■	■
Maximeters / minimeters						
	Associated with instantaneous rms measurements	Reset via FDM display unit and Micrologic keypad	A/E	P	■	■
Energy metering						
Energy	Active (kW), reactive (kVARh), apparent (kVAh)	Total since last reset	- /E	P	■	■
Demand and maximum demand values						
Demand current (A)	Phases and neutral	Present value on the selected window	- /E	P	■	■
		Maximum demand since last reset	- /E	P	■ *(2)*	■
Demand power	Active (kWh), reactive (kVAR), apparent (kVA)	Present value on the selected window	- /E	P	■	■
		Maximum demand since last reset	- /E	P	■ *(2)*	■
Calculation window	Sliding, fixed or com-synchronised	Adjustable from 5 to 60 minutes in 1 minute steps (1)	- /E	P	-	-

(1) Available via the communication system only.
(2) Available for Micrologic P only.
(3) FDM121 only.

Operating-assistance functions
Micrologic A/E/P control unit with COM option (BCM ULP)

Histories
- Trip indications in clear text in a number of user-selectable languages.
- Time-stamping: date and time of trip.

Maintenance indicators
Micrologic control unit have indicators for, among others, the number of operating cycles, contact wear P, load profile and operating times (operating hours counter) of the Masterpact circuit breaker.
It is possible to assign an alarm to the operating cycle counter to plan maintenance.
The various indicators can be used together with the trip histories to analyse the level of stresses the device has been subjected to.

Management of installed devices
Each circuit breaker equipped with a COM option (BCM ULP) can be identified via the communication system:
- serial number
- firmware version
- hardware version
- device name assigned by the user.

This information together with the previously described indications provides a clear view of the installed devices.

Micrologic A/E/P operating assistance functions			Type		Display	
			A/E	P	Micrologic LCD	FDM121 display
Operating assistance						
Trip history						
Trips	Cause of tripping	Ir, Isd, Ii, Ig, IΔn	-/E	P	■	■
Maintenance indicators						
Counter	Mechanical cycles	Assignable to an alarm	A/E	P	-	■
	Electrical cycles	Assignable to an alarm	A/E	P	-	■
	Hours	Total operating time (hours) (1)	A/E	P	-	-
Indicator	Contact wear	%	-/-	P	-	■
Load profile	Hours at different load levels	% of hours in four current ranges: 0-49 % In, 50-79 % In, 80-89 % In and ≥ 90 % In	A/E	P	-	■

(1) Also available via the communication system.

Additional technical characteristics

Contact wear

Each time Compact opens, the Micrologic P trip unit measures the interrupted current and increments the contact-wear indicator as a function of the interrupted current, according to test results stored in memory. Breaking under normal load conditions results in a very slight increment. The indicator value may be read on the FDM121 display. It provides an estimation of contact wear calculated on the basis of the cumulative forces affecting the circuit breaker. When the indicator reaches 100 %, it is advised to inspect the circuit breaker to ensure the availability of the protected equipment.

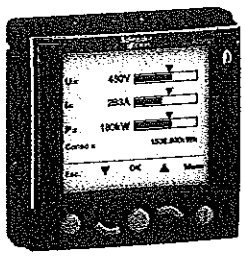
Circuit breaker load profile

Micrologic A/E/P calculates the load profile of the circuit breaker protecting a load circuit. The profile indicates the percentage of the total operating time at four current levels (% of breaker In):
- *0 to 49 % In*
- *50 to 79 % In*
- *80 to 89 % In*
- *≥ 90 % In.*

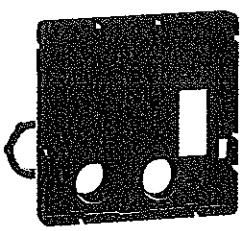
This information can be used to optimise use of the protected equipment or to plan ahead for extensions.

Switchboard-display functions
Micrologic A/E/P control unit with COM option (BCM ULP)

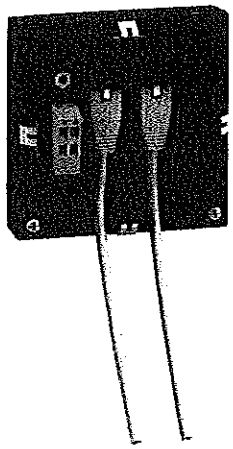
Micrologic measurement capabilities come into full play with the FDM121 switchboard display. It connects to COM option (BCM ULP) via a breaker ULP cord and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.



FDM121 display.



Surface mount accessory.



Connection with FDM121 display unit.

FDM121 switchboard display

An FDM121 switchboard display unit can be connected to a ULP IMU using a prefabricated cord to display all measurements, alarms, histories and event tables, maintenance indicators, management of installed devices on a screen. The result is a veritable 96 x 96 mm Power Meter.
The FMD121 display unit requires a 24 V DC power supply.
The FDM121 is a switchboard display unit that can be integrated in the Compact NSX100 to 630 A, Powerpact H/J/L/P/R, Compact NS or Masterpact systems. It uses the sensors and processing capacity of the Micrologic trip unit. It is easy to use and requires no special software or settings. It is immediately operational when connected to the Compact NSX by a simple cord.
Also, it provides monitoring and control with the use of the I/O application module, the motor mecanism module, or the Breaker Status module.
The FDM121 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and alarms

The FDM121 is intended to display Micrologic 5 / 6 measurements, alarms and operating information. It cannot be used to modify the protection settings.
Measurements may be easily accessed via a menu. All user-defined alarms are automatically displayed. The display mode depends on the priority level selected during alarm set-up:
- high priority: a pop-up window displays the time-stamped description of the alarm and the orange LED flashes
- medium priority: the orange "Alarm" LED goes steady on
- low priority: no display on the screen.

All faults resulting in a trip automatically produce a high-priority alarm, without any special settings required. In all cases, the alarm history is updated. Micrologic saves the information in its non-volatile memory in the event of an FDM121 power failure.

Status indications and remote control

When the circuit breaker is equipped with the Breaker Status Module, the FDM121 display can also be used to view circuit breaker status conditions:
- O/F: ON/OFF
- SD: trip indication
- SDE: Fault-trip indication (overload, short-circuit, ground fault).

When the circuit breaker system is equipped with the I/O application module, the FDM121 can monitor and control:
- craddle management
- circuit breaker operation
- light and load control
- custom application.

When the circuit breaker system is equipped with the motor mechanism module, the FDM121 offers remote closing and opening control.

Main characteristics

- 96 x 96 x 30 mm screen requiring 10 mm behind the door (or 20 mm when the 24 V power supply connector is used).
- White backlighting.
- Wide viewing angle: vertical ±60°, horizontal ±30°.
- High resolution: excellent reading of graphic symbols.
- Alarm LED: flashing orange for alarm pick-up, steady orange after operator reset if alarm condition persists.
- Operating temperature range -10 °C to +55 °C.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V -20 % (19.2 V) to 24 V +10 % (26.4 V).

When the FDM121 is connected to the communication network, the 24 V DC can be supplied by the communication system wiring system.
- Consumption 40 mA.

Mounting

The FDM121 is easily installed in a switchboard.
- Standard door cut-out 92 x 92 mm.
- Attached using clips.

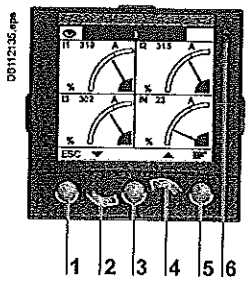
To avoid a cut-out in the door, an accessory is available for surface mounting by drilling only two 22 mm diameter holes.
The FDM121 degree of protection is IP54 in front. IP54 is maintained after switchboard mounting by using the supplied gasket during installation.

Connection

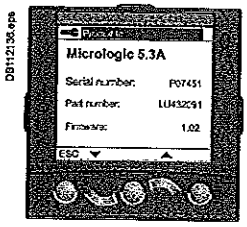
The FDM121 is equipped with:
- a 24 V DC terminal block:
  - plug-in type with 2 wire inputs per point for easy daisy-chaining
  - power supply range of 24 V DC -20 % (19.2 V) to 24 V DC +10 % (26.4 V).

A 24 V DC type auxiliary power supply must be connected to a single point on the ULP system. The FDM121 display unit has a 2-point screw connector on the rear panel of the module for this purpose. The ULP module to which the auxiliary power supply is connected distributes the supply via the ULP cable to all the ULP modules connected to the system and therefore also to Micrologic.

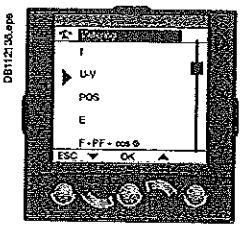
Switchboard-display functions
Micrologic A/E/P control unit with COM option (BCM ULP)



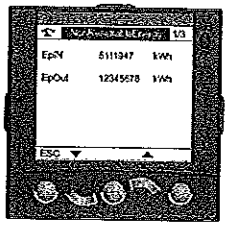
1 Escape
2 Down
3 OK
4 Up
5 Context
6 Alarm LED



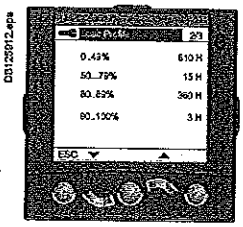
Product identification.



Metering: sub-menu.



Metering: meter.



Services.

■ two RJ45 jacks.
The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord. Connection to one of the RJ45 connectors on the FDM121 automatically establishes communication between the Micrologic and the FDM121 and supplies power to the Micrologic measurement functions.
When the second connector is not used, it must be fitted with a line terminator.

Navigation
Five buttons are used for intuitive and fast navigation.
The "Context" button may be used to select the type of display (digital, bargraph, analogue).
The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

Screens
Main menu
When powered up, the FDM121 screen automatically displays the ON/OFF status of the device.

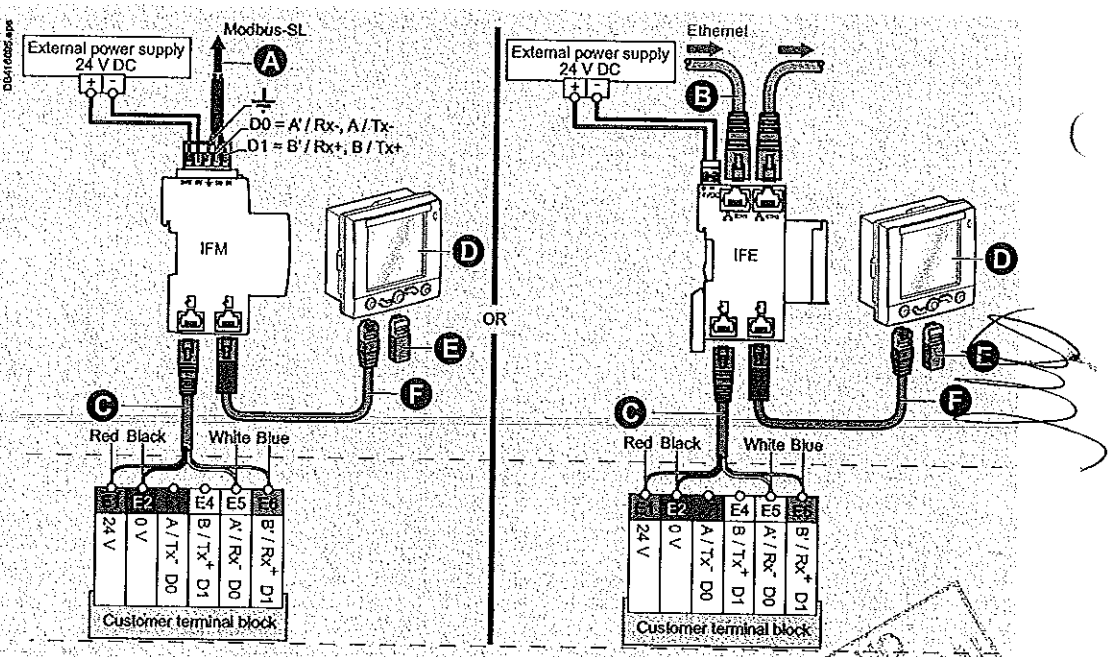
Quick view
Alarms
Metering
Services.
Control

When not in use, the screen is not backlit. Backlighting can be activated by pressing one of the buttons. It goes off after 3 minutes.

Fast access to essential information
■ "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

Access to detailed information
■ "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.
■ Alarms displays active alarms and the alarm history.
■ Services provides access to the operation counters, energy and maximeter reset
■ function, maintenance indicators, identification of modules connected to the internal bus and FDM121 internal settings (language, contrast, etc.).

Communication components and FDM121 connections



Connections
■ *Compact NS is connected to the ULP devices (FDM121 display, IFM, IFE or I/O application module) unit via the breaker ULP cord.*
□ *cord available in three lengths: 0.35 m, 1.3 m and 3 m.*
□ *lengths up to 10 m possible using extensions.*

Ⓐ *Modbus network*
Ⓑ *Ethernet network*
Ⓒ *Breaker ULP cord*
Ⓓ *FDM121 display*
Ⓔ *ULP termination*
Ⓕ *ULP cable*

Switchboard-display functions
Micrologic A/E/P control unit with COM Ethernet gateway

Micrologic measurement capabilities come into full play with the FDM128 switchboard display. It connects to Ethernet communication via RJ45 port and displays Micrologic information. The result is a true integrated unit combining a circuit breaker and a Power Meter. Additional operating assistance functions can also be displayed.

FDM128 switchboard display

The FDM128 switchboard display unit can be connected to a Micrologic COM option (BCM ULP via IFE). It uses the sensors and processing capacity of the Micrologic control unit. It is easy to use and requires no special software or settings.
The FDM128 is a large display, but requires very little depth. The anti-glare graphic screen is backlit for very easy reading even under poor ambient lighting and at sharp angles.

Display of Micrologic measurements and trips

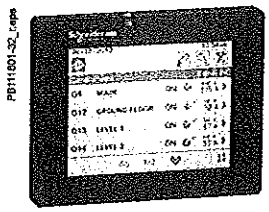
The FDM128 is intended to display Micrologic A/E/P measurements, trips and operating information. It cannot be used to modify the protection settings.
Measurements may be easily accessed via a menu.
Trips are automatically displayed.
A pop-up window displays the time-stamped description of the trip.

Status indications

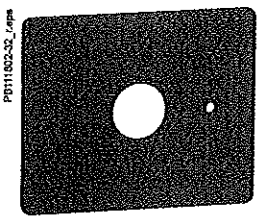
When the circuit breaker is equipped with the COM option (BCM ULP) (including its set of sensors) the FDM128 display can also be used to view circuit breaker status conditions:
- O/F: ON/OFF
- SDE: Fault-trip indication (overload, short-circuit, ground fault)
- PF: ready to close
- CH: charged (spring loaded).
- CE, CD, CT cradle management with I/O application module.

Remote control

When the circuit breaker is equipped with the COM option (BCM ULP) (including its kit for connection to XF and MX1 communication voltage releases), the FDM128 display can also be used to control (open/close) the circuit breaker.
Two operating mode are available:
- local mode : open/close commands are enabled from FDM128 while disable from communication network
- remote mode : open/close commands are disabled from FDM128 while, enabled from communication network.



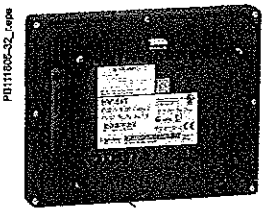
FDM128 display.



Surface mount accessory.

Main characteristics

- 115.2 x 86.4 mm with 5.7" QVGA display 320 x 240 pixels.
- Color TFT LCD, LED backlight.
- Wide viewing angle: vertical ±80°, horizontal ±70°.
- High resolution: excellent reading of graphic symbols.
- Operating temperature range -10 °C to +55 °C.
- CE / UL / CSA marking (pending).
- 24 V DC power supply, with tolerances 24 V (limit 20.4 - 28.8 V DC).
- Consumption ≤ 6.8 W.



Mounting

The FDM128 is easily installed in a switchboard.
- Standard door hole Ø 22 mm.

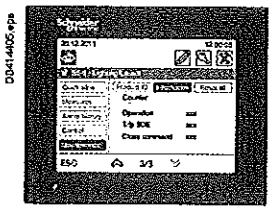
The FDM128 degree of protection is IP65 in front and IP54.

Connection

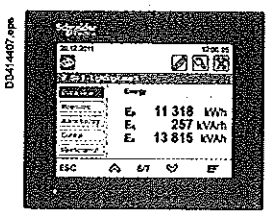
The FDM128 is equipped with:
- a 24 V DC terminal block:
  - power supply range of 24 V DC (limit 20.4 - 28.8 V DC). The FDM128 display unit has a 2-point screw connector on the rear panel of the module for this purpose.
- One RJ45 Ethernet jacks.

The Micrologic connects to the internal communication terminal block on the Masterpact via the breaker ULP cord and Ethernet connection through IFE.

Switchboard-display functions
Micrologic A/E/P control unit with COM Ethernet gateway


DD414405.eps

Product identification.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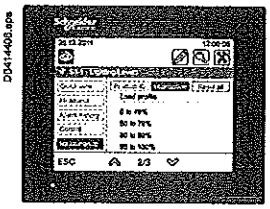
Metering: meter.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Services.

Navigation
Touch screen is used for intuitive and fast navigation.
The user can select the display language (Chinese, English, French, German, Italian, Portuguese, Spanish, etc.).

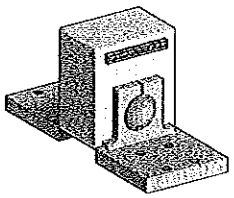
Screens
Main menu

- Quick view
- Alarms
- Metering
- Maintenance.
- Control

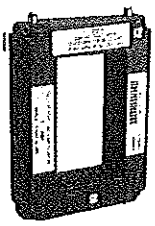
When not in use, the screen is automatically shifted to low back-lighting.

Fast access to essential information
- "Quick view" provides access to five screens that display a summary of essential operating information (I, U, f, P, E, THD, circuit breaker On / Off).

Access to detailed information
- "Metering" can be used to display the measurement data (I, U-V, f, P, Q, S, E, THD, PF) with the corresponding min/max values.
- Alarms displays the trip history.
- Services provides access to the operation counters, energy and maximeter reset function, maintenance indicators, identification of modules connected to the internal bus and FDM128 internal settings (language, contrast, etc.).



External sensor (CT).



External sensor for source ground return protection.

External sensors

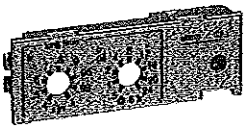
External sensor for earth-fault and neutral protection
The sensors, used with the 3P circuit breakers, are installed on the neutral conductor for:
- neutral protection (with Micrologic P)
- residual type earth-fault protection (with Micrologic A, E and P).

The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:
- NS630b to 1600 A - 400/1600 CT
- NS1600b to 3200 A - 1000/4000 CT.

Rectangular sensor for earth-leakage protection
The sensor is installed around the busbars (phases + neutral) to detect the zero-phase sequence current required for the earth-leakage protection. Rectangular sensors are available in two sizes.
Inside dimensions (mm)
- 280 x 115 up to 1600 A for Compact NS630b to 1600 A
- 470 x 160 up to 3200 A for Compact NS1600b to 3200 A.

External sensor for source ground return protection
The sensor is installed around the connection of the transformer neutral point to earth and connects to the Micrologic 6.0 control unit via an MDGF module to provide the source ground return (SGR) protection.

Long-time rating plug



Long-time rating plug.

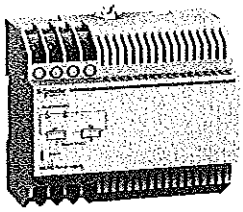
Four interchangeable plugs may be used to limit the long-time threshold setting range for higher accuracy.
The time delay settings indicated on the plugs are for an overload of 6 Ir (for further details, see the characteristics on page A-13 and page A-17).

As standard, control units are equipped with the 0.4 to 1 plug.

Setting ranges										
Standard	Ir = In x...	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Low-setting option	Ir = In x...	0.4	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.8
High-setting option	Ir = In x...	0.80	0.82	0.85	0.88	0.90	0.92	0.95	0.98	1
Off plug		No long-time protection (Ir = In for Isd setting)								

Important: long-time rating plugs must always be removed before carrying out insulation or dielectric withstand tests.

External 24 V DC power-supply module

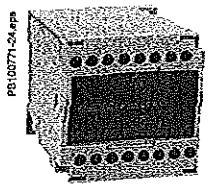


External 24 V DC power power supply module.

The external power-supply module makes it possible to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the "electrical diagrams" part of this catalogue).
This module powers both the control unit (100 mA) and M6C programmable contacts (100 mA).
If the COM communication option is used, the communication bus requires 24 V DC power supply. With the Micrologic A/E control unit, this module makes it possible to display currents of less than 20 % of In.
With the Micrologic P, it can be used to display fault currents after tripping.

Characteristics
- Power supply:
  - 110/130, 200/240, 380/415 V AC (+10 % -15 %)
  - 24/30, 48/60, 100/125 V DC (+20 % -20 %).
- Output voltage: 24 V DC ±5 %, 1 A.
- Ripple < 1 %.
- Dielectric withstand : 3.5 kV rms between input/output, for 1 minute.
- Overvoltage category: as per IEC 60947-1 cat. 4.

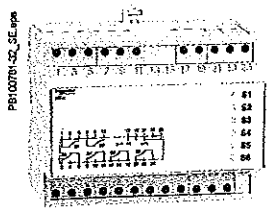
Protection of distribution systems
Micrologic control units for Compact NS630b to 3200



Battery module.

Battery module
The battery module maintains display operation and communication with the supervisor if the power supply to the Micrologic control unit is interrupted.
It is installed in series between the Micrologic control unit and the AD module.

Characteristics
- Battery run-time: 4 hours (approximately).
- Mounted on vertical backplate or symmetrical rail.

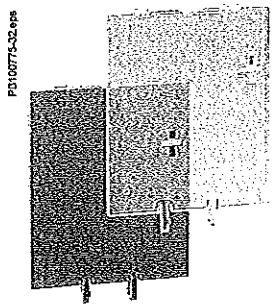


M6C.

M6C programmable contacts
These contacts are optional equipment for the Micrologic P control units.
They are described with the indication contacts for the circuit breakers.

Micrologic Characteristics			Type P M6C
Minimum load			100 mA/24 V
Breaking capacity (A) p.f.: 0.7	VAC	240	5
		380	3
	VDC	24	1.8
		48	1.5
		125	0.4
		250	0.15

M6C: external 24 V DC power supply required (consumption 100 mA).



Lead-seal cover.

Spare parts
Lead-seal covers
A lead-seal cover controls access to the adjustment dials.
When the cover is closed:
- it is impossible to modify settings using the keypad unless the settings lockout pin on the cover is removed
- the test connector remains accessible
- the test button for the earth-fault and earth-leakage protection function remains accessible.

Characteristics
- Transparent cover for basic Micrologic and Micrologic A, E control units.
- Non-transparent cover for Micrologic P control units.

Spare battery
A battery supplies power to the LEDs identifying the tripping causes. Battery service life is approximately ten years.
A test button on the front of the control unit is used to check the battery condition.
The battery may be replaced on site when discharged.

Portable test kit.

Test equipment

Hand-held test kit

The hand-held mini test kit may be used to:

- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit breaker is open (Micrologic P control units).

Power source: standard LR6-AA battery.

Full function test kit

The test kit can be used alone or with a supporting personal computer.

The test kit without PC may be used to check:

- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
  - display of settings
  - automatic and manual tests on protection functions
  - test on the zone-selective interlocking (ZSI) function
  - inhibition of the earth-fault protection
  - inhibition of the thermal memory.

The test kit with PC offers in addition:

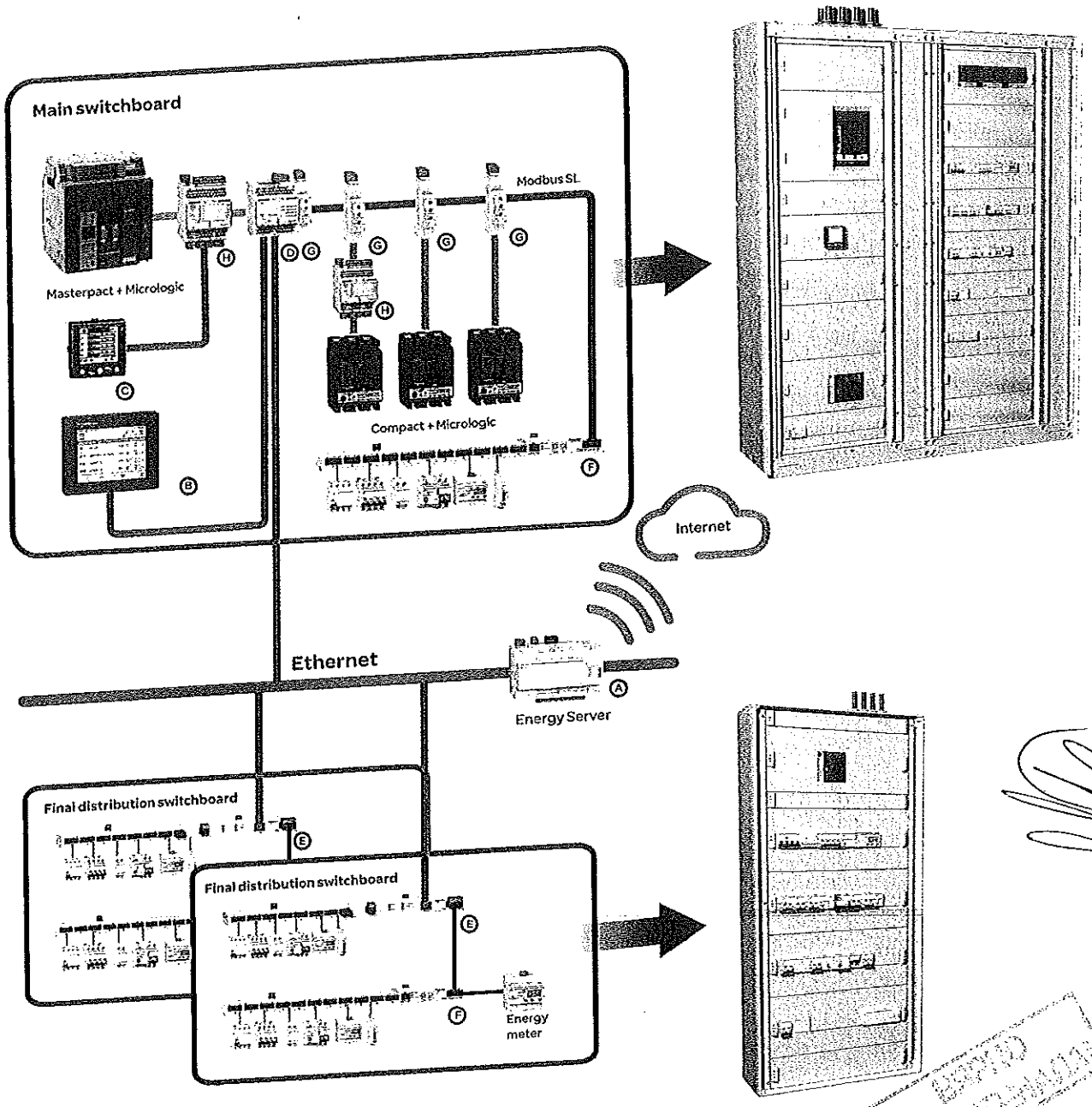
- the test report (software available on request).

Enerlin'X communication system
Products overview

Enerlin'X communication system provides access to status, electrical values and devices control using Ethernet and Modbus SL communication protocols.

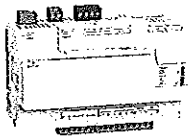
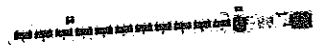
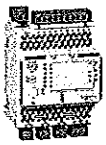
Ethernet has become the universal link between switchboards, computers and communication devices inside the building. The large amount of information which can be transferred makes the connection of Enerlin'X digital system to hosted web services of Schneider Electric a reality. More advantages are offered to integrators thanks to configuration web pages available remotely or on the local Ethernet network.

Modbus SL is the most widely used communication protocol in industrial networks. It operates in master-slave mode. The devices (slaves) communicate one after the other with a gateway (master).

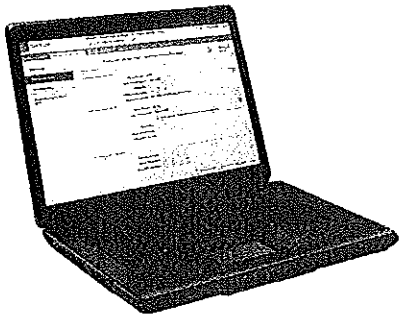


ULP is a fast communication link dedicated to circuit breaker monitoring and control.

EnerlinX communication devices and displays

		Name	Function	Port (to device)	Port (to server)	Bin. Input	Analog Input	Bin. Output	Cial. Ref.
Ⓐ		Com'X 200	Energy Server with Ethernet Gateway (1) function	Modbus Master	Ethernet cable + WiFi	6	2	-	EBX200
Ⓑ		FDM128	Ethernet LCD colour touch screen	-	Ethernet	-	-	-	LV434128
Ⓒ		FDM121	LCD display for circuit breaker	ULP	-	-	-	-	TRV00121
Ⓓ		IFE interface + gateway	Ethernet interface (2) & Gateway	Modbus Master & ULP	Ethernet	-	-	-	LV434011
		IFE interface	Ethernet interface for circuit breakers	ULP	Ethernet	-	-	-	LV434010
Ⓔ		Acti 9 Smartlink Ethernet	Ethernet interface with Input/Output functions & Gateway	Modbus Master	Ethernet	14	2	7	A9XMEA08
Ⓕ		Acti 9 Smartlink Modbus	Modbus interface with Input/Output functions	-	Modbus Slave	22	-	11	A9XMSB11
Ⓖ		IFM	Modbus interface for circuit breaker	ULP	Modbus Slave	-	-	-	TRV00210
Ⓗ		I/O	Input/Output application module for circuit breaker	ULP	ULP	6	-	3	LV434063

(1) Gateway: transfers data from a network to another (ie.: Modbus to Ethernet).
(2) Interface: transfers data from an equipment to a network.(ie.: ULP to Modbus).



Plug and play commissioning tools give a real peace of mind to panel builders as their panels can be functionally checked before delivery.

Commissioning / maintenance tools

Web pages embedded into Com'X 200 and Acti 9 Smartlink Ethernet gateways

Access with a standard PC and common browser:
- commissioning,
- communication diagnosis,
- functional tests...

Electrical Asset Manager

Loaded into a standard PC Error free commissioning. Time saving, easier management and maintenance thanks to the advanced services:
- project management,
- configuration of controllers, gateways, ...
- test of communication networks, diagnostic report.

Communication
Communication wiring system

Wiring system ULP
The wiring system is designed for low-voltage power switchboards. Installation requires no tools or special skills.
The prefabricated wiring ensures both data transmission (Modbus protocol) and 24 V DC power distribution for the communications modules on the Micrologic control units.

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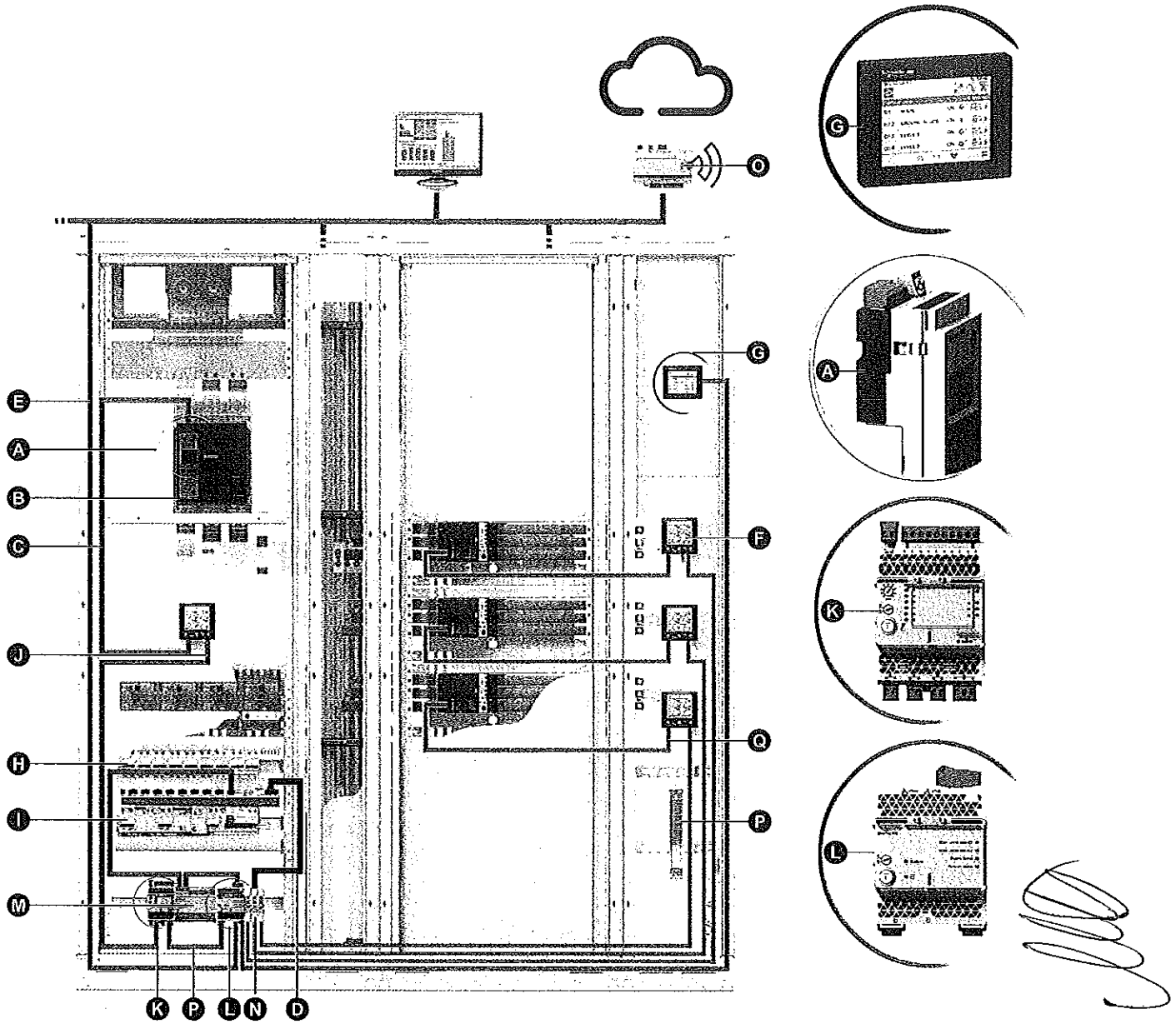
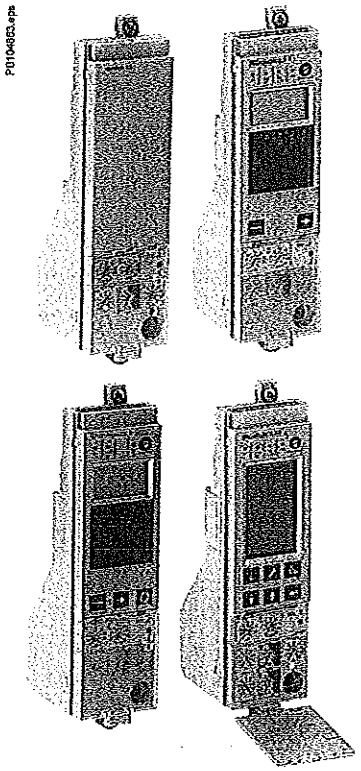


A BCM ULP: Breaker Communication Module with ULP port		
B Micrologic control unit		
C Breaker ULP cord	0.35 m	LV434195
	1.3 m	LV434196
	3 m	LV434197
D Modbus cable		
E Ethernet cable		
F FDM121: Front Display Module		TRV00121
G FDM128: Front Display Module		LV434128
H Smart Link		A9XMSB11
I Acti9		
J ULP line terminators		TRV00880
K I/O (Input/Output) application module		LV434063
L IFE: Ethernet interface		LV434010 or LV434011
M External 24 V DC power supply module		
N IFM: Modbus-SL interface		TRV00210
O Com'X 200		
P ULP cable	0.3 m	TRV00803
	0.6 m	TRV00806
	1 m	TRV00810
	2 m	TRV00820
	3 m	TRV00830
	5 m	TRV00850
Q NSX cord	0.35 m	LV434200
	1.3 m	LV434201
	3 m	LV434202

Ethernet
Modbus
ULP
24 V DC



S: Micrologic without measurement.
A: Micrologic with ammeter
E: Micrologic "Energy"
P: Micrologic "Power"

Note: see the description of the Micrologic control units for further details on protection and alarms, measurements, waveform capture, histories, logs and maintenance indicators.

Four functional levels
The Compact can be integrated into a Modbus communication environment. There are four possible functional levels that can be combined.

	Switch-disconnectors	Circuit breaker			
Status indications					
ON/OFF (O/F)	■	S	A	E	P
Spring charged CH	■	S	A	E	P
Ready to close	■	S	A	E	P
Fault-trip SDE	■	S	A	E	P
Connected / disconnected / test position CE/CD/CT (CCM only)	■	S	A	E	P
Controls					
MX1 open	■	S	A	E	P
XF close	■	S	A	E	P
Measurements					
Instantaneous measurement information	■		A	E	P
Averaged measurement information	■			E	P
Maximeter / minimeter	■		A	E	P
Energy metering	■			E	P
Demand for current and power	■			E	P
Power quality	■				
Operating assistance					
Protection and alarm settings					P
Histories				E	P
Time stamped event tables					P
Maintenance indicators			A	E	P

Communication Modbus bus

The Modbus RS 485 (RTU protocol) system is an open bus on which communicating Modbus devices (Compact NS with Modbus COM, Power Meter PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.) are installed. All types of PLCs and microcomputers may be connected to the bus.

Addresses
The Modbus communication parameters (address, baud rate, parity) are entered using the keypad on the Micrologic A, E, P. For a switch-disconnector, it is necessary to use the RSU (Remote Setting Utility) Micrologic utility.

Modbus addresses		
@xx	Circuit breaker manager	(1 to 47)
@xx + 50	Chassis manager	(51 to 97)
@xx + 200	Measurement manager	(201 to 247)
@xx + 100	Protection manager	(101 to 147)

The manager addresses are automatically derived from the circuit breaker address @xx entered via the Micrologic control unit (the default address is 47).

Number of devices
The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Compact with Modbus COM, PM700, PM800, Sepam, Vigilohm, Compact NSX, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS 485 physical layer offers up to 32 connection points on the bus (1 master, 31 slaves).
A fixed device requires only one connection point (communication module on the device). A drawout device uses two connection points (communication modules on the device and on the chassis).
The number must never exceed 31 fixed devices or 15 drawout devices.

Length of bus
The maximum recommended length for the Modbus bus is 1200 meters.

Bus power source
A 24 V DC power supply is required (less than 20 % ripple, insulation class II).

Communication
COM option in Compact

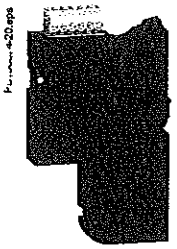
All the Compact devices can be fitted with the communication function thanks to the COM option. Compact uses the Ethernet or Modbus communications protocol for full compatibility with the supervision management systems.
Eco COM is limited to the transmission of metering data. It is not used to communicate status and controls.

For fixed devices, the COM option is made up of:
- a BCM ULP module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro switches) its kit for connection to XF and MX1 communicating voltage releases and its COM terminal block (inputs E1 to E6)
- IFM, this module required for connection to the network, contains the Modbus address (1 to 99) declared by the user via the two dials in front. It automatically adapts (baud rate, parity) to the Modbus network in which it is installed.

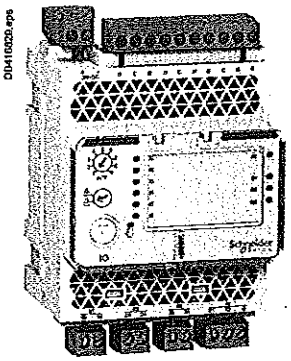
Or
- IFE, the Ethernet interface for LV circuit breaker enables an intelligent modular unit (IMU), for example a Compact NS circuit breaker to be connected to an Ethernet network. Each circuit breaker has its own IFE and a corresponding IP address.

For drawout devices, the COM option is made up of:
- a BCM ULP module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro switches) its kit for connection to XF and MX1 communicating voltage releases and its COM terminal block (inputs E1 to E6).
- IFM, this module required for connection to the network, contains the Modbus address (1 to 99) declared by the user via the two dials in front. It automatically adapts (baud rate, parity) to the Modbus network in which it is installed.

Or
- IFE, the Ethernet interface for LV circuit breaker enables an intelligent modular unit (IMU), for example a Compact NS circuit breaker to be connected to an Ethernet network. Each circuit breaker has its own IFE and a corresponding IP address.
- I/O (Input/Output) application module for LV breaker, the I/O application module is delivered with withdrawable devices ordered with the COM option, for cradle management. It must be installed on a DIN rail near the device. It must be connected to the ULP system and to the position contacts (CD, CT, CE) that transmit the position of the device in the cradle.



BCM ULP.



I/O application module.

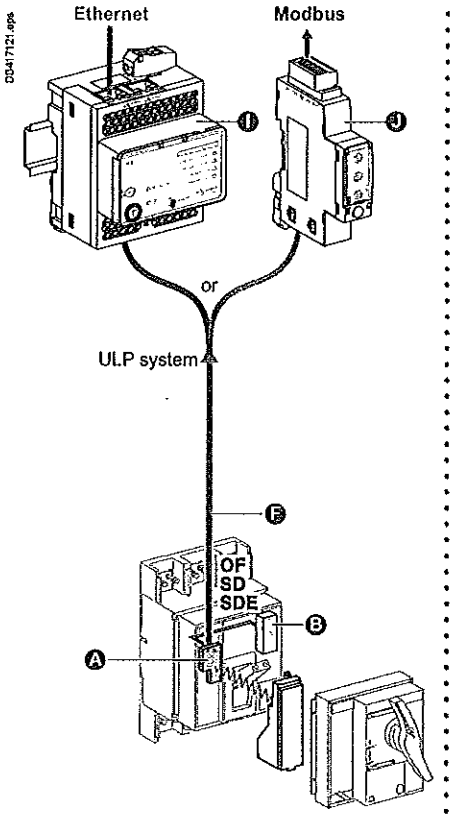
BCM ULP module
This module is independent of the control unit. It receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.
Consumption: 30 mA, 24 V.

XF and MX1 communicating voltage releases
The XF and MX1 communicating voltage releases are equipped for connection to the "device" communication module.
The remote-tripping function (MX2 or MN) are independent of the communication option. They are not equipped for connection to the "device" communication module.

Communication architecture

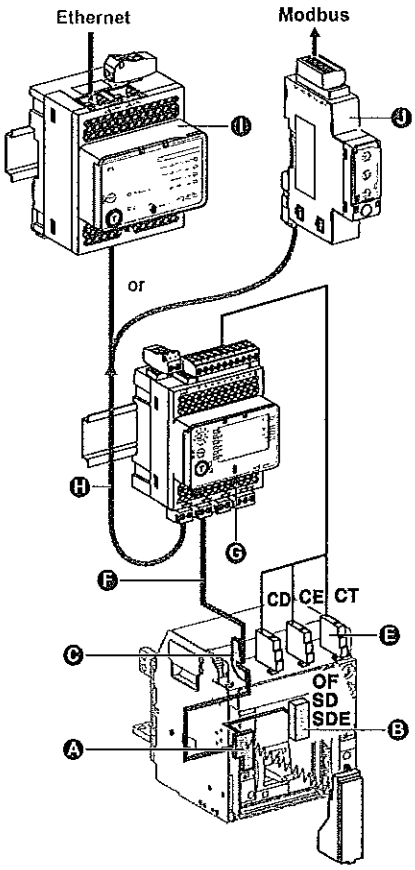
Electrical operated

Fixed device

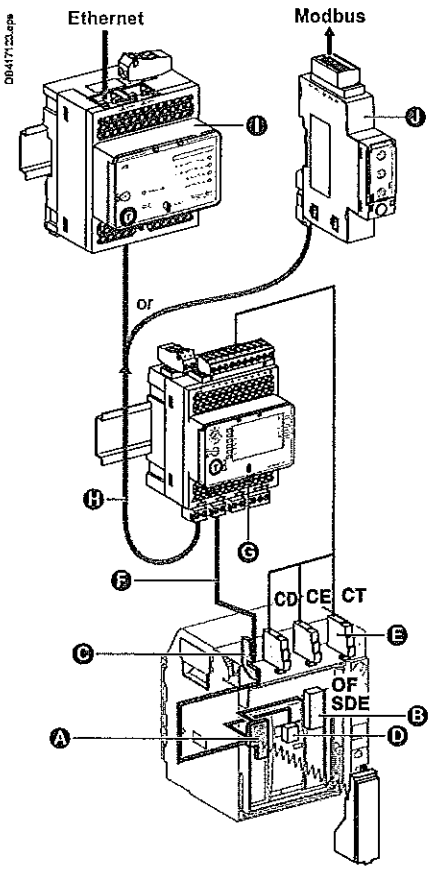


Manually operated fixed device

Drawout devices



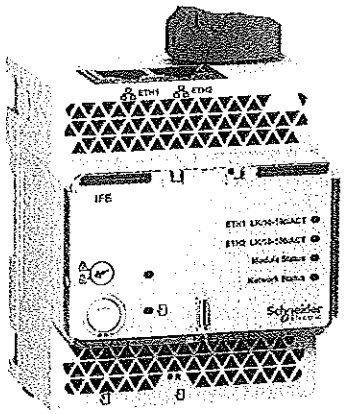
Manually operated withdrawable device



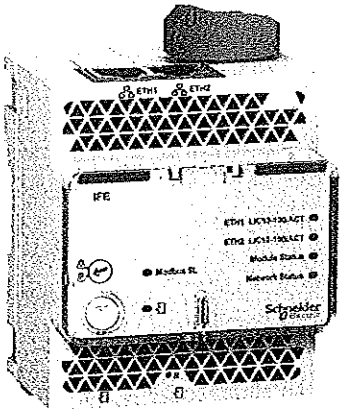
Electrically operated withdrawable device

- Ⓐ BCM ULP
- Ⓑ OF, SDE ... microswitches
- Ⓒ COM terminal block (E1 to E6)
- Ⓓ MX1 and XF communicating voltage releases
- Ⓔ CE, CD and CT contacts
- Ⓕ Breaker ULP cord
- Ⓖ I/O application module
- Ⓗ ULP cable
- Ⓘ IFE module
- Ⓙ IFM module

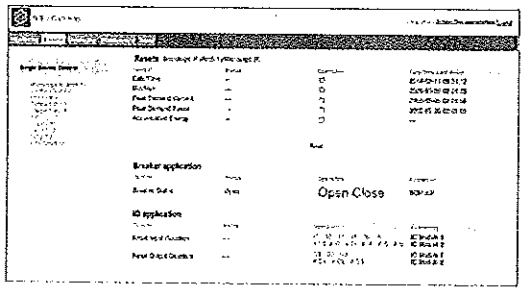
IFE Ethernet interface



IFE interface, ref.: LV434010



IFE interface + gateway, ref.: LV434011



IFE interface, IFE interface + gateway description

Introduction

The IFE interface and IFE interface + gateway enable LV circuit breakers as Masterpact NT/NW, Compact NSX or Powerpact to be connected to an Ethernet network.

IFE interface: ref. LV434010

Provides an Ethernet access to a single LV circuit breaker.

Function

Interface - one circuit breaker is connected to the IFE interface via its ULP port.

IFE interface + gateway: ref. LV434011

Provides an Ethernet access to one or several LV circuit breakers.

Functions

- Interface - one circuit breaker is connected to the IFE interface via its ULP port.
- Gateway: several circuit breakers on a Modbus network are connected via the IFE interface + gateway master Modbus port.

IFE interface, IFE interface + gateway features

- Dual 10/100 Mbps Ethernet port for simple daisy chain connection.
- Device profile web service for discovery of the IFE interface, IFE interface + gateway on the LAN.
- ULP compliant for localization of the IFE interface in the switchboard.
- Ethernet interface for Compact, Masterpact and Powerpact circuit breakers.
- Gateway for Modbus-SL connected devices (IFE interface + gateway only).
- Embedded set-up web pages.
- Embedded monitoring web pages.
- Embedded control web pages.
- Built-in e-mail alarm notification.

Mounting

The IFE interface, IFE interface + gateway are DIN rail mounting devices. A stacking accessory enables the user to connect several IFMs (ULP to Modbus interfaces) to an IFE interface + gateway without additional wiring.

24 V DC power supply

The IFE interface, IFE interface + gateway must always be supplied with 24 V DC. The IFMs stacked to an IFE interface + gateway are supplied by the IFE interface + gateway, thus it is not necessary to supply them separately. It is recommended to use an UL listed and recognized limited voltage/limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE interface, IFE interface + gateway firmware update

The firmware can be updated using:

- FTP
- customer engineering tool.

Required circuit breaker communication modules

The connection to IFE interface or IFE interface + gateway requires a communication module embedded into the circuit breaker:

- Compact NS: BCM ULP communication module.
- Withdrawable Compact NS: BCM ULP and its respective I/O (Input/Output) application module. All connection configurations for Compact NS require the breaker ULP cord. The insulated NSX cord is mandatory for system voltages greater than 480 V AC. When the second ULP RJ45 connector is not used, it must be closed with an ULP terminator (TRV00880).

Network communication interface

Characteristic		Value
Type of interface module		Modbus RTU, RS485 serial connection Modbus TCP/IP Ethernet
Transmission	Modbus RS485	Transfer rate: 9,600...19,200 Baud Medium Double shielded twisted pair Impedance 120 Ω
	Ethernet	Transfer rate : 10/100 Mbps Medium STP, Cat5e, straight cable
Structure	Type	Modbus, Ethernet
	Method	Master/Slave
Device type	Modbus	Master
	Ethernet	Server
Turnaround time	Modbus	10 ms
	Ethernet	1 ms
Maximum length of cable	Modbus	1000 m
	Ethernet	100 m
Type of bus connector	Modbus	4-pin connector
	Ethernet	RJ45 (Shielded)

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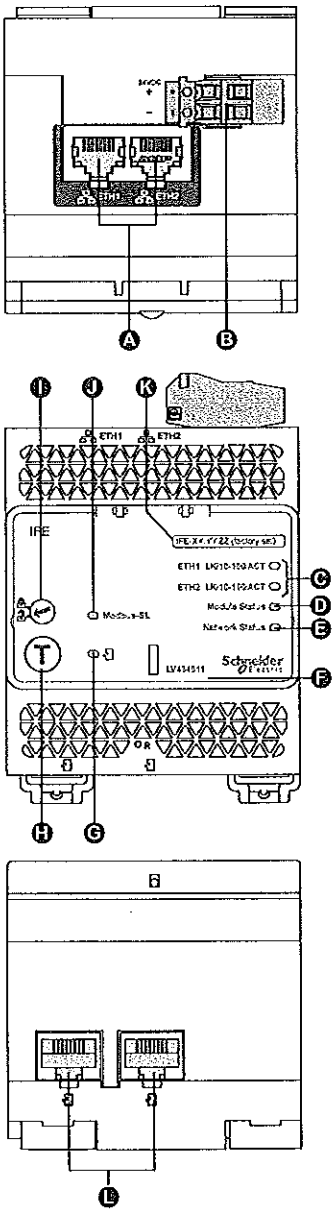


- **A** *Ethernet 1 and Ethernet 2 communication port.*
- **B** *24 V DC power supply terminal block.*
- **C** *Ethernet communication LEDs:*
  - *yellow: 10 Mb*
  - *green: 100 Mb.*
- **D** *Module status LED:*
  - *steady off: no power*
  - *steady green: device operational*
  - *steady red: major fault*
  - *flashing green: standby*
  - *flashing red: minor fault*
  - *flashing green/red: self-test.*
- **E** *Network status LED:*
  - *steady off: not power/no valid IP address*
  - *steady green: connected, valid IP address*
  - *steady orange: default IP address*
  - *steady red: duplicated IP address*
  - *flashing green/red: Self-test.*
- **F** *Sealable transparent cover.*
- **G** *ULP status LED.*
- **H** *Test button (accessible closed cover).*
- **I** *Locking pad.*
- **J** *Modbus traffic status LED (LV434011 only).*
- **K** *Device name label.*
- **L** *ULP ports.*

General characteristics

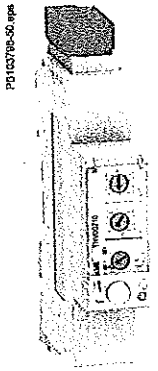
Environmental characteristics	
Conforming to standards	UL 508, UL 60950, IEC 60950, 60947-6-2
Certification	cUIUs, GOST, FCC, CE
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Relative humidity	5–85 %
Level of pollution	Level 3
Flame resistance	ULV0
Mechanical characteristics	
Shock resistance	1000 m/s2
Resistance to sinusoidal vibrations	-5 Hz < f < 8.4 Hz
Electrical characteristics	
Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	120 mA at 24 V input
Physical characteristics	
Dimensions	72 x 105 x 71 mm (2.83 x 4.13 x 2.79 in.)
Mounting	DIN rail
Weight	182.5 g (0.41 lb)
Degree of protection of the installed IO	■ On the front panel (wall mounted enclosure): IP4x ■ Connectors: IP2x ■ Other parts: IP3x
Connections	Screw type terminal blocks
Technical characteristics - 24 V DC power supply	
Power supply type	Regulated switch type
Rated power	72 W
Input voltage	100–120 VAC for single phase 200–500 VAC phase-to-phase
PFC filter	With IEC 61000-3-2
Output voltage	24 V DC
Power supply out current	3 A

Note: it is recommended to use an UL listed/UL listed recognized limited voltage/Limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

IFE web page description

Monitoring web page	
Real time data 67	■
Device logging	■
Control web page	
Single device control	■
Diagnostics web page	
Statistics	■
Device information	■
IMU information	■
Read device registers	■
Communication check	■
Maitenance web page	
Maintenance log	■
Maintenance counters	■
Setup web page	
Device localization/name	■
Ethernet configuration (dual port)	■
IP configuration	■
Modbus TCP/IP filtering	■
Serial port	■
Date and time	■
E-mail server configuration	■
Alarms to be e-mailed	■
Device list	■
Device logging	■
Device log export	■
SNMP parameters	■
Documentation links	■
Preferences	■
Advanced services control	■
User accounts	■
Web page access	■

IFM Modbus communication interface



IFM Modbus communication interface.
Ref.: TRV00210.

Function

A IFM - Modbus communication interface - is required for connection of a Masterpact or Compact to a Modbus network as long as this circuit breaker is provided with a ULP (Universal Logic Plug) port. The port is available on respectively a BCM ULP or BSCM embedded module.

The IFM is defined as an IMU (Intelligent Modular Unit) in the ULP connection System documentation.

Once connected, the circuit breaker is considered as a slave by the Modbus master. Its electrical values, alarm status, open/close signals car be monitored or controlled by a Programmable Logic Controller or any other system.

Characteristics

ULP port

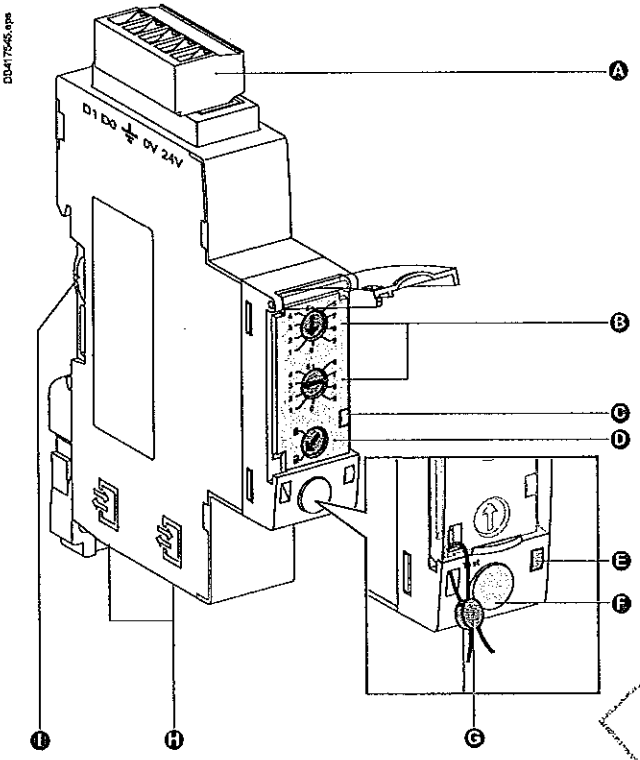
2 RJ45 sockets, internal parallel wiring.
- Connection of a single circuit breaker (eventually via its I/O application module).
- A ULP line terminator or an FDM121 display unit must be connected to the second RJ45 ULP socket.

The RJ45 sockets deliver a 24 VDC supply fed from the Modbus socket.
Built-in test function, for checking the correct connection to the circuit breaker and FDM121 display unit.

Modbus slave port

- Top socket for screw-clamp connector, providing terminals for:
  - 24 VDC input supply (0 V, +24 V)
  - Modbus line (D1, D2, Gnd).
- Lateral socket, for Din-rail stackable connector.

Both top and lateral sockets are internally parallel wired.
- Multiple IFM can be stacked, thus sharing a common power supply and Modbus line without individual wiring.
- On the front face:
  - Modbus address setting (1 to 99): 2 coded rotary switches
  - Modbus locking pad: enables or disables the circuit breaker remote control and modification of IFM parameters.
- Self adjusting communication format (Baud rate, parity).



- **A** *Modbus screw clamp connector.*
- **B** *Modbus address switches.*
- **C** *Modbus traffic LED.*
- **D** *Modbus locking pad.*
- **E** *ULP activity LED.*
- **F** *Test button.*
- **G** *Mechanical lock.*
- **H** *ULP RJ45 connectors.*
- **I** *Stacking accessory connection.*

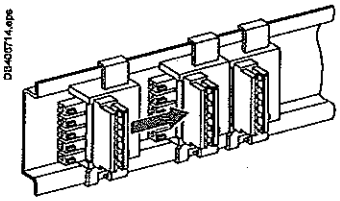
Technical characteristics

IFM Modbus communication interface		
Dimensions		18 x 72 x 96 mm
Maximum number of stacked IFM		12
Degree of protection of the installed module	Part projecting beyond the escutcheon	IP4x
	Other module parts	IP3x
	Connectors	IP2x
Operating temperature		-25...+70 °C
Power supply voltage		24 V DC -20 %/+10 % (19.2...26.4 V DC)
Consumption	Typical	21 mA/24 V DC at 20 °C
	Maximum	30 mA/19.2 V DC at 60 °C

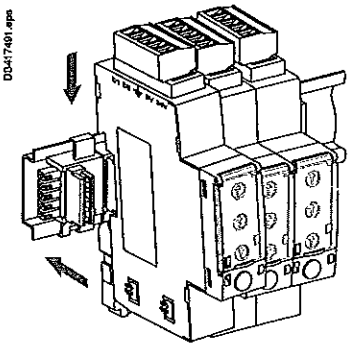
Certification	
CE	IEC/EN 60947-1
UL	UL 508 - Industrial Control Equipment
CSA	No. 142-M1987 - Process Control Equipment ■ CAN/CSA C22.2 No. 0-M91 - General requirements - Canadian Electrical Code Part ■ CAN/CSA C22.2 No. 14-05 - Industrial Control Equipment

Simplified IFM installation

Staking IFM

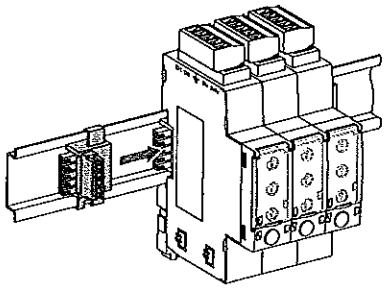


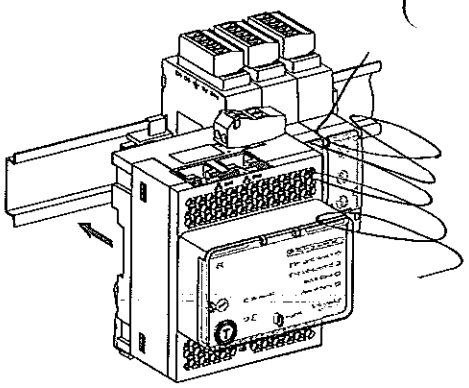
Stacking accessories



Up to 12 stacked IFM

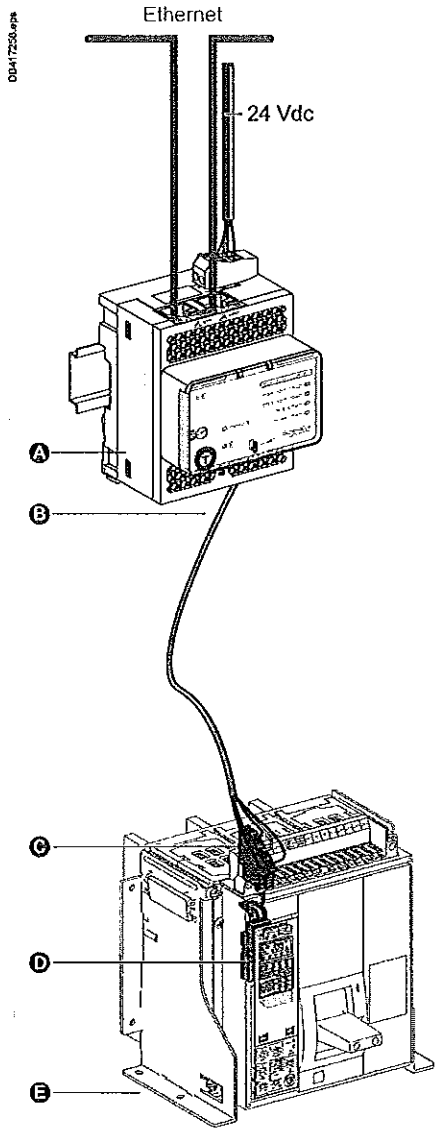
Stacking an IFE interface + gateway with IFM





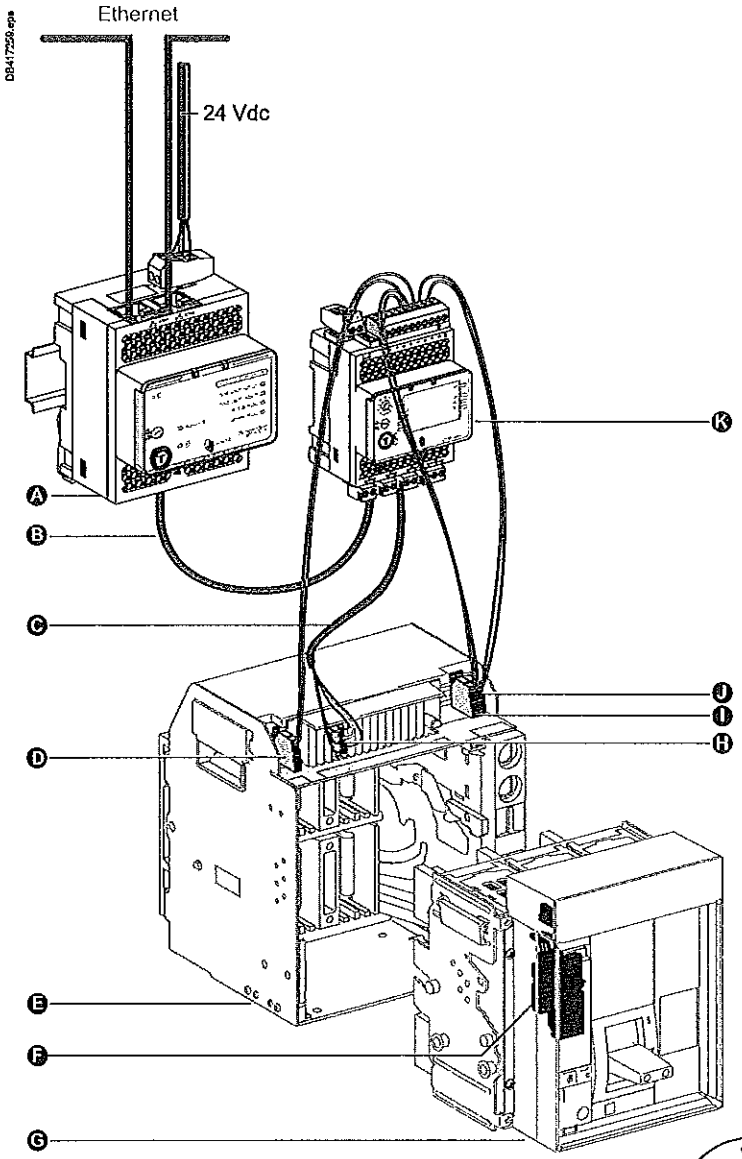
Connection of the IFE to a fixed or drawout Compact NS

Connect the IFE to a fixed manual operated Compact NS or circuit breaker using the breaker ULP cord



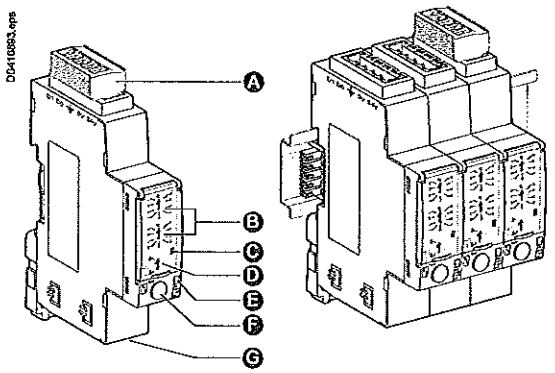
Ⓐ IFE Ethernet interface for LV circuit breaker
Ⓑ Breaker ULP cord
Ⓒ Fixed terminal block
Ⓓ BCM ULP communication module
Ⓔ Fixed electrically operated circuit breaker

Connect the IFE to a drawout Compact NS or circuit breaker using the breaker ULP cord



Ⓐ IFE Ethernet interface for LV circuit breaker
Ⓑ ULP cable
Ⓒ Breaker ULP cord
Ⓓ Circuit breaker disconnected position contact (CD)
Ⓔ Circuit breaker cradle
Ⓕ BCM ULP communication module
Ⓖ Drawout circuit breaker
Ⓗ Drawout terminal block
Ⓘ Circuit breaker connected position contact (CE)
Ⓙ Circuit breaker test position contact (CT)
Ⓚ I/O (Input/Output) application module for LV circuit breaker

Connection of the IFM to a fixed or drawout Compact NS



Ⓐ Five-point Modbus and 24 V DC connector
Ⓑ Two Modbus address dials (1 to 99)
Ⓒ Modbus traffic LED
Ⓓ Lock-out to disable writing to the NSX
Ⓔ Test LED
Ⓕ Test button
Ⓖ Two connectors for RJ45 cable

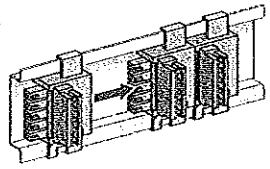
Modbus interface module IFM

Functions

This module, required for connection to the network, contains the Modbus address (1 to 99) declared by the user via the two dials in front. It automatically adapts (baud rate, parity) to the Modbus network in which it is installed.
It is equipped with a lock-out switch to enable or disable operations involving writing to Micrologic, i.e. reset, counter reset, setting modifications, device opening and closing commands, etc.
There is a built-in test function to check the connections of the Modbus interface module with the Micrologic and FDM121 display unit.

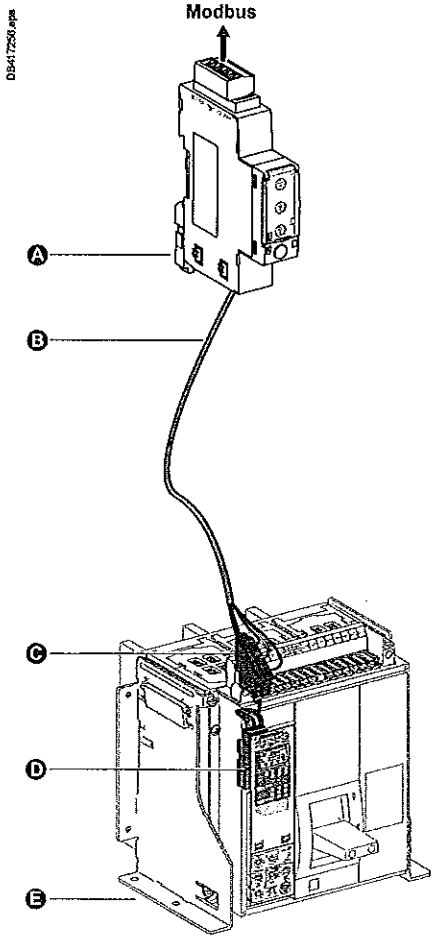
Mounting

The module is mounted on a DIN rail. A number of modules may be clipped one next to the other. For this, a stacking accessory is available for fast clip-connection of both the Modbus link and the 24 V DC supply.
The Modbus interface module supplies 24 V DC to the corresponding Micrologic, FDM121 display and BSCM module. Module consumption is 60 mA / 24 V DC.



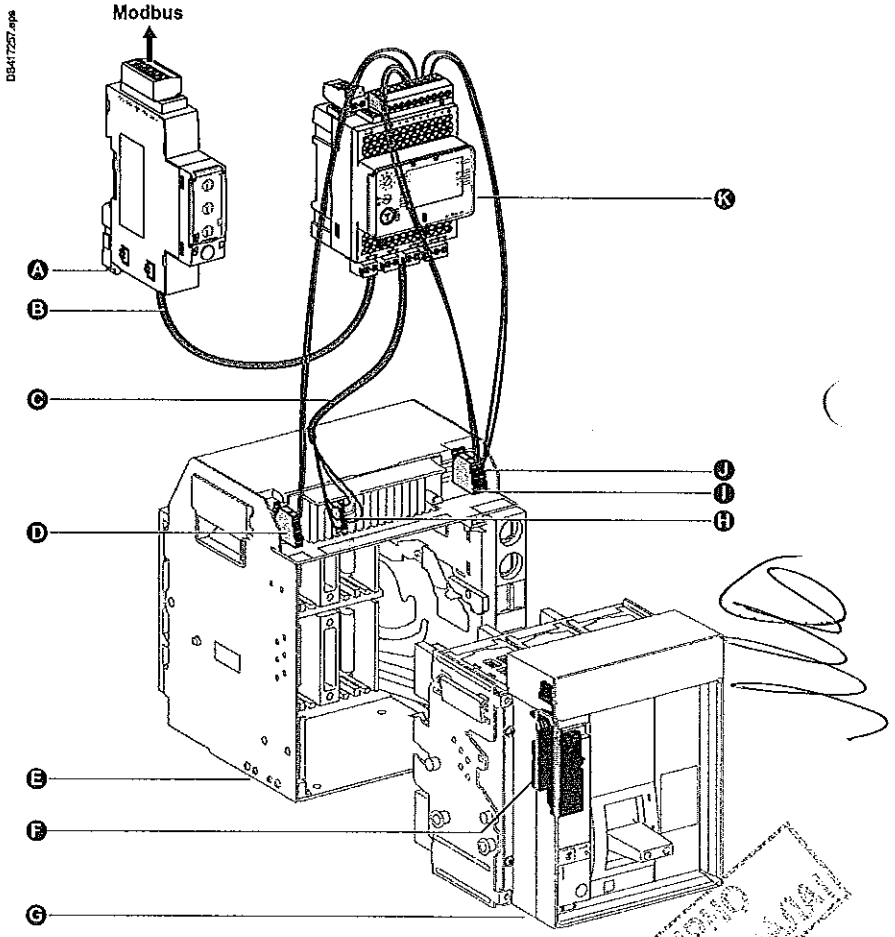
Mounting with stacking accessory.

Connect the IFM to a fixed manual operated Compact NS or circuit breaker using the breaker ULP cord



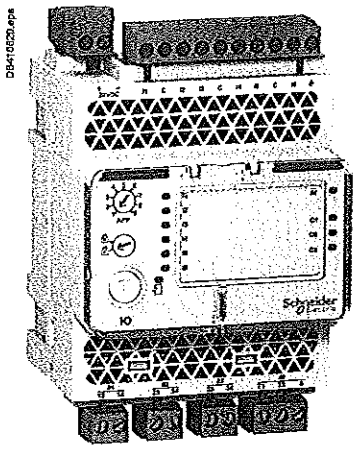
Ⓐ IFM Ethernet interface for LV circuit breaker
Ⓑ Breaker ULP cord
Ⓒ Fixed terminal block
Ⓓ BCM ULP communication module
Ⓔ Fixed electrically operated circuit breaker

Connect the IFM to a drawout Compact NS or circuit breaker using the breaker ULP cord



Ⓐ IFM Ethernet interface for LV circuit breaker
Ⓑ ULP cable
Ⓒ Breaker ULP cord
Ⓓ Circuit breaker disconnected position contact (CD)
Ⓔ Circuit breaker cradle
Ⓕ BCM ULP communication module
Ⓖ Drawout circuit breaker
Ⓗ Drawout terminal block
Ⓘ Circuit breaker connected position contact (CE)
Ⓙ Circuit breaker test position contact (CT)
Ⓚ I/O (Input/Output) application module for LV circuit breaker

I/O application module



Description

The I/O (Input/Output) application module for LV breaker is part of an ULP system with built-in functionalities and applications to enhance the application needs. The ULP system architecture can be built without any restrictions using the wide range of circuit breakers.
The I/O application module is compliant with the ULP system specifications.
Two I/O application module can be connected in the same ULP network.

The ranges of LV circuit breakers enhanced by the I/O application module are:
- Masterpact NW
- Masterpact NT
- Compact NS1600b-3200
- Compact NS630b-1600
- Compact NSX100-630 A.

I/O (Input/Output) application module for LV breaker resources

The I/O application module module ressources are:
- 6 digital inputs that are self powered for either NO and NC dry contact or pulse counter
- 3 digital outputs that are bistable relay (5 A maximum)
- 1 analog input for Pt100 temperature sensor.

Pre-defined applications

Pre-defined application adds new functions to the IMU in a simple way:
- selection by the application rotary switch on the I/O application module, defining the application with pre-defined input/output assignment and wiring diagram.
- no additional setting with the customer engineering tool required.

The resources not assigned to the pre-defined application are free for additional user-defined applications:
- cradle management
- breaker operation
- cradle management and Energy Reduction Maintenance Setting (ERMS)
- light and load control
- custom.

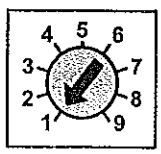
User-defined applications

User-defined applications are processed by the I/O application module in addition to the pre-defined application selected.
The user-defined applications are available depending on:
- the pre-defined application selected
- the I/O application module resources (inputs and outputs) not used by the application.

The resources required by user-defined applications are assigned using the customer engineering tool:
- protection
- control
- energy management
- monitoring.

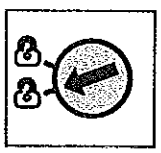
Mounting

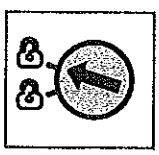
The I/O application module is a DIN rail mounting device.



Application rotary switch

The application rotary switch enables the selection of the pre-defined application.
It has 9 positions and each position is assigned to a pre-defined application.
The factory set position of the switch is pre-defined application 1.





Setting locking pad

The setting locking pad on the front panel of the I/O application module enables the setting of the I/O application module by the customer engineering tool.

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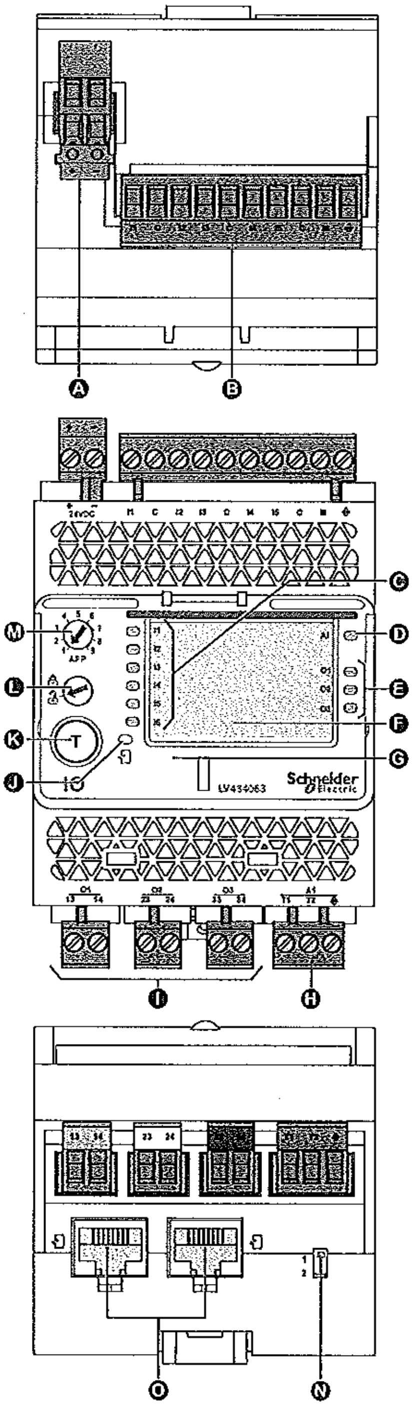

A *24 V DC power supply terminal block.*
B *Digital input terminal block: 6 inputs, 3 commons and 1 shield.*
C *6 input status LEDs.*
D *Analog input status LED.*
E *3 output status LEDs.*
F *I/O application module identification labels.*
G *Sealable transparent cover.*
H *Analog input terminal block.*
I *Digital output terminal blocks.*
J *ULP status LED.*
K *Test/reset button (accessible with cover closed).*
L *Setting locking pad.*
M *Application rotary switch: 1 to 9.*
N *Switch for I/O addressing (I/O 1 or I/O 2).*
O *ULP connectors.*

General characteristics

Environmental characteristics

Conforming to standards	UL 508, UL 60950, IED 60950, 60947-6-2
Certification	cUlUs, GOST, FCC, CE
Ambient temperature	-20 to +70 °C (-4 to +158 °F)
Relative humidity	5–85 %
Level of pollution	Level 3
Flame resistance	ULV0

Mechanical characteristics

Shock resistance	1000 m/s2
Resistance to sinusoidal vibrations	-5 Hz < f < 8.4 Hz

Electrical characteristics

Resistance to electromagnetic discharge	Conforming to IEC/EN 61000-4-3
Immunity to radiated fields	10 V/m
Immunity to surges	Conforming to IEC/EN 61000-4-5
Consumption	165 mA

Physical characteristics

Dimensions	71.7 x 116 x 70.6 mm (2.83 x 4.56 x 2.78 in.)
Mounting	DIN rail
Weight	229.5 g (0.51 lb)
Degree of protection of the installed I/O application module	▪ On the front panel (wall mounted enclosure): IP4x ▪ IO parts: IP3x ▪ Connectors: IP2x
Connections	Screw type terminal blocks

Technical characteristics - 24 V DC power supply

Power supply type	Regulated switch type
Rated power	72 W
Input voltage	100–120 V AC for single phase 200–500 V AC phase-to-phase
PFC filter	With IEC 61000-3-2
Output voltage	24 V DC
Power supply out current	3 A

Note: it is recommended to use an UL listed/UL listed recognized limited voltage/Limited current or a class 2 power supply with a 24 V DC, 3 A maximum.

Digital inputs

Digital input type	Self powered digital input with current limitations as per IEC 61131-2 type 2 standards (7 mA)
Input limit values at state 1 (close)	19.8–25.2 V DC, 6.1–8.8 mA
Input limit values at state 0 (open)	0–19.8 V DC, 0 mA
Maximum cable length	10 m (33 ft)

Note: for a length greater than 10 m (33 ft) and up to 300 m (1,000 ft), it is mandatory to use a shielded twisted cable. The shield cable is connected to the I/O functional ground of the I/O application module.

Digital outputs

Digital output type	Bistable relay
Rated load	5 A at 250 V AC
Rated carry current	5 A
Maximum switching voltage	380 V AC, 125 V DC
Maximum switch current	5 A
Maximum switching power	1250 VA, 150 W
Minimum permissible load	10 mA at 5 V DC
Contact resistance	30 mΩ
Maximum operating frequency	▪ 18000 operations/hr (Mechanical) ▪ 1800 operations/hr (Electrical)
Digital output relay protection by an external fuse	External fuse of 5 A or less
Maximum cable length	10 m (33 ft)

Analog inputs

The I/O application module analog input can be connected to a Pt100 temperature sensor

Range	-30 to 200 °C	-22 to 392 °F
Accuracy	±2 °C from -30 to 20 °C ±1 °C from 20 to 140 °C ±2 °C from 140 to 200 °C	±3.6 °F from -22 to 68 °F ±1.8 °F from 68 to 284 °F ±3.6 °F from 284 to 392 °F
Refresh interval	5 s	5 s

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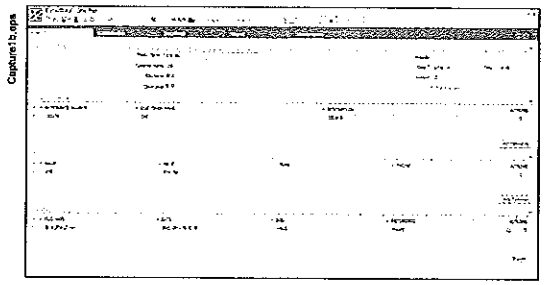
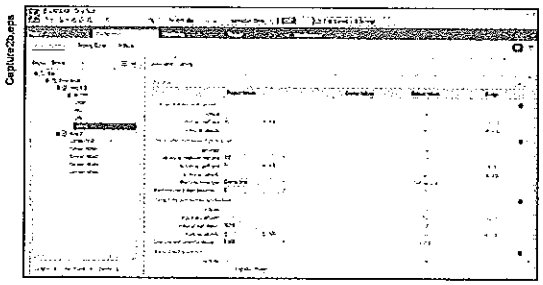
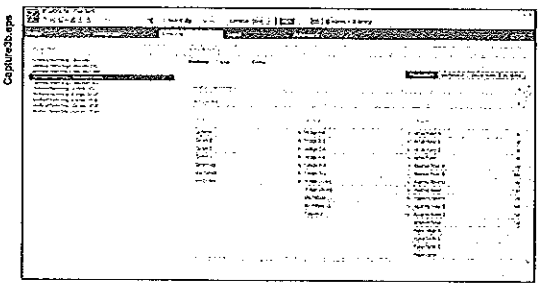
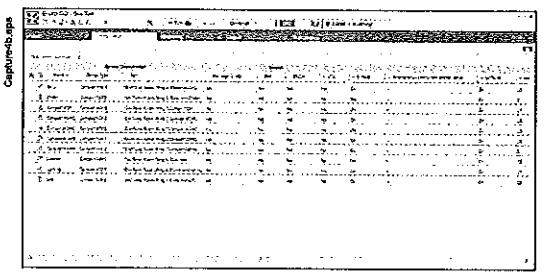
Electrical Asset Manager
Configuration Engineering tool









Introduction

Electrical Asset Manager is a software application that helps the user to manage a project as part of designing, testing, site commissioning, and maintenance of the project life cycle.
It enables the user to prepare the settings of the devices offline (without connecting to the device) and configure them when connected with the devices.
Also it provides lot of other value added features for the user to manage the project such as, safe repository in cloud, attach artifacts to each device or at the project level, organize devices in switchboard wise, manage a hierarchical structure of the installation etc.

Compatible devices (configuration and device management)

Electrical Asset Manager is compatible with the following devices:

- Compact NSX100-630 (IEC)
- PowerPactTM (UL) circuit breaker
- Compact NS630b-3200 (IEC)
- Masterpact NT/NW (IEC and UL) circuit breaker
- Acti9 Smartlink.
- Compatible devices (Device Management in the project)
- Switch disconnectors (Compact NSX, Masterpact & PowerPact Family)
- Third party devices.

References:
Electrical Asset Manager software package can be downloaded from our website www.schneider-electric.com.

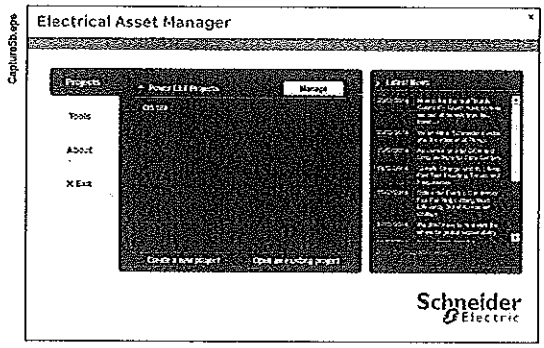
Features

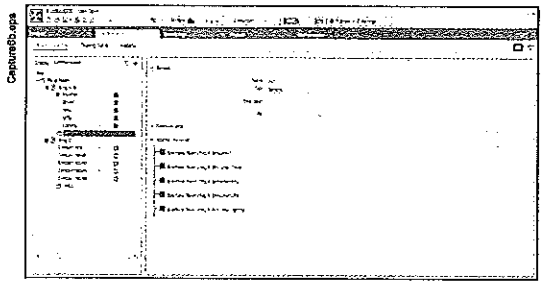
Electrical Asset Manager supersedes the Schneider Electric customer engineering tools such as Remote setting Utility (RSU) and Remote Control Utility (RCU) with additional features.

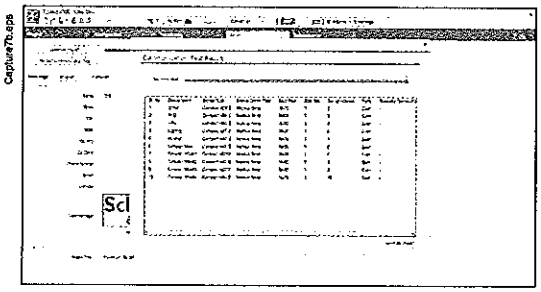
Electrical Asset Manager supports the connection of Schneider Electric communicable devices to:

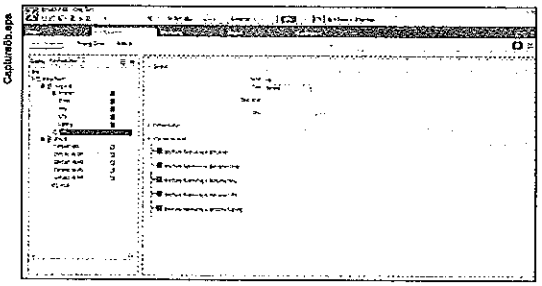
- create projects by device discovery, selection of devices, and import Bill of Material (BOM)
- monitor the status of protection and IO status
- read information (alarms, measurements, parameters)
- check protection discrimination between two devices
- upload and download of configuration or settings in batch mode to multiple devices.
- carry out commands and tests
- generate and print device settings report and communication test report
- manage multiple devices with electrical and communication hierarchy model
- manage artifacts (project documents)
- check consistency in settings between devices on a communication network
- compare configuration settings between PC and device (online)
- download latest firmware.

Electrical Asset Manager enables the user to avail the advanced features of the software once the project is saved in Schneider Electric cloud.









Functions

Offline Mode

A project can be built in offline mode through 2 different ways:

- through BOM file import
- through Device Selection.

Additionally, the user can open an existing project and modify the settings offline. The user can do the discrimination curve check and firmware compatibility check for devices in the project.

Online Mode

A project can be built in online mode through device discovery also other than the methods possible through offline method.
Once the project is built, the following functions can be performed in addition to the functions available in offline mode:

- compare the device parameters with project parameters
- load parameters from project to the device and vice versa
- firmware downloads to the device
- monitor the measurement, maintenance, device status and I/O status
- control functions.

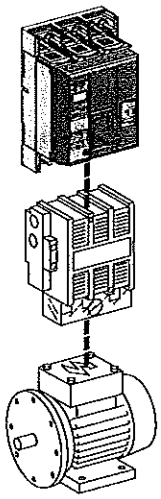
User Interface

Electrical Asset Manager software provides fast direct access to the project and the devices in the project through different tabs.

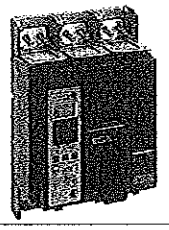
- Project: to provide the project information including customer details, project references and to add project artifacts (documents related to the project).
- Configuration: to build up the tree structure of the project architecture ; to have a table view of the devices added in the project ; to set the parameters of the devices ; to transfer the device settings ; to view the tripping curves; to attach device artifacts and to download the latest firmware, to do the communication test for all the devices and generate the test report.
- Monitoring: this allows the user to monitor the real time values of different devices through different sub tabs namely Monitoring, Logs and Control.
- Reports: report tab allows you to generate and print a report of the project settings from the report tab. The user details and project characteristics are automatically filled with the details entered in the Project page.

Motor protection
Overview of solutions

The circuit breakers presented here provide protection against short circuits and are suitable for isolation as defined by standard IEC 60947-2.
For complete protection of the motor and its control device, overload protection may be provided by either the circuit breaker or a separate Schneider Electric thermal relay.
The control device may be of the direct on-line type (with or without reversing) or of the "star-delta" type.
Combinations are governed by standard IEC 60947-4.1.



Motor protection up to 750 kW

Motor rating (kW)		160...750
Compact		NS630b to 1600
		
Breaking capacity (kA rms) 380/415 V	N	50
	H	70
	L	150

General circuit breaker characteristics page A-12

Compact NS630b to 1600 circuit breakers equipped with Micrologic control units are the same as those for distribution systems.

Accompanying control units page A-20

Micrologic electronic control units may be used on all Compact NS630b to 1600 circuit breakers.
Micrologic 2.0 A and 5.0 A electronic control units provide protection against short-circuits and overloads. Micrologic 7.0 A provides the same protection functions, plus earth-leakage protection.

Protection coordination (as defined by IEC 60947-4)
Whatever the power of the motor, the coordination between the circuit breaker, contactor and relay can be of either type 1 or 2.
Selection depends on operational requirements concerning continuity of service and the technical skills of servicing personnel.
All type 2 have been tested under the conditions defined by standards and they are certified ASEFA/LOVAG.

Selection of a trip unit or Micrologic control unit

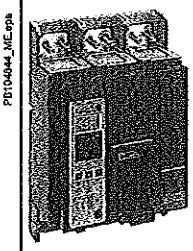
P (kW) (400 V, 50 Hz)	0.37	1.1	5.5	18.5		37					110	160	250		560	750
Ir (A)	1.5	2.5	12	40	50	80	100	160	200	220	320	500	800	1000	1350	
Compact NS630b ... NS1600										Micrologic 2.0 A / 5.0 A / 6.0 A / 7.0 A						
										Micrologic 2.0 E / 5.0 E / 6.0 E						

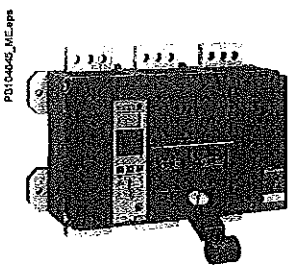
Earth-leakage protection
Overview of solutions

Earth-leakage protection is obtained by:
- installing a Micrologic 7.0 A control unit (Compact NS630b to 3200).
- using a Vigirex relay and separate sensors (all Compact circuit breakers).

Circuit breakers equipped with a control unit offering integrated earth-leakage protection and an external rectangular sensor

Rated current (A)	630 - 3200	
Compact	NS630b to 1000 N/L NS1250 and 1600 N	NS1600b to 3200





General circuit breaker characteristics page A-12

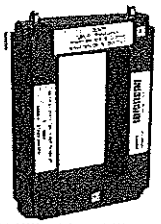
Compact NS630b to 3200 circuit breakers are presented in the "Protection of distribution systems" section.

Accompanying control units page A-22

Micrologic 7.0 A electronic control units offer earth-leakage protection as standard.

Earth-leakage protection using a Vigirex relay

Earth-leakage relay	Separate toroids	Rectangular sensors



Compact circuit breaker + Vigirex relay combination

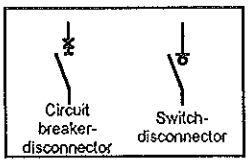
Vigirex relays may be used to add external earth-leakage protection to Compact NS circuit breakers. The circuit breakers must be equipped with an MN or MX voltage release. Vigirex relays are very useful when special time-delay or tripping-threshold values are required, or when there are major installation constraints (circuit breaker already installed and connected, limited space available, etc.).

Vigirex-relay characteristics:
- rectangular sensors up to 3200 A
- 400 Hz distribution systems.

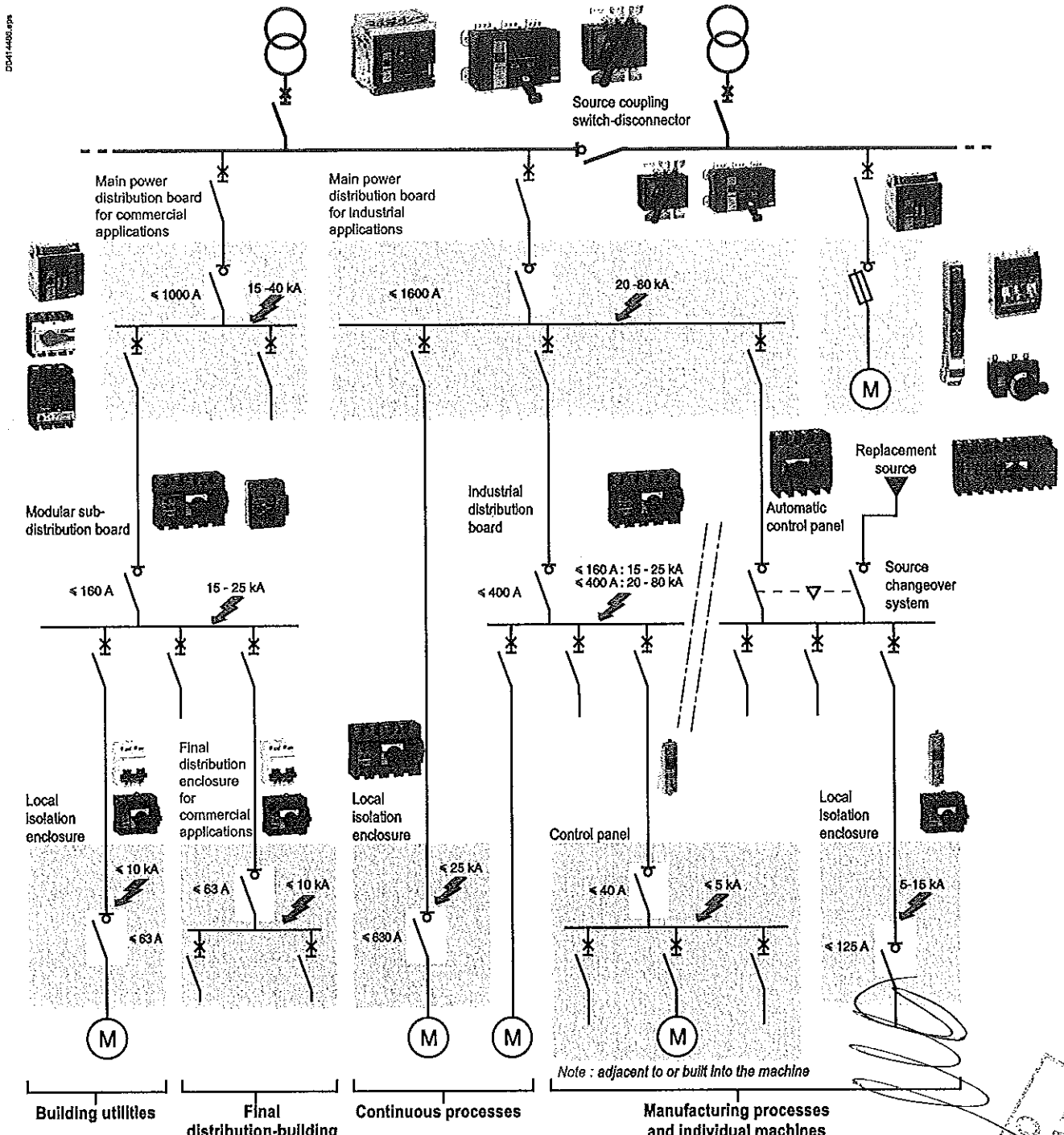
Options:
- trip alarm by a fail-safe contact
- pre-alarm LED and contact, etc.

Compliance with standards:
- IEC 60947-2, appendix M
- IEC/EN 60755: general requirements for residual current operated protective devices
- IEC/EN 6100-4-2 to 4-6: immunity tests
- CISPR11: radio-frequency radiated and conducted emission tests
- UL1053 and CSA22.2 No. 144 for RH10, RH21 and RH99 relays at supply voltages up to and including 220/240 V.

Control and isolation
Overview of solutions

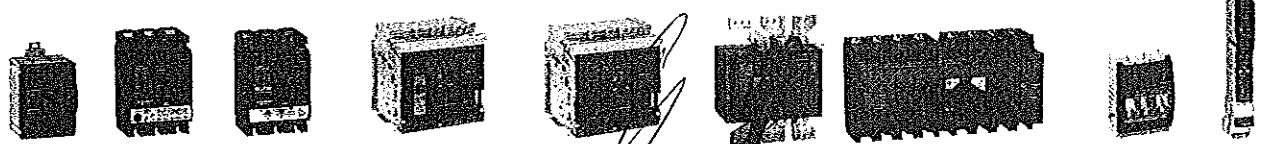


Standardised symbols



LV devices

Acti 9 *NG125* *Easypact* *Compact NS* *Masterpact NT* *Micrologic* *Compact INS* *Compact INV* *Fupact INF*

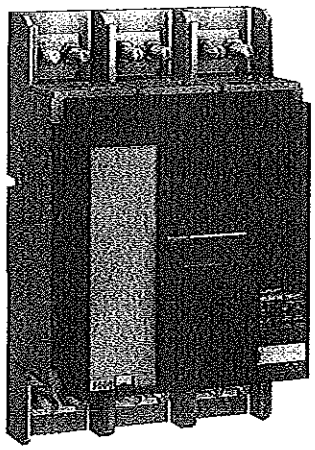


NG160 *Compact NSX* *Compact NSX DC* *Masterpact NW* *Masterpact NW DC* *Compact INS/INV* *Source-changeover* *Fupact ISFT* *Fupact ISFL*

Compact switch-disconnectors are used to control and isolate electrical distribution circuits. In addition to these basic functions, other functions for safety, remote control and convenience include:

- earth-leakage protection
- auxiliary MN/MX releases
- remote operation.

Compact switch-disconnectors may be interlocked with another Compact switch-disconnector or circuit breaker to constitute a source-changeover system.



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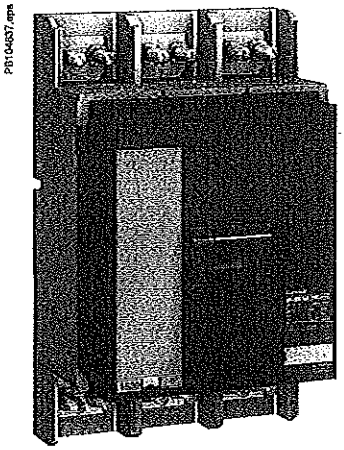
Compact NS1600NA switch-disconnector.

Control and disconnection
Compact NS630bNA to 1600NA switch-disconnectors

Installation standards require upstream protection.



Compact NS800NA.

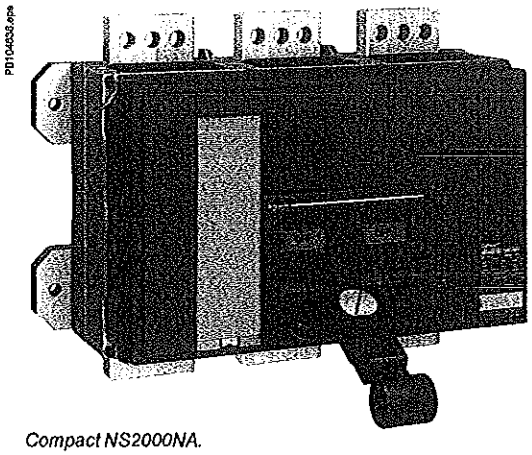
Compact switch-disconnectors				
Number of poles				
Control	manual		toggle direct or extended rotary handle	
	electric			
Connections	fixed			front connection rear connection
	withdrawable (on chassis)			front connection rear connection
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)		Ith	60 °C	
Rated insulation voltage (V)		Ui		
Rated impulse withstand voltage (kV)		Uimp		
Rated operational voltage (V)		Ue	AC 50/60 Hz	
Rated operational current		Ie	AC 50/60 Hz	
				220/240 V
				380/415 V
				440/480 V (1)
				500/525 V
				660/690 V
Short-circuit making capacity		Icm	(kA peak)	
Short-time withstand current		Icw	(A rms)	0.5 s
				20 s
Suitability for isolation				
Durability (C-O cycles)	mechanical			
	electrical	AC	440 V	AC23A/In
Positive contact indication				
Pollution degree				
Protection				
Add-on earth-leakage protection			combination with Vigirex relay	
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases		MX shunt release MN undervoltage release		
Remote communication by bus				
Device status indications (communicating auxiliary contacts)				
Device remote operation (communicating motor mechanism)				
Installation				
Accessories		terminal extensions and spreaders terminal shields and interphase barriers escutcheons		
Dimensions (mm)		fixed		3P
W x H x D				4P
Weight (kg)		fixed		3P
				4P
Source-changeover system (see section "on source-changeover systems")				
Manual source-changeover systems, remote-operated and automatic				

(1) Suitable for 480 V NEMA.

	NS630bNA	NS800NA	NS1000NA	NS1250NA	NS1600NA
	3, 4	3, 4	3, 4	3, 4	3, 4
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	630	**800**	**1000**	**1250**	**1600**
	800	800	800	800	800
	8	8	8	8	8
	690	690	690	690	690
	AC23A	**AC23A**	**AC23A**	**AC23A**	**AC23A**
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	52	52	52	52	52
	25	25	25	25	25
	4	4	4	4	4
	■	■	■	■	■
	10000	10000	10000	10000	10000
	2000	2000	2000	2000	1000
	■	■	■	■	■
	3	3	3	3	3
	■				
	■				
	■				
	■				
	■				
	■				
	■				
	■				
	327 x 210 x 147				
	327 x 280 x 147				
	14				
	18				
	■				

Control and disconnection
Compact NS1600bNA to 3200NA switch-disconnectors

Installation standards require upstream protection. However, Compact NS1600b to 3200NA switch-disconnectors are self-protected for all currents higher than 130 kA peak.



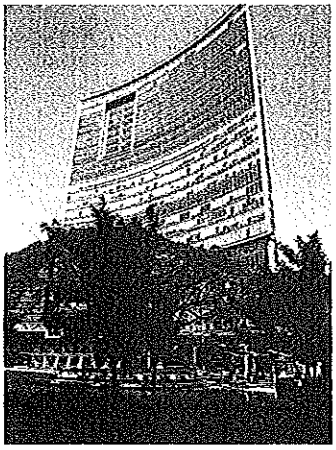
Compact NS2000NA.

Compact switch-disconnectors				
Number of poles				
Control	manual		toggle	
			direct or extended rotary handle	
	electric			
Connections	fixed			front connection
				rear connection
	withdrawable (on chassis)			front connection
				rear connection
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)		**Ith**	60 °C	
Rated insulation voltage (V)		**Ui**		
Rated impulse withstand voltage (kV)		**Uimp**		
Rated operational voltage (V)		**Ue**	AC 50/60 Hz	
Rated operational current		**Ie**	AC 50/60 Hz	
				220/240 V
				380/415 V
				440/480 V (1)
				500/525 V
				660/690 V
Short-circuit making capacity		**Icm**	(kA peak)	
Short-time withstand current		**Icw**	(A rms)	3 s
Integrated instantaneous protection (kA peak ±10 %)				
Suitability for isolation				
Durability (C-O cycles)	mechanical			
	electrical	AC	440 V	AC23A/In
Positive contact indication				
Pollution degree				
Protection				
Add-on earth-leakage protection		combination with Vigirex relay		
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases		MX shunt release		
		MN undervoltage release		
Installation				
Accessories		escutcheons		
Dimensions (mm)		fixed		3P
W x H x D				4P
Weight (kg)		fixed		3P
				4P
Source-changeover system (see section "on source-changeover systems")				
Manual source-changeover systems, remote-operated and automatic				

(1) Suitable for 480 V NEMA.

	NS1600bNA	NS2000NA	NS2500NA	NS3200NA
	3, 4	3, 4	3, 4	3, 4
	■	■	■	■
	-	-	-	-
	-	-	-	-
	■	■	■	■
	-	-	-	-
	-	-	-	-
	-	-	-	-
	1600	2000	2500	3200
	800	800	800	800
	8	8	8	8
	690	690	690	690
	AC23A	**AC23A**	**AC23A**	**AC23A**
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	135	135	135	135
	32	32	32	32
	130	130	130	130
	■	■	■	■
	6000	6000	6000	6000
	1000	1000	1000	1000
	■	■	■	■
	3	3	3	3
	■			
	■			
	■			
	■			
	■			
	350 x 420 x 160			
	350 x 535 x 160			
	23			
	36			
	-			

Source-changeover systems
Presentation



Some installations use two supply sources to counter the temporary loss of the main supply.
A source-changeover system is required to safely switch between the two sources.
The replacement source can be a generator set or another network.

Manual source-changeover system or M: Manual Transfer Switching Equipment

The simplest way to switch the load.
It is controlled manually by an operator.
The time required to switch from the S1 source to S2 source is variable.

System
2 or 3 mechanically interlocked circuit breakers or
2 switch-disconnectors.

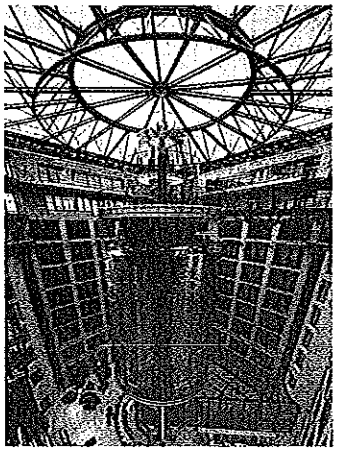
Applications
Small commercial buildings and small and medium industrial activities where the need for continuity of service is significant but not a priority.

Automatic source-changeover system or A: Automatic Transfer Switching Equipment

An automatic controller may be added to a remote operated source-changeover system. It is possible to automatically control source transfer according to programmed (dedicated controllers) or programmable (PLC) operating modes.
These solutions ensure optimum energy management.
The time required to switch from the S1 source to S2 source is fixed.

System
2 or 3 circuit breakers linked by an electrical interlocking system. A mechanical interlocking system protects also against incorrect manual operations, with an automatic control system (dedicated controllers).

Applications
Large infrastructures, industry, critical buildings & process where the continuity of service is a priority.



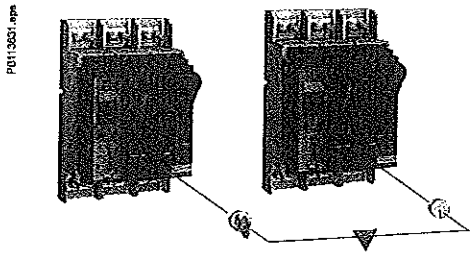
Remote source-changeover system or R: Remote Transfer Switching Equipment

In this case, no direct human intervention is required. The time required to switch from the S1 source to S2 source is fixed.

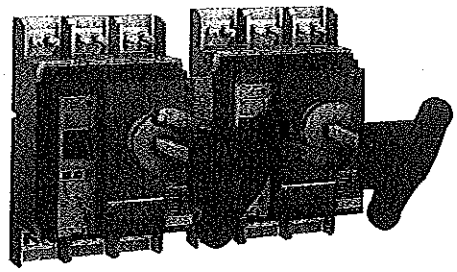
System
2 or 3 circuit breakers linked by an electrical interlocking system. A mechanical interlocking system protects also against incorrect manual operations. In this case is necessary to add a PLC controller not dedicated for source-changeover application.

Applications
Industry & Infrastructure where continuity of service requirements are meaningful but not a priority.

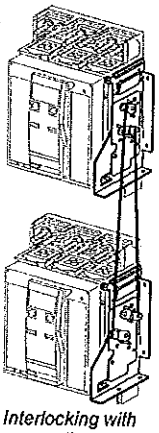
A manual source-changeover system can be installed on two to three manually-operated circuit breakers or switch-disconnectors. Interlocking is mechanical. Interlocks prevent connection to both sources at the same time, even momentarily.



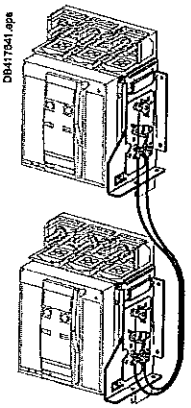
Interlocking with keylocks.



Interlocking of two devices with rotary handles.



Interlocking with connecting rods.



Interlocking with cables.

Interlocking of two devices with rotary handles

The rotary handles are padlocked with the devices in the OFF position.
The mechanism inhibits the two devices being closed at the same time, but does allow for both to be open (OFF) at the same time.

Combinations of "Normal" and "Replacement" devices
All Compact NS630b to 1600 circuit breakers and switch-disconnectors with rotary handles can be interlocked.
Interlocking of a Compact NS630b with a Compact NS630b to 1600 is not possible.

Interlocking of a number of devices using keylocks (captive keys)

Interlocking uses two identical keylocks with a single key. This solution enables interlocking between two devices that are physically distant or that have significantly different characteristics, for example between a low and a medium-voltage device, or between Compact NS circuit breakers and switch-disconnectors.
A system of wall-mounted units with captive keys makes possible a large number of combinations between many devices.

Combinations of Normal and Replacement devices
All Compact NS630b to 1600 circuit breakers and switch-disconnectors with rotary handles or motor mechanisms can be interlocked.

Interlocking of two Compact NS630b to 1600 devices using connecting rods

The two devices must be mounted one above the other (either 2 fixed or 2 withdrawable/drawout devices).

Installation
This function requires:
- an adaptation fixture on the right side of each circuit breaker or switch-disconnector
- a set of connecting rods with no-slip adjustments.

The adaptation fixtures, connecting rods and circuit breakers or switch-disconnectors are supplied separately, ready for assembly by the customer.
The maximum vertical distance between the fixing planes is 900 mm.

Possible combinations of "S1" and "S2" source circuit breakers
Combinations are possible between Compact NS630b to NS1600 devices and between Masterpact NT and Masterpact NW devices.

Interlocking of two Compact NS630b to 1600 devices using cables

For cable interlocking, the circuit breakers may be mounted one above the other or side-by-side.
The interlocked devices may be fixed or drawout, three-pole or four-pole, and have different ratings and sizes.

Installation
This function requires:
- an adaptation fixture on the right side of each device
- a set of cables with no-slip adjustments.

The maximum distance between the fixing planes (vertical or horizontal) is 2000 mm.

Possible combinations of "S1" and "S2" source circuit breakers

Source "S1"	Source "S2"			
	NS630b to NS1600	NT06 to NT16	NW08 to NW40	NW40b to NW63
NS630b to NS1600				
Ratings 250...1600A	■	-	-	-

It is not possible to combine Compact NS630b to 1600 and Masterpact (NT or NW) devices.

Electrical interlocking
IVE unit

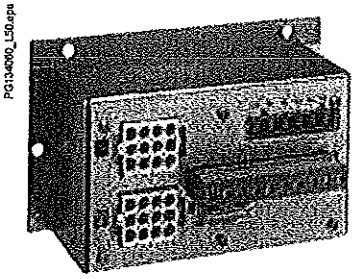
Electrical interlocking is used with a mechanical interlocking system.

Morover, the relays controlling the closing order to the "S1" and "S2" circuit breakers must be mechanically and/or electrically interlocked to prevent them from giving simultaneous closing commands.

Electrical interlocking is carried out by an electrical control device.
For Compact NS630b to NS1600, this function can be implemented in one of two ways:
- using the IVE unit
- by an electrician based on the diagrams in accordance with the chapter "Electric diagrams" source-changeover system.

Characteristics of the IVE unit
- External connection terminal block:
  - inputs: circuit breaker control signals
  - outputs: status of the SDE contacts on the "S1" and "S2" source circuit breakers.
- 2 connectors for the two "S1" and "S2" source circuit breakers:
  - inputs:
    - status of the OF contacts on each circuit breaker (ON or OFF)
    - status of the SDE contacts on the "S1" and "S2" source circuit breakers
  - outputs: power supply for operating mechanisms.
- Control voltage:
  - 24 to 250 V DC
  - 48 to 415 V 50/60 Hz - 440 V 60 Hz.

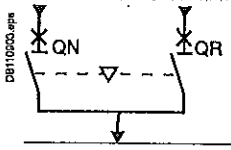
The IVE unit control voltage must be same as that of the circuit breaker operating mechanisms.

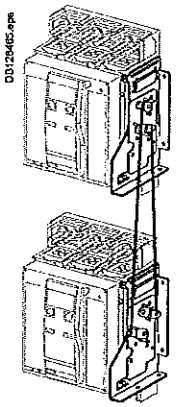


IVE unit.

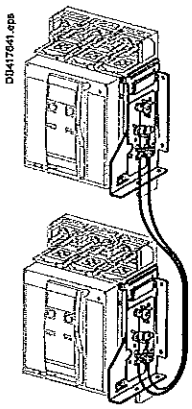
For Compact NS630b to NS1600, each circuit breaker must be equipped with:
- a motor mechanism
- an available OF contact
- a CE connected-position contact (carriage switch) on withdrawable circuit breakers
- an SDE contact.

Standard configuration for Compact NS

Types of mechanical interlocking	Possible combinations		Typical electrical diagrams	Diagram no.
	QN	QR	**Compact NS630b to 1600:**	
	0	0	■ electrical interlocking with lockout after fault:	
	1	0	□ permanent replacement source (with IVE)	**51201183**
	0	1	□ with EPO by MX (with IVE)	**51201184**
			□ with EPO by MN (with IVE)	**51201185**



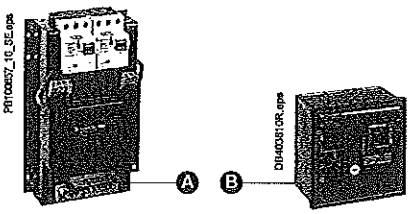
Interlocking by rods.



Interlocking by cables.

Source-changeover system with a controller

In this case, changeovers between the "Normal" and "Replacement" sources under predefined conditions are initiated by a Schneider Electric controller.



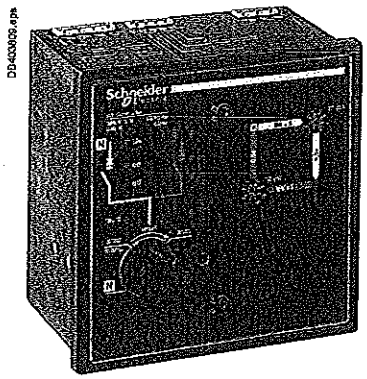
Control plate. *Controller.*

Switching between sources can be automated by adding:

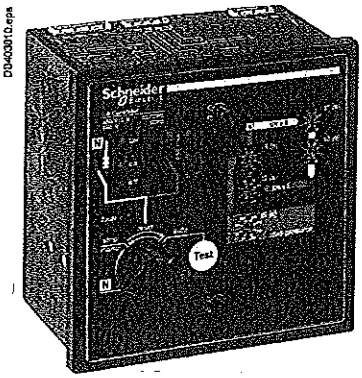
- Ⓐ *ACP control plate*
- Ⓑ *BA or UA controller, or an electrical system provided by the installer for NS630b to 1600. Electrical system example: part no. 51156904 and 51156904 in the source-changeover system catalogue.*

Source-changeover systems
Associated controllers

By combining a remote-operated source-changeover system with an integrated BA or UA automatic controller, it is possible to automatically control source transfer according to user-selected sequences.
These controllers can be used on source-changeover systems comprising 2 circuit breakers.
For source-changeover systems comprising 3 circuit breakers, the automatic control diagram must be prepared by the installer as a complement to to diagrams provided in the "electrical diagrams" section of this catalogue.



BA controller.



UA controller

Controller		BA	UA
4-position switch			
Compatible circuit breaker		All Compact NS circuit breaker	
Automatic operation		■	■
Forced operation on "Normal" source		■	■
Forced operation on "Replacement" source		■	■
Stop (both Normal and Replacement sources OFF)		■	■
Automatic operation			
Monitoring of the "Normal" source and automatic transfer		■	■
Generator set startup control			■
Delayed shutdown (adjustable) of engine generator set			■
Load shedding and reconnection of non-priority circuits			■
Transfer to the "Replacement" source if one of the phases of the "Normal" phase is absent			■
Test			
By opening the P25M circuit breaker supplying the controller		■	
By pressing the test button on the front of the controller			■
Indications			
Circuit breaker status indication on the front of the controller: on, off, fault trip		■	■
Automatic mode indication contact		■	■
Other functions			
Selection of type of "Normal" source (single-phase or three-phase) (1)			■
Voluntary transfer to "Replacement" source (e.g. energy-management commands)		■	■
During peak-tariff periods (energy-management commands) forced operation on "Normal" source if "Replacement" source not operational			■
Additional control contact (not in controller). Transfer to "Replacement" source only if contact closed (e.g. used to test the frequency of UR)		■	■
Setting of maximum startup time for the replacement source			■
Options			
Communication option			■
Power supply			
Control voltages (2)	110 V	■	■
	220 to 240 V 50/60 Hz	■	■
	380 to 415 V 50/60 Hz	■	■
	440 V 60 Hz	■	■
Operating thresholds			
Undervoltage	0.35 Un ≤ voltage ≤ 0.7 Un	■	■
Phase failure	0.5 Un ≤ voltage ≤ 0.7 Un		■
Voltage presence	voltage ≥ 0.85 Un	■	■

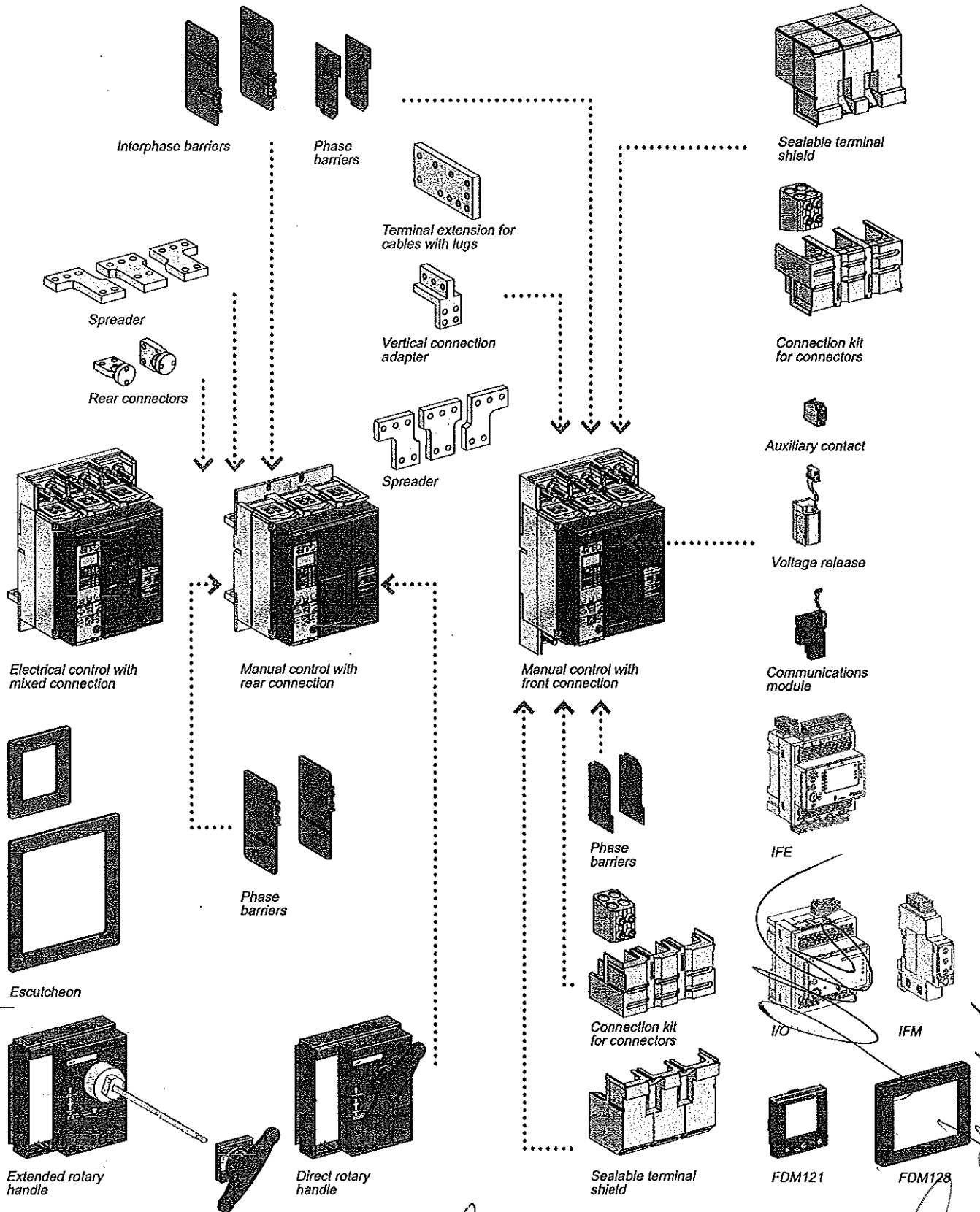
(1) For example, 220 V single-phase or 220 V three-phase.
(2) The controller is powered by the ACP control plate. The same voltage must be used for the ACP plate, the IVE unit and the operating mechanisms. If this voltage is the same as the source voltage, then the "Normal" and "Replacement" sources can be used directly for the power supply. If not, an isolation transformer must be used.

Controller		BA	UA
IP degree of protection (EN 60529) and IK degree of protection against external mechanical impacts (EN 50102)			
Front	IP40	■	■
Side	IP30	■	■
Connectors	IP20	■	■
Front	IK07	■	■
Characteristics of output contacts (dry, volt-free contacts)			
Rated thermal current (A)	8		
Minimum load	10 mA at 12 V		
Output contacts: Position of the Auto/Stop switch		■	■
Load shedding and reconnection order			■
Generator set start order			■

		AC				DC	
Utilisation category (IEC 60947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	6	8	2
	48 V	8	7	5	5	2	-
	110 V	8	6	4	4	0.6	-
	220/240 V	8	6	4	3	-	-
	250 V	-	-	-	-	0.4	-
	380/415 V	5	-	-	-	-	-
	440 V	4	-	-	-	-	-
	660/690 V	-	-	-	-	-	-

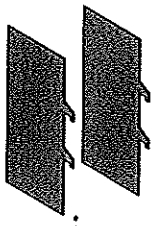
Electrical and mechanical accessories
Compact NS630b to 1600 (fixed version)

DB417254.eps

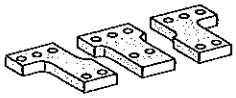


Compact NS630b to 1600 (withdrawable version)

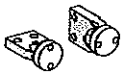
DB417425.eps



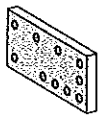
Interphase barriers



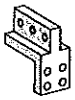
Spreader



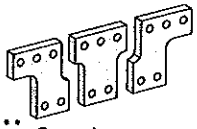
Rear connectors



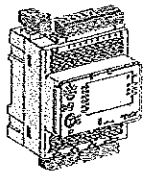
Terminal extension for cables with lugs



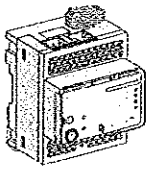
Vertical connection adapter



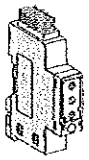
Spreader



IFE

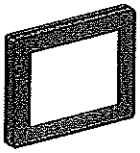


I/O

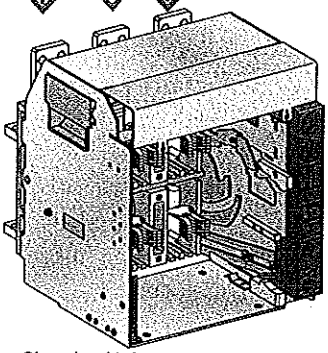


IFM

FDM121

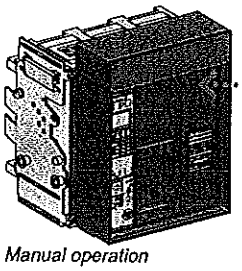


FDM128



Chassis with front or rear connection

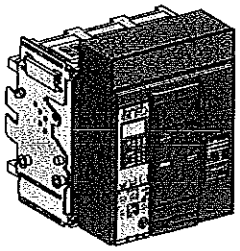
Auxiliary contact



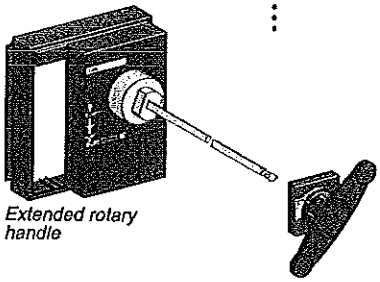
Manual operation

Voltage release

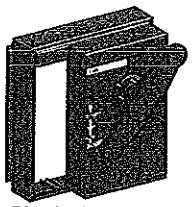
Communications module



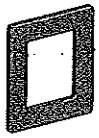
Electrical operation

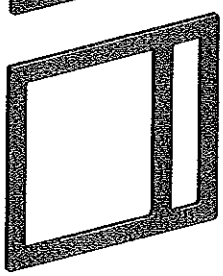


Extended rotary handle

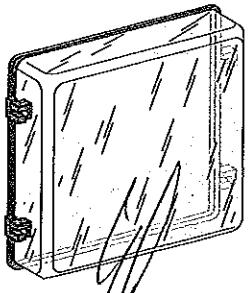


Direct rotary handle



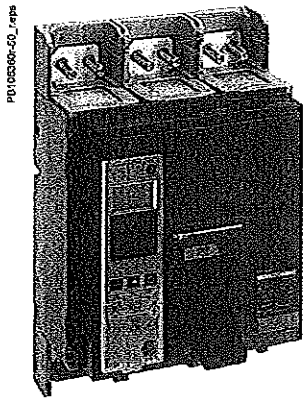


Escutcheon



Transparent cover

Electrical and mechanical accessories
Compact NS630b to 1600

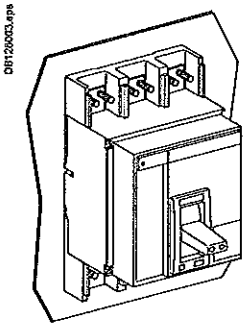


Fixed Compact NS800.

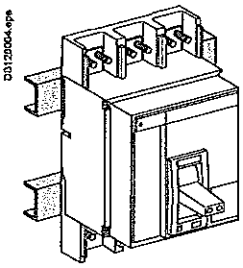
Installation

Fixed configuration

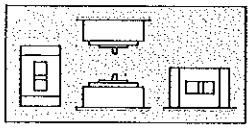
Compact NS630b to 1600 circuit breakers may be installed vertically, horizontally or flat on their back.



Mounting on a backplate.



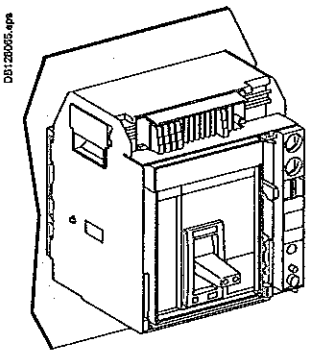
Mounting on rails.



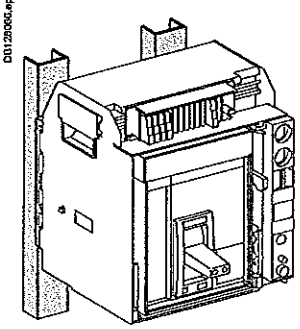
The withdrawable configuration makes it possible to:
- extract and/or rapidly replace the circuit breaker without having to touch connections;
- allow for the addition of future circuits at a later date.

Withdrawable configuration

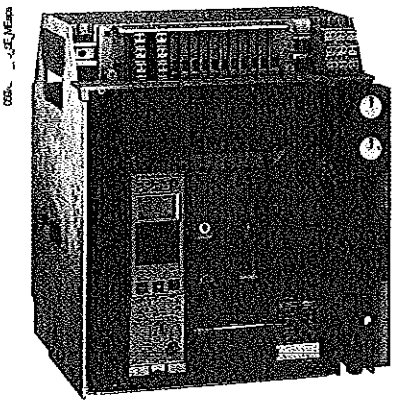
Compact NS630b to 1600 circuit breakers should be installed vertically only.



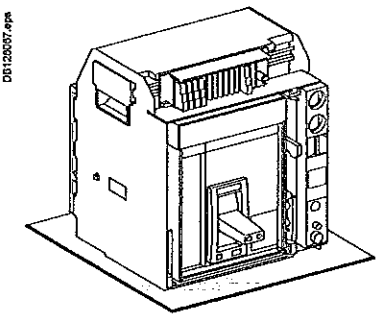
Mounting on a backplate.



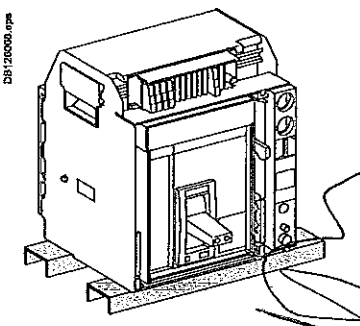
Rear mounting on rails.



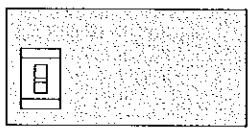
Withdrawable Compact NS800H.



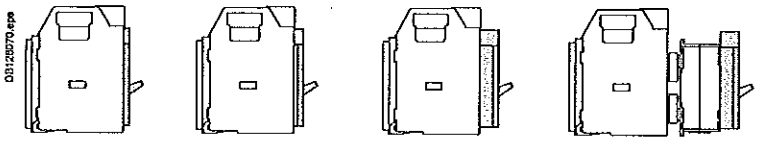
Device on mounting plate.



Device on rails.



The device may be in one of four positions on the chassis:
- connected position. The power circuits and auxiliary contacts are all connected
- test position. The power circuits are disconnected. The auxiliary contacts are still connected and the device can be operated electrically
- disconnected position. The power circuits and auxiliary contacts are all disconnected, however the device is still mounted on the chassis. It can be operated manually (ON, OFF, "push to trip").
- removed position. All circuits are disconnected. The device simply rests on the chassis rails and can be removed.



Connected *Test* *Disconnected* *Removed*

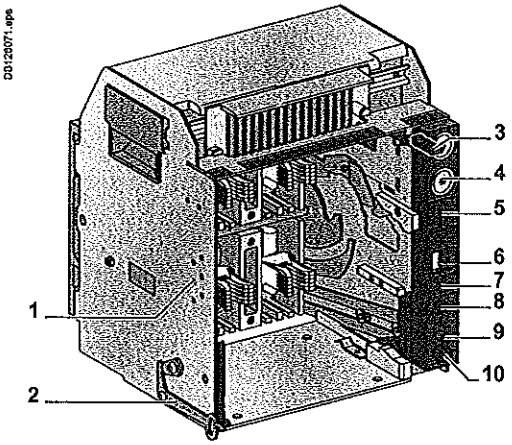
The multifunctional chassis for Compact NS630b to 1600 devices is particularly suited for incoming circuit breakers. Features include:
- device connection and disconnection through a door, using a crank that can be stored in the chassis
- three positions (connected, test and disconnected) that are indicated:
  - locally by a position indicator
  - remotely by carriage switches (3 for the connected position, 2 for the disconnected position and 1 for the test position)
- circuit breaker ON/OFF commands through a switchboard front panel.

Locking

There are extensive locking possibilities:
- chassis locking in connected, disconnected and test positions using three padlocks and two keylocks, on the switchboard front panel
- door interlock (inhibits door opening with breaker in connected position)
- racking interlock (inhibits racking with door open)
- locking in each of the connected, disconnected and test positions during device connection or disconnection. Continuation to the next position requires pressing a release button to free the crank.

Other safety function

Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics.



1 mismatch protection
2 door interlock
3 racking interlock
4 keylock locking
5 padlock locking
6 position indicator
7 chassis front plate (accessible with cubicle door closed)
8 crank entry
9 reset button
10 crank storage

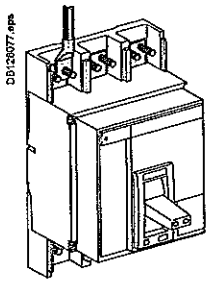
Electrical and mechanical accessories
Compact NS630b to 1600

Types of connection

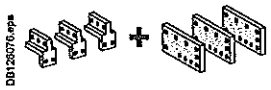
Fixed device

Front connections (N, L) — Connection by:

bars | bare cables (except L) | cables with lugs

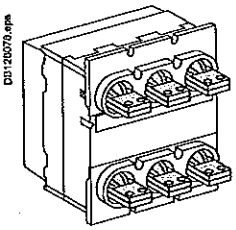
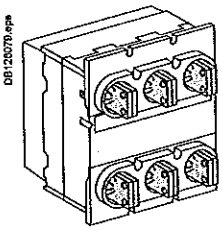




Rear connections (N, L, LB) — Connection by:

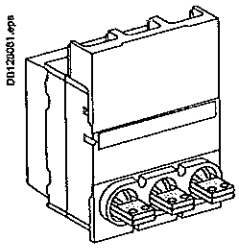
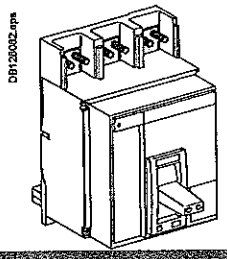
Horizontal: | Vertical: | bars | cables with lugs

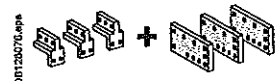

Simply turn a horizontal rear connector 90° to make it a vertical connector.

Combination of front and rear connections (N, L) — Connection by:

bars | bare cables (except L) | cables with lugs

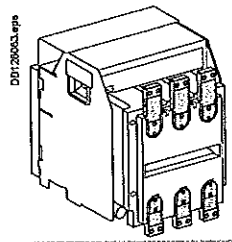


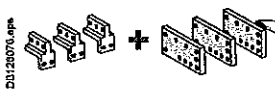



Withdrawable device

Front connections — Connection by:

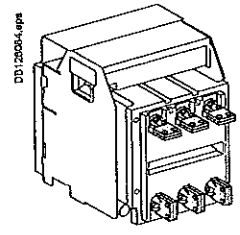
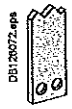
bars | cables with lugs

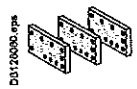


Rear connections — Connection by:

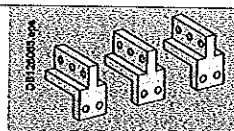
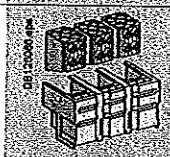
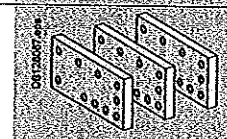
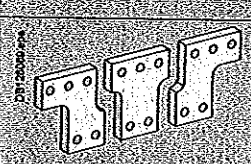
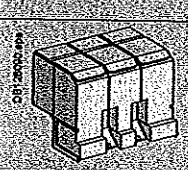
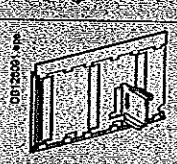
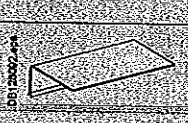
bars | cables with lugs



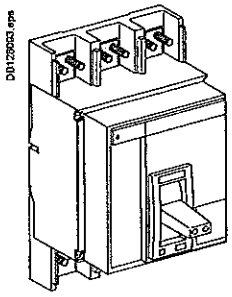
Connections accessories

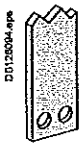
To ensure performance and isolation, depending on the type of circuit breaker (N, H, L, LB) and type of connection, certain isolation accessories are mandatory.

Type of accessories		For Compact NS630b to NS1600			
		Fixed:		Withdrawable:	
		Front connection	Rear connection	Front connection	Rear connection
Vertical-connection adapters		N, H, L	-	N, L, LB	-
Set of bare-cable connectors and terminal shields for ratings ≤ 1250 A		N, H	-	-	-
Cable lug adapters		N, H, L	N, H, L, LB	N, H, L, LB	N, H, L, LB
Interphase barriers (3)		N, H, L, LB (1) (2)	N, H, L, LB (1)	-	N, H, L, LB (1)
Spreaders		N, H, L	N, H, L, LB	N, H, L, LB	N, H, L, LB
Connection shield		N, H, L	-	-	-
Safety shutters with locking by padlocks (IP20)		-	-	N, H, L, LB *(standard)*	N, H, L, LB *(standard)*
Arc chute screen		N, H, L (1) (2)	-	-	

(1) Mandatory for voltages ≥ 500 V unless using the bare-cable connector + terminal shield kit.
(2) Mandatory for fixed devices with L and LB performance levels, whatever the voltage.
(3) The interphase barriers are not compatible with the spreaders.

Electrical and mechanical accessories
Compact NS630b to 1600

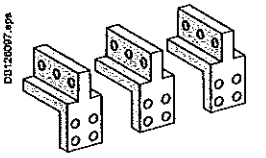




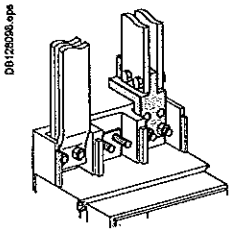
Front connection of fixed devices

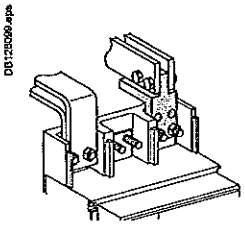
Bars

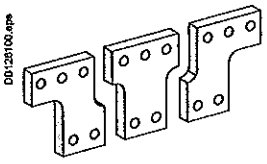
Fixed, front-connection Compact NS630b to 1600 devices are equipped with terminals comprising captive screws for direct connection of bars.
Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch to 95 mm.
If the vertical connection adapters are front oriented, then it is mandatory to install the arc chute screen in order to comply with the safety clearances.



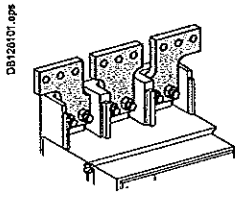
Vertical-connection adapters.

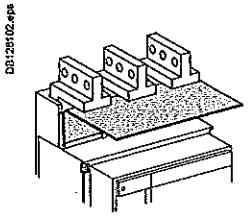






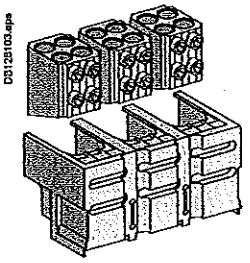
Spreaders.



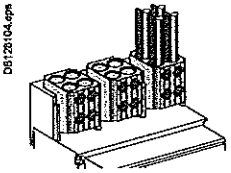


Bare cables

Special sets of connectors and terminal shields may be used to connect up to four 240 mm² copper or aluminium cables for each phase. Bare cable connection is possible for ratings up to and including 1250 A.

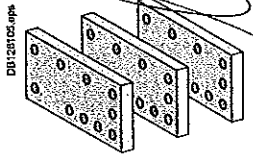


4-cable connectors.

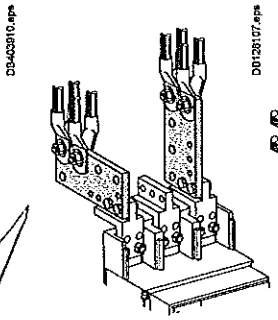


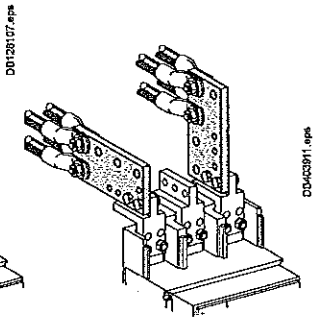
Cables with lugs

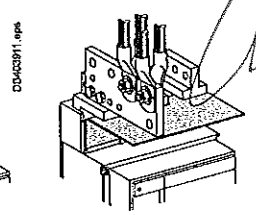
Cable lug adapters are combined with the vertical-connection adapters.
One to four cables with crimped lugs (≤ 300 mm²) may be connected.
To ensure stability, spacers must be positioned between the terminal extensions.
If the cable lug adapters are installed over the top of the arc chute chambers, then it is mandatory to install the arc chute screen in order to comply with the safety clearances.

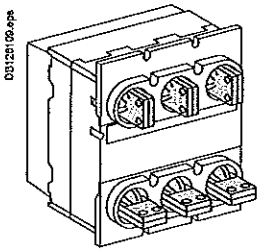


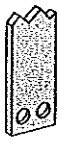
Cable lug adapters.







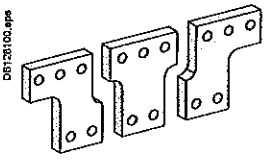




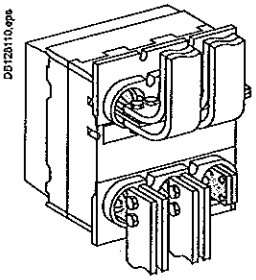
Rear connection of fixed devices

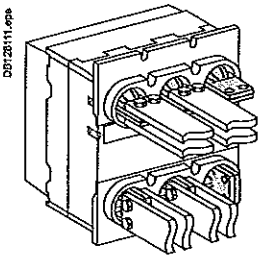
Bars

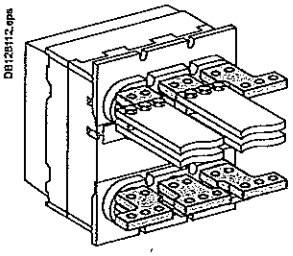
Fixed, rear-connection Compact NS630b to 1600 devices equipped with horizontal or vertical connectors may be directly connected to flat or edgewise bars, depending on the position of the connectors.
Spreaders are available to increase the pole pitch to 95 mm.



Spreaders.

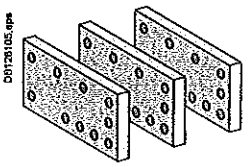




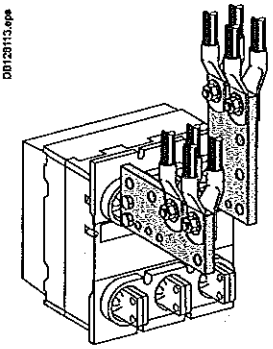


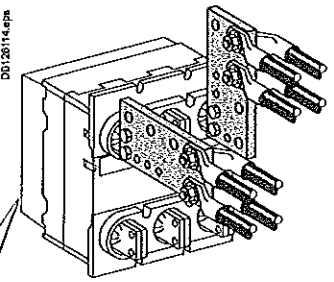
Cables with lugs

Cable lug adapters enable connection of one to four cables with crimped lugs ($\leq 300\ mm^2$).
To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters.



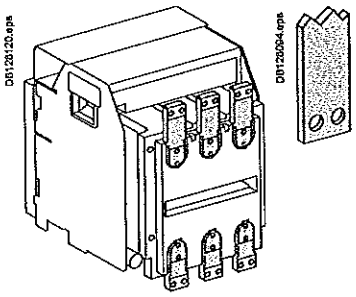


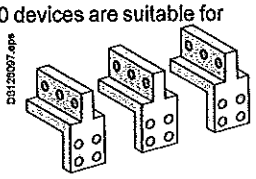
Electrical and mechanical accessories
Compact NS630b to 1600

Front connection of withdrawable devices

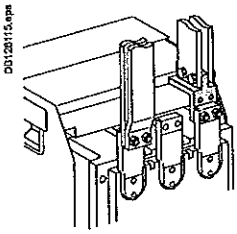
Bars

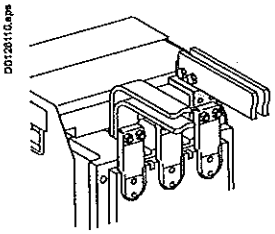
Withdrawable, front-connection Compact NS630b to 1600 devices are suitable for direct connection of bars.
Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch to 95 mm.

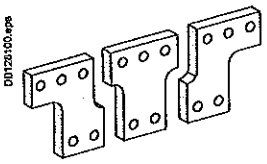




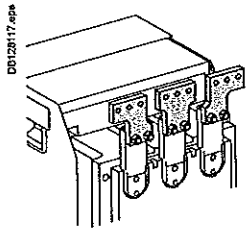
Vertical-connection adapters.





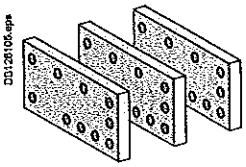


Spreaders.

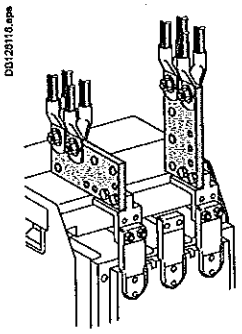


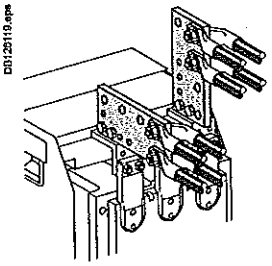
Cables with lugs

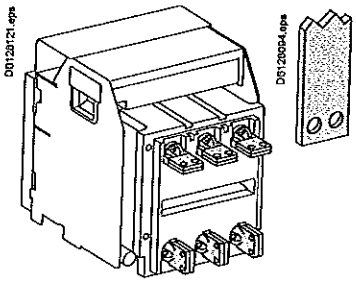
Cable lug adapters enable connection of one to four cables with crimped lugs (≤ 300 mm²).
To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters.



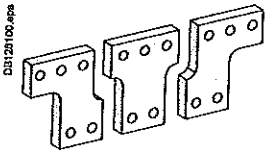




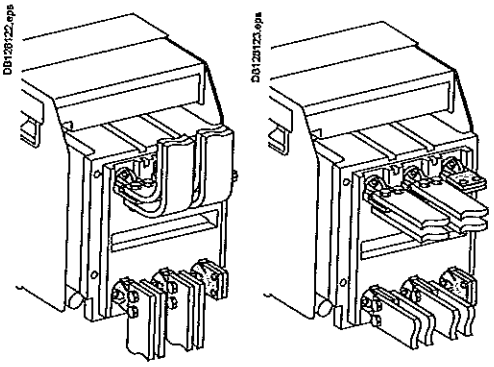
Rear connection of withdrawable devices

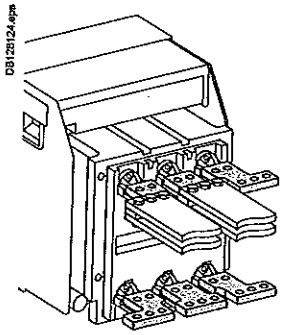
Bars

Withdrawable, rear-connection Compact NS630b to 1600 devices equipped with horizontal or vertical connectors may be directly connected to flat or edge-wise bars, depending on the position of the connectors.
Spreaders are available to increase the pole pitch to 95 mm.



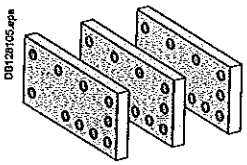
Spreaders.



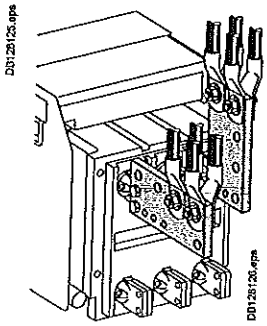


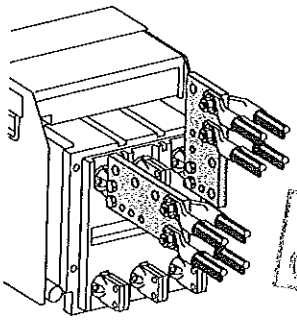
Cables with lugs

Cable lug adapters enable connection of one to four cables with crimped lugs (≤ 300 mm²).
To ensure stability, spacers must be positioned between the terminal extensions.

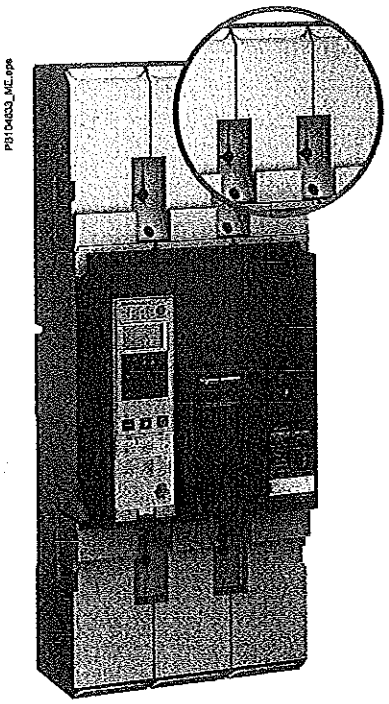


Cable lug adapters.





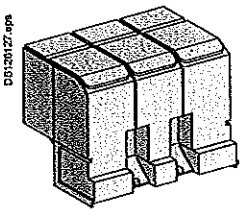
Electrical and mechanical accessories
Compact NS630b to 1600



Compact NS equipped with connection shield.

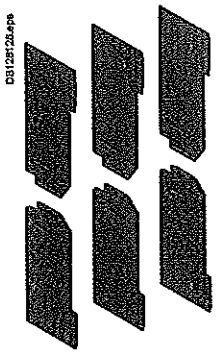
Insulation of live parts

Connection shield
Mounted on fixed, front-connection devices, this shield insulates power-connection points, particularly when cables with lugs are used

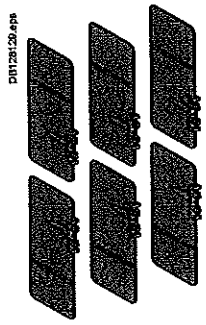


Connection shield.

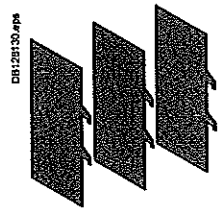
Interphase barriers
These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not.
Barriers are installed vertically between front or rear connection terminals.
They are mandatory for voltages ≥ 500 V for both fixed and withdrawable products and for L and LB types, whatever the voltage.



Interphase barriers for fixed device, front connection.

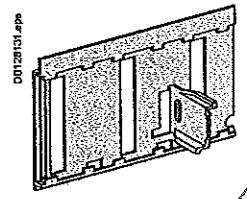


Interphase barriers for fixed device, rear connection.

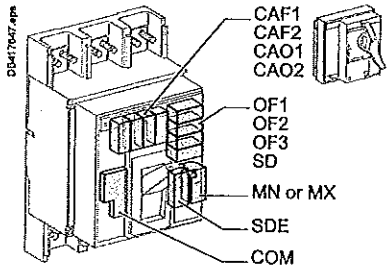


Interphase barriers for withdrawable device, rear connection.

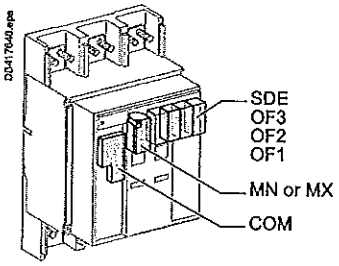
Safety shutters (standard)
Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP20). When the device is removed from its chassis, no live parts are accessible.
The shutters can be padlocked (padlock not supplied) to:
- prevent connection of the device
- lock the shutters in the closed position.



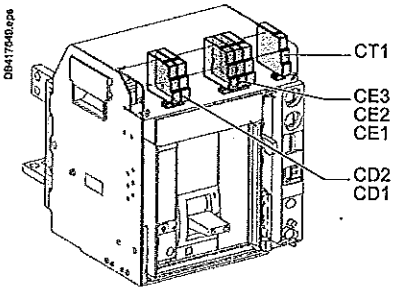
Safety shutters.



Manually operated device.



Electrically operated device.

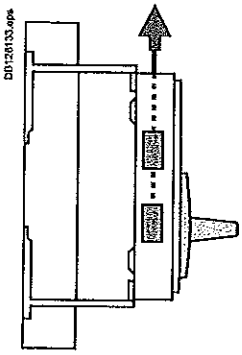


Withdrawable device.

Connection of electrical auxiliaries

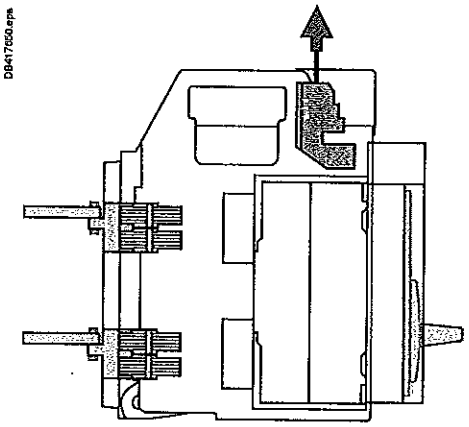
Fixed devices

Connections are made directly to the auxiliaries once the front has been removed.
Wires exit the circuit breaker through a knock-out in the top.



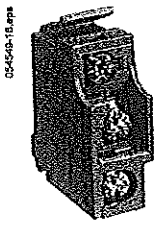
Withdrawable devices

Auxiliary circuits are connected to terminal blocks located in the top part of the chassis.
The auxiliary terminal block is made up of a fixed and moving part. The two parts are in contact when the device is in the test and connected positions.



Electrical and mechanical accessories
Compact NS630b to 1600

All the auxiliary contacts opposite are also available in "low-level" versions capable of switching very low loads (e.g. for the control of PLCs or electronic circuits).



OF, SD and SDE changeover contacts.

Indication contacts

Contacts installed in the device

Changeover contacts are used to remote circuit breaker status information and can thus be used for indications, electrical locking, relaying, etc.
They comply with the IEC 60947-5 international recommendation.

Functions

- ■ OF (ON/OFF) - indicates the position of the main circuit breaker contacts
- ■ SD (trip indication) - indicates that the circuit breaker has tripped due to:
  - □ an overload
  - □ a short-circuit
  - □ an earth-leakage fault.
  - □ operation of a voltage release
  - □ operation of the "push to trip" button
  - □ disconnection when the device is ON.

Returns to de-energised state when the circuit breaker is reset.

- ■ SDE (fault indication) - indicates that the circuit breaker has tripped due to:
  - □ an overload
  - □ a short-circuit
  - □ an earth-leakage fault.

Returns to de-energised state when the circuit breaker is reset.

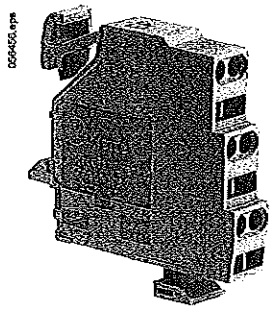
- ■ CAF / CAO (early-make or early-break function) - indicates the position of the rotary handle. Used in particular for advanced opening of safety trip devices (early break) or to energise a control device prior to circuit breaker closing (early make).

Installation

- ■ OF, SD and SDE functions - a single type of contact provides all these different indication functions, depending on where it is inserted in the device. The contacts clip into slots behind the front cover of the circuit breaker
- ■ CAF / CAO function - the contact fits into the rotary-handle unit (direct or extended).

Electrical characteristics of the OF/SD/SDE/CAF/CAO auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	6	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	2	-	-	5	1.5	-	-
	480 V	6	1.5	-	-	5	1	-	-
	660/690 V	6	0.1	-	-	-	-	-	-



Carriage switches for connected (CE), disconnected (CD) and test (CT) positions.

Connected, disconnected, test position carriage switches

A single type of changeover contact can be mounted optionally on the chassis to indicate, depending on the slot where it is installed:

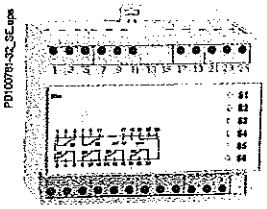
- ■ the connected (CE) position
- ■ the disconnected (CD) position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- ■ the test (CT) position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Installation

- ■ contacts for the connected (CE), disconnected (CD) and test (CT) positions clip into the upper front section of the chassis.

Electrical characteristics of the CE/CD/CT auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		8				5			
Minimum load		100 mA at 24 V				2 mA at 15 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	8	6	2.5	1	5	3	5	1
	48 V	8	6	2.5	0.2	5	3	2.5	0.2
	110 V	8	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	8	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	8	3	-	-	5	1.5	-	-
	660/690 V	6	0.1	-	-	-	-	-	-



M6C programmable contacts:
circuit breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection (maximum length is 10 meters).

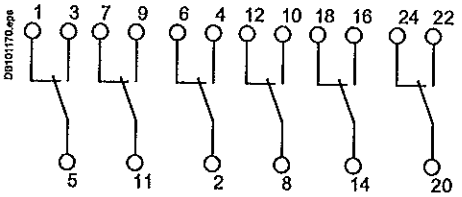
M6C programmable contacts

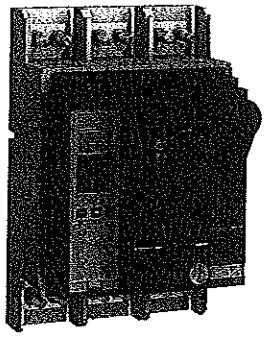
These contacts, used with the Micrologic P control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.
They indicate:
- the type of fault
- instantaneous or delayed threshold overruns.

They may be programmed:
- with instantaneous return to the initial state
- without return to the initial state
- with return to the initial state following a delay.

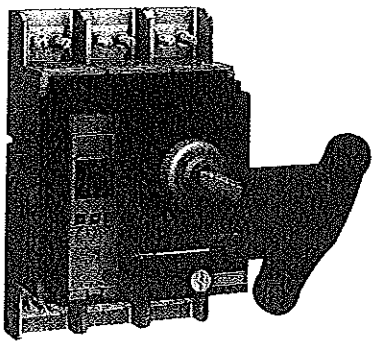
Characteristics			M6C
Minimum load			100 mA/24 V
Breaking capacity (A)	VAC	240	5
p.f.: 0.7		380	3
	VDC	24	1.8
		48	1.5
		125	0.4
		250	0.15

M6C : alimentation extérieure 24 V CC (consommation 100 mA).





Compact NS with a direct rotary handle.



Compact NS with an extended rotary handle.

Rotary handles

There are two types of rotary handle:
- direct rotary handle
- extended rotary handle.

There are two models:
- standard with a black handle
- VDE with a red handle and yellow front for machine-tool control.

Direct rotary handle

Degree of protection IP40, IK07.
The direct rotary handle maintains:
- visibility of and access to trip unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to the "push to trip" button
- circuit breaker locking capability in the OFF position by one to three padlocks, shackle diameter 5 to 8 mm (not supplied).

It replaces the circuit breaker front cover.
Accessories transform the standard direct rotary handle for the following situations:
- a higher degree of protection (IP43, IK07)
- machine-tool control, complying with CNOMO E03.81.501, IP54, IK07.

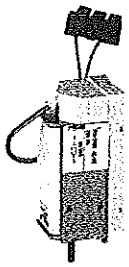
Extended rotary handle

Degree of protection IP55, IK07.
This handle makes it possible to operate circuit breakers installed at the back of switchboards, from the switchboard front.
It maintains:
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to trip unit settings, when the switchboard door is open
- circuit breaker locking capability in the OFF position by one to three padlocks, shackle diameter 5 to 8 mm (not supplied).

The door cannot be opened if the circuit breaker is ON or locked.
The extended rotary handle is made up of:
- a unit that replaces the front cover of the circuit breaker (secured by screws)
- an assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally
- an extension shaft that must be adjusted to the distance. The min/max distance between the back of circuit breaker and door is 218/605 mm.

Electrical and mechanical accessories
Compact NS630b to 1600

Manually operated circuit breakers may be equipped with an MX shunt release, an MN undervoltage release or a delayed undervoltage release (MN + delay unit). Electrically operated circuit breakers are equipped as standard with a remote-operating mechanism to remotely open or close the circuit breaker. An MX shunt release or an MN undervoltage release (instantaneous or delayed) may be added.



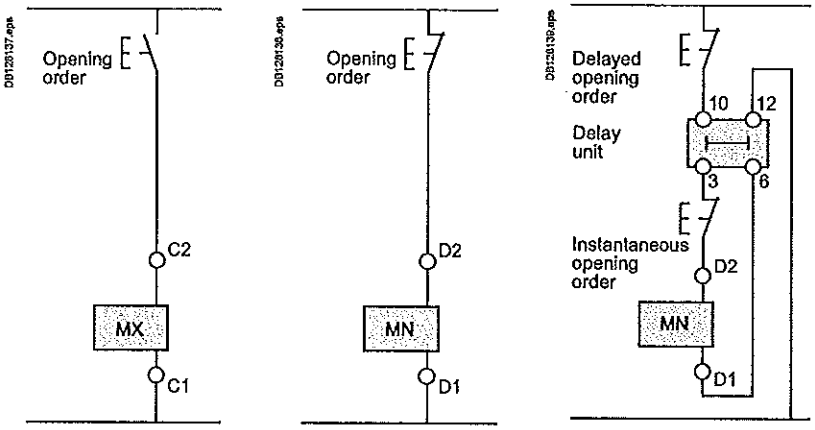
MX voltage release.

Remote tripping

This function opens the circuit breaker via an electrical order. It is made up of:
- a shunt release (2nd MX)
- or an undervoltage release MN
- or a delayed undervoltage release MN + delay unit.

These releases (2nd MX or MN) cannot be operated by the communication bus. The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases 2nd MX

When energised, the 2nd MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the 2nd MX locks the circuit breaker in the OFF position.

Characteristics			
Power supply	VAC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.7 to 1.1 Un	
Permanent locking function		0.85 to 1.1 Un	
Consumption (VA or W)		pick-up: 200 (200 ms)	hold: 4.5
Circuit breaker response time at Un		50 ms ±10	

Instantaneous voltage releases MN

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

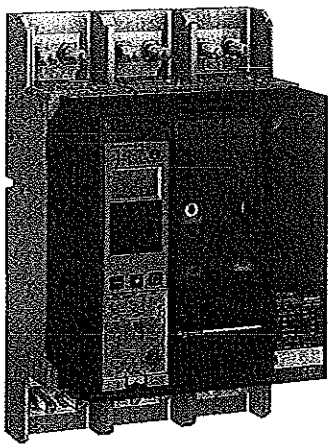
Characteristics			
Power supply	VAC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480	
	V DC	24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	opening	0.35 to 0.7 Un	
	closing	0.85 Un	
Consumption (VA or W)		pick-up: 200 (200 ms)	hold: 4.5
MN consumption with delay unit (VA or W)		pick-up: 400 (200 ms)	hold: 4.5
Circuit breaker response time at Un		90 ms ±5	

MN delay units

To eliminate circuit breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics		
Power supply VAC 50-60 Hz /DC	non-adjustable	100/130 - 200/250
	adjustable	48/60 - 100/130 - 200/250 - 380/480
Operating threshold	opening	0.35 to 0.7 Un
	closing	0.85 Un
Consumption of delay unit alone (VA or W)	pick-up: 200 (200 ms)	hold: 4.5
Circuit breaker response time at Un	non-adjustable	0.25 s
	adjustable	0.5 s - 0.9 s - 1.5 s - 3 s

Electrically operated circuit breakers are equipped as standard with a motor mechanism module.
Two solutions are available for electrical operation:
- a point-to-point solution
- a bus solution with the COM communication option.



Electrically operated Compact NS circuit breaker.

Electrically operated circuit breaker

The motor mechanism module is used to remotely open and close the circuit breaker. It is made up of a spring-charging motor equipped with an opening release and a closing release.
An electrical operation function is generally combined with:
- device ON/OFF indication OF
- "fault-trip" indication SDE.

Motor mechanism module		
Power supply	VAC 50/60 Hz V DC	48/60 - 100/130 - 200/240 - 277 - 380/415 24/30 - 48/60 - 100/125 - 200/250
Operating threshold		0.85 to 1.1 Un
Consumption (VA or W)		180
Motor overcurrent		2 to 3 In for 0.1 second
Charging time		maximum 4 seconds
Operating frequency		maximum 3 cycles per minute

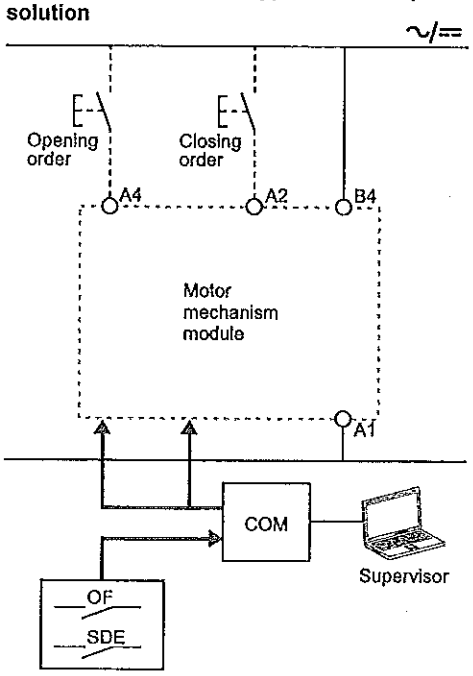
Electrical closing order

The release remotely closes the circuit breaker if the spring mechanism is charged. Release electrical characteristics are identical to those of an MX release (see above), the operating threshold is from 0.85 to 1.1 Un and the circuit breaker response time at Un is 60 ms ±10.
The Compact NS electrical operation function can be used to implement a synchro-coupling system.

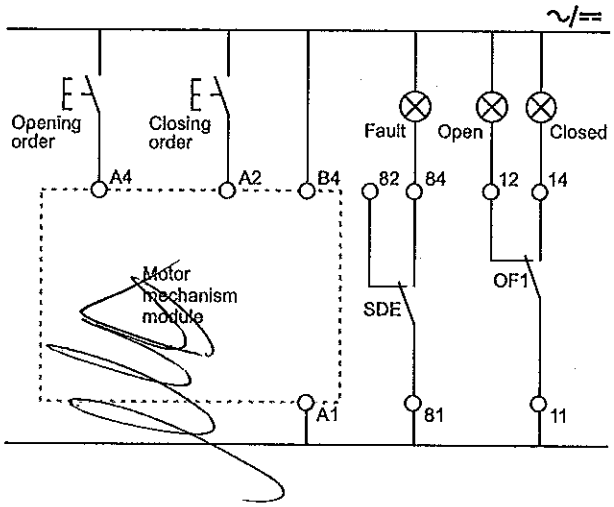
Electrical opening order

The release instantaneously opens the circuit breaker when energised. The supply can be impulse-type or maintained.
Release electrical characteristics are identical to those of an MX release (see above).

Wiring diagram of a bus-type electrical operation solution

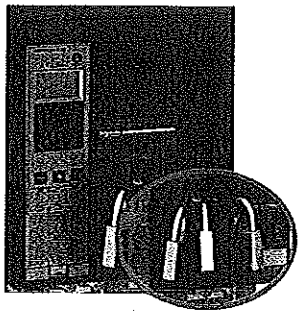


Wiring diagram of a point-to-point electrical operation solution

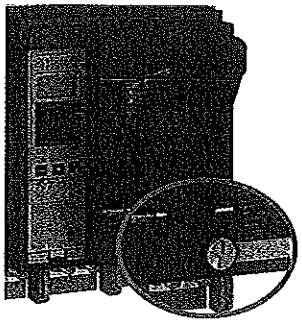


In the event of simultaneous opening and closing orders, the mechanism discharges without any movement of the main contacts.
In the event of maintained opening and closing orders, the standard electrical operation solution provides an anti-pumping function by blocking the main contacts in open position.

Electrical and mechanical accessories
Compact NS630b to 1600



Toggle locked by removable padlocking device.



Rotary handle locked by a keylock.

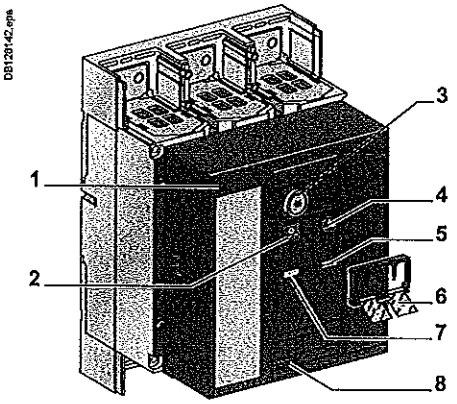
Locking on manually operated devices

Locking in the OFF position guarantees isolation as per IEC 60947-2.
Padlocking systems can receive up to three padlocks with shackle diameters ranging from 5 to 8 mm (padlocks not supplied).

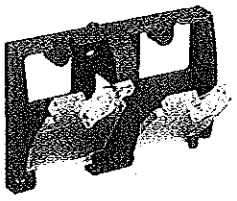
Control device	Function	Means	Required accessories
Toggle	lock in		
	■ OFF position	padlock	removable device
	■ OFF or ON position	padlock	fixed device
Direct rotary handle	lock in		
	■ OFF position	padlock	
	■ OFF or ON position	keylock	locking device + keylock
CNOMO direct rotary handle	lock in ■ OFF position	padlock	
Extended rotary handle	lock in OFF position, door opening prevented	padlock	
		keylock	keylock

Locking in ON position does not prevent the device from tripping in the event of a fault or remote tripping order.

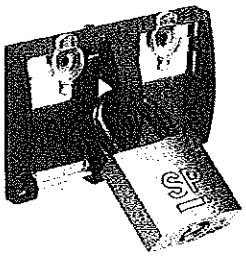
Locking on electrically operated devices



1 *reset of mechanical trip indicator*
2 *OFF pushbutton*
3 *OFF position locking*
4 *ON pushbutton*
5 *springs charged indication*
6 *pushbutton locking*
7 *contact position indication*
8 *operation counter*



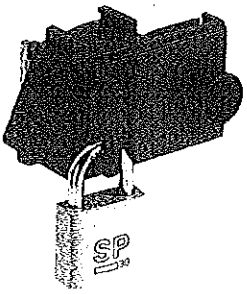
Access to pushbuttons protected by transparent cover.



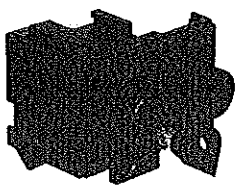
Pushbutton locking using a padlock.

Pushbutton locking VBP

The transparent cover blocks access to the pushbuttons used to open and close the device.
It is possible to independently lock the opening OFF button and the closing ON button.
The pushbuttons may be locked using either:
- three padlocks (not supplied)
- lead seal
- two screws.



OFF position locking using padlocks.



OFF position locking using a keylock and padlocks.

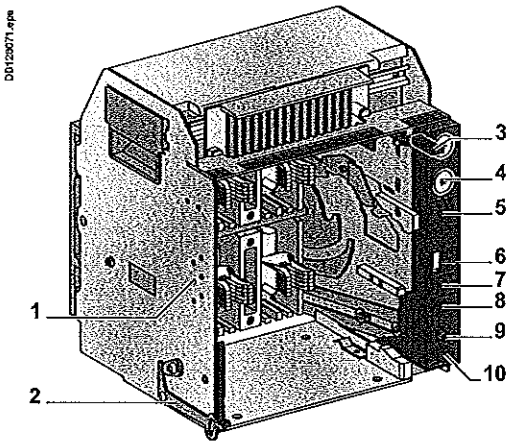
Device locking in the OFF position VCPO by padlocks, VSPO by keylocks

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:
- using padlocks in standard (one to three padlocks, not supplied)
- using a keylock (supplied).

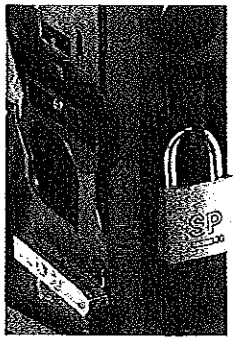
Keys may be removed only when locking is effective (Profalux or Ronis type locks).
The keylocks are available in any of the following configurations:
- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device.

A locking kit (without lock) is available for installation of a keylock (Ronis, Profalux, Kirk or Castell).

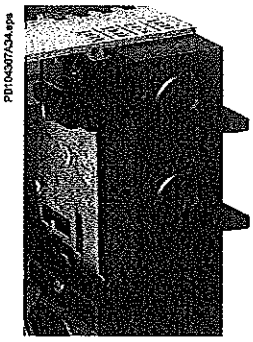
Chassis locking



1 *mismatch protection*
2 *door interlock*
3 *racking interlock*
4 *keylock locking*
5 *padlock locking*
6 *position indicator*
7 *chassis front plate (accessible with cubicle door closed)*
8 *crank entry*
9 *reset button*
10 *crank storage*



"Disconnected" position locking by padlocks.



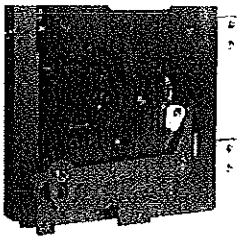
"Disconnected" position locking by keylocks.

"Disconnected" position locking by padlocks (standard) or keylocks (VSPD option)

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the disconnected position in two manners:
- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:
- one keylock
- one keylock mounted on the device + one identical keylock supplied separately, using the same key, for interlocking with another device
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately, for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).



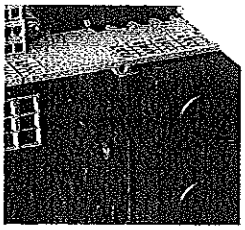
Door interlock.

"Connected", "disconnected" and "test" position locking

The connected, disconnected and test positions are shown by an indicator and are mechanically indexed.
The racking crank blocks when the exact position is obtained.
A release button is used to free it.
As standard, the circuit breaker can be locked only in "disconnected position". On request, the locking system may be modified to lock the circuit breaker in any of the three positions: "connected", "disconnected" or "test".

Door interlock catch VPEC

Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in connected or test position. It the breaker is put in the connected position with the door open, the door may be closed without having to disconnect the circuit breaker.



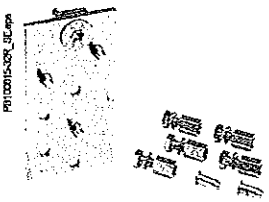
Racking interlock.

Racking interlock VPOC

This device prevents insertion of the crank when the cubicle door is open (device cannot be connected).

Mismatch protection VDC

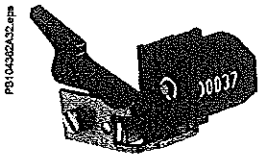
Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics. It is made up of two parts (one on the chassis and one on the circuit breaker) offering twenty different combinations that the user may select.



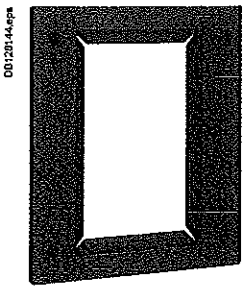
Mismatch protection.

Electrical and mechanical accessories
Compact NS630b to 1600

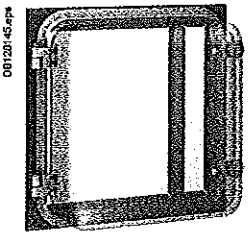
Auxiliary terminal shield.



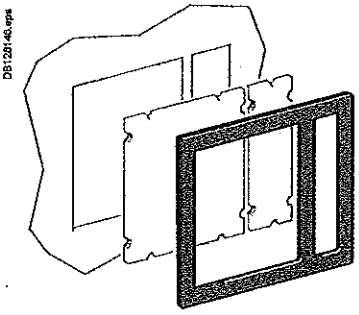
Operation counter.



Escutcheon.



Transparent cover.



Blanking plate.

Other accessories

Auxiliary terminal shield (CB)
Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.

Operation counter (CDM)
The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with electrically operated devices.

Escutcheon (CDP)
Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP40. It is available in fixed and withdrawable versions.

Transparent cover (CCP) for escutcheon
Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP54 and the degree of protection against mechanical impacts to IK10. It may be used for withdrawable devices only.

Blanking plate (OP) for escutcheon
Used with the escutcheon, this option closes off the door cutout of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and withdrawable devices.

Electrical and mechanical accessories
Compact NS1600b to 3200 (fixed version)

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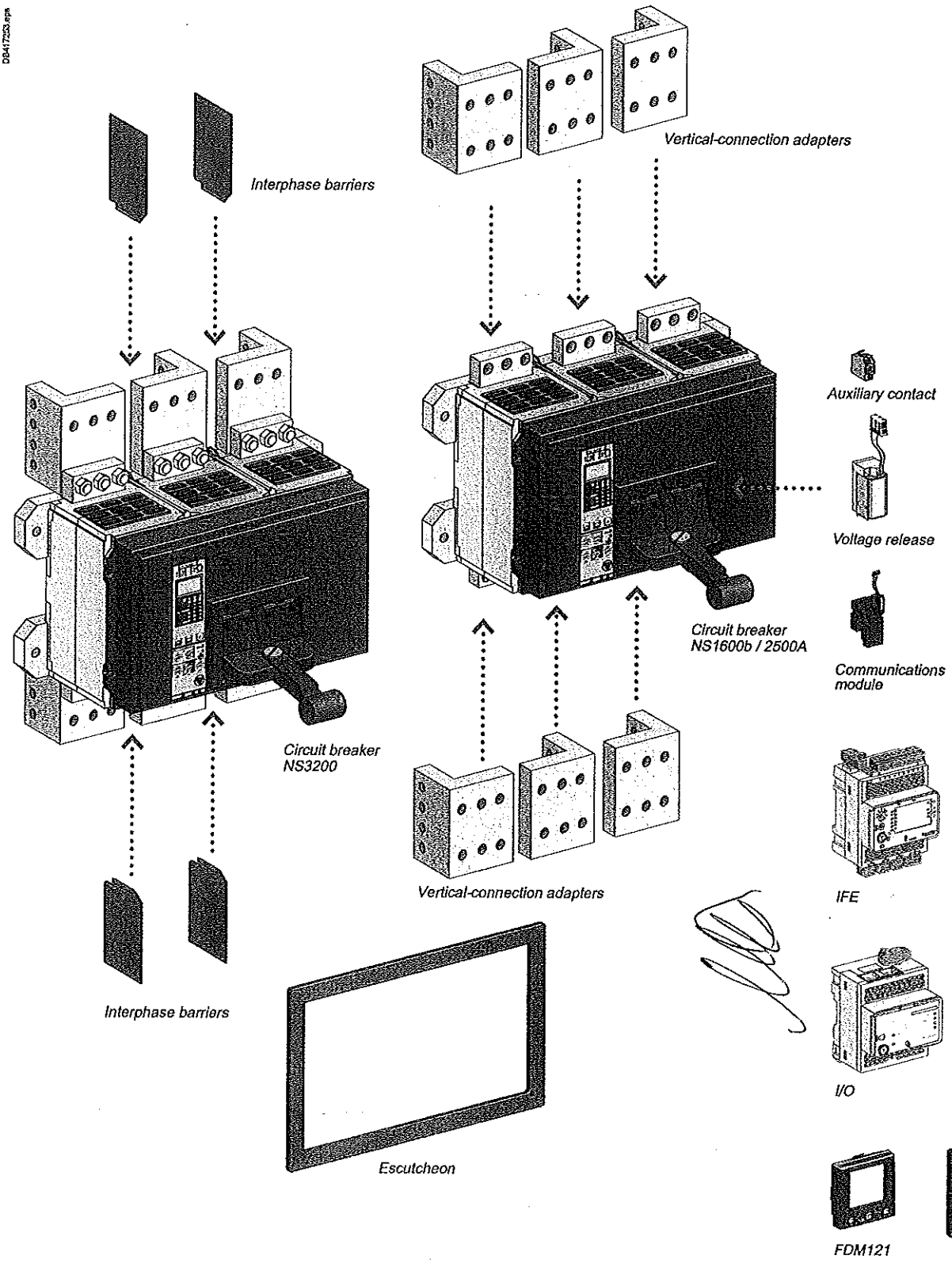
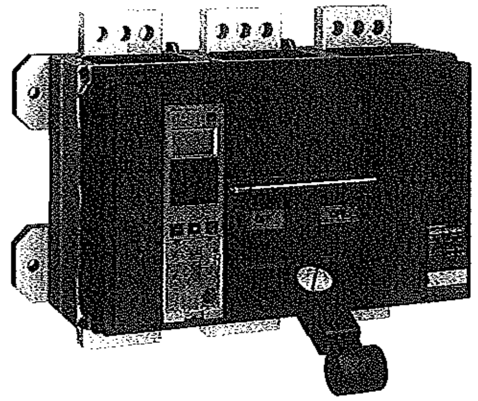


Electrical and mechanical accessories

Compact NS1600b to 3200

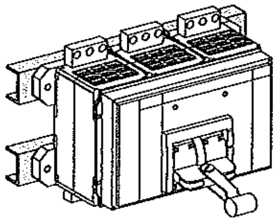


Fixed Compact NS.

Installation

Fixed circuit breakers

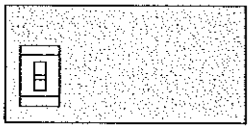
Compact NS1600b to 3200 circuit breakers should be installed vertically only.



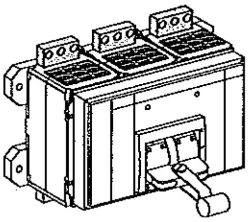
Mounting on rails.

Connection

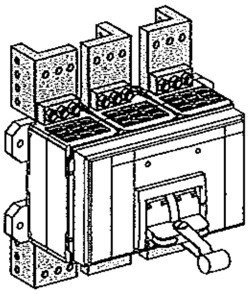
Front connection



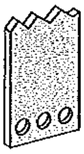
NS1600 to 2500



NS3200

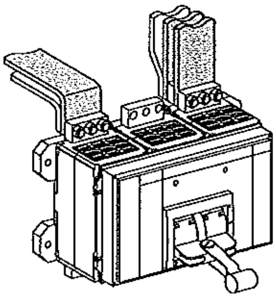


Bars

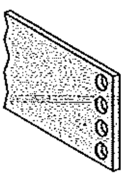


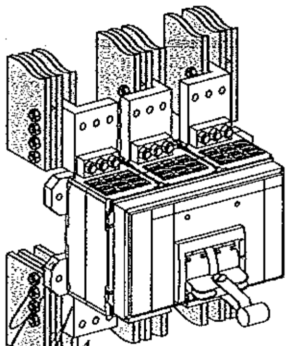
Bars may be directly connected to the terminals of Compact NS1600b to 3200 circuit breakers.

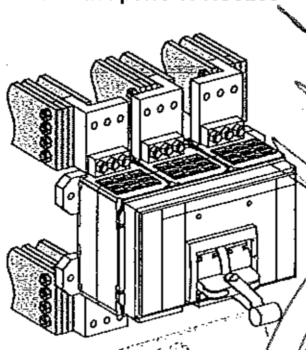
NS1600b to 2500



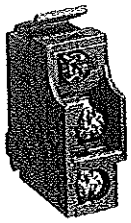
NS1600b to 2500 with connection for vertical-connection adapters or NS3200







All the auxiliary contacts opposite are also available in "low-level" versions capable of switching very low loads (e.g. for the control of PLCs or electronic circuits).



OF, SD and SDE changeover contacts.

Indication contacts

Contacts installed in the device

Changeover contacts are used to remote circuit breaker status information and can thus be used for indications, electrical locking, relaying, etc.
They comply with the IEC 60947-5 international recommendation.

Functions

- OF (ON/OFF) - indicates the position of the main circuit breaker contacts
- SD (trip indication) - indicates that the circuit breaker has tripped due to:
  - an overload
  - a short-circuit
  - an earth-leakage fault
  - operation of a voltage release
  - operation of the "push to trip" button
- Returns to de-energised state when the circuit breaker is reset.

SDE (fault indication) - indicates that the circuit breaker has tripped due to:
- an overload
- a short-circuit
- an earth-leakage fault.

Returns to de-energised state when the circuit breaker is reset.

Installation

- OF, SD and SDE functions - a single type of contact provides all these different indication functions, depending on the position where it is inserted in the device. The contacts clip into slots behind the front cover of the circuit breaker.

Electrical characteristics of the OF/SD/SDE auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	6	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	2	-	-	5	1.5	-	-
	480 V	6	1.5	-	-	5	1	-	-
	660/690 V	6	0.1	-	-	-	-	-	-

Electrical and mechanical accessories
Compact NS1600b to 3200

Compact NS1600b to 3200 circuit breakers may be equipped with an MX shunt release, an MN undervoltage release or a delayed undervoltage release (MNR = MN + delay unit).

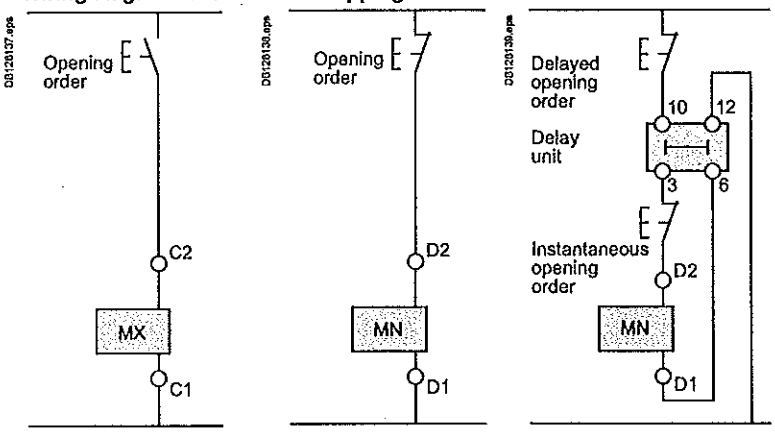
MX voltage release

Remote tripping

This function opens the circuit breaker via an electrical order. It is made up of:
- a shunt release 2nd MX
- or an undervoltage release MN
- or a delayed undervoltage release MNR = MN + delay unit.

These releases (2nd MX or MN) cannot be operated by the communication bus. The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases 2nd MX

When energised, the 2nd MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the 2nd MX locks the circuit breaker in the OFF position.

Characteristics			
Power supply	VAC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480	
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250	
Operating threshold		0.7 to 1.1 Un	
Permanent locking function		0.85 to 1.1 Un	
Consumption (VA or W)		pick-up: 200 (80 ms)	hold: 4.5
Circuit breaker response time at Un		50 ms ±10	

Instantaneous voltage releases MN

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

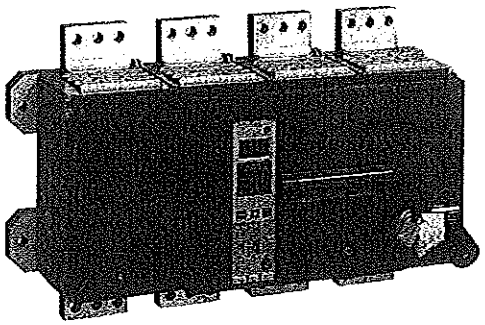
Characteristics			
Power supply	VAC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480	
	V DC	24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	opening	0.35 to 0.7 Un	
	closing	0.85 Un	
Consumption (VA or W)		pick-up: 200 (200 ms)	hold: 4.5
MN consumption with delay unit (VA or W)		pick-up: 400 (200 ms)	hold: 4.5
Circuit breaker response time at Un		90 ms ±5	

MN delay units

To eliminate circuit breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics			
Power supply VAC 50-60 Hz /DC	non-adjustable	100/130 - 200/250	
	adjustable	48/60 - 100/130 - 200/250 - 380/480	
Operating threshold	opening	0.35 to 0.7 Un	
	closing	0.85 Un	
Consumption of delay unit alone (VA or W)		pick-up: 200 (200 ms)	hold: 4.5
Circuit breaker response time at Un	non-adjustable	0.25 s	
	adjustable	0.5 s - 0.9 s - 1.5 s - 3 s	

PB104830_ME.eps



Compact NS with toggle locked using a fixed device and padlocks.

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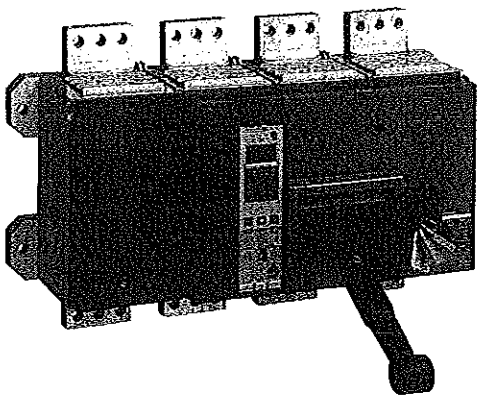

Compact NS with toggle locked using a removable device and padlocks.

Device locking

Locking in the OFF position guarantees isolation as per IEC 60947-2. Padlocking systems can receive up to three padlocks with shackle diameters ranging from 5 to 8 mm (padlocks not supplied).

Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	lock in OFF or ON position	padlock	fixed device

Interphase barriers

These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not. Barriers are installed vertically between front connection terminals.

Escutcheon CDP

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP40.

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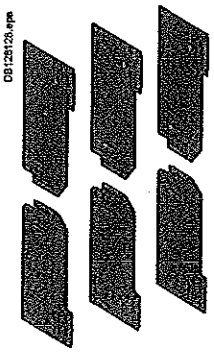

Interphase barriers.

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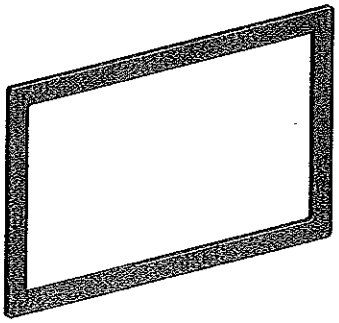


Escutcheon.

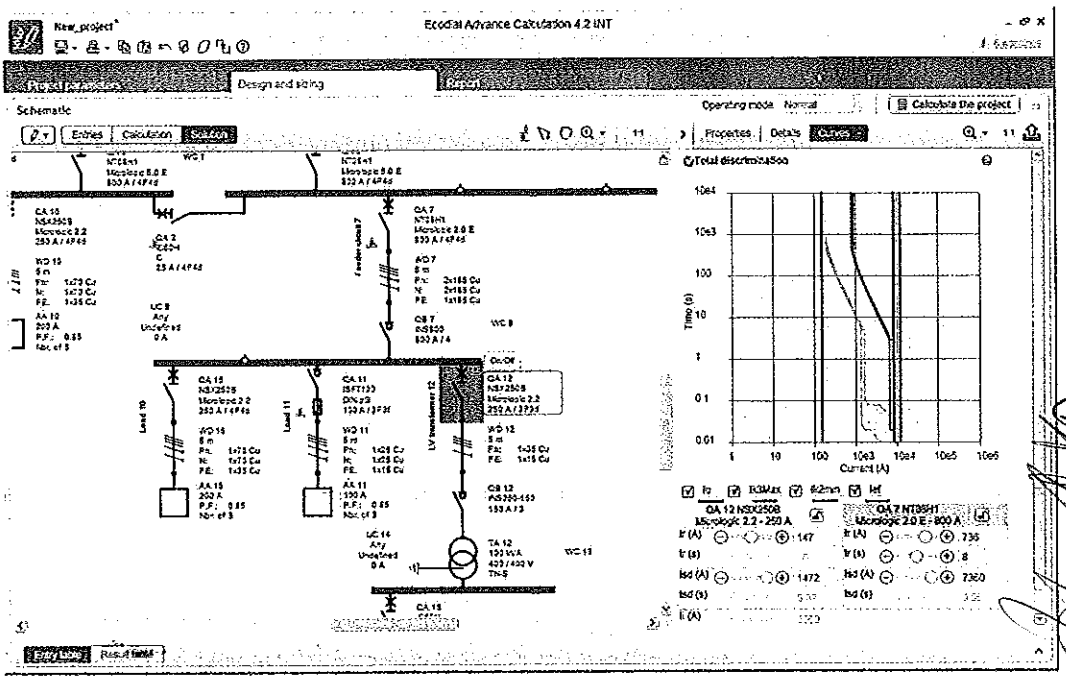
TOOLS

Ecodial

Ecodial software is dedicated to LV electrical installation calculation in accordance with the IEC60364 international standard or national standards.

This 4th generation, "Ecodial Advance Calculation 4", offers a new ergonomic and new features:

- operating mode that allows easy calculation in case of installation with different type of sources (parallel transformers, back-up generators...)
- discrimination analysis associating curves checking and discrimination tables
- direct access to protection settings including residual current protections
- easy selection of alternate solutions or manual selection of a product.



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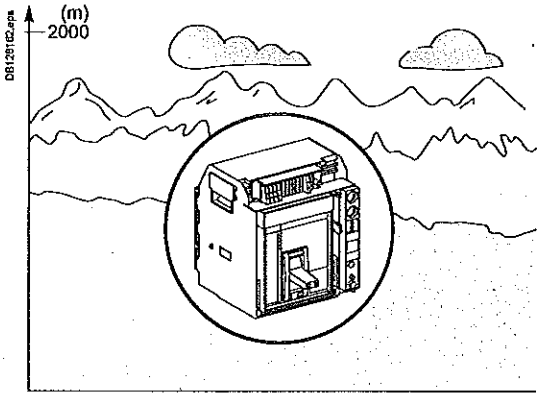
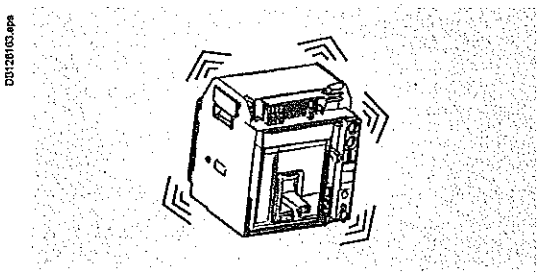
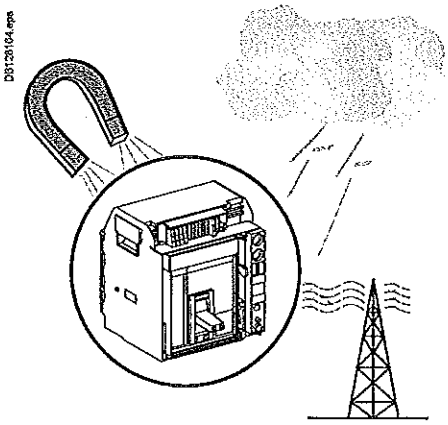
Installation recommendations

Operating conditions

Compact circuit breakers have been tested for operation in industrial atmospheres.
It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.







Altitude derating

Altitude does not significantly affect circuit-breaker characteristics up to 2000 m. Above this altitude, it is necessary to take into account the decrease in the dielectric strength and cooling capacity of air.
The following table gives the corrections to be applied for altitudes above 2000 metres. The breaking capacities remain unchanged.

Compact NS630b to 3200

Altitude (m)	2000	3000	4000	5000
Impulse withstand voltage Uimp (kV)	8	7.1	6.4	5.6
Rated insulation voltage (Ui)	800	710	635	560
Maximum rated operationnal voltage 50/60 Hz Ue (V)	690	690	635	560
Rated current 40 °C	1 x In	0.99 x In	0.96 x In	0.94 x In

Intermediate values may be obtained by interpolation.

Vibrations

Compact NS devices resist electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 60068-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):
- 2 → 13.2 Hz: amplitude ±1 mm
- 13.2 → 100 Hz: constant acceleration 0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.

Electromagnetic disturbances

Compact NS devices are protected against:
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced by users.

Compact NS devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:
- IEC 60947-2, appendix F
- IEC 60947-2, appendix B (trip units with Vigi earth-leakage function).

The above tests guarantee that:
- no nuisance tripping occurs
- tripping times are respected.

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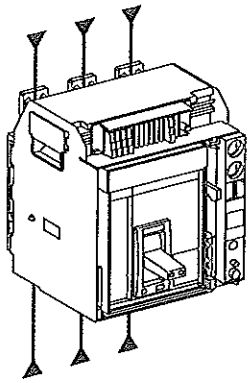
Installation in switchboards
Power supply and weights



Power supply
Compact NS circuit breakers can be supplied from either the top or the bottom without any reduction in performance. This capability facilitates connection when installed in a switchboard.

Weights

		Circuit breaker	Chassis
NS630b to 1600 manual operation	3P	14	14
	4P	18	18
NS630b to 1600 electrical operation	3P	14	16
	4P	18	21
NS1600b to 3200	3P	24	-
	4P	36	-

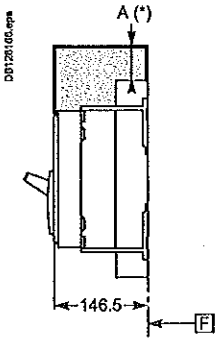
The table above presents the weights (in kg) of the circuit breakers and the main accesories, which must be summed to obtain the total weight of complete configurations.

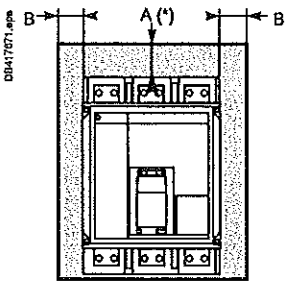
Installation in switchboards
Safety clearances and minimum distances

General rules

When installing a circuit breaker, minimum distances (safety clearances) must be maintained between the device and panels, bars and other protection devices installed nearby. These distances, which depend on the ultimate breaking capacity, are defined by tests carried out in accordance with standard IEC 60947-2.
If installation conformity is not checked by type tests, it is also necessary to:
- use insulated bars for circuit-breaker connections
- block off the busbars using insulating screens.

Compact NS630b to 3200 (fixed devices)

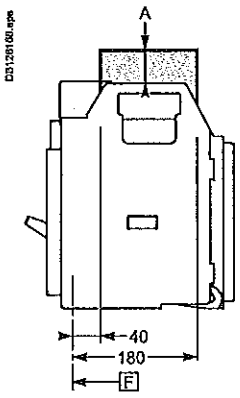


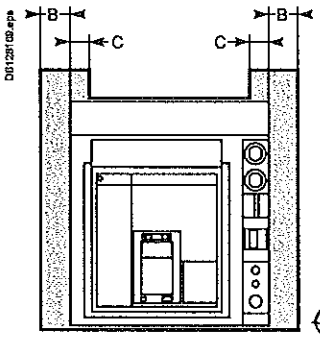


(*) An overhead clearance of 50 mm is required to remove the arc chutes.

	Insulated parts	Metal parts	Live parts
NS630b to 1600			
A	0	120	180
B	0	10	60
NS1600b to 3200			
A	50	170	230
B	0	10	60

Compact NS630b to 1600 (withdrawable devices)





	Insulated parts	Metal parts	Live parts
A	0	0	30
B	10	10	60
C	0	0	30

F *Datum*

Installation example

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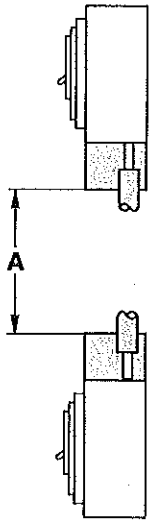
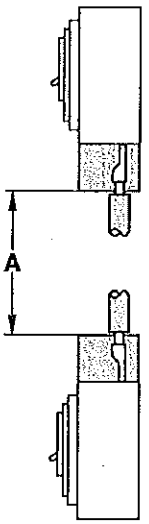
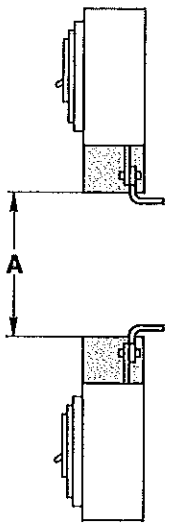


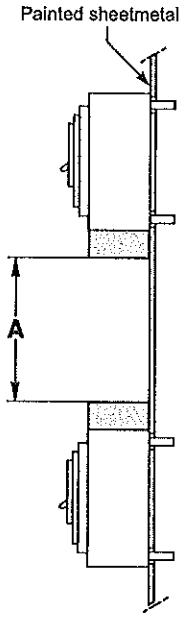
Direct connection by bare cables, devices with terminal shields.



Connection by cables with lugs, devices with terminal shields.



Connection by insulated bars, devices with terminal shields.



Rear connection or plug-in base, devices with terminal shields.

Minimum dimensions (mm) Compact circuit breaker	A
NS630b-1600	250
NS1600b-3200	300

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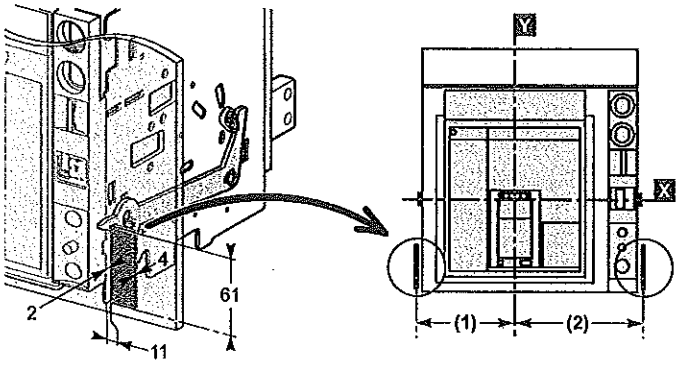
Door interlock for Compact NS630b to 1600

Mounted on the left or right-hand side of the chassis, this locking device prevents opening of the door if the circuit breaker is in the connected or test positions. If the circuit breaker was connected with the door open, the door may be closed without having to disconnect the circuit breaker.

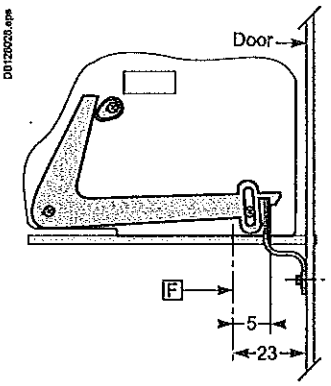


Dimensions (mm)

Type	(1)	(2)
NS630b to 1600 (3P)	135	168
NS630b to 1600 (4P)	205	168

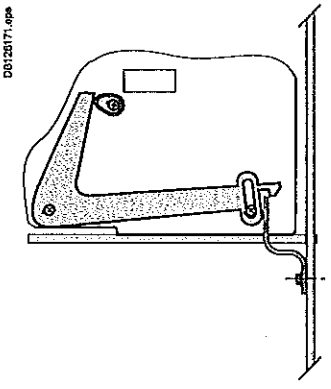
Device in the connected or test positions

Door locked



Device in the disconnected position

Door not locked



Note: *The door interlock may be mounted on either the left or right-hand side of the chassis.*

F *Datum*

Wiring of voltage releases

During pick-up, the power consumed is approximately 150 to 200 VA.
For low control voltages (12, 24, 48 V), maximum cable lengths are imposed by the voltage and the cross-sectional area of cables.

Recommended maximum cable lengths (meter).

		12 V		24 V		48 V	
		2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²
MN	U source 100 %	–	–	58	35	280	165
	U source 85 %	–	–	16	10	75	45
MX-XF	U source 100 %	21	12	115	70	550	330
	U source 85 %	10	6	75	44	350	210

Note: the indicated length is that of each of the two wires.

24 V DC power-supply module

External 24 V DC power-supply module for Micrologic (F1-, F2+)

- Do not connect the positive terminal (F2+) to earth.
- The negative terminal (F1-) can be connected to earth, except in IT systems.
- A number of Micrologic control units and M6C modules can be connected to the same 24 V DC power supply (the consumption of a Micrologic control unit or an M6C module is approximately 100 mA).
- Do not connect any devices other than a Micrologic control unit or an M6C module if voltage > 480 V AC or in an environment with high level of electromagnetic desturbance.
- The maximum length for each conductor is ten metres. For greater distances, it is advised to twist the supply wires together.
- The 24 V DC supply wires must cross the power cables perpendicularly. If this is difficult, it is advised to twist the supply wires together.
- The technical characteristics of the external 24 V DC power-supply module for Micrologic control units are indicated on page A-28.

Communication bus

- Do not connect the positive terminal (E1) to earth.
- The negative terminal (E2) can be connected to earth.
- A number of "device" or "chassis" communication modules can be connected to the same 24 V DC power supply (the consumption of each module is approximately 30 mA).

***Note:** wiring of ZSI: it is recommended to use twisted shielded cable. The shield must be connected to earth at both ends.*

Temperature derating
Compact NS devices equipped with electronic trip units

Compact circuit breakers have been tested for operation in industrial atmospheres.
It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

Compact NS630b to NS1600 (1)

The table below indicates the maximum rated-current value for each type of connection, depending on the ambient temperature.
For mixed connections, use the same derating values as for horizontal connections.

Version	Fixed device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/L	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
NS1250 N	1250	1250	1250	1250	1250	1240	1090	1250	1250	1250	1250	1250	1250	1180
NS1600 N	1600	1600	1560	1510	1470	1420	1360	1600	1600	1600	1600	1600	1510	1460

Version	Withdrawable device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/L	1000	1000	1000	1000	1000	1000	920	1000	1000	1000	1000	1000	1000	990
NS1250 N	1250	1250	1250	1250	1250	1170	1000	1250	1250	1250	1250	1250	1250	1090
NS1600 N	1600	1600	1520	1480	1430	1330	1160	1600	1600	1600	1560	1510	1420	1250

Compact NS1600b to 3200

Version	Fixed device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS1600b N	1600	1600	1600	1600	1500	1450	1400	1600	1600	1600	1600	1600	1550	1500
NS2000 N	2000	2000	2000	2000	1900	1800	1700	2000	2000	2000	2000	2000	1900	1800
NS2500 N	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
NS3200 N	-	-	-	-	-	-	-	3200	3200	3200	3180	3080	2970	2860

(1) For a circuit breaker mounted in horizontal position, the derating to be applied is equivalent to that of a front or horizontal rear connected circuit breaker.
(2) Ti: temperature around the circuit breaker and its connections.

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Temperature derating
Compact NS devices equipped with electronic trip units

Compact circuit breakers have been tested for operation in industrial atmospheres.
It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

Compact NS630b to NS1600 (1)

The table below indicates the maximum rated-current value for each type of connection, depending on the ambient temperature.
For mixed connections, use the same derating values as for horizontal connections.

Version	Fixed device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/L	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
NS1250 N	1250	1250	1250	1250	1250	1240	1090	1250	1250	1250	1250	1250	1250	1180
NS1600 N	1600	1600	1560	1510	1470	1420	1360	1600	1600	1600	1600	1600	1510	1460

Version	Withdrawable device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/L	1000	1000	1000	1000	1000	1000	920	1000	1000	1000	1000	1000	1000	990
NS1250 N	1250	1250	1250	1250	1250	1170	1000	1250	1250	1250	1250	1250	1250	1090
NS1600 N	1600	1600	1520	1480	1430	1330	1160	1600	1600	1600	1560	1510	1420	1250

Compact NS1600b to 3200

Version	Fixed device													
Connection	Front or horizontal rear							Vertical rear						
temp. Ti (2)	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS1600b N	1600	1600	1600	1600	1500	1450	1400	1600	1600	1600	1600	1600	1550	1500
NS2000 N	2000	2000	2000	2000	1900	1800	1700	2000	2000	2000	2000	2000	1900	1800
NS2500 N	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
NS3200 N	-	-	-	-	-	-	-	3200	3200	3200	3180	3080	2970	2860

(1) For a circuit breaker mounted in horizontal position, the derating to be applied is equivalent to that of a front or horizontal rear connected circuit breaker.
(2) Ti: temperature around the circuit breaker and its connections.

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Power dissipation / Resistance

Compact NS devices equipped with electronic trip units

The values indicated in the tables opposite are typical values.

Power dissipated per pole (P/pole) in Watts (W)
The value indicated in the table is the power dissipated at I_N, 50/60 Hz, for a three-pole or four-pole circuit breaker (these values can be higher than the power calculated on the basis of the pole resistance). Measurement and calculation of the dissipated power are carried out in compliance with the recommendations of Annex G of standard IEC 60947-2.

Resistance per pole (R/pole) in milliohms (mΩ)
The value of the resistance per pole is provided as a general indication for a new device.
The value of the contact resistance must be determined on the basis of the measured voltage drop, in accordance with the manufacturer's test procedure (expert card ABT no. FE 05e).

Note: this measurement is not sufficient to determine the quality of the contacts, i.e. the capacity of the circuit breaker to carry its rated current.

Compact NS630b to 1600

Version	Fixed device					
	N		L		LB	
	R/pole	P/pole	R/pole	P/pole	R/pole	P/pole
NS630b	0.026	10	0.039	15	0.056	15
NS800	0.026	15	0.039	20	0.056	20
NS1000	0.026	22	0.039	34		
NS1250	0.026	44				
NS1600	0.026	74				

Version	Withdrawable device					
	N		L		LB	
	R/pole	P/pole	R/pole	P/pole	R/pole	P/pole
NS630b	0.038	19	0.072	34	0.086	34
NS800	0.038	30	0.072	40	0.086	40
NS1000	0.038	50	0.072	77		
NS1250	0.036	84				
NS1600	0.036	154				

Compact NS1600b to 3200

Version	Fixed device	
	N	
	R/pole	P/pole
NS1600b	0.019	84
NS2000	0.013	84
NS2500	0.008	100
NS3200	0.008	227

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TOOLS

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This international site allows you to access all the Schneider Electric Solution and Product information via :

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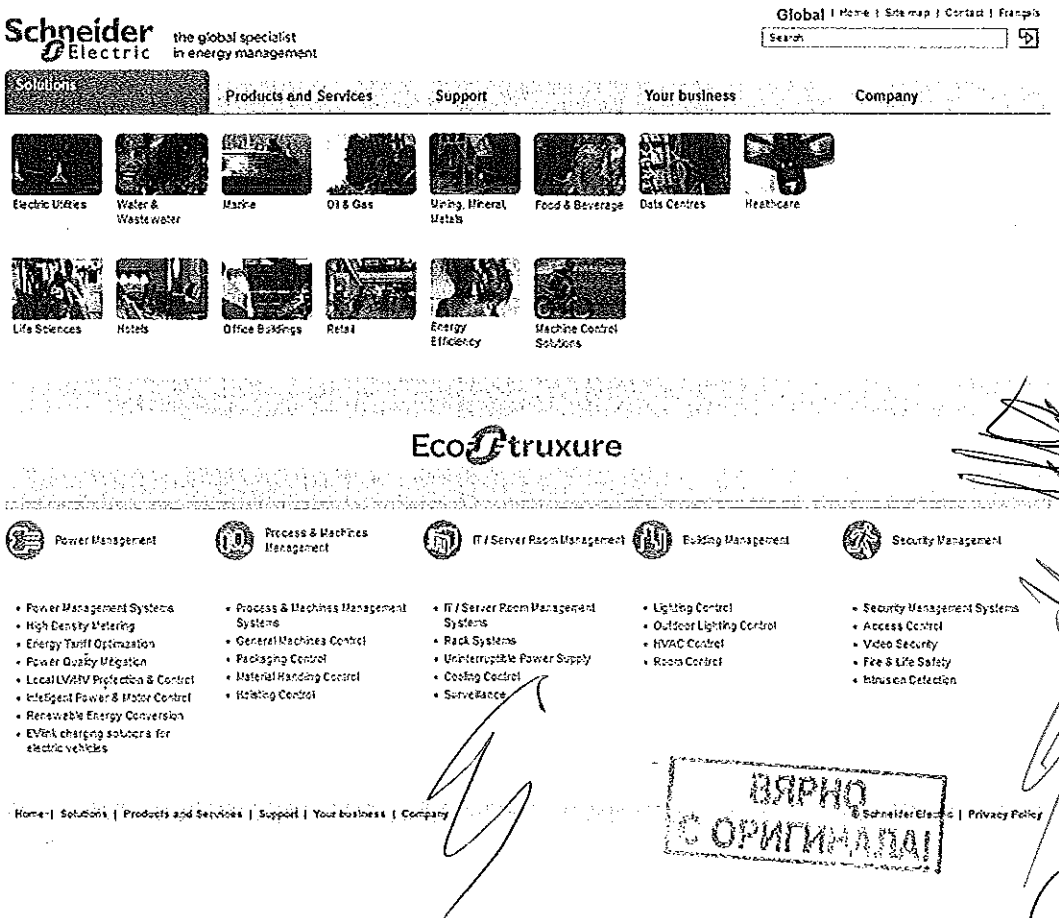
- range data sheets
- a download area
- product selectors
- ...

You can also access the information dedicated to your business and get in touch with your Schneider Electric country support.



ВЯРНО
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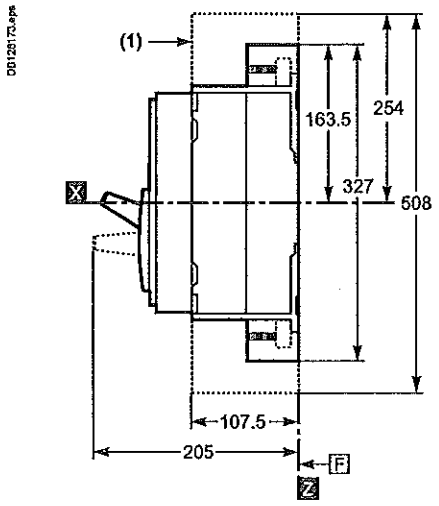
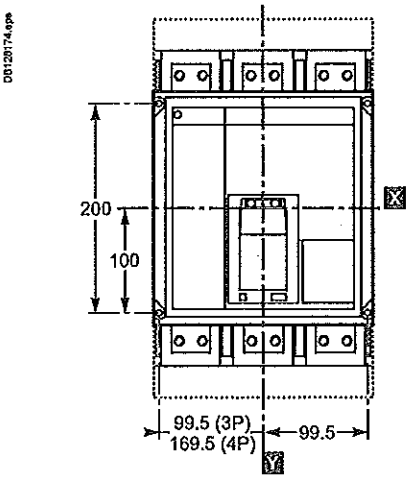
Dimensions and connection

Compact NS630b to 1600 (fixed version)
Dimensions

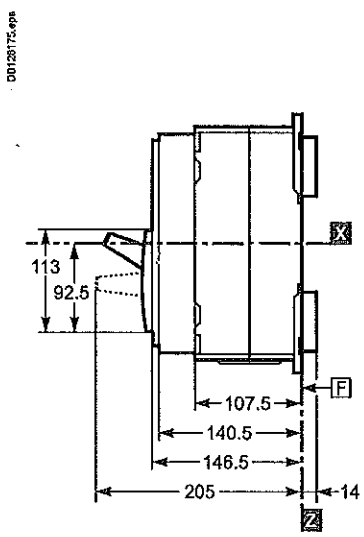
Manual control
Front connection (N, L)

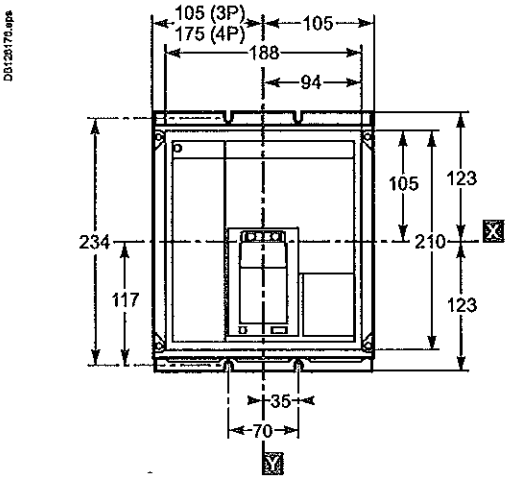




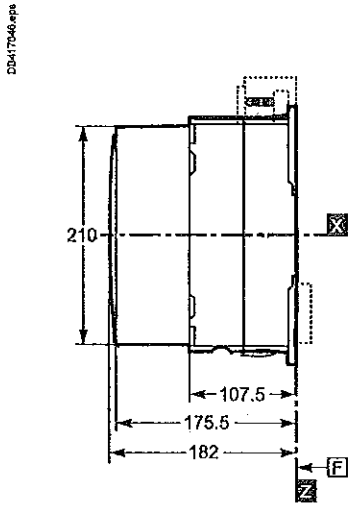
(1) Terminal shields are optional.

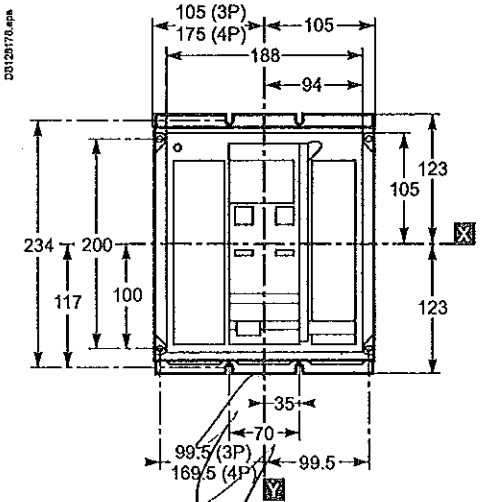
Rear connection (N, L, LB)





Electrical control
Front and rear connection (N, L, LB)





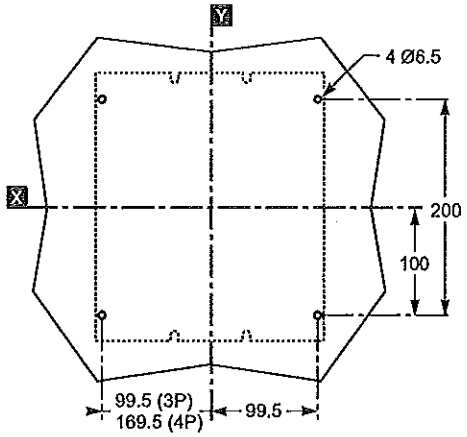
F : Datum.

Note: Dimensions for front and rear connection on electrically operated devices are identical to those for manually operated devices.

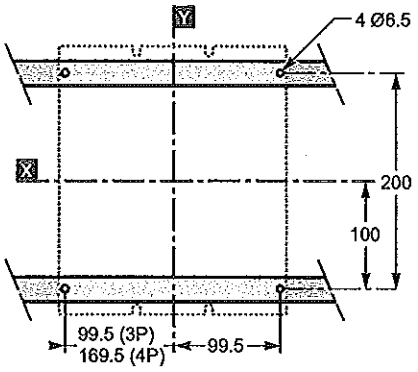
Mounting

Front connection

On backplate

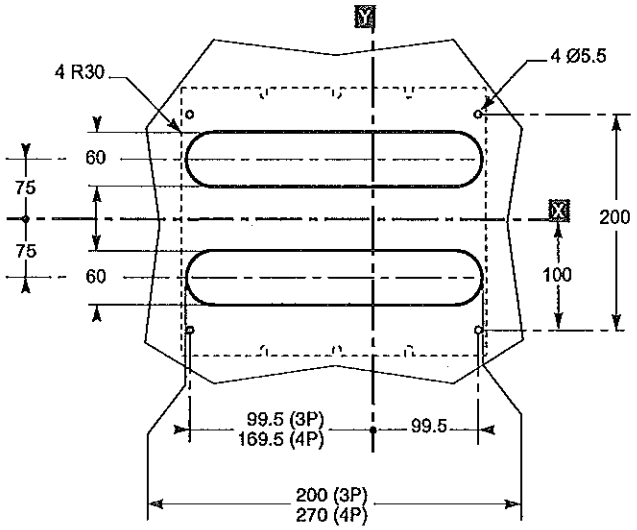


On rails

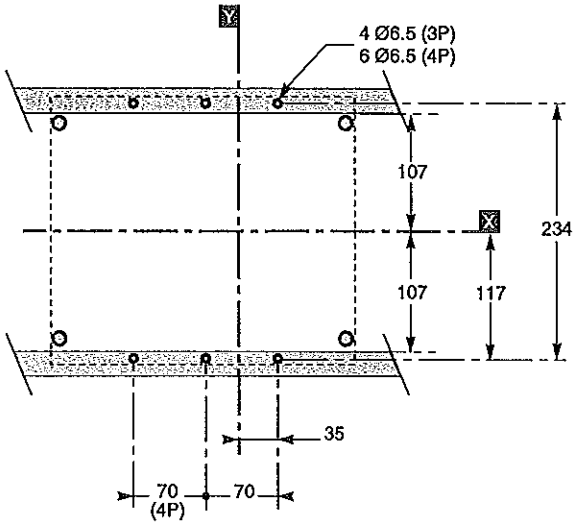


Rear connection

On backplate



On rails

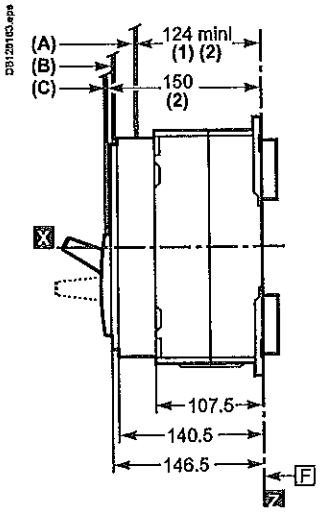


Note: Mounting parameters for electrically operated devices are identical to those for manually operated devices.
X and Y are the symmetry planes for a 3-pole device
Z is the back plane of the device.

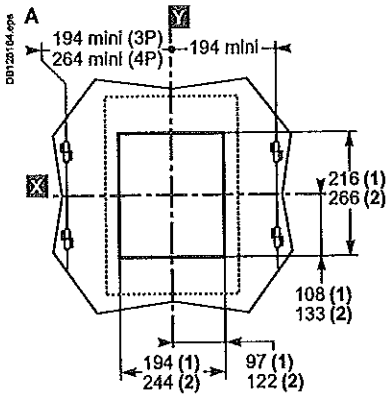
Compact NS630b to 1600 (fixed version)

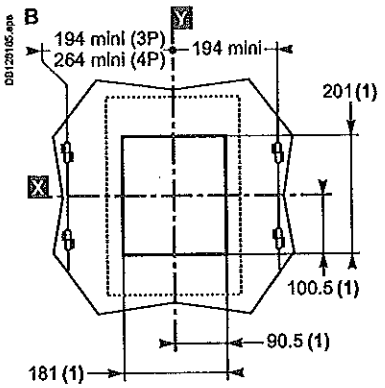
Front-panel cutouts

Toggle control

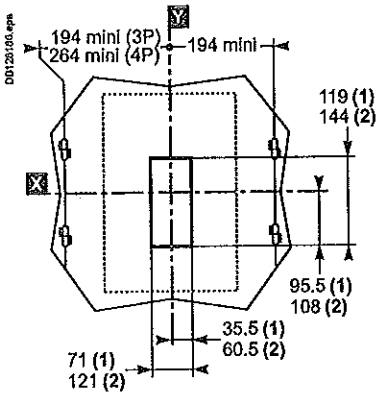


Door cutout

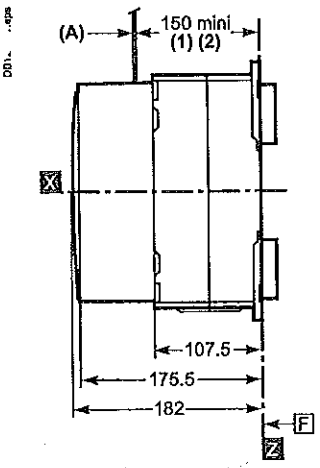




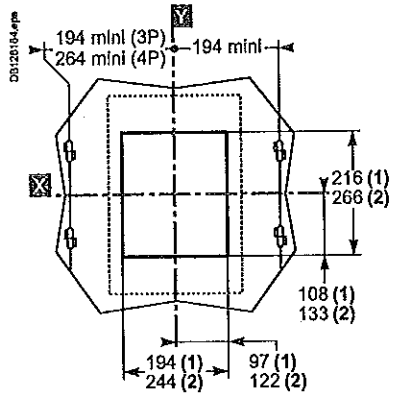
F : *Datum.*
(1) Without escutcheon.
(2) With escutcheon.



Electrical control



Door cutout

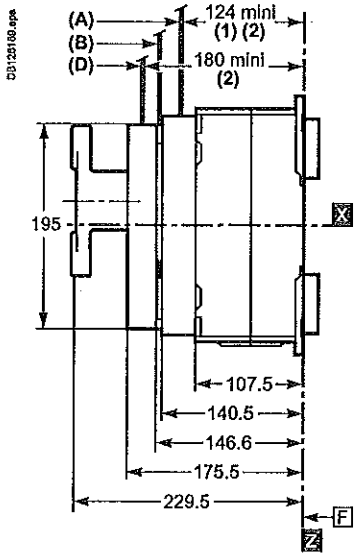


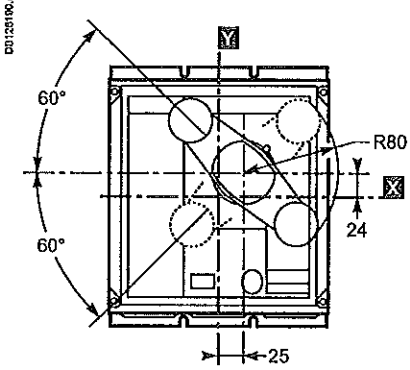
F : *Datum.*
(1) Without escutcheon.
(2) With escutcheon.

Rotary handle

Direct rotary handle

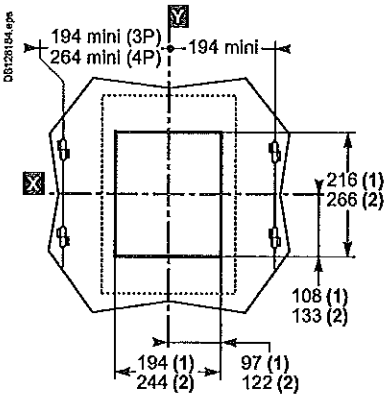
Dimensions



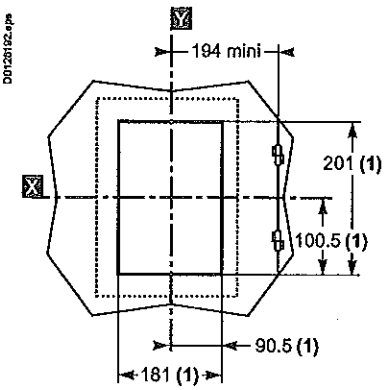


Door cutout

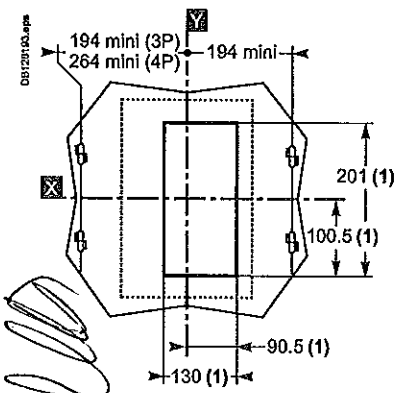
A



B



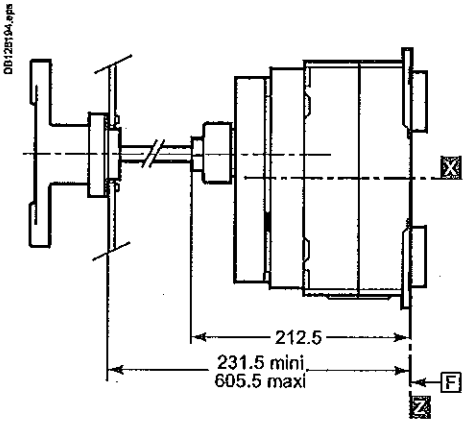
D

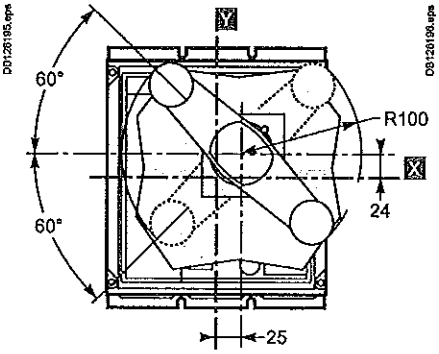


(1) Without escutcheon.
(2) With escutcheon.

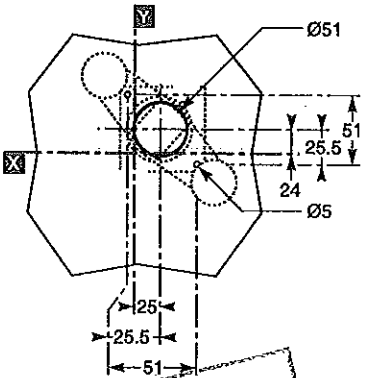
Extended rotary handle

Dimensions





Door cutout



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F : Datum.

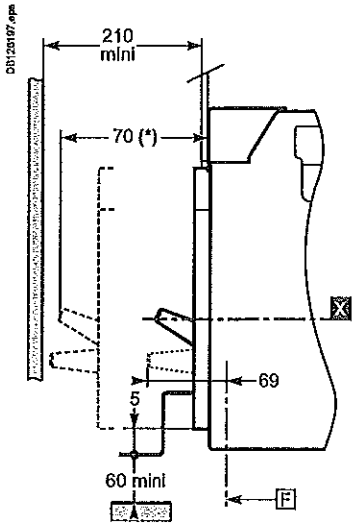
Note: X and Y are the symmetry planes for a 3-pole device Z is the back plane of the device.

Compact NS630b to 1600 (withdrawable version)

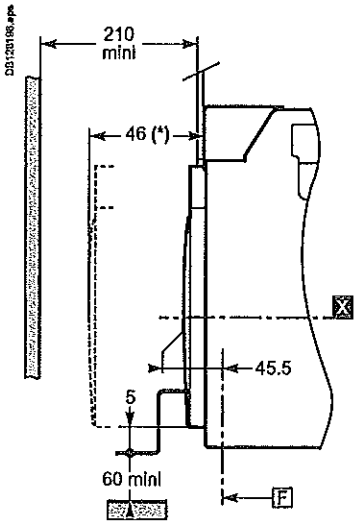
Dimensions, mounting and cutouts

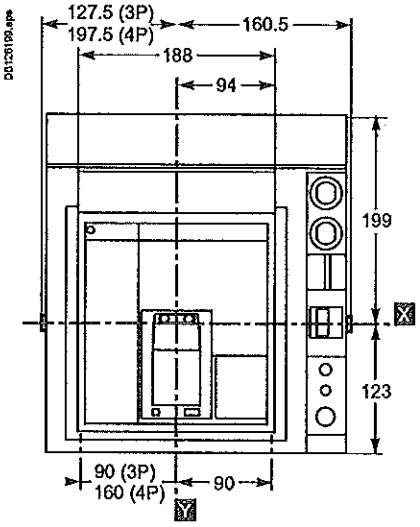
Dimensions

Manual control



Electrical control

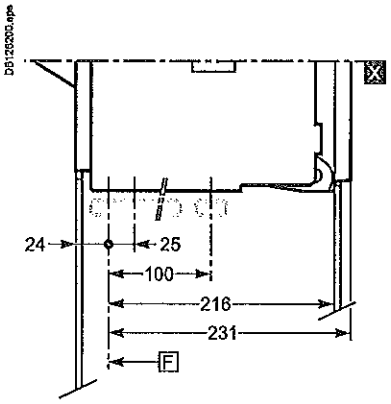


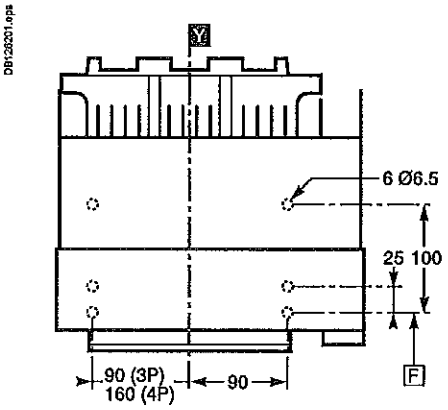


(*) Withdrawable position

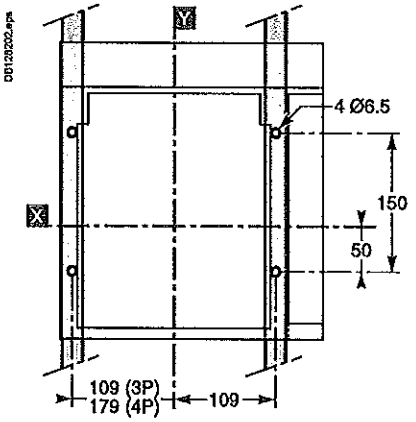
Mounting

Bottom mounting on base plate or rails



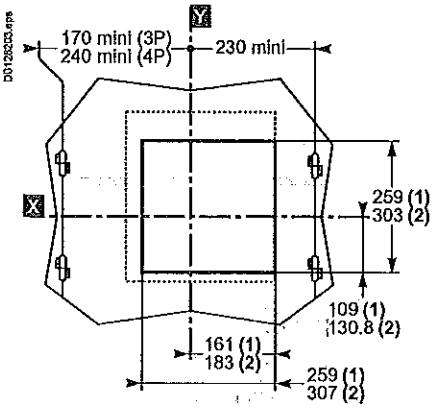


Vertical on uprights or backplate

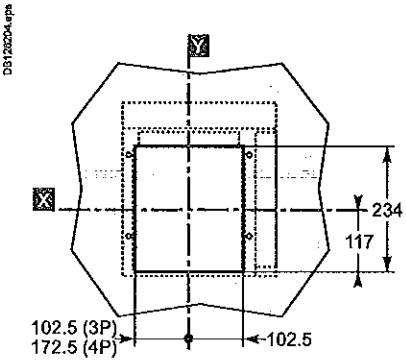


Cutouts

Door cutout



Rear panel cutout



(1) Without escutcheon.
(2) With escutcheon.

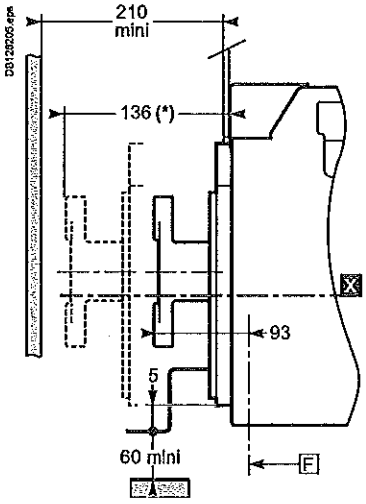
F : Datum.

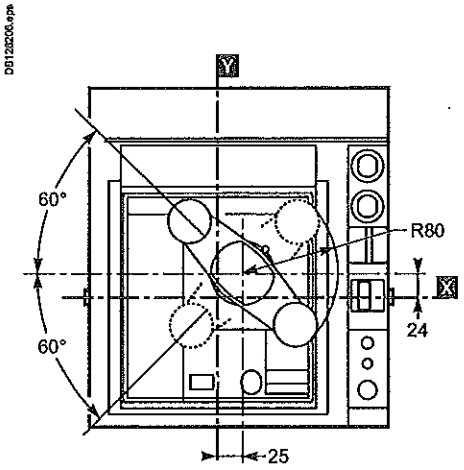
Note: X and Y are the symmetry planes for a 3-pole device.

Rotary handle

Direct rotary handle

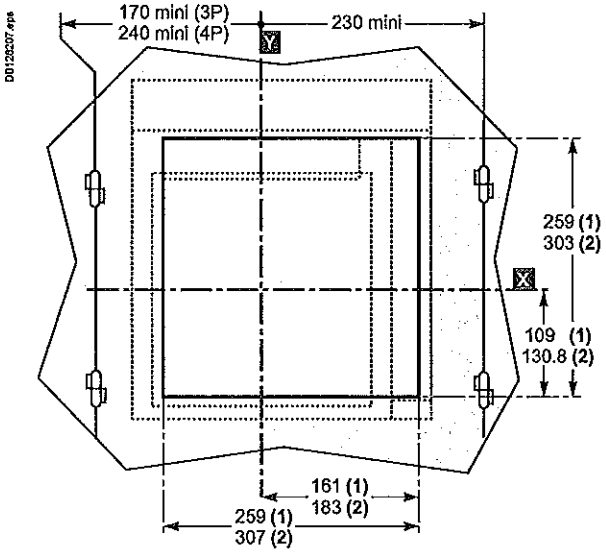
Dimensions





(*) Withdrawable position.

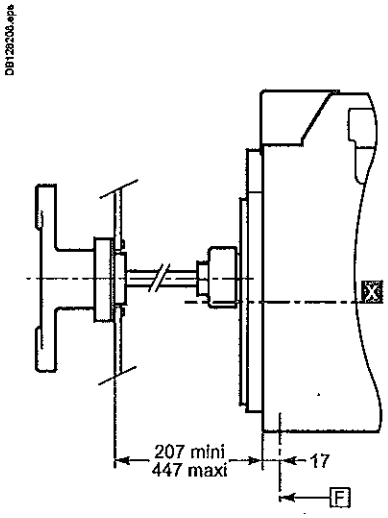
Door cutout

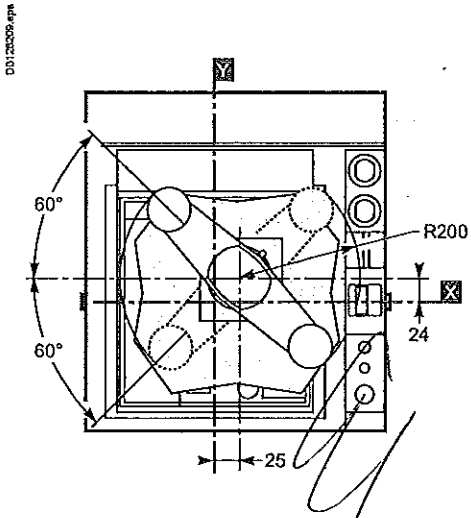


(1) Without escutcheon.
(2) With escutcheon.

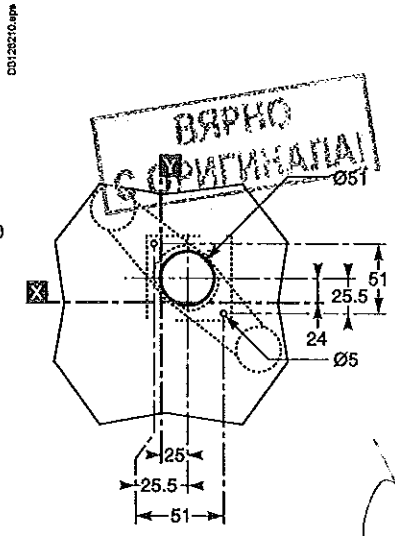
Extended rotary handle

Dimensions





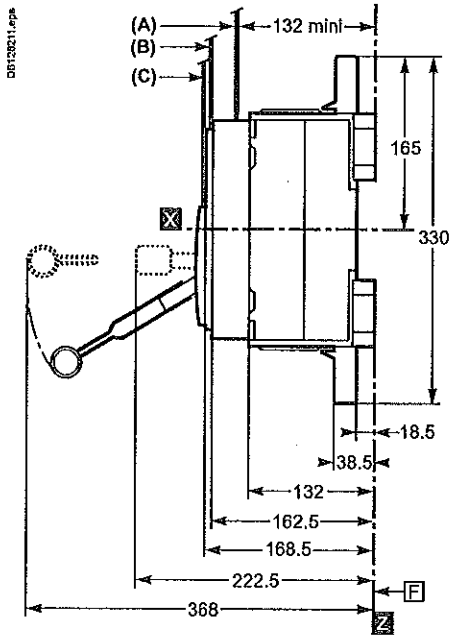
Door cutout

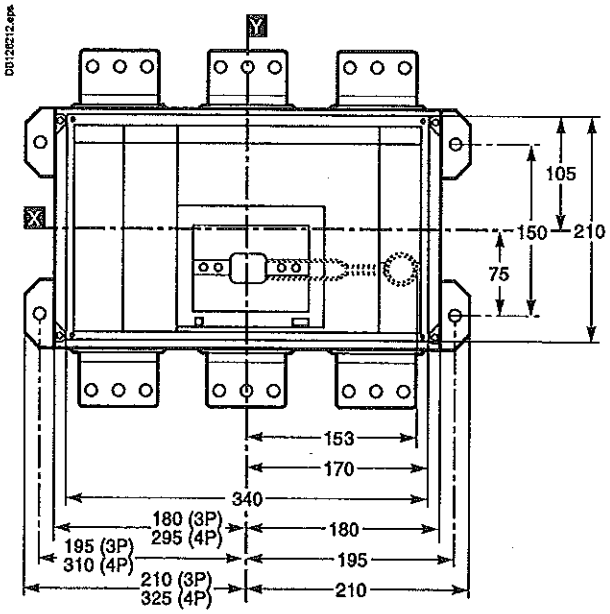


Note: X and Y are the symmetry planes for a 3-pole device.

Compact NS1600b to 3200 (fixed version)
Dimensions

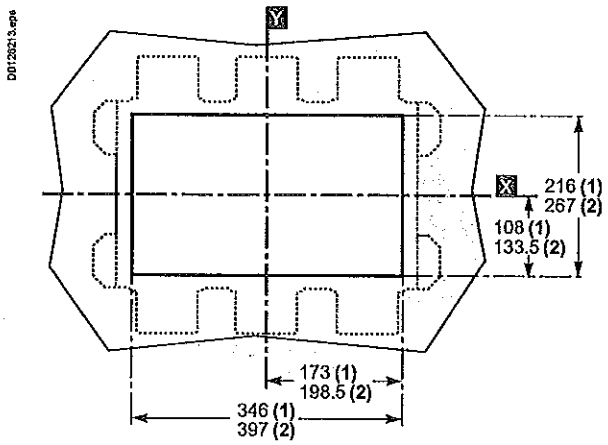
Dimensions



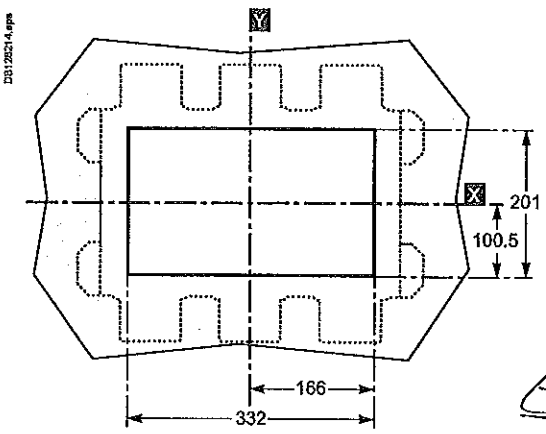


Door cutout (A, B, C)

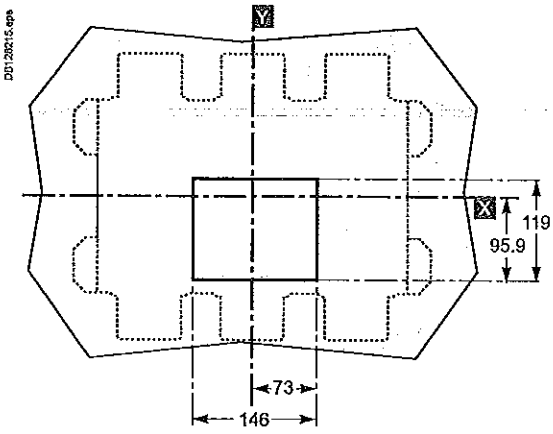
A



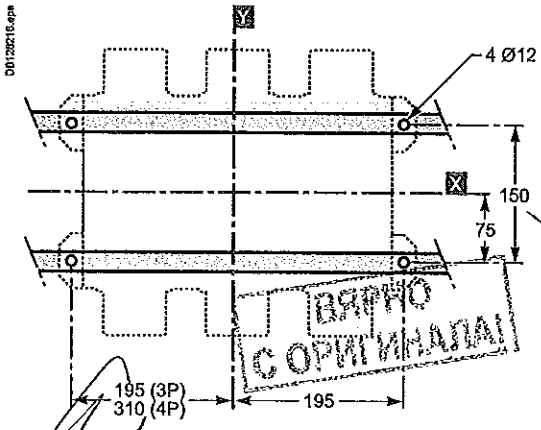
B



C



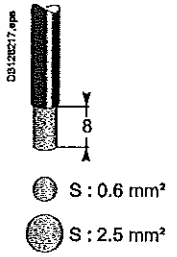
Mounting on rails

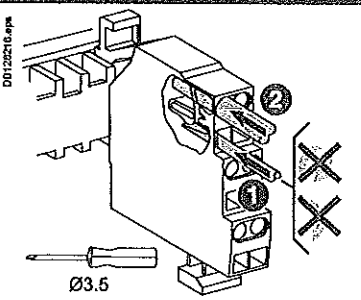


F : Datum.
(1) Without escutcheon.
(2) With escutcheon.

Note: X and Y are the symmetry planes for a 3-pole device

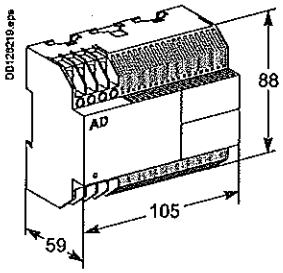
Control-wire connections to terminal block

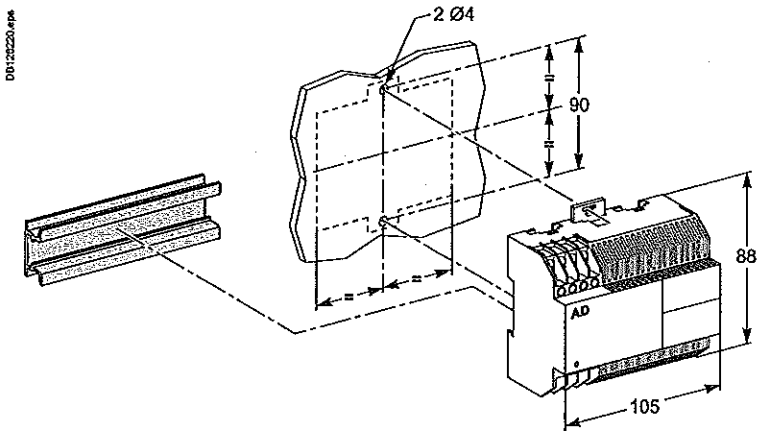




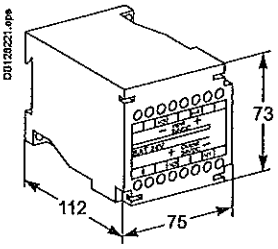
Only one wire per terminal.

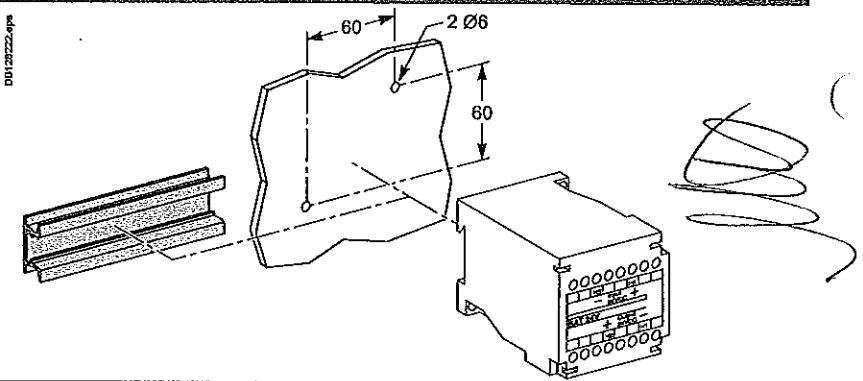
External power-supply module (AD)





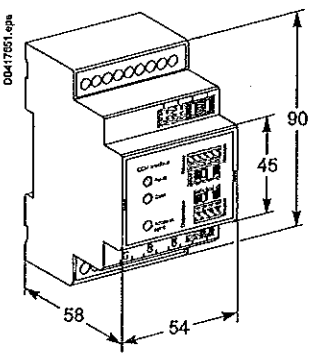
Battery module (BAT)





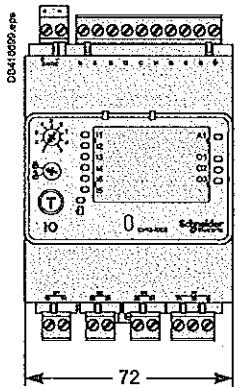
Chassis communication module

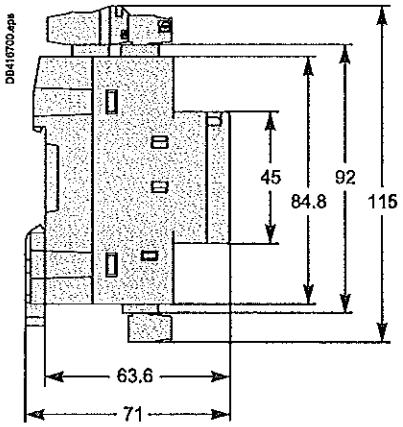
Modbus



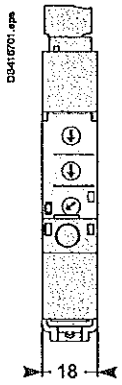
Compact NS630b to 3200
External modules

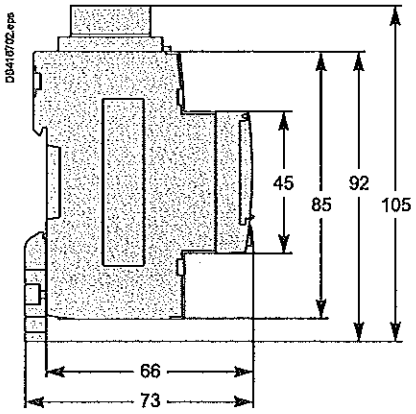
I/O (Input/Output) application module



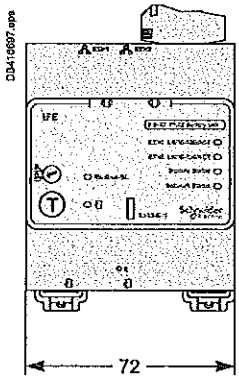


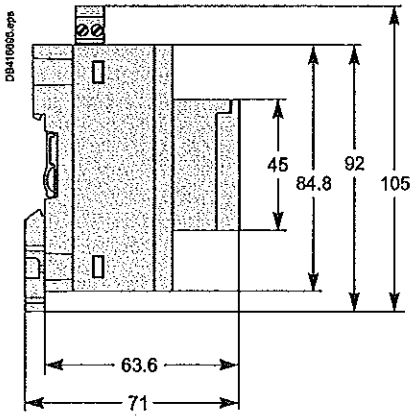
IFM - Modbus-SL interface



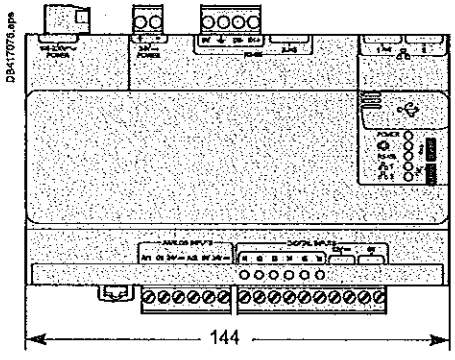


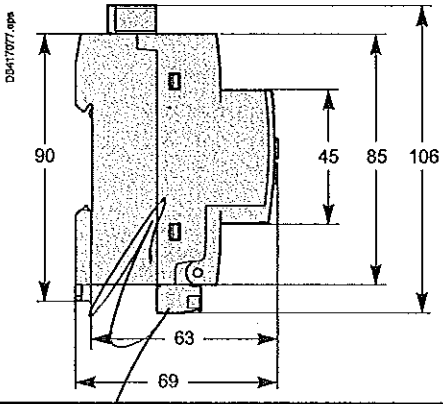
IFE - Ethernet interface





Com'X 200

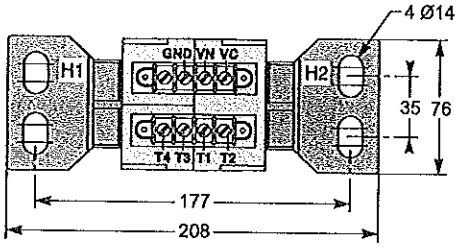




External sensor for neutral

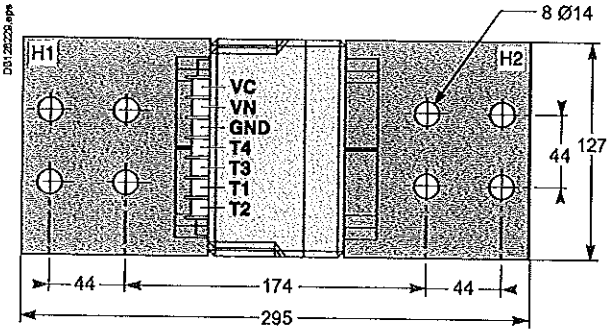
400/1600 A (NS630b to 1600)

DB120226.eps



1000/4000 A (NS1600b to 3200)

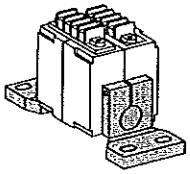
DB120229.eps



Installation

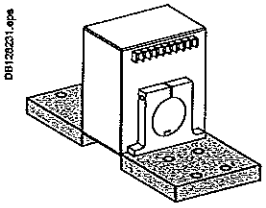
400/1600 (NS630b to NS1600)

DB120230.eps



1000/4000 A (NS1600b to NS3200)

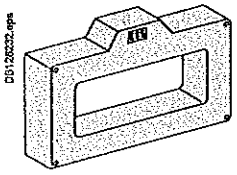
DB120231.eps

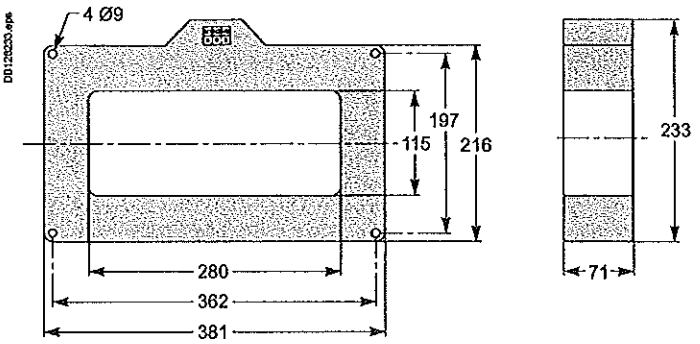


Compact NS630b to 3200
External modules

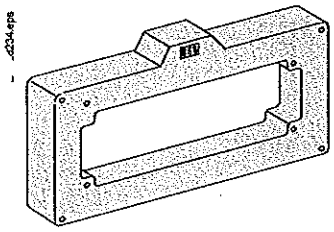
Rectangular sensor for earth leakage protection (Vigi)

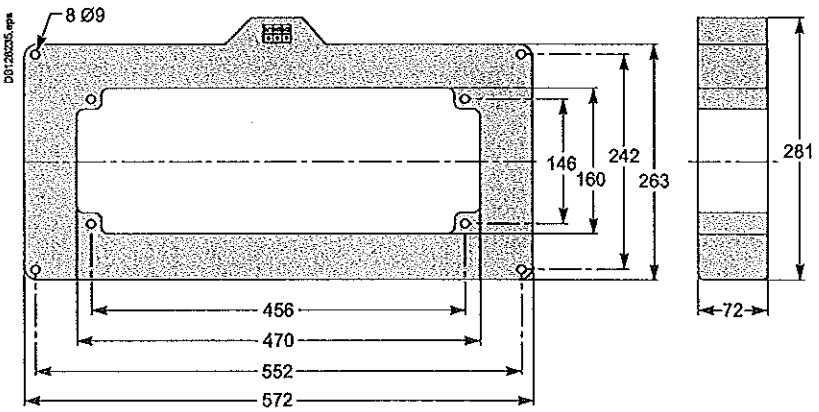
280 x 115 mm window





470 x 160 mm window



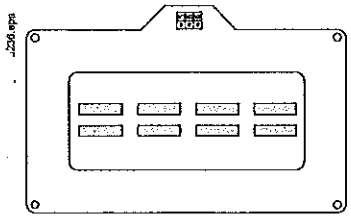


Busbars	I ≤ 1600 A	I ≤ 3200 A
Window (mm)	280 x 115	470 x 160
Weight (kg)	14	18

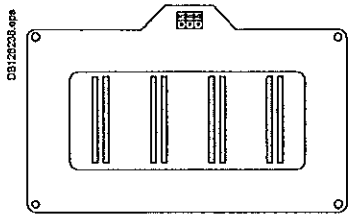
Busbars path

280 x 115 mm window

Busbars spaced 70 mm centre-to-centre



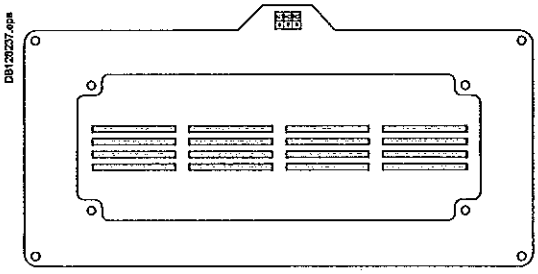
2 bars 50 x 10



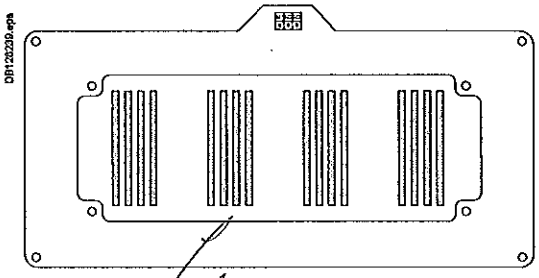
2 bars 100 x 5

470 x 160 mm window

Busbars spaced 115 mm centre-to-centre



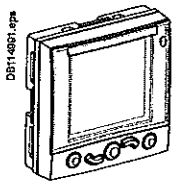
4 bars 100 x 5

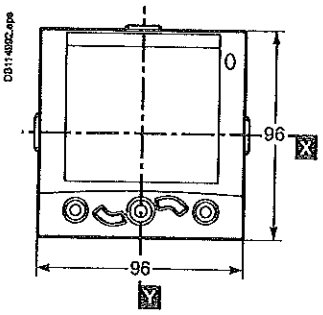


4 bars 125 x 5

FDM121 switchboard display

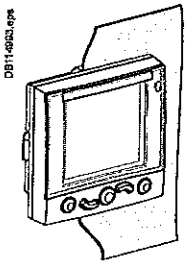
Dimensions

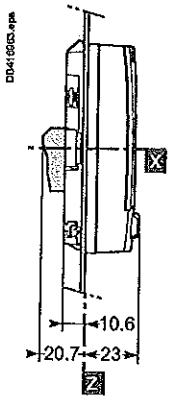


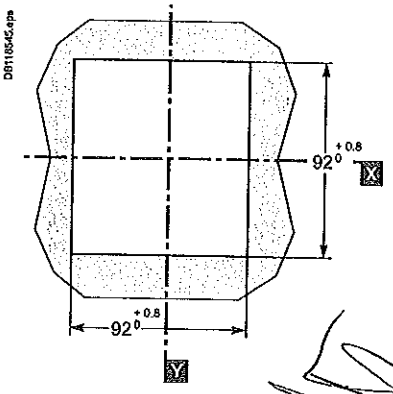


Mounting

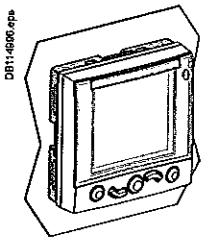
Through panel

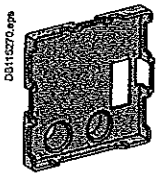


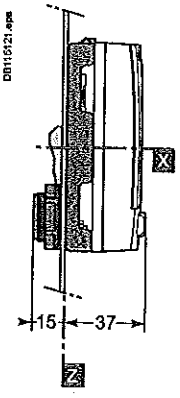


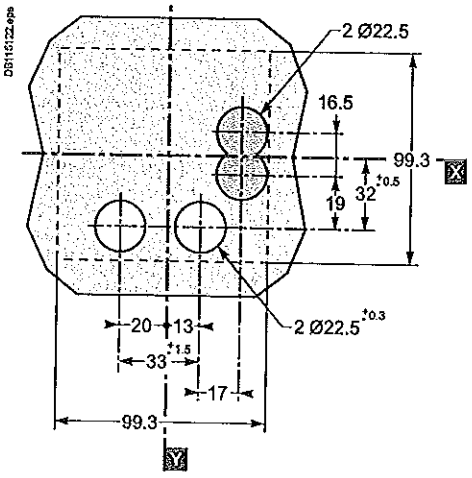


On panel







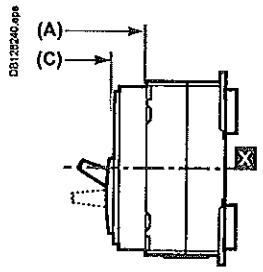


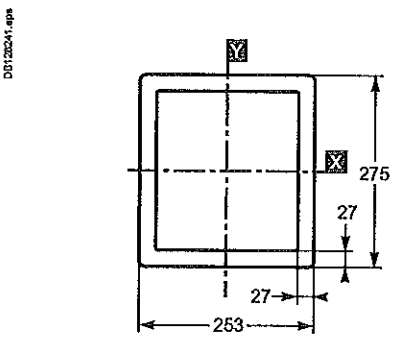
Connector (optional).

Escutcheon

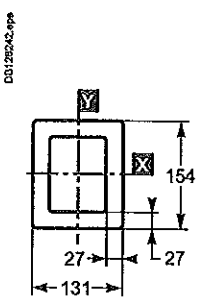
NS630b to NS1600 (fixed control)

A

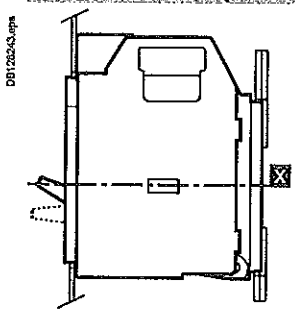


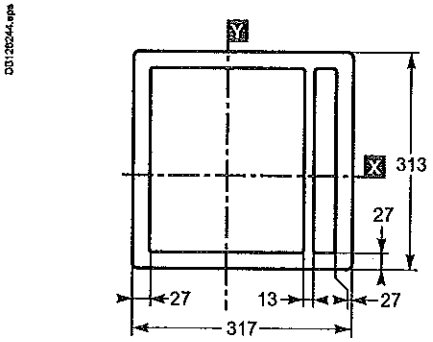


C

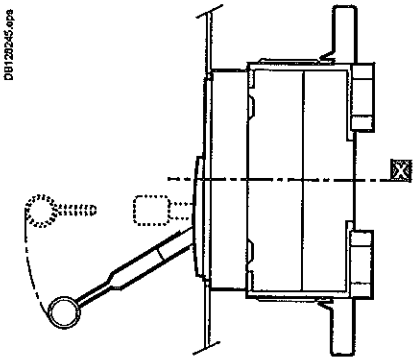


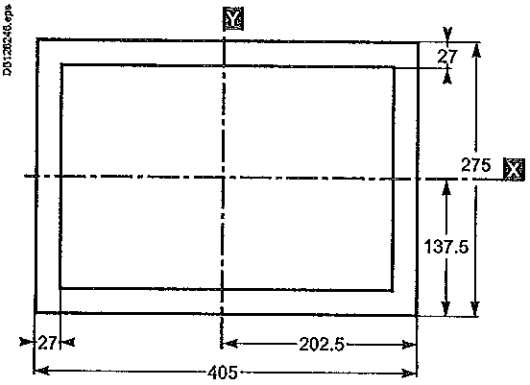
NS630b to NS1600 (withdrawable control)





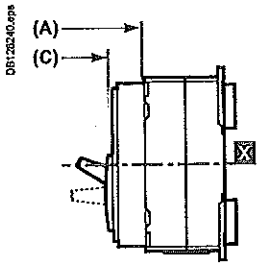
NS1600b to NS3200 (fixed control)



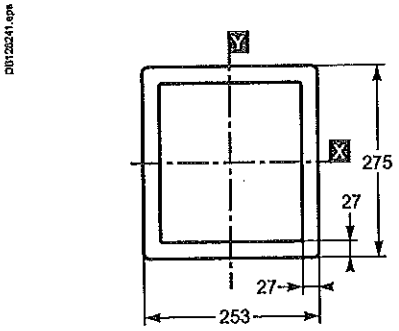


Escutcheon

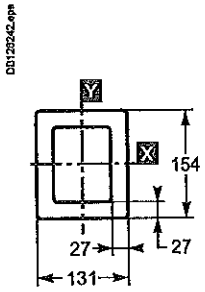
NS630b to NS1600 (fixed control)



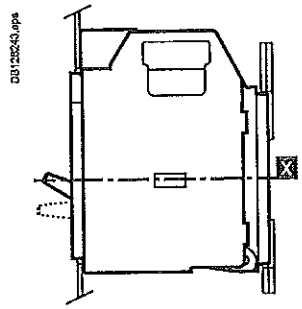
A

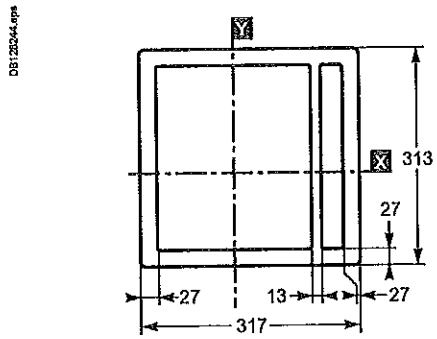


C

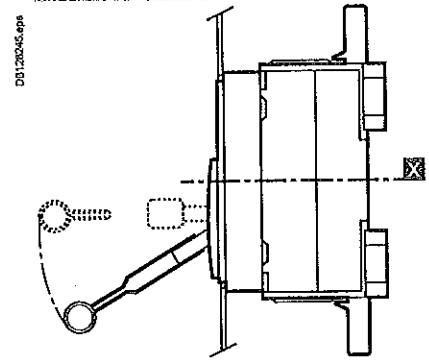


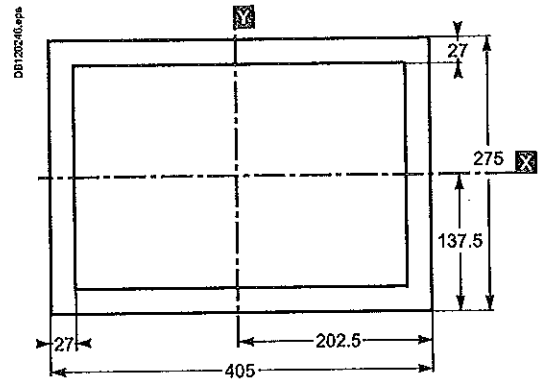
NS630b to NS1600 (withdrawable control)





NS1600b to NS3200 (fixed control)

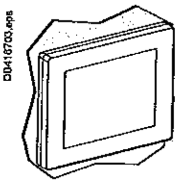




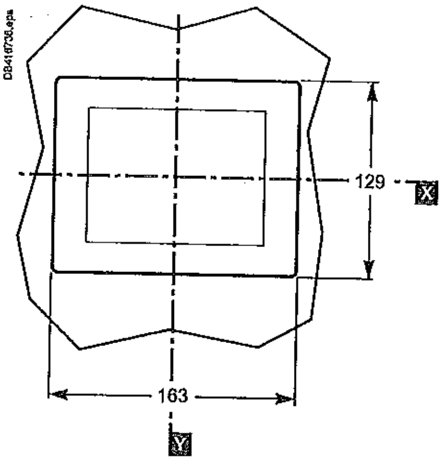
FDM128 switchboard display

Dimensions

DB416703.eps



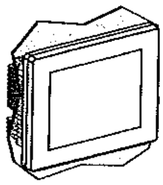
DB416736.eps



Mounting

On panel

DB416704.eps



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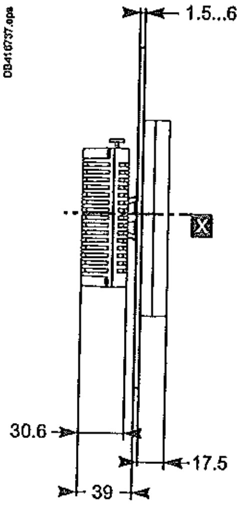

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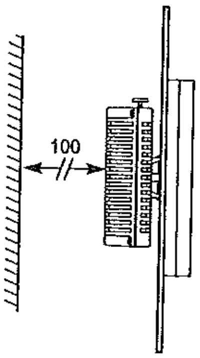

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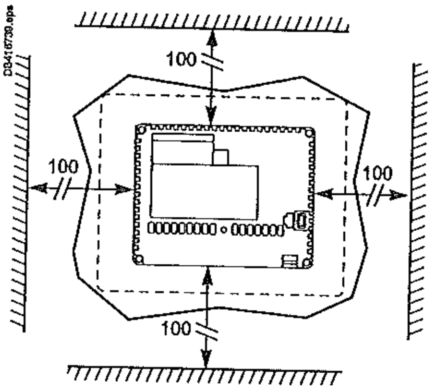

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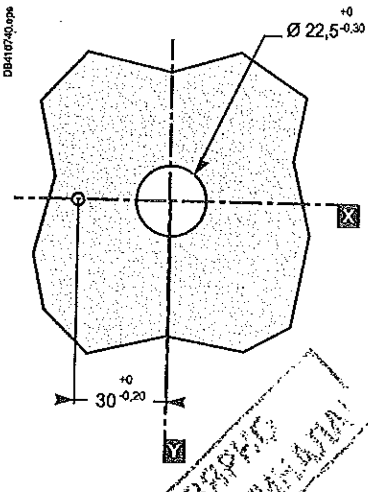
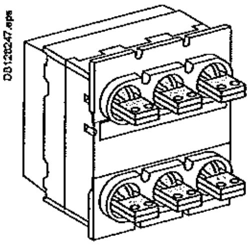
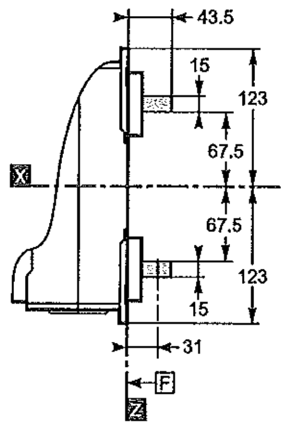


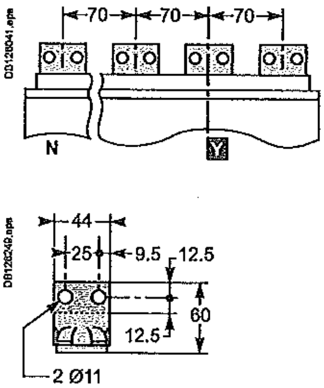
Compact NS630b to 1600 (fixed version)

Bars

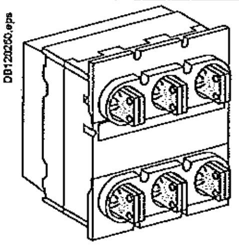
Horizontal rear connection

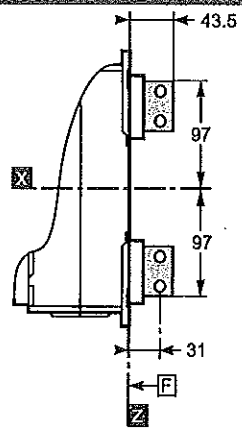


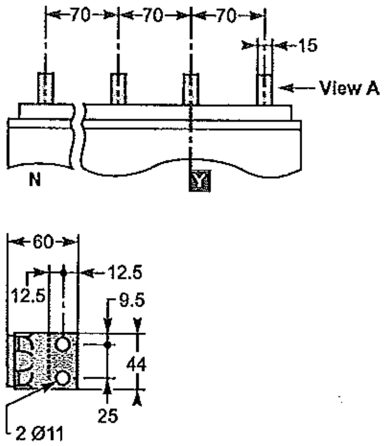




Vertical rear connection

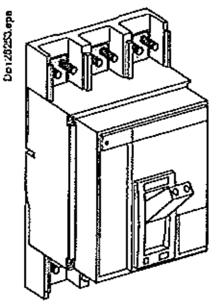


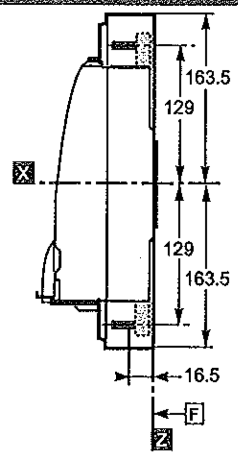


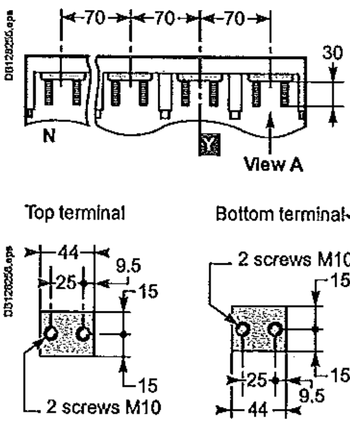


View A detail.

Front connection





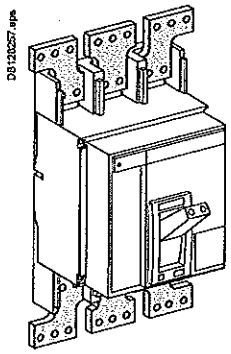


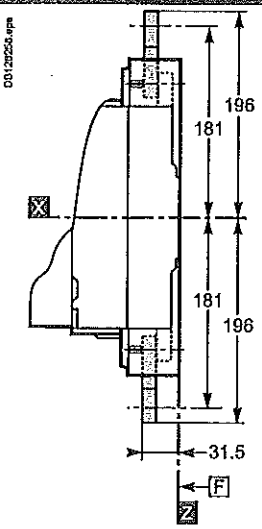
View A detail.

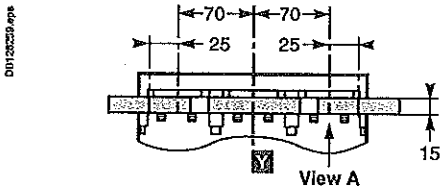
F : *Datum.*

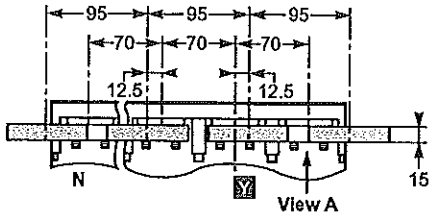
*Note: Recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Front connection with spreaders

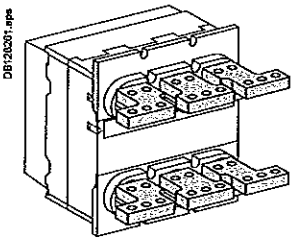


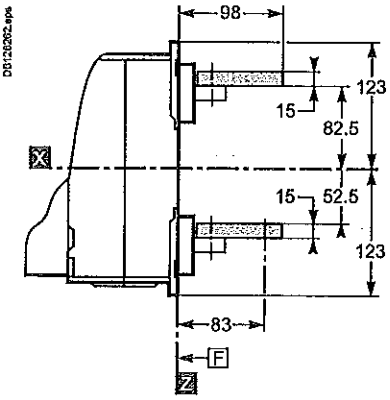


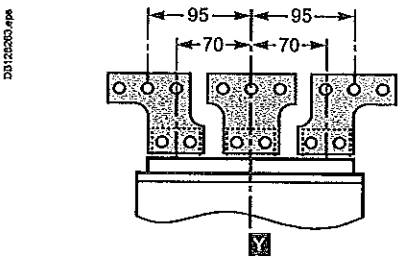


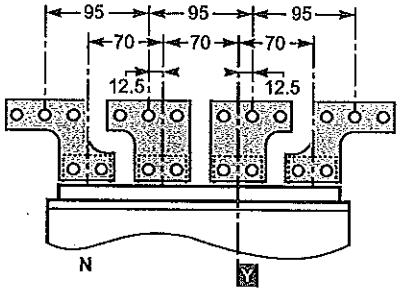


Rear connection with spreaders



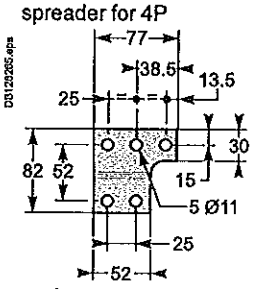




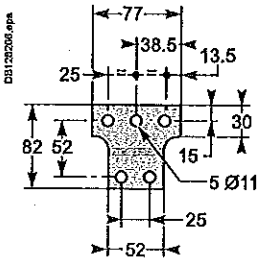


Spreader detail

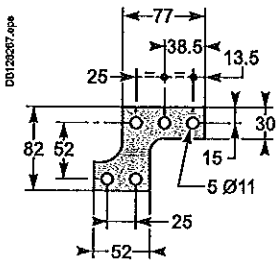
Middle left or middle right spreader for 4P



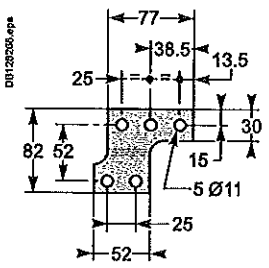
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P



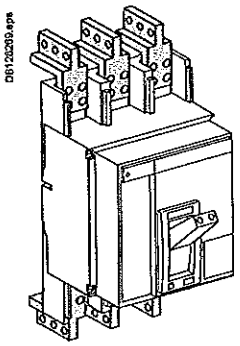
View A detail.

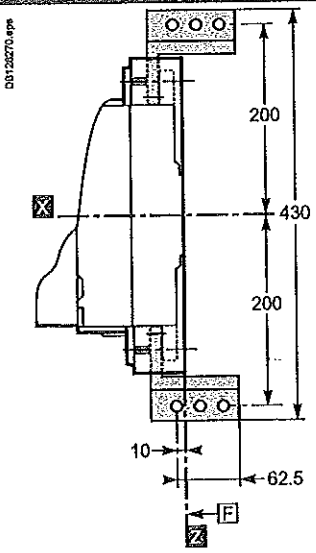
F : *Datum.*

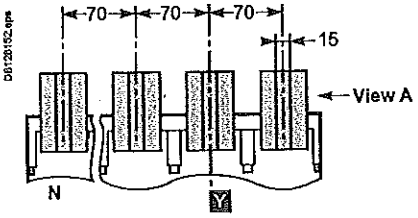
Note: X and Y are the symmetry planes for a 3-pole device.

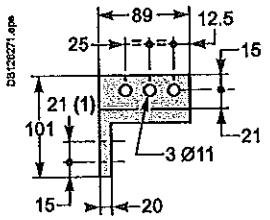
Compact NS630b to 1600 (fixed version)
Bars

Front connection with vertical-connection adapters







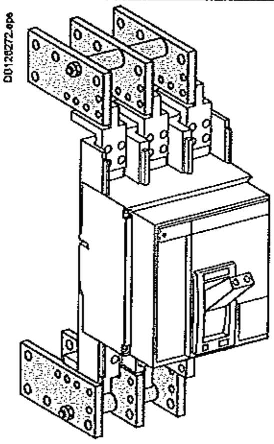


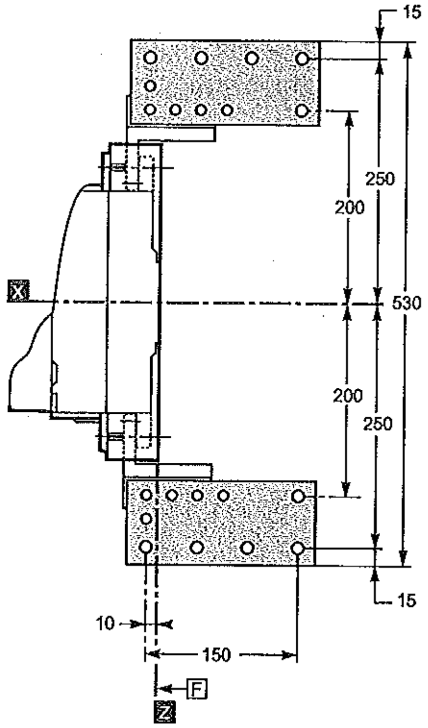
View A detail.

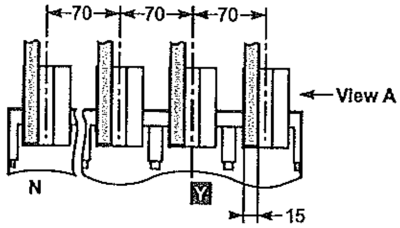
F : *Datum.*

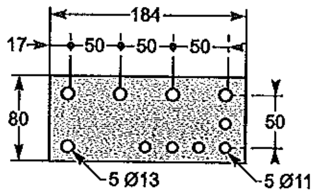
Note: ***(1)*** *two mounting possibilities for vertical-connection adapters (pitch 21 mm).*
Recommended connection screws: ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

Front connection with vertical-connection adapters and cable-lug adapters



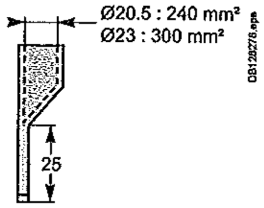


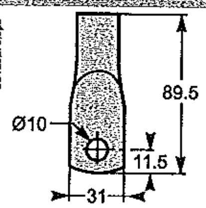




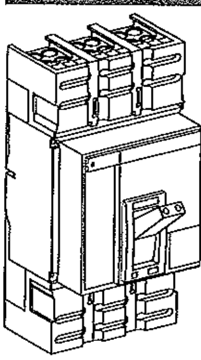
View A detail.

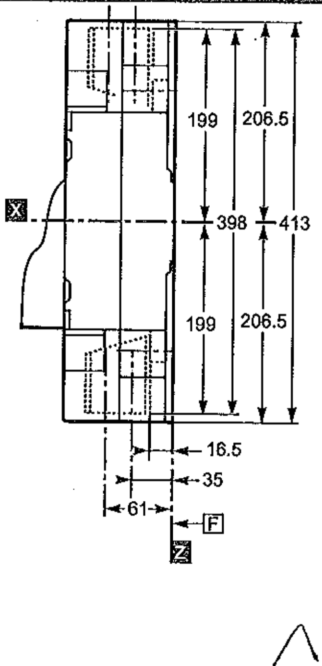
Lugs

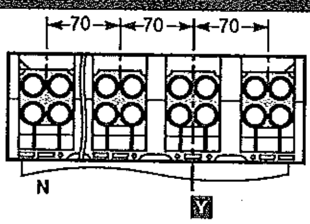


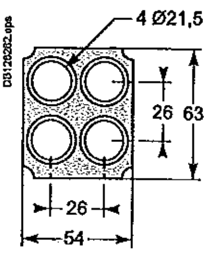


Fixed circuit breaker with 4-cable bare-cable connectors (240 mm²)







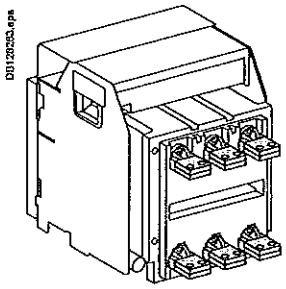


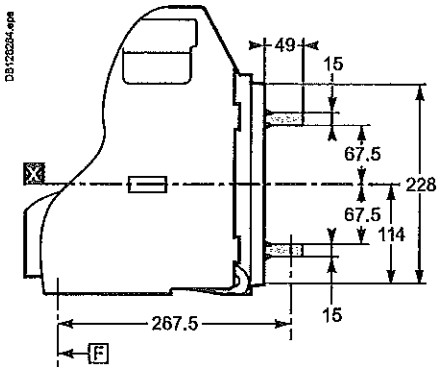
F : *Datum.*

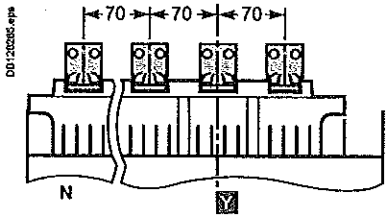
Compact NS630b to 1600 (plug-in and withdrawable versions)

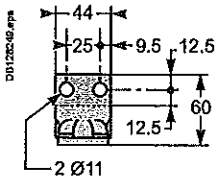
Bars

Horizontal rear connection

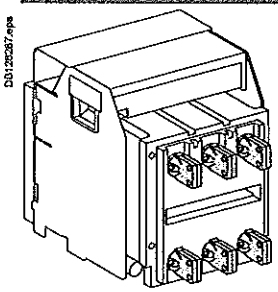


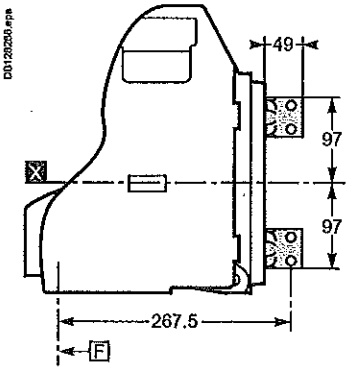


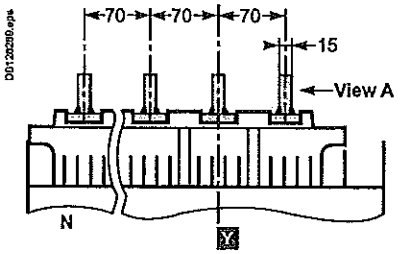


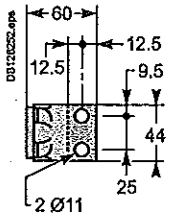


Vertical rear connection



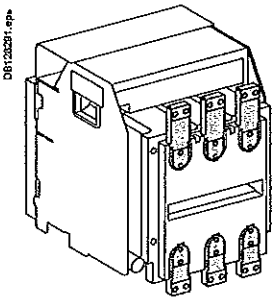


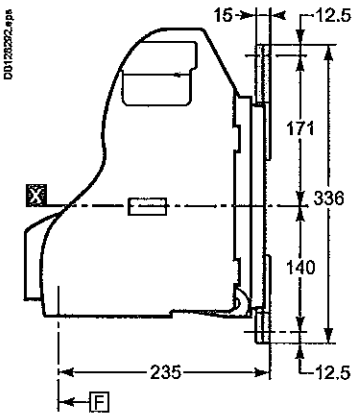


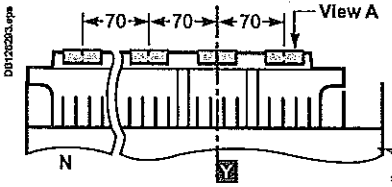


View A detail.

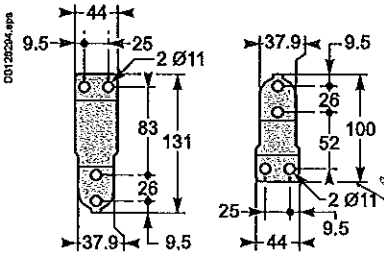
Front connection







Top terminal Bottom terminal

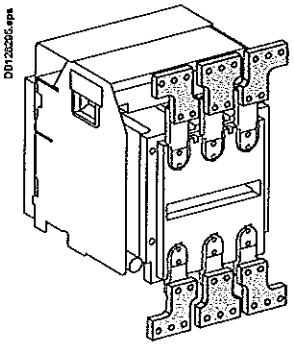


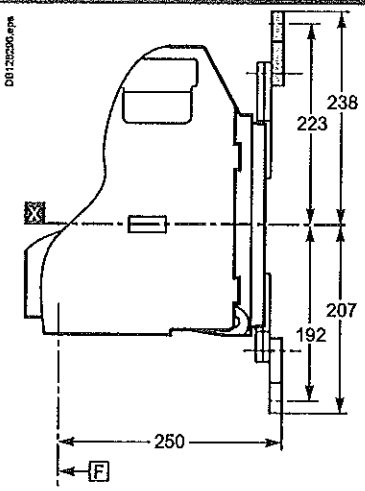
View A detail.

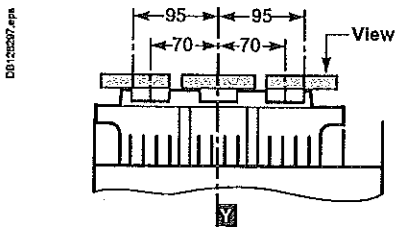
F : *Datum.*

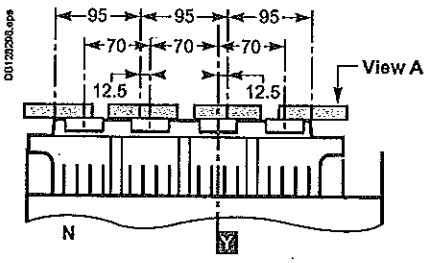
*Note: Recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Front connection with spreaders



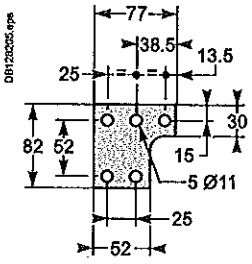






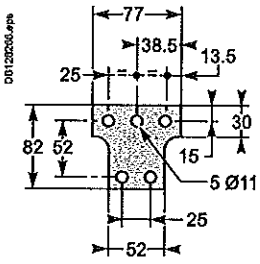
Spreader detail

Middle left or middle right spreader for 4P

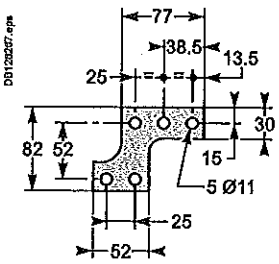


View A detail.

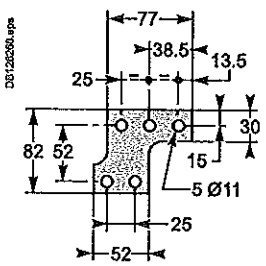
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P

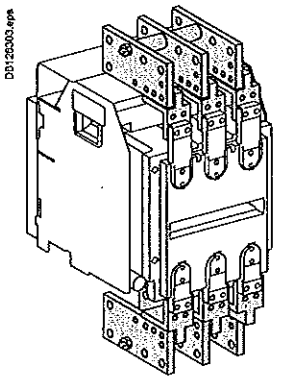


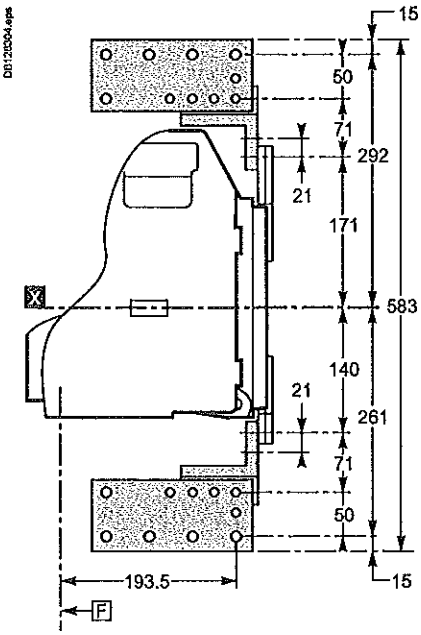
F : *Datum.*

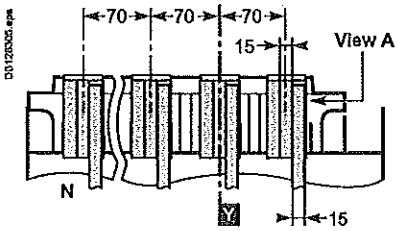
Compact NS630b to 1600 (plug-in and withdrawable versions)

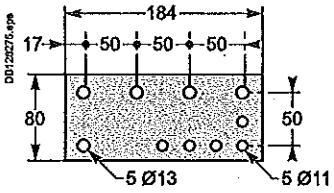
Cables with lugs

Front connection with vertical-connection adapters and cable-lug adapters



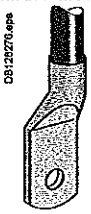


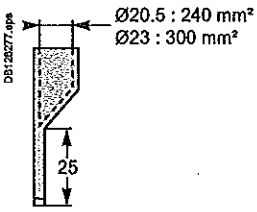


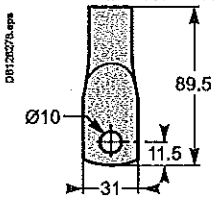


View A detail.

Lugs



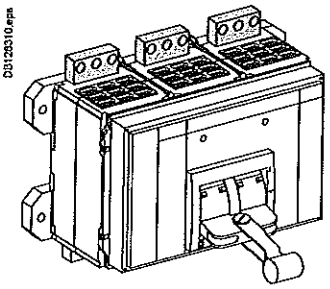


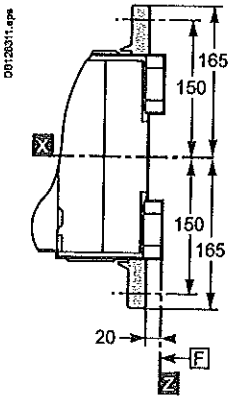


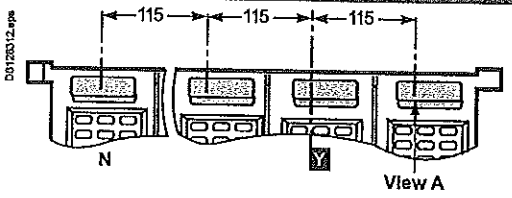
F : *Datum.*
Note: X and Y are the symmetry planes for a 3-pole device.
*Recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

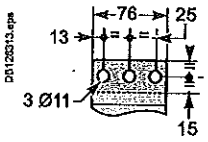
Compact NS1600b to 3200 (fixed version)

Front connection (NS1600b to 2500)



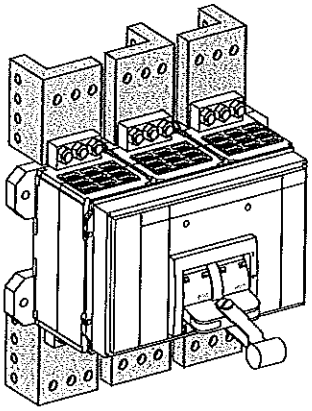


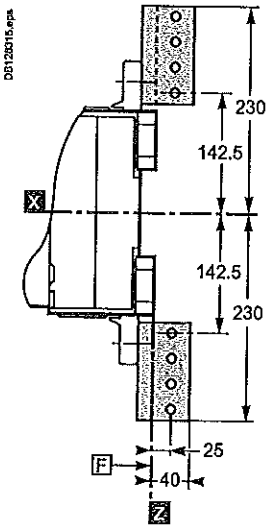


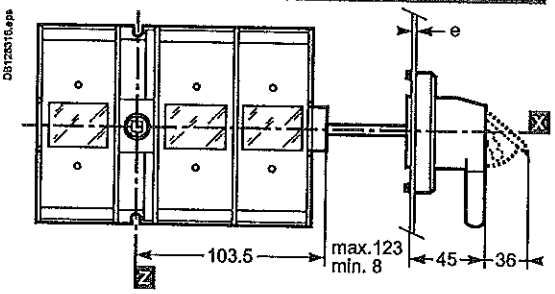


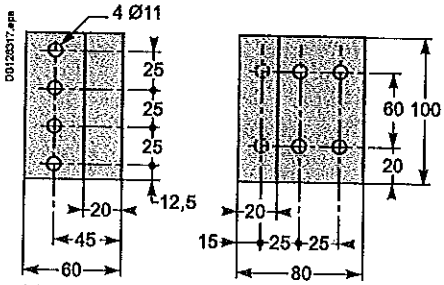
View A detail.

Front connection with vertical-connection adapters (NS1600b to 2500)



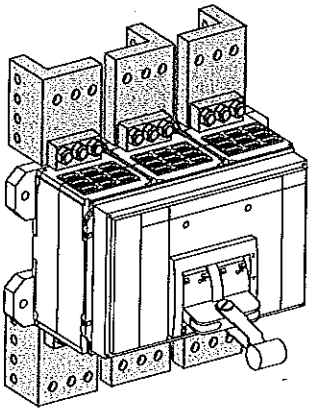


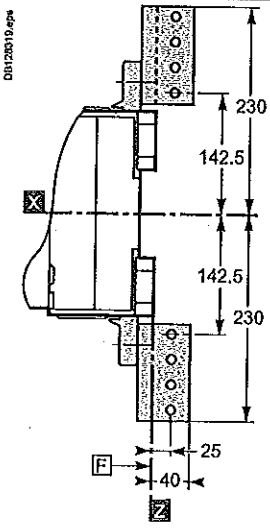


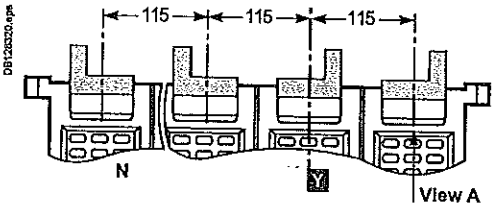


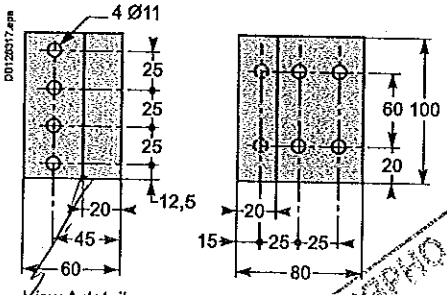
View A detail.

Front connection (NS3200)









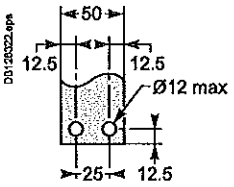
View A detail.

F : *Datum.*
Note: Recommended connection screws: ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

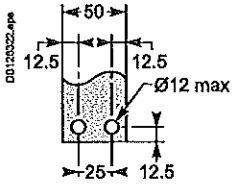
Power connections for Compact NS630b to 1600

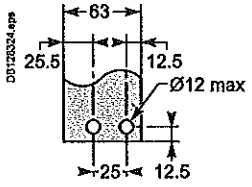
Recommended drilling dimensions

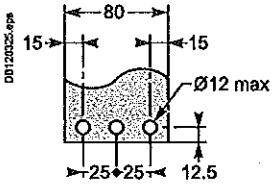
Rear connection



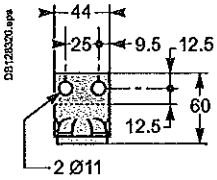
Rear connection with spreaders

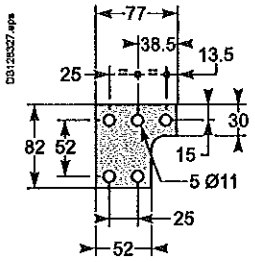




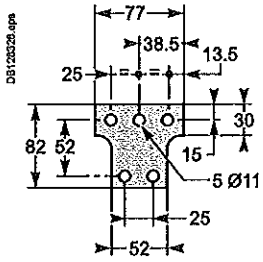


Middle left or middle right spreader for 4P

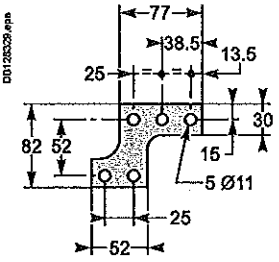




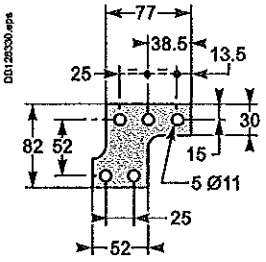
Middle spreader for 3P



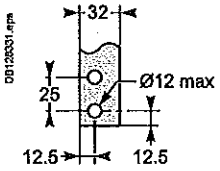
Left or right spreader for 4P

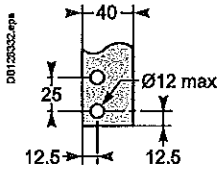


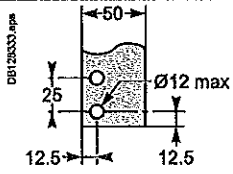
Left or right spreader for 3P

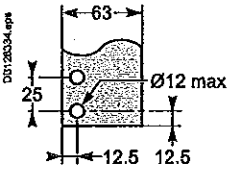


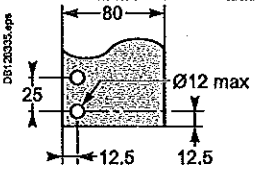
Vertical rear connection

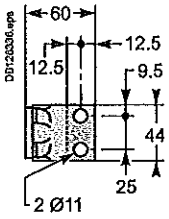




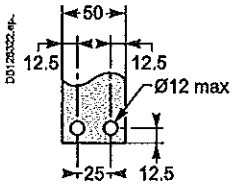




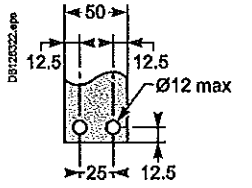


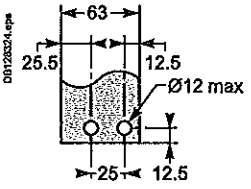


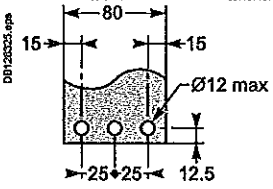
Front connection



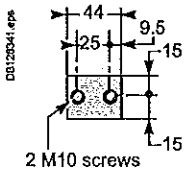
Front connection with vertical-connection adapter



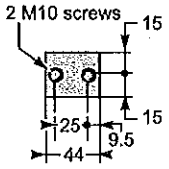


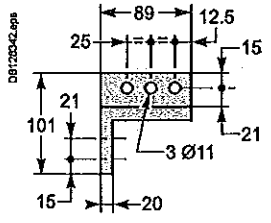


Top terminal



Bottom terminal

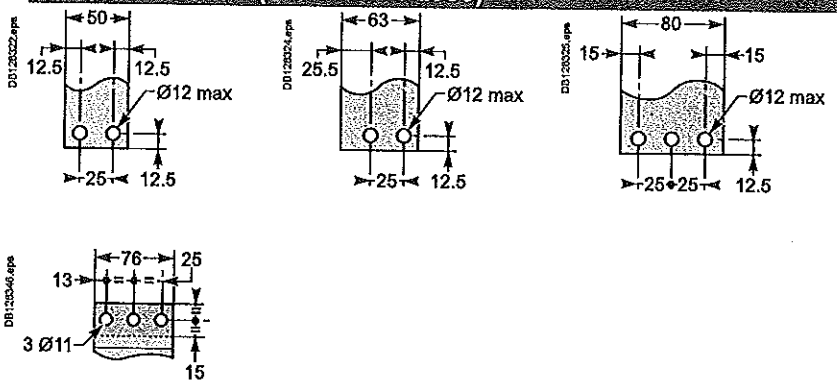




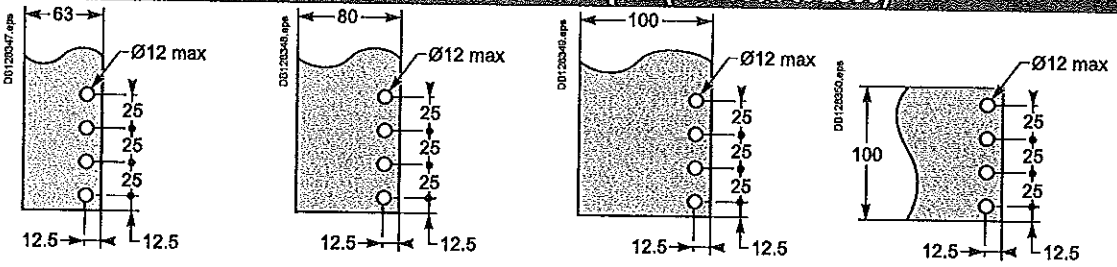
Power connections for Compact NS1600b to 3200

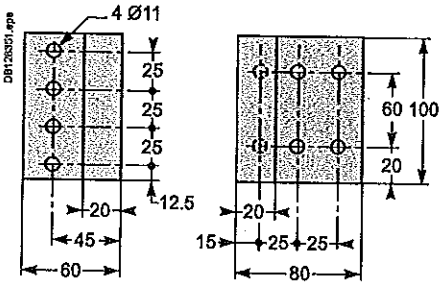
Recommended drilling dimensions

Front connection (NS1600b to 2500)

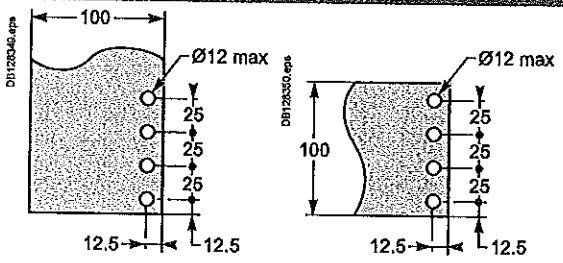


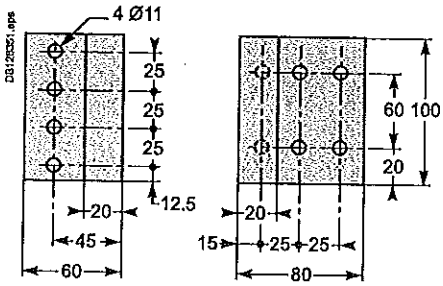
Front connection with vertical-connection adapter (NS1600b to 2500)





Front connection (NS3200)





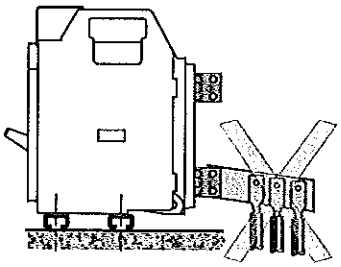
Power connections for Compact NS630b to 3200

Conductor materials and electrodynamic stresses

Compact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors (flexible or rigid bars, cables).
In the event of a short-circuit, thermal and electrodynamic stresses will be exerted on the conductors. They must therefore be correctly sized and maintained in place using supports.
Electrical connection points on all types of devices (switch-disconnectors, contactors, circuit breakers, etc.) should not be used for mechanical support.
Any partition between upstream and downstream connections of the device must be made of non-magnetic material.

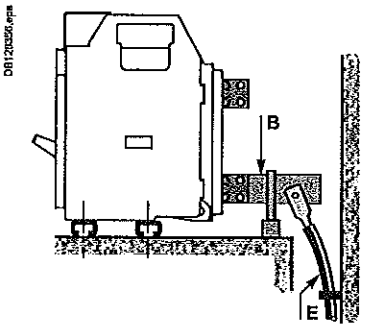
Ties for flexible bars and cables

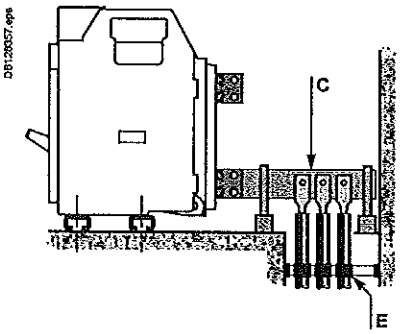
The table below indicates the maximum distance between ties depending on the prospective short-circuit current.
The maximum distance between ties attached to the switchboard frame is 400 mm.

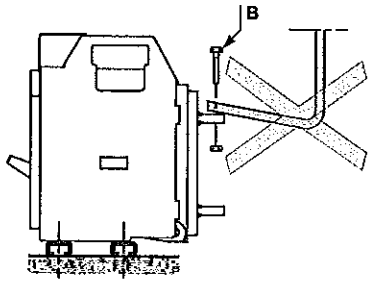


Type of tie	"Panduit" ties Width: 4.5 mm Maximum load: 22 kg Colour: white			"Sarel" ties Width: 9 mm Maximum load: 90 kg Colour: black				
Maximum distance between ties (mm)	200	100	50	350	200	100	70	50 (double ties)
Short-circuit current (kA rms)	10	15	20	20	27	35	45	100

Note: For cables ≥ 50 mm², use 9 mm-wide ties.







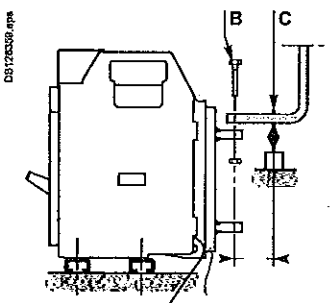
Connection of bars

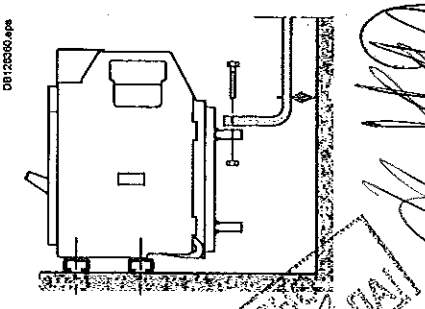
Bars must be adjusted to ensure correct positioning on the terminals before bolting **(B)**.
Bars must rest on a support firmly attached to the switchboard frame, such that the circuit breaker terminals do not bear any weight **(C)**.

Electrodynamic forces

The first spacer between bars must be positioned within a maximum distance (see table below) of the connection point to the circuit breaker. This distance is calculated to resist the electrodynamic stresses exerted between the bars of each phase during a short-circuit.

Maximum distance A between the circuit breaker connection and the first spacer between bars, depending on the short-circuit current						
Isc (kA)	30	50	65	80	100	150
Distance (mm)	350	300	250	150	150	150





Power connections for Compact NS630b to 3200

Conductor materials and electrodynamic stresses

Compact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors (flexible or rigid bars, cables).
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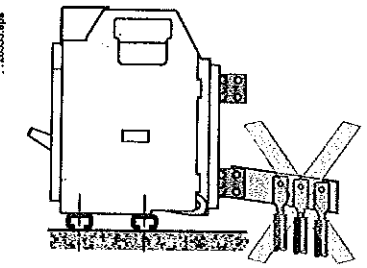
Electrical connection points on all types of devices (switch-disconnectors, contactors, circuit breakers, etc.) should not be used for mechanical support.
Any partition between upstream and downstream connections of the device must be made of non-magnetic material.

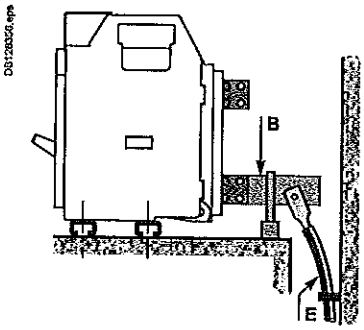
Ties for flexible bars and cables

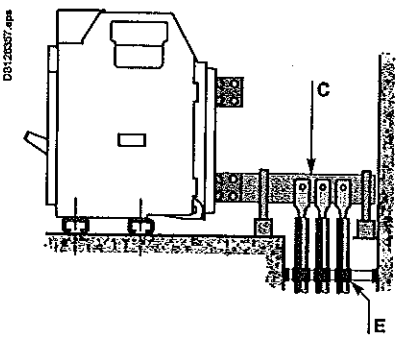
The table below indicates the maximum distance between ties depending on the prospective short-circuit current.
The maximum distance between ties attached to the switchboard frame is 400 mm.

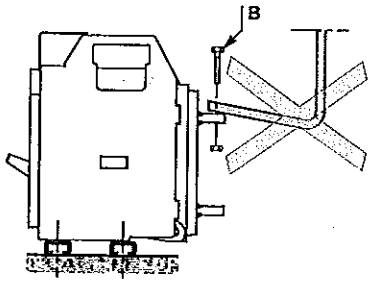


Type of tie	"Panduit" ties Width: 4.5 mm Maximum load: 22 kg Colour: white			"Sarel" ties Width: 9 mm Maximum load: 90 kg Colour: black				
Maximum distance between ties (mm)	200	100	50	350	200	100	70	50 (double ties)
Short-circuit current (kA rms)	10	15	20	20	27	35	45	100

Note: For cables ≥ 50 mm², use 9 mm-wide ties.







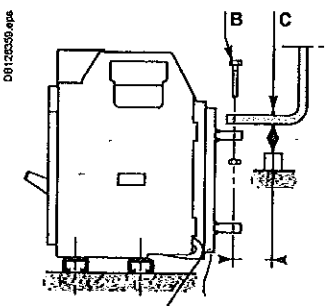
Connection of bars

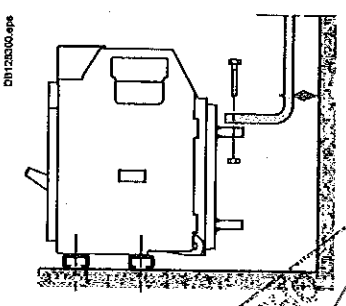
Bars must be adjusted to ensure correct positioning on the terminals before bolting (**B**).
Bars must rest on a support firmly attached to the switchboard frame, such that the circuit breaker terminals do not bear any weight (**C**).

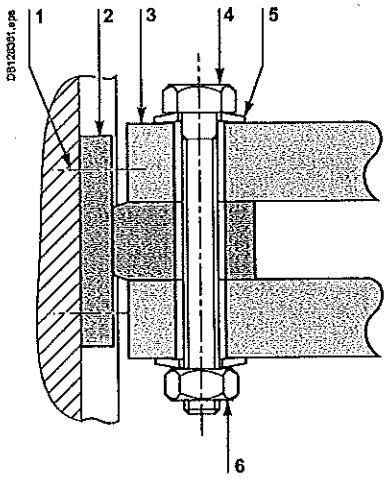
Electrodynamic forces

The first spacer between bars must be positioned within a maximum distance (see table below) of the connection point to the circuit breaker. This distance is calculated to resist the electrodynamic stresses exerted between the bars of each phase during a short-circuit.

Maximum distance A between the circuit breaker connection and the first spacer between bars, depending on the short-circuit current						
Isc (kA)	30	50	65	80	100	150
Distance (mm)	350	300	250	150	150	150





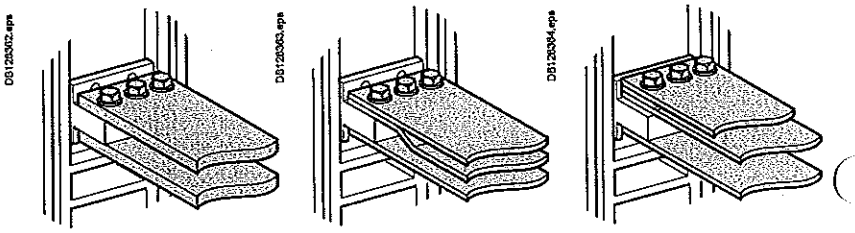


1 *terminal screws, factory tightened to 13 Nm*
2 *circuit breaker terminal*
3 *bars*
4 *bolt*
5 *washer*
6 *nut*

Connections

The quality of bar connections depends, among other things, on the tightening torques used for the nuts and bolts. Over-tightening may have the same consequences as under-tightening.
The correct tightening torques for the connection of bars to the circuit breaker terminals are indicated in the table below.
The values below are for copper bars (Cu ETP-NFA51-100) and steel nuts and bolts (class 8.8).
The same values apply to AGS-T52 quality aluminium bars (French standard NFA 02-104 and American National Standard H-35-1).

Examples of bar connections

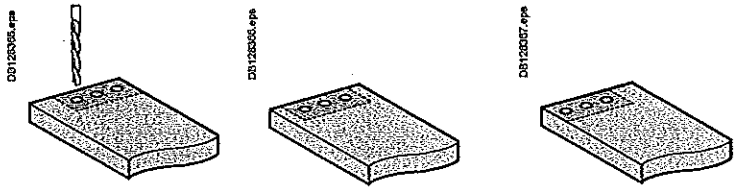


Tightening torque for bars

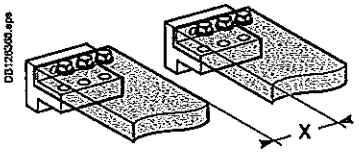
Rated diameter (mm)	Drilling (mm) diameter	Tightening torque (Nm) with flat or grower washers	Tightening torque (Nm) with contact or split washers
10	11	37.5	50

Bar drilling

Examples



Insulation distance

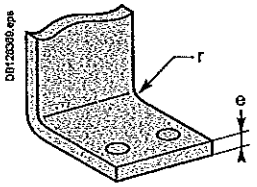


Dimensions (mm)

Utilisation voltage	X minimum
Ui ≤ 600 V	8 mm
Ui ≤ 1000 V	14 mm

Bar bending

Bars must be bent according to the table below. A tighter bend may cause cracks.



Dimensions (mm)

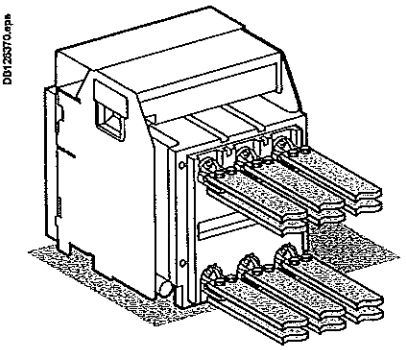
e	Radius r	
	Minimum	Recommended
5	5	7.5
10	15	18 to 20

Power connections for Compact NS630b to 3200
Sizing of bars

The following tables are based on the following assumptions:
- maximum permissible temperature of bars is 100 °C
- Ti: temperature around the circuit breaker and its connections
- busbars made of copper and not painted.

Note: The values presented in the tables are the result of trials and theoretical calculations on the basis of the assumptions mentioned above.
These tables are intended as an aid in designing connections, however, the actual values must be confirmed by tests on the installation.

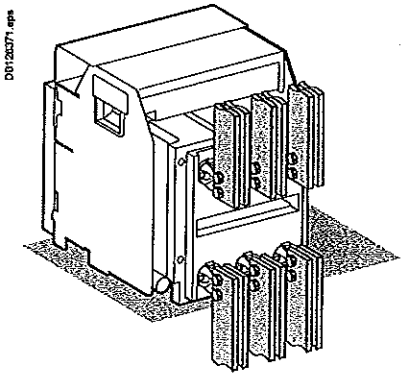
Front or horizontal rear connections



Compact	Maximum service current	Ti: 40 °C Number of bars 5 mm thick	10 mm thick	Ti: 50 °C Number of bars 5 mm thick	10 mm thick	Ti: 60 °C Number of bars 5 mm thick	10 mm thick
NS630b	400	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NS630b	630	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NS800	800	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.63 x 10
NS1000	1000	3b.50 x 5	1b.63 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
NS1250	1250	3b.50 x 5	2b.40 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
		2b.80 x 5	2b.40 x 10	2b.80 x 5			
NS1600/1600b	1400	2b.80 x 5	2b.40 x 10	2b.80 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NS1600/1600b	1600	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.80 x 5	3b.50 x 10
NS2000	1800	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NS2000	2000	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	3b.100 x 5	3b.63 x 10
NS2500	2200	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	4b.80 x 5	2b.100 x 10
NS2500	2500	4b.100 x 5	2b.100 x 10	4b.100 x 5	2b.100 x 10	4b.100 x 5	3b.80 x 10
NS3200	2800	4b.100 x 5	3b.80 x 10	4b.100 x 5	3b.80 x 10	5b.100 x 5	3b.100 x 10
NS3200	3000	5b.100 x 5	3b.80 x 10	6b.100 x 5	3b.100 x 10	8b.100 x 5	4b.80 x 10
NS3200	3200	6b.100 x 5	3b.100 x 10	8b.100 x 5	3b.100 x 10		4b.100 x 10

Note: With Compact NS630b to NS1600, it is recommended to use 50 mm wideness bars (see "Recommended busbars drilling").

Vertical rear connections



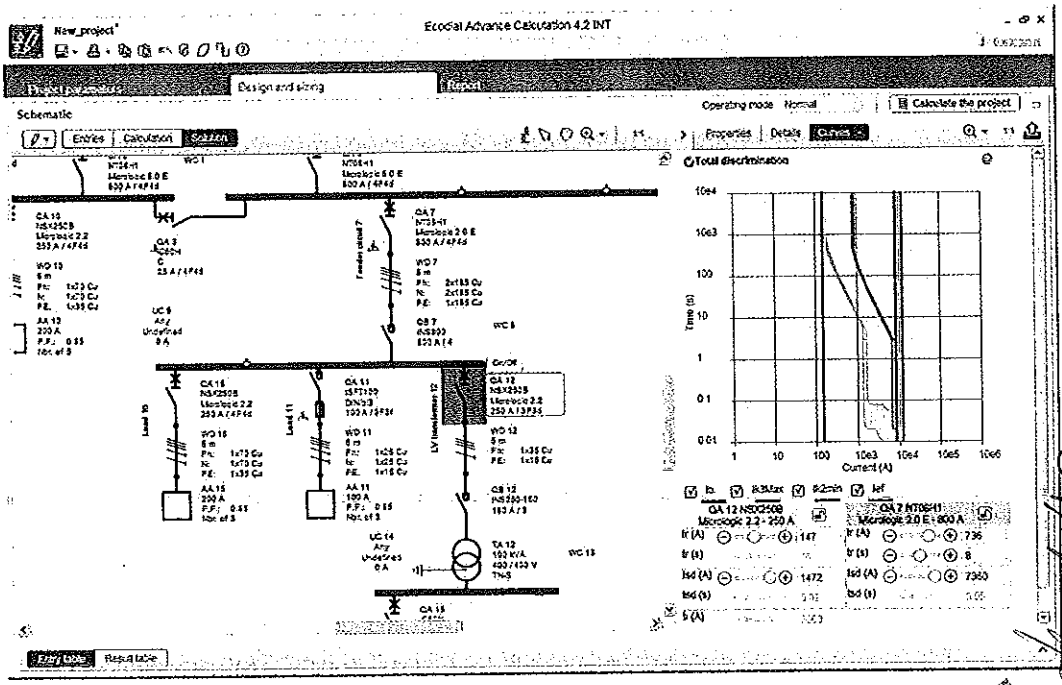
Compact	Maximum service current	Ti: 40 °C Number of bars		Ti: 50 °C Number of bars		Ti: 60 °C Number of bars	
		5 mm thick	10 mm thick	5 mm thick	10 mm thick	5 mm thick	10 mm thick
NS630b	400	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NS630b	630	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NS800	800	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10
NS1000	1000	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.63 x 5	1b.63 x 10
NS1250	1250	2b.63 x 5	1b.63 x 10	3b.50 x 5	2b.40 x 10	3b.50 x 5	2b.40 x 10
NS1600	1400	2b.80 x 5	1b.80 x 10	2b.80 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
NS1600	1600	3b.63 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10

Ecodial

Ecodial software is dedicated to LV electrical installation calculation in accordance with the IEC60364 international standard or national standards.

This 4th generation, "Ecodial Advance Calculation 4", offers a new ergonomic and new features:

- operating mode that allows easy calculation in case of installation with different type of sources (parallel transformers, back-up generators...)
- discrimination analysis associating curves checking and discrimination tables
- direct access to protection settings including residual current protections
- easy selection of alternate solutions or manual selection of a product.

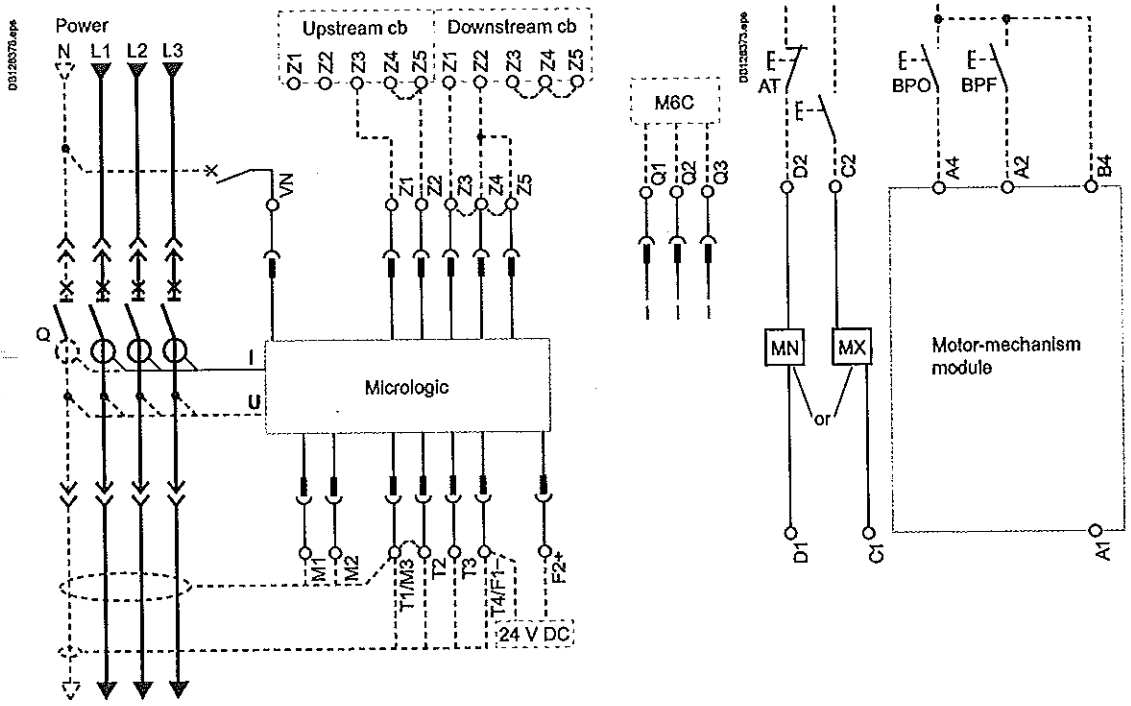


Electrical diagrams

Compact NS630b to 1600
Fixed circuit breakers

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position

Power **Control unit** **Remote operation**



Basic	A	E	P	Control unit
■	■	■	■	E1-E6 communication
	■	■	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault)
	■		■	M1 = Vigi module input (Micrologic 7)
	■	■	■	T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	■	■	F2+, F1– external 24 V DC power supply
		■	■	VN external voltage connector (must be connected to the neutral with a 3P circuit breaker)
			■	**M6C** : 6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required

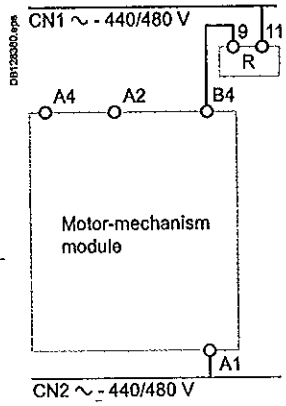
E : energy
A : digital ammeter.
P : A + power meter + additional protection.

Remote operation

MN : undervoltage release
or
MX : shunt release

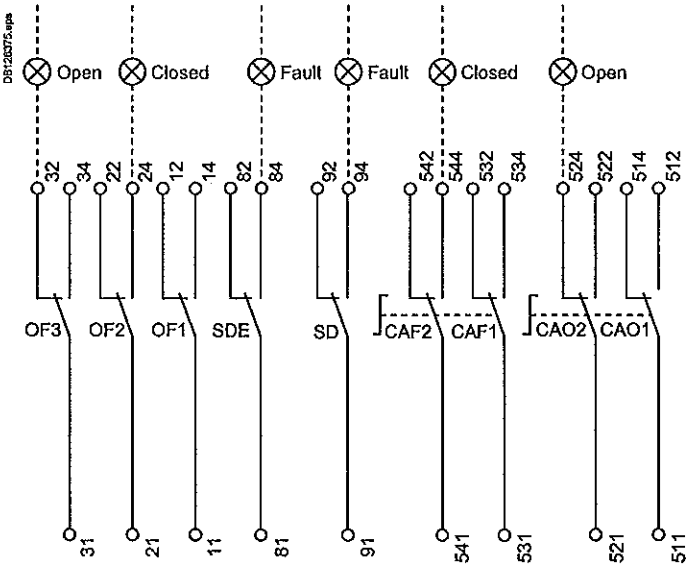
Motor-mechanism module (*)
A4 : electrical opening order
A2 : electrical closing order
B4, A1 : power supply for control devices and gear motor

(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)

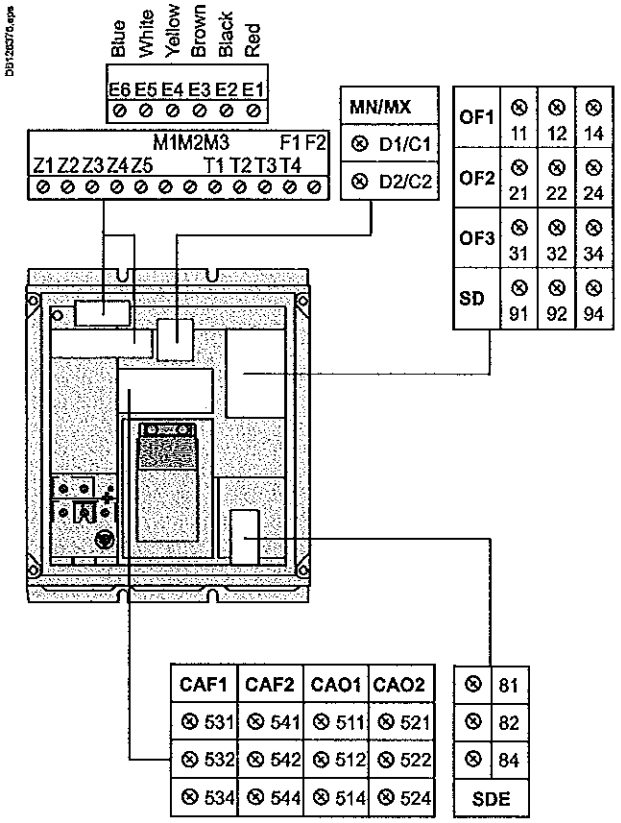


Compact NS630b to 1600
Fixed circuit breakers

Indication contacts



Terminal-block marking (manual operation)



Indication contacts

OF3 / OF2 / OF1 : indication contacts

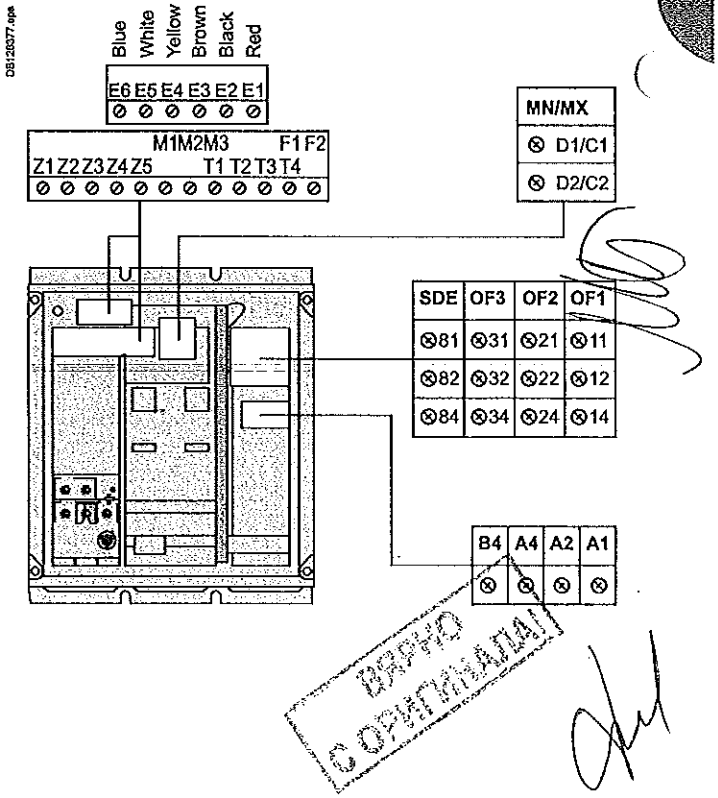
SDE : fault-trip indication contact (short-circuit, overload, earth fault)

SD : trip indication contact (manual operation)

CAF2/CAF1 * : early-make contact (rotary handle)

CAO2 / CAO1 : early-break contact (rotary handle)

Terminal-block marking (electrical operation)

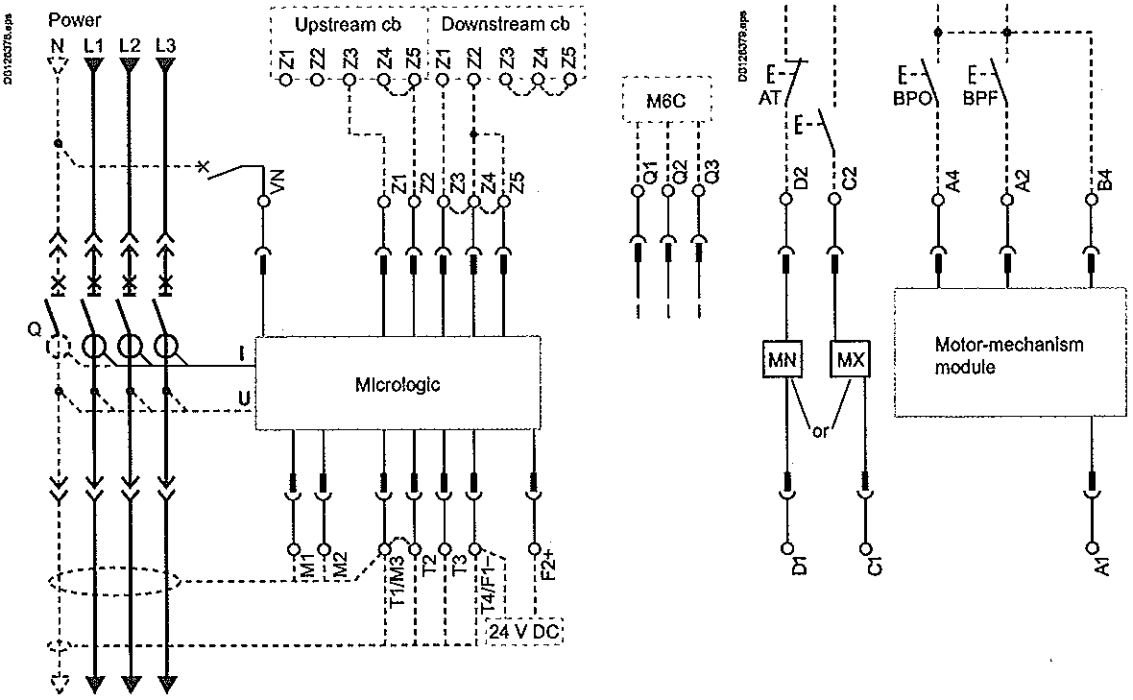


* *CAF2 option is not compatible with M6C option.*

Compact NS630b to 1600
Plug-in / withdrawable circuit breakers

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Power **Control unit** **Remote operation**



Terminal-block marking

Control unit

Com	UC1	UC2	UC3	M6C / CAF2
E5 E6	Z5 M1	M2 M3	F2+	Q3 544
E3 E4	Z3 Z4	T3 T4	VN	Q2 542
E1 E2	Z1 Z2	T1 T2	F1 –	Q1 541

Remote operation

MN / MX	MT2	MT1
D2 / C2	A4	A2
		B4
D1 / C1		A1

Basic	A	E	P		Control unit
■	■	■	■	Com:	E1-E6 communication
	■	■	■	UC1:	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault)
	■		■		M1 = Vigi module input (Micrologic 7)
	■	■	■	UC2:	T1, T2, T3, T4 = external neutral;
	■		■		M2, M3 = Vigi module input (Micrologic 7)
	■	■	■	UC3:	F2+, F1- external 24 V DC power supply
	■		■		VN external voltage connector (must be connected to the neutral with a 3P circuit breaker)
			■	M6C:	6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required

A : digital ammeter.
P : A + power meter + additional protection.

Remote operation

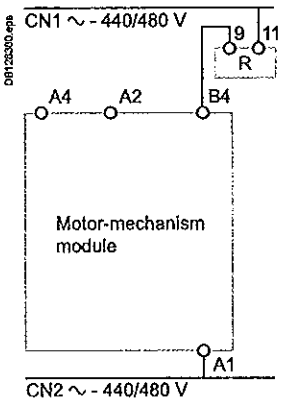
MN : undervoltage release
or
MX : shunt release

Motor-mechanism module (*)

MT2 : **A4** : electrical opening order

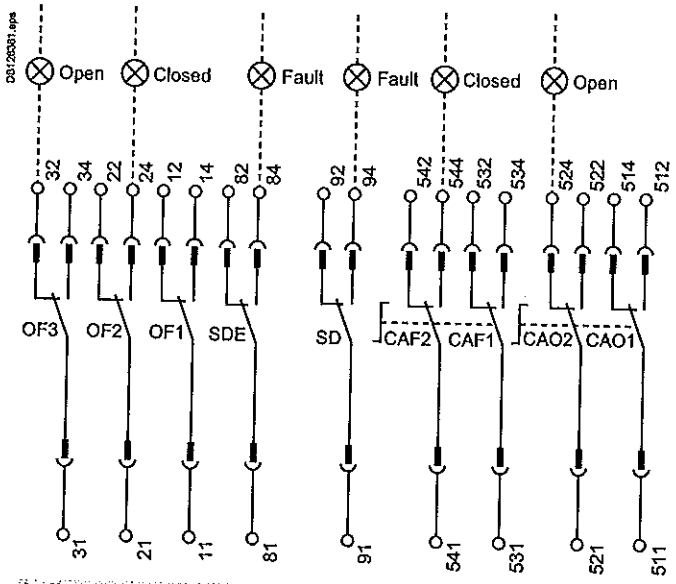
MT1 : **A2** : electrical closing order
B4, A1 : power supply for control devices and gear motor (MCH)

(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)

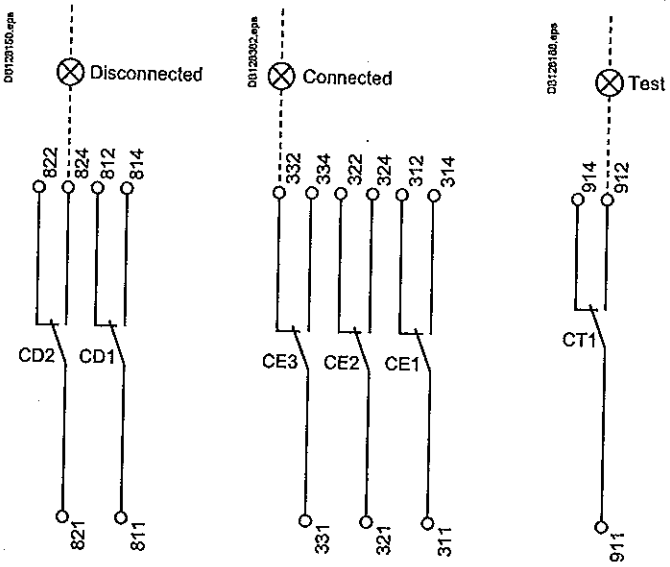


Compact NS630b to 1600
Plug-in / withdrawable circuit breakers

Indication contacts



Carriage switches



Indication contacts

M6C / CAF2	CAF1	SDE	SD	CAO2	CAO1	OF3	OF2	OF1
Q3 544	534	84	94	524	514	34	24	14
Q2 542	532	82	92	522	512	32	22	12
Q1 541	531	81	91	521	511	31	21	11

Carriage switches

CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

OF3 / OF2 / OF1 : indication contacts

SDE : fault-trip indication contact (short-circuit, overload, earth fault)

SD : trip indication contact (manual operation)

CAF2/CAF1 * : early-make contact (rotary handle)

CAO2 / CAO1 : early-break contact (rotary handle)

Carriage switches

CD2 : disconnected
CD1 position

CE3 : connected
CE2 position
CE1

CT1 : test position

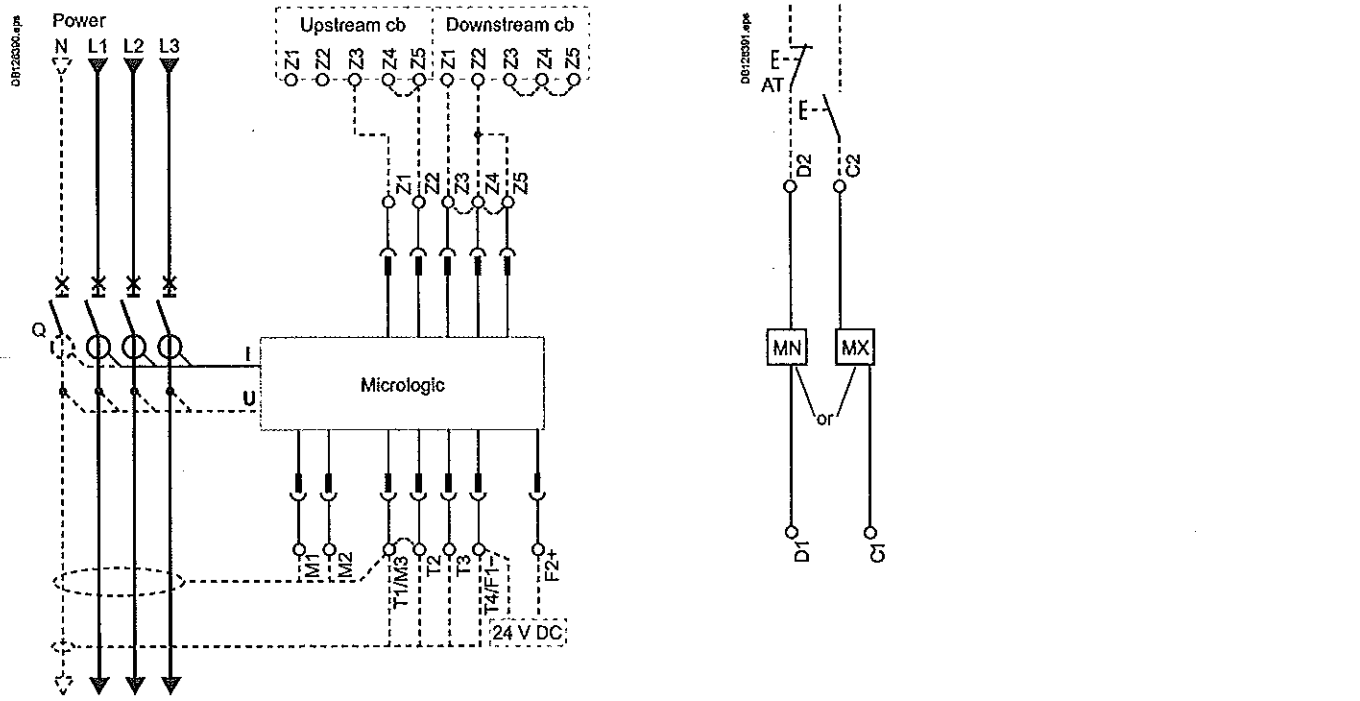
** CAF2 option is not compatible with M6C option.*

Legend
Connected
(only one wire per connection point).

Compact NS1600b to 3200
Fixed circuit breakers

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position

Power **Control unit** **Remote operation**



– (basic)	A	E	Control unit
■	■	■	E1-E6 communication
	■	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)
	■	■	T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	■	F2+, F1- external 24 V DC power supply

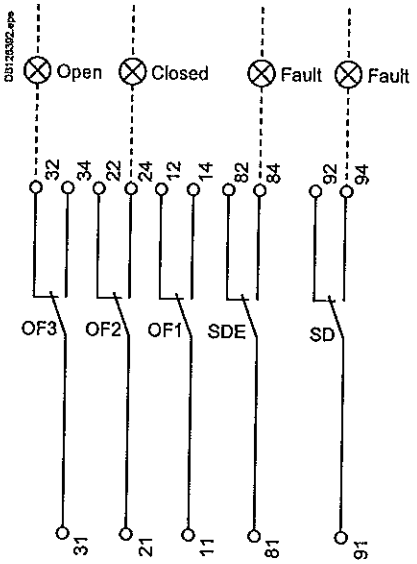
–: basic Micrologic control unit.
A: digital ammeter.

Remote operation

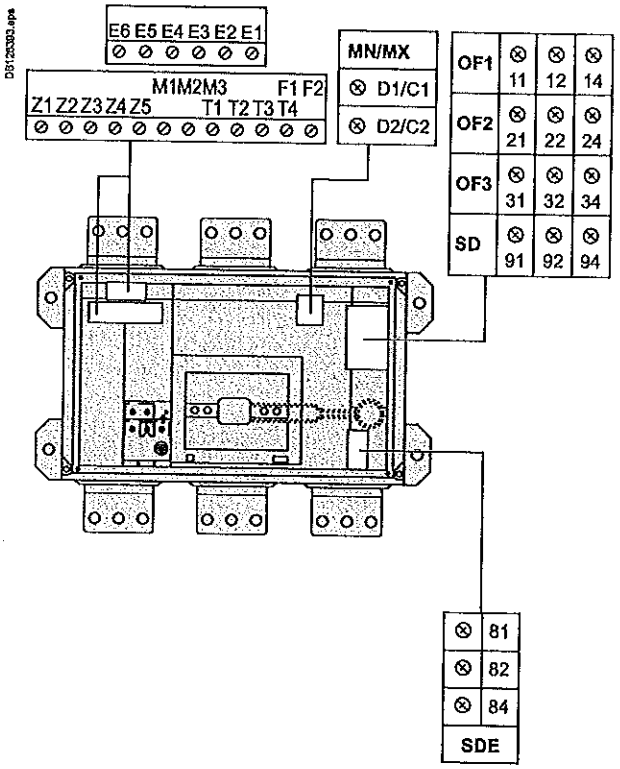
MN : undervoltage release
or
MX : shunt release

Compact NS1600b to 3200
Fixed circuit breakers

Indication contacts



Terminal-block marking



Indication contacts

OF3 / OF2 / OF1 : ON / OFF indication contacts

SDE : fault-trip indication contact (short-circuit, overload, earth fault)

SD : trip indication contact

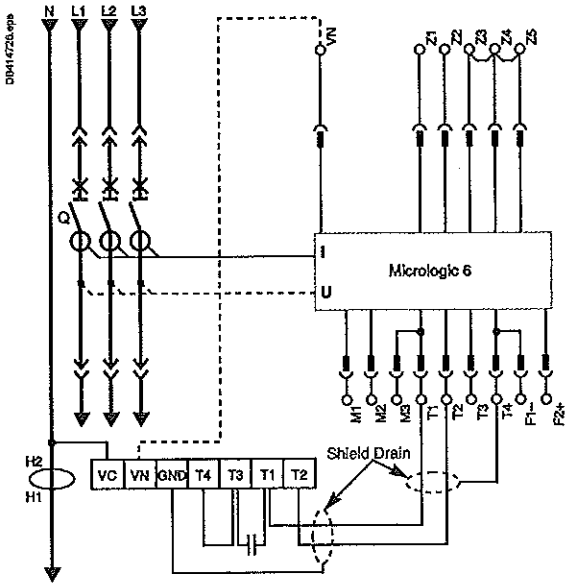
Compact NS630b to 3200

Earth-fault and earth-leakage protection
Neutral protection
Zone selective interlocking

External sensor (CT) for residual earth-fault protection

Connection of current-transformer secondary circuit for external neutral
Compact equipped with a Micrologic 6 A/E/P [1]:
- shielded cable with 2 twisted pairs
- T1 twisted with T2
- maximum length 4 meters
- cable cross-sectional area 0.4 to 1.5 mm²
- recommended cable: Belden 9552 or equivalent.

For proper wiring of neutral CT, refer to instruction Bulletin 48041-082-03 shipped with it.
Do not remove Micrologic factory-installed jumper between T1 and T2 unless neutral CT is connected.
If supply is via the top, follow the shematics.
If supply is via the bottom, control wiring is identical; for the power wiring, H1 is connected to the source side, H2 to the load side.
For four-pole versions, for residual earth-fault protection, the current transformer for the external neutral is not necessary.
Connection for signal VN is required only for power measurements (3 Ø, 4 wires, 4CTs).

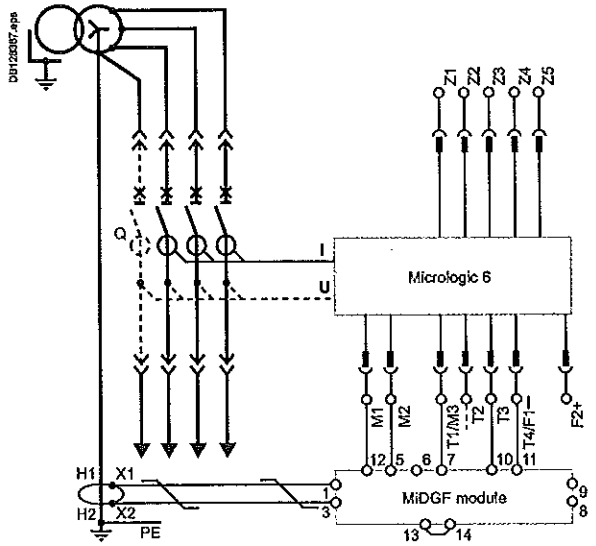


(1) Only for NS630b to 1600.

External transformer for source ground return (SGR) earth-fault protection

Connection of the secondary circuit
Compact equipped with a Micrologic 6 A/E/P [1]:
unshielded cable with 1 twisted pair
- maximum length 150 metres
- cable cross-sectional area 0.4 to 1.5 mm²
- recommended cable: Belden 9409 or equivalent.

(1) Only for NS630b to 1600.

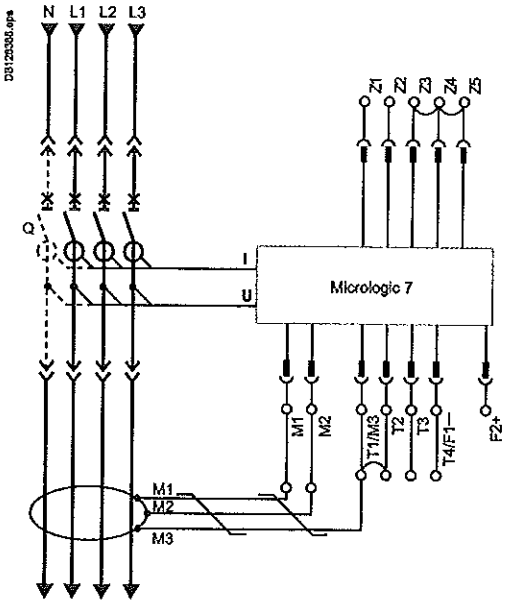


Compact NS630b to 3200

Earth-fault and earth-leakage protection
Neutral protection
Zone selective interlocking

Earth-leakage protection

Connection of the rectangular-sensor secondary circuit
Compact equipped with a Micrologic 7 A/P:
use the cable shipped with the rectangular sensor.

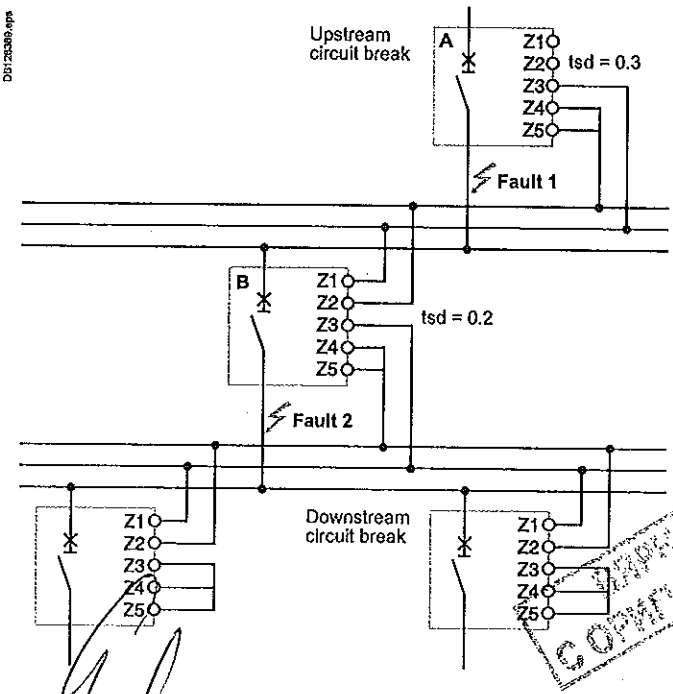


Neutral protection

- three pole circuit breaker:
  - neutral protection is impossible with Micrologic A
  - with Micrologic E/P, an external neutral transformer is necessary; the connection diagram is the same as for residual earth-fault protection.
- four pole circuit breaker:
  - Compact equipped with Micrologic A
  - the current transformer for external neutral is not necessary.

Zone selective interlocking

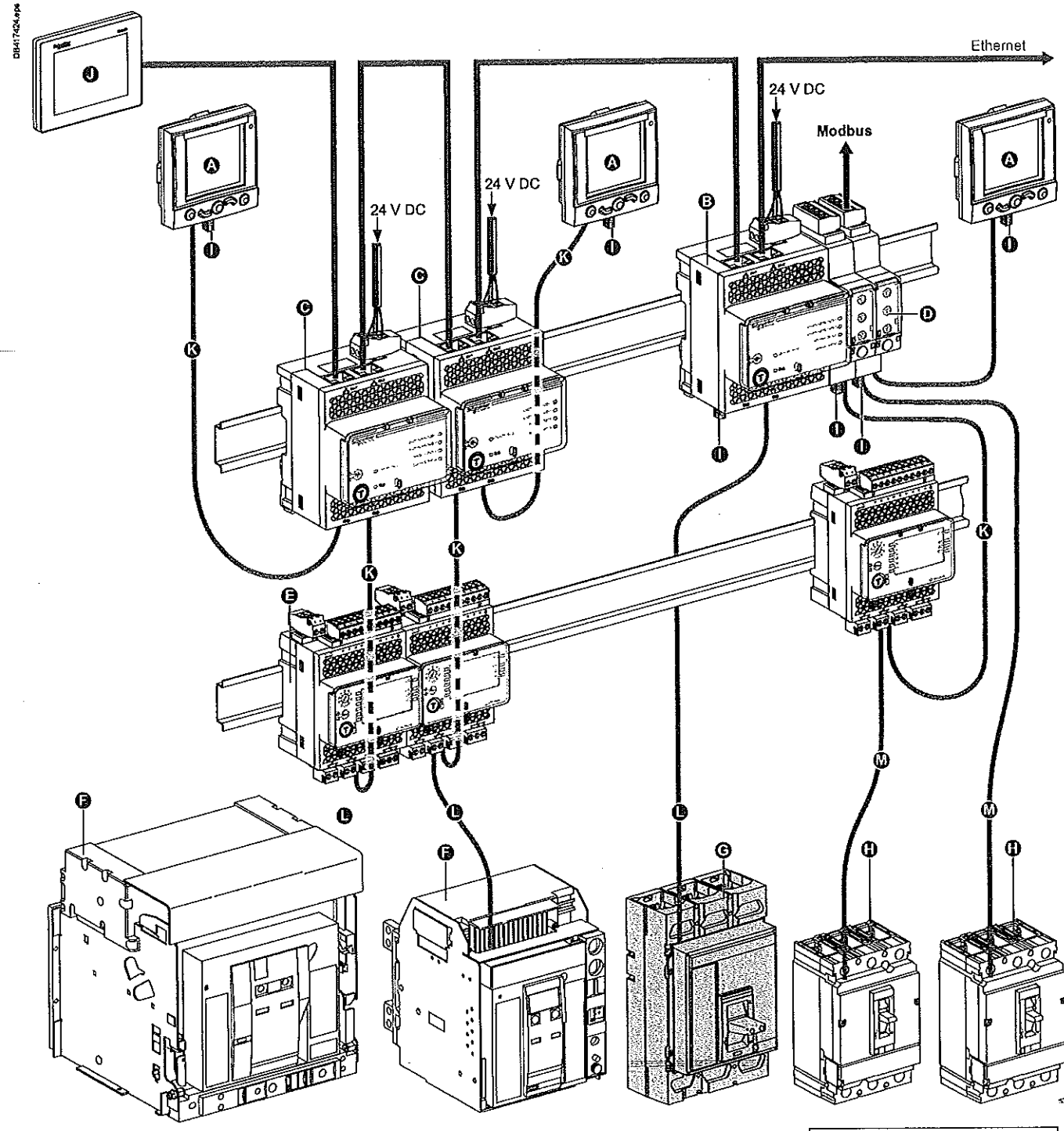
Zone-selective interlocking is used to reduce the electrodynamic forces exerted on the installation by shortening the time required to clear faults, while maintaining time discrimination between the various devices.
A pilot wire interconnects a number of circuit breakers equipped with Micrologic A/E/P control units, as illustrated in the diagram above.
The control unit detecting a fault sends a signal upstream and checks for a signal arriving from downstream. If there is a signal from downstream, the circuit breaker remains closed for the full duration of its tripping delay. If there is no signal from downstream, the circuit breaker opens immediately, regardless of the tripping-delay setting.
Fault 1.
Only circuit breaker A detects the fault. Because it receives no signal from downstream, it immediately opens in spite of its tripping delay set to 0.3.
Fault 2.
Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.



Wiring
- Maximum impedance: 2.7 Ω / 300 m.
- Capacity of connectors: 0.4 to 2.5 mm².
- Wires: single or multicore.
- Maximum lenght: 3000 m.
- Limits to device interconnection:
  - the common ZSI - OUT (Z1) and the output ZSI - OUT (Z2) can be connected to a maximum of 10 upstream device
  - a maximum of 100 downstream devices may be connected to the common ZSI - IN (Z3) and to an input ZSI - IN CR (Z4) or GF (Z5).

Compact NS630b to 3200
Communication

Connection of circuit breakers to the Modbus communication network



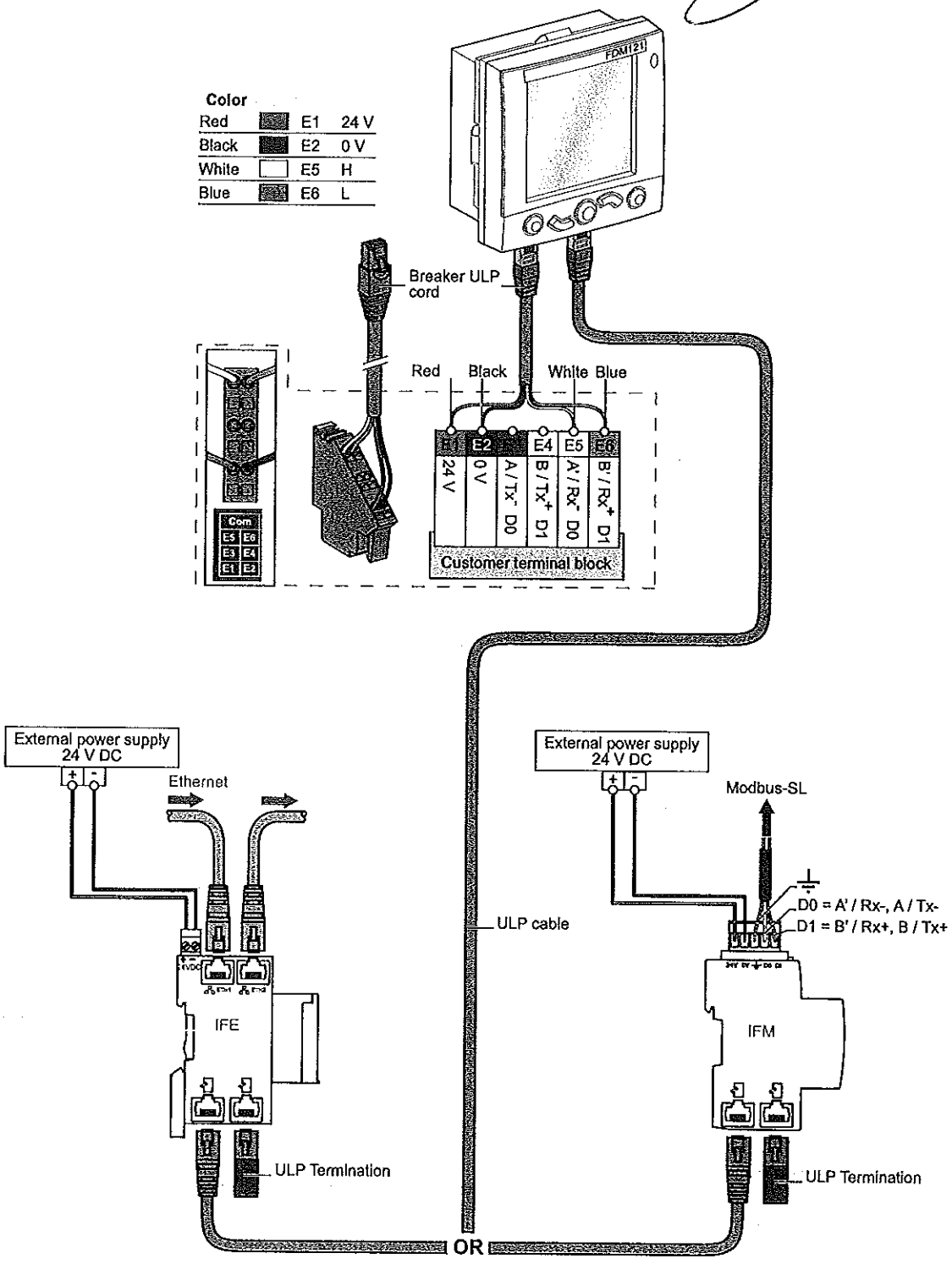
- Ⓐ FDM121 (TRV00121)
- Ⓑ IFE master (LV434011)
- Ⓒ IFE (LV434010)
- Ⓓ IFM (TRV00210)
- Ⓔ I/O application module (LV434063)
- Ⓕ Masterpact NT/NW
- Ⓖ Compact NS630b-3200
- Ⓗ Compact NSX
- Ⓘ ULP termination (TRV00880)
- Ⓙ FDM128 (LV434128)

- Ⓚ ULP cable
- Ⓛ Breaker ULP cord
- Ⓜ NSX cord
- Ethernet
- Modbus

Fixed, electrically operated Compact NS630b to 3200

Connection to the communication interface module

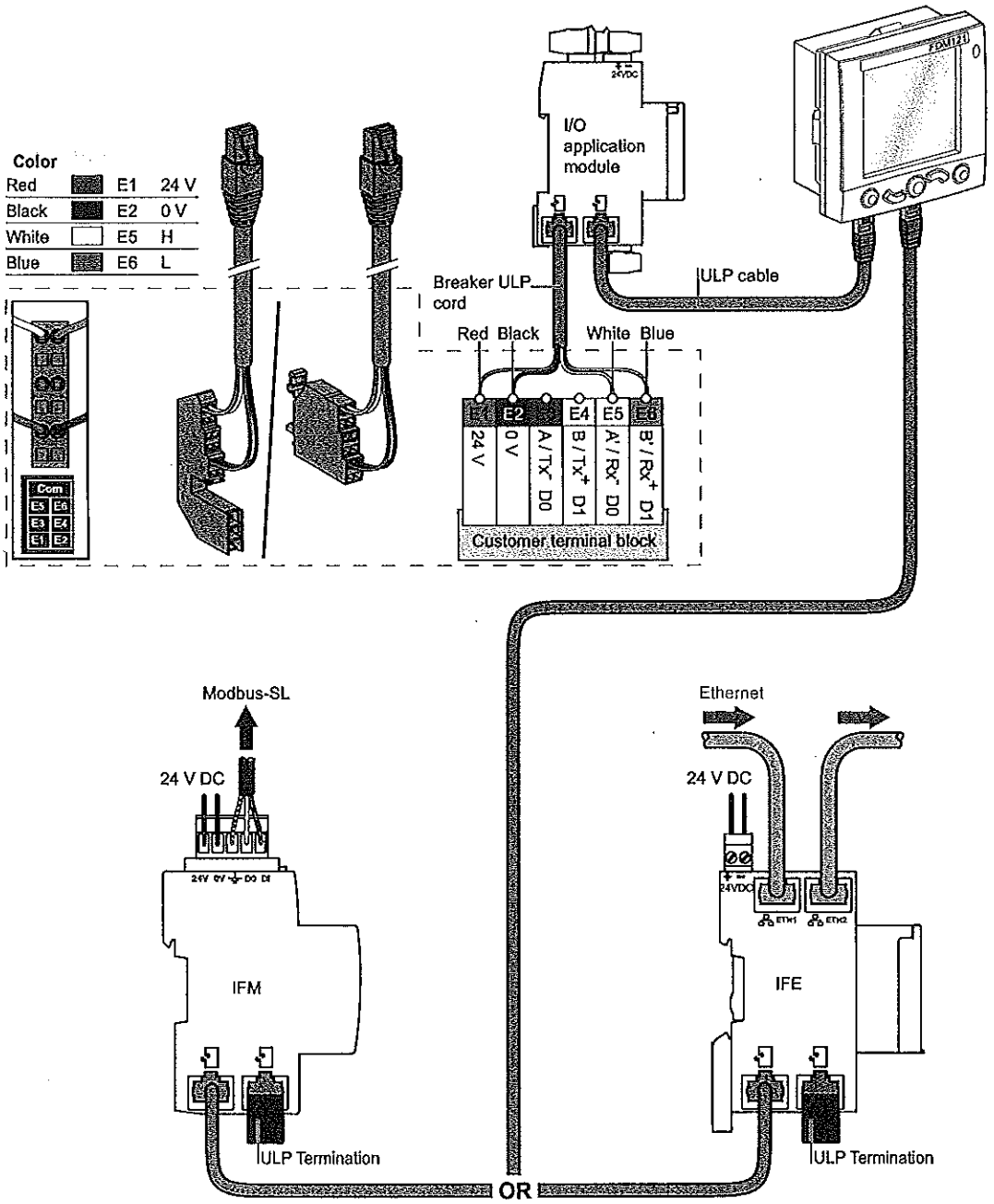
DB4107707.eps



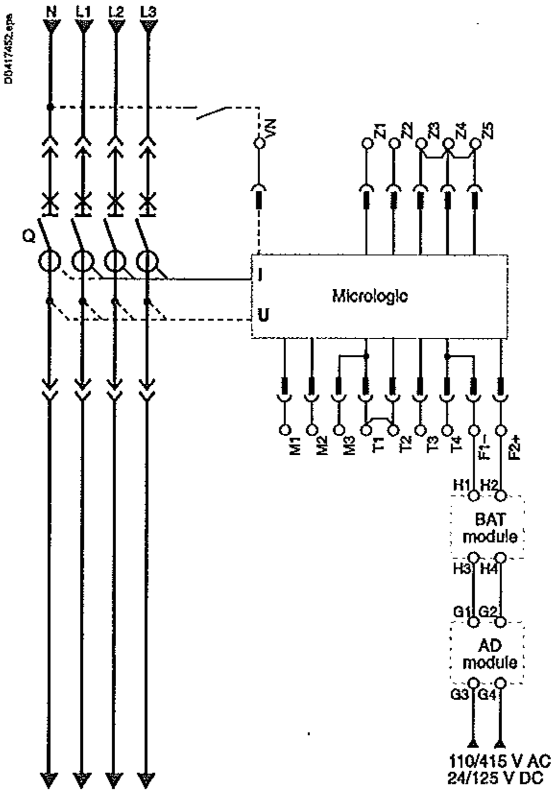
Withdrawable Compact NS630b to 3200

Connection to the I/O application module and communication interface module

DB410708.eps



Compact NS630b to 3200
Connection of the 24 V DC external power supply AD module



- The 24 V DC external power-supply (AD module) for the Micrologic control unit (F1- F2+) is not required for basic protections LSIG.
- The 24 V DC external power-supply (AD module) for the BCM ULP communication module (E1-E2) is required.
- The 24 V DC external power-supply (AD module) for the FDM121 front display module (0V +24) is required.
- The 24 V DC external power-supply (AD module) for the programmable contact M2C/M6C is required.
- The same 24 V DC external power-supply (AD module) can be connected to Micrologic control unit, BCM ULP and FDM121, M2C/M6C.
  - *If voltage > 480 V AC or in an environment with a high level of electromagnetic disturbances, use separate power supply: 1 power supply for Micrologic (F1- F2+) and M2C/M6C, another power supply for BCM ULP and FDM121.*
- With Micrologic A/E, it is recommended to connect 24 V DC external power-supply (AD module) to the Micrologic control unit (F1- F2+) in order to keep available the display and the energy metering, even if Current < 20 % In.

Note: In case of using the 24 V DC external power supply (AD module), maximum cable length between 24 V DC (G1, G2) and the control unit (F1-, F2+) must not exceed 10 meters.

The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.

The internal voltage taps are connected to the botton side of the circuit breaker.

With Micrologic P/H, external voltage taps are possible using the PTE option. With this option, the internal voltage taps are disconnected and the voltage taps are connected to terminals VN, V1, V2, V3.

The PTE option is required for voltages less than 220 V and greater than 690 V (in which case a voltage transformer is compulsory). For three-pole devices, the system is supplied with terminal VN connected only to the control unit (Micrologic P).

When the PTE option is implemented, the voltage measurement input must be protected against short-circuits. Installed as close as possible to the busbars, this protection function is ensured by a P25M circuit breaker (1 A rating) with an auxiliary contact (cat. no. 21104 and 21117). This voltage measurement input is reserved exclusively for the control unit and must not ever be used to supply other circuits outside the switchboard.

Connection

The maximum length for each conductor supplying power to the trip unit or M6C module is 10 m.

Do not ground F2+, F1-, or power supply output:
- the positive terminal (F2+) on the trip unit must not be connected to earth ground
- the negative terminal (F1-) on the trip unit must not be connected to earth ground
- the output terminals (- and +) of the 24 V DC power supply must not be grounded.

Reduce electromagnetic Interference:
- the input and output wires of the 24 V DC power supply must be physically separated as much as possible
- if the 24 V DC power supply wires cross power cables, they must cross perpendicularly. If this is not physically possible, the power supply conductors must be twisted together
- Power supply conductors must be cut to length. Do not loop excess conductor.

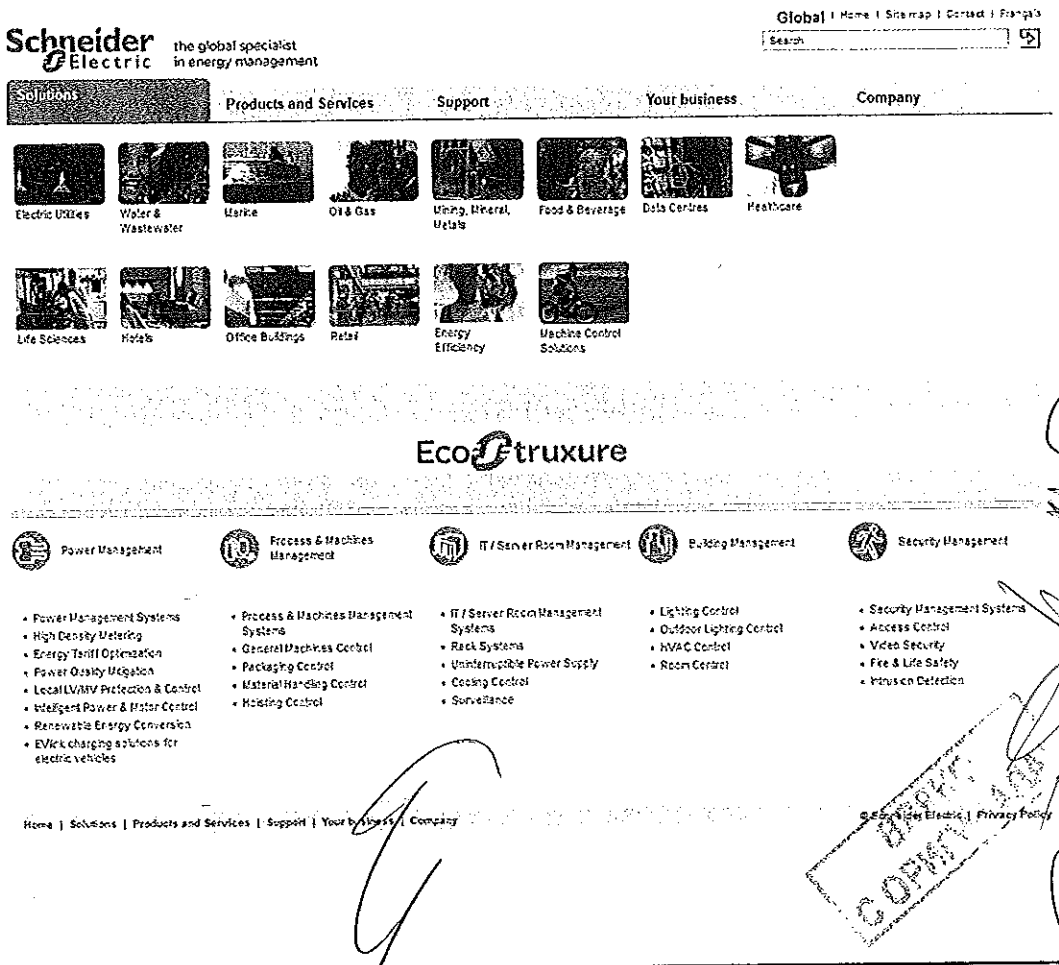
TOOLS

schneider-electric.com

This international site allows you to access all the Schneider Electric Solution and Product information via :

- comprehensive descriptions
- range data sheets
- a download area
- product selectors
- ...

You can also access the information dedicated to your business and get in touch with your Schneider Electric country support.

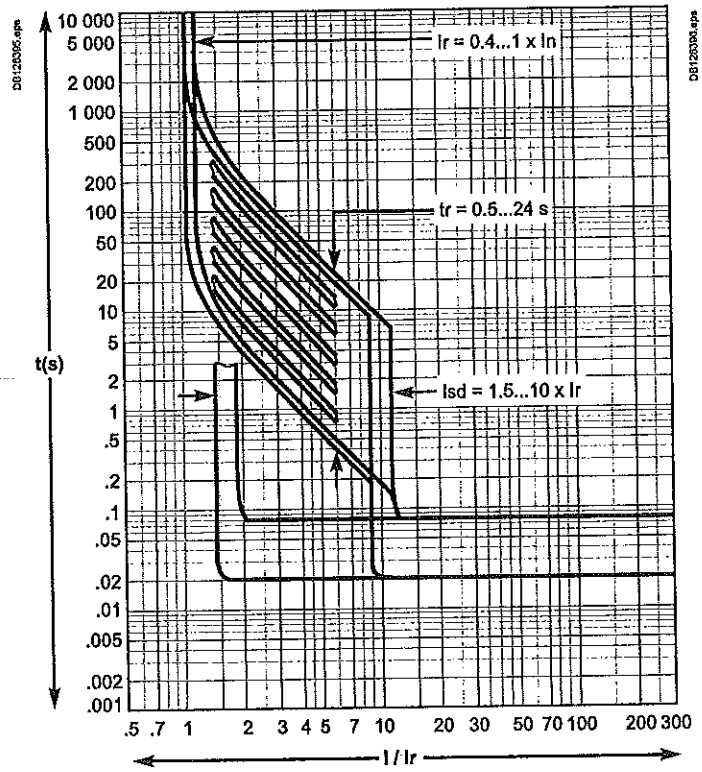


Additional characteristics

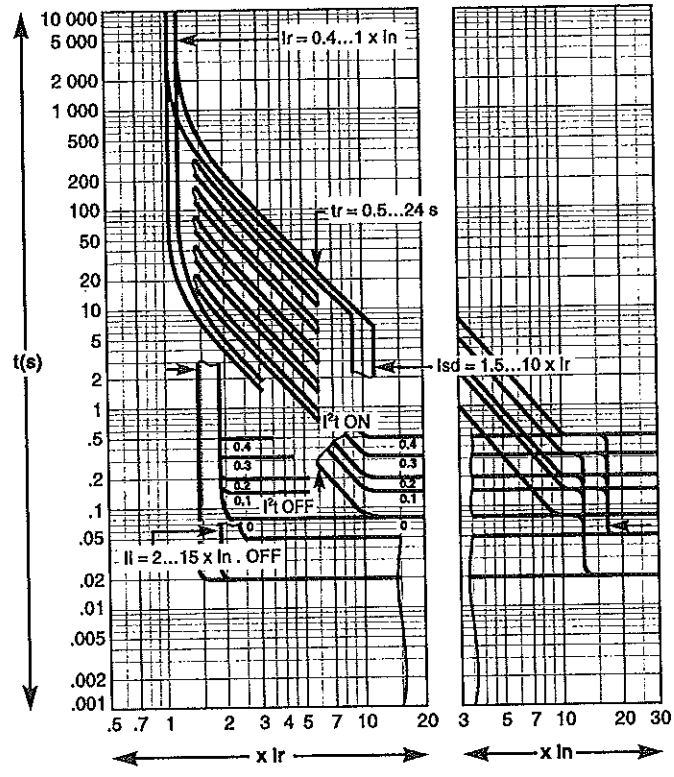
Tripping curves
Compact NS630b to 3200

Micrologic electronic control units

Micrologic 2.0

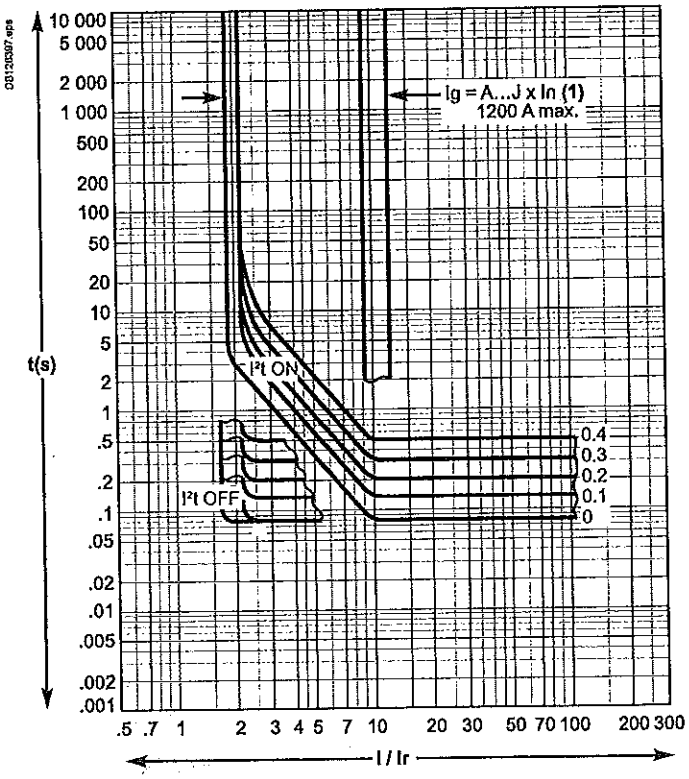


Micrologic 5.0, 6.0, 7.0



Options for Micrologic electronic control units

Earth-fault protection (Micrologic 6.0)



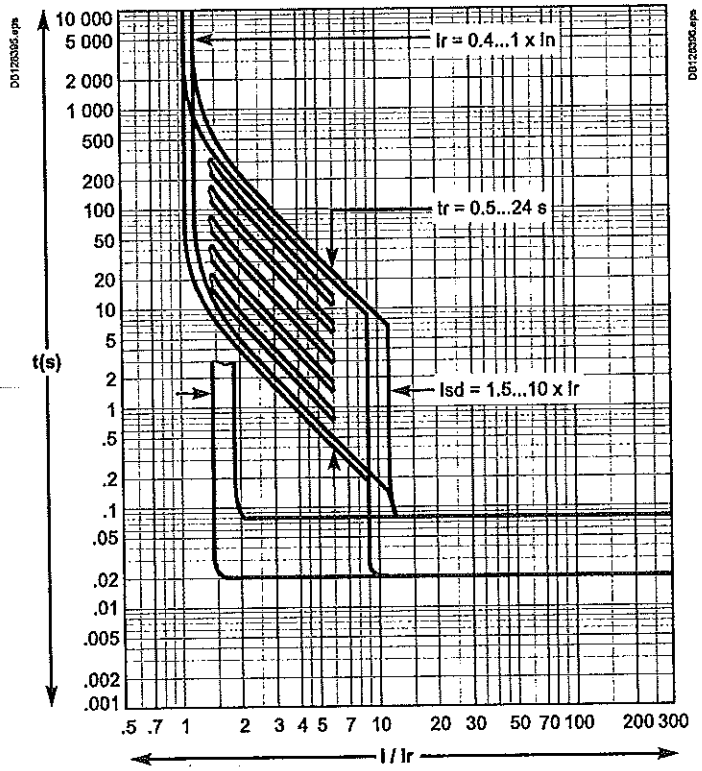
(1)

Ig = In x ...	A	B	C	D	E	F	G	H	J
In < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ≤ In ≤ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
In > 1200 A	500	640	720	800	880	960	1040	1120	1200

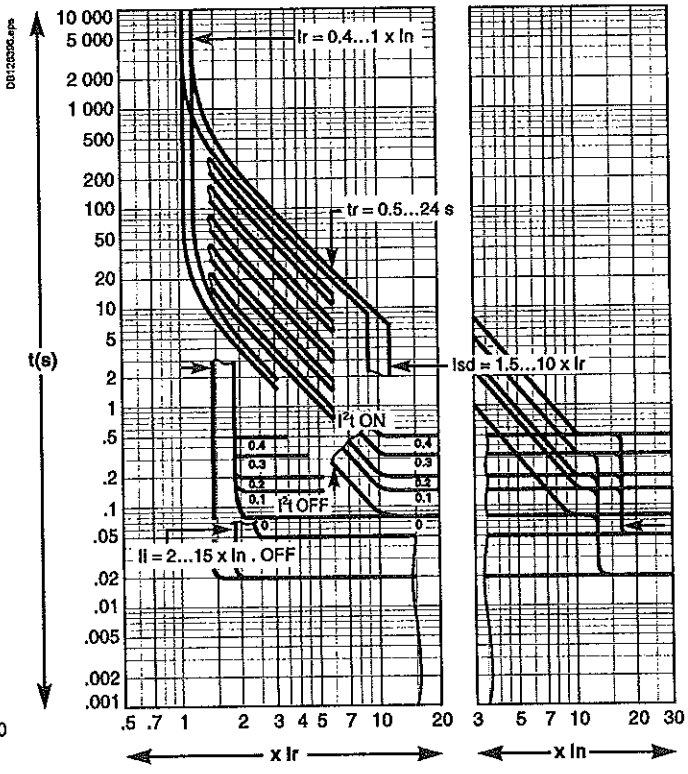
Tripping curves
Compact NS630b to 3200

Micrologic electronic control units

Micrologic 2.0

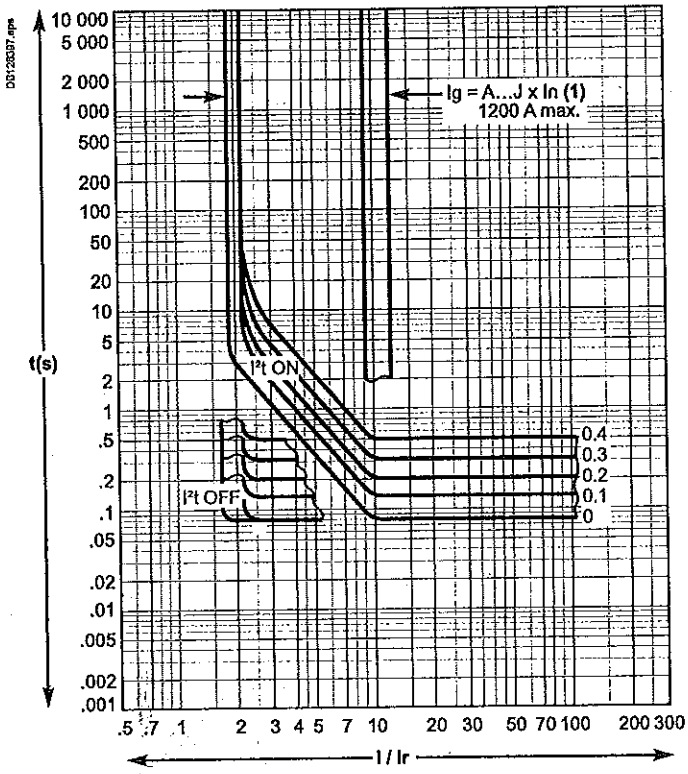


Micrologic 5.0, 6.0, 7.0



Options for Micrologic electronic control units

Earth-fault protection (Micrologic 6.0)

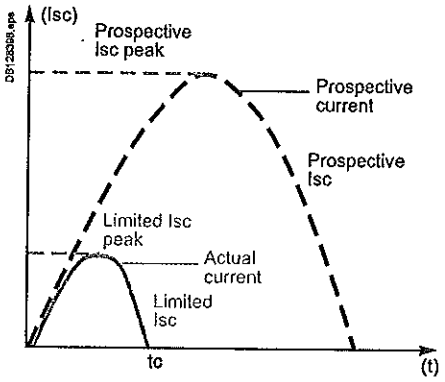


(1)

Ig = In x ...	A	B	C	D	E	F	G	H	J
In < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ≤ In ≤ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
In > 1200 A	500	640	720	800	880	960	1040	1120	1200

Current-limiting curves

The limiting capacity of a circuit breaker is its aptitude to limit short-circuit currents.



The exceptional limiting capacity of the Compact NS range is due to the rotating double-break technique (very rapid natural repulsion of contacts and the appearance of two arc voltages in-series with a very steep wave front).

Ics = 100 % Icu

The exceptional limiting capacity of the Compact NS range greatly reduces the forces created by fault currents in devices.
The result is a major increase in breaking performance. In particular, the service breaking capacity Ics is equal to 100 % of Icu.
The Ics value, defined by IEC standard 60947-2, is guaranteed by tests comprising the following operations:

- break three times consecutively a fault current equal to 100 % of Icu
- check that the device continues to function normally:
  - it conducts the rated current without abnormal temperature rise
  - protection functions perform within the limits specified by the standard
  - suitability for isolation is not impaired.

Longer service life of electrical installations

Current-limiting circuit breakers greatly reduce the negative effects of short-circuits on installations.

Thermal effects
Less temperature rise in conductors, therefore longer service life for cables.

Mechanical effects
Reduced electrodynamic forces, therefore less risk of electrical contacts or busbars being deformed or broken.

Electromagnetic effects
Less disturbances for measuring devices located near electrical circuits.

Economy by means of cascading

Cascading is a technique directly derived from current limiting. Circuit breakers with breaking capacities less than the prospective short-circuit current may be installed downstream of a limiting circuit breaker. The breaking capacity is reinforced by the limiting capacity of the upstream device.
It follows that substantial savings can be made on downstream equipment and enclosures.

Current-limiting curves

The current-limiting capacity of a circuit breaker is expressed by two curves which are a function of the prospective short-circuit current (the current which would flow if no protection devices were installed):

- the actual peak current (limited current),
- thermal stress (A^2s), i.e. the energy dissipated by the short-circuit in a conductor with a resistance of 1 Ω.

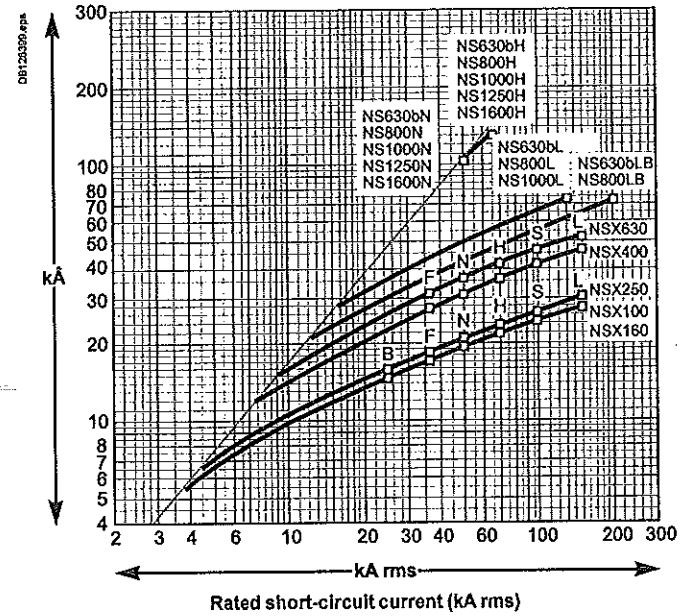
Example
What is the real value of a 200 kA rms prospective short-circuit (i.e. 440 kA peak) limited by an NS630bLB upstream ?
Answer: 70 kA peak (see next page).

Current-limiting curves

Current-limiting curves

Voltage 400/440 V AC (1)

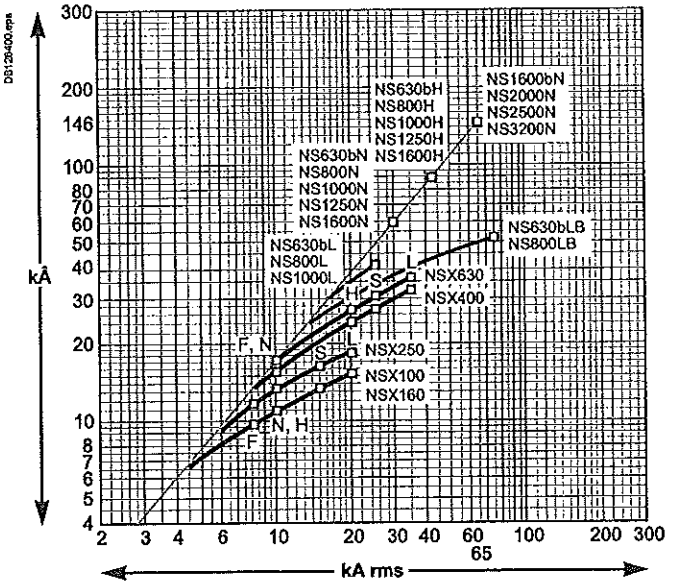
Limited short-circuit current (kÂ peak)



Rated short-circuit current (kA rms)

Voltage 660/690 V AC

Limited short-circuit current (kÂ peak)

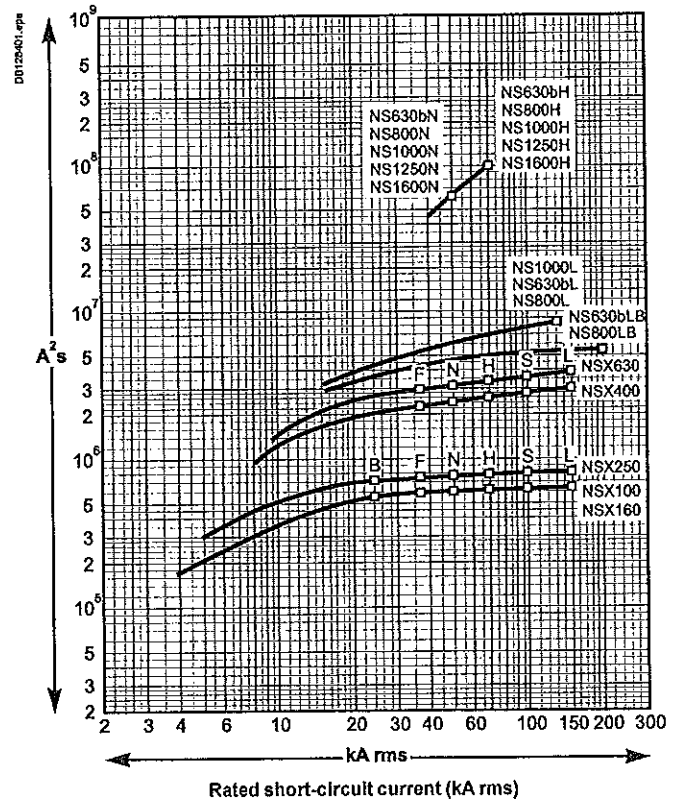


Rated short-circuit current (kA rms)

Thermal-stress curves

Voltage 400/440 V AC (1)

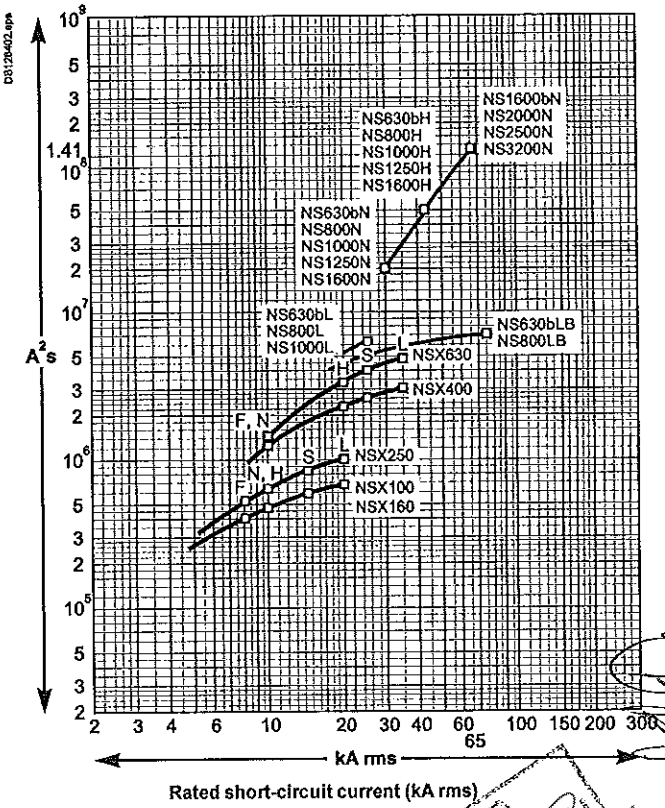
Limited energy



Rated short-circuit current (kA rms)

Voltage 660/690 V AC

Limited energy



Rated short-circuit current (kA rms)

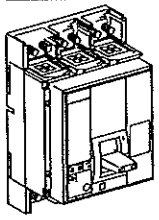
(1) Valid for 480 V Nema.

Catalogue numbers and order forms

NS630b to NS1600 fixed manually operated

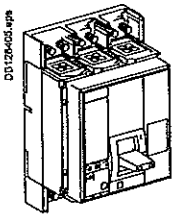
Complete device

Front-connected circuit breaker with Micrologic 2.0 control unit



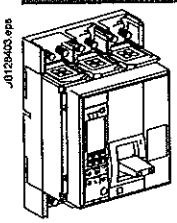
Compact NS type N Icu = 50 kA at 220/415 V	3P	4P
NS630b	33460	33463
NS800	33466	33469
NS1000	33472	33475
NS1250	33478	33480
NS1600	33482	33484
Compact NS type H Icu = 70 kA at 220/415 V	3P	4P
NS630b	33461	33464
NS800	33467	33470
NS1000	33473	33476
NS1250	33479	33481
NS1600	33483	33485
Compact NS type L Icu = 150 kA at 220/415 V	3P	4P
NS630b	33462	33465
NS800	33468	33471
NS1000	33474	33477

Front-connected circuit breaker with Micrologic 5.0 control unit



Compact NS type N Icu = 50 kA at 220/415 V	3P	4P
NS630b	33546	33549
NS800	33552	33555
NS1000	33558	33561
NS1250	33564	33566
NS1600	33568	33570
Compact NS type H Icu = 70 kA at 220/415 V	3P	4P
NS630b	33547	33550
NS800	33553	33556
NS1000	33559	33562
NS1250	33565	33567
NS1600	33569	33571
Compact NS type L Icu = 150 kA at 220/415 V	3P	4P
NS630b	33548	33551
NS800	33554	33557
NS1000	33560	33563

Front-connected circuit breaker with Micrologic 6.0 A control unit

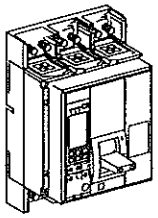


Compact NS type N Icu = 50 kA at 220/415 V	3P	4P
NS630b	33886	33888
NS800	33893	33896
NS1000	33909	33917
NS1250	33919	33923
NS1600	33925	33927
Compact NS type H Icu = 70 kA at 220/415 V	3P	4P
NS630b	33887	33889
NS800	33894	33901
NS1000	33916	33918
NS1250	33922	33924
NS1600	33926	33928

NS630b to NS1600 fixed manually operated

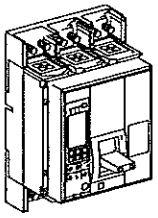
Complete device

Front-connected circuit breaker with Micrologic 2.0 A control unit



Compact NS type N		
Icu = 50 kA at 220/415 V	3P	4P
NS630b	33223	33227
NS800	33233	33237
NS1000	33243	33247
NS1250	33253	33257
NS1600	33263	33267
Compact NS type H		
Icu = 70 kA at 220/415 V	3P	4P
NS630b	33228	33229
NS800	33238	33239
NS1000	33248	33249
NS1250	33258	33259
NS1600	33268	33269
Compact NS type L		
Icu = 150 kA at 220/415 V	3P	4P
NS630b	33497	33500
NS800	33498	33501
NS1000	33499	33502

Front-connected circuit breaker with Micrologic 5.0 A control unit



Compact NS type N		
Icu = 50 kA at 220/415 V	3P	4P
NS630b	33323	33327
NS800	33333	33337
NS1000	33343	33347
NS1250	33353	33357
NS1600	33363	33367
Compact NS type H		
Icu = 70 kA at 220/415 V	3P	4P
NS630b	33328	33329
NS800	33338	33339
NS1000	33348	33349
NS1250	33358	33359
NS1600	33368	33369
Compact NS type L		
Icu = 150 kA at 220/415 V	3P	4P
NS630b	33516	33519
NS800	33517	33520
NS1000	33518	33521

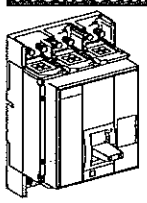
Fixed front connected Micrologic 2.0 E

Compact NS type N		
	3P	4P
NS630b	34400	34402
NS800	34404	34406
NS1000	34408	34410
NS1250	34412	34414
NS1600	34416	34418
Compact NS type H		
	3P	4P
NS630b	34401	34403
NS800	34405	34407
NS1000	34409	34411
NS1250	34413	34415
NS1600	34417	34419

Fixed front connected Micrologic 5.0 E

Compact NS type N		
	3P	4P
NS630b	34420	34422
NS800	34424	34426
NS1000	34428	34430
NS1250	34432	34434
NS1600	34436	34438
Compact NS type H		
	3P	4P
NS630b	34421	34423
NS800	34425	34427
NS1000	34429	34431
NS1250	34433	34435
NS1600	34437	34439

Front-connected switch-disconnector



	3P	4P
NS630b	33486	33491
NS800	33487	33492
NS1000	33488	33493
NS1250	33489	33494
NS1600	33490	33495

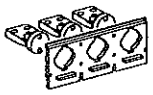
Note: select in addition the connection accessories, device accessories and auxiliaries, control-unit accessories and communications option, as required.

Spare parts: NS630b to NS1600 fixed circuit breaker
Connection

Connections for circuit breakers and switch-disconnectors

Front connection / Replacement kit (3 or 4 parts)

		3P	4P
630/1000 A - N	Top	33598	33608
	Bottom	33599	33609
1250 A - N	Top	33600	33610
630-1000 A - L	Bottom	33601	33611
630/800 A - LB			
1600 A - N	Top	33602	33612
	Bottom	33603	33613



Rear connection / Replacement kit (3 or 4 parts)

	3P	4P
Vertical and horizontal (top or bottom)	33584	33585
Installation manual	33148	

Connection accessories

Bare-cable connectors + 1 connector shield for 4 cables (240 mm²)

3P	33640
4P	33641
Installation manual	33148

1 long connection shield / 1 part

3P	33628
4P	33629

Vertical-connection adapters / Replacement kit (3 or 4 parts)

3P	33642
4P	33643
Installation manual	33148

Cable lug adapters / Replacement kit (3 or 4 parts)

3P	33644
4P	33645
Installation manual	33148

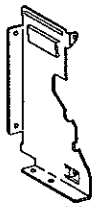
Interphase barriers / Replacement kit (3 parts)

	Front connection	Rear connection
3P/4P top	33646	33648
3P/4P bottom	33646	33648
Installation manual	33148	

Arc chute screen / 1 part

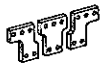
3P	64907
4P	33597
Installation manual	33148

Brackets for mounting on a horizontal surface (2 parts)



3P/4P	64908

Spreaders / Replacement kit (3 or 4 parts)



3P	33622
4P	33623
Installation manual	33148

Cable lug kits / Replacement kit (6 or 8 parts)

240 mm²	3P (6 lug kit)	33013
	4P (8 lug kit)	33014
300 mm²	3P (6 lug kit)	33015
	4P (8 lug kit)	33016
Installation manual		33148

Spare parts: NS630b to NS1600 fixed circuit breaker

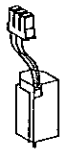
Electrical auxiliaries

Electrical auxiliaries

Indication contact / 1 part

	6 A - 240 V	Low level
OF, ON/OFF indication contacts	29450	29452
SD trip indication contact for manually operated devices	29450	29452
SDE fault indication contact operated devices	29450	29452
Up to 3 OF, 1 SD and 1 SDE can be connected (the SDE contact is standard for electrically operated devices).		
Installation manual		33148

Remote tripping / 1 part

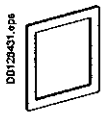


	MX	MN	Delay unit	R (non-adjustable)	Rr (adjustable)
12 V DC	33658				
24/30 V DC, 24 VAC	33659	33668			
48/60 V DC, 48 VAC	33660	33669	48/60 VAC/DC		33680
100/130 VAC/DC	33661	33670	100/130 VAC/DC	33684	33681
200/250 VAC/DC	33662	33671	200/250 VAC/DC	33685	33682
277 VAC	33663				
380/480 VAC	33664	33673	380/480 VAC/DC		33683
Installation manual	33149				

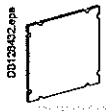
Spare parts: NS630b to NS1600 fixed circuit breaker

Installation accessories

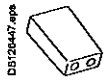
Installation accessories / 1 part

 DB128143.eps	Escutcheon (small cut-out) for manually operated device with toggle	33717
 DB128431.eps	Escutcheon for: - device with toggle (large cutout) - device with rotary handle - electrically operated device	33718

Blanking plate / 1 part

 DB128402.eps	Blanking plate	33858
	Installation manual	33148

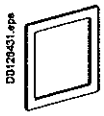
Toggle extension / 1 part

 DB128447.eps	Toggle extension	46996
	Additional toggle extension	33195

Spare parts: NS630b to NS1600 fixed circuit breaker

Installation accessories

Installation accessories / 1 part

 DB128143.eps	Escutcheon (small cut-out) for manually operated device with toggle	33717
 DB129451.eps	Escutcheon for: - device with toggle (large cutout) - device with rotary handle - electrically operated device	33718

Blanking plate / 1 part

 DB128432.eps	Blanking plate	33858
	Installation manual	33148

Toggle extension / 1 part

 DB128447.eps	Toggle extension	46996
	Additional toggle extension	33195

Spare parts: NS630b to NS1600 fixed circuit breaker

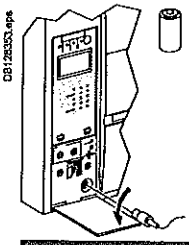
Micrologic control unit, external sensor

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

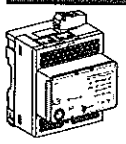
Standard	0.4 at 1 x Ir	33542
Low-setting option	0.4 at 0.8 x Ir	33543
High-setting option	0.8 at 1 x Ir	33544
Without long-time protection	off	33545

Battery + cover

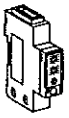


Battery (1 part)		33593
Cover (1 part)	For Micrologic A, E	33592
	For Micrologic P	47067

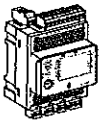
Communication option



IFE	Ethernet interface for LV breaker	LV434010
	Ethernet interface for LV breakers and gateway	LV434011



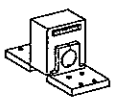
IFM Modbus-SL interface module	TRV00210



I/O application module	LV434063
User guide IFE	DOCA0084EN-00
User guide I/O application module	DOCA0055EN-00

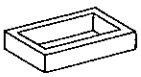
External sensors

External sensor for neutral + earth-fault protection (TCE) / 1 part



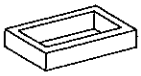
CT rating: 400/1600 A	33576

Rectangular sensor for earth-leakage protection + 1 Vigi cable / 1 part



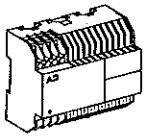
280 mm x 115 mm	33573

Source ground return (SGR) earth-fault protection / 1 part



External sensor (SGR)	33579
MDGF summing module	48891

External power supply module (AD) / 1 part)



24-30 V DC	54440
48-60 V DC	54441
100-125 V DC	54442
110-130 VAC	54443
200-240 VAC	54444
380-415 VAC	54445

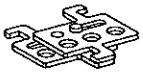
Test equipments / 1 part

Hand held test kit (HHTK)	33594
Full function test kit (FFTK)	33595
Test report edition come from FFTK	34559
FFTK test cable 2 pin for STR trip unit	34560
FFTK test cable 7 pin for Micrologic trip unit	33590

Spare parts: NS630b to NS1600 fixed circuit breaker
Locking and accessories

Locking for manually operated devices

Removable toggle locking system / 1 part



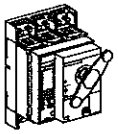
Locking by 3 padlocks	44936
Installation manual	33148

Fixed toggle locking system / 1 part

Locking by 3 padlocks	32631
Installation manual	33148

Rotary handle for manually operated devices

Devices with direct rotary handles / 1 part



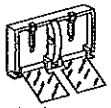
Conversion accessory	CNOMO	33866	
Locking by keylocks		Ronis	Profalux
	OFF position	33870	33869
	OFF and ON positions	33872	33871
Keylock kit (without keylocks)		33868	33868
Installation manual		33150	

Mechanical interlocking

For 2 devices with extended rotary handles	33890

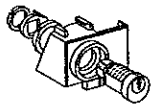
Locking and accessories for electrically operated devices

Pushbutton locking / 1 part



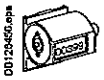
By transparent cover + padlocks	33897
Installation manual	47103

Locking in OFF position / 1 part



By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	33902
	2 locks 1 key + adaptation kit	33904
1 keylock Profalux (without adaptation kit):		
	identical key not identified combination	33173
	identical key identified 215470 combination	33174
	identical key identified 215471 combination	33175
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	33903
	2 locks 1 key + adaptation kit	33905
1 keylock Ronis (without adaptation kit):		
	identical key not identified combination	33189
	identical key identified EL24135 combination	33190
	identical key identified EL24153 combination	33191
	identical key identified EL24315 combination	33192
Adaptation kit (without keylock):		
	adaptation kit Profalux	33898
	adaptation kit Ronis	33899
	adaptation kit Kirk	47517
	adaptation kit Castell	47518
Installation manual		47103

Operation counter CDM / 1 part



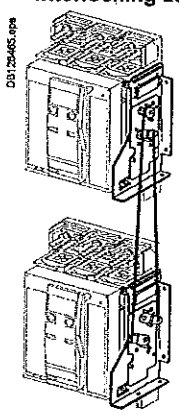
Operation counter CDM	33895
Installation manual	47103

Spare parts: NS630b to NS1600 fixed and withdrawable circuit breaker

Mechanical interlocking for source changeover

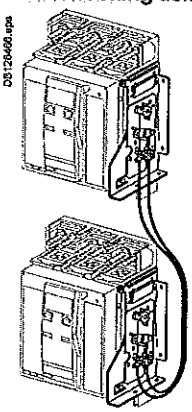
Mechanical interlocking for source changeover

Interlocking using connecting rods for Compact electrically operated devices



Complete assembly with 2 adaptation fixtures + rods	
2 Compact fixed devices	33910
Note: the installation manual is enclosed.	

Interlocking using cables for Compact electrically operated devices



Complete assembly with 2 adaptation fixtures + cables	
2 Compact fixed devices	33911
1 Compact fixed + 1 Compact withdrawable device	33915
Note: the installation manual is enclosed.	

Spare parts: NS630b to NS1600 withdrawable circuit breaker
Connection

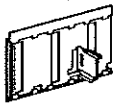
Connection

		3P	4P
	**Front connection / Replacement kit (6 or 8 parts)**		
	Top and bottom	33588	33589
 	**Rear connection / Replacement kit (4 or 6 parts)**		
	Vertical and horizontal	33586	33587
Vert. mounting. *Horiz. mounting.*	Installation manual		33149

Connection accessories

	**Vertical connection adapters for front-connected chassis / Replacement kit (3 or 4 parts)**	
	3P	33642
	4P	33643
	Installation manual	33149
	**Cable lug adapters for front-connected chassis / Replacement kit (3 or 4 parts)**	
	3P	33644
	4P	33645
	Installation manual	33149
	**Interphase barriers for rear-connected chassis / Replacement kit (3 parts)**	
	3P/4P	33768
	Installation manual	33149
	**Spreaders for front-connected and rear-connected chassis / Replacement kit (3 or 4 parts)**	
	3P	33622
	4P	33623
	Installation manual	33149
	**Cable lug kits / Replacement kit (6 or 8 parts)**	
	240 mm² — 3P (6 lug kit)	33013
	4P (8 lug kit)	33014
	300 mm² — 3P (6 lug kit)	33015
	4P (8 lug kit)	33016
	Installation manual	33149

Chassis accessories

	**Auxiliary terminal shield (CB) / 1 part**	
	3P	33763
	4P	33764
	Installation manual	33149
	**Safety shutters (VO) / 1 part**	
	3P	33765
	4P	33766
	Installation manual	47104

Clusters

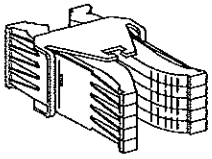
	1 disconnecting contact cluster for chassis (see table below) (1 part)	64906

Table : number of clusters required for the different chassis models

Chassis rating (A)	Compact NS - 3P		Compact NS - 4P	
	NA - N	L	NA - N	L
630	12	18	16	24
800	12	18	16	24
1000	12	18	16	24
1250	12		16	
1600	18		24	

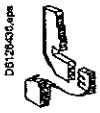
Note: the minimum order is 6 parts.

Spare parts: NS630b to NS1600 withdrawable circuit breaker

Electrical auxiliaries

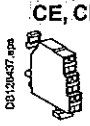
Electrical auxiliaries

SD trip indication contact for manually operated devices / 1 part



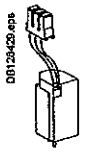
	6 A - 240 V	Low level
OF, ON/OFF indication contacts	29450	29452
SD trip indication contact for manually operated devices	29450	29452
SDE fault indication contact operated devices	29450	29452
Up to 3 OF, 1 SD and 1 SDE can be connected (the SDE contact is standard for electrically operated devices).		
Installation manual		47103

CE, CD, CT carriage switches / 1 part



6 A - 240 V	33170
Low level	33171
Up to 3 CE, 1 CT, 2 CD per device	
Installation manual	47104

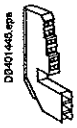
Instantaneous voltage releases / 1 part



	MX	MN	Delay unit	R (non-adjustable)	Rr (adjustable)
12 V DC	33658				
24/30 V DC, 24 V AC	33659	33668			
48/60 V DC, 48 V AC	33660	33669	48/60 V AC/DC		33680
100/130 V AC/DC	33661	33670	100/130 V AC/DC	33684	33681
200/250 V AC/DC	33662	33671	200/250 V AC/DC	33685	33682
277 V AC	33663				
380/480 V AC	33664	33673	380/480 V AC/DC		33683
Installation manual	47103				

Auxiliaries terminal for chassis

3 wires.



6 wires.

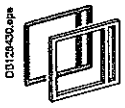
3 wire terminal block (1 part)	33098
6 wire terminal block (1 part)	33099
Jumpers (10 parts)	47900
Installation manual	47103

Spare parts: NS630b to NS1600 withdrawable circuit breaker

Installation accessories

Installation accessories

Escutcheon / 1 part | 33857



Transparent cover for escutcheon / 1 part | 33859

Blanking plate / 1 part | 33858

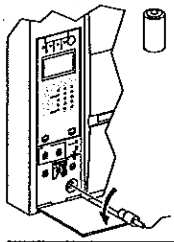
Spare parts: NS630b to NS1600 withdrawable circuit breaker
Micrologic control unit, external sensor

Replacement parts for Micrologic control units

Long-time rating plug (limits setting range for higher accuracy) / 1 part

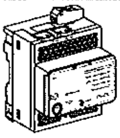
Standard	0.4 at 1 x Ir	33542
Low-setting option	0.4 at 0.8 x Ir	33543
High-setting option	0.8 at 1 x Ir	33544
Without long-time protection	off	33545

Battery + cover

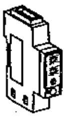


Battery (1 part)		33593
Cover (1 part)	For Micrologic A, E	33592
	For Micrologic P	47067

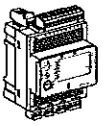
Communication option



IFE	Ethernet interface for LV breaker	LV434010
	Ethernet interface for LV breakers and gateway	LV434011



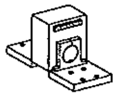
IFM Modbus-SL interface module	TRV00210



I/O application module	LV434063
User guide IFE	DOCA0084EN-00
User guide I/O application module	DOCA0055EN-00

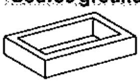
External sensors

External sensor for neutral + earth-fault protection (TCE) / 1 part



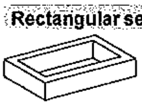
CT rating: 400/1600 A	33576

Source ground return (SGR) earth-fault protection + Vigi cable / 1 part



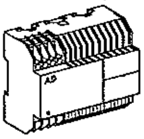
External sensor (SGR)	33579
MDGF summing module	48891

Rectangular sensor for earth-leakage protection / 1 part



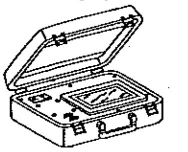
280 mm x 115 mm	33573

External power supply module (AD) / 1 part



24-30 V DC	54440
48-60 V DC	54441
100-125 V DC	54442
110-130 V AC	54443
200-240 V AC	54444
380-415 V AC	54445

Test equipments / 1 part



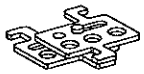
Hand held test kit (HHTK)	33594
Full function test kit (FFTK)	33595
Test report edition come from FFTK	34559
FFTK test cable 2 pin for STR trip unit	34560
FFTK test cable 7 pin for Micrologic trip unit	33590

Spare parts: NS630b to NS1600 withdrawable circuit breaker

Locking and accessories

Locking for manually operated devices

Removable toggle locking system / 1 part



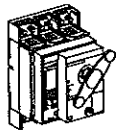
Locking by 3 padlocks	44936
Installation manual	33148

Fixed toggle locking system / 1 part

Locking by 3 padlocks	32631
Installation manual	33148

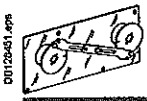
Rotary handle for manually operated devices

Devices with direct rotary handles / 1 part



Conversion accessory	CNOMO	33866	
Locking by keylocks		Ronis	Profalux
	OFF position	33870	33869
	OFF and ON positions	33872	33871
Keylock kit (without keylocks)		33868	33868
Installation manual			33150

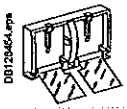
Mechanical interlocking



For 2 devices with extended rotary handles	33890

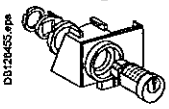
Locking and accessories for electrically operated devices

Pushbutton locking / 1 part



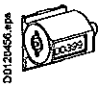
By transparent cover + padlocks	33897
Installation manual	47103

Locking in OFF position / 1 part



By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	33902
	2 locks 1 key + adaptation kit	33904
1 keylock Profalux (without adaptation kit):		
	identical key not identified combination	33173
	identical key identified 215470 combination	33174
	identical key identified 215471 combination	33175
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	33903
	2 locks 1 key + adaptation kit	33905
1 keylock Ronis (without adaptation kit):		
	identical key not identified combination	33189
	identical key identified EL24135 combination	33190
	identical key identified EL24153 combination	33191
	identical key identified EL24315 combination	33192
Adaptation kit (without keylock):		
	adaptation kit Profalux	33898
	adaptation kit Ronis	33899
	adaptation kit Kirk	47517
	adaptation kit Castell	47518
Installation manual		47103

Operation counter CDM / 1 part



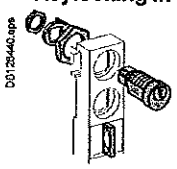
Operation counter CDM / 1 part	33895
Installation manual	47103

Spare parts: NS630b to NS1600 withdrawable circuit breaker

Chassis locking and accessories
Mechanical interlocking for source changeover

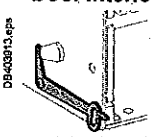
Chassis locking

Keylocking in disconnected position / 1 part



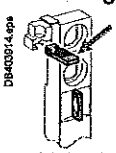
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	64909
	2 locks 1 key + adaptation kit	64910
	2 locks 2 different keys + adaptation kit	64911
1 keylock Profalux (without adaptation kit):	identical key not identified combination	33173
	identical key identified 215470 combination	33174
	identical key identified 215471 combination	33175
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	64912
	2 locks 1 key + adaptation kit	64913
	2 locks 2 different keys + adaptation kit	64914
1 keylock Ronis (without adaptation kit):	identical key not identified combination	33189
	identical key identified EL24135 combination	33190
	identical key identified EL24153 combination	33191
	identical key identified EL24315 combination	33192
Adaptation kit (without keylock):	adaptation kit Profalux	33769
	adaptation kit Ronis	33770
	adaptation kit Castell	33771
	adaptation kit Kirk	33772

Door interlock / 1 part



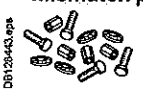
Right and left side of chassis (VPECD or VPECG)	33172
Installation manual	47104

Racking interlock (VPOC) / 1 part



	33788
Installation manual	47104

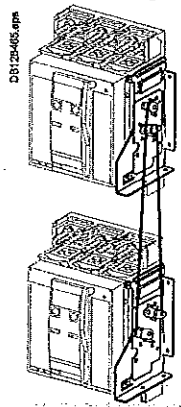
Mismatch protection (VDC) / 1 part



	33767
Installation manual	47104

Mechanical interlocking for source changeover

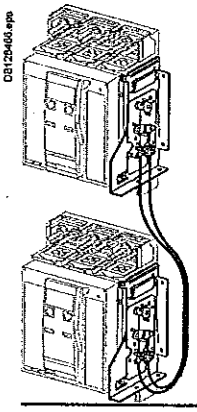
Interlocking using connecting rods for Compact electrically operated devices



Complete assembly with 2 adaptation fixtures + rods 2 Compact withdrawable devices	33913

Note: the installation manual is enclosed.

Interlocking using cables for Compact electrically operated devices



Complete assembly with 2 adaptation fixtures + cables	
2 Compact fixed devices	33914
1 Compact fixed + 1 Compact withdrawable device	33915

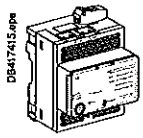
Note: the installation manual is enclosed.

Spare parts: NS630b to NS1600 fixed or withdrawable circuit breaker
Instructions

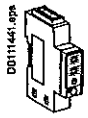
Instructions			
Chassis accessories			47104
Circuit breaker accessories		Manual	33148
		Electrical	33149
Fixed and drawout circuit breaker		Manual	33148
		Electrical	33149
NS630b user manual	French		33159
	English		33160
Micrologic user manual	20/50 (French)		33076
	20/50 (English)		33077
	2A/7A (French)		33079
	2A/7A (English)		33080
	2E/6E (French)		33079
	2E/6E (English)		33080
	5P/7P (French)		33082
	5P/7P (English)		33083
Modbus communication notice for manual			33088

Spare parts: Communication bus accessories, monitoring and control, ethernet gateway

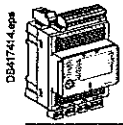
Communication options



IFE	Ethernet interface for LV breaker	LV434010
	Ethernet interface for LV breakers and gateway	LV434011



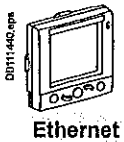
IFM Modbus-SL interface module		TRV00210



I/O application module		LV434063

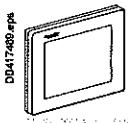
Monitoring and control

ULP display module (1)



Switchboard front display module FDM121	TRV00121
FDM mounting accessory (diameter 22 mm)	TRV00128

Ethernet display module



Switchboard front display module FDM128	LV434128

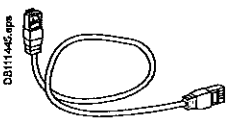
ULP wiring accessories

Breaker ULP cord L = 0.35 m	LV434195
Breaker ULP cord L = 1.3 m	LV434196
Breaker ULP cord L = 3 m	LV434197

10 Modbus line terminators	VW3A8306DRC (2)

5 RJ45 connectors female/female	TRV00870

10 ULP line terminators	TRV00880

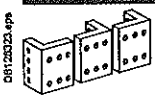


10 RJ45/RJ45 male cord L = 0.3 m	TRV00803
10 RJ45/RJ45 male cord L = 0.6 m	TRV00806
5 RJ45/RJ45 male cord L = 1 m	TRV00810
5 RJ45/RJ45 male cord L = 2 m	TRV00820
5 RJ45/RJ45 male cord L = 3 m	TRV00830
1 RJ45/RJ45 male cord L = 5 m	TRV00850

(1) For measurement display with Micrologic A, E, P.
(2) www.schneider-electric.com.

Spare parts:
Compact NS1600b to 3200
Connection, locking and installation accessories

Optional vertical connection adaptor / Replacement kit (3 or 4 parts)



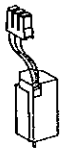
1600/2500/3200 A	3P	33975
	4P	33976
Installation manual		33969

Electrical auxiliaries

Indication contacts (1 part)

OF, SD, SDE	6 A - 240 V	29450
	Low level	29452
Note: up to 3 OF, 1 SD and 1 SDE can be connected.		
Installation manual		33969

Instantaneous voltage releases (1 part)



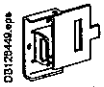
	MX	MN	Delay unit	R (non-adjustable)	Rr (adjustable)
12 V DC	33658				
24/30 V DC, 24 VAC	33659	33668			
48/60 V DC, 48 VAC	33660	33669	48/60 VAC/DC		33680
100/130 VAC/DC	33661	33670	100/130 VAC/DC	33684	33681
200/250 VAC/DC	33662	33671	200/250 VAC/DC	33685	33682
277 VAC	33663				
380/480 VAC	33664	33673	380/480 VAC/DC		33683
Installation manual	33969				

Locking

Removable toggle locking system / 1 part

Locking by 3 padlocks	33996
Installation manual	33969

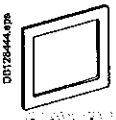
Fixed toggle locking system / 1 part



Locking by 3 padlocks	32631
Installation manual	33969

Installation accessories

Escutcheon / 1 part

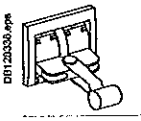


	33929

Interphase barriers / 3 parts

	33998
Installation manual	33969

Toggle extension / 1 part



NS3200 toggle extension for replacement	33997
Installation manual	33969

Spare parts: Compact NS1600b to 3200
Micrologic control unit, external sensor

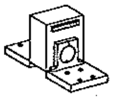
Accessories for Micrologic control units

Long-time rating plug (enhanced accuracy by limiting the setting range) / 1 part

Standard	0.4 to 1 x Ir	33542
Low setting	0.4 to 0.8 x Ir	33543
High setting	0.8 to 1 x Ir	33544
Without long-time protection	OFF	33545

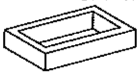
External sensors

External sensor for neutral + earth-fault protection (TCE) / 1 part



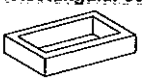
CT rating: 1000/4000 A	34036

Source ground return (SGR) earth-fault protection + Vigi cable / 1 part



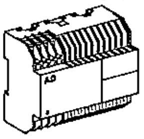
External sensor (SGR)	33579
MDGF summing module	48891

Rectangular sensor for earth-leakage protection / 1 part



470 mm x 160 mm	33574

External power supply module (AD) / 1 part



24-30 V DC	54440
48-60 V DC	54441
100-125 V DC	54442
110-130 V AC	54443
200-240 V AC	54444
380-415 V AC	54445

Test equipments / 1 part

Hand held test kit (HHTK)	33594
Full function test kit (FFTK)	33595
Test report edition come from FFTK	34559
FFTK test cable 2 pin for STR trip unit	34560
FFTK test cable 7 pin for Micrologic trip unit	33590

Order form:
Compact NS630b to NS3200
Circuit breakers and switch-disconnectors

Name of customer: .....

Address for delivery: .....

Requested delivery date: .....

Customer order no.: .....

To indicate your choices, check the applicable square boxes ☐

and enter the appropriate information in the rectangles ☐

Circuit breaker or switch-disconnector

Compact type		NS630b to NS1600	
		NS1600b to NS3200	
Rating		A	
Circuit breaker		N, H, L, LB	
Switch-disconnector		NA	
Number of poles		3 or 4	
Device	NS630b/3200	Fixed	
	NS630b/1600	Withdr. with chassis	
		Withdr. without chassis (moving part only)	
Chassis alone without connections			

Micrologic control unit

Basic protection 2.0 ☐ 5.0 ☐ 6.0 ☐

A - ammeter 2.0 ☐ 5.0 ☐ 6.0 ☐ 7.0 ☐

E - energy 2.0 ☐ 5.0 ☐ 6.0 ☐

P - power only for NS630b/1600 5.0 ☐ 6.0 ☐ 7.0 ☐

AD - external power-supply module V ☐

ENVT - External Neutral Voltage Temp. (3P + N and Micrologic P) ☐

TCE - external sensor (CT) for neutral protection ☐

Rectangular sensor for earth-leakage protection: NS630b/1600 280 x 115 mm ☐; NS1600b/3200 470 x 160 mm ☐

TCW - external sensor for SGR protection ☐

LR - long-time rating plug: Standard 0.4 to 1 Ir ☐; Low setting 0.4 to 0.8 Ir ☐; Hight setting 0.8 to 1 Ir ☐; LT OFF ☐

Communication

COM module

Device (BCM-ULP) ☐ with Ethernet interface ☐

with Ethernet interface + Gateway ☐

with Modbus interface ☐

Cradle management with I/O application module (Chassis) ☐

Eco COM module

Device (BCM-ULP) ☐ with Ethernet interface ☐

with Ethernet interface + Gateway ☐

with Modbus interface ☐

Front Display Module (FDM121) ☐ Mounting accessories ☐

Breaker ULP Cord: L = 0.35 m ☐; L = 1.3 m ☐; L = 3 m ☐

NS630b/1600 connection

Horizontal rear connections	Top ☐	Bottom ☐	
Vertical rear connections	Top ☐	Bottom ☐	
Front connections	Top ☐	Bottom ☐	
4 x 240² bare cable connectors + shields	NS - FC fixed ☐		
Long connection shields	NS - FC fixed ☐		
Vertical-connection adapters	NS - FC fixed, withdr. ☐		
Cable-lug adapters	NS - FC fixed, withdr. ☐		
Arc chute screen	NS - FC fixed ☐		
Interphase barriers	NS - FC fixed, withdrawable ☐		
Spreaders	NS - FC fixed, withdrawable ☐		

NS1600b/3200 connection

Front connections	NS - FC fixed ☐
Vertical connection adaptor	optional for NS1600b/2500 (standard for NS3200) ☐

Indication contacts

NS630b/3200

SD trip indication (maximum 1) (only for manually operated devices)
6 A-240 V AC qty ☐ Low level qty ☐

SDE fault-trip indication (maximum 1)
(SDE integrated in electrically operated devices)
6 A-240 V AC qty ☐ Low level qty ☐

OF ON/OFF indication contacts (maximum 3)
6 A-240 V AC qty ☐ Low level qty ☐

NS630b/1600

Carriage switches
(possible combinations: 3 CE, 2 CD, 1 CT)

CE - "connected" position	6 A-240 V AC qty ☐	Low level qty ☐	
CD - "disconnected" position	6 A-240 V AC qty ☐	Low level qty ☐	
CT - "test" position	6 A-240 V AC qty ☐	Low level qty ☐	

Programmable contacts (630b - 1600)
M6C kit for manually Compact ☐

Auxiliary terminals for chassis alone: 3-wire terminal (30 parts) ☐; Jumpers (set of 10) ☐; 6-wire terminal (10 parts) ☐

Remote operation

Electrical operation (NS630b/1600): Standard ☐ Communicating ☐

Voltage releases: Power supply AC ☐ DC ☐ V; MX AC ☐ DC ☐ V; MN AC ☐ DC ☐ V

MN delay unit: Ajustable ☐ Non ajustable ☐

Rotary handles for NS630b/1600 fixed and withdrawable device

Direct: Black ☐ Red on yellow front ☐ CNOMO conversion access. ☐

Extended: Black ☐ Red on yellow front ☐ Telescopic handle for withdrawable device ☐

Indication auxiliary: 6 A-240 V AC 2 early-make switches ☐ 2 early-break switches ☐

Locking

Toggle (1 to 3 padlocks): Removable system ☐ Fixed system ☐

Rotary handle using a keylock (NS630b/1600): OFF position ☐ ON and OFF positions ☐; Ronis 1351B.500 ☐ Profalux KS5 B24 D4Z ☐; Keylock kit (without keylock) ☐

For electrically operated devices (NS630b/1600): **VBP** - ON/OFF pushbutton locking (by transparent cover +padlocks) ☐

OFF position locking:
VCPO - by padlocks ☐
VSPO - by keylocks:

Keylock kit (w/o keylock)	Profalux ☐	Ronis ☐		
1 keylock	Profalux ☐	Ronis ☐		
2 identical keylocks, 1 key	Profalux ☐	Ronis ☐		

Chassis locking in "disconnected" position:
VSPD - by keylocks

Keylock kit (w/o keylock)	Profalux ☐	Ronis ☐	
	Kirk ☐	Castell ☐	
1 keylock	Profalux ☐	Ronis ☐	
2 identical keylocks, 1 key	Profalux ☐	Ronis ☐	
2 keylocks, different keys	Profalux ☐	Ronis ☐	

Optional connected/disconnected/test position locking

VPEC - door interlock: On right-hand side of chassis ☐ On left-hand side of chassis ☐

VPOC - racking interlock ☐

VDC - mismatch protection ☐

Accessories

VO - safety shutters on chassis NS - withdrawable as standard ☐

CDM - mechanical operation counter ☐

CDP - escutcheon ☐

CP - transparent cover for escutcheon ☐

OP - blanking plate for escutcheon ☐

Mounting brackets for fixed NS for mounting on horizontal plane ☐

Test kits: Mini test kit ☐ Portable test kit ☐

Micrologic control unit functions:
2.0: basic protection (long time + inst.)
5.0: selective protection (long time + short time + inst.)
6.0: selective + earth-fault protection (long time + short time + inst. + earth-fault)
7.0: selective + earth-leakage protection (long time + short time + inst. + earth-leakage)

Note

Note

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CS 30323
92506 Rueil Malmaison Cedex
France

RCS Nanterre 954 503 439
Capital social 896 313 776 €
www.schneider-electric.com

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication.

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07-2014

Schneider Electric

Декларация

Шнайдер Електрик България ЕООД

Продуктова група: **COMPACT NS**

Декларация за съответствие

Долуподписаният, фирма Шнайдер Електрик България ЕООД с адрес София 1766, Бизнес Парк София, сграда 4, ЕИК по Булстат 121587769, тел. 02/9329320 декларира на собствена отговорност, че продуктите:
Автоматични прекъсвачи Compact NS630b до NS3200, както и спомагателните устройства към тях с търговска марка Schneider Electric са в съответствие с:

- Наредба за съществените изисквания и оценяване на съответствието на електрически съоръжения, предназначени за използване в определени граници на напрежението. В сила от 14.01.2003 г. Приета с ПМС № 182 от 06.07.2006 г. Обн. ДВ. бр.62 от 13 Юли 2001г., изм. ДВ. бр.74 от 22 Август 2003г., изм. ДВ. бр.24 от 21 Март 2006г., изм. ДВ. бр.40 от 16 Май 2006г., изм. ДВ. бр.37 от 8 Май 2007г.

- Наредба за съществените изисквания и оценяване на съответствието за електромагнитна съвместимост. В сила от 20.07.2007 г. Приета с ПМС № 76 от 6 април 2007 г. Обн. ДВ. бр.32 от 17 Април 2007г.

Гореспоменатите продукти съответстват на изискванията на стандарти
БДС EN 60947-1 и БДС EN 60947-2, които въвеждат съответните хармонизирани европейски стандарти.

София
11.04.2013

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ВЯРНО С ОРИГИНАЛА

Schneider Electric

Декларация

Шнайдер Електрик България ЕООД

Продуктова група: **COMPACT NS**

Декларация за съответствие

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Schneider Electric

Декларация

Шнайдер Електрик България ЕООД

Продуктова група: **COMPACT NS**

Декларация за съответствие

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ВЕРНО С ОРИГИНАЛА

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asefa

Certifié conforme à l'original
Le 30 mars 2006
Le secrétariat permanent de l'ASEFA
G.Gosse

Attestation de conformité / *attestation of conformity* n°05b-05BT

Annule et remplace l'attestation de conformité / *cancels and replaces attestation of conformity n° 05a-05BT*

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tétrapolaire ou tripolaire / *Four- or three-pole circuit-breaker*

références / *references* : COMPACT NS 630b à/*to* NS 1600, types N, H ou/*or* L
(avec déclencheur MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= sans, A, P ou H) / *with release MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= none, A, P or H)*
constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA
marque commerciale / *trade mark* : Merlin Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

IACS E10 test n°9 (Essais fonctionnels selon document technique/*Functional tests according to* DT-ABT-02.0-A), IEC 60068.2.1, test Ab (Essai au froid/*Cold test*) ; IEC 60068.2.2, test Bb (Essai de chaleur sèche/*Dry test*) ; IEC 60068.2.30, test Db (Essai cyclique de chaleur humide/*Damp heat cycling*) ; IEC 60068.2.52, test Kb (Brouillard salin/*Salt mist*) ; IEC 60947-1 table 12A

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current* : 630 A, 800 A, 1000 A, 1250 A, 1600 A pour/*for* types N, H
630 A, 800 A, 1000 A pour/*for* type L
Tension d'emploi / *Operational voltage* : 220 Vac à/*up to* 690 Vac
Pouvoir de coupure de service en court-circuit / *Service short-circuit capacity* : 150 kA – 415 V three-phase
: 130 kA – 440 V three-phase
: 100 kA – 525 V three-phase
: 60 kA – 303 V through the four pole and it's adjacent pole
: 90 kA – 240 V through the four pole and it's adjacent pole
: 78 kA – 254 V through the four pole and it's adjacent pole
Pouvoir ultime de coupure en court-circuit / *Ultimate short-circuit capacity* : 100% Ics
Fréquence / *Frequency* : 50 Hz / 60 Hz

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / Test report (s) : F03.2005.0216-00, F03.2005.0216-01, F03.2005.0216-02,

Cette attestation ne s'applique qu'à l'échantillon soumis à l'essai de type / *This attestation applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2005-11-04

Le Président de l'ASEFA / *The chairman of ASEFA,*

M. BRENON

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
fax 01 40 95 88 18
e-mail : asefa@lcie.fr

ВЯРНО
С ОРИГИНАЛА!

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asefa

Attestation de conformité / *attestation of conformity* n°06-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tétrapolaire ou tripolaire / *Four- or three-pole circuit-breaker*

références / *references* : COMPACT NS 630b à/*to* NS 1600, types N, H ou/*or* L
(avec déclencheur MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= sans, A, P ou H) /
with release MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= none, A, P or H)

constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA

marque commerciale / *trade mark* : Merlin Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

CEI / *IEC* 60092-504 (2001), IACS (1993), essais/*Tests* 11a et/*and* 11b
Inclinaisons statique (30°) et dynamique (±22,5°) / *Static (30°) and dynamic (±22,5°) inclinations tests*

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*, (Ie)	: types N ou/or H : 630 A, 800 A, 1000 A, 1250 A ou/*or* 1600 A types L : 630 A, 800 A ou/*or* 1000 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz - 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: Vac
Catégorie d'utilisation /*Utilization category*	: A
Température de référence / *Reference temperature*	: °C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / Test report (s) : EHL06058 (émis/*issued by* par SOPEMEA)

Cette attestation ne s'applique qu'à l'échantillon soumis à l'essai de type / *This attestation applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006-03-30

Le Président de l'ASEFA / *The chairman of ASEFA*,

M. BRENON

33, av du général leclerc
92260 Fontenay-aux-roses -- France
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ВЯРНО
С ОРИГИНАЛА!

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asefa

Certificat de conformité / *certificate of conformity* n° 146-05BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89 boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tripolaire ou tétrapolaire, fixe / *Low-voltage fixed three- or four-pole circuit-breaker*

référence / *reference* : Compact NS 630b N, 800 N, 1000 N, 1250 N, 1600 N, avec déclencheur électronique / *with electronic trip unit* (MICROLOGIC 2.0, 5.0, 6.0, 7.0, types A, P et/*and* H)

constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA
marque commerciale / *trademark* : MERLIN GERIN

selon le(s) référentiel(s) / *according to standard(s)* :

CEI/IEC 60947-2 (2003-04) ed.3, sequences IV, § 8.3.6

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current* (Ie)	: 630 A à/*up to* 1600 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz - 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: 800 V
Tension de tenue aux chocs / *Impulse withstand voltage*, (Uimp)	: 8 kV
Courant courte durée admissible / *Short-time withstand current*	: 19.2 kA - 1 s, triphasé / *three-phase*
	: 11.52 kA - 1 s, monophasé /*single phase*
Catégorie d'utilisation / *Utilization category*	: B
Température de référence / *Reference temperature*	: 40°C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / *Test report (s)* : F01.04.18

Ce certificat ne s'applique qu'à l'échantillon soumis à l'essai de type / *This certificate applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2005-12-22

Le Président de l'ASEFA / *The chairman of ASEFA,*

M. BRENON

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cofrac
Accréditation n° 5-0037
Portée communiquée sur demande

ВЯРНО С ОРИГИНАЛА!

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Test platform accredited
Under the Nr F01 by :

asefa

File nr : 31039

RECORD OF PROVING TEST n° : F01.04.18

Issued to : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
F-92500 RUEIL-MALMAISON FRANCE

Apparatus tested : Low-voltage circuit-breaker

reference : Compact NS 630bN, 1250N, 1600N
with MICROLOGIC 5.0A

manufacturer : SCHNEIDER ELECTRIC SA

Purpose of the test : Verification of the rated short-time withstand current based on IEC 60947-2 (04/2003) § 8.3.6 sequence IV

Rated characteristics :

Operational Voltage	220V to 690V
Rated current	630A to 1600A
Rated short circuit withstand current	19.2kA – 1s Three phase
Rated short circuit withstand current	11.52kA – 1s Single phase

Date or period of test : April 23th 2004 to January 16th 2005

This record of proving test comprises : 70 page(s) + 28 appendixe(s)
The results obtained during tests entered in this record of proving test justify the rated characteristics assigned by the Manufacturer as stated above.

Date of issue : 13th july 2005

The technical responsible ,

Name : E. FERNANDEZ Signature

cofrac
ESSAIS
Accreditation
Nr 1-0140

Scope on request

This document results from tests carried out on a sample. It does not prejudge the compliance of the whole manufactured products with the tested specimen.
This record of proving test shall only be reproduced in the complete form..
COFRAC accreditation is an attestation of the laboratory technical competence within the field of test covered by the accreditation
Test performed by : VOLTA LABORATORY - SCHNEIDER ELECTRIC
2 rue Volta 38050 GRENOBLE Cedex 09

Description and characterization of the test object

Characteristics

Type of circuit-breaker:	**Compact NS 630bN, 1250N, 1600N**
Number of poles	4
Kind of current	a.c.
Number of phases	3
Rated frequency	50/60 Hz
Utilization category	B
Reference temperature	40°C
Suitability for isolation	yes

Rated and limiting values: (according to test volume)

Main circuit:

Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	800 V
Conventional thermal current I_{th} / I_{the}	630A to 1600A
Rated current I_n	630A to 1600A
Rated current in the neutral pole	630A to 1600A

Short-circuit characteristics:

U_e/V	I_{cm}/kA	I_{cu}/kA	$I_{cs100\%}$/kA For In=630 to 1250A	$I_{cs75\%}$/kA For In=1600A	I_{cw}/kA – 1s Three phase	I_{cw}/kA – 1s Single phase
220/240	105	50	50	37,5	19,2	11,52
380/415	105	50	50	37,5	19,2	11,52
440	105	50	50	37,5	19,2	11,52
500/525	84	40	40	30	19,2	11,52
660/690	63	30	30	22,5	19,2	11,52

Control circuits:

Electrical control circuits:

Kind of current	a.c. or d.c.
Rated frequency	50/60Hz or d.c.
Rated control circuit voltage U_c	MN : 24 to 480Vac , 24 to 250Vdc MX : 24 to 480Vac , 12 to 250Vdc
Rated control supply voltage U_s	./. V
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	690 V

Air-supply control circuits:

Rated supply pressure	./. kPa
Limits of pressure	./. kPA
Required volume for each closing operation	./. m^3
Required volume for each opening operation	./. m^3

Auxiliary circuits:

Rated operational voltage U_e	240 to 690 Vac and 24 to 250Vdc
Rated impulse withstand voltage U_{imp}	8 kV
Rated insulation voltage U_i	690 V
Rated frequency	50/60 Hz
Rated operational current I_e	according models
Number of circuits	according models
Number and kind of contact elements	OF/SDE/EF/CE/CD/CT/M2C/M6C

Releases:

- Shunt release:

- Rated control circuit voltage U_c	MX : 24 to 480Vac , 12 to 250Vdc
- Kind of current	a.c. or d.c.
- Rated frequency if a.c.	50/60 Hz or d.c.

- Undervoltage or no-voltage release

- Rated control circuit voltage U_c	MN : 24 to 480Vac , 24 to 250Vdc
- Kind of current	a.c. or d.c.
- Rated frequency if a.c.	50/60 Hz or d.c.

- Over-current release:

  - Short-circuit release

- instantaneous release	No
- definite time-delay release	yes
- Rated current I_n	630 to 1600 A
- Kind of current	a.c.
- Rated frequency if a.c.	50/60 Hz
- Current setting (or range of settings)	Isd:1.5 to 10xIn Ii=2 to 15 In
- Time setting (or range of settings)	Tsd : 0.1 to 0.4s, on, off

  - Overload release (IEC 60947-1; 2.4.30):

- instantaneous release	No
- definite time-delay release	Yes
- inverse time-delay release	No
dependent on ambient air temperature	No
independent of ambient air temperature	Yes
- Reference temperature	40°C
- Rated current I_n	630 to 1600A
- Kind of current	a.c.
- Rated frequency if a.c.	50/60 Hz
- Current setting (or range of settings)	0.4 to 1 In
- Time setting (or range of settings)	tr:0.4 to 24 s

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TEST SEQUENCE IV

Rated short-time withstand current

Test sequence IV comprises the following tests:

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Synthesis of tested samples

Sample Nb	Type	Test	Ir	Ics Tested	Supply	pages
31039.09	NS1600N	3 Ph.	1600A	19.2kA/690V	Upper	8-17
31039.10	NS630bN	3 Ph.	630x0.4=252A	19.2kA/690V	Upper	18-26
31039.11B	NS1600N	3 Ph.	1600A	19.2kA/690V	Lower	27-36
31039.12	NS1600N	Single Ph.	1600A	11.52kA/690V/√3	Upper	37-46
31039.13	NS630bN	Single Ph.	630x0.4=252A	11.52kA/690V/√3	Upper	47-55
31039.14	NS1600N	Single Ph.	1600A	11.52kA/690V/√3	Lower	56-65

The MICROLOGIC tripping unit being independent of the temperature, the connections used for testing tripping caracteristics differ from thoses given in the tables of standard (refer to IEC 60947-2 note 2 of 8.3.5.1)

The rated short-time withstand current about circuit-breaker NS 1600 N are the same that circuit-breaker NS 1600 H. Consequently, this test-report covers both types.

ВЯРНО С ОРИГИНАЛА

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Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.09

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1	Cabling characteristics			Braid
Table 9, 10	Cable		./. mm^2	2000 mm^2
and 11	Bar		80 x 5 mm	./. x ./. mm
	Number		2 /Ph	1 /Ph
	Length		./. mm	700 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			22 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	242 s
		Ph_1	≤ 270 s	238 s
		Ph_2	≤ 270 s	227 s
		Ph_3	≤ 270 s	234 s

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С ОРИГИНАЛА!

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Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.09

Standard and clause	Kind of tests and requirements			Test values Results
8.3.6.2 8.3.8.2	**TEST OF RATED SHORT-TIME WITHSTAND CURRENT**			
Table 4	Utilization category		B	
	Rated operational voltage U_e		690 V	
	Short-time withstand current I_{cw}		19,2 kA	
	Short-time t_{st}		1 s	
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Next page
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm^2	./. mm^2
	Bar		5 x 80 mm	5 x 80 mm
	Number		2	2
	Length	supply side	./. mm	./. mm
		load side	./. mm	./. mm
	Tightening torque			50 Nm
60947-1 8.3.4.3	**Alternating current**			
	Oscillogram			20040096.0040
	Test voltage		≥ 80 V	750 V
Table 11	Power factor			0.27
	Frequency		50 Hz	50 Hz
	Test duration t_{st}			1107.9 ms
	Test current value		i_1	19.37 kA
			I_2	19.94 kA
			I_3	19.3 kA
	Average		i_m	19.53 kA

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Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.09

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	368.64 $(kA)^2s$	
	Oscillogram		20040096.0040
	Peak current maximum value		40.88 kA
	Test duration t_{test}		1107.9 ms
	Joule-integral $\int^2_{test}dt$	Ph_1	384.45 $(kA)^2s$
		Ph_2	413.48 $(kA)^2s$
		Ph_3	412.4 $(kA)^2s$
	Average value	Ph_m	403.44 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $\int^2_{test}dt$		./. A^2s

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Standard and clause	Kind of tests and requirements		Test values Results
8.3.4.4 8.3.6.3 8.3.7.2 8.3.8.6	**VERIFICATION OF TEMPERATURE-RISE ONLY FOR TERMINALS**		
8.3.2.5	**Temperature-rise test**		
60947-1 8.3.3.3.1	Ambient temperature	10...40 °C	22 °C
	Main circuits		
60947-1 8.3.3.3.4	Conventional thermal current I_{th}	1600 A	1600 A
	Conventional thermal current for enclosure I_{the}	./. A	./. A
	Conventional thermal current for the neutral pole	./. A	./. A
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Phase poles		
	Cable	./. mm^2	./. mm^2
	Bar	5 x 80 mm	5 x 80 mm
	Number	2 /Ph	2 /Ph
	Length	2000 mm	2000 mm
	Tightening torque		50 Nm
	Neutral pole (if applicable)		
	Cable	./. mm^2	./. mm^2
	Bar	./. x ./. mm	./. x ./. mm
	Number	./.	./.
	Length	./. mm	./. mm
	Tightening torque		./. Nm
	Arrangement:	3 phase ☒ or poles in series ☐	
Table 7	Temperature-rise limits		
	Terminals	≤ 80 K	47.3 K

Standard and clause	Kind of tests and requirements		Test values Results
8.3.6.4	**TEST OF SHORT-CIRCUIT BREAKING CAPACITY AT THE MAXIMUM SHORT-TIME WITHSTAND CURRENT**		
	Utilization category	B	
	Rated operational voltage U_e	690 V	
	Recovery voltage	1.05 x U_e	724.5 V(0, +5%)
	Rated short-time withstand current	I_{cw}	19.2 kA(0, +5%)
Table 11	Power factor	0.30	0.30(-0.05, 0)
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
	Energization direction	Top/Bottom	Top
	Cabling characteristics	Pageform	Page 66

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CRCUIT**		
	Oscillogram		20040169-0010 20040169-0012
	Applied voltage		735.6 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	20.3 kA 19.7 kA 19.9 kA
	Average RMS. Value		20.0 kA
	Peak current maximum value		40.6 kA
	Power factor		0.27

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.09

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION "O"		
	Oscillogram		20040169.0015
	Peak current value	I_1	39.8 kA
		I_2	27.8 kA
		I_3	36.98 kA
	Maximum total duration		418.2 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	781.13 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	741.03 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	698.4 V
	Average value	U_{rm}	740.19 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.07
	Joule integral	Ph_1	154.91 $(kA)^2s$
		Ph_2	150.01 $(kA)^2s$
		Ph_3	151.12 $(kA)^2s$
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	3 min
	OPERATION "CO"		
	Oscillogram		20040169.0016
	Applied voltage		742.01 V
	Peak current value	I_1	37.84 kA
		I_2	30.41 kA
		I_3	38.64 kA
	Maximum total duration		420.3 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	804.86 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	688.98 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	711.07 V
	Average value	U_{rm}	734.97 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.06
	Joule integral	Ph_1	154.64 $(kA)^2s$
		Ph_2	150.88 $(kA)^2s$
		Ph_3	155.28 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

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Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		1380 V
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	5 s

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =759 V	760 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	0 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.09

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			Braid
	Cable		./. mm^2	2000 mm^2
	Bar		80 x 5 mm	./. x ./. mm
	Number		2 /Ph	1 /Ph
	Length		./. mm	700 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			29 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	260 s
		Ph_1	≤ 270 s	236 s
		Ph_2	≤ 270 s	231 s
		Ph_3	≤ 270 s	234 s

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		185 mm^2	Braid 2000 mm^2
	Bar		./. x ./. mm	./. x ./. mm
	Number		2 /Ph	1 /Ph
	Length		./. mm	700 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			23 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	630*0.4=252 A
	Test current			
	either k x 2.0 x I_n		504 A	504 A
8.3.5.1	Test sequence II (I_{cs} = I_{cu})	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II (I_{cs} = I_{cu})	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	220 s
		Ph_1	≤ 270 s	214 s
		Ph_2	≤ 270 s	214 s
		Ph_3	≤ 270 s	233 s

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.10

Standard and clause	Kind of tests and requirements			Test values Results
8.3.6.2 8.3.8.2	**TEST OF RATED SHORT-TIME WITHSTAND CURRENT**			
Table 4	Utilization category		B	
	Rated operational voltage U_e		690 V	
	Short-time withstand current I_{cw}		19.2 kA	
	Short-time t_{st}		1 s	
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Next page
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		185 mm²	./. mm²
	Bar		./. x ./. mm	10 x 100 mm
	Number		2	1
	Length	supply side	./. mm	350 mm
		load side	./. mm	350 mm
	Tightening torque			50 Nm
60947-1 8.3.4.3	**Alternating current**			
	Oscillogram			20040096.0041
	Test voltage		≥ 80 V	750 V
Table 11	Power factor			0.28
	Frequency		50 Hz	50 Hz
	Test duration t_{st}			1108.65 ms
	Test current value		i_1	19.32 kA
			I_2	19.86 kA
			I_3	19.25 kA
	Average		i_m	19.48 kA

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.10

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	368.64 $(kA)^2s$	
	Oscillogram		20040096.0041
	Peak current maximum value		40.51 kA
	Test duration t_{test}		1108.65 ms
	Joule-integral $I^2_{test}dt$	Ph_1	382.58 $(kA)^2s$
		Ph_2	411.49 $(kA)^2s$
		Ph_3	410.37 $(kA)^2s$
	Average value	Ph_m	401.48 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $I^2_{test}dt$		./. A^2s

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Standard and clause	Kind of tests and requirements		Test values Results
8.3.6.4	**TEST OF SHORT-CIRCUIT BREAKING CAPACITY AT THE MAXIMUM SHORT-TIME WITHSTAND CURRENT**		
	Utilization category	B	
	Rated operational voltage U_e	690 V	
	Recovery voltage	1.05 x U_e	724.5 V(0, +5%)
	Rated short-time withstand current	I_{cw}	19.2 kA(0, +5%)
Table 11	Power factor	0.30	0.30(-0.05, 0)
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
	Energization direction	Top/Bottom	Top
	Cabling characteristics	Pageform	Page 66

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Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CRCUIT**		
	Oscillogram		20040096-0034 20040096-0035
	Applied voltage		750.82 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	19.34 kA 19.83 kA 20.52 kA
	Average RMS. Value		19.9 kA
	Peak current maximum value		40.89 kA
	Power factor		0.27

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.10

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION "O"		
	Oscillogram		20040096.0044
	Peak current value	I_1	32.05 kA
		I_2	34.45 kA
		I_3	40.33 kA
	Maximum total duration		412.85 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	727.9 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	727.7 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	726.9 V
	Average value	U_{rm}	727.5 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.05
	Joule integral	Ph_1	141.31 $(kA)^2s$
		Ph_2	151.94 $(kA)^2s$
		Ph_3	153.83 $(kA)^2s$
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	3 min
	OPERATION "CO"		
	Oscillogram		20040096.0045
	Applied voltage		750.13 V
	Peak current value	I_1	32.96 kA
		I_2	39.96 kA
		I_3	33.54 kA
	Maximum total duration		412.7 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	735 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	731 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	739 V
	Average value	U_{rm}	735 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.06
	Joule integral	Ph_1	143.17 $(kA)^2s$
		Ph_2	155.64 $(kA)^2s$
		Ph_3	152.69 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.10

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		1380 V
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	5 s

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =760 V	759 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	1 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.10

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			Braid
	Cable		185 mm²	2000 mm²
	Bar		./. x ./. mm	./. x ./. mm
	Number		2 /Ph	1 /Ph
	Length		./. mm	700 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			27 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	630*0.4=252V
	Test current			
	either k x 2.0 x I_n		504 A	504 A
8.3.5.1	Test sequence II (I_{cs} = I_{cu})	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II (I_{cs} = I_{cu})	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	225 s
		Ph_1	≤ 270 s	192 s
		Ph_2	≤ 270 s	195 s
		Ph_3	≤ 270 s	183 s

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.11B

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	500 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			20.3 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	221 s
		Ph_1	≤ 270 s	221 s
		Ph_2	≤ 270 s	220 s
		Ph_3	≤ 270 s	208 s

ВЯРНО С ОРИГИНАЛА!

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.11B

Standard and clause	Kind of tests and requirements			Test values Results
8.3.6.2 8.3.8.2	**TEST OF RATED SHORT-TIME WITHSTAND CURRENT**			
Table 4	Utilization category		B	
	Rated operational voltage U_e		690 V	
	Short-time withstand current I_{cw}		19.2 kA	
	Short-time t_{st}		1 s	
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Next page
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm^2	./. mm^2
	Bar		100 x 10 mm	100 x 10 mm
	Number		1	1
	Length	supply side	./. mm	500 mm
		load side	./. mm	0 mm
	Tightening torque			50 Nm
60947-1 8.3.4.3	**Alternating current**			
	Oscillogram			20040283.0169
	Test voltage		≥ 80 V	736 V
Table 11	Power factor			0.24
	Frequency		50 Hz	50 Hz
	Test duration t_{st}			1024 ms
	Test current value		i_1	18.74 kA
			I_2	19.53 kA
			I_3	19.4 kA
	Average		I_m	19.22 kA

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Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	368.64 $(kA)^2s$	
	Oscillogram		20040283.0169
	Peak current maximum value		39.9 kA
	Test duration t_{test}		1024 ms
	Joule-integral $\int^2_{test}dt$	Ph_1	366.16 $(kA)^2s$
		Ph_2	395.38 $(kA)^2s$
		Ph_3	387.92 $(kA)^2s$
	Average value	Ph_m	383.15 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $\int^2_{test}dt$		./. A^2s

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Type test according to: IEC 60947-2
Test sequence II/III

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.11B

Standard and clause	Kind of tests and requirements		Test values Results
8.3.4.4 8.3.6.3 8.3.7.2 8.3.8.6	**VERIFICATION OF TEMPERATURE-RISE ONLY FOR TERMINALS**		
8.3.2.5	**Temperature-rise test**		
60947-1 8.3.3.3.1	Ambient temperature	10...40 °C	22 °C
	Main circuits		
60947-1 8.3.3.3.4	Conventional thermal current I_{th}	1600 A	1600 A
	Conventional thermal current for enclosure I_{the}	./. A	./. A
	Conventional thermal current for the neutral pole	./. A	./. A
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Phase poles		
	Cable	./. mm^2	./. mm^2
	Bar	100 x 5 mm	100 x 5 mm
	Number	2 /Ph	2 /Ph
	Length	./. mm	3000 mm
	Tightening torque		50 Nm
	Neutral pole (if applicable)		
	Cable	./. mm^2	./. mm^2
	Bar	./. x ./. mm	./. x ./. mm
	Number	./.	./.
	Length	./. mm	./. mm
	Tightening torque		./. Nm
	Arrangement:	3 phase ☒ or poles in series ☐	
Table 7	Temperature-rise limits		
	Terminals	≤ 80 K	61.3 K

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Standard and clause	Kind of tests and requirements		Test values Results
8.3.6.4	**TEST OF SHORT-CIRCUIT BREAKING CAPACITY AT THE MAXIMUM SHORT-TIME WITHSTAND CURRENT**		
	Utilization category	B	
	Rated operational voltage U_e	690 V	
	Recovery voltage	1.05 x U_e	724.5 V(0, +5%)
	Rated short-time withstand current	I_{cw}	19.2 kA(0, +5%)
Table 11	Power factor	0.30	0.30(-0.05, 0)
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
	Energization direction	Top/Bottom	Bottom
	Cabling characteristics	Pageform 9	Page ./.

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CRCUIT**		
	Oscillogram		20040096-0013 20040096-0067
	Applied voltage		744 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	20.05 kA 19.53 kA 19.66 kA
	Average RMS. Value		19.75 kA
	Peak current maximum value		40.42 kA
	Power factor		0.26

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.11B

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION "O"		
	Oscillogram		20040096.0069
	Peak current value	I_1	40.30 kA
		I_2	30.52 kA
		I_3	36.01 kA
	Maximum total duration		428.78 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	725 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	726 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	726 V
	Average value	U_{rm}	725 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.05
	Joule integral	Ph_1	155.34 A^2s
		Ph_2	153.79 A^2s
		Ph_3	155.41 A^2s
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	5 min
	OPERATION "CO"		
	Oscillogram		20040096.0070
	Applied voltage		765.46 V
	Peak current value	I_1	39.27 kA
		I_2	27.78 kA
		I_3	36.87 kA
	Maximum total duration		427.46 ms
	Recovery voltage	$U_{r(1-2)}$ ☒ or $U_{r(1-N)}$ ☐	721.66 V
	(phase to phase or phase to neutral)	$U_{r(2-3)}$ ☒ or $U_{r(2-N)}$ ☐	727.91 V
		$U_{r(3-1)}$ ☒ or $U_{r(3-N)}$ ☐	747.04 V
	Average value	U_{rm}	732.2 V
	Ratio between U_{rm} and U_e	U_{rm}/U_e	1.06
	Joule integral	Ph_1	155,57 $(kA)^2s$
		Ph_2	155.34 $(kA)^2s$
		Ph_3	154.42 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

ВЯРНО С ОРИГИНАЛА!

Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.11B

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		1380 V
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	60 s

ВЯРНО С ОРИГИНАЛА!

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Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =760 V	759 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	1 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.11B

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	3000 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			20.3 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	236 s
		Ph_1	≤ 270 s	236 s
		Ph_2	≤ 270 s	231 s
		Ph_3	≤ 270 s	217 s

ВЯРНО С ОРИГИНАЛА!

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.12

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	500 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			21.8 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	220 s
		Ph_1	≤ 270 s	228 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.12

Standard and clause	Kind of tests and requirements		Test values Results
8.3.6.2	**ADDITIONAL TEST OF RATED SHORT-TIME WITHSTAND CURRENT ON FOUR POLE CIRCUIT-BREAKERS**		
	Test made on the same sample as for the three-pole short-time withstand or on a new sample	same/new	new
Table 4	Utilization category	B	
60947-1 8.3.4.3	Rated operational voltage U_e	690 V√3=398V	
	Short-time withstand current of the fourth pole I_{cw} (not less than 60 % of I_{cw})	11.52 kA	
	Short-time t_{st}	1 s	
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm²	./. mm²
	Bar	100 x 5 mm	100 x 5 mm
	Number	2	2
	Length supply side	./. mm	500 mm
	load side	./. mm	0 mm
	Tightening torque		50 Nm
60947-1 8.3.4.3	**Alternating current**		
	Oscillogram		20040283.0134
	Test voltage	≥ 80 V	780 V
Table 11	Power factor		0.29
	Frequency	50 Hz	50 Hz
	Test duration t_{st}		1112.7 ms
	Test current value i_1		12.02 kA

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.12

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	132.71 $(kA)^2s$	
	Oscillogram		20040283.0134
	Peak current maximum value		23.22 kA
	Test duration t_{test}		1112.7 ms
	Joule-integral $I^2_{test}dt$	Ph_1	139.55 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $I^2_{test}dt$		./. A^2s

ВЯРНО С ОРИГИНАЛА

Standard and clause	Kind of tests and requirements		Test values Results
8.3.4.4 8.3.6.3 8.3.7.2 8.3.8.6	**VERIFICATION OF TEMPERATURE-RISE ONLY FOR TERMINALS**		
8.3.2.5	**Temperature-rise test**		
60947-1 8.3.3.3.1	Ambient temperature	10...40 °C	22 °C
	Main circuits		
60947-1 8.3.3.3.4	Conventional thermal current I_{th}	1600 A	1600 A
	Conventional thermal current for enclosure I_{the}	./. A	./. A
	Conventional thermal current for the neutral pole	./. A	./. A
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Phase poles		
	Cable	./. mm^2	./. mm^2
	Bar	100 x 5 mm	100 x 5 mm
	Number	2 /Ph	2 /Ph
	Length	./. mm	3000 mm
	Tightening torque		50 Nm
	Neutral pole (if applicable)		
	Cable	./. mm^2	./. mm^2
	Bar	./. x ./. mm	./. x ./. mm
	Number	./.	./.
	Length	./. mm	./. mm
	Tightening torque		./. Nm
	Arrangement:	3 phase ☒ or poles in series ☐	
Table 7	Temperature-rise limits		
	Terminals	≤ 80 K	56.3 K

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.12

Standard and clause	Kind of tests and requirements		Test values Results
8.3.5.2 8.3.6.4 8.3.7.6	**ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS**		
	Test made on the same sample as for the three-pole short-circuit or on a new sample	same/new	new
	Rated operational voltage U_e	690 V	
	Test voltage	$U_e/\sqrt{3}$	398 V
	Recovery voltage	1.05 x $U_e/\sqrt{3}$	418 V
	Rated ultimate short-circuit breaking capacity I_{cu}	50 kA	
	Rated short-time withstand current I_{cw}	11.52 kA	
	Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)		11.52 kA
Table 11	Power factor	0.30	0.30(-0.05, 0)
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
	Energization direction	Top/Bottom	Top
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Cable	./. mm^2	./. mm^2
	Bar	100 x 10 mm	100 x 10 mm
	Number	1	1
	Length supply side	./. mm	400 mm
	load side	./. mm	0 mm
	Tightening torque		50 Nm

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CRCUIT**		
	Oscillogram		20040299-0003 20040299-0008
	Applied voltage		425.55 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	11.77 kA ./. kA ./. kA
	Average RMS. Value		11.77 kA
	Peak current maximum value		23.24 kA
	Power factor		0.28

Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.12

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION "O"		
	Oscillogram		20040299-0011
	Peak current value	i_1	23.29 kA
	Total duration		415.75 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	419.02 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	53.87 $(kA)^2s$
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	3 min
	OPERATION "CO"		
	Oscillogram		20040299.0012
	Applied voltage		435 V
	Peak current value	i_1	19.38 kA
	Total duration		420.45 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	418.57 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	52.85 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

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Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		1380 V
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	5 s

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.12

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =759 V	759 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	0 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm^2	./. mm^2
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	500 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			18.2 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	215 s
		Ph_1	≤ 270 s	226 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.13

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		185 mm²	185 mm²
	Bar		./. x ./. mm	./. x ./. mm
	Number		1 /Ph	1 /Ph
	Length		./. mm	2000 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			21.7 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	630x0.4=252 A
	Test current			
	either k x 2.0 x I_n		504 A	504 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	236 s
		Ph_1	≤ 270 s	212 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

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Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.13

Standard and clause	Kind of tests and requirements			Test values Results
8.3.6.2	**ADDITIONAL TEST OF RATED SHORT-TIME WITHSTAND CURRENT ON FOUR POLE CIRCUIT-BREAKERS**			
	Test made on the same sample as for the three-pole short-time withstand or on a new sample		same/new	new
Table 4	Utilization category		B	
60947-1 8.3.4.3	Rated operational voltage U_e		690√3=398 V	
	Short-time withstand current of the fourth pole I_{cw} (not less than 60 % of I_{cw})		11.52 kA	
	Short-time t_{st}		1 s	
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Next page
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 10 mm	100 x 10 mm
	Number		1	1
	Length	supply side	./. mm	400 mm
		load side	./. mm	./. mm
	Tightening torque			50 Nm
60947-1 8.3.4.3	**Alternating current**			
	Oscillogram			20040283.0135
	Test voltage		≥ 80 V	780 V
Table 11	Power factor			0.29
	Frequency		50 Hz	50 Hz
	Test duration t_{st}			1112.95 ms
	Test current value I_1			11.97 kA

Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.13

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	132.71 $(kA)^2s$	
	Oscillogram		20040283.0135
	Peak current maximum value		23.12 kA
	Test duration t_{test}		1112.95 ms
	Joule-integral $I^2_{test}dt$	Ph_1	139.86 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $I^2_{test}dt$		./. A^2s

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Standard and clause	Kind of tests and requirements		Test values Results
8.3.5.2 8.3.6.4 8.3.7.6	**ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS**		
	Test made on the same sample as for the three-pole short-circuit or on a new sample	same/new	new
	Rated operational voltage U_e	690 V	
	Test voltage	$U_e/\sqrt{3}$	398 V
	Recovery voltage	1.05 x $U_e/\sqrt{3}$	418 V
	Rated ultimate short-circuit breaking capacity I_{cu}	50 kA	
	Rated short-time withstand current I_{cw}	11.52 kA	
	Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)		11.52 kA
Table 11	Power factor	0.30	0.29
	Frequency	50 Hz	50 Hz
8.3.2.1	Control supply voltage	0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time		./. ms
	Sequence of operation	O - t - CO	O - t - CO
	Circuit diagram		Page 68
	Calibration of the test circuit	Pageform	Next page
	Safety area	Pageform	Page 67
	Installation of the material tested	Pageform	Page 66
	Energization direction	Top/Bottom	Top
60947-1	Cabling characteristics		
Table 9, 10	Cable	./. mm^2	./. mm^2
and 11	Bar	100 x 10 mm	100 x 10 mm
	Number	2	2
	Length supply side	./. mm	400 mm
	load side	./. mm	0 mm
	Tightening torque		50 Nm

Type test according to: IEC 60947-2

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.13

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CRCUIT**		
	Oscillogram		20040299-0003 20040299-0008
	Applied voltage		430 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	11.77 kA ./. kA ./. kA
	Average RMS. Value		11.77 kA
	Peak current maximum value		23.24 kA
	Power factor		0.28

Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION „O“		
	Oscillogram		20040299.0013
	Peak current value	i_1	23.14 kA
	Total duration		414.75 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	419 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	53.55 $(kA)^2s$
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	3 min
	OPERATION „CO“		
	Oscillogram		20040299.0014
	Applied voltage		426.54 V
	Peak current value	i_1	22.91 kA
	Total duration		414.25 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	420 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	52.9 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.13

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	1380 V
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	1 min

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Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =759 V	759 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	0 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.13

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		185 mm²	185 mm²
	Bar		./. x ./. mm	./. x ./. mm
	Number		1 /Ph	1 /Ph
	Length		./. mm	2000 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			17.8 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	0.4x630=252 A
	Test current			
	either k x 2.0 x I_n		504 A	504 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	235 s
		Ph_1	≤ 270 s	225 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

ВЯРНО С ОРИГИНАЛА!

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.14

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	500 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			18.2 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	218 s
		Ph_1	≤ 270 s	215 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.14

Standard and clause	Kind of tests and requirements			Test values Results
8.3.6.2	**ADDITIONAL TEST OF RATED SHORT-TIME WITHSTAND CURRENT ON FOUR POLE CIRCUIT-BREAKERS**			
	Test made on the same sample as for the three-pole short-time withstand or on a new sample		same/new	new
Table 4	Utilization category		B	
60947-1	Rated operational voltage U_e		690/√3=398 V	
8.3.4.3	Short-time withstand current of the fourth pole I_{cw} (not less than 60 % of I_{cw})		11.52 kA	
	Short-time t_{st}		1 s	
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Next page
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
60947-1	Cabling characteristics			
Table 9, 10	Cable		./. mm²	./. mm²
and 11	Bar		100 x 5 mm	100 x 5 mm
	Number		2	2
	Length	supply side	./. mm	500 mm
		load side	./. mm	0 mm
	Tightening torque			50 Nm
60947-1	**Alternating current**			
8.3.4.3				
	Oscillogram			20040283.0136
	Test voltage		≥ 80 V	780 V
Table 11	Power factor			0.29
	Frequency		50 Hz	50 Hz
	Test duration t_{st}			1112.95 ms
	Test current value I_1			12.04 kA

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Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.3	**Alternative test**		
	$I_{cw}^2 \times t_{st}$	132.7 $(kA)^2s$	
	Oscillogram		20040283.0136
	Peak current maximum value		23.25 kA
	Test duration t_{test}		1112.95 ms
	Joule-integral $I^2_{test}dt$	Ph_1	139.04 $(kA)^2s$
60947-1 8.3.4.3	**Direct current**		
	$I_{cw}^2 \times t_{st}$	./. A^2s	
	Oscillogram		Page ./.
	Test voltage	≥ 80 V	./. V
	Maximum of test current I_{test}		./. kA
	Test duration t_{test}		./. ms
	Joule-integral $I^2_{test}dt$		./. A^2s

Type test according to: IEC 60947-2
Test sequence IV

Type: Compact NS 630bN, 1250N, 1600N
Sample 31039.14

Standard and clause	Kind of tests and requirements		Test values Results
8.3.4.4 8.3.6.3 8.3.7.2 8.3.8.6	**VERIFICATION OF TEMPERATURE-RISE ONLY FOR TERMINALS**		
8.3.2.5	**Temperature-rise test**		
60947-1 8.3.3.3.1	Ambient temperature	10...40 °C	22 °C
	Main circuits		
60947-1 8.3.3.3.4	Conventional thermal current I_{th}	1600 A	1600 A
	Conventional thermal current for enclosure I_{the}	./. A	./. A
	Conventional thermal current for the neutral pole	./. A	./. A
60947-1 Table 9, 10 and 11	Cabling characteristics		
	Phase poles		
	Cable	./. mm^2	./. mm^2
	Bar	100 x 5 mm	100 x 5 mm
	Number	2 /Ph	2 /Ph
	Length	./. mm	500 mm
	Tightening torque		50 Nm
	Neutral pole (if applicable)		
	Cable	./. mm^2	./. mm^2
	Bar	./. x ./. mm	./. x ./. mm
	Number	./.	./.
	Length	./. mm	./. mm
	Tightening torque		./. Nm
	Arrangement: 3 phase ☒ or poles in series ☐		
Table 7	Temperature-rise limits		
	Terminals	≤ 80 K	53.6 K

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.14

Standard and clause	Kind of tests and requirements			Test values Results
8.3.5.2 8.3.6.4 8.3.7.6	**ADDITIONAL SEQUENCE OF SHORT-CIRCUIT OPERATIONS ON FOUR POLE CIRCUIT-BREAKERS**			
	Test made on the same sample as for the three-pole short-circuit or on a new sample		same/new	new
	Rated operational voltage U_e		690 V	
	Test voltage		$U_e/\sqrt{3}$	398 V
	Recovery voltage		1.05 x $U_e/\sqrt{3}$	418 V
	Rated ultimate short-circuit breaking capacity I_{cu}		11.52 kA	
	Rated short-time withstand current I_{cw}		11.52 kA	
	Short-circuit breaking capacity of the fourth pole (by arrangement) (not less than 60 % of I_{cu} or I_{cw} as applicable)			11.52 kA
Table 11	Power factor		cos 0.30	0.28
	Frequency		50 Hz	50 Hz
8.3.2.1	Control supply voltage		0.85 x U_s ./. V	./. V
7.2.1.1.3	Maximum value of the closing time			./. ms
	Sequence of operation		O - t - CO	O - t - CO
	Circuit diagram			Page 68
	Calibration of the test circuit		Pageform	Page ./.
	Safety area		Pageform	Page 67
	Installation of the material tested		Pageform	Page 66
	Energization direction		Top/Bottom	Bottom
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm^2	./. mm^2
	Bar		100 x 10 mm	100 x 10 mm
	Number		1	1
	Length	supply side	./. mm	400 mm
		load side	./. mm	0 mm
	Tightening torque			50 Nm

Type test according to: IEC 60947-2 | Type: Compact NS 630bN, 1250N, 1600N Sample 31039.14

Standard and clause	Kind of tests and requirements		Test values Results
60947-1 8.3.4.1.5	**CALIBRATION OF THE TEST CIRCUIT**		
	Oscillogram		20040299-0003 20040299-0008
	Applied voltage		430 V
	Frequency	50 Hz	50 Hz
	RMS current value at 20 ms	i_1 i_2 i_3	11.77 kA ./. kA ./. kA
	Average RMS. Value		11.77 kA
	Peak current maximum value		23.24 kA
	Power factor		0.28

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Standard and clause	Kind of tests and requirements		Test values Results
	OPERATION "O"		
	Oscillogram		20040299.0015
	Peak current value	i_1	23.08 kA
	Total duration		415.7 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	419 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	53.77 $(kA)^2s$
	Melting of the fusible element	Yes/No	No
	Holes in the PE-sheet (if applicable)	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.
	Time interval between operations	3 min	4 min
	OPERATION "CO"		
	Oscillogram		20040299.0016
	Applied voltage		426.6 V
	Peak current value	i_1	22.9 kA
	Total duration		415.65 ms
	Recovery voltage (phase to neutral)	$U_{r(1-N)}$	419 V
	Ratio between U_r and U_e	U_r/U_e	1.05
	Joule integral	Ph_1	53.2 $(kA)^2s$
7.2.1.1.3	Closing operation time		./. ms
	Melting of the fusible element	Yes/No	No
	Cracks observed	Yes/No	No
	if Yes		Page ./.

ВЯРНО
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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.14

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF DIELECTRIC WITHSTAND		
	Test voltage		
	2 x U_e, min. 1000 V	1380 V	
8.3.3.5	Test sequence I		
8.3.4.3	Test sequence II		
8.3.5.3	Test sequence III		
8.3.6.5	Test sequence IV		1380 V
8.3.7.3	Test sequence V, stage 1		
8.3.7.7	Test sequence V, stage 2		
8.3.8.5	Combined test sequence		
B.10.3.1	Test sequence B.II		
A.5	Verification of discrimination		
A.6.3	Verification of back-up protection		
C.3	Individual pole short-circuit test sequence		
H.3	Test sequence for circuit-breakers for IT-systems		
8.3.3.2.2 a)	Application of the test voltage -Main circuit of the circuit-breaker -Isolating contacts of the withdrawable unit (if applicable)		
	Test duration	5 s	1 min

624

Standard and clause	Kind of tests and requirements		Test values Results
	VERIFICATION OF LEAKAGE CURRENT		
	For circuit-breakers suitable for isolation having an operational voltage U_e greater than 50 V.		
8.3.3.2	**- Main circuit of the circuit-breaker** **- Isolating contacts of a withdrawable unit (if applicable)**		
	Test voltage	1.1 x U_e =759 V	759 V
60947-1 7.2.7	Application of the test voltage		
	Leakage current		
8.3.3.2	Test sequence I (in new condition)	≤ 0.5 mA	./. mA
8.3.3.5	Test sequence I (after overload performance)	≤ 2 mA	./. mA
8.3.4.3	Test sequence II	≤ 2 mA	./. mA
8.3.5.3	Test sequence III	≤ 6 mA	./. mA
8.3.6.5	Test sequence IV	≤ 2 mA	0 mA
8.3.7.3	Test sequence V, stage 1	≤ 2 mA	./. mA
8.3.7.7	Test sequence V, stage 2	≤ 6 mA	./. mA
8.3.8.5	Combined test sequence	≤ 2 mA	./. mA
C.3	Individual pole short-circuit test sequence I_{su}	≤ 6 mA	./. mA
H.3	Individual pole short-circuit test sequence I_{IT}	≤ 6 mA	./. mA

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Type test according to: IEC 60947-2, Test sequence IV | Type: Compact NS 630bN, 1250N, 1600N, Sample 31039.14

Standard and clause	Kind of tests and requirements			Test values Results
	VERIFICATION OF OVERLOAD RELEASES ON EACH POLE SEPARATELY			
60947-1 Table 9, 10 and 11	Cabling characteristics			
	Cable		./. mm²	./. mm²
	Bar		100 x 5 mm	100 x 5 mm
	Number		2 /Ph	2 /Ph
	Length		./. mm	500 mm
	Tightening torque			50 Nm
	Reference temperature		40 °C ± 2 °C	
	Ambient temperature			18.2 °C
	Correction factor (k = 1 for releases independent of ambient temperature)		k	1
	Current setting value		I_n	1600 A
	Test current			
	either k x 2.0 x I_n		3200 A	3200 A
8.3.5.1	Test sequence II ($I_{cs} = I_{cu}$)	before 8.3.4.1		
8.3.5.1	Test sequence III	before 8.3.5.2		
8.3.6.1	Test sequence IV	before 8.3.6.2		
8.3.6.6	Test sequence IV	after 8.3.6.5		
8.3.7.4	Test sequence V	before 8.3.7.5		
8.3.8.1	Combined test sequence	before 8.3.8.2		
A.5	Verification of discrimination	before 8.3.5.2		
A.6.3	Verification of back-up protection	before 8.3.5.2		
	or k x 2.5 x I_n		./. A	./. A
8.3.5.4	Test sequence II ($I_{cs} = I_{cu}$)	after 8.3.4.5		
8.3.5.4	Test sequence III	after 8.3.5.3		
8.3.7.8	Test sequence V	after 8.3.7.7		
8.3.8.7	Combined test sequence	after 8.3.8.6		
A.5	Verification of discrimination	after 8.3.5.3		
A.6.3	Verification of back-up protection	after 8.3.5.3		
C.4	Individual pole short-circuit test sequence			
H.4	Test sequence for circuit-breakers for IT-systems			
	Tripping time (for twice the value of current setting on single pole)			
		Neutral	≤ 270 s	218 s
		Ph_1	≤ 270 s	215 s
		Ph_2	≤ ./. s	./. s
		Ph_3	≤ ./. s	./. s

INSTALLATION

The apparatus is set up on a metallic structure, fixed on insulated bars.
The safety perimeter is materialised by a metallic enclosure (see next page) connected to the neutral by a fuse.

The apparatus are operated with an air actuator for test of rated service short-circuit breaking capacity.

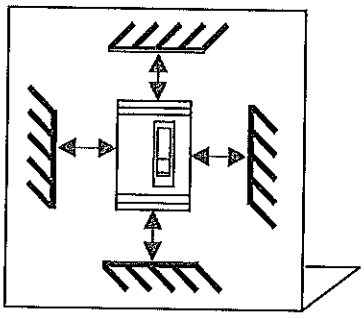
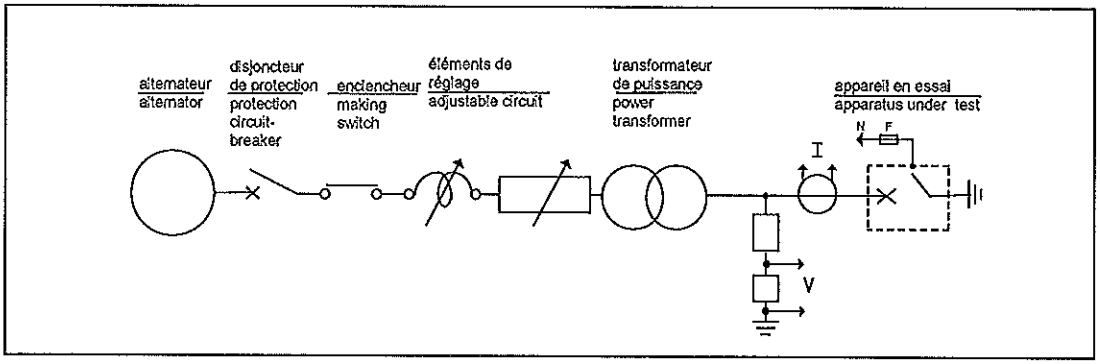
Standard and clause	Kind of tests and requirements		Test values Results
	SAFETY AREA AND DETECTION OF THE FAULT CURRENT		
60947-2	Characteristics of the metallic screen		
	- structure	woven wire mesh	./.
		perforated metal	./.
		expanded metal	Yes
	- ratio hole area / total area	0,45 - 0,65	./.
	- size of hole	≤ 30 mm²	./. mm²
	- coating	bare	./.
		conductive plating	yes
			Top : 120 mm Left : 10 mm Right : 10 mm Bottom : 120 mm Front : 0 mm Back : 0 mm
	Detection of the fault current		
	- prospective fault current in the fusible element circuit		50 A
	- fusible element		
	. diameter of copper wire		0.1 mm
	. length		100 mm
	or		
	. equivalent fusible element		/

DIAGRAM OF THE TEST CIRCUIT

TEST OF RATED SERVICE SHORT-CIRCUIT BREAKING CAPACITY



ВЯРНО
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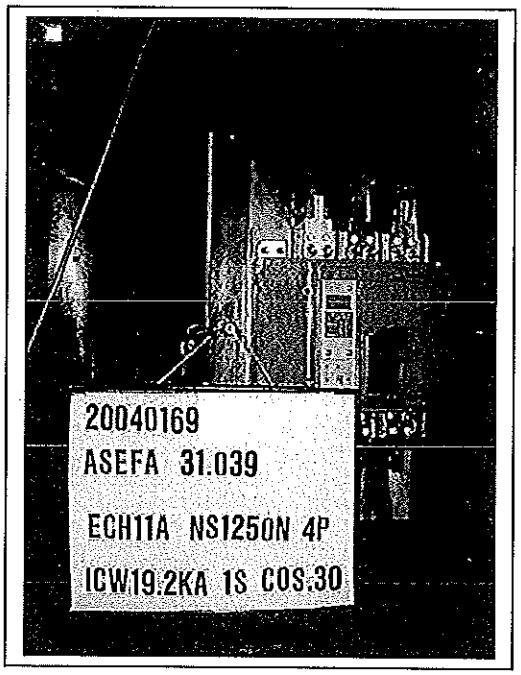
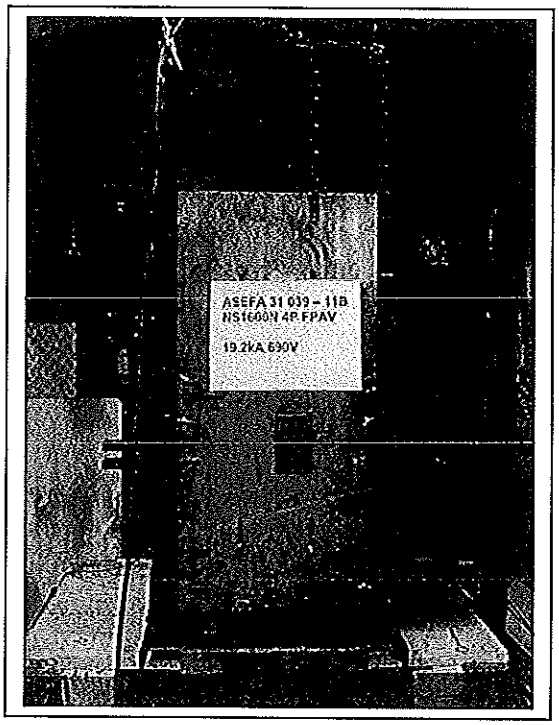
PHOTOGRAPHIE OF THE ASSEMBLY





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APPENDIXES

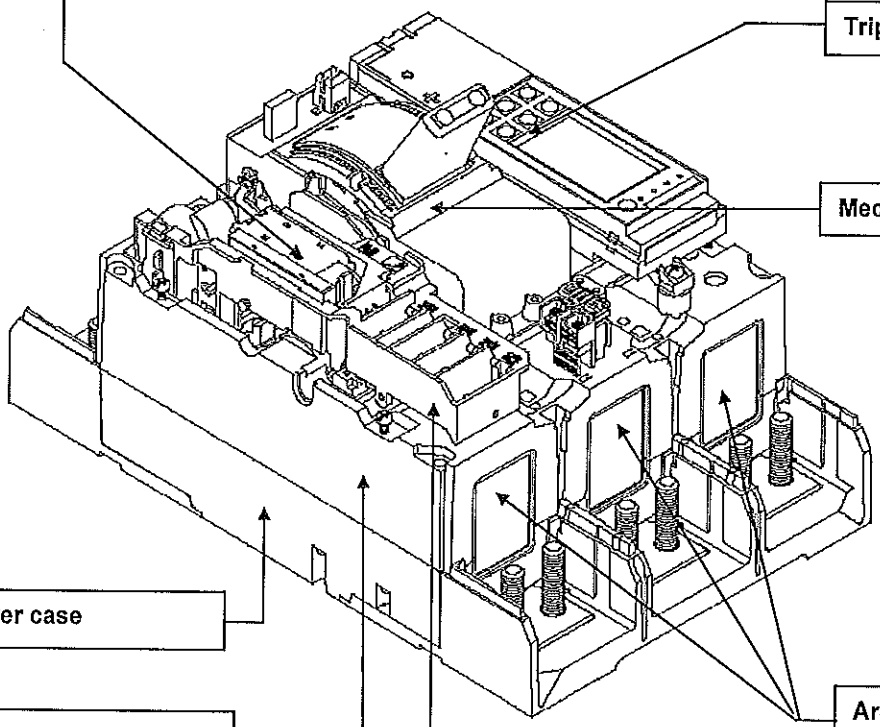
APPARATUS CHARACTERISTICS

General view circuit-breaker	GHD1189100 ind.B
Tripping curve Micrologic 5.0A	51156274AA 01 1/1

OSCILLOGRAMS

ASEFA 31 039.09 ICW	20040096 – 0040
Calibration voltage	20040169 – 0010
Calibration current	20040169 – 0012
ASEFA 31 039.09 Opening	20040169 – 0015
ASEFA 31 039.09 Closing/Opening 1	20040169 – 0016
ASEFA 31 039.10 ICW	20040096 – 0041
Calibration voltage	20040096 – 0034
Calibration current	20040096 – 0035
ASEFA 31 039.10 Opening	20040096 – 0044
ASEFA 31 039.10 Closing/Opening 1	20040096 – 0045
ASEFA 31 039.11B ICW	20040283 – 0169
Calibration voltage	20040096 – 0013
Calibration current	20040096 – 0067
ASEFA 31 039.11B Opening	20040096 – 0069
ASEFA 31 039.11B Closing/Opening 1	20040096 – 0070
ASEFA 31 039.12 ICW	20040283 – 0134
Calibration voltage	20040299 – 0003
Calibration current	20040299 – 0008
ASEFA 31 039.12 Opening	20040299 – 0011
ASEFA 31 039.12 Closing/Opening 1	20040299 – 0012
ASEFA 31 039.13 ICW	20040283 – 0135
ASEFA 31 039.13 Opening	20040299 – 0013
ASEFA 31 039.13 Closing/Opening 1	20040299 – 0014
ASEFA 31 039.14 ICW	20040283 – 0136
ASEFA 31 039.14 Opening	20040299 – 0015
ASEFA 31 039.14 Closing/Opening 1	20040299 – 0016

GENERAL VIEW - FIGURE 1



ВЯРНО С ОРИГИНАЛА!

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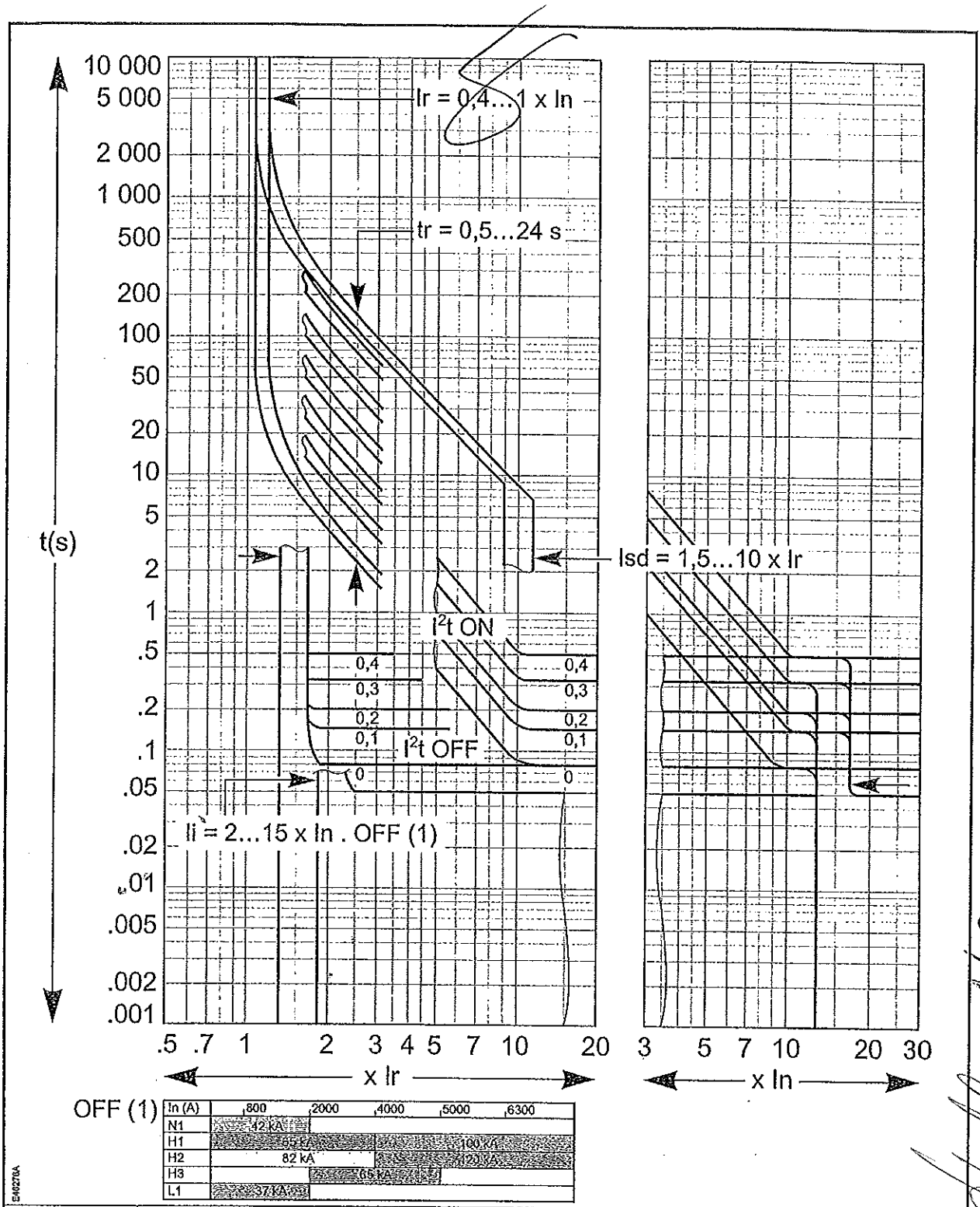


Ind / Rev	Date / Date	Modification / Modification	JOUBERT Nom/Name	Visa	GRELIER Nom/Name	Visa	Archiv./ Microfil.
02	09/06/99	Rajout des crans 0 à 0,4	Préparer/Issued by		Préparer/Issued by		

Projet / Projet: Compact NS630b à NS1600

Dossier / Folder:

GROUPE SCHNEIDER

Code diff. / Distrib. code

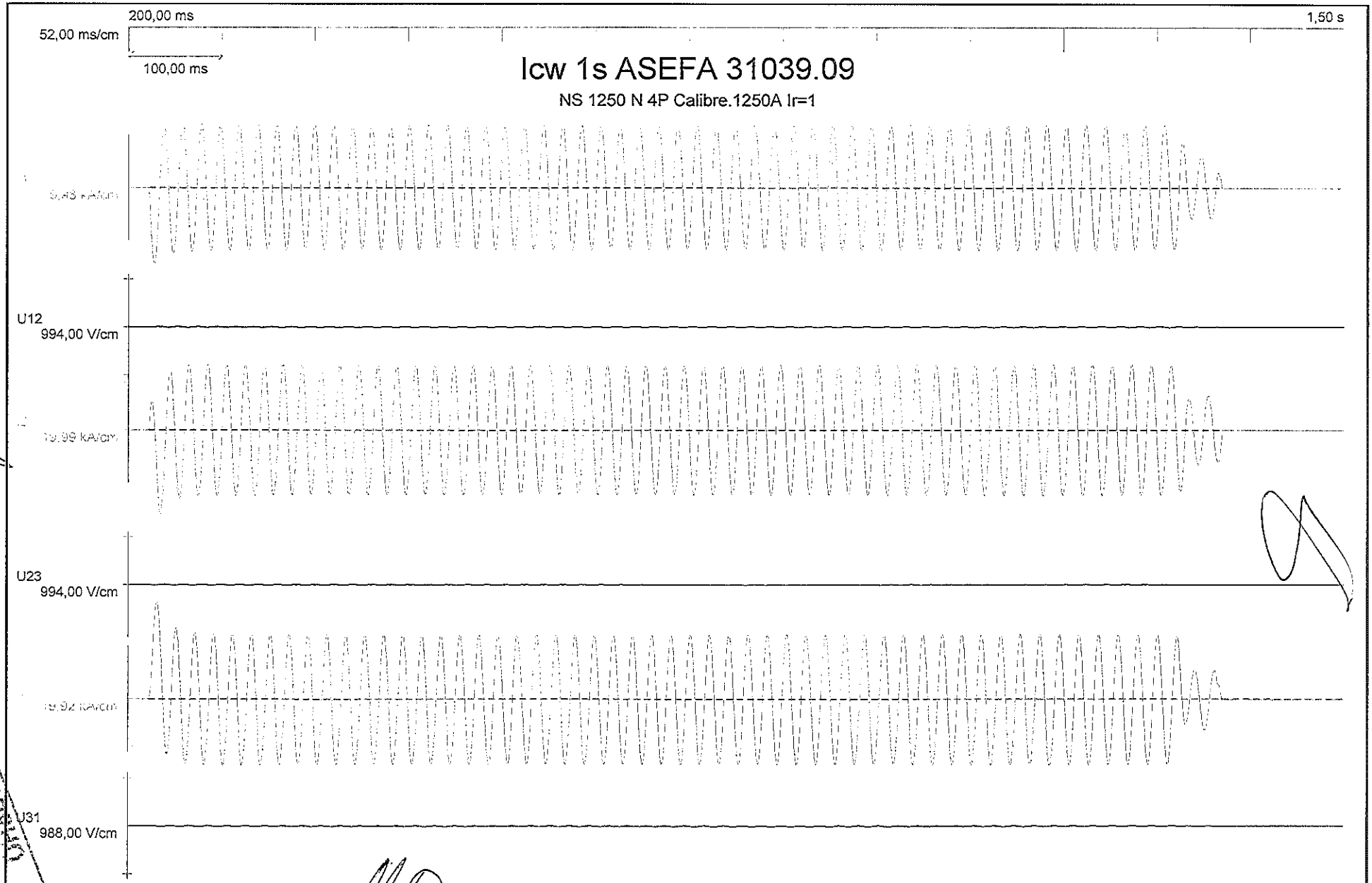
Unité / Département: DBTP

DISJONCTEUR FIXE ET DEBROCHABLE

Courbe de déclenchement pour déclencheurs Micrologic 5.0 , 6.0 , 7.0

51156274AA	Ind/Rev 01	Folio/Sheet 1/1

633



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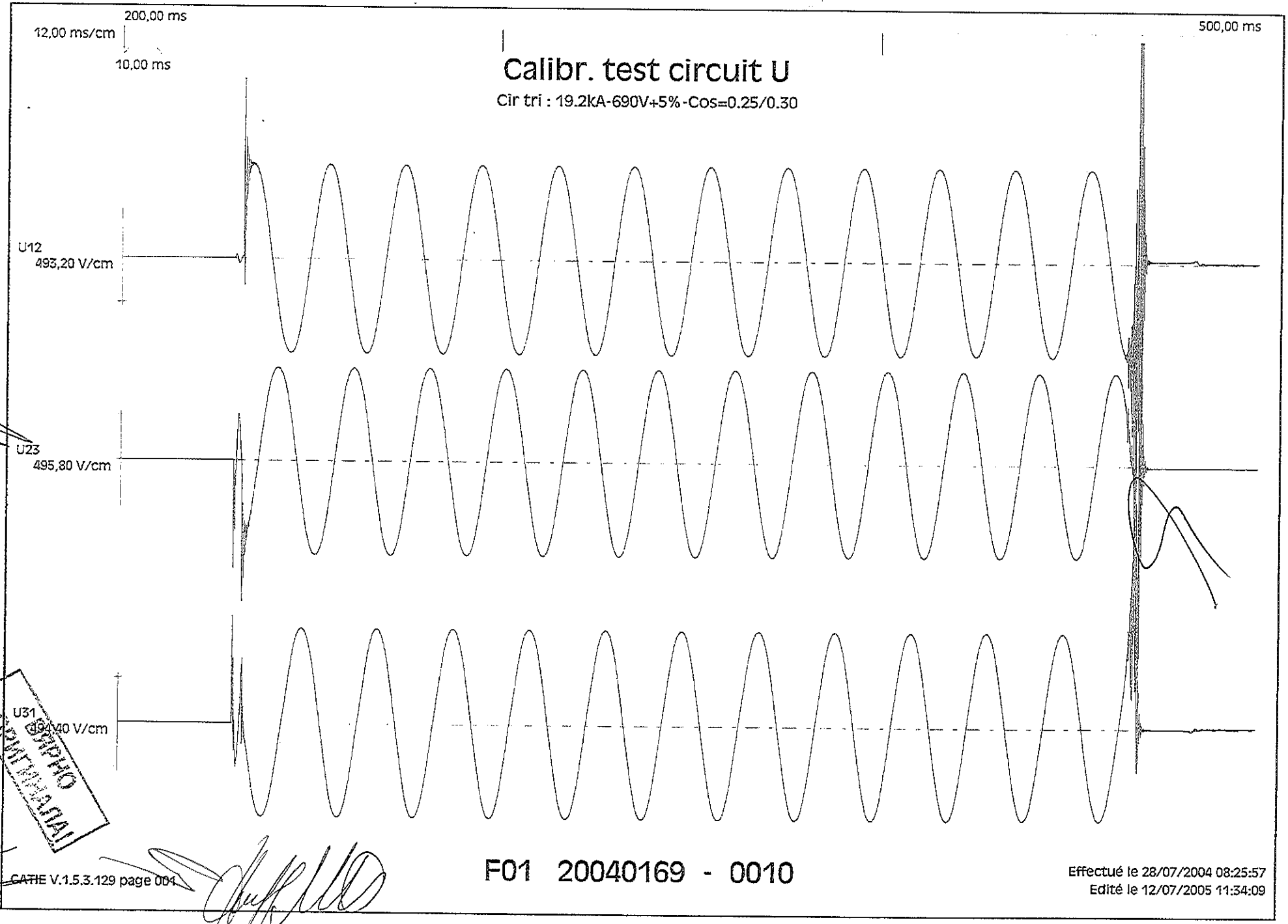
CATIE V.1.5.3.129 page 001

Effectué le 27/04/2004 09:06:13
Edité le 06/02/2006 15:45:37



200,00 ms

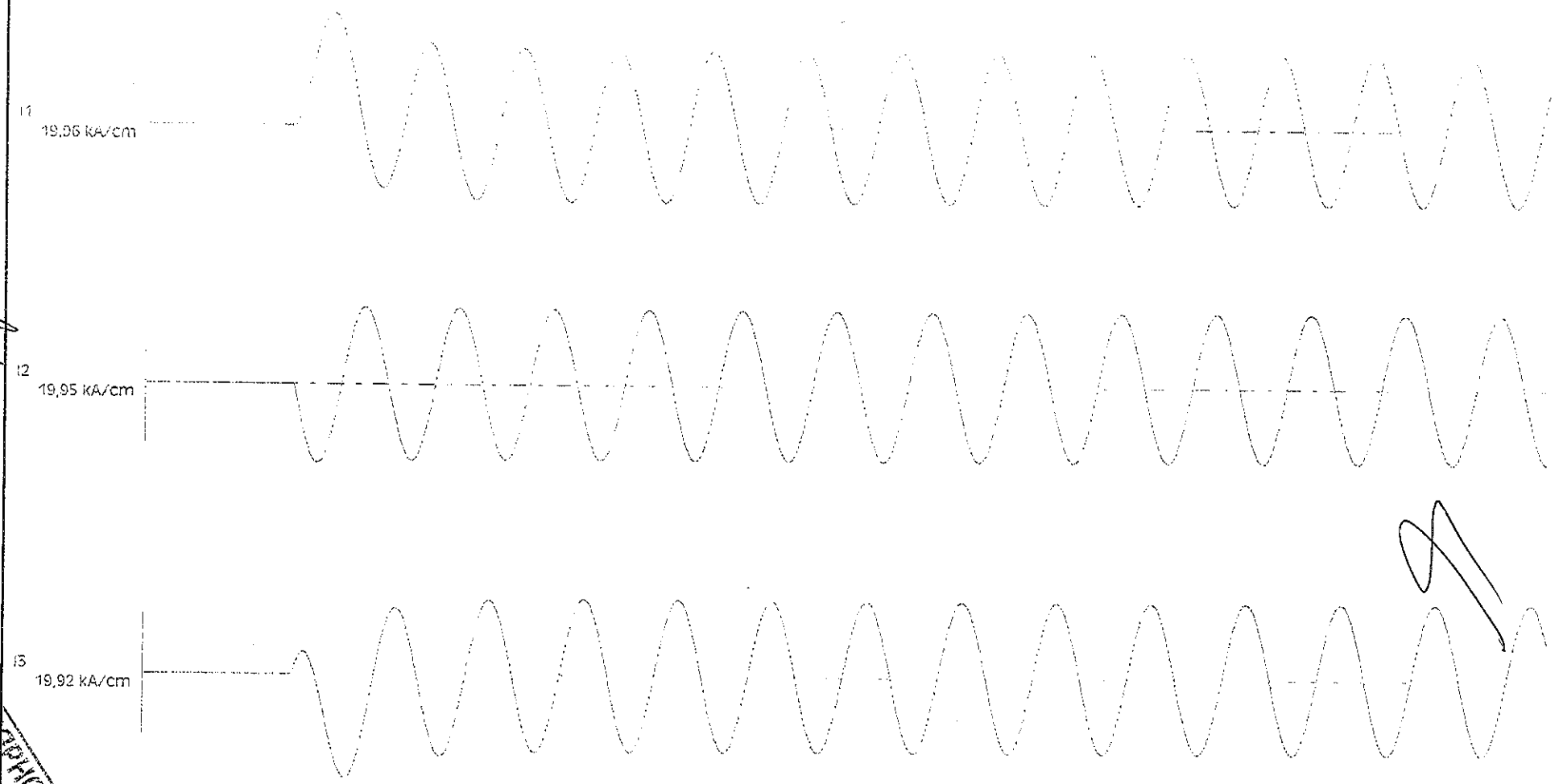
12,00 ms/cm

10,00 ms

500,00 ms

Calibr. test circuit I

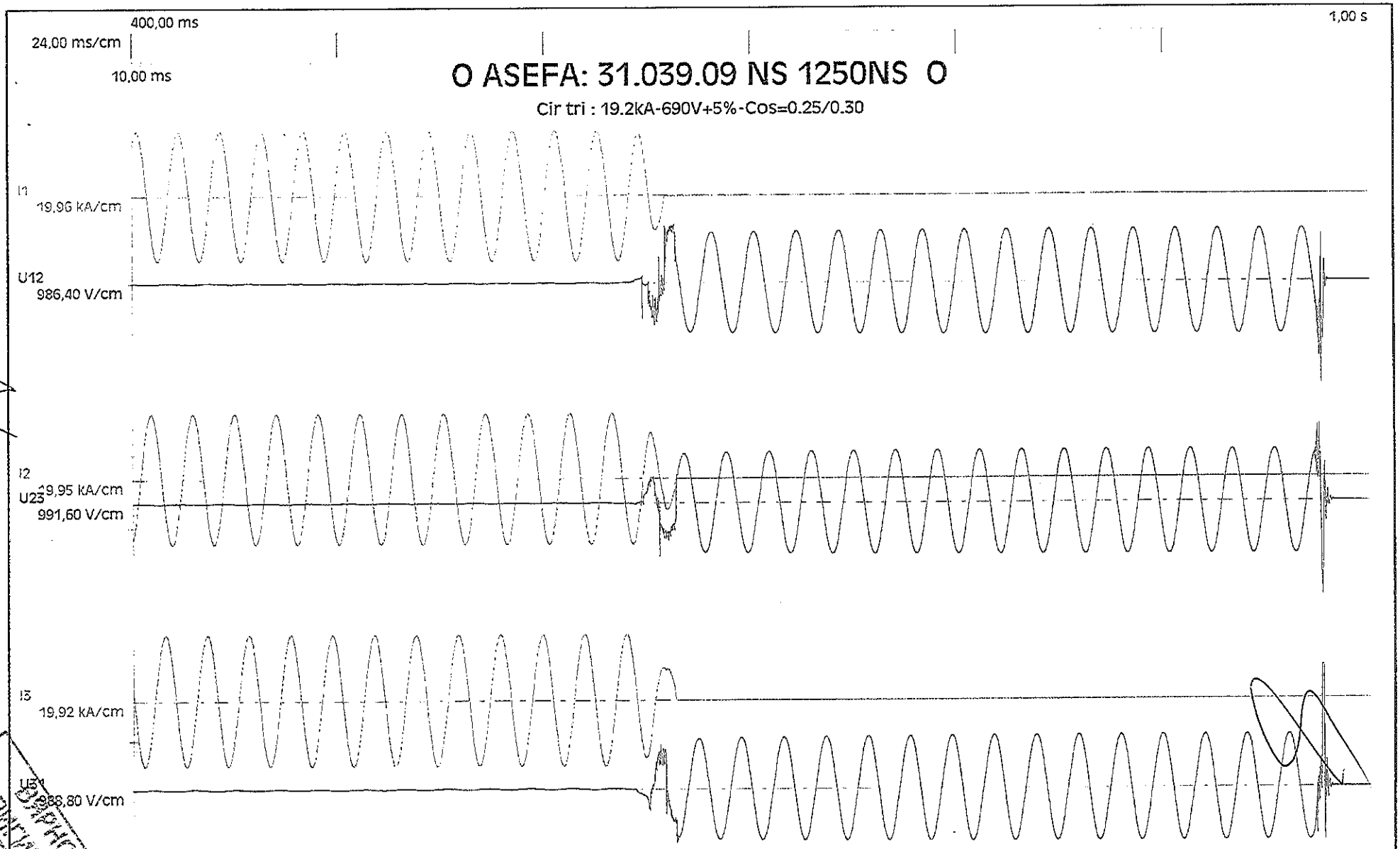
Cir tri : 19.2kA-690V+5%-Cos=0.25/0.30

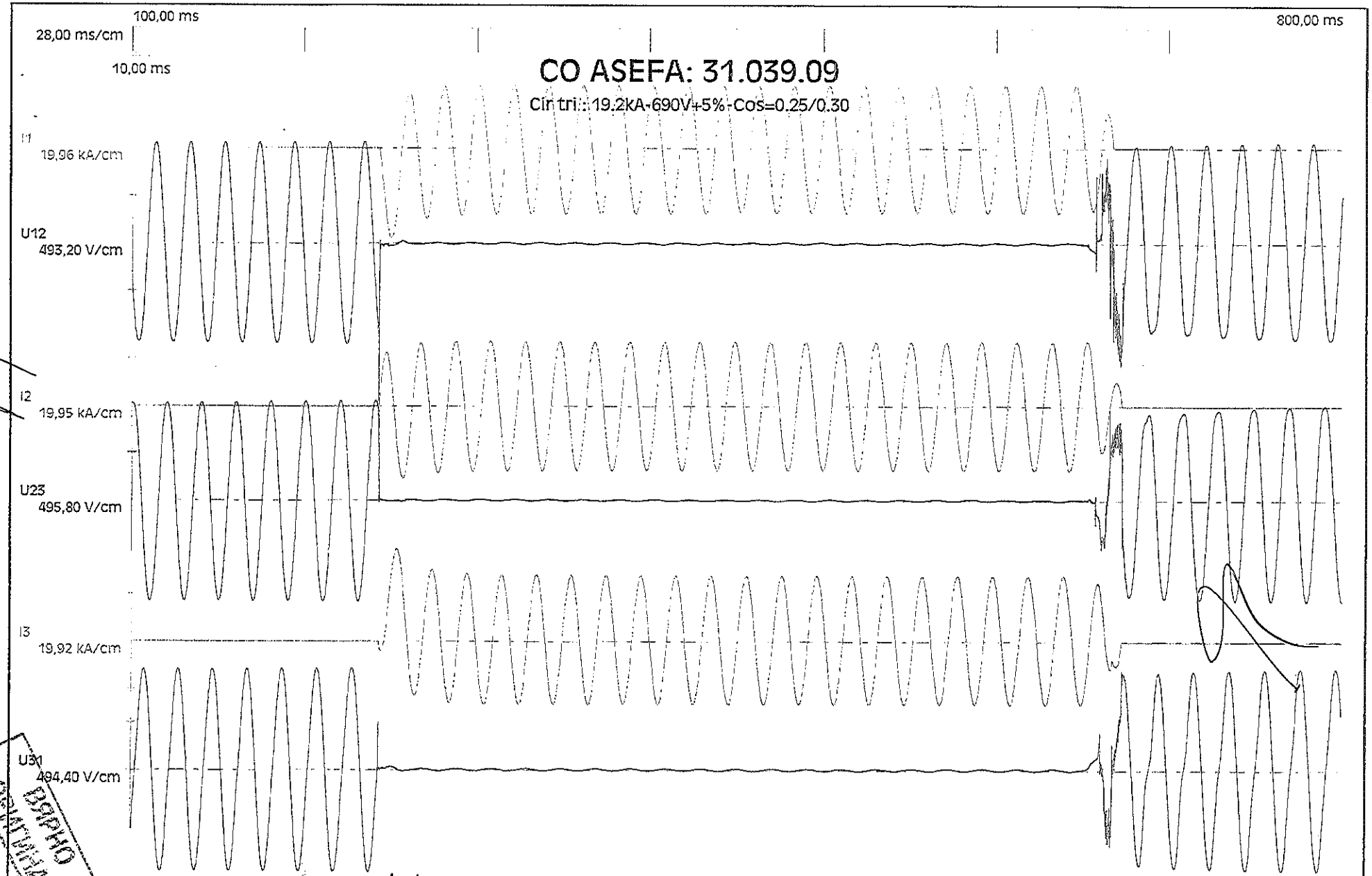


CATIE V.1.5.3.129 page 001

F01 20040169 - 0012

Effectué le 28/07/2004 08:35:22
Edité le 12/07/2005 11:34:44





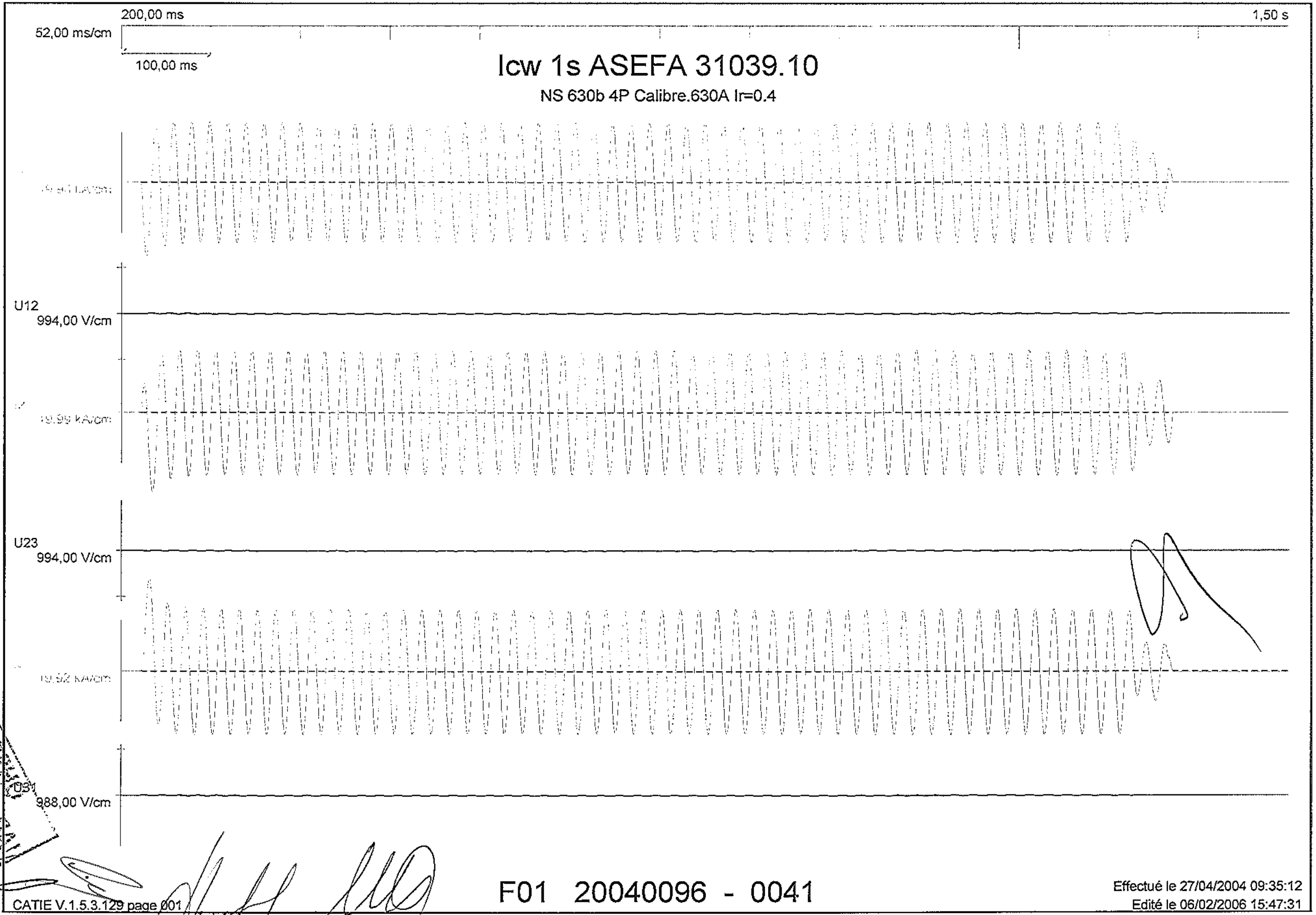
F01 20040169 - 0016

CATIE V.1.5.3.129 page 001

Effectué le 28/07/2004 08:58:28
Edité le 21/07/2005 11:41:25

Icw 1s ASEFA 31039.10

NS 630b 4P Calibre.630A Ir=0.4



F01 20040096 - 0041

Effectué le 27/04/2004 09:35:12
Edité le 06/02/2006 15:47:31

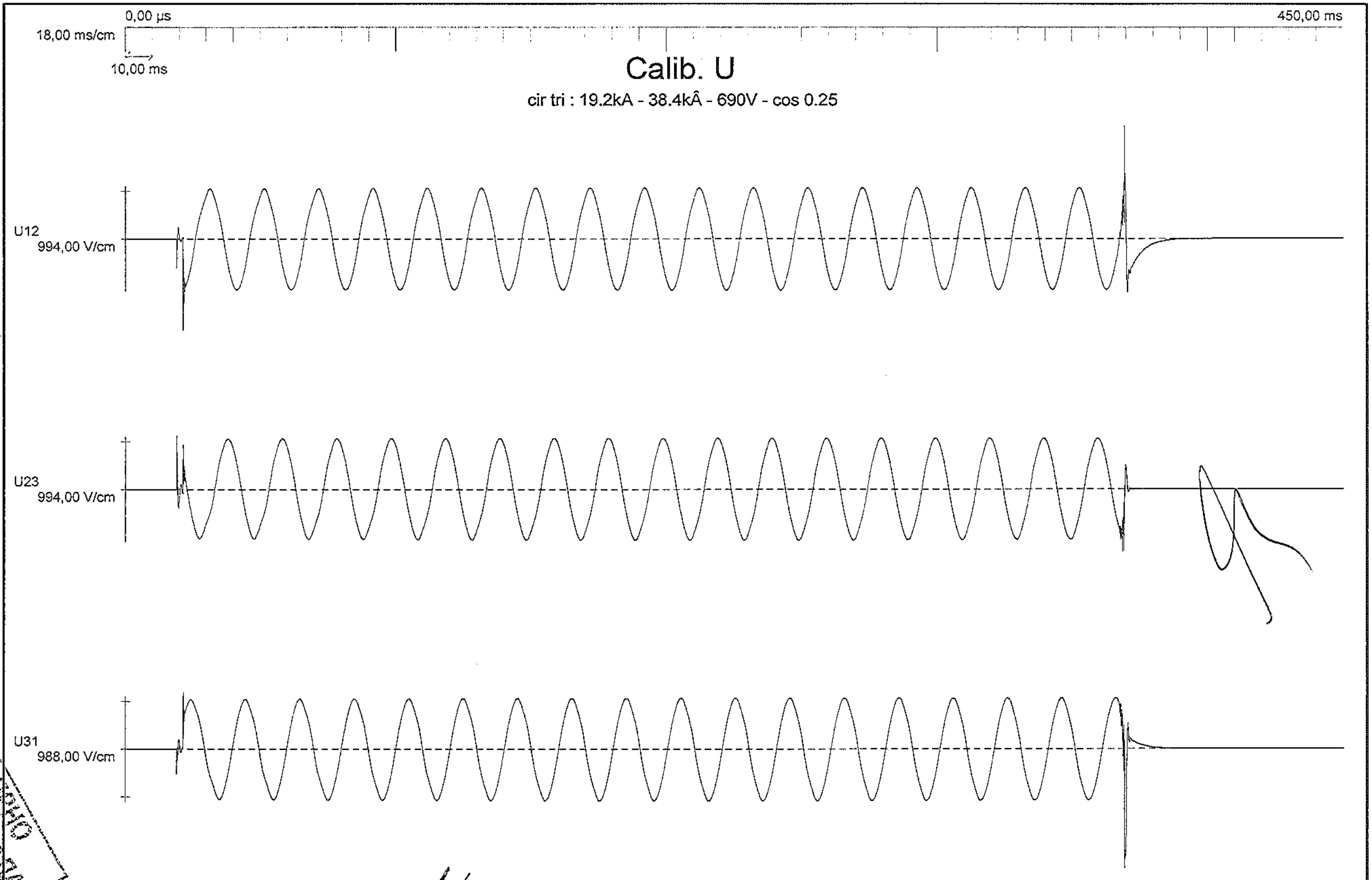
CATIE V.1.5.3.129 page 001

ВЯРНО С ОРИГИНАЛА

639

Calib. U

cir tri : 19.2kA - 38.4kÂ - 690V - cos 0.25



F01 20040096 - 0034

Effectué le 27/04/2004 07:39:52
Edité le 06/02/2006 15:48:31

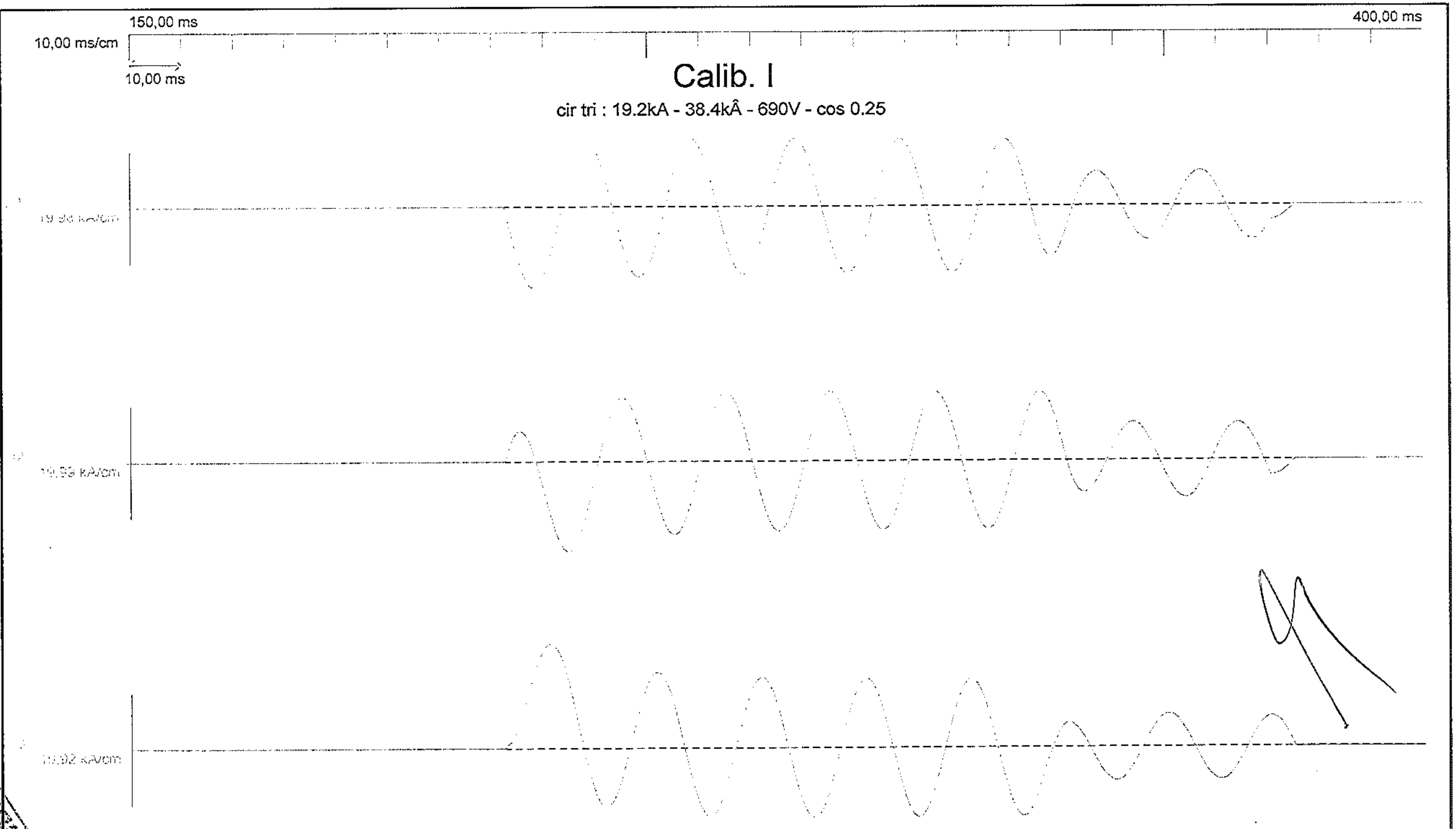
CATIE V.1.5.3.129 page 001

ВЯРНО С ОРИГИНАЛА

640

Calib. I

cir tri : 19.2kA - 38.4kÂ - 690V - cos 0.25



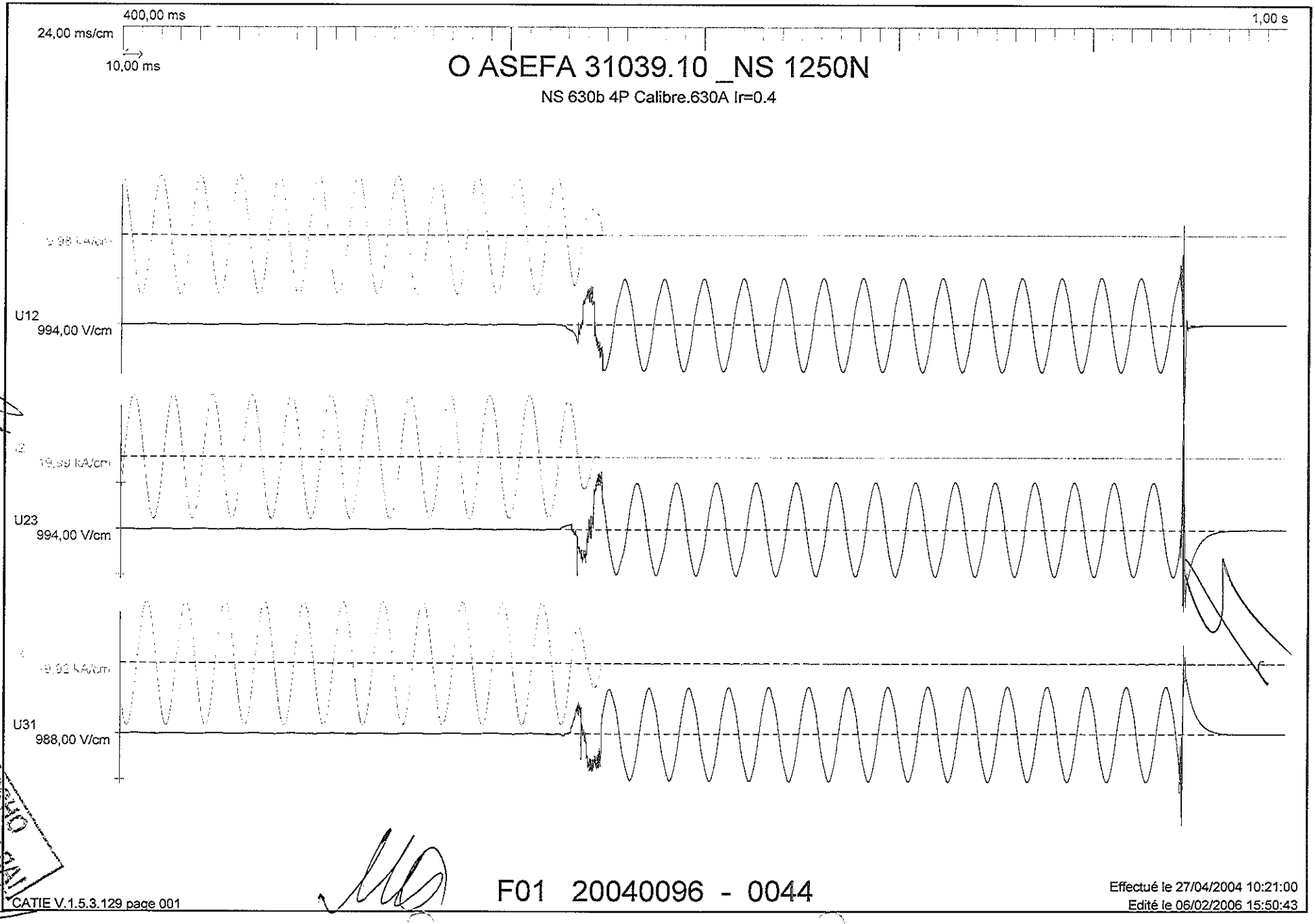
F01 20040096 - 0035

CATIE V.1.5.3.129 page 001

Effectué le 27/04/2004 07:47:11
Edité le 06/02/2006 15:49:07

ВЯРНО С ОРИГИНАЛА!

64



CATIE V.1.5.3.129 page 001

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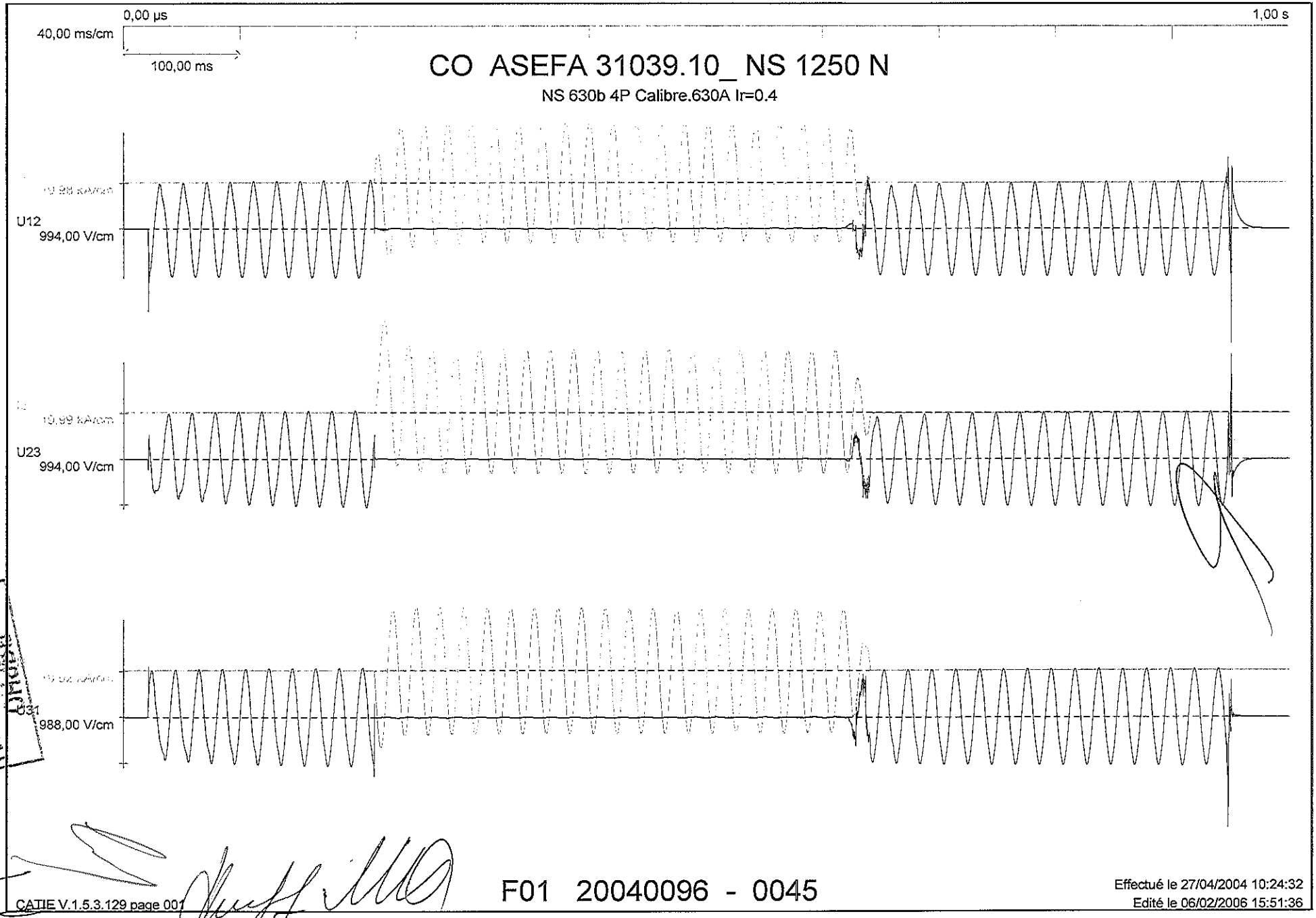
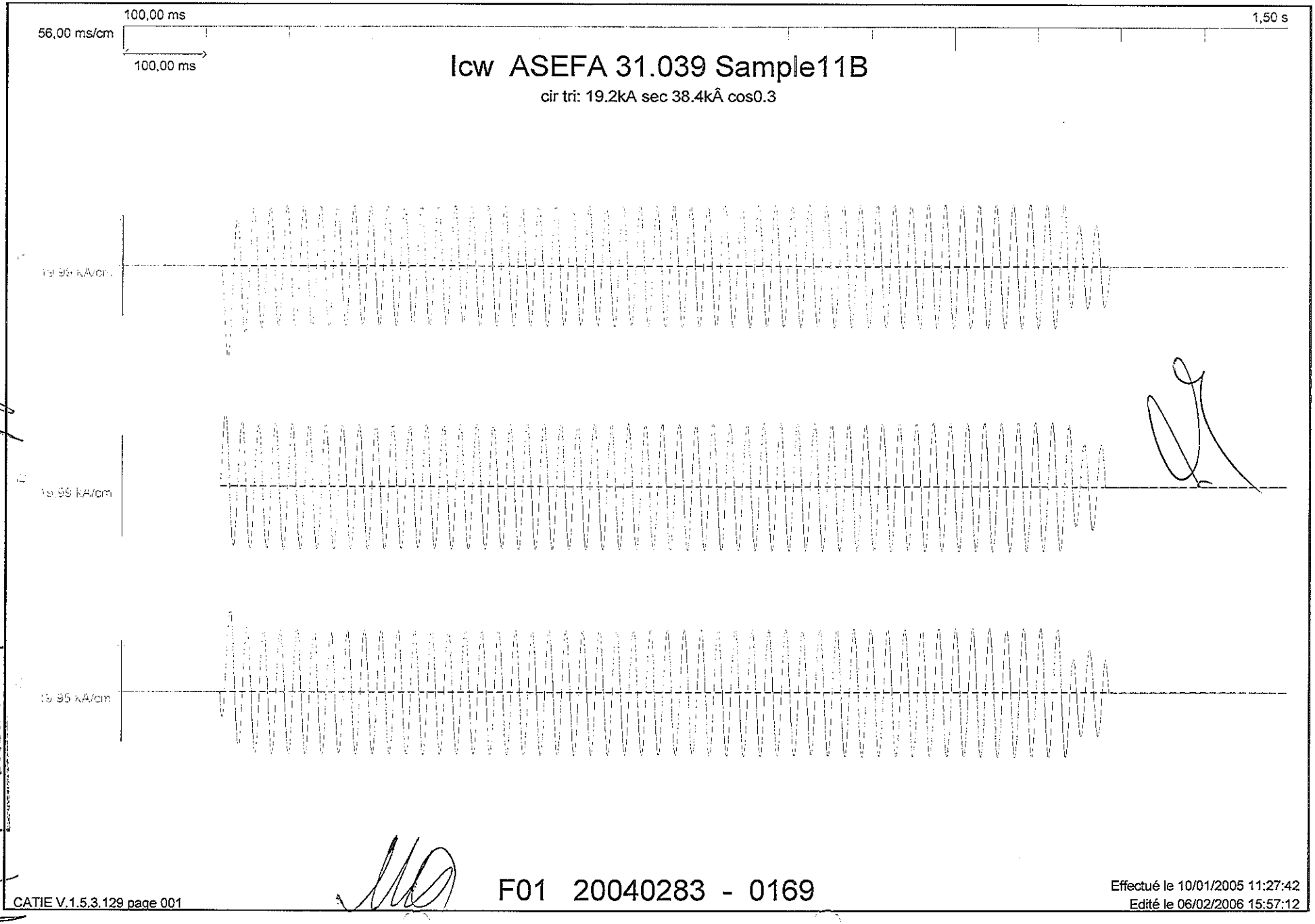
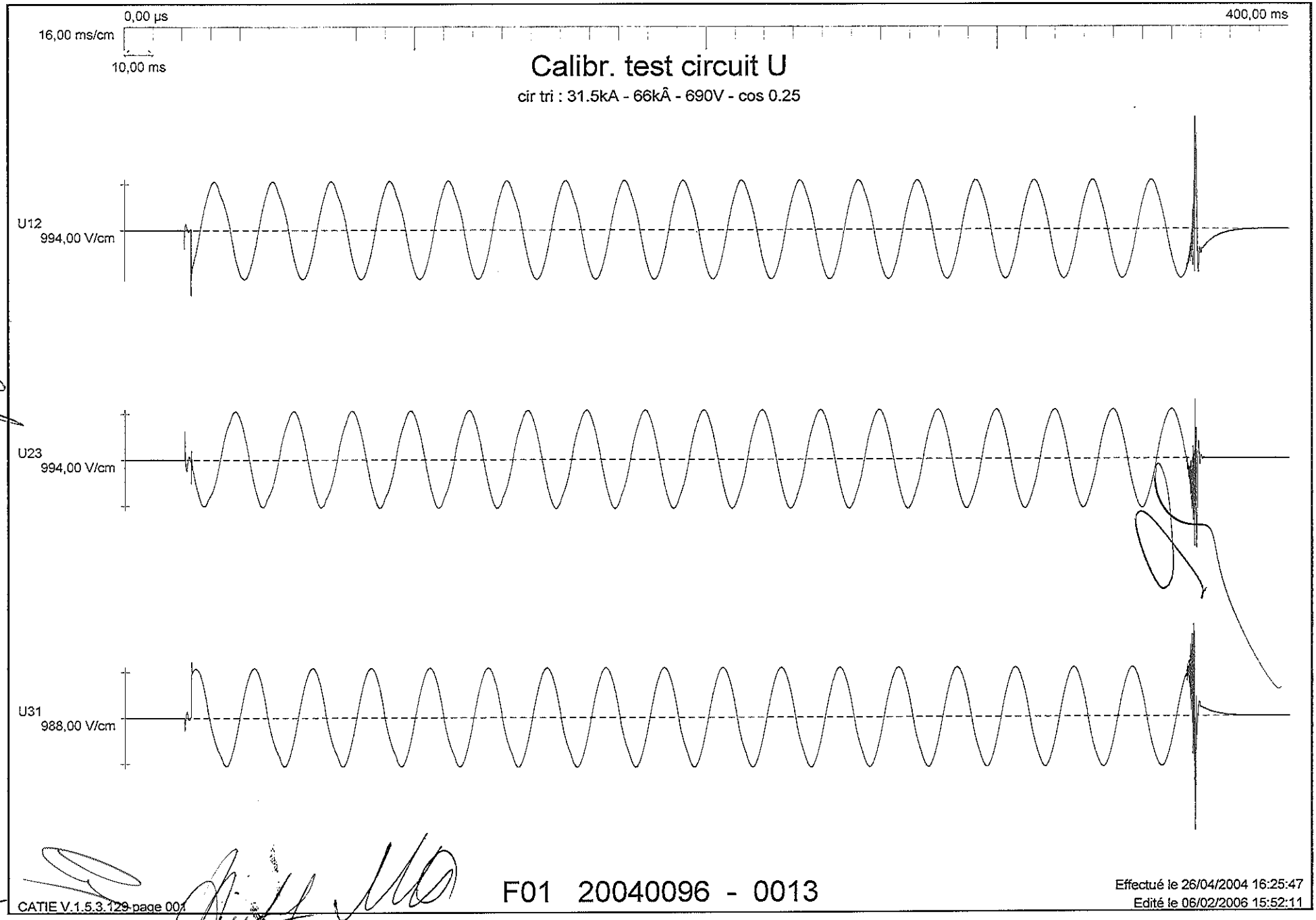
Edité le 06/02/2006 15:50:43

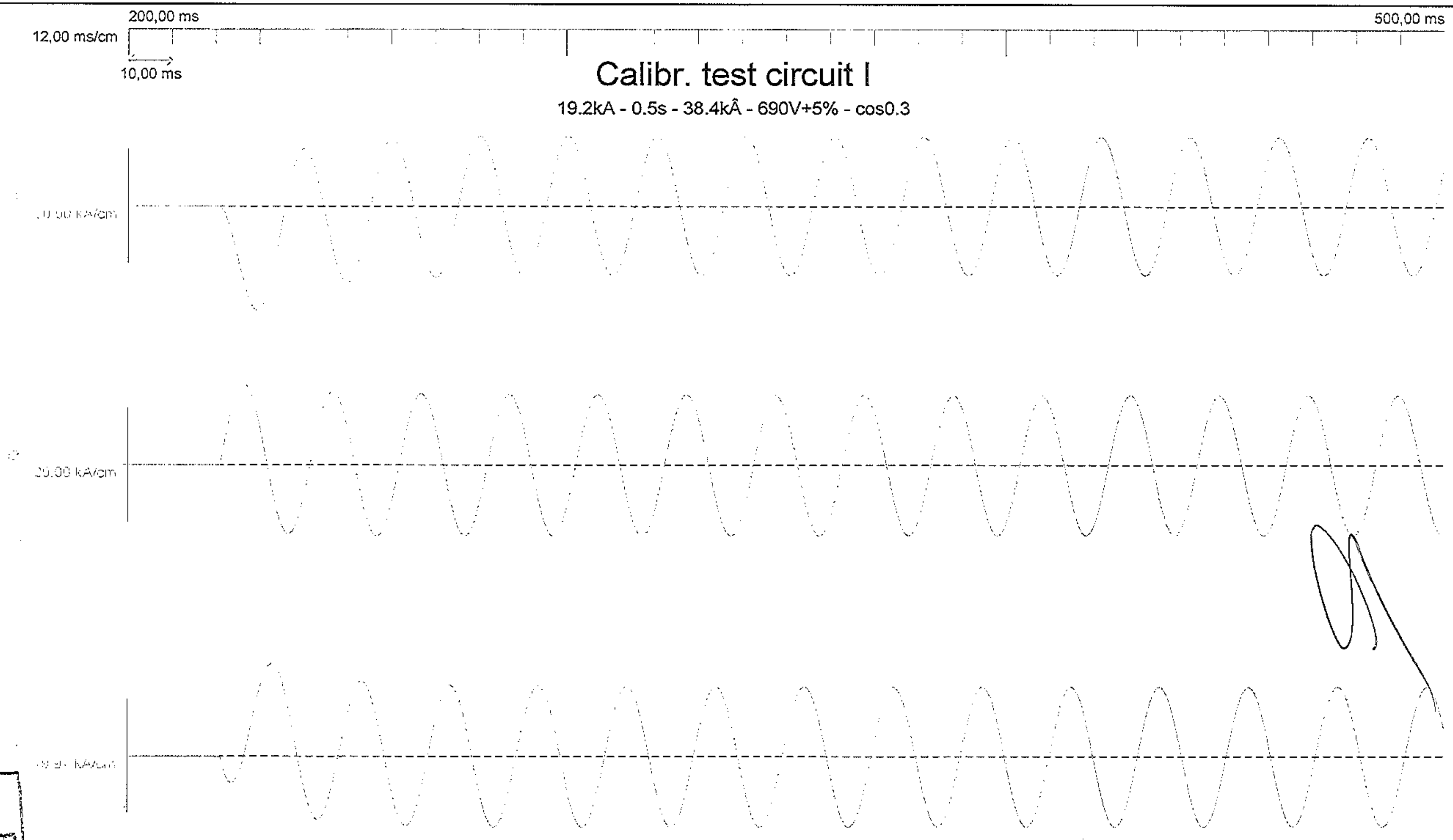

0,00 µs
1,00 s
40,00 ms/cm
100,00 ms
CO ASEFA 31039.10_ NS 1250 N
NS 630b 4P Calibre.630A Ir=0.4
U12
994,00 V/cm
U23
994,00 V/cm
988,00 V/cm
F01 20040096 - 0045
CATIE V.1.5.3.129 page 001
Effectué le 27/04/2004 10:24:32
Edité le 06/02/2006 15:51:36




0,00 µs
400,00 ms
16,00 ms/cm
10,00 ms
Calibr. test circuit U
cir tri : 31.5kA - 66kÂ - 690V - cos 0.25
U12
994,00 V/cm
U23
994,00 V/cm
U31
988,00 V/cm
F01 20040096 - 0013
Effectué le 26/04/2004 16:25:47
Edité le 06/02/2006 15:52:11
CATIE V.1.5.3.129 page 001

Calibr. test circuit I

19.2kA - 0.5s - 38.4kÂ - 690V+5% - cos0.3



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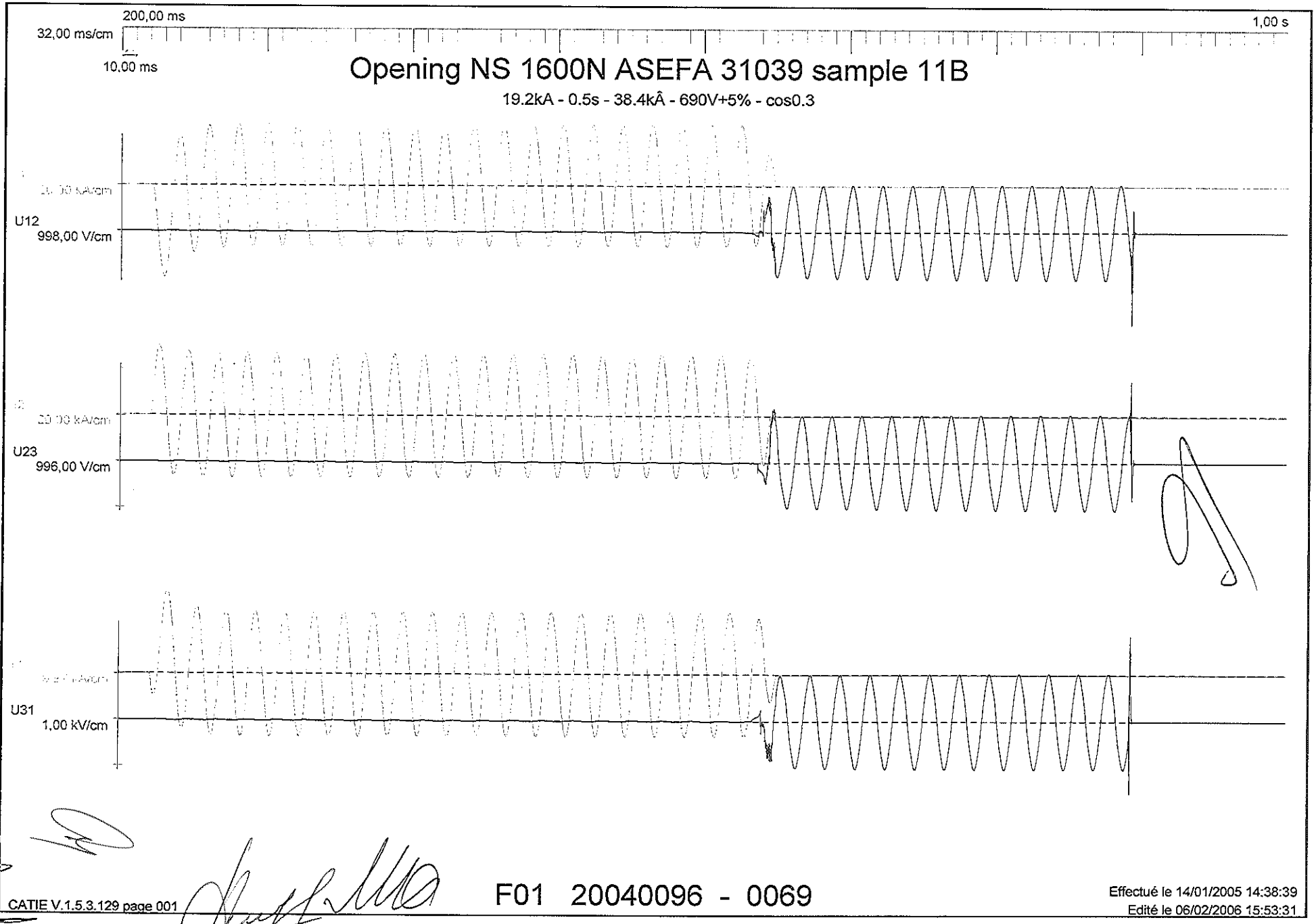
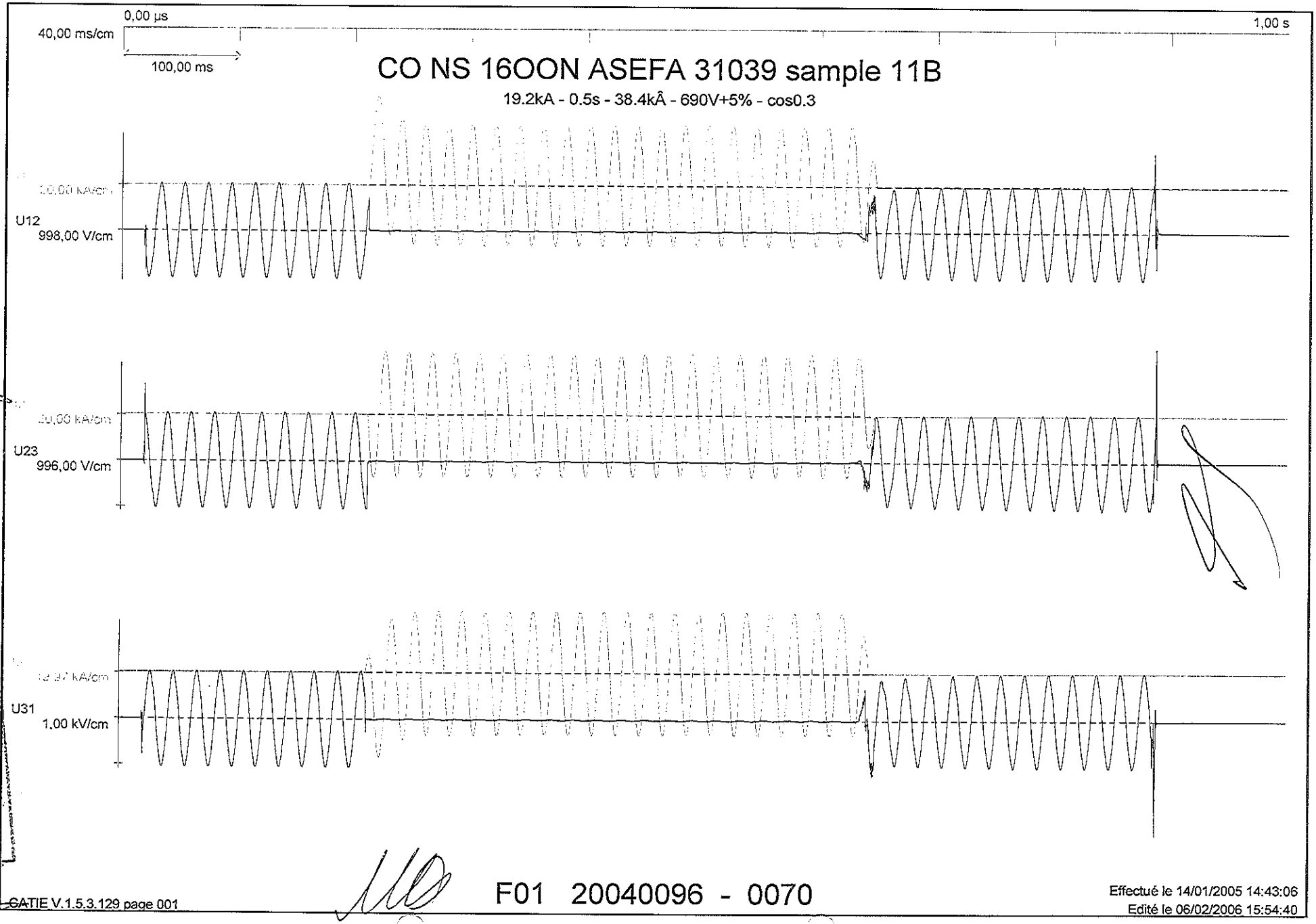
Effectué le 14/01/2005 13:32:54
Edité le 06/02/2006 15:52:42

ВЯРНО
С ОРИГИНАЛА

646





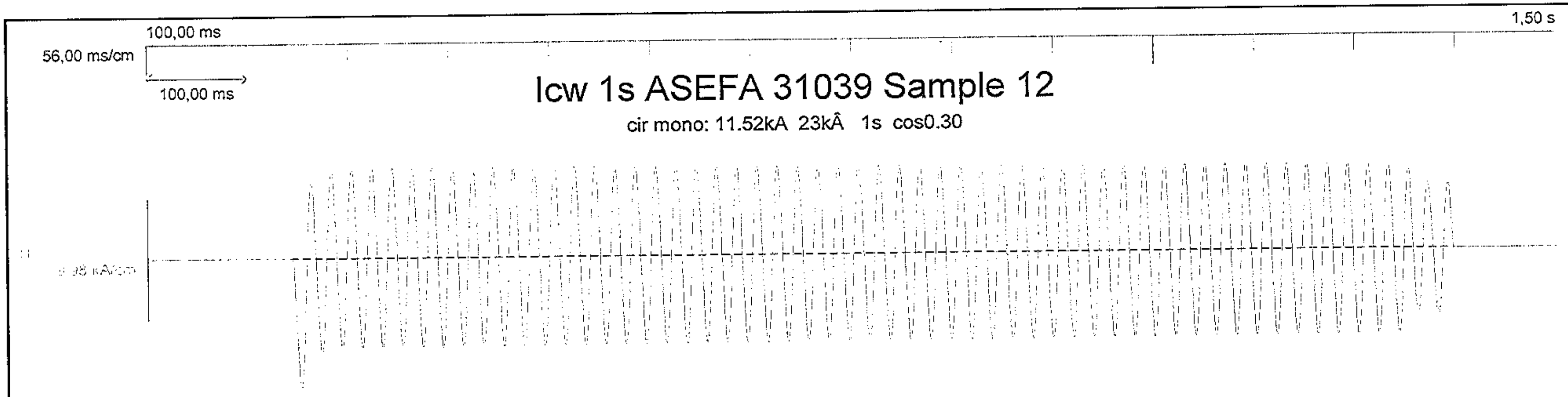
GATIE V.1.5.3.129 page 001

F01 20040096 - 0070

Effectué le 14/01/2005 14:43:06
Edité le 06/02/2006 15:54:40

Icw 1s ASEFA 31039 Sample 12

cir mono: 11.52kA 23kÂ 1s cos0.30



F01 20040283 - 0134

Effectué le 07/12/2004 15:14:02
Edité le 06/02/2006 15:58:17

GATIE V.1.5.3.129 page 001

ВЯРНО
С ОРИГИНАЛА!

649

50,00 ms

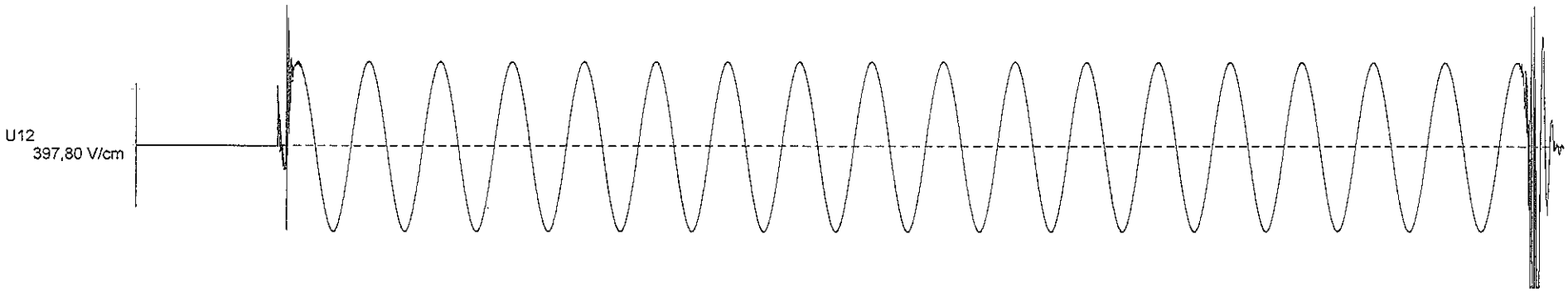
450,00 ms

16,00 ms/cm

10,00 ms

Calibr. test circuit U

Cir Mono-11.52kA-23kÂ-398V+5%-cos0.30



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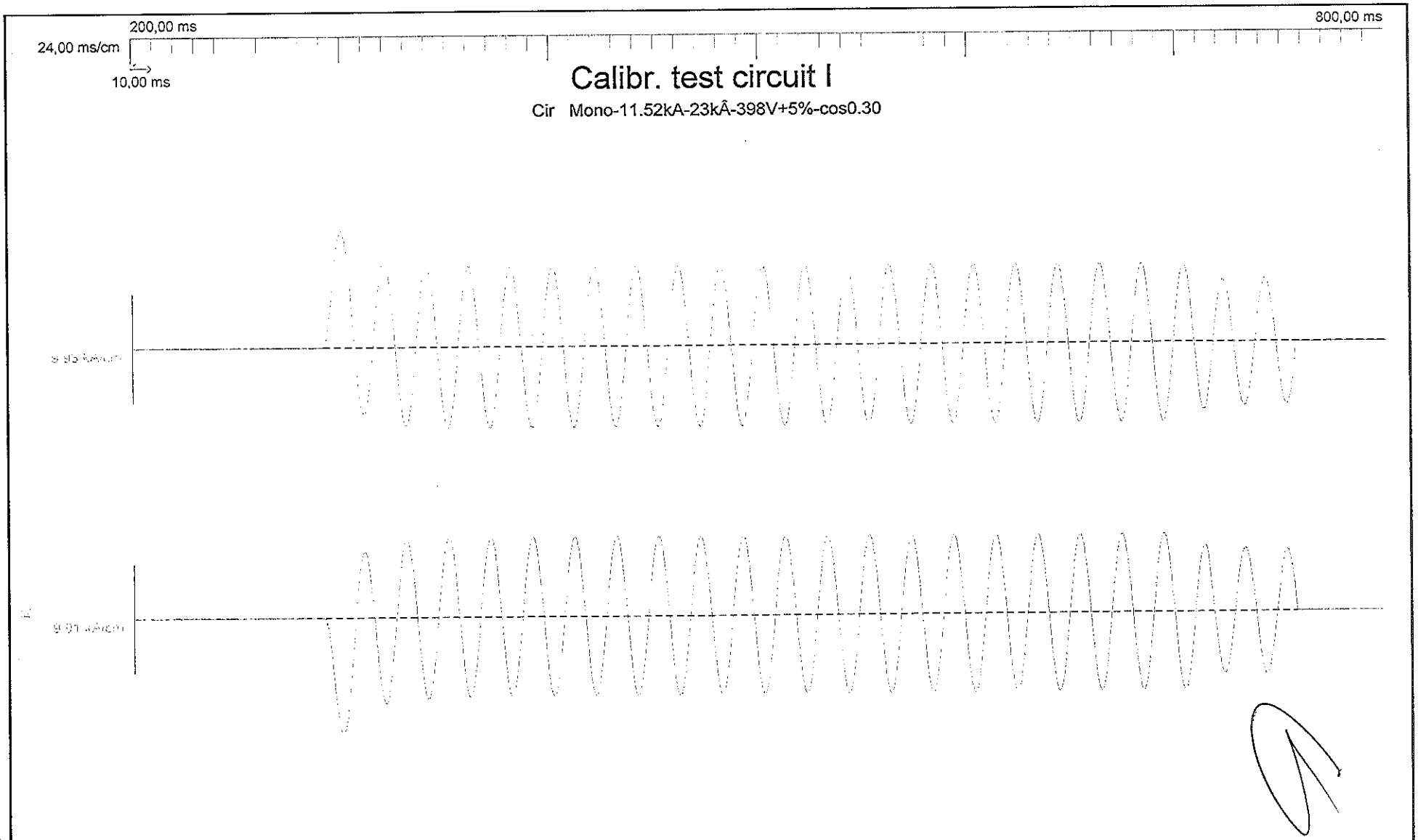
Edité le 06/02/2006 16:01:54



ВЯРНО С ОРИГИНАЛА

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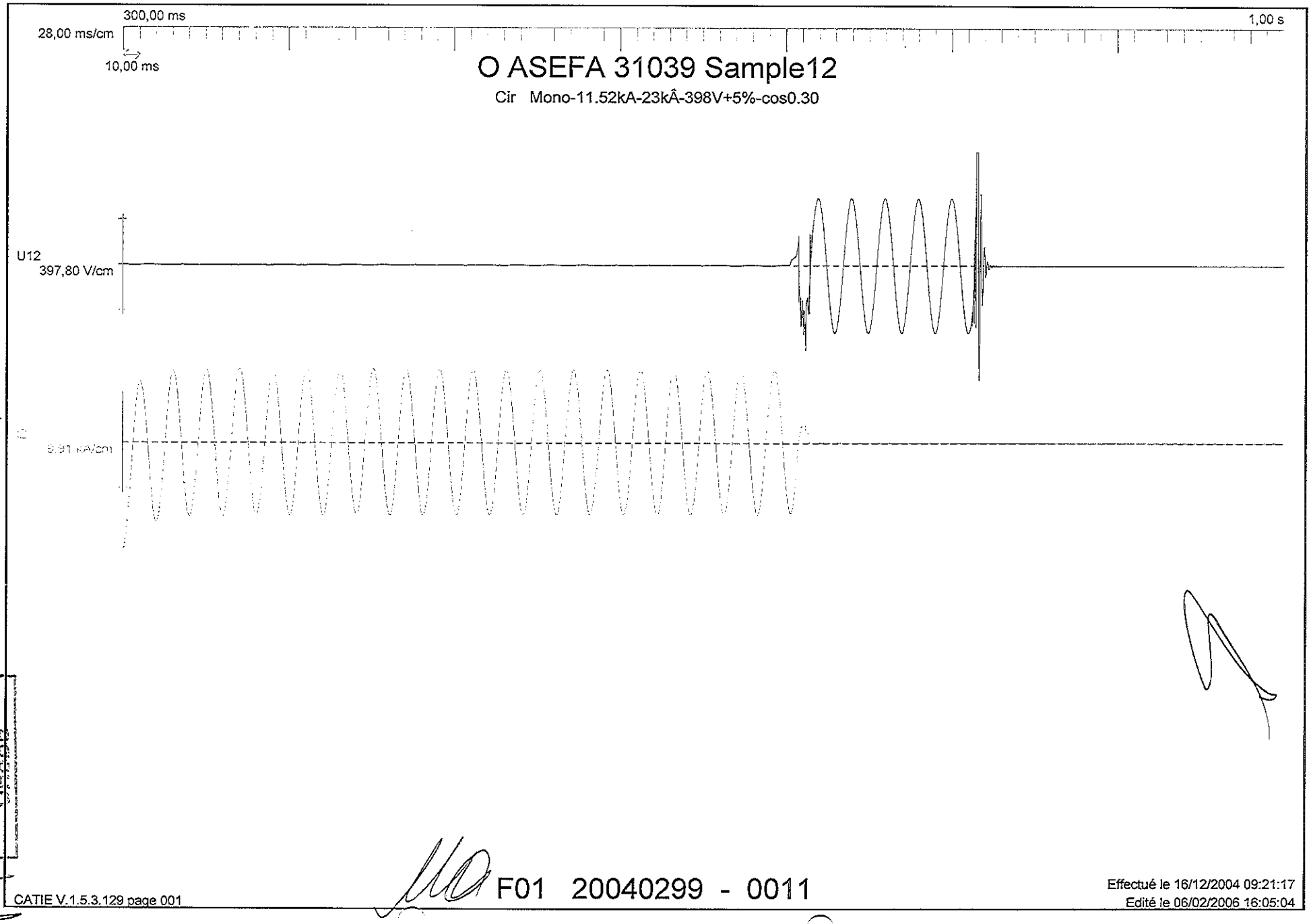
Effectué le 16/12/2004 08:17:53
Edité le 06/02/2006 16:03:20



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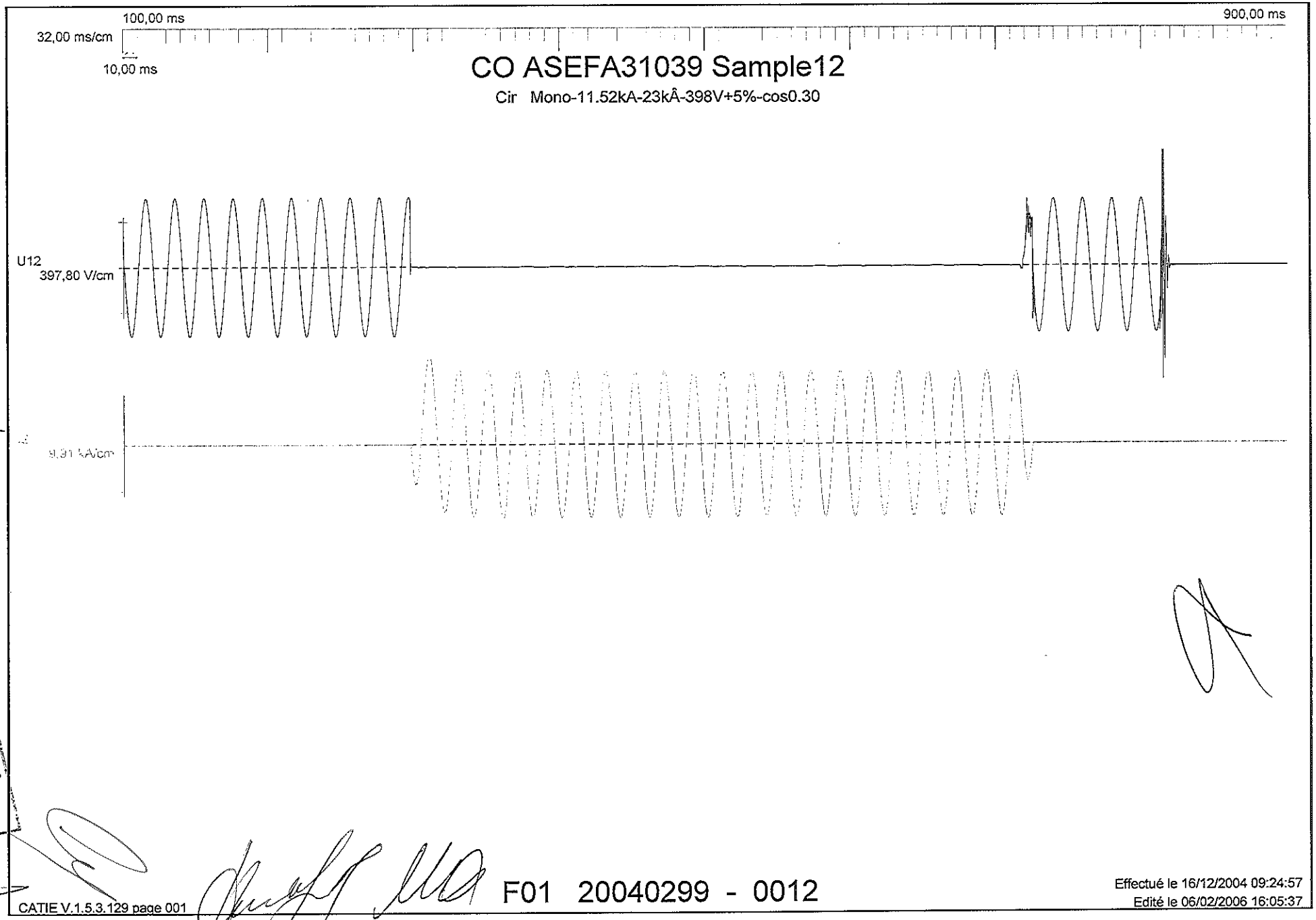
Edité le 06/02/2006 16:05:04



CATIE V.1.5.3.129 page 001

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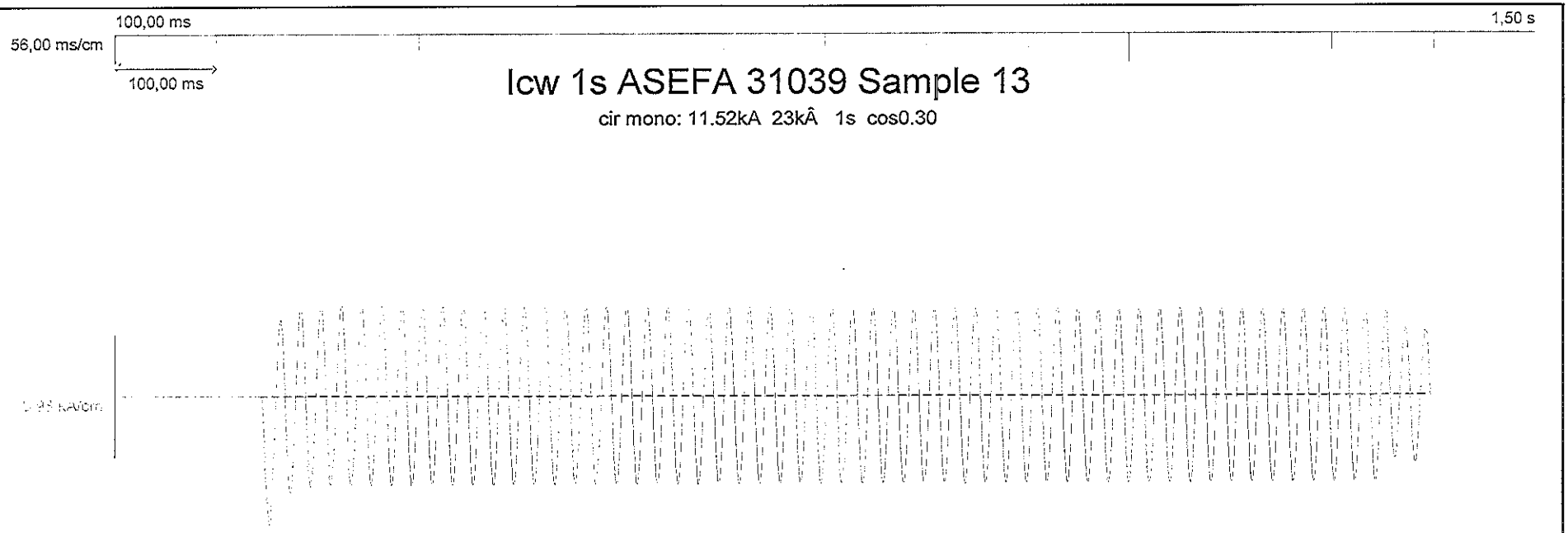
Effectué le 16/12/2004 09:24:57
Edité le 06/02/2006 16:05:37



Icw 1s ASEFA 31039 Sample 13

cir mono: 11.52kA 23kÂ 1s cos0.30

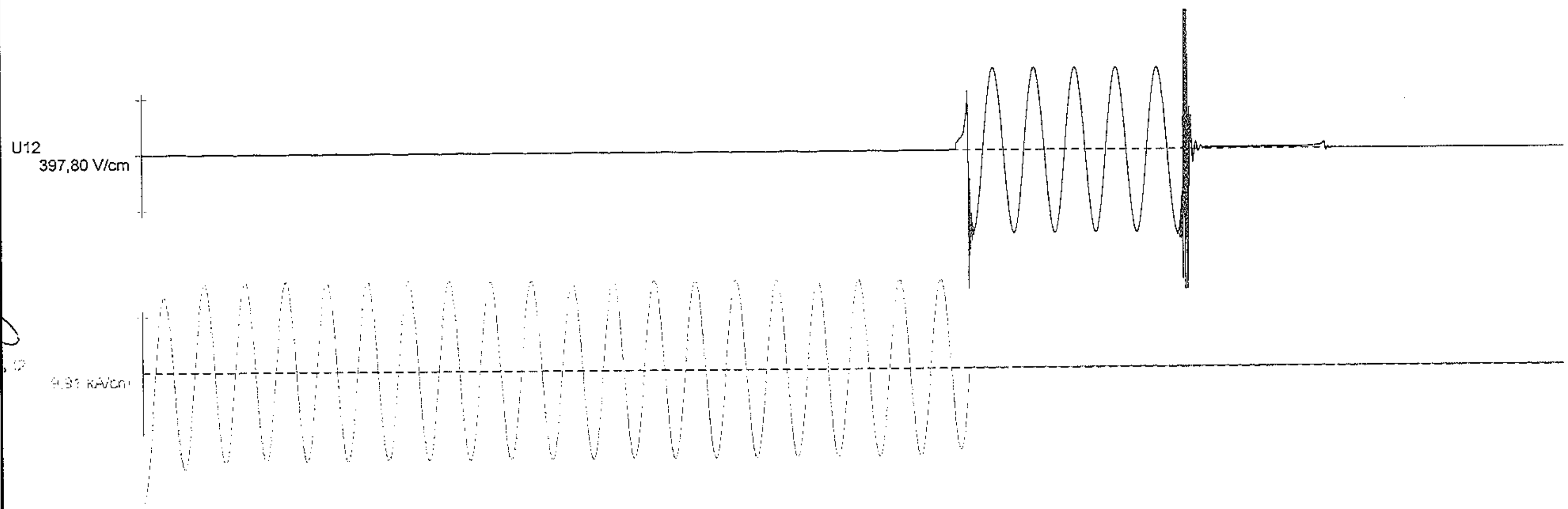
F01 20040283 - 0135

Effectué le 07/12/2004 15:54:20
Edité le 06/02/2006 15:59:02

300,00 ms
28,00 ms/cm
10,00 ms
1,00 s

O ASEFA 31039 Sample13

Cir Mono-11.52kA-23kÂ-398V+5%-cos0.30



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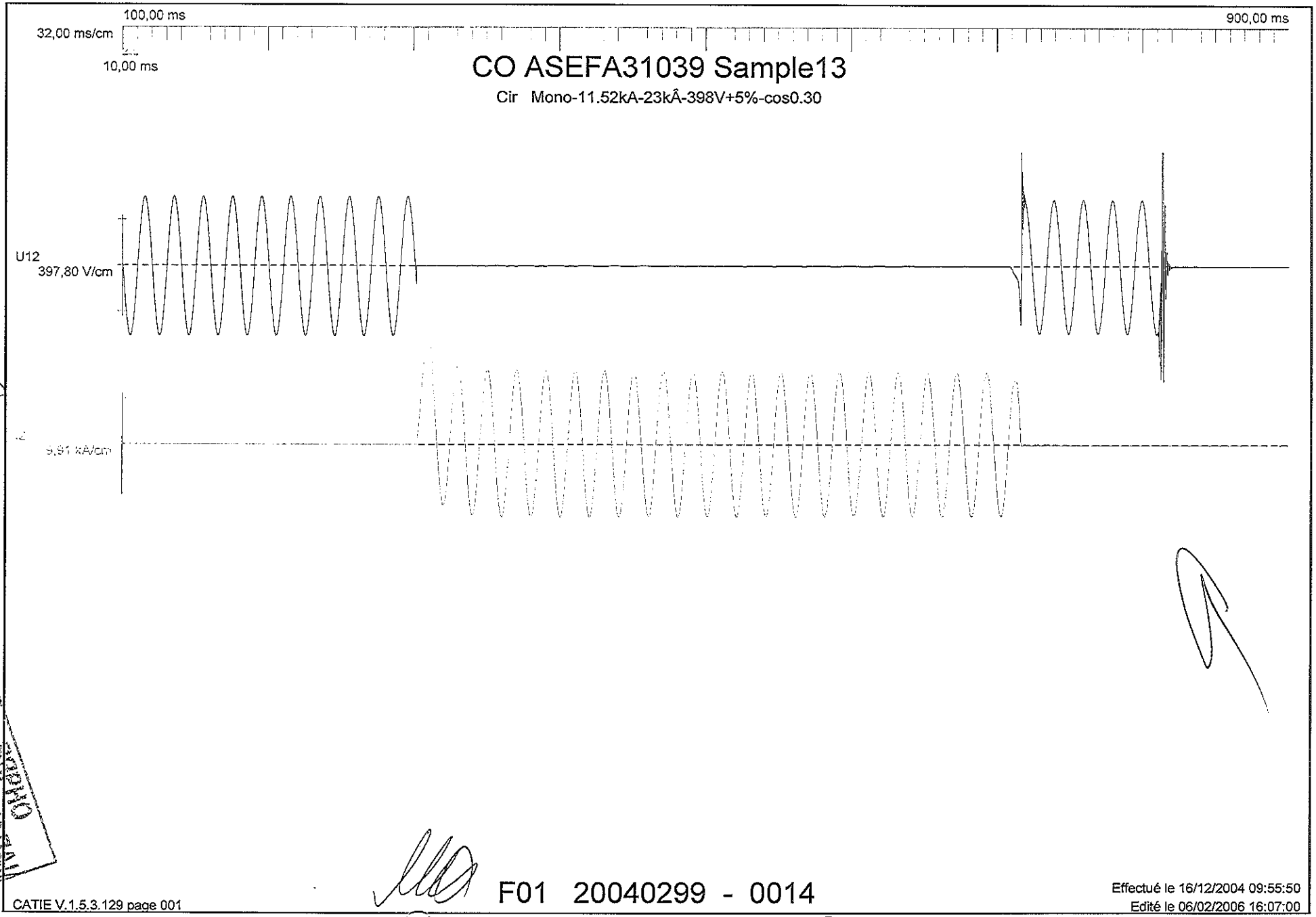
Edité le 06/02/2006 16:06:32



CATIE V.1.5.3.129 page 001

F01 20040299 - 0014

Effectué le 16/12/2004 09:55:50
Edité le 06/02/2006 16:07:00

Icw 1s ASEFA 31039 Sample 14

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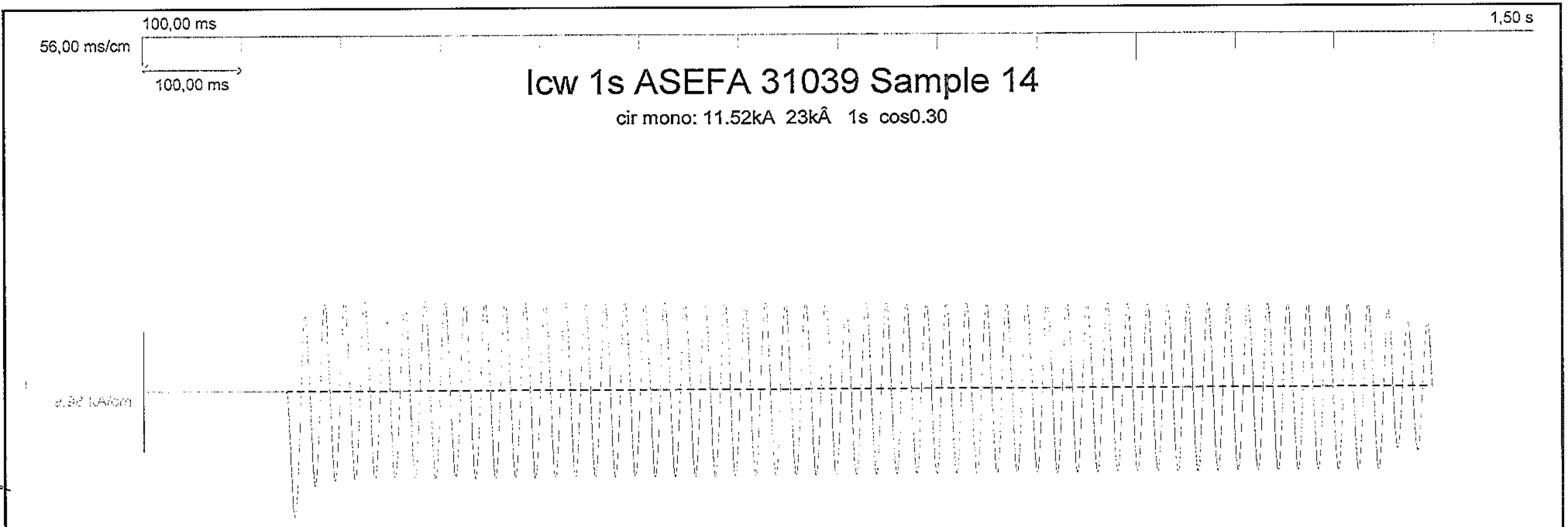
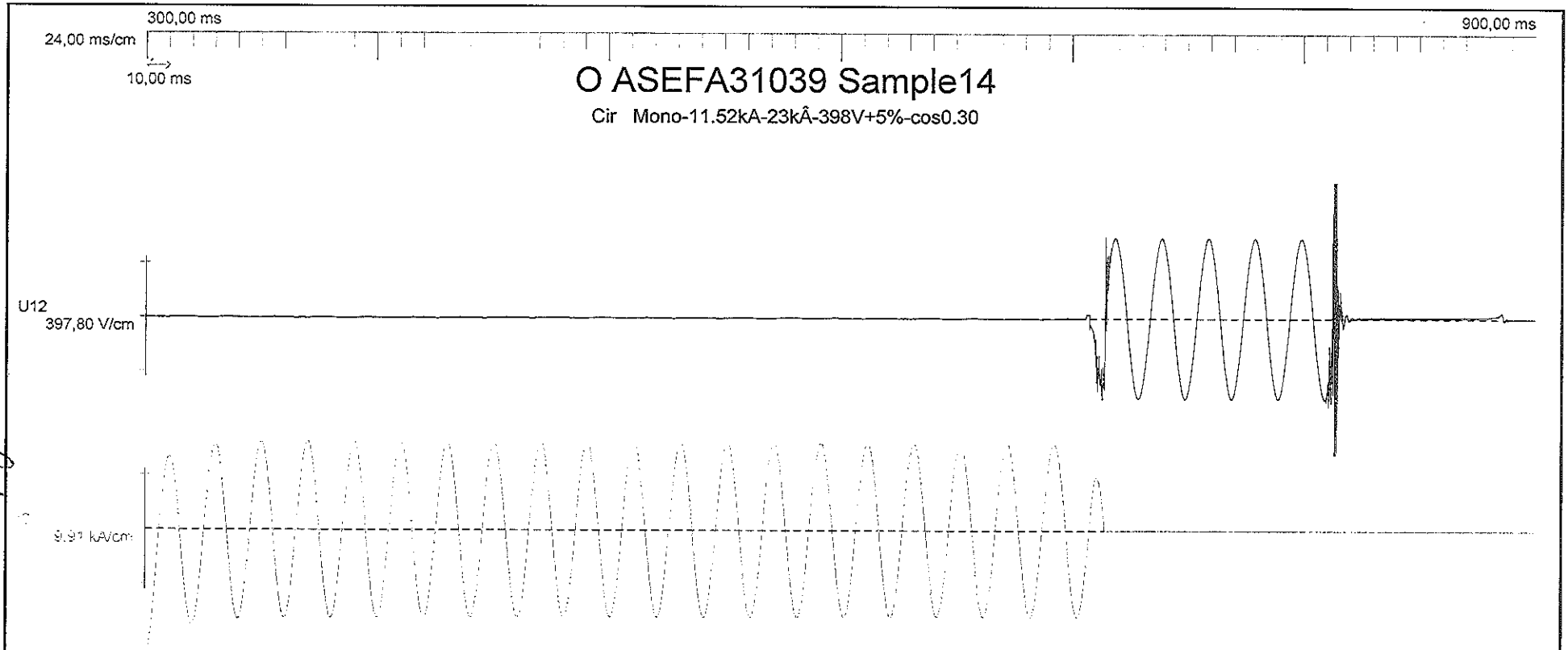


F01 20040283 - 0136

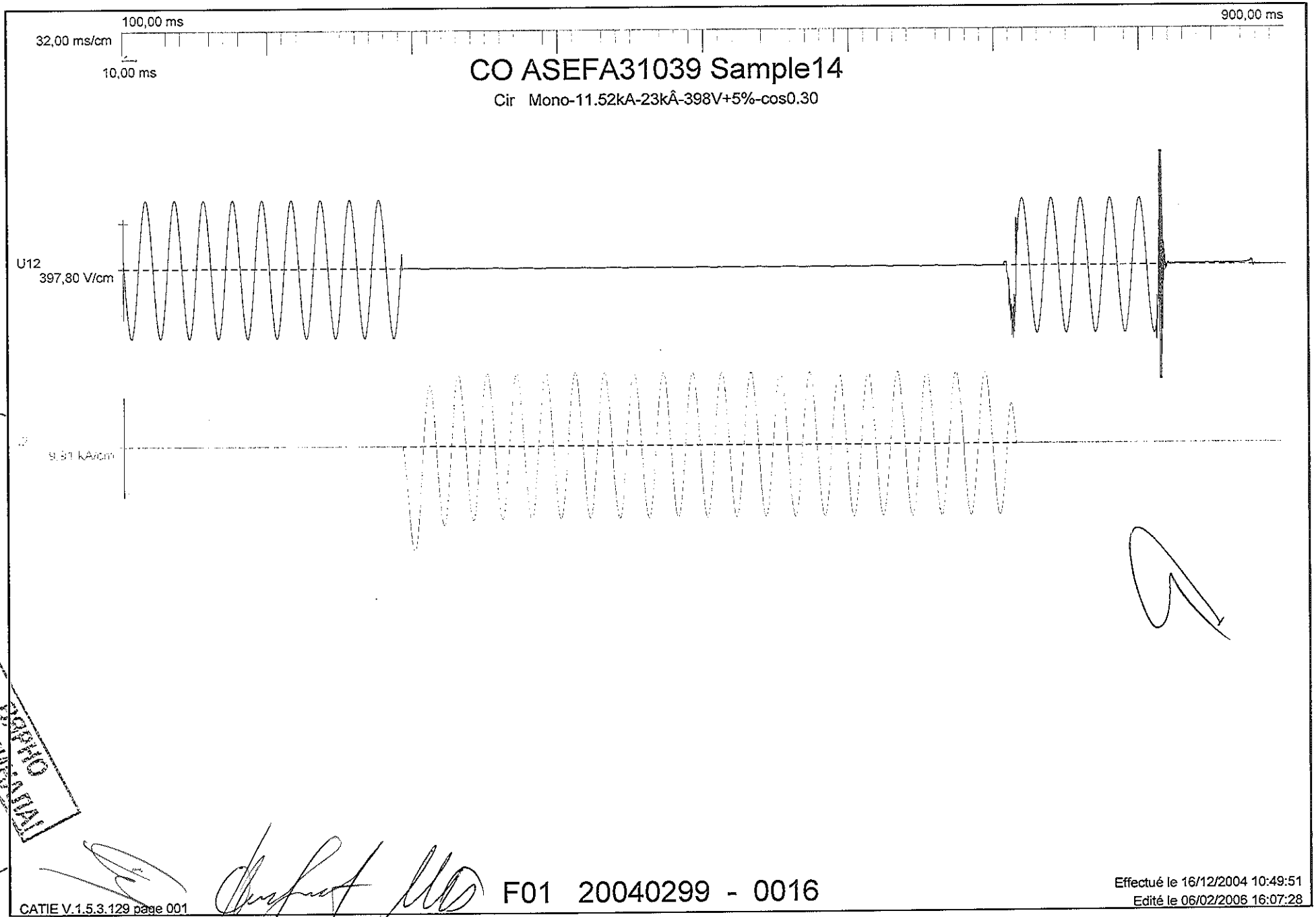
Effectué le 07/12/2004 16:51:01
Edité le 06/02/2006 15:59:35

657



F01 20040299 - 0015

Effectué le 16/12/2004 10:45:59
Edité le 06/02/2006 16:08:01



F01 20040299 - 0016

Effectué le 16/12/2004 10:49:51
Edité le 06/02/2006 16:07:28

asefa

Attestation de conformité / *attestation of conformity* n°05-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tétrapolaire ou tripolaire / *Four- or three-pole circuit-breaker*

références / *references* : COMPACT NS 630b à/*to* NS 1600, types N, H ou/*or* L
(avec déclencheur MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= sans, A, P ou H) / *with release MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= none, A, P or H)*

constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA

marque commerciale / *trade mark* : Merlin Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

IEC 60068.2.6, Fc test and guide (Vibrations sinusoïdales / *Sinusoidal vibrations*)

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*, (Ie)	: types N ou/or H : 630 A, 800 A, 1000 A, 1250 A ou/*or* 1600 A type L : 630 A, 800 A ou/*or* 1000 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz - 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: Vac
Catégorie d'utilisation /*Utilization category*	: A
Température de référence / *Reference temperature*	: °C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / Test report (s) : F03.2005.0223-00, F03.2005.0224-00

Cette attestation ne s'applique qu'à l'échantillon soumis à l'essai de type / *This attestation applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006-03-30

Le Président de l'ASEFA / *The chairman of ASEFA*,

M. BRÉNON

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
fax 01 40 95 88 18
e-mail : asefa@lcie.fr

ВЯРНО С ОРИГИНАЛА!

660

asefa

Certifié conforme à l'original
Le 30 mars 2006
Le secrétariat permanent de l'ASEFA
G.Gosse

Attestation de conformité / *attestation of conformity* n°05b-05BT

Annule et remplace l'attestation de conformité / *cancels and replaces attestation of conformity n° 05a-05BT*

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tétrapolaire ou tripolaire / *Four- or three-pole circuit-breaker*

références / *references* : COMPACT NS 630b à/*to* NS 1600, types N, H ou/*or* L
(avec déclencheur MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= sans, A, P ou H) / *with release MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= none, A, P or H)*
constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA
marque commerciale / *trade mark* : Merlin Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

IACS E10 test n°9 (Essais fonctionnels selon document technique/*Functional tests according to* DT-ABT-02.0-A), IEC 60068.2.1, test Ab (Essai au froid/*Cold test*) ; IEC 60068.2.2, test Bb (Essai de chaleur sèche/*Dry test*) ; IEC 60068.2.30, test Db (Essai cyclique de chaleur humide/*Damp heat cycling*) ; IEC 60068.2.52, test Kb (Brouillard salin/*Salt mist*) ; IEC 60947-1 table 12A

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current* : 630 A, 800 A, 1000 A, 1250 A, 1600 A pour/*for* types N, H
630 A, 800 A, 1000 A pour/*for* type L
Tension d'emploi / *Operational voltage* : 220 Vac à/*up to* 690 Vac
Pouvoir de coupure de service en court-circuit / *Service short-circuit capacity* : 150 kA – 415 V three-phase
: 130 kA – 440 V three-phase
: 100 kA – 525 V three-phase
: 60 kA – 303 V through the four pole and it's adjacent pole
: 90 kA – 240 V through the four pole and it's adjacent pole
: 78 kA – 254 V through the four pole and it's adjacent pole
Pouvoir ultime de coupure en court-circuit / *Ultimate short-circuit capacity* : 100% Ics
Fréquence / *Frequency* : 50 Hz / 60 Hz

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / Test report (s) : F03.2005.0216-00, F03.2005.0216-01, F03.2005.0216-02,

Cette attestation ne s'applique qu'à l'échantillon soumis à l'essai de type / *This attestation applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2005-11-04

Le Président de l'ASEFA / *The chairman of ASEFA*,

M. BRENON

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
fax 01 40 95 88 18
e-mail : asefa@icle.fr

ВЯРНО
С ОРИГИНАЛА

asefa

Attestation de conformité / *attestation of conformity* n°06-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89, boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tétrapolaire ou tripolaire / *Four- or three-pole circuit-breaker*

références / *references* : COMPACT NS 630b à/*to* NS 1600, types N, H ou/*or* L
(avec déclencheur MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= sans, A, P ou H) / *with release MICROLOGIC 2.0x, 5.0x ,6.0x ou 7.0x (x= none, A, P or H)*

constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA

marque commerciale / *trade mark* : Merlin Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

CEI / *IEC* 60092-504 (2001), IACS (1993), essais/*Tests* 11a et/*and* 11b
Inclinaisons statique (30°) et dynamique (±22,5°) / *Static (30°) and dynamic (±22,5°) inclinations tests*

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*, (Ie)	: types N ou/or H : 630 A, 800 A, 1000 A, 1250 A ou/*or* 1600 A type L : 630 A, 800 A ou/*or* 1000 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz - 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: Vac
Catégorie d'utilisation /*Utilization category*	: A
Température de référence / *Reference temperature*	: °C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / Test report (s) : EHL06058 (émis/*issued by* par SOPEMEA)

Cette attestation ne s'applique qu'à l'échantillon soumis à l'essai de type / *This attestation applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006-03-30

Le Président de l'ASEFA / *The chairman of ASEFA*,

M. BRENON

33, av du général leclerc
92260 Fontenay-aux-roses – France
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ВЯРНО С ОРИГИНАЛА

6062

asefa

Certificat de conformité / *certificate of conformity* n° 021-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89 boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tripolaire ou tétrapolaire, fixe / *Low-voltage fixed three- or four-pole circuit-breaker*

référence / *reference* : Compact NS 630b L, 800 L, 1000 L avec déclencheur électronique / *with electronic trip unit*, (Micrologic 2.0, 5.0, 6.0, 7.0, types A, P et/*and* H)

constructeur / *manufacturer* : SCHNEIDER ELECTRIC SA
marque commerciale / *trademark* : MERLIN GERIN

selon le(s) référentiel(s) / *according to standard(s)* :

CEI/IEC 60947-2 (2003-04) ed.3, sequences 2 et/*and* 3, § 8.3.4, § 8.3.5

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*, (Ie)	: 630 A à/to 1000 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to 525* Vac
Fréquence / *Frequency*	: 50 Hz - 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: 800 V
Courant thermique conventionnel / *Conventional thermal current*	: 630 A à/to 1000 A
Pouvoirs de coupure de service et ultime en court-circuit / *Service and ultimate short-circuit breaking capacities*, (Ics=Icu)	: 150 kA - 220 / 240 V triphasé / *three phase* 150 kA - 380 / 415 V triphasé / *three phase* 130 kA - 440 V triphasé / *three phase* 100 kA - 500 / 525 V triphasé / *three phase*
Catégorie d'utilisation /*Utilization category*	: A
Température de référence / *Reference temperature*	: 40°C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport (s) d'essai / *Test report (s)* : F01-2005-0570

Ce certificat ne s'applique qu'à l'échantillon soumis à l'essai de type / *This certificate applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006-02-28

Le Président de l'ASEFA / *The chairman of ASEFA,*

M. BRENON

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
fax 01 40 95 88 18
e-mail : asefa@lcie.fr

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS
Accréditation n° 5-0027
Portée communiquée sur demande
Scope on request

ВЯРНО С ОРИГИНАЛА

663

asefa

Certificat de conformité / *Certificate of conformity* n° 072-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89 boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tripolaire ou tétrapolaire, fixe ou débrochable / *Low-voltage fixed or withdrawable three-pole or four-pole circuit-breaker*

références / *references* : Compact NS 630b N, NS 800 N, NS 1000 N, NS 1250 N, NS 1600 N
NS 630b H, NS 800 H, NS 1000 H, NS 1250 H, NS 1600 H,
avec déclencheur électronique/*with electronic trip unit* (MICROLOGIC 2.0, 5.0, 6.0, 7.0, types A, P et/*and* H)

constructeur / *manufacturer* : Schneider Electric SA
marque commerciale / *trade mark* : Merlin-Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

IEC 60947-2, ed. 3 (04/2003), annex H (§ H2, H3 and H4)

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*	: 1600 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz / 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: 800 V
Tension de tenue aux chocs / *Impulse withstand voltage* (Uimp)	: 8 kV
Court-circuit sur un pôle séparément pour disjoncteur pour réseaux IT/ *Individual pole short-circuit for circuit-breaker for IT systems* (I_{IT})	: 19.2 kA / 440 Vac
Courant thermique conventionnel / *Conventional thermal current*	: 1600 A
Catégorie d'utilisation / *Utilization category*	: B
Température de référence / *Reference temperature*	: 40°C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport(s) d'essai / *Test report(s):* F01 2006-0106-00

Ce certificat ne s'applique qu'à l'échantillon soumis à l'essai de type / *This certificate applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006/08/28

p° Le Président de l'ASEFA / *The chairman of ASEFA,*

C. MENGUY

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
fax 01 40 95 88 18
e-mail : asefa@lcie.fr

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS
Accréditation n° 5-0037
Portée communiquée sur demande
Scope on request

ВЯРНО С ОРИГИНАЛА!

asefa

Certificat de conformité / *Certificate of conformity* n° 073-06BT

délivré à / *issued to* : SCHNEIDER ELECTRIC INDUSTRIES SAS
89 boulevard Franklin Roosevelt
92500 RUEIL MALMAISON
FRANCE

pour le matériel / *for the apparatus* : Disjoncteur basse tension tripolaire ou tétrapolaire, fixe ou débrochable / *Low-voltage fixed or withdrawable three-pole or four-pole circuit-breaker*

références / *references* : Compact NS 630b L, NS 800 L, NS 1000 L, avec déclencheur électronique / *with electronic trip unit*, (MICROLOGIC 2.0, 5.0, 6.0, 7.0, types A, P et/*and* H)

constructeur / *manufacturer* : Schneider Electric SA
marque commerciale / *trade mark* : Merlin-Gerin

selon le(s) référentiel(s) / *according to standard(s)* :

IEC 60947-2, ed. 3 (04/2003), annex H (§ H2, H3 and H4)

caractéristiques assignées / *rated characteristics* :

Courant d'emploi / *Operational current*, (Ie)	: 1000 A
Tension d'emploi / *Operational voltage*, (Ue)	: 220 Vac à/*up to* 690 Vac
Fréquence / *Frequency*	: 50 Hz / 60 Hz
Tension d'isolement / *Insulation voltage*, (Ui)	: 800 V
Tension de tenue aux chocs / *Impulse withstand voltage* (Uimp)	: 8 kV
Court-circuit sur un pôle séparément pour disjoncteur pour réseaux IT/ *Individual pole short-circuit for circuit-breaker for IT systems* (I_{IT})	: 12 kA / 525 Vac
Courant thermique conventionnel / *Conventional thermal current*	: 1000 A
Catégorie d'utilisation / *Utilization category*	: A
Température de référence / *Reference temperature*	: 40°C
Appareil apte au sectionnement / *Device suitable for isolation*	: oui / *yes*
Service / *Duty*	: Ininterrompu / *uninterrupted*

document(s) pris en compte (s) / *relevant document(s)* :

Rapport(s) d'essai / *Test report(s)* : F01 2006-0105-00

Ce certificat ne s'applique qu'à l'échantillon soumis à l'essai de type / *This certificate applies only to the sample submitted to the type test.*

Fontenay-aux-Roses,
Le / on : 2006/08/28

Le Président de l'ASEFA / *The chairman of ASEFA,*

C. MENGUY

33, av du général leclerc
92260 Fontenay-aux-roses – France
tél. 01 40 95 63 34
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e-mail : asefa@lcie.fr

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS
Accréditation n° 5-0037
Portée communiquée sur demande
Scope on request

ВЯРНО С ОРИГИНАЛА

665

IEC | IECEE CB SCHEME

Accréditation
N° 5-0014

cofrac
CERTIFICATION DE PRODUITS INDUSTRIELS

Ref. Certif. No.
FR 60052378A

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

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

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product Produit	Circuit-breakers
Name and address of the applicant Nom et adresse du demandeur	SCHNEIDER ELECTRIC INDUSTRIES SAS 89 boulevard Franklin Roosevelt - RUEIL-MALMAISON 92500 - FRANCE
Name and address of the manufacturer Nom et adresse du fabricant	See annex
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*	See annex
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	with electronic trip unit (MICROLOGIC 2.0, 5.0, 6.0, 7.0, types A, P, H)
Trademark (if any) Marque de fabrique (si elle existe)	MERLIN GERIN
Model / Type Ref. Ref. De type	Compact NS630b N, NS800 N, NS1000 N, NS1250 N, NS1600 N
Additional information (if necessary may also be reported on page 2) Informations complémentaires (si nécessaire, peuvent être indiquées sur la 2ème page)	Cancels and replaces CBTC n° FR 60052378A due to editorial correction of circuit-breaker's name in TR n° 60028009-523214NS See overleaf
	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 60947-2:2003 (ed. 3)
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	N° 60028009-523214NS/A1, 60052378-553314A

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

Laboratoire Central des Industries Électriques
33, av du Général Leclerc – BP 8
FR 92266 Fontenay-aux-Roses cedex
www.lcie.fr

Date: 2007-08-01

Signature: Rémi HANOT
Certification Manager

Issued 2007-02 - IMPRIMERIE HAUGUEL

ВЯРНО
С ОРИГИНАЛА

Annex 1 : List of Manufacturers and Factories

Annexe 1 : Liste des fabricants et des usines de fabrication

Circuit-breakers

Product Reference *Référence du produit*	Factory *Usine*	Manufacturer *Fabricant*
Compact NS 630b N	SCHNEIDER SHANGAI POWER DISTRIBUTION ELEC. APP. CO. LTD. 1625MO 833 Kang Qiao Lu Pu Dong - 201315 Shanghai - CHINA	SCHNEIDER ELECTRIC INDUSTRIES SAS 89 boulevard Franklin Roosevelt - RUEIL-MALMAISON 92500 - FRANCE
Compact NS 630b N	SCHNEIDER ELECTRIC INDUSTRIES ITALIA SPA 1701MO Corso Italia, 115 - 80020 CASAVATORE (NAPOLI) - ITALY	-

ВЯРНО С ОРИГИНАЛА

IEC | IECEE CB SCHEME

Ref. Certif. No.
FR 01-52378-A1

Low-voltage fixed three- or four-pole circuit-breakers

MERLIN GERIN : Compact NS630b N, NS800 N, NS1000 N, NS1250 N, NS1600 N

FACTORY	MANUFACTURER
SCHNEIDER ELECTRIC INDUSTRIES ITALIA SPA Corso Italia, 115 80020 CASAVATORE (NAPOLI) – ITALY	SCHNEIDER ELECTRIC INDUSTRIES SAS 43, 45 boulevard Franklin Roosevelt 92500 RUEIL-MALMAISON - FRANCE
SCHNEIDER SHANGAI POWER DISTRIBUTION ELEC. APP. CO. LTD. 833 Kang Qiao Lu- Pu Dong 201315 Shanghai - CHINA	SCHNEIDER ELECTRIC INDUSTRIES SAS 43, 45 boulevard Franklin Roosevelt 92500 RUEIL-MALMAISON - FRANCE

Rated Characteristics :

Operational current, (Ie)	630A up to 1600A
Operational voltage, (Ue)	220Vac up to 690Vac
Frequency	50/60Hz
Insulation voltage, (Ui)	800V
Impulse withstand voltage, (Uimp)	8 kV
Utilization category	B
Reference temperature	40°C
Device suitable for isolation	Yes
Duty	uninterrupted

Additional Information (if necessary)
Informations complémentaires (si nécessaire)

Laboratoire Central des Industries Électriques
33,av du Général Leclerc – BP 8
FR 92266 Fontenay-aux-Roses cedex
www.lcie.fr

Date: 2007-08-01

Signature: Rémi HANOT

ВЯРНО С ОРИГИНАЛА

668

Указание за транспортиране, съхранение на склад, монтаж и експолатация

На апаратура на Шнайдер Електрик от сериите:

Compact NS , Compact NSX, EasyPact CVS, EasyPact EZC, Interpact INS , Interpact INV както и допълнителни устройства и аксесоари за тях

Изброената по-горе апаратура трябва да се транспортира и съхранява в оригиналната опаковка при допустими температурни граници от -50°C до +85°C , и влажност до 85% при 55°C.
Монтажа да се извършва от правоспособни лица, като се спазват изизвканията за затягане на клемните съединения приложени в инструкциите към всеки апарат.
Само за Vigi модулите веднъж месечно трябва да се проверява нормалната работата на изделието чрез натискане на бутона Test.

Дата: 5 Юли 2015
София

Продуктов мениджър НН
Стилиян Янев

ШНАЙДЕР ЕЛЕКТРИК БЪЛГАРИЯ ЕООД София 2

ВЯРНО С ОРИГИНАЛА

София 1766
Бизнес Парк София
сграда 4, ет. 6
тел.: +359 2 932 93 20
факс: +359 2 932 93 93

www.schneider-electric.com

Център „Обслужване на клиенти"
тел.: 0700 110 20, +359 2 932 93 33
факс: +359 2 932 93 94
e-mail: csc@schneiderelectric.bg

Варна 9009
бул. Владислав Варненчик 258, Източна кула, ет. 4
Варна Тауърс
тел.: (052) 730 155
факс: (052) 730 166

Бургас 8000
ул. „Трайко Китанчев" 47
ет. 1, офис 3
тел./факс: +359 56 816 970

669