

ПАПКА 11

ПРИЛОЖЕНИЕ 10 Други документи за  
Позиция 1 и Позиция 2

ПРИЛОЖЕНИЕ 10.3 Автоматични  
прекъсвачи

Приложение 1

Приложение 2

Приложение 3

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10.3.1

# Compact NS

**Catalogue 2018**

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

ВЯРНО С  
ОРИГИНАЛА



Life Is On

**Schneider**  
Electric

[schneider-electric.com](http://schneider-electric.com)

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# Green Premium™

Endorsing eco-friendly products in the industry



## Green Premium™ Product

Green Premium is the only label that allows you to effectively develop and promote an environmental policy whilst preserving your business efficiency. This ecolabel guarantees compliance with up-to-date environmental regulations, but it does more than this.

Over 75% of  
Schneider Electric  
manufactured products  
have been awarded the  
Green Premium ecolabel



Discover what we  
mean by green ...

Check your products!

Schneider Electric's Green Premium ecolabel is committed to offering transparency, by disclosing extensive and reliable information related to the environmental impact of its products:

### RoHS

Schneider Electric products are subject to RoHS requirements at a worldwide level, even for the many products that are not required to comply with the terms of the regulation. Compliance certificates are available for products that fulfill the criteria of this European initiative, which aims to eliminate hazardous substances.

### REACH

Schneider Electric applies the strict REACH regulation on its products at a worldwide level, and discloses extensive information concerning the presence of SVHC (Substances of Very High Concern) in all of its products.

### PEP: Product Environmental Profile

Schneider Electric publishes complete set of environmental data, including carbon footprint and energy consumption data for each of the lifecycle phases on all of its products, in compliance with the ISO 14025 PEP ecopassport program. PEP is especially useful for monitoring, controlling, saving energy, and/or reducing carbon emissions.

### EoLI: End of Life Instructions

Available at the click of a button, these instructions provide:

- Recyclability rates for Schneider Electric products.
- Guidance to mitigate personnel hazards during the dismantling of products and before recycling operations.
- Parts identification for recycling or for selective treatment, to mitigate environmental hazards/incompatibility with standard recycling processes.

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## Compact NS Molded case circuit breakers

The world is becoming more electric, digitized and decarbonized. Our digitized LV products are powered by innovation at every level enabling enhanced connectivity, real-time operations and smart analytics. They bring improved safety and security. They help you to improve reliability and performance – and to prepare for the future of power distribution.

Compact is an integral part of EcoStruxure™ Power – Schneider's open, interoperable, IoT-enabled system architecture. Through this platform, we deliver enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers. We leverage technologies in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level. This includes Connected Products, Edge Control, and Apps, Analytics & Services. EcoStruxure has been deployed in 450,000+ installations, with the support of 9,000 system integrators, connecting over 1 billion devices.

The launch of Schneider Electric Compact NS in 1994 revolutionized the world of molded case circuit breakers and benefits from 60 years of experience and leadership in industrial circuit breakers.

As well as offering proven performance, flexibility and reliability, the Compact NS sets the standard in most applications: buildings, windturbine, solar, genset, data center, healthcare, marine and infrastructure and decrease your energy consumption thanks to very low power dissipation.

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

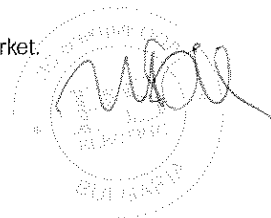
The communication option makes it possible to control power consumption, simplify maintenance and improve operating comfort.

A wide range of optimized auxiliaries and accessories is available to meet the needs of protection of AC installations, generator protection, motor protection, switch-disconnectors, source changeover switch function and specific offers available for DC applications up to 1000 V.

Today, the Compact NS range remains the international reference in the molded-case, circuit breaker market.

[schneider-electric.com/compactns](http://schneider-electric.com/compactns)

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# I design electrical solutions

More than 10 years of long-felt techniques and technologies ahead quite simple and convenient.



Win more projects and deliver the best solution for your customers

- Enhance power availability with total control of selectivity and power management with advanced trip unit.
- Optimize panel cost with cascading; the Compact NS technology covers all your needs from 630 to 3200 A, with a breaking capacity from 50 to 200 kA.
- Equipped with electronic control units, the Compact NS circuit breakers ensure protection and measurement of your electrical installation.
- Provide efficiency to your customer with small size and multi-ways of installation and highly immune protection system insensitive to disturbances (IEC 60947-2 Annex F).

### Standards

Compact NS circuit breakers and auxiliaries comply with:

- IEC/EN 60947-1: General rules
- IEC/EN 60947-2: Circuit-breakers
- IEC/EN 60947-3: Switch-disconnectors
- IEC/EN 60947-4-1: Contactors and motor-starters
- IEC/EN 60947-5-1: Control circuit devices

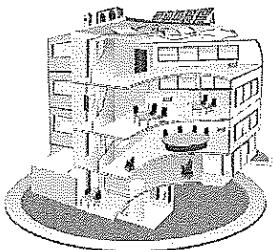
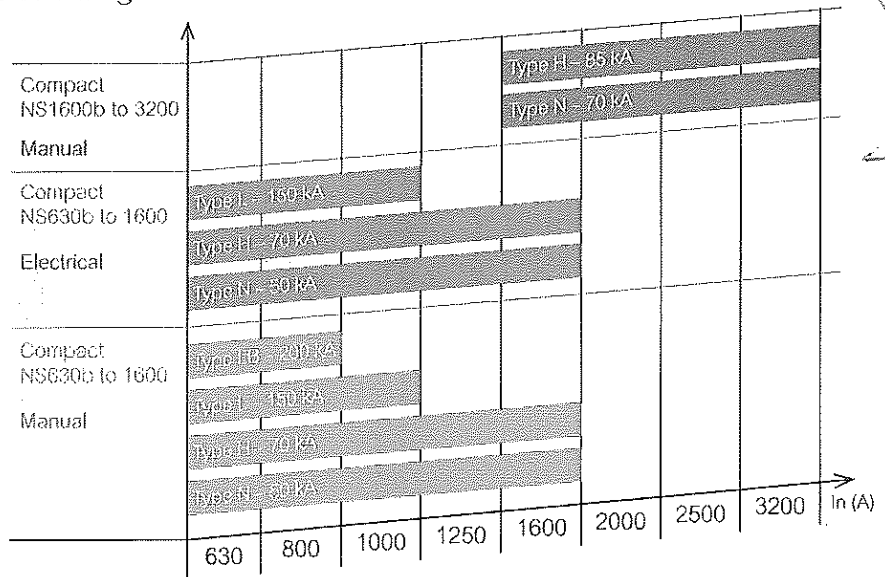
The Compact NS range covers all ratings from 630 to 3200 A

#### Compact NS630b to 1600

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

#### Compact NS1600b to 3200

- Compact NS from 1600 to 3200 A, fixed, front connection, with manual operating mechanism



The Masterpact and Compact range Circuit breakers, switch-disconnectors and source changeover are the best choice for all standards and specific applications.

> Masterpact MTZ



LVPED216026EN

> Compact NSXm/NSX



LVPED217032EN

> Compact INS/INV



LVPED213024EN

> Source-changeover systems



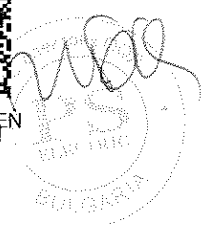
LVPED216026EN

> Complementary technical information



LVPED308006EN

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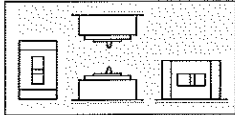




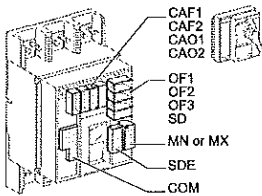
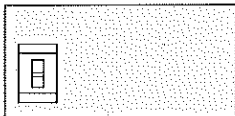
# I design and build machines

## Installation

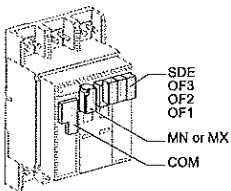
### Fixed device



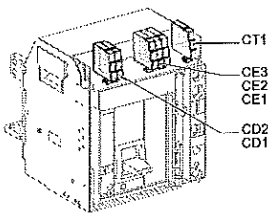
### Withdrawable device



Manually operated device.



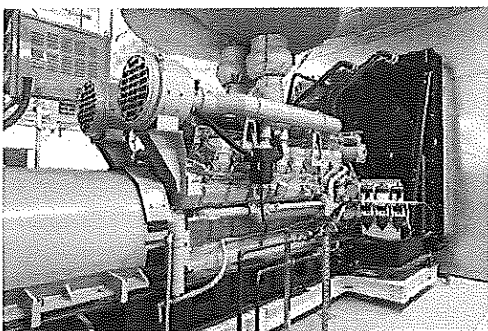
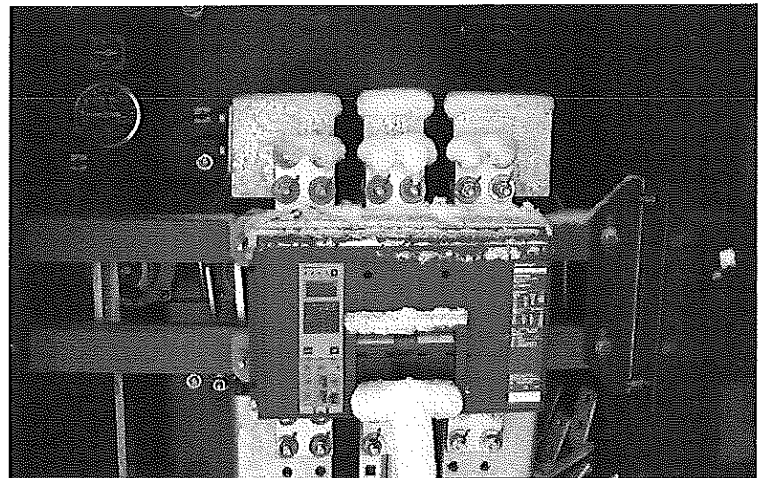
Electrically operated device.



Withdrawable device.

## Optimize your solution

- Minimum distances (safety clearance) between 2 circuit breakers are reduced thanks to the arc chute filters.
- A solution for all your applications:
  - generator protection
  - motor protection up to 750 kW with coordination between breakers and contactors (coordination type 1 and type 2)
  - source-changeover.
- Best combination of size (small depth), performance with no derating up to 65 °C (vertical connection) and flexible mounting options.
- Ensure continuity of service:
  - Total control of selectivity for the whole Schneider Electric circuit breakers range from moulded circuit breaker to air circuit breaker
  - High withstand of the devices to various environmental stresses.
- Bring flexibility to your installation:
  - Interchangeable trip units, standardized accessories, adjustable rating and scalable indication and control functions.



I operate my installation



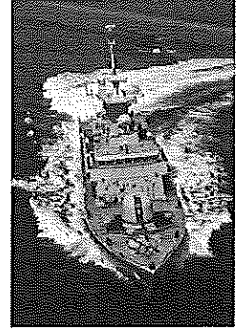
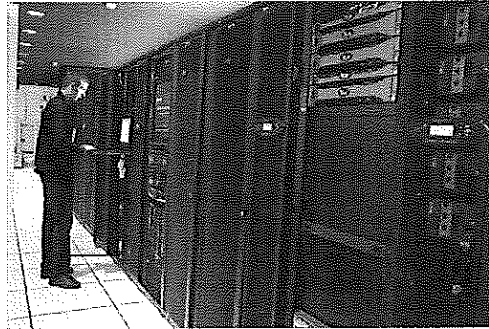
I operate and manage my installation

Ensure continuity of service

- Electrical energy is available, prevent nuisance power outages using total control of selectivity.

Monitor your power

- Power consumption is optimized with on-site, real-time monitoring and control, plus online energy management services
- Maintenance is simplified
- Installation is scalable
- Using Compact NS will decrease permanent consumption with lower power dissipations.



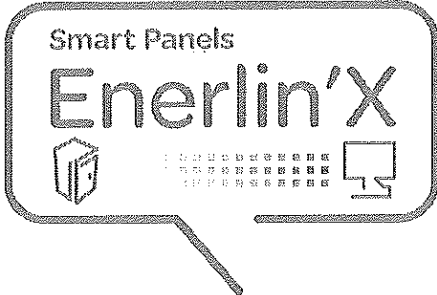
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Life Is On | Schneider Electric

Schneider Electric logo and a circular stamp with the word "BULGARIA" and a signature.



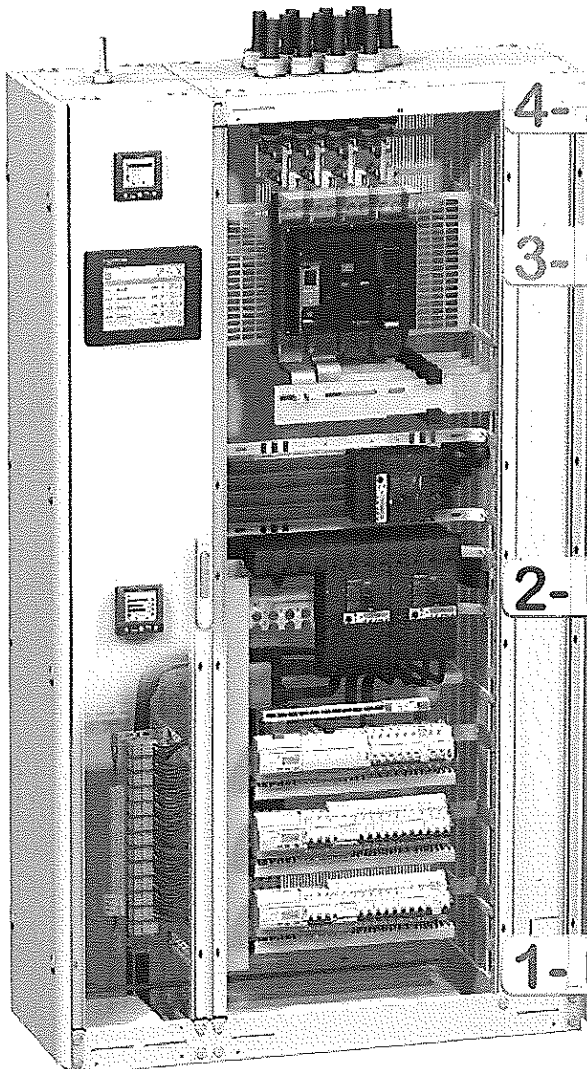
# Architecture overview



## Ethernet-ready Smart Panels

Ethernet-ready Smart Panels enable electrical distribution control and expertise. 'Protect' - 'Measure' - 'Connect' are the 3 pillars of their technology.

PS110232-004



### 4- Act

### 3- Connect

Give a voice to the panel

Safe Ethernet network data transmission is now part of the intrinsic design of protection and metering devices

### 2- Measure

Keeping a close eye on energy flows

The switchboard plays a key role in capturing building-related data, by gathering the critical protection and metering components.

### 1- Protect

Electrical protection is at the core of Smart Panel

Reliable and high-performance technology is present in every breaker and every residual current device.

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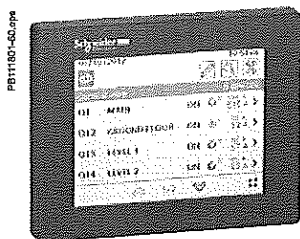
# Architecture overview

## Future savings, peace-of-mind

Access to Smart Panel status, values, is essential for taking advantages of monitoring and management services, locally or remotely.

### Act in small/medium buildings

with FDM 128, Com'X 510, Power View, EcoStruxure™ Facility Expert

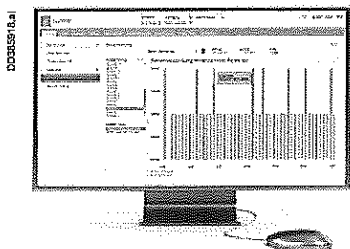


Electrical device monitoring and control with FDM 128, locally



#### Optimizing energy-efficiency

- Visualize, record energy consumption and WAGES.
- Comply with regulation .

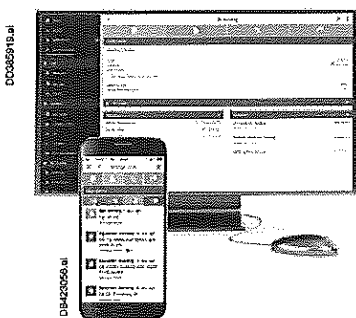


Com'X 510 web pages direct display, or Cloud based pages from other devices with Power View.



#### Improving continuity of service

- Get instant notifications
- Manage with assets-maintenance platform
- Get and analyze data for quick crisis-recovery



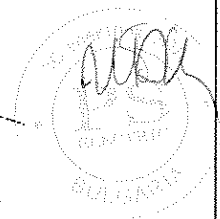
Distance management with EcoStruxure™ Facility Expert on Smartphone, tablet, PC



#### Increasing maintenance efficiency

- Operate preventive maintenance tools
- Follow maintenance & planning
- Provide business owner instant access to maintenance reports

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# Architecture overview

## Day-to-day energy management

### >> Power availability & quality, energy performance

For simply dealing with building user's needs and energy constraints.

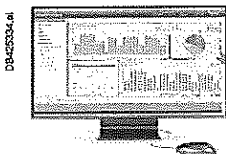
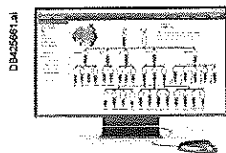
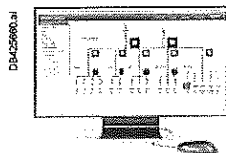
EcoStruxure™ Building Management provides electrical management, monitoring and energy accounting.

Energy decisions are often crucial in large critical buildings, they must be informed.

EcoStruxure™ Power Monitoring Expert (software for PC) collects Smart Panels values to provide expert analysis.

### Act in large non-critical buildings

with EcoStruxure™ Energy Expert



#### Managing equipment & key assets

- Check operating status, faults on custom on-line diagrams.



#### Monitoring electrical network

- Observe voltage disturbances, harmonics on graphics.
- Read power factor.

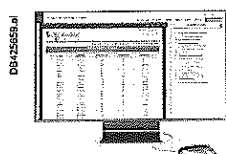
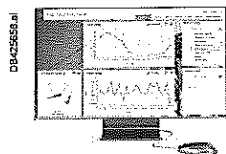


#### Accounting energy

- Record power meter data on dashboards.
- Allocate energy consumption with costs.
- Follow conservation goals.

### Act in large critical buildings

with EcoStruxure™ Power Monitoring Expert<sup>[1]</sup>



#### Analysing Power Events

- Speed up downtime crisis recovery
- Determine incident root cause, events sequence.
- Troubleshoot power quality issues.



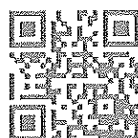
#### Monitoring Power quality

- Be alerted of equipment affected by power quality issue.
- Compare power quality against industry standards.
- Collect facts for future discussion with Utility.



#### Analysing Energy Performance

- Evaluate building energy saving performance;
- Identify underperforming loads;
- Analyze Energy Conservation Measures (ECMs) according ISO50001 program.



[1] EcoStruxure™ Power Monitoring Expert, <http://www.schneider-electric.com/demodemo.biz/web/>  
ID: demo & Password: demo

# General contents

## Compact NS630b to 3200

Functions and characteristics

Installation recommendations

Dimensions and connection

Electrical diagrams

Additional characteristics

Catalogue numbers and order form

A

B

C

D

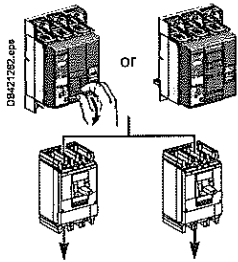
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F

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# Compact NS, even more applications...



## Protection of LV distribution systems

> pages A-2 et A-25

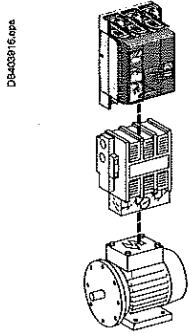
Protection for:

- 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.

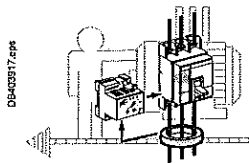


## Protection of motors feeders (AC 220/690 V)

> 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.



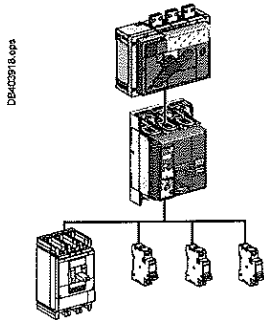
## Earth-leakage

> 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.

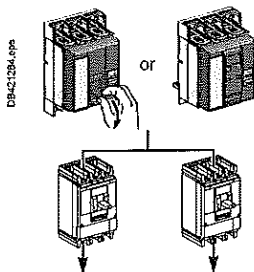


## Service connection

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.



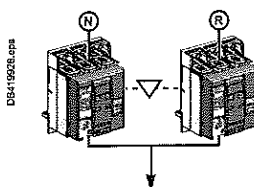
## Control and isolation using switch-disconnectors

> 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

To ensure a continuous supply of power, some electrical installations are connected to two power sources:

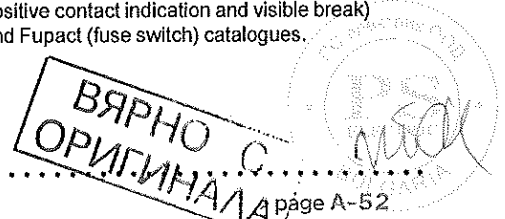
- a source "S1"
- a source "S2" to supply the installation when the source "S1" is not available.

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:

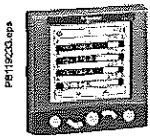
- manual with mechanical device interlocking
- remote controlled with mechanical and/or electrical device interlocking
- automatic by adding a controller to manage switching from one source to the other on the basis of external parameters.

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

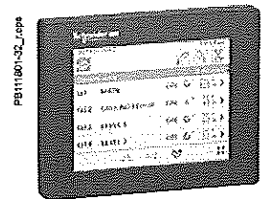


They can be combined with the FDM121 switchboard display unit to provide all the functions of a Power Meter as well as operating assistance.

Power Meter functions > page A-18



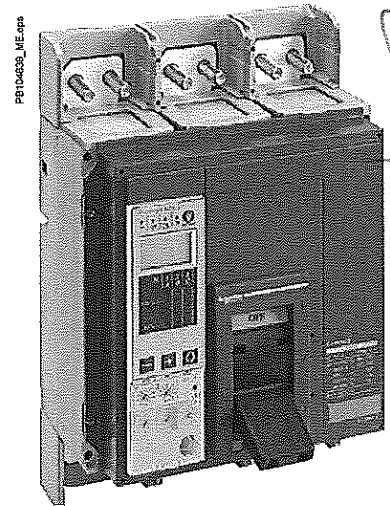
All Compact circuit breakers are equipped with a Micrologic control unit that can be changed on site. Control units are designed to protect Power circuits and loads. Alarms may be programmed for remote indications. In addition to protection functions, Micrologic S/A/E/P control units offer all the functions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



Operating-assistance functions > page A-20



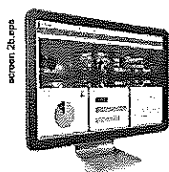
Integration of measurement functions provides operators with operating assistance functions including alarms tripped by user-selected measurement values, time-stamped event tables and histories, and maintenance indicators.



Switchboard-display unit functions > page A-21

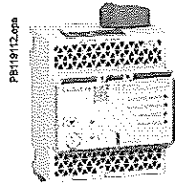
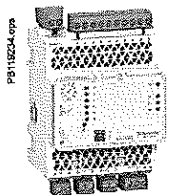
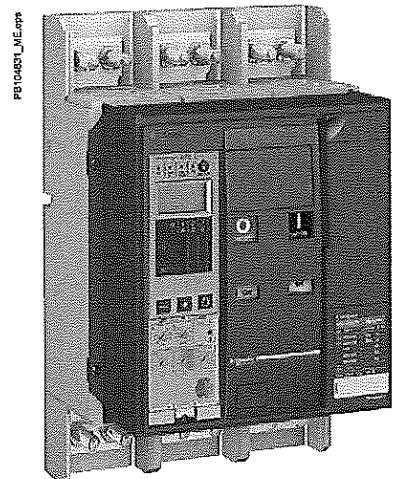
The main measurements can be read on the built-in screen of Micrologic 2 / 5 / 6 / 7 trip units. They can also be displayed on the FDM switchboard display unit along with pop-up windows signalling the main alarms.

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.
- Ecoreach software.




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# Introduction


## General characteristics for NS630b to 3200 range

DB421307.rps

Compact NS1600 H 		
Ui 800 V	Uimp 8 kV	
Ue (V)	Icu(kA)	Ics(kA)
220/240 a	70	37
380/415 a	70	37
440 a	65	37
500/525 a	50	30
660/690 a	42	22
Icw 19.2kA / 1s cat B		
50/60Hz IEC 60947-2		


Electrically operated Compact NS circuit breaker.

DB421307.rps

Compact NS1600 H 		
Ui 800 V	Uimp 8 kV	
Ue (V)	Icu(kA)	Ics(kA)
220/240 a	85	37
380/415 a	70	37
440 a	65	37
500/525 a	50	30
660/690 a	42	22
Icw 19.2kA / 1s cat B		
50/60Hz IEC 60947-2		

Manually operated Compact NS circuit breaker.

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

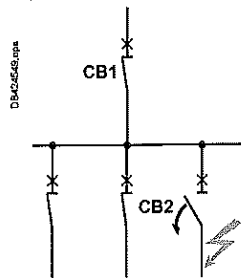
Compact NS circuit breakers take into account important concerns for environmental protection. Most components are recyclable and the parts of Compact NS630b to NS3200 circuit breakers are marked as specified in applicable standards.

### 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.

### Selectivity

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



[1] -40 °C for Micrologic control units with an LCD screen.

ВЯРНО С  
ОРИГИНАЛА



# General characteristics for NS630b to 3200 range

## 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:

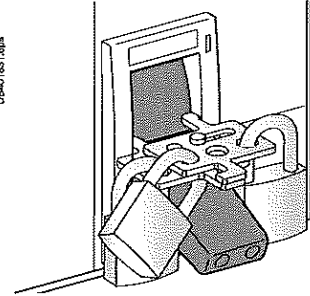
- the mechanical reliability of the position indication system
- the absence of leakage currents
- overvoltage withstand capacity between upstream and downstream connections.

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).



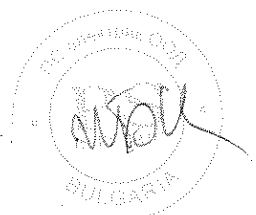
### Bare circuit breaker with terminal shields

	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 MCC CNOMO	IP40 IP435 IP547	IK07
	With extended rotary handle	IP55	IK08

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ОРИГИНАЛА



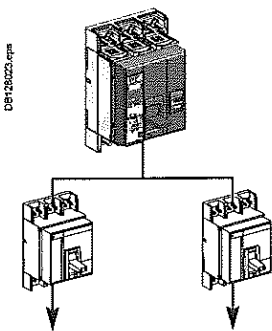
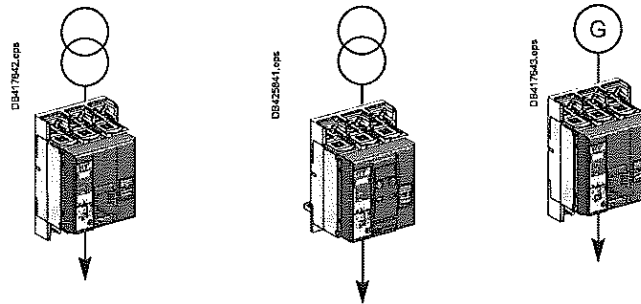


# Protection of distribution systems

## Overview of solutions

Protection of distribution systems means protection of:

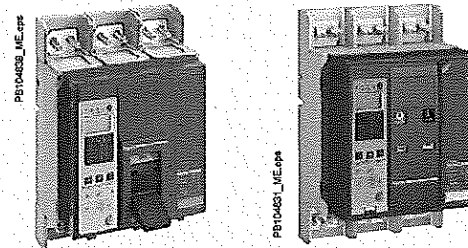
- systems supplied by a transformer
- systems supplied by an engine generator set
- long cables in IT and TN systems.



### Power distribution

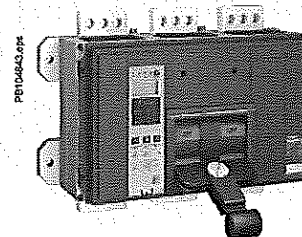
Selection of circuit breakers from 630 to 3200 A page A-2

Rated current (A)	630	800	1000	1250	1600
Compact	NS630b	NS800	NS1000	NS1250	NS1600



Breaking capacity (kArms) 380/415 V	N	50	50	50	50	
	H	70	70	70	70	
	L	150	150	150	-	-
	LB [1]	200	200	-	-	-

Rated current (A)	1600	2000	2500	3200
Compact	NS1600b	NS2000	NS2500	NS3200



Breaking capacity (kArms) 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.

[1] Only for manual operated version.

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ОРИГИНАЛ



# Functions and characteristics

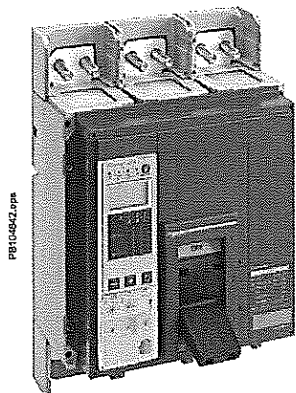
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Compact NS circuit breakers from 630b up to 3200 A.....	A-2
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Micrologic E "energy".....	A-12
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A

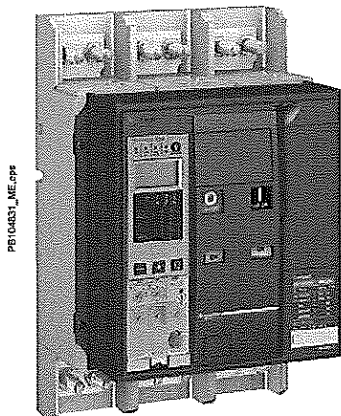
# Protection of distribution systems

## Compact NS circuit breakers from 630b up to 3200 A

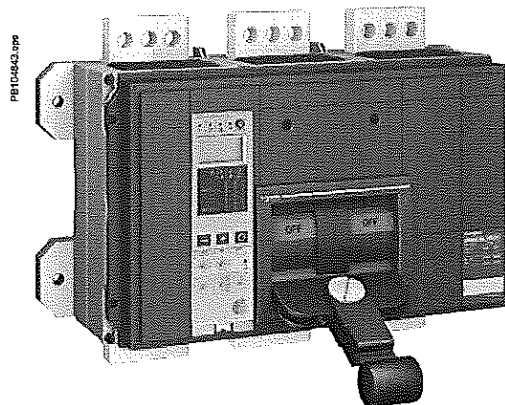
A



Compact NS800L



Compact NS1600H



Compact NS2000H

[1] 65 °C with vertical connections. See the temperature derating tables for other types of connections.

### Compact circuit breakers

Number of poles		
Control	manual	toggle
	electric	direct or extended rotary handle

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 IEC 60947-2 and EN 60947-2

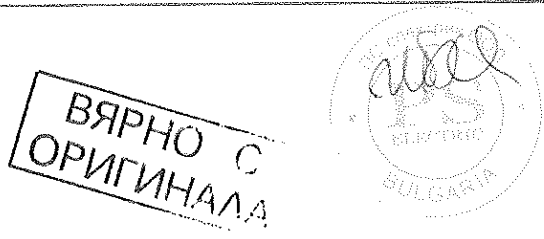
Rated current (A)	$I_n$	50 °C 65 °C [1]
Rated insulation voltage (V)	$U_i$	
Rated impulse withstand voltage (kV)	$U_{imp}$	
Rated operational voltage (V)	$U_e$	AC 50/60 Hz

Type of circuit breaker				
Ultimate breaking capacity (kA rms)	Manual	$I_{cu}$	AC 50/60 Hz	220/240 V
				380/415 V
				440 V
				500/525 V
				660/690 V
		$I_{cs}$	AC 50/60 Hz	220/240 V
				380/415 V
				440 V
				500/525 V
				660/690 V
Electrical		$I_{cu}$	AC 50/60 Hz	220/240 V
				380/415 V
				440 V
				500/525 V
				660/690 V
		$I_{cs}$	AC 50/60 Hz	220/240 V
				380/415 V
				440 V
				500/525 V
				660/690 V

Short-time withstand current (kA rms)	$I_{cw}$	AC	1 s
		50/60 Hz	3 s
Integrated instantaneous protection			kA peak $\pm 10\%$

Suitability for isolation			
Utilisation category			
Durability (C-O cycles)	mechanical		
	electrical	440 V	$I_n/2$
		690 V	$I_n$
			$I_n/2$
			$I_n$

Pollution degree



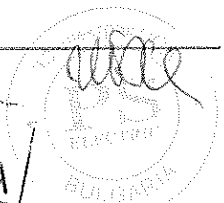
# Protection of distribution systems

## Compact NS circuit breakers from 630b up to 3200 A

A

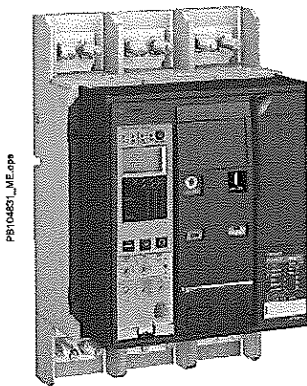
NS630b				NS800				NS1000				NS1250		NS1600		NS1600b		NS2000		NS2500		NS3200	
3, 4				3, 4				3, 4				3, 4		3, 4		3, 4		3, 4		3, 4		3, 4	
⊗				⊗				⊗				⊗		⊗		⊗		⊗		⊗		⊗	
⊗				⊗				⊗				⊗		⊗		⊗		⊗		⊗		⊗	
⊗ (except LB)				⊗				⊗				⊗		⊗		⊗		⊗		⊗		⊗	
N	H	L	LB	N	H	L	LB	N	H	L	LB	N	H	N	H	N	H	N	H	N	H	N	H
⊗	⊗	⊗	-	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	-	-
⊗	⊗	-	-	⊗	⊗	-	-	⊗	⊗	-	-	⊗	⊗	-	-	⊗	⊗	-	-	⊗	⊗	-	-
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	-	-
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	-	-
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	-	-
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	LB	N	H	L	LB	N	H	N	H	N	H	N	H	N	H	N	H
85	85	150	200	85	85	150	200	85	85	150	200	85	85	85	85	85	85	85	85	85	85	85	125
50	70	150	200	50	70	150	200	50	70	150	200	50	70	50	70	50	70	50	70	50	70	50	85
50	65	130	200	50	65	130	200	50	65	130	200	50	65	50	65	50	65	50	65	50	85		
40	50	100	100	40	50	100	100	40	50	100	100	40	50	40	50	40	50	40	50	40	65	-	
30	42	-	75	30	42	-	75	30	42	-	75	30	42	30	42	30	42	30	42	30	65	-	
50	50	150	200	50	52	150	200	50	52	150	200	50	52	37	37	37	37	37	37	37	65	94	
50	50	150	200	50	52	150	200	50	52	150	200	50	52	37	37	37	37	37	52	37	64		
50	50	130	200	50	48	130	200	50	48	130	200	50	48	37	37	37	37	37	65	37	64		
40	40	100	100	40	37	100	100	40	37	100	100	40	37	30	30	30	30	30	65	30	-		
30	30	-	75	30	31	-	75	30	31	-	75	30	31	22	22	22	22	22	65	22	-		
50	70	150	-	50	70	150	-	50	70	150	-	50	70	50	70	50	70	50	-	50	-		
50	70	150	-	50	70	150	-	50	70	150	-	50	70	50	70	50	70	50	-	50	-		
50	65	130	-	50	65	130	-	50	65	130	-	50	65	50	65	50	65	50	-	50	-		
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30	42	-	-	30	42	-	-	30	42	-	-	30	42	30	42	30	42	30	-	30	-		
37	37	150	-	37	37	150	-	37	37	150	-	37	37	37	37	37	37	37	-	37	-		
37	37	150	-	37	37	150	-	37	37	150	-	37	37	37	37	37	37	37	-	37	-		
37	37	130	-	37	37	130	-	37	37	130	-	37	37	37	37	37	37	37	-	37	-		
30	30	100	-	30	30	100	-	30	30	100	-	30	30	30	30	30	30	30	-	30	-		
22	22	-	-	22	22	-	-	22	22	-	-	22	22	22	22	22	22	22	-	22	-		
19.2	19.2	-	-	19.2	19.2	-	-	19.2	19.2	-	-	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	40	40	40	40	40	130	40	-		
⊗				⊗				⊗				⊗		⊗		⊗		⊗		⊗			
B	B	A	A	B	B	A	A	B	B	A	A	B	B	B	B	B	B	B		B			
10000				10000				10000				10000		10000		5000		5000		5000			
6000	6000	4000	4000	6000	6000	4000	4000	5000	5000	3000	4000	5000	5000	2000	2000	3000	3000	2000	2000	2000	2000		
5000	5000	3000	3000	5000	5000	3000	3000	4000	4000	3000	3000	4000	4000	2000	2000	2000	2000	2000	2000	2000	2000		
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2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	1000	1000	1000	1000	1000	1000	1000	1000		
3				3				3				3		3		3		3		3			

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# Protection of distribution systems

## Compact NS circuit breakers from 630b up to 3200 A



Electrically operated device.

### Compact circuit breakers

#### Protection and measurements

##### Interchangeable control units

Overload protection	long time	$I_r$ (In x ...)
Short-circuit protection	short time	$I_{sd}$ (Ir x ...)
	instantaneous	$I_l$ (In x ...)

Earth-fault protection  $I_g$  (In x ...)

Residual earth-leakage protection  $I_{\Delta n}$

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) 3P

H x W x D 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.

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# Protection of distribution systems

## Compact NS circuit breakers from 630b up to 3200 A

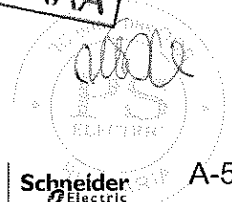
	NS630b NS800		NS1000 NS1250 NS1600 NS1600b				NS2000 NS2500 NS3200						
Micrologic	2.0	5.0	6.0	2.0A	5.0A	6.0A	7.0A	2.0E	5.0E	6.0E	5.0P <sup>(1)</sup>	6.0P <sup>(1)</sup>	7.0P <sup>(1)</sup>
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
-	-	⊗	⊗	-	⊗	⊗	⊗	-	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
-	-	⊗	-	-	⊗	-	-	-	-	⊗	-	⊗	-
-	-	-	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
-	-	-	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗
-	-	-	-	-	-	-	-	-	-	-	⊗	⊗	⊗
-	-	-	-	-	-	-	-	⊗	⊗	⊗	-	-	-

A

Handwritten mark resembling a stylized 'B' or 'S' with a checkmark.

	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
⊗									-

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# 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

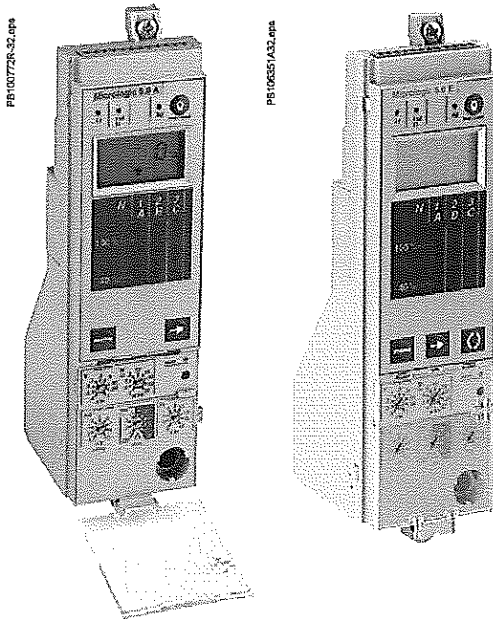
- 2 for basic protection
- 5 for selective protection
- 6 for selective + earth-fault protection
- 7 for selective + earth-leakage protection.

Y: control-unit generation

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

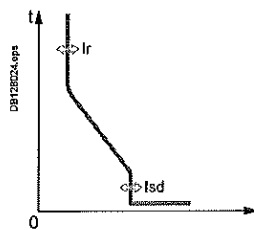
Z: type of measurement

- A for "ammeter"
- E for "energy"
- P for "power meter"



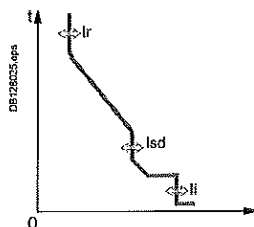
### Current protection

#### Micrologic 2: basic protection



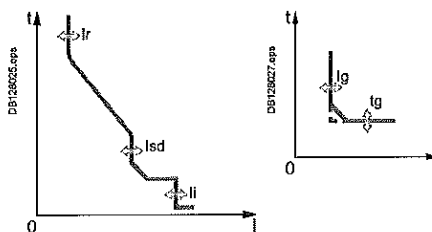
Protection:  
long time  
+ instantaneous

#### Micrologic 5: selective protection



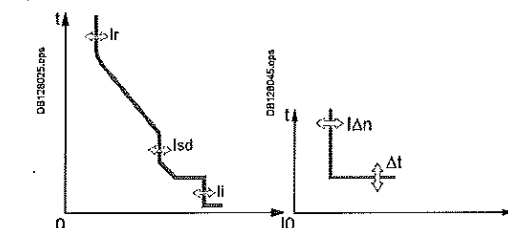
Protection:  
long time  
+ short time  
+ instantaneous

#### Micrologic 6: selective + earth-fault protection



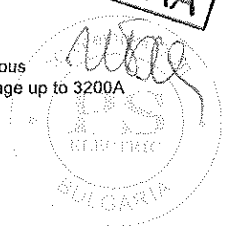
Protection:  
long time  
+ short time  
+ instantaneous  
+ earth fault

#### Micrologic 7: selective + earth-leakage



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

**ВЯРНО С  
ОРИГИНАЛА**



# Functions and characteristics

## Micrologic control units

### Overview of functions

Micrologic  
without  
measurement

Measurements and programmable protection

A

**A: ammeter**

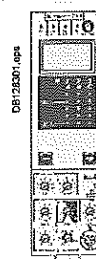
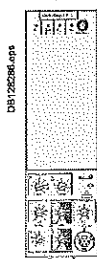
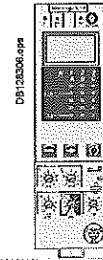
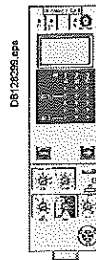
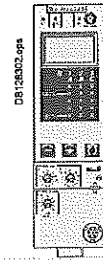
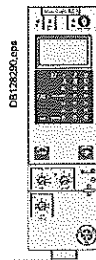
- I<sub>1</sub>, I<sub>2</sub>, I<sub>3</sub>, I<sub>N</sub>, earth-fault, earth-leakage and maximeter for these measurements
- fault indications
- settings in amperes and in seconds.

**E: Energy**

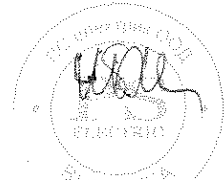
- incorporates all the rms measurements of Micrologic A, plus voltage, power factor, power and energy metering measurements.
- calculates the current demand value
- "Quickview" function for the automatic cyclical display of the most useful values (as standard or by selection).

**P: A + power meter + programmable protection**

- measurements of V, A, W, VAR, VA, Wh, VARh, VAh, Hz, V<sub>peak</sub>, A<sub>peak</sub>, 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.



ВЕРНО С  
ОРИГИНАЛА

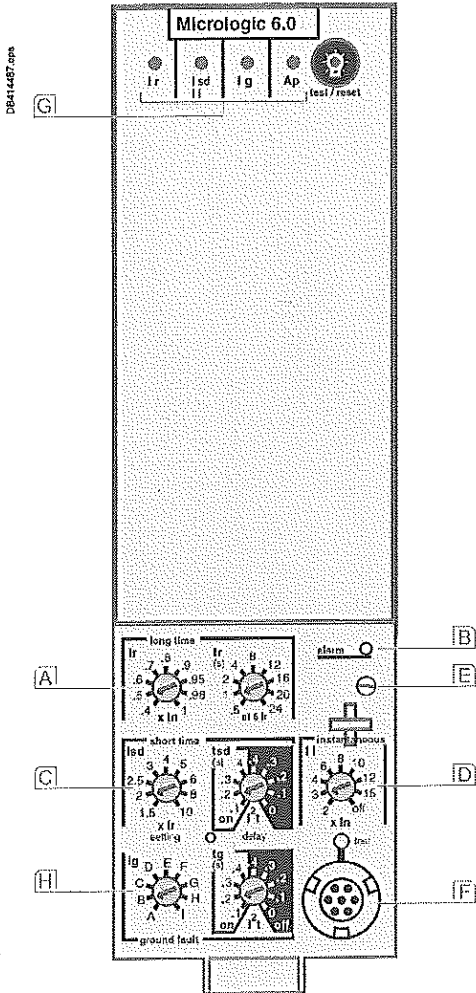




# Micrologic control units

## 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 selectivity for short-circuits as well.



- A long-time threshold and tripping delay
- B overload alarm (LED)
- C short-time pick-up and tripping delay
- D instantaneous pick-up
- E fixing screw for long-time rating plug
- F test connector
- G indication of tripping cause
- H earth-leakage or earth-fault pick-up and tripping delay

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

### 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<sup>2</sup>t type (ON or OFF) for short-time delay.

#### Earth-fault protection

Residual or source ground return earth fault protection.

Selection of I<sup>2</sup>t 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)

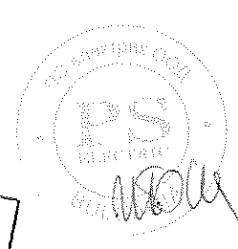
LEDs indicate the type of fault:

- overload (long-time protection Ir)
- short-circuit (short-time I<sub>sd</sub> or instantaneous I<sub>i</sub> 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.

ВЯРНО С  
ОРИГИНАЛА



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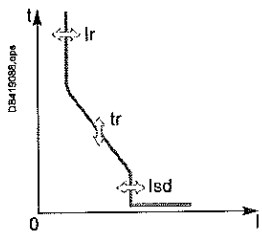
# Functions and characteristics

## Micrologic control units

### For Compact NS630b to 3200

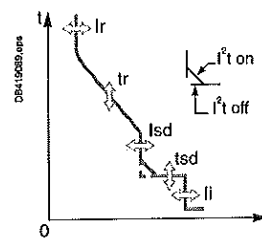


#### Micrologic 2.0



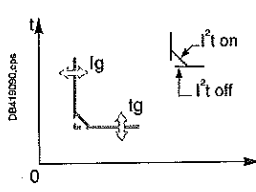
<b>Long-time</b>		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
Current setting (A)	$I_r = I_n \times \dots$	other ranges or disable by changing long-time rating plug									
Tripping between	1.05 and 1.20 x $I_r$	tr = 0.5 s to 24 s, step 0.5 s for 6 $I_r$									
Time setting	$t_r$ (s)	1.5 x $I_r$	12.5	25	50	100	200	300	400	500	600
Time setting example:	Accuracy: 0 to -30 %	6 x $I_r$	0.5 <sup>[1]</sup>	1	2	4	8	12	16	20	24
time delay (s)	Accuracy: 0 to -20 %	7.2 x $I_r$	0.7 <sup>[2]</sup>	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
<b>Instantaneous</b>		1.5	2	2.5	3	4	5	6	8	10	
Pick-up (A)	$I_{sd} = I_r \times \dots$										
Accuracy:	±10 %										
Time delay		Max resettable time: 20 ms Max break time: 80 ms									

#### Micrologic 5.0 / 6.0 / 7.0



<b>Long-time</b>		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
Current setting (A)	$I_r = I_n \times \dots$	Other ranges or disable by changing long-time rating plug									
Tripping between	1.05 and 1.20 x $I_r$										
Time setting	$t_r$ (s)	1.5 x $I_r$	0.5	1	2	4	8	12	16	20	24
Time setting example:	Accuracy: 0 to -30 %	6 x $I_r$	0.5 <sup>[1]</sup>	1	2	4	8	12	16	20	24
time delay (s)	Accuracy: 0 to -20 %	7.2 x $I_r$	0.7 <sup>[2]</sup>	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
<b>Short-time</b>		1.5	2	2.5	3	4	5	6	8	10	
Pick-up (A)	$I_{sd} = I_r \times \dots$										
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				
Operating time at 10 x $I_r$	max resettable time	20	80	140	230	350					
$I^2t$ Off or $I^2t$ On	max break time	80	140	200	320	500					
<b>Instantaneous</b>		2	3	4	6	8	10	12	15	off	
Pick-up (A)	$I_i = I_n \times \dots$										
Accuracy:	±10 %										
Operating time		<b>Standard</b>									
	max resettable time	20 ms									
	max break time	50 ms									

#### Micrologic 6.0



<b>Earth fault</b>		A	B	C	D	E	F	G	H	J
Pick-up (A)	$I_g = I_n \times \dots$	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Accuracy:	±10 %									
	$I_n \leq 400$ A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	$400$ A < $I_n$ < $1250$ A	500	640	720	800	880	960	1040	1120	1200
	$I_n \geq 1250$ A									
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 $I_n$ or 1200 A	$t_g =$ max break time	80	140	200	320	500				
( $I^2t$ Off or $I^2t$ On)										

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

[1] 0 to -40 % - [2] 0 to -60 %

ВЯРНО С  
ОРИГИНАЛА

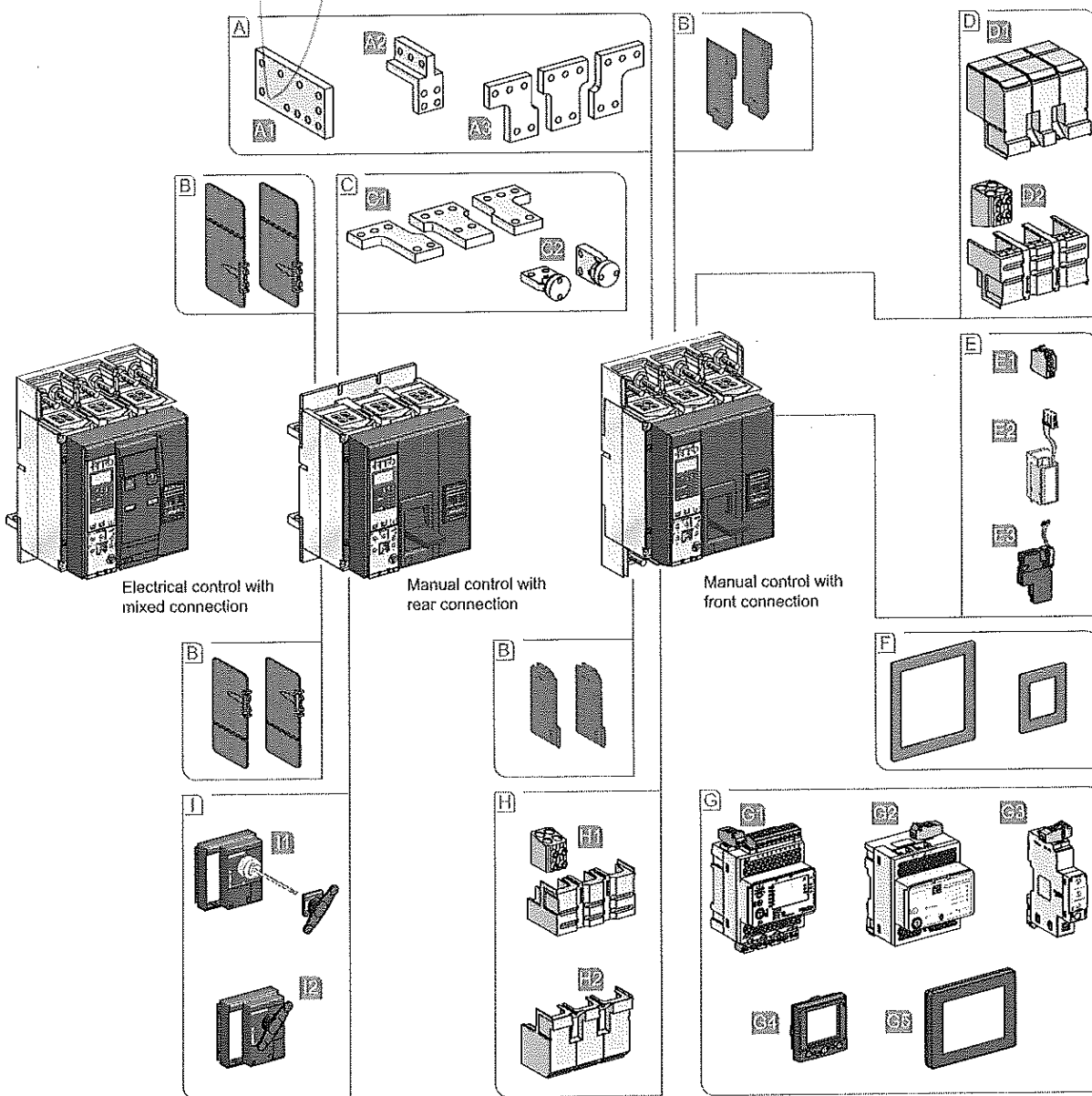
PS

# Electrical and mechanical accessories

## Compact NS630b to 1600 (fixed version)



D1442537.rps

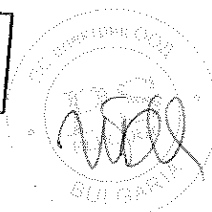


- A1** Terminal extension for cables with lugs
- A2** Vertical connection adapter
- A3** Spreader
- B1** Interphase barriers
- C1** Spreader
- C2** Rear connectors
- D1** Sealable terminal shield
- D2** Connection kit for connectors

- E1** Auxiliary contact
- E2** Voltage release
- E3** Communications module
- F1** Escutcheon
- G1** I/O
- G2** IFE
- G3** IFM
- G4** FDM121

- G5** FDM128
- H1** Connection kit for connectors
- H2** Sealable terminal shield
- I1** Extended rotary handle
- I2** Direct rotary handle

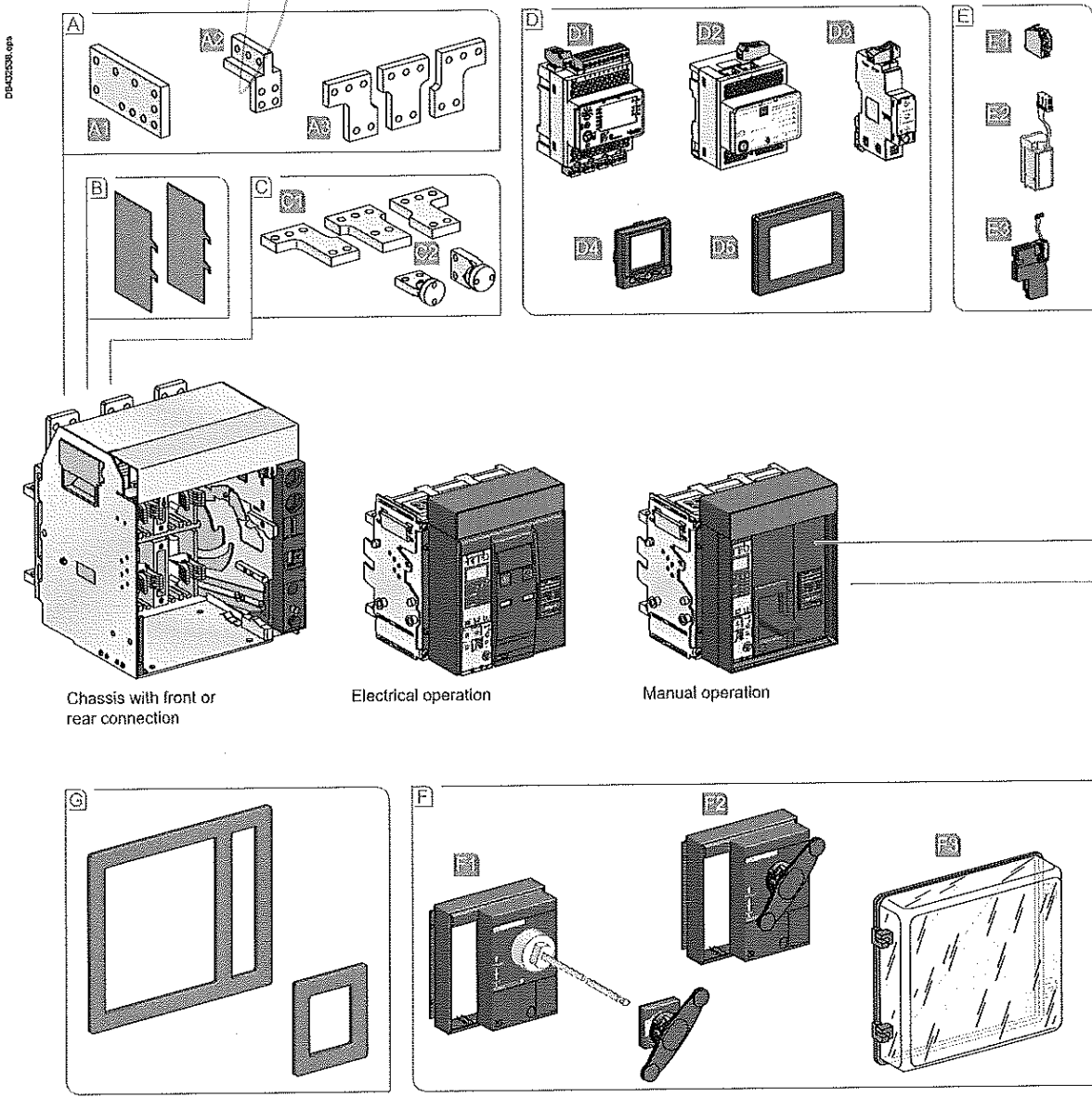
ВЯРНО С  
ОРИГИНАЛА



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# Electrical and mechanical accessories

## Compact NS630b to 1600 (withdrawable version)



- A1** Terminal extension for cables with lugs
- A2** Vertical connection adapter
- A3** Spreader
- B1** Interphase barriers
- C1** Spreader
- C2** Rear connectors
- D1** I/O
- D2** IFE
- D3** IFM
- D4** FDM121
- D5** FDM128

- E1** Auxiliary contact
- E2** Voltage release
- E3** Communications module
- E4** Extended rotary handle
- E5** Direct rotary handle
- F1** Transparent cover
- F2** Escutcheon

ВЯРНО С  
ОРИГИНАЛА

PS  
ELITE TRIP

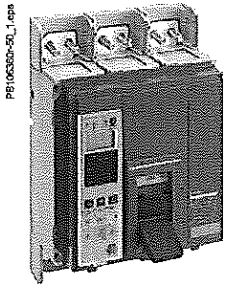
# Electrical and mechanical accessories

## Compact NS630b to 1600

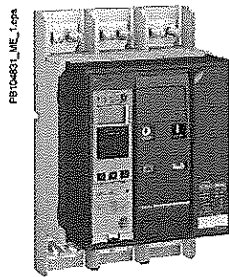


The withdrawable configuration makes it possible to:

- extract and/or rapidly replace the circuit breaker without having to touch connections;
- allow for the addition of future circuits at a later date.



Manually operated fixed Compact NS800.

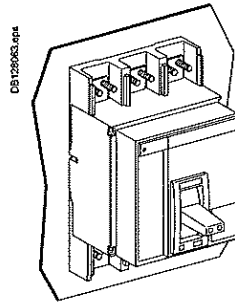


Electrically operated fixed Compact NS1600.

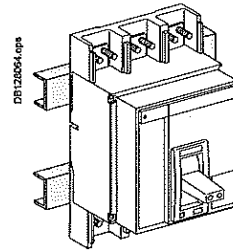
### Installation

#### Fixed configuration

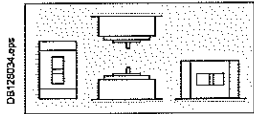
Compact NS630b to 1600 circuit breakers may be installed vertically, horizontally or flat on their back.



Mounting on a backplate.

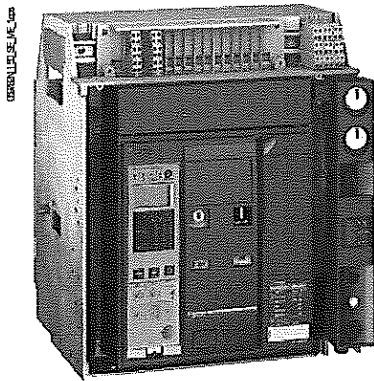


Mounting on rails.

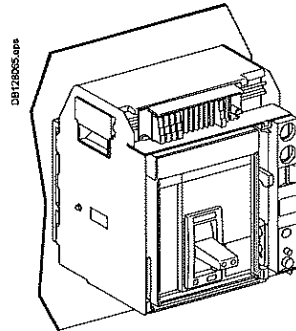


#### Withdrawable configuration

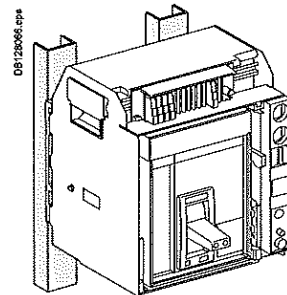
Compact NS630b to 1600 circuit breakers should be installed vertically only.



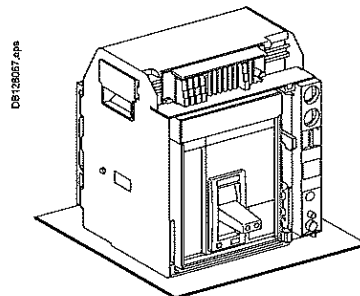
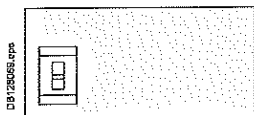
Electrically operated withdrawable Compact NS800H.



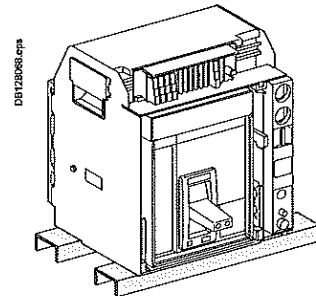
Mounting on a backplate.



Rear mounting on rails.



Device on mounting plate.



Device on rails.

ВЯРНО С  
ОРИГИНАЛА



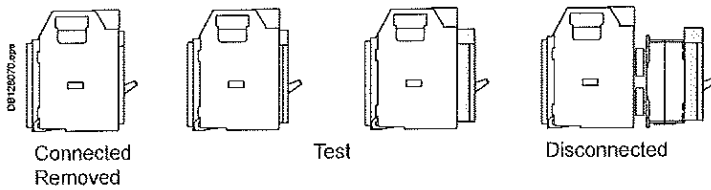
# Electrical and mechanical accessories

## Compact NS630b to 1600

A

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.



- 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.

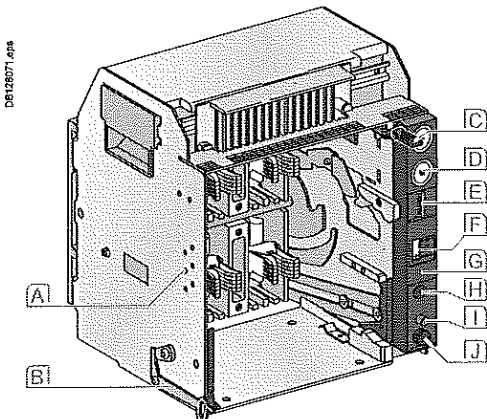
### Locking

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.



- A Mismatch protection
- B Door interlock
- C Racking interlock
- D Keylock locking
- E Padlock locking
- F Position indicator
- G Chassis front plate (accessible with cubicle door closed)
- H Crank entry
- I Reset button
- J Crank storage

ВЯРНО С  
ОРИГИНАЛА



# Electrical and mechanical accessories

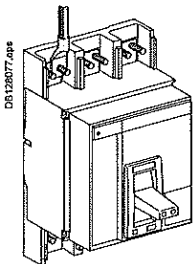
## Compact NS630b to 1600



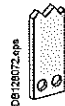
### Types of connection

#### Fixed device

##### Front connections (N, L)



Connection by:  
bars



bare cables (except L)

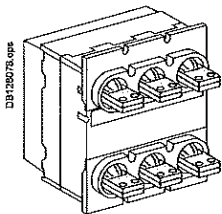


cables with lugs

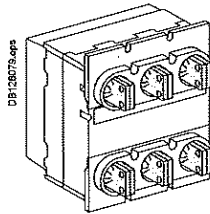


##### Rear connections (N, L, LB)

Horizontal:

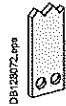


Vertical:

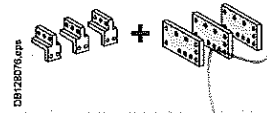
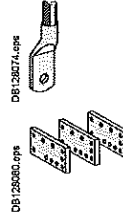


Connection by:

bars

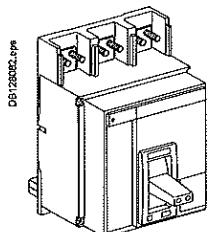
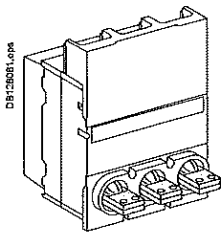


cables with lugs



Simply turn a horizontal rear connector 90° to make it a vertical connector.

##### Combination of front and rear connections (N, L)



Connection by:

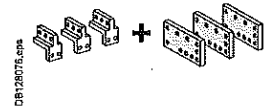
bars



bare cables (except L)

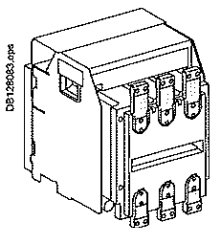


cables with lugs



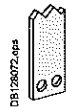
#### Withdrawable device

##### Front connections

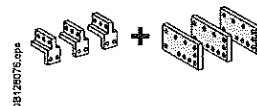


Connection by:

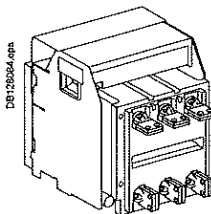
bars



cables with lugs



##### Rear connections

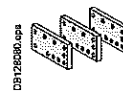


Connection by:

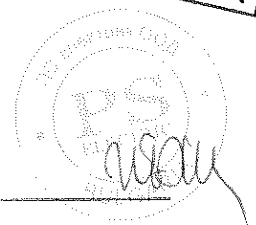
bars



cables with lugs



ВЯРНО С  
ОРИГИНАЛА





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.

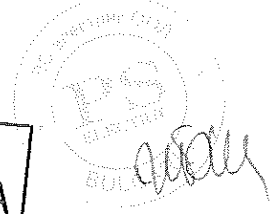
A

Connections accessories

Type of accessories	For Compact NS630b to NS1600			
	Fixed:		Withdrawable:	
	Front connection	Rear connection	Front connection	Rear connection
<b>Vertical-connection adapters</b> 	N, H, L	-	N, L, LB	-
<b>Set of bare-cable connectors and terminal shields for ratings ≤ 1250 A</b> 	N, H	-	-	-
<b>Cable lug adapters</b> 	N, H, L	N, H, L, LB	N, H, L, LB	N, H, L, LB
<b>Interphase barriers</b> 	N, H, L, LB	N, H, L, LB	-	N, H, L, LB
<b>Spreaders</b> 	N, H, L	N, H, L, LB	N, H, L, LB	N, H, L, LB
<b>Connection shield</b> 	N, H, L	-	-	-
<b>Safety shutters with locking by padlocks (IP20)</b> 	-	-	N, H, L, LB (standard)	N, H, L, LB (standard)
<b>Arc chute screen</b> 	N, H, L	-	-	-

[1] Spreaders, vertical connection adapters and cable lugs adapters are not compatible with voltages  $u \geq 500$  V.  
 [2] Mandatory for voltages  $u \geq 500$  V unless using the bare-cable connector + terminal shield kit.  
 [3] Mandatory for fixed devices with L and LB performance levels, whatever the voltage.  
 [4] Mandatory for fixed front-connection versions with vertical connection adapters oriented towards the front.

ВЯРНО С  
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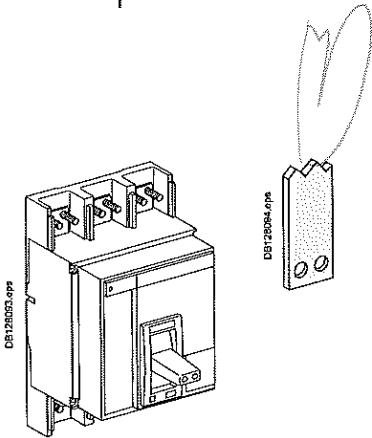


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# Electrical and mechanical accessories

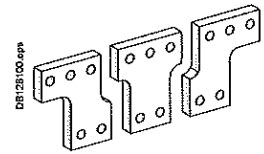
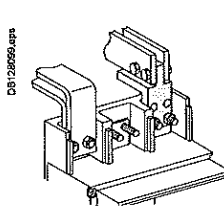
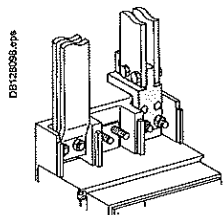
## Compact NS630b to 1600



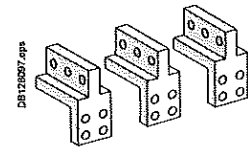
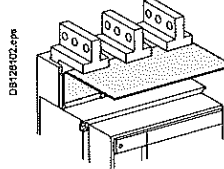
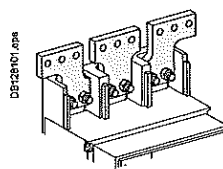
### Front connection of fixed devices

#### 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.



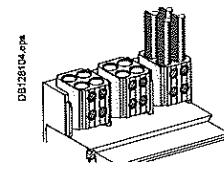
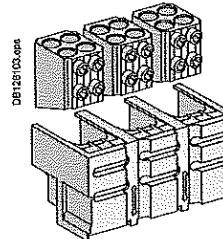
Spreaders.



Vertical-connection adapters.

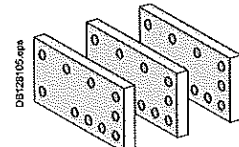
#### Bare cables

Special sets of connectors and terminal shields may be used to connect up to four 240 mm<sup>2</sup> copper or aluminium cables for each phase. Bare cable connection is possible for ratings up to and including 1250 A.

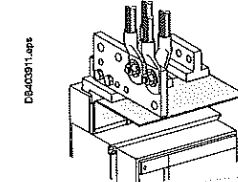
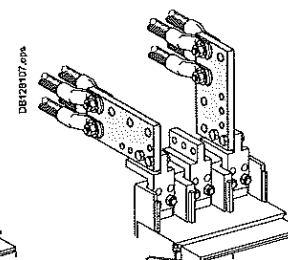
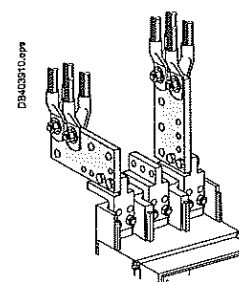


#### 4-cable connectors. Cables with lugs

Cable lug adapters are combined with the vertical-connection adapters. One to four cables with crimped lugs ( $\leq 300 \text{ mm}^2$ ) 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.



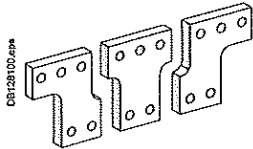
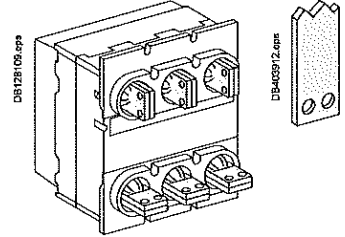
ВЯРНО С  
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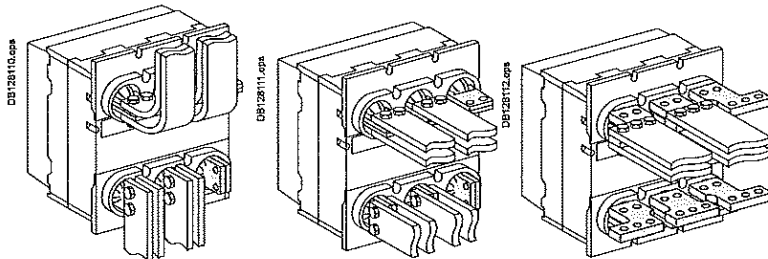
### Rear connection of fixed devices

#### 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.

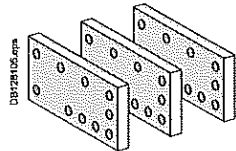


Spreaders.

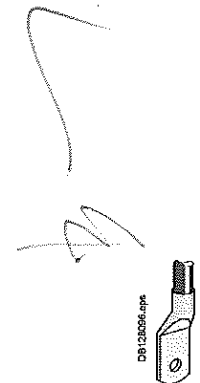
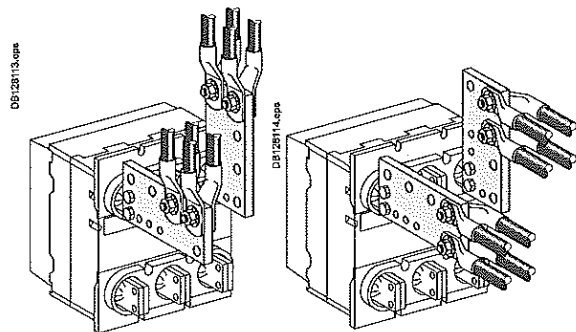


#### Cables with lugs

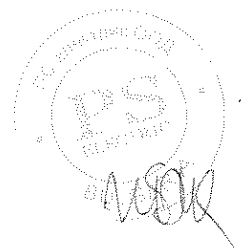
Cable lug adapters enable connection of one to four cables with crimped lugs ( $\leq 300 \text{ mm}^2$ ). To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters.

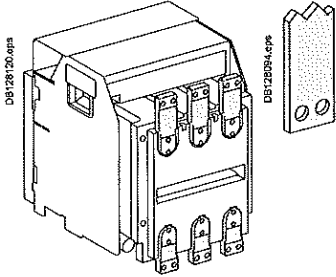


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# Electrical and mechanical accessories

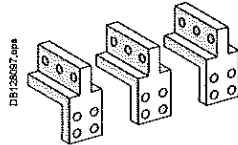
## Compact NS630b to 1600



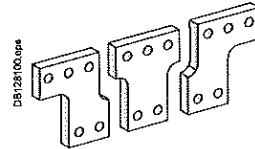
### Front connection of withdrawable devices

#### Bars

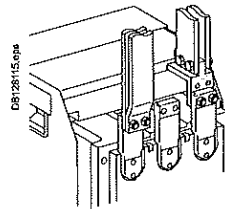
Withdrawable, front-connection Compact NS630b to 1600 devices are suitable for direct connection of bars. Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch to 95 mm.



Vertical-connection adapters.

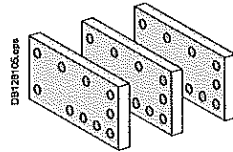


Spreaders.

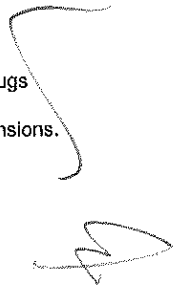
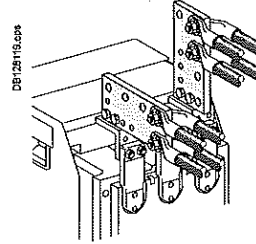
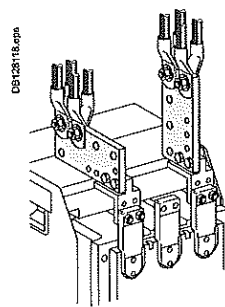


#### Cables with lugs

Cable lug adapters enable connection of one to four cables with crimped lugs ( $\leq 300 \text{ mm}^2$ ). To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters.



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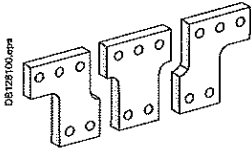
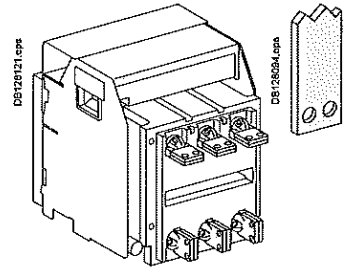




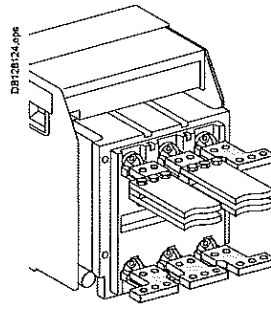
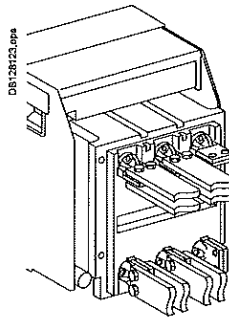
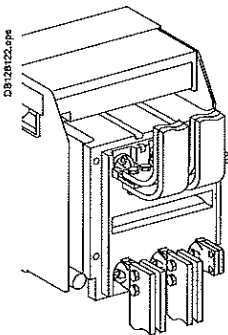
### Rear connection of withdrawable devices

#### 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.

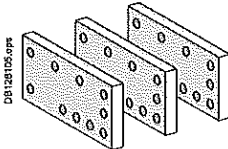


Spreaders.

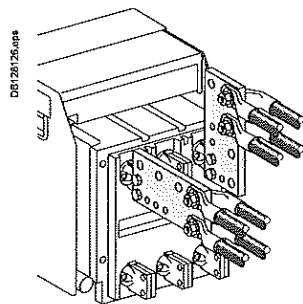
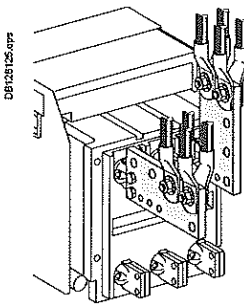


#### Cables with lugs

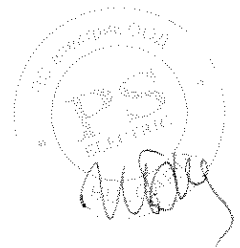
Cable lug adapters enable connection of one to four cables with crimped lugs ( $\leq 300 \text{ mm}^2$ ). To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters.



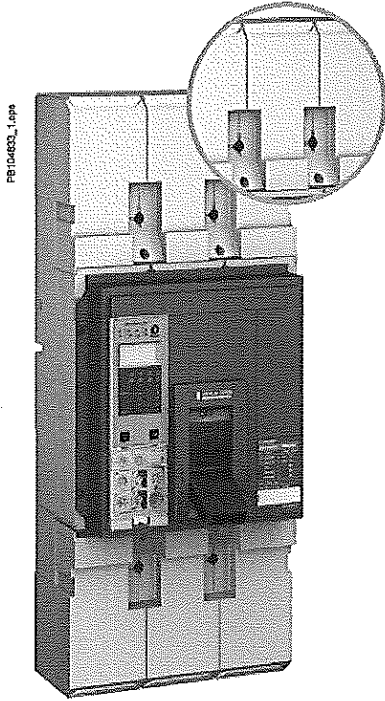
ВЯРНО С  
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# Electrical and mechanical accessories

## Compact NS630b to 1600

A

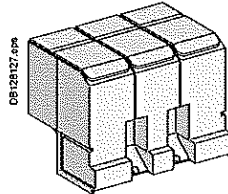


Compact NS equipped with connection shield.

### Insulation of live parts

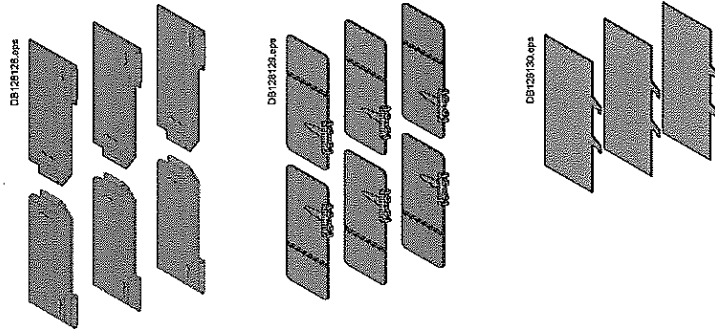
#### Connection shield

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  $\geq 500$  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.

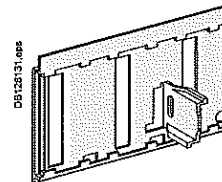
Interphase barriers for withdrawable device, rear connection.

#### 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.

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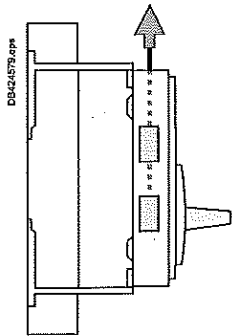


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**Connection of electrical auxiliaries**

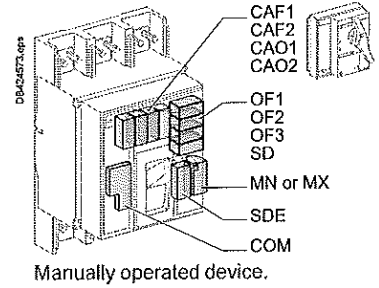
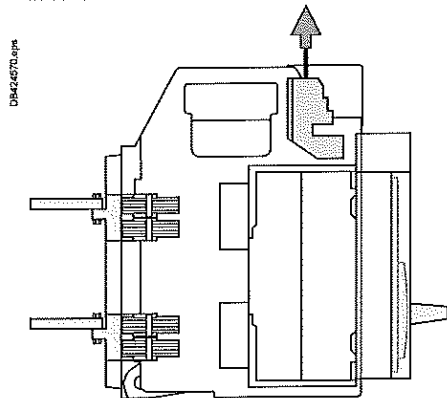
**Fixed devices**

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.

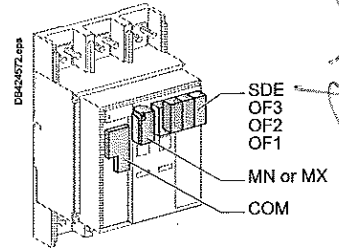


**Withdrawable devices**

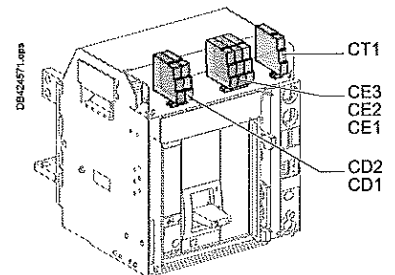
Auxiliary circuits are connected to terminal blocks located in the top part of the chassis. The auxiliary terminal block is made up of a fixed and moving part. The two parts are in contact when the device is in the test and connected positions.



Manually operated device.



Electrically operated device.



Withdrawable device.



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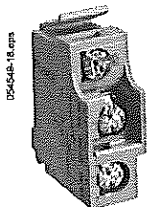
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# Electrical and mechanical accessories

## 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				
	AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14	
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	-	-	-	-	-	-

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:

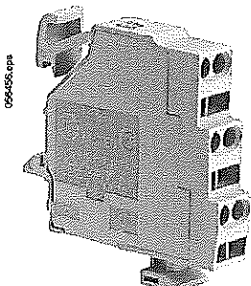
- the connected (CE) position
- the disconnected (CD) position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
- the test (CT) position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

#### Installation

■ contacts for the connected (CE), disconnected (CD) and test (CT) positions clip into the upper front section of the chassis.

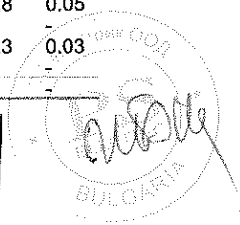
#### Electrical characteristics of the CE/CD/CT auxiliary contacts

Contacts	Standard				Low level				
	AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14	
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	-	-	-	-	-	-



Carriage switches for connected (CE), disconnected (CD) and test (CT) positions.

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# Functions and characteristics Electrical and mechanical accessories Compact NS630b to 1600



## 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.

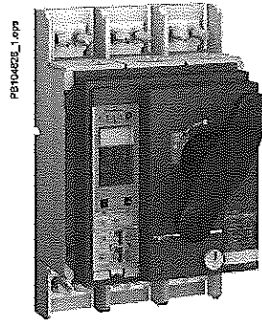
It maintains:

- 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).

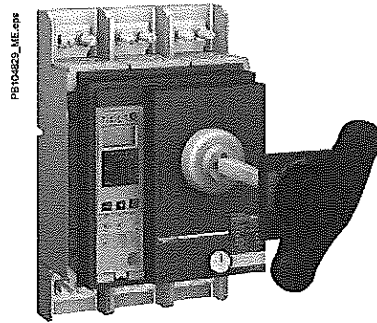
The door cannot be opened if the circuit breaker is ON or locked.

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.



Compact NS with a direct rotary handle.



Compact NS with an extended rotary handle.



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# 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.

### Remote tripping

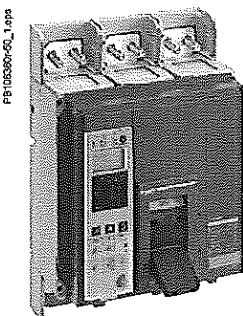
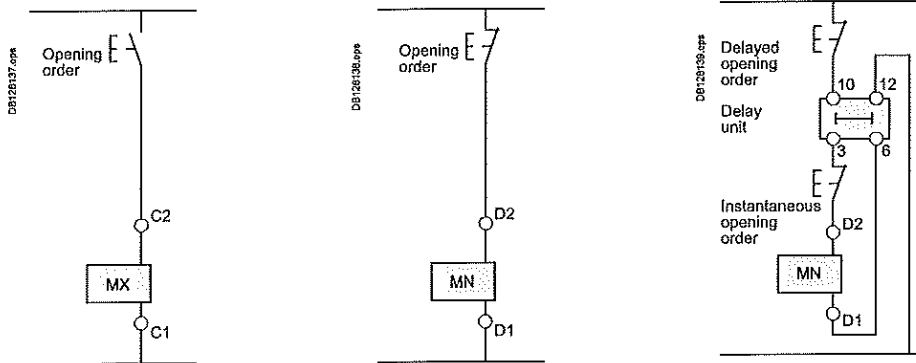
This function opens the circuit breaker via an electrical order. It is made up of:

- a shunt release (2<sup>nd</sup> MX)
- or an undervoltage release MN
- or a delayed undervoltage release MN + delay unit.

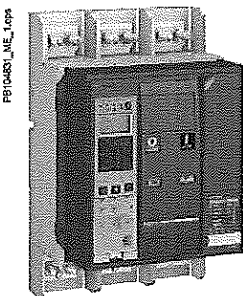
These releases (2<sup>nd</sup> MX or MN) cannot be operated by the communication bus.

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



Fixed Compact NS800.



Fixed Compact NS1600.

### Voltage releases 2<sup>nd</sup> MX

When energised, the 2<sup>nd</sup> MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the 2<sup>nd</sup> MX locks the circuit breaker in the OFF position. The MX release instantaneously opens the circuit breaker when energised, the minimum duration of the pulse operating order must be 200 ms. The MX release locks the circuit breaker in OFF position if the order is maintained (except for MX "communicating" releases).

Characteristics	
Power supply VAC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480
VDC	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
VDC	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

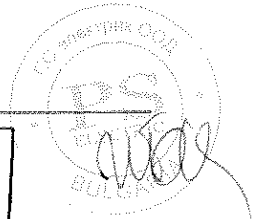
To eliminate circuit breaker nuisance tripping during short voltage dips, operation of the MN release can be delayed. This function is achieved by adding an external delay unit in the MN voltage-release circuit. Two versions are available, adjustable and non-adjustable.

Characteristics		
Power supply	non-adjustable	100/130 - 200/250
VAC 50-60 Hz /DC	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 - 1 s - 1.5 s - 3 s



MX voltage release.

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# Electrical and mechanical accessories

## Compact NS630b to 1600

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 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	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277 - 380/415
	V DC	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.

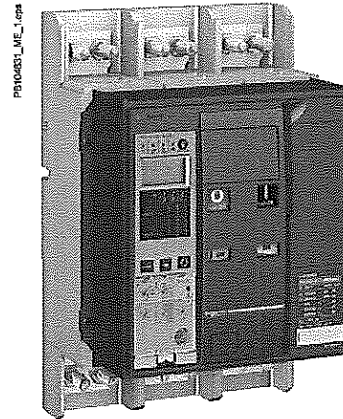
The Compact NS electrical operation function can be used to implement a synchronizing system.

#### Electrical opening order

The release instantaneously opens the circuit breaker when energised. The supply can be impulse-type or maintained.

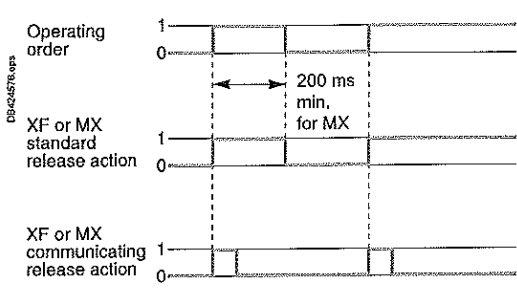
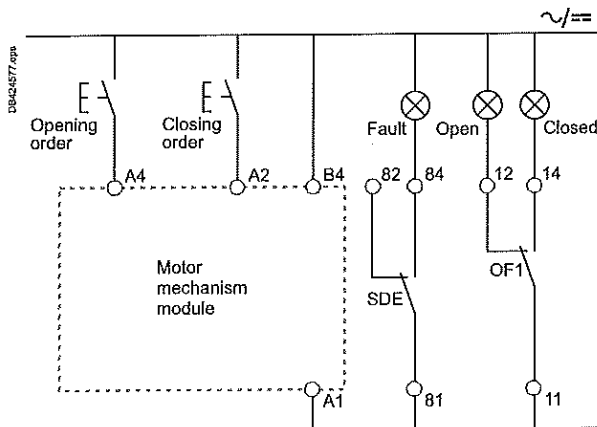
Release electrical characteristics are identical to those of an MX release (see above).

Note: whether the operating order is maintained or automatically disconnected (pulse-type), "communicating" releases ("bus" solution with "COM" communication option) always have an impulse-type action (see diagram).

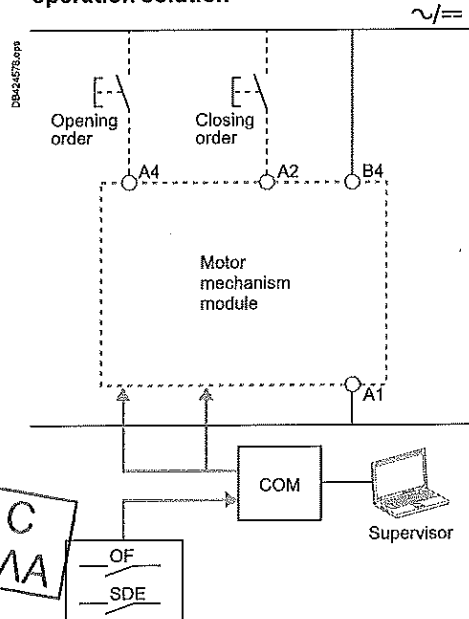


Electrically operated Compact NS circuit breaker.

### Wiring diagram of a point-to-point electrical operation solution



### Wiring diagram of a bus-type electrical operation solution



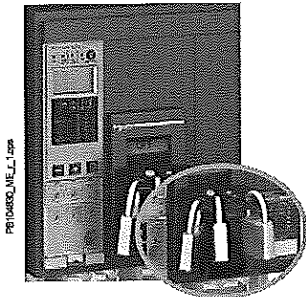
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На основание чл. 2  
от ЗЗЛД

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.

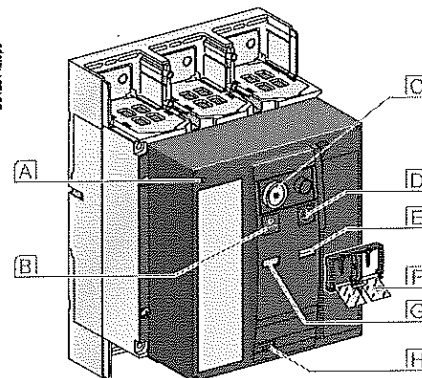
### Locking on manually operated devices

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		
	<ul style="list-style-type: none"> <li>■ OFF position</li> <li>■ OFF or ON position</li> </ul>	<ul style="list-style-type: none"> <li>padlock</li> <li>padlock</li> </ul>	<ul style="list-style-type: none"> <li>removable device</li> <li>fixed device</li> </ul>
Direct rotary handle	lock in		
	<ul style="list-style-type: none"> <li>■ OFF position</li> <li>■ OFF or ON position</li> </ul>	<ul style="list-style-type: none"> <li>padlock</li> <li>keylock</li> </ul>	<ul style="list-style-type: none"> <li>locking device + keylock</li> </ul>
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



- A reset of mechanical trip indicator
- B OFF pushbutton
- C OFF position locking
- D ON pushbutton
- E springs charged indication
- F pushbutton locking
- G contact position indication
- H operation counter

#### 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:

- padlocks (not supplied), 5 to 8 mm
- lead seal
- two screws.

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:

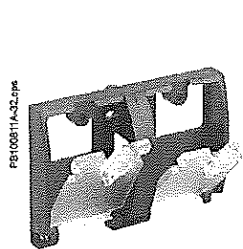
- using padlocks in standard (one to three padlocks, not supplied)
- using a keylock (supplied).

Keys may be removed only when locking is effective (Profalux or Ronis type locks).

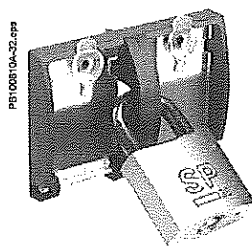
The keylocks are available in any of the following configurations:

- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device.

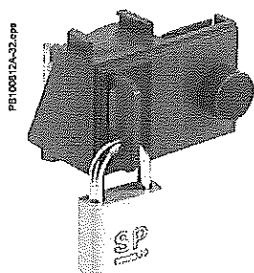
A locking kit (without lock) is available for installation of a keylock (Ronis, Profalux, Kirk or Castell).



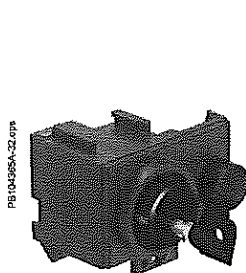
Access to pushbuttons protected by transparent cover.



Pushbutton locking using a padlock.

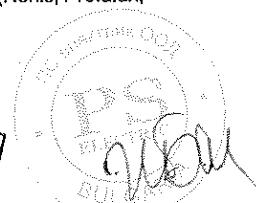


OFF position locking using padlocks.



OFF position locking using a keylock and padlocks.

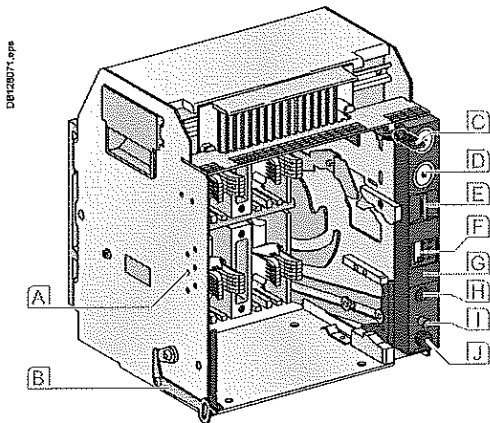
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**Chassis locking**



- A** mismatch protection
- B** door interlock
- C** racking interlock
- D** keylock locking
- E** padlock locking
- F** position indicator
- G** chassis front plate (accessible with cubicle door closed)
- H** crank entry
- I** reset button
- J** crank storage

**"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).

**"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**

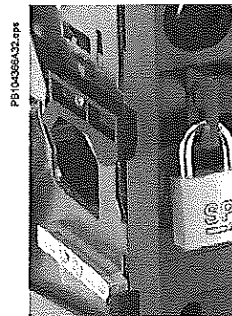
Mounted on the right or left-hand side of the chassis, this device inhibits opening of the cubicle door when the circuit breaker is in connected or test position. If the breaker is put in the connected position with the door open, the door may be closed without having to disconnect the circuit breaker.

**Racking interlock VPOC**

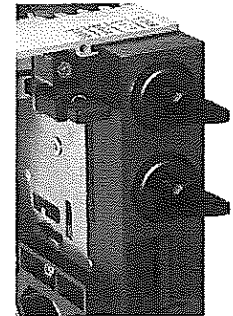
This device prevents insertion of the crank when the cubicle door is open (device cannot be connected).

**Mismatch protection VDC**

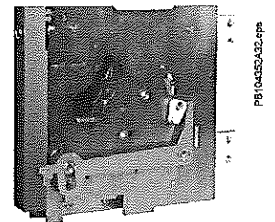
Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics. It is made up of two parts (one on the chassis and one on the circuit breaker) offering twenty different combinations that the user may select.



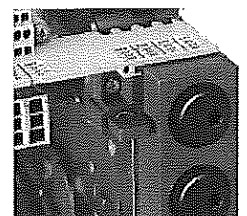
"Disconnected" position locking by padlocks.



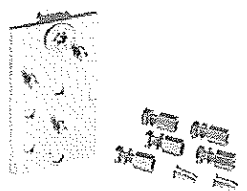
"Disconnected" position locking by keylocks.



Door interlock.



Racking interlock.



Mismatch protection.

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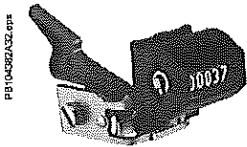
# Electrical and mechanical accessories

## Compact NS630b to 1600



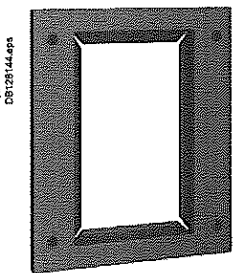
PE10474632.0ps

Auxiliary terminal shield.



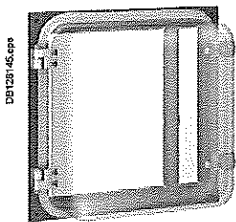
PE104362432.0ps

Operation counter.



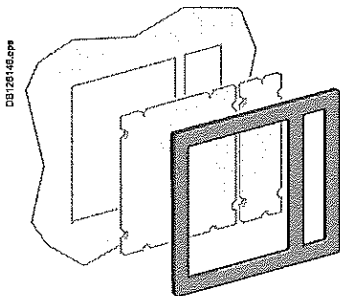
DB128144.0ps

Escutcheon.



DB128146.0ps

Transparent cover.



DB128148.0ps

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. This option is mandatory for Source-changeover systems and only compatible with electrically operated devices.

#### Escutcheon (CDP)

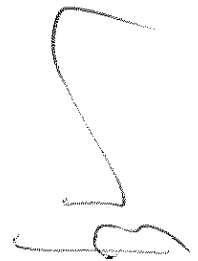
Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP40. It is available in fixed and withdrawable versions.

#### Transparent cover (CCP) for escutcheon

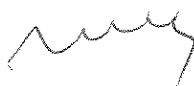
Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP54 and the degree of protection against mechanical impacts to IK10. It may be used for withdrawable devices only.

#### 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.



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# Installation recommendations

Operating conditions ..... B-2

Installation in switchboards

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Safety clearances and minimum distances ..... B-4

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Door interlock for Compact NS630b to 1600 ..... B-6

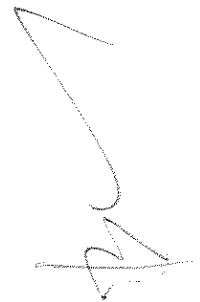
Control wiring ..... B-7

Temperature derating

Compact NS devices equipped with electronic trip units ..... B-8

Power dissipation / Resistance

Compact NS devices equipped with electronic trip units ..... B-9



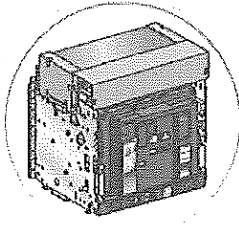
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# Operating conditions

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.

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### 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 U <sub>imp</sub> (kV)	8	7.1	6.4	5.6
Rated insulation voltage (U <sub>i</sub> )	800	710	635	560
Maximum rated operational voltage 50/60 Hz U <sub>e</sub> (V)	690	690	635	560
Rated current 40 °C	1 x I <sub>n</sub>	0.99 x I <sub>n</sub>	0.96 x I <sub>n</sub>	0.94 x I <sub>n</sub>

Intermediate values may be obtained by interpolation.

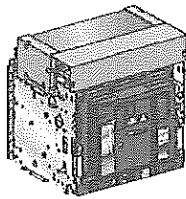
### Vibrations

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.



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### Electromagnetic disturbances

Compact NS devices are protected against:

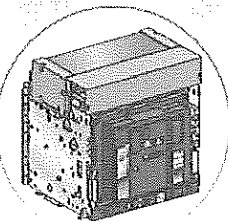
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced 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 recommendations

## Installation in switchboards

### Power supply and weights

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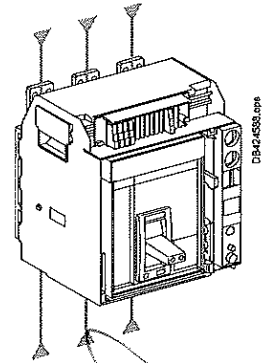
#### Power supply

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

		<b>Circuit breaker</b>	<b>Chassis</b>
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 accessories, which must be summed to obtain the total weight of complete configurations.



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# Installation in switchboards

## Safety clearances and minimum distances

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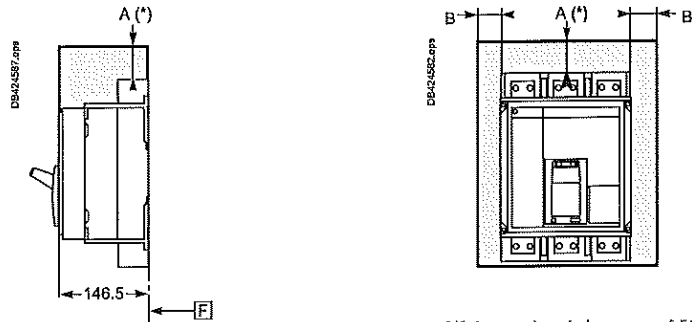
### General rules

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.

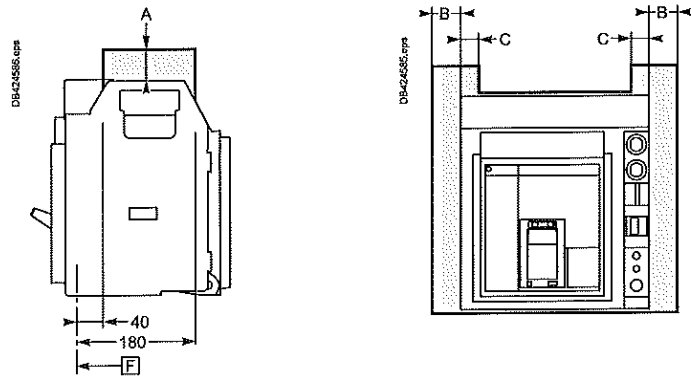
Compact NS630b to 3200 (fixed devices)



[\*] An overhead clearance of 50 mm is required to remove the arc chutes.

	Insulated parts	Metal parts	Live parts
<b>NS630b to 1600</b>			
A	0	120	180
B	0	10	60
<b>NS1600b to 3200</b>			
A	50	170	230
B	0	10	60

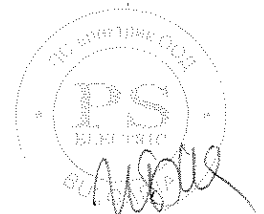
Compact NS630b to 1600 (withdrawable devices)



	Insulated parts	Metal parts	Live parts
A	0	0	30
B	10	10	60
C	0	0	30

[E] Datum

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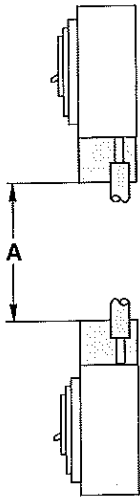


# Installation recommendations

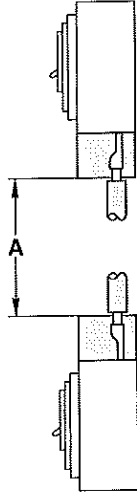
## Installation in switchboards

### Installation example

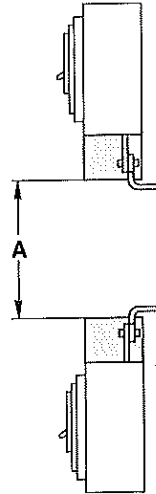
DB42/500/079



Direct connection by bare cables, devices with terminal shields.

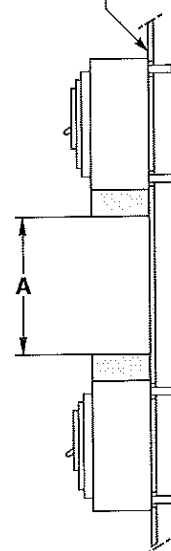


Connection by cables with lugs, devices with terminal shields.



Connection by insulated bars, devices with terminal shields.

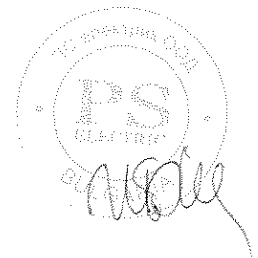
Painted sheetmetal



Rear connection devices with terminal shields.

Minimum dimensions (mm)	A
<b>Compact circuit breaker</b>	
NS630b-1600	250
NS1600b-3200	300

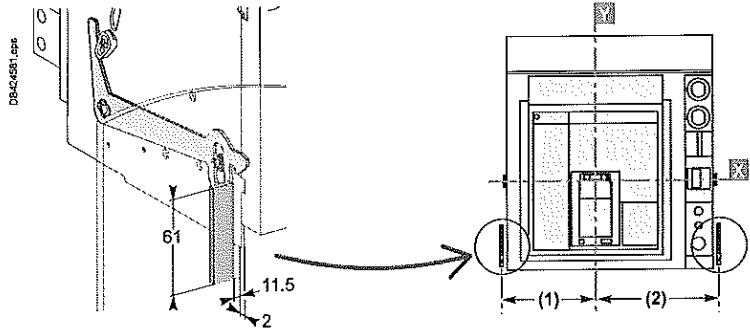
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# Door interlock for Compact NS630b to 1600

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.

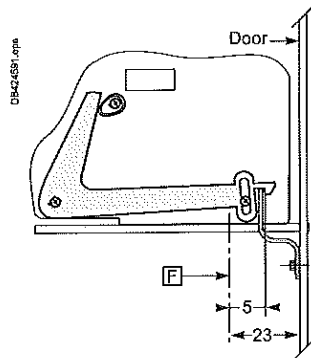
B



Dimensions (mm)		
Type	(1)	(2)
NS630b to 1600 (3P)	135	168
NS630b to 1600 (4P)	205	168

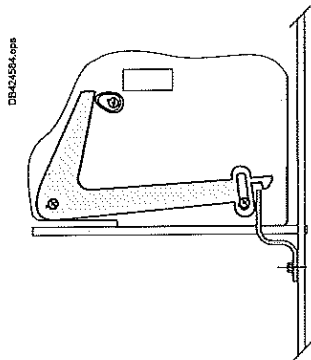
Device in the connected or test positions

### Door locked



Device in the disconnected position

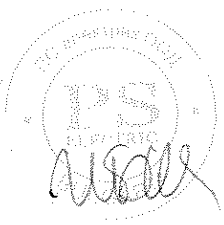
### Door not locked



Note: The door interlock may be mounted on either the left or right-hand side of the chassis.

[F] Datum

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## 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	1.5	2.5	1.5	2.5	1.5 mm <sup>2</sup>
		mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>	mm <sup>2</sup>
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+)**

- It is recommended to use the AD power supply due to its low stray primary-secondary capacitance. Good operation of the Micrologic Trip Unit in noisy environment is not guaranteed with other power supplies.
- The dedicated AD power supplies shall be used only for the Micrologic trip units. If the COM option is used, a second dedicated power supply shall be used.
- The consumption of a Micrologic Trip Unit is approximately 100mA.
- For Micrologics control units alone, a number of 10 devices can be connected to the same AD power supply. Add other AD power supply for more than 10 Micrologics.
- If the installation is shared between several panels, one AD power supply shall be added for each panel.
- AD power supply dedicated to Micrologics trip units shall not be connected to earth. (F1-, F2+).

**External 24 V DC power supply for Communication bus**

- A dedicated 24 V DC power supply shall be used for the communication devices.
- Do not connect the positive terminal (E1) to earth.
- The negative terminal (E2) can be connected to earth.
- A number of communication modules (BCM, IFE, IFM, I/O, FDM...) can be connected to the same 24 V DC power supply. Refer below the devices consumption table to avoid exceeding the maximum current delivered by the 24 V DC power supply.

**ULP module consumption**

The table below lists the ULP module consumption.

Module	Typical Consumption (24 V DC at 20 °C / 68 °F)	Maximum Consumption (19.2 V DC at 60 °C / 140 °F)
BCM ULP for Masterpact and Compact NS	40 mA	65 mA
Micrologic 5 or 6 trip unit for Compact NSX circuit breakers	30 mA	55 mA
BSCM for Compact NSX circuit breakers	9 mA	15 mA
2-wire RS 485 isolated repeater	15 mA	19 mA
FDM121 display for LV circuit breaker	21 mA	30 mA
IFM Modbus-SL interface for LV circuit breaker	21 mA	30 mA
IFE Ethernet interface for LV circuit breaker	120 mA	3 A (with gateway)
I/O input/output interface module for LV circuit breaker	165 mA	420 mA
Maintenance module	0 mA (the maintenance module has its own power supply)	0 mA (the maintenance module has its own power supply)

**Installation recommendation**

- The 24 V DC wires (output of the 24 V DC power supply) shall be twist together.
- The 24 V DC wires (output of the 24 V DC power supply) must cross all power cables perpendicularly.
- The technical characteristics of the external 24 V DC power-supply module for Micrologic control units are indicated on page A-28.

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. T <sub>i</sub> [2]	40	45	50	55	60	65	70	40	45	50	55	60	65
NS630b N/L	630	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	800
NS1000 N/L	1000	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	1250	1180
NS1600 N	1600	1600	1560	1510	1470	1420	1360	1600	1600	1600	1600	1600	1600	1510	1460

Version	Withdrawable device														
	Connection	Front or horizontal rear							Vertical rear						
		temp. T <sub>i</sub> [2]	40	45	50	55	60	65	70	40	45	50	55	60	65
NS630b N/L	630	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	800
NS1000 N/L	1000	1000	1000	1000	1000	1000	920	1000	1000	1000	1000	1000	1000	1000	990
NS1250 N	1250	1250	1250	1250	1250	1170	1000	1250	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. T <sub>i</sub> [2]	40	45	50	55	60	65	70	40	45	50	55	60	65
NS1600b N	1600	1600	1600	1600	1500	1450	1400	1600	1600	1600	1600	1600	1600	1550	1500
NS2000 N	2000	2000	2000	2000	1900	1800	1700	2000	2000	2000	2000	2000	2000	1900	1800
NS2500 N	2500	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] T<sub>i</sub>: temperature around the circuit breaker and its connections.

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# Power dissipation / Resistance

## Compact NS devices equipped with electronic trip units

B

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	
	R/pole	P/pole
NS1600b	0.019	84
NS2000	0.013	84
NS2500	0.008	100
NS3200	0.008	227

B

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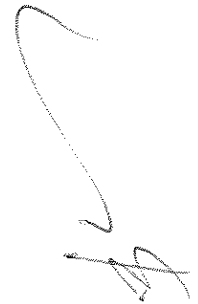
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Schneider Electric  
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## Dimensions and connection

<b>Compact NS630b to 1600 (fixed version)</b>	
Dimensions .....	C-2
Mounting .....	C-3
Front-panel cutouts .....	C-4
Rotary handle.....	C-5
<b>Compact NS630b to 1600 (withdrawable version)</b>	
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<b>Compact NS1600b to 3200 (fixed version)</b>	
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External modules.....	C-9
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Recommended drilling dimensions.....	C-24
<b>Power connections for Compact NS1600b to 3200</b>	
Recommended drilling dimensions.....	C-25
<b>Power connections for Compact NS630b to 3200.....</b>	
Sizing of bars .....	C-26
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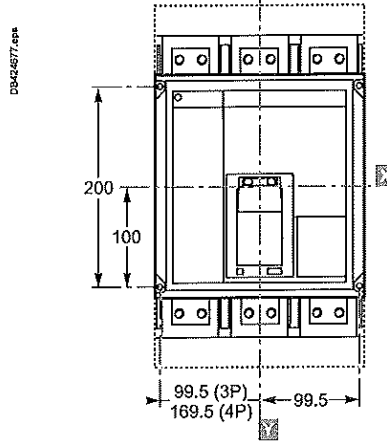
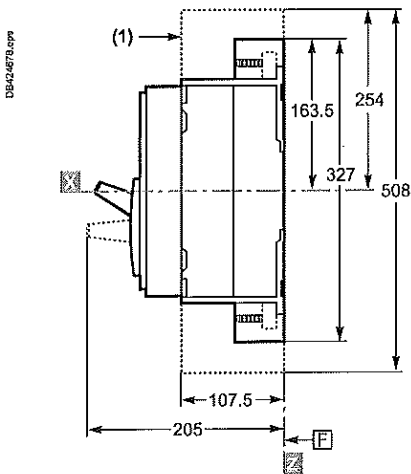
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# Compact NS630b to 1600 (fixed version)

## Dimensions

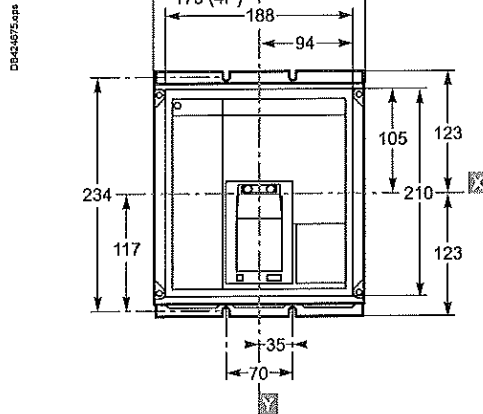
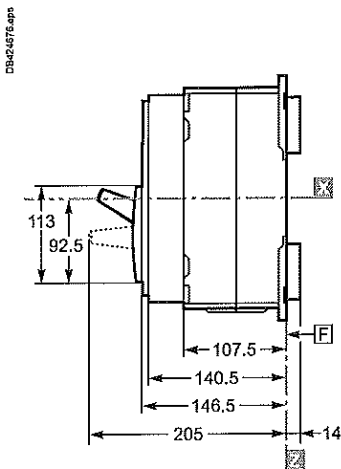
### Manual control

#### Front connection (N, L)



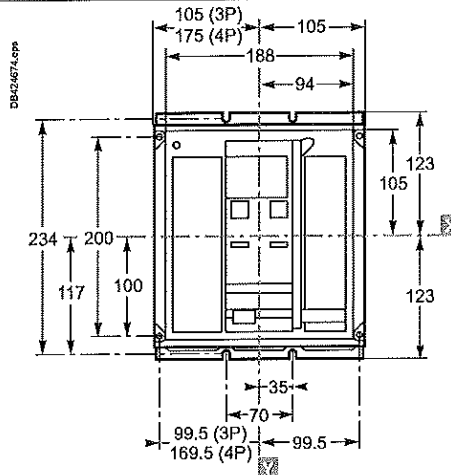
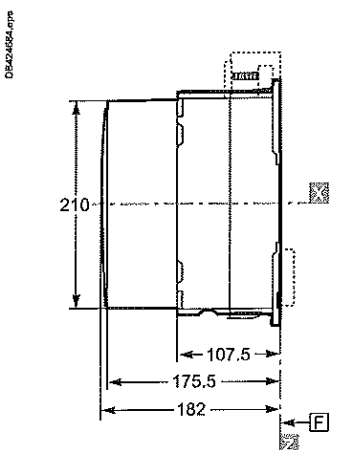
[1] Terminal shields are optional.

#### Rear connection (N, L, LB)

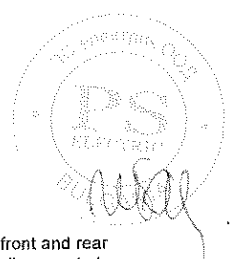


### Electrical control

#### Front and rear connection (N, L, LB)



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**F**: Datum.

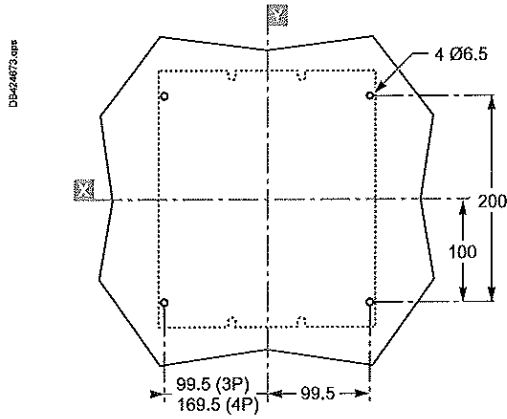
Note: Dimensions for front and rear connection on electrically operated devices are identical to those for manually operated devices.



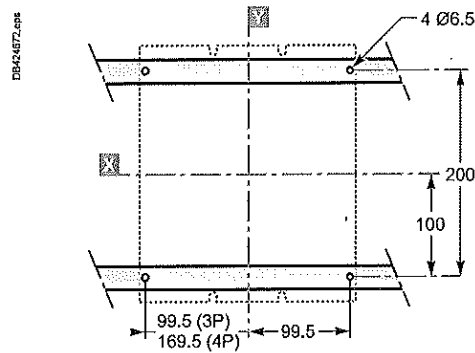
# Compact NS630b to 1600 (fixed version) Mounting

## Front connection

### On backplate

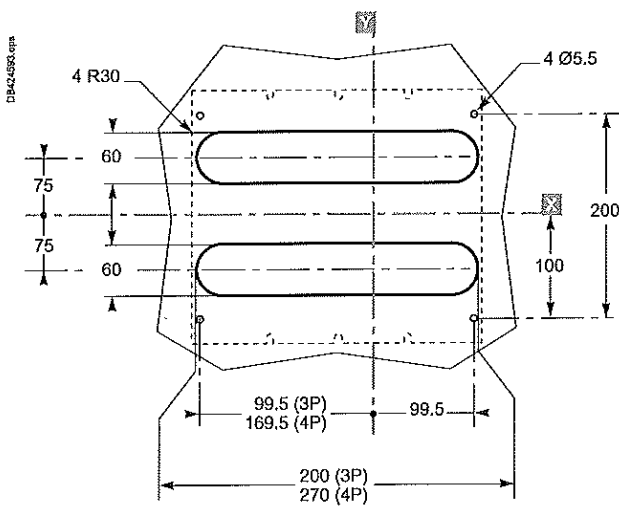


### On rails

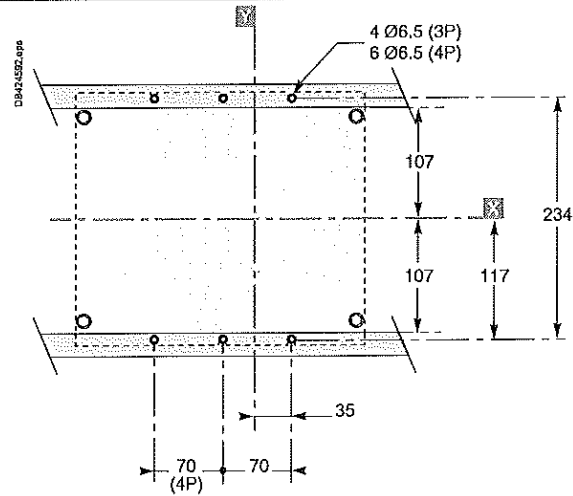


## Rear connection

### On backplate



### On rails



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Note: Mounting parameters for electrically operated devices are identical to those for manually operated devices.

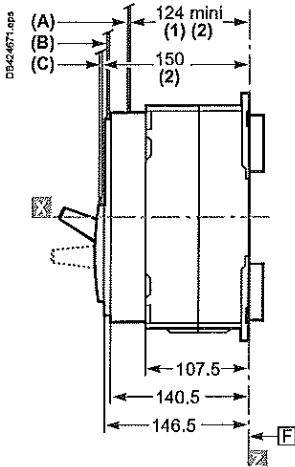
☒ and ☒ are the symmetry planes for a 3-pole device

☒ is the back plane of the device.

# Compact NS630b to 1600 (fixed version) Front-panel cutouts

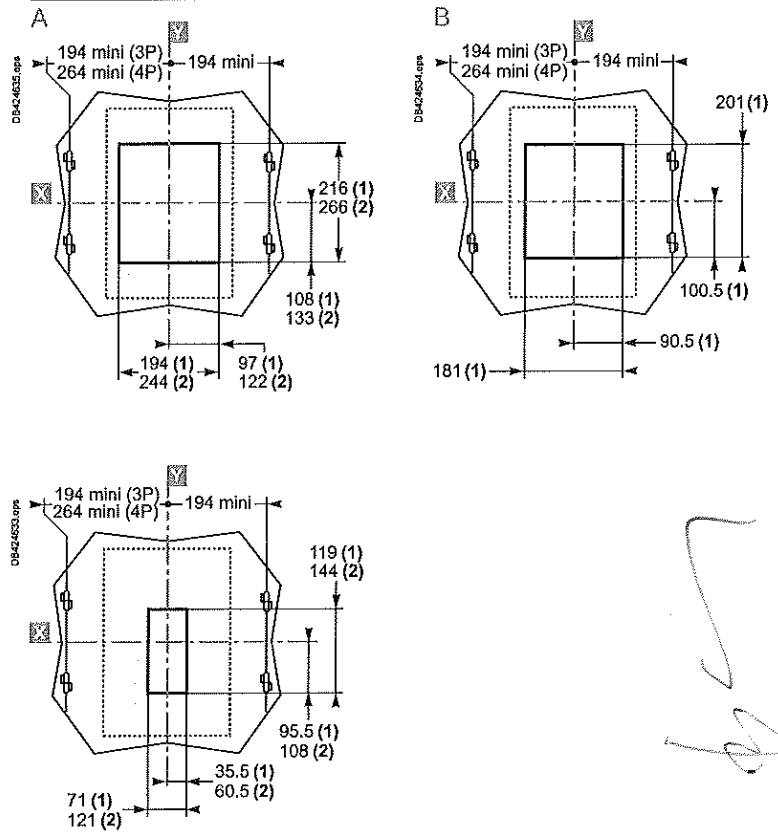
## Toggle control

*B*



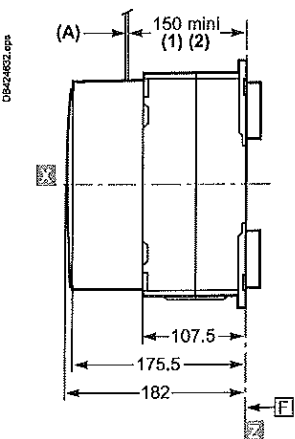
**F** : Datum.  
[1] Without escutcheon.  
[2] With escutcheon.

## Door cutout



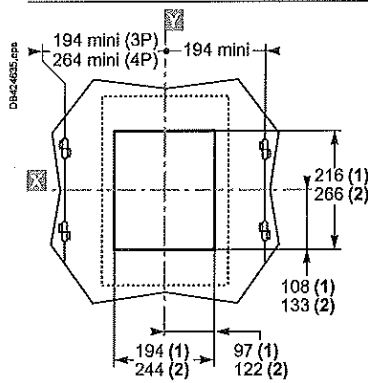
*Handwritten mark resembling a checkmark or 'L' shape.*

## Electrical control



**F** : Datum.  
[1] Without escutcheon.  
[2] With escutcheon.

## Door cutout A



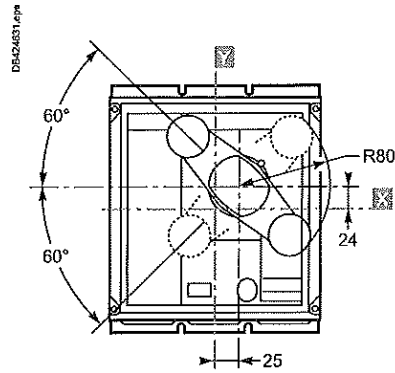
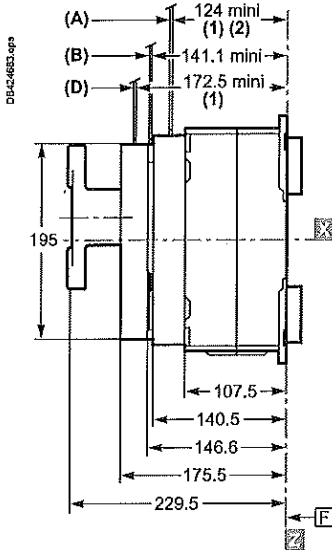
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# Compact NS630b to 1600 (fixed version) Rotary handle

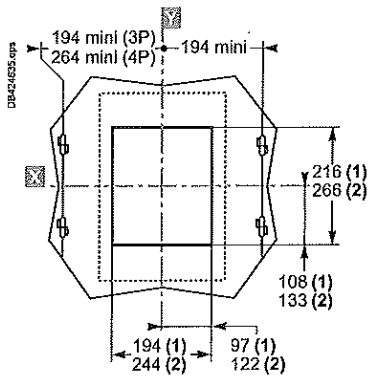
## Direct rotary handle

### Dimensions

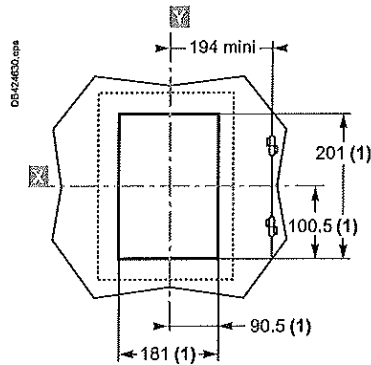


### Door cutout

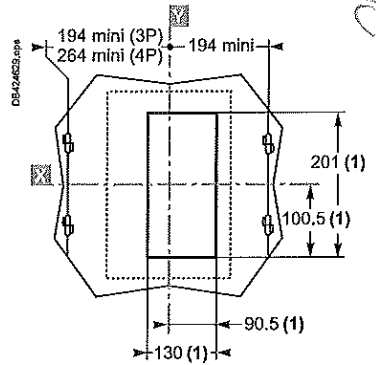
A



B



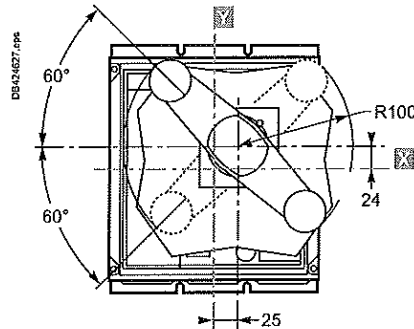
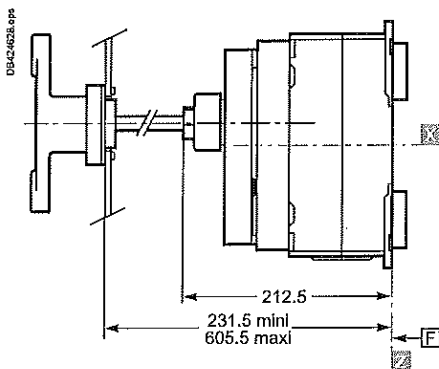
D



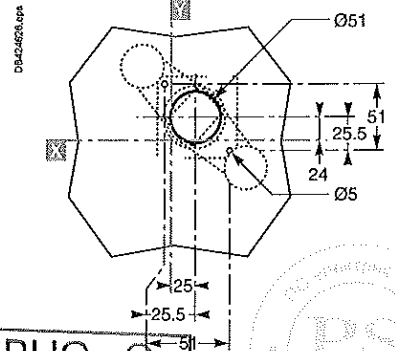
[1] Without escutcheon.  
[2] With escutcheon.

## Extended rotary handle

### Dimensions

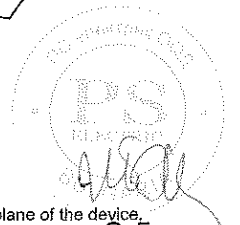
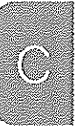


### Door cutout



[F] : Datum.

Note: [ ] and [ ] are the symmetry planes for a 3-pole device [ ] is the back plane of the device.



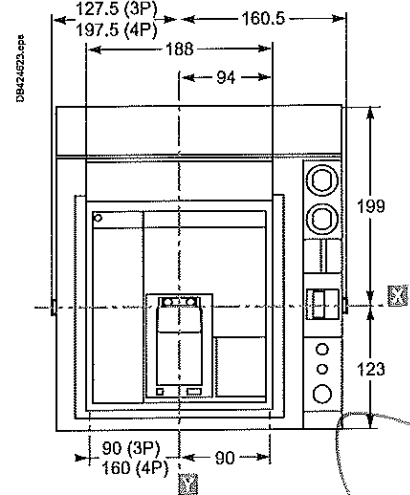
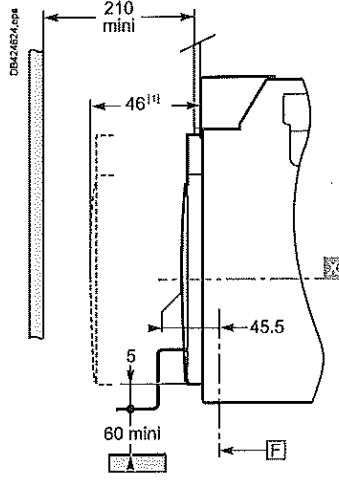
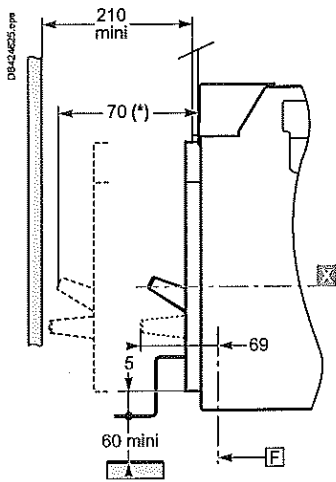
# Compact NS630b to 1600 (withdrawable version)

## Dimensions, mounting and cutouts

### Dimensions

#### Manual control

#### Electrical control

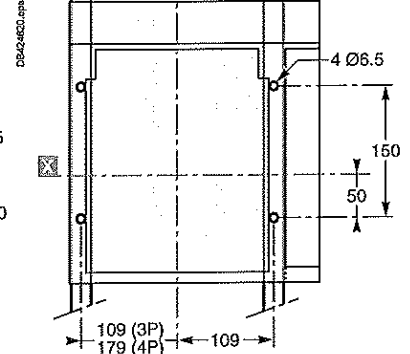
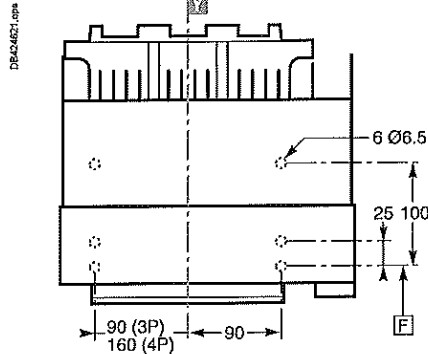
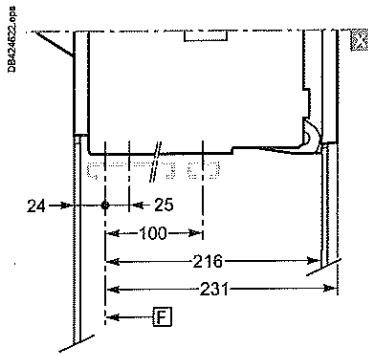


[1] Withdrawable position

### Mounting

#### Bottom mounting on base plate or rails

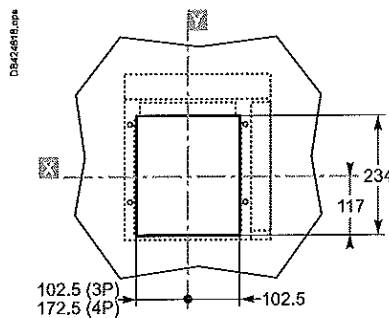
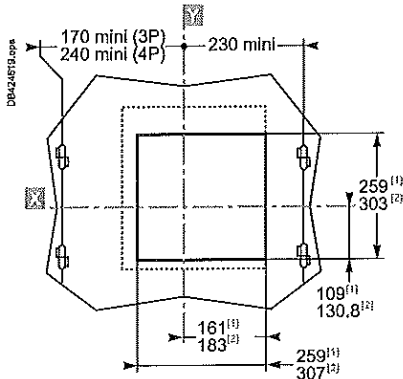
#### Vertical on uprights or backplate



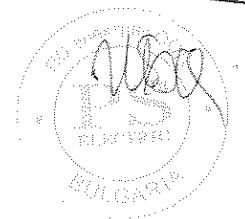
### Cutouts

#### Door cutout

#### Rear panel cutout



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[1] Without escutcheon.

[2] With escutcheon.

[F] : Datum.

Note: [X] and [Y] are the symmetry planes for a 3-pole device.

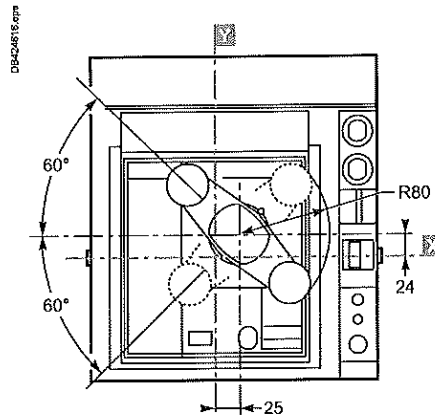
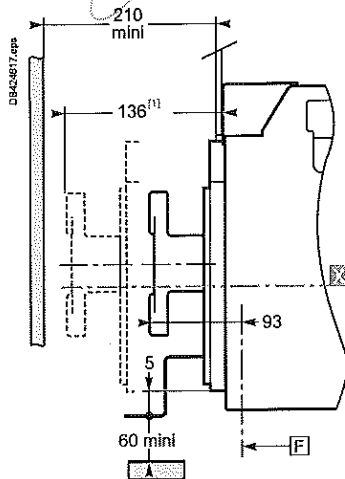
*Handwritten signature*

# Compact NS630b to 1600 (withdrawable version)

## Rotary handle

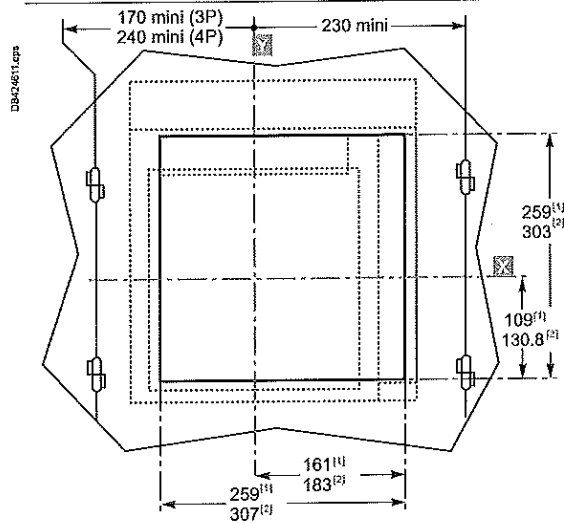
### Direct rotary handle

#### Dimensions



[1] Withdrawable position.

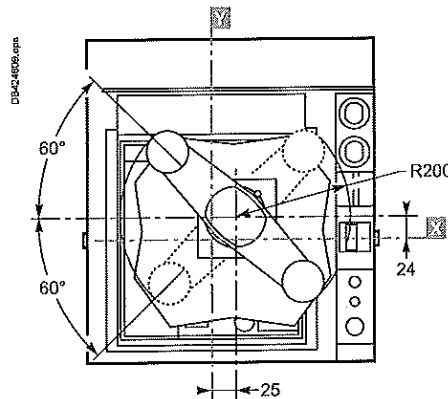
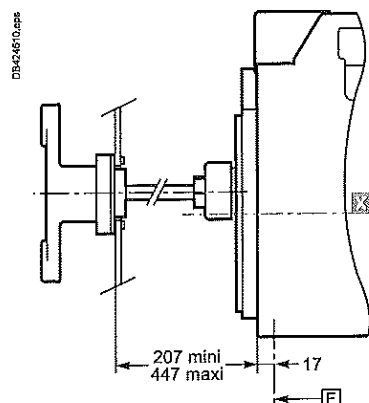
#### Door cutout



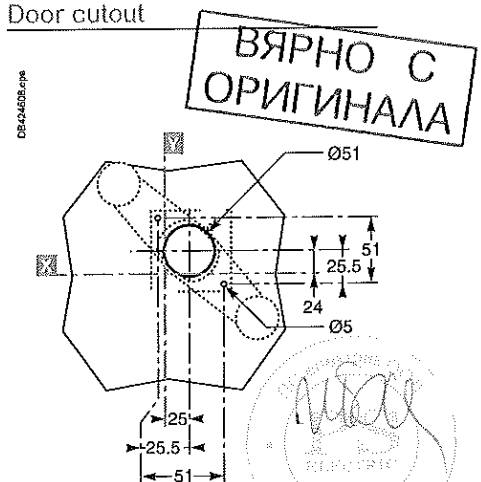
[1] Without escutcheon.  
[2] With escutcheon.

### Extended rotary handle

#### Dimensions



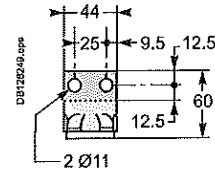
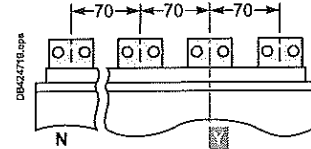
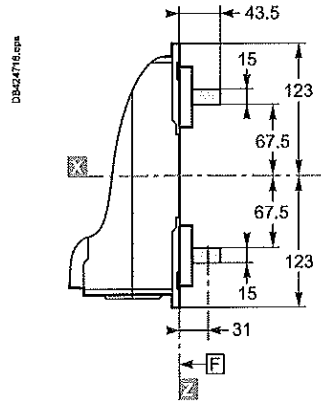
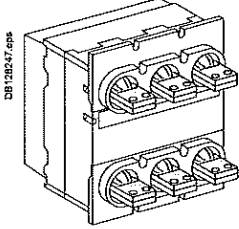
#### Door cutout



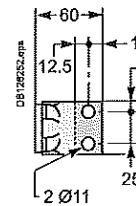
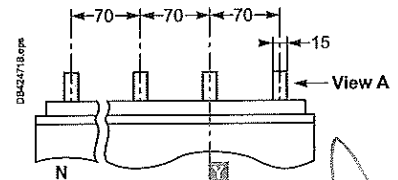
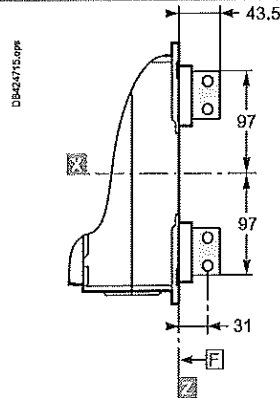
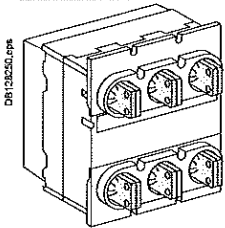
Note: [X] and [Y] are the symmetry planes for a 3-pole device.

# Compact NS630b to 1600 (fixed version) Bars

## Horizontal rear connection

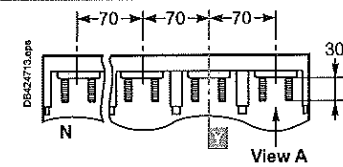
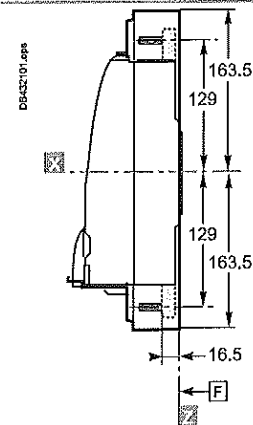
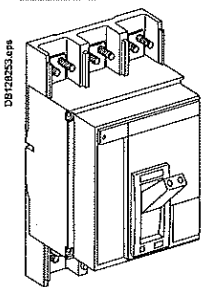


## Vertical rear connection



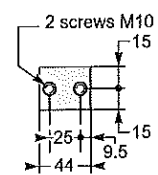
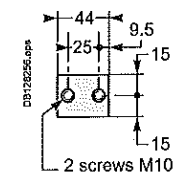
View A detail.

## 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.

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Electric

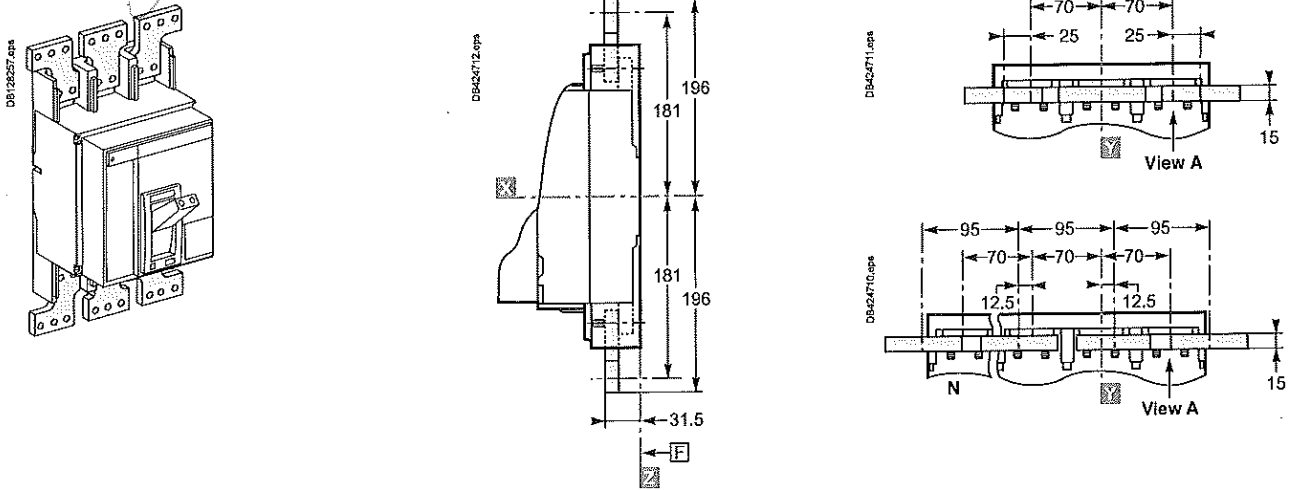
ВЯРНО С  
ОРИГИНАЛА



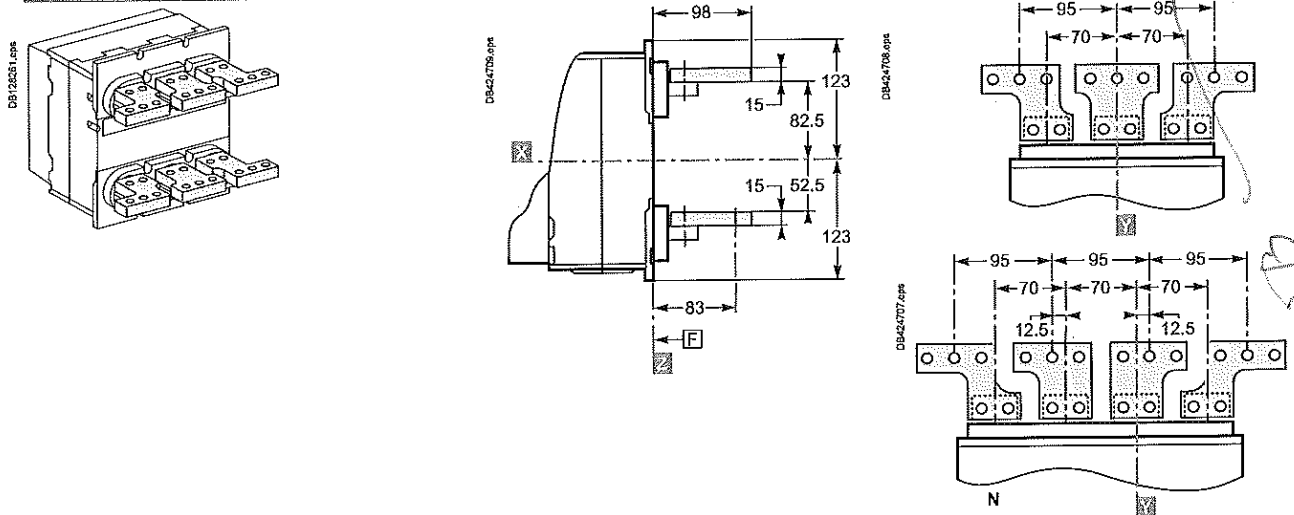
*Handwritten signature*

# Dimensions and connection Compact NS630b to 1600 (fixed version) Bars

## Front connection with spreaders

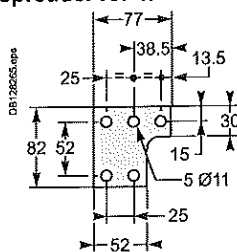


## Rear connection with spreaders



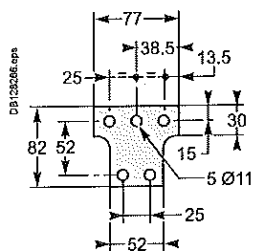
## Spreader detail

Middle left or middle right spreader for 4P

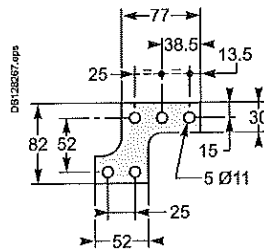


View A detail.

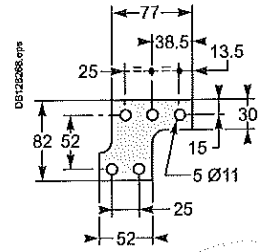
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P



**F** : Datum.

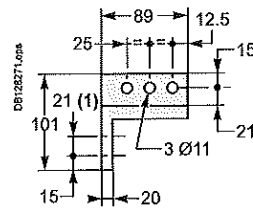
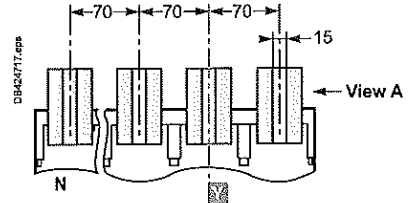
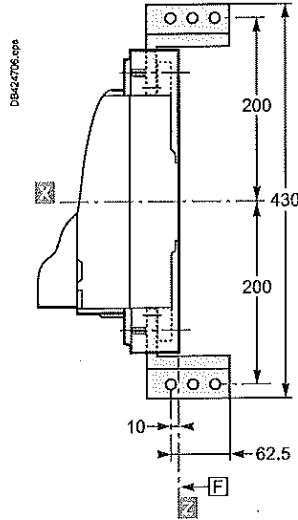
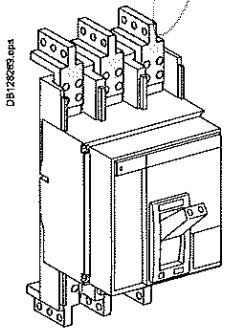
Note: and are the symmetry planes for a 3-pole device.

**ВЯРНО С  
ОРИГИНАЛА**

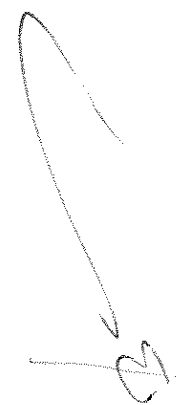


# Compact NS630b to 1600 (fixed version) Bars

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.

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*Handwritten signature*



