LV power air circuit breakers
and switch-disconnectors

Compact Merlin Gerin
80 to 3200 A

Catalogue

2005

Merlin Gerin
Modicon
Square D
Telemecanique

Schneider Electric

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Design: Schneider Electric - AMEG
Photos: Schneider Electric
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046751

Compact NS 80 A

045345

Compact NS 100 to 250 A

053100

Compact NS 400 to 630 A

Things will never be the same

E45151

Compact NS 630 to 1600 A

E45178

Compact NS 1600 to 3200 A

New Compact NS, setting the standard, once again...

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

Today, Schneider Electric continues to innovate, extending the Compact NS range to high power ratings to offer a comprehensive and consistent range from 80 to 3200 A. Equipped with the new generation of Micrologic control units, Compact NS630b to 3200 circuit breakers integrate electrical measurement and analysis functions.

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

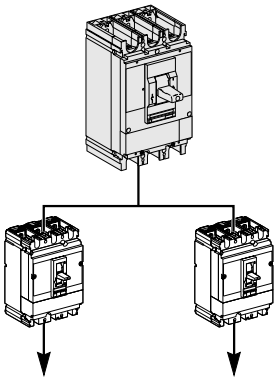
A wide range of optimised auxiliaries and accessories is also available to meet the needs of even more applications.

Compact NS, simply a step ahead...

Compact NS, even more applications…

Protection of LV distribution systems p. xx

E20999



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

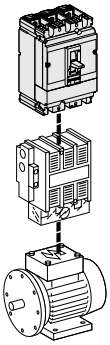
Installation :
- in power switchboards
- on symmetrical rails (see page xx)

Special applications:
- 1000 V distribution systems (see page xx)
- 400 Hz distribution systems (see page xx)
- single-phase and two-phase systems (see page xx)
- DC systems (see page xx).

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 motor feeders p. xx

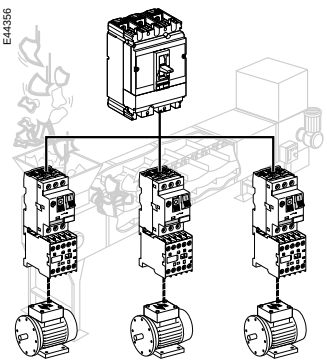
E26988



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.

Protection of machines p. xx

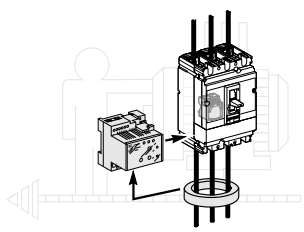
E44356



The different circuit-breaker versions in the Compact NS range are designed to meet the specific requirements of machines:
- compliance with international standards IEC 60947-2 and UL 508 / CSA 22-2 No. 14
- compliance with U.S. standard UL 489
- protection against overloads and short-circuits
- positive contact indication
- installation in universal functional enclosures.

Earth-leakage protection p. xx

E44357

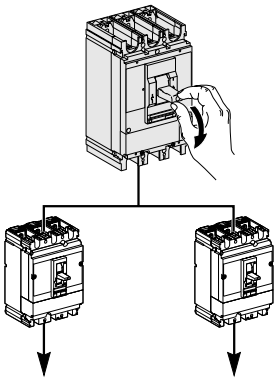


Additional earth-leakage protection protects life and property against the risks of faulty insulation in the installation. Depending on the circuit breaker, earth-leakage protection is provided by:
- adding a Vigi module to the circuit breaker
- using a specific Micrologic control unit
- using a Vigirex relay and separate toroids.

Switch-disconnectors

p. xx

E21272



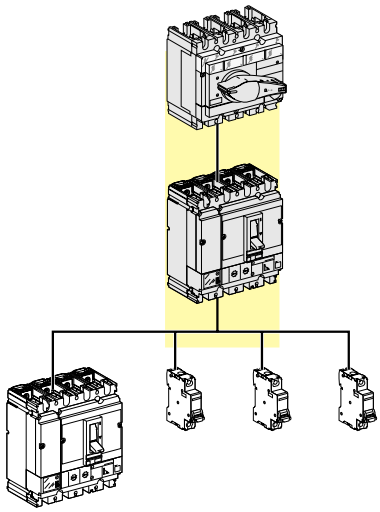
A switch-disconnector version of Compact NS circuit breakers exists for circuit control and isolation.
All the additional functions may be combined with the basic switch-disconnector function, including:
- earth-leakage protection
- motor mechanism
- ammeter, etc.

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

Service connection

p. xx

E56631



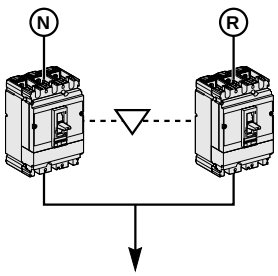
Compact NS service-connection circuit breakers are specially designed for the service-connection function:
- lead seals and locking systems
- tripping curves certified by utilities
- fast overload curves to limit the power supplied, etc.

Interpact 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.

Source-changeover systems

p. xx (see also the "Source-changeover system" catalogue)

E32454



To ensure a continuous supply of power, some electrical installations are connected to two power sources:
- a normal source
- a replacement source on hand to supply the installation when the normal source is not available.

A mechanical and/or electrical interlocking system between two Interpact, Compact or Masterpact devices avoids all risk of parallel connection of the sources during switching.

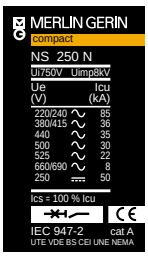
A source-changeover system can be:
- manual with mechanical interlocking between the devices
- remote controlled when an electrical interlocking function in added
- automatic when a controller is added to manage switching from one source to the other on the basis of external parameters.

UL 489 applications

Compact NS circuit breakers also meet the requirements of applications governed by standard UL 489 (see the corresponding catalogue).

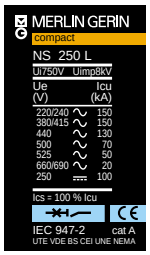
The Compact NS range now covers all ratings from 80 to 3200 A:
- *Compact NS80 to 1600 A, fixed, withdrawable, front or rear connections, manual or motorised operation*
- *Compact NS1600 to 3200 A, fixed, front connection, manual operation.*

E27836



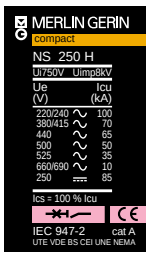
***N**: standard breaking capacity*

E27838



***L**: very high breaking capacity*

E27837



***H**: high breaking capacity*

The rating plates on the front panel of each device indicate the breaking capacity (N, H or L).

Compact NS100 to 630

Service breaking capacity
Ics at 415 V

E58549

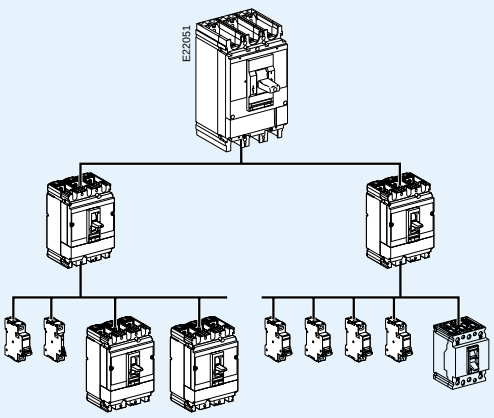
Compact NS630b to 1600

Service breaking capacity
Ics at 415 V

E58550

Total discrimination as standard

E22051



Discrimination between Compact NS circuit breakers is total for all types of faults (overloads, high or low short-circuits) and whatever the type of trip unit used with the circuit breaker.

Compact NS1600b to 3200

Service breaking capacity
Ics at 415 V

E58551

041625

Manual Compact NS250 with thermal-magnetic trip unit

053100

Compact NS400 with electronic trip unit

047313

Compact NS250 with motor mechanism

041879

Withdrawable Compact NS250 on chassis

Plug-in Compact NS250 on base

E45151

Compact NS800 with manual control

E45163

Withdrawable Compact NS800 with electrical control

E45178

Compact circuit breakers make it possible to standardise switchboards for faster installation and fewer errors.
All type L Compact circuit breakers (150 kA) are housed in the same case as the type N and type H models with the same ratings.
Compact circuit breakers up to 1600 A can be easily installed side-by-side in a minimum amount of space.

5 frame sizes from 80 to 3200 A

80 A

100 to 250 A

400 to 630 A

630 to 1600 A

1600 to 3200 A

Many connection possibilities

Numerous connection possibilities, including front and rear connections for bare cables, cable lugs or bars, as well as plug-in or withdrawable versions, are available using accessories that can be rapidly added to the circuit breaker.

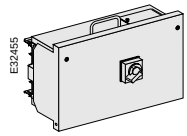
Connection parts for Compact NS

UPlug-in and withdrawable versions

Plug-in and withdrawable versions for:
■ fast removal or insertion of the circuit breaker without exposure to live parts
■ standby outgoing circuits ready for wiring and circuit breaker installation at a later date
■ visible break possibility.

Busways

Compact NS circuit breakers up to 630 A can be installed in tap-off units of the Telemecanique Canalis range of busbar trunking.



Each Compact NS circuit breaker provides different types of protection, depending on the trip unit or control unit selected. Additional measurement and indication functions are available:
- *on Compact NS100 to 630, by adding an electrical auxiliary to the circuit breaker*
- *on Compact NS630b to 3200, depending on the Micrologic control unit selected.*

Compact NS100 to 630

On Compact NS100 to NS250 circuit breakers, the thermal-magnetic and electronic trip units are interchangeable and may be rapidly fitted to the circuit breakers. It is therefore easy to change the protection of a given circuit following a modification in an installation.

On Compact NS400 and NS630 circuit breakers, the electronic trip units are interchangeable, plug-in modules. The STR53UE trip unit offers a large number of protection settings:

standard:
- specific indication of the different types of faults (overloads, short-circuits, etc.)

optional:
- built-in ammeter
- earth-fault protection
- communication: transmission of all information concerning circuit-breaker operation to an electrical distribution control, monitoring and automation system via Digipact modules (see page xx)


041625

Compact NS250


041638

TM thermal-magnetic trip unit


041641

STR electronic trip unit


048287

Voltage presence indication module


045212

Ammeter module

Compact NS630b to 3200

Compact NS630b to 3200 circuit breakers are equipped with Micrologic control units that may added or replaced on site.

Micrologic 2.0 and 2.0 A control units offer standard protection. Micrologic 5.0 and 5.0 A control units offer selective protection that can be completed by earth-fault protection on Micrologic 6.0 A and earth-leakage protection on Micrologic 7.0 A control units.

The ammeter version of Micrologic control units provides current measurements. These units are equipped with a digital display and bargraph, used in conjunction with simple navigation buttons. Access to the desired parameters and settings is direct and navigation between screens is intuitive. Settings are greatly simplified by direct display on the screen.


E45151

Compact NS1600

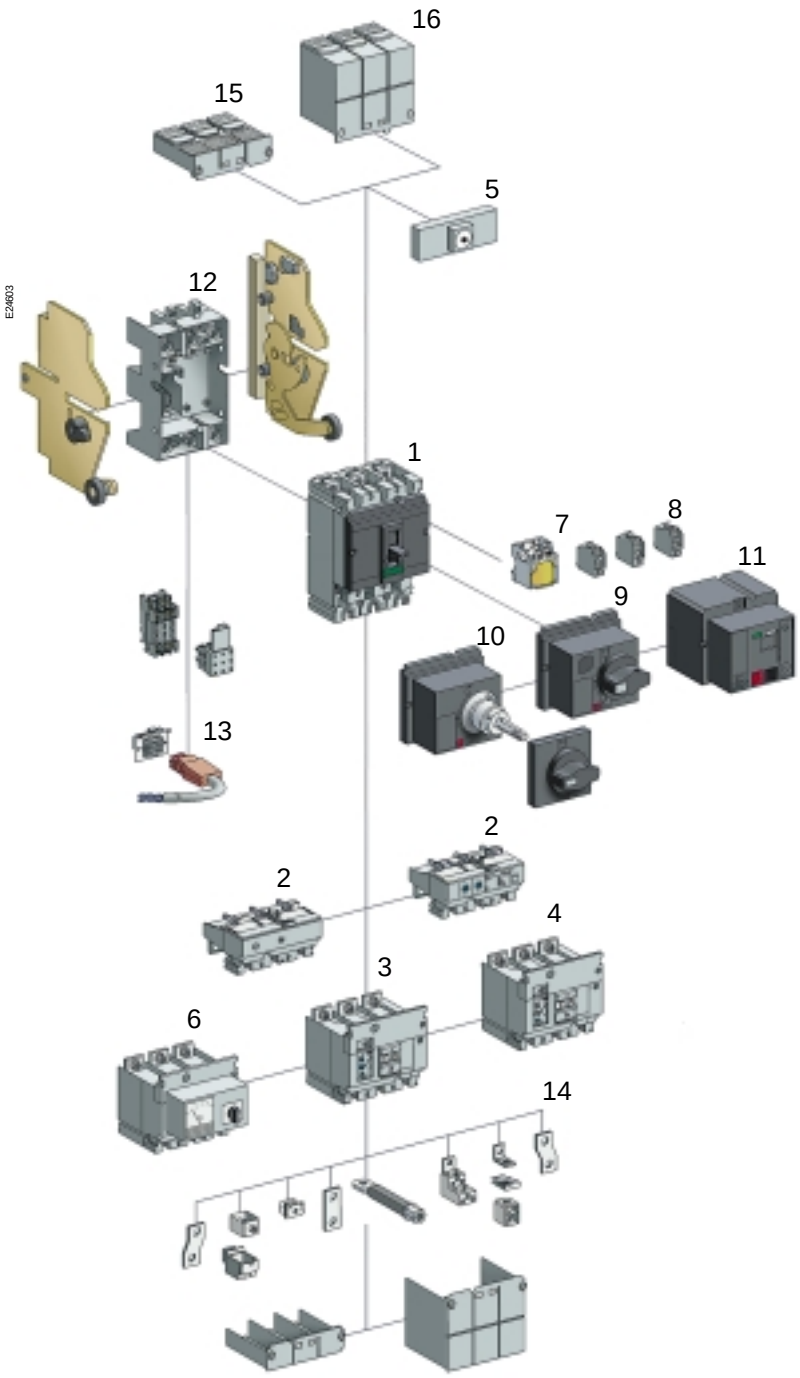

056479

Micrologic 2.0, 5.0


056480

Micrologic 2.0 A, 5.0 A, 6.0 A, 7.0 A

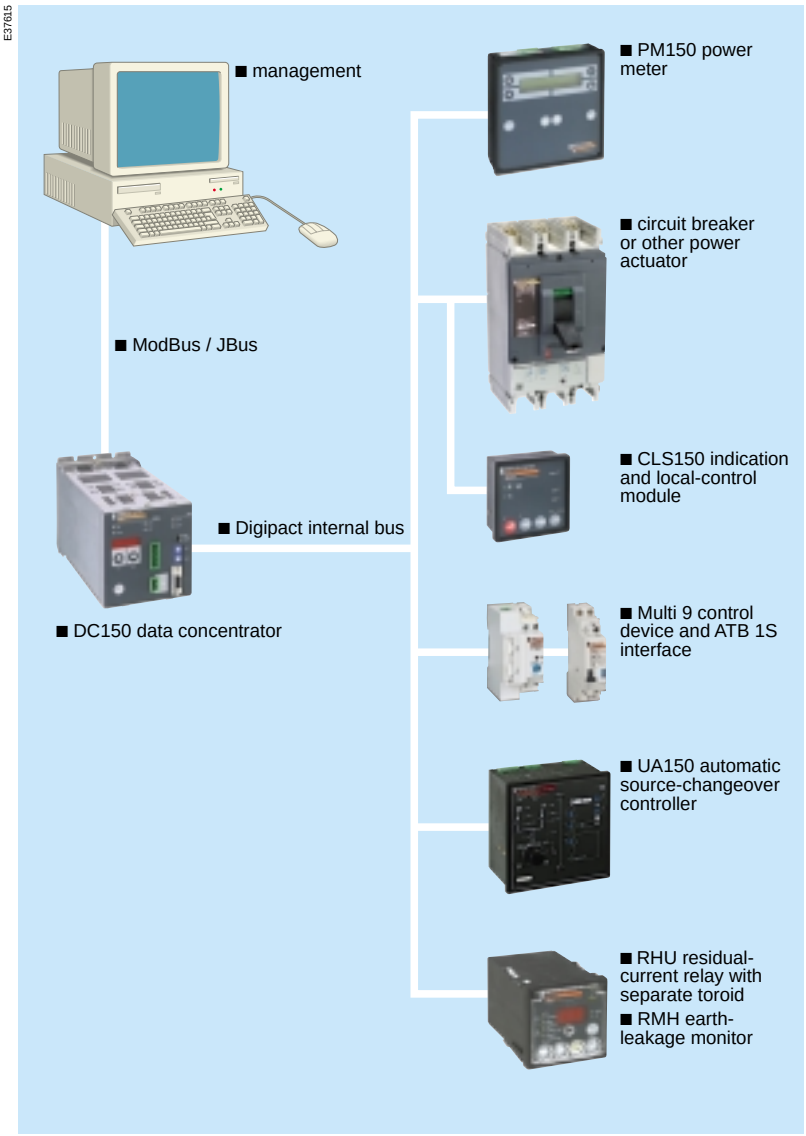
A complete system of add-on modules for Compact NS:
Fewer catalogue numbers means immediate availability of parts for all solutions.
Trip units, control units, auxiliaries and installation and connection accessories are the same for a given frame size and often for a number of frame sizes (e.g. auxiliary contacts, MN and MX voltage releases, etc.):
- Compact NS800 to NSA160
- Compact NS100 to NS250
- Compact NS400 to NS630
- Compact NS630b to 1600
- Compact 1600b to 3200.



1 *Breaking unit*
2 *Trip units or control units*
3 *Vigi earth-fault protection module*
4 *Insulation monitoring module*
5 *Voltage presence indicator*
6 *Ammeter module*
7 *MN and MX voltage releases*
8 *Multifunction auxiliary contact*
9 *Direct rotary handle*
10 *Extended rotary handle*
11 *Motor mechanism*
12 *Plug-in base*
13 *Connection of auxiliary circuits to plug-in base or withdrawable chassis*
14 *Connection accessories*
15 *Short terminal shields*
16 *Long terminal shields*

Open communication ...

Equipped with a communications option, Compact NS circuit breakers fit perfectly in the Digipact installation-management system or other supervision systems. Via a PC or a PLC, the operator can:
- display the status of each circuit breaker and its settings
- control the circuit breakers
- display faults
- access measurements supplied by the electronic control units.



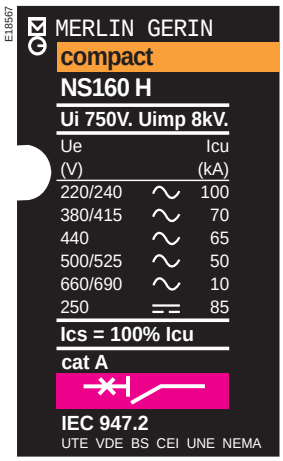
Digipact installation-management system

... and protection of the environment

Schneider Electric fully takes into account environmental requirements, starting right from the design stage of products through to the end of their service life:
- the materials used for Compact NS are not dangerous for the environment
- the production facilities are non-polluting in compliance with the IS 14001 standard
- filtered breaking for the high ratings eliminates pollution in the switchboard
- the energy dissipated per pole is low, making energy losses insignificant
- the materials are marked to facilitate sorting for recycling at the end of product service life.

Selection of a Compact NS circuit breaker depends on the application requiring protection (distribution systems, motor feeders, etc.) and on the prescribed installation conditions (see section “Installation, connection and auxiliaries”).

General characteristics



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*
	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 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 III 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 68-2-1 - dry cold (-55° C)
■ IEC 68-2-2 - dry heat (+85° C)
■ IEC 68-2-30 - damp heat (95% relative humidity at 55°C)
■ IEC 68-2-52 - salt mist (severity level 2).

Environmental protection

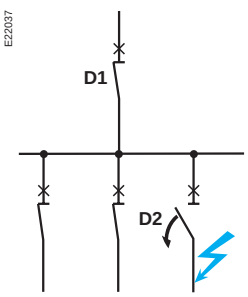
Compact NS circuit breakers take into account important concerns for environmental protection. Most components are recyclable and the parts of Compact NS630b to NS3200 circuit breakers are marked as specified in applicable standards.

Ambient temperature

■ Compact NS circuit breakers may be used between -25° C and +70° C.
For temperatures higher than 40° C (65° C for circuit breakers used to protect motor feeders), devices must be derated as indicated in the documentation.
■ Circuit-breakers should be put into service under normal ambient operating-temperature conditions. Exceptionally, the circuit breaker may be put into service when the ambient temperature is between -35° C and -25° C.
■ The permissible storage-temperature range for Compact NS circuit breakers in the original packing is -50° C (1) to +85° C.

Discrimination

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



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

044.334

E18569

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

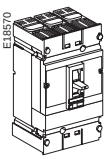
All Compact NS circuit breakers are class II front face devices. They may be installed through the door of class II switchboards (as per IEC standard 60664), without downgrading switchboard insulation. Installation requires no special operations, even when the circuit breaker is equipped with a rotary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

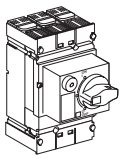
Bare circuit breaker with terminal shields

E18570



With toggle IP40 IK07

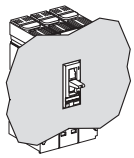
E28439



With direct rotary handle IP40 IK07
standard / VDE

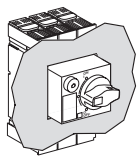
Circuit breaker installed in a switchboard

E21277



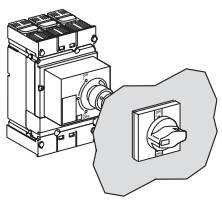
With toggle IP40 IK07

E28440



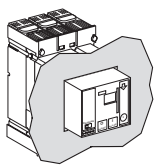
With direct rotary handle IP40 IK07
standard / VDE
MCC IP435
CNOMO IP547

E28441



With extended rotary handle IP55 IK08

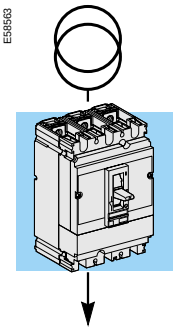
E28442

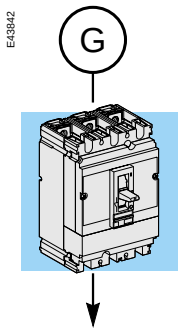


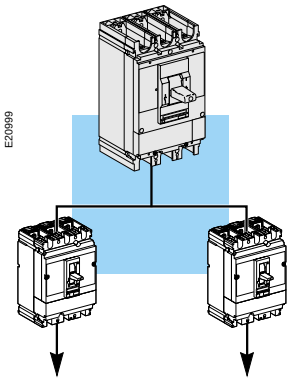
With motor mechanism IP40 IK07

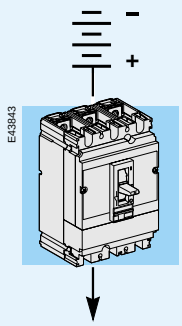
Protection of low-voltage distribution systems
Overview of solutions

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.*









Special case of DC systems:
TM thermal-magnetic trip units for Compact NS100 to 250 and MP magnetic trip units for Compact NS400 and 630 may be used to protect DC distribution systems.

Power distribution

Selection of circuit breakers up to 630 A **page 16**

Rated current (A)		**12.5 … 125**	**12.5 … 100**	**12.5 … 160**	**12.5 … 250**	**60… 400**	**250… 630**
Compact		NS125E	NS100	NS160	NS250	NS400	NS630
							
Breaking capacity	E	16					
(kA rms)	N		25	36	36	45	45
380/415 V	H		70	70	70	70	70
	L		150	150	150	150	150

Accompanying trip units up to 630 A **page 22**

Interchangeable thermal-magnetic and electronic trip units for NS100 to 630 and built-in thermal-magnetic trip unit for Compact NS125E

Selection of circuit breakers from 630 to 3200 A **page 20**

Rated current (A)		**250 … 630**	**320 … 800**	**400 … 1000**	**500… 1250**	**640… 1600**
Compact		NS630b	NS800	NS1000	NS1250	NS1600
						
Breaking capacity	N	50	50	50	50	50
(kA rms)	H	70	70	70	70	70
380/415 V	L	150	150	150	-	-

Rated current (A)		**640 … 1600**	**800 … 2000**	**1000 … 2500**	**1250 … 3200**
Compact		NS1600b	NS2000	NS2500	NS3200
					
Breaking capacity	N	70	70	70	
(kA rms)	H	85	85	85	
380/415 V					

Accompanying control units up to 3200 A **page 28**

Micrologic electronic control units may be used on all Compact NS630b to 3200 circuit breakers and can be changed on site.

Power distribution (cont.)

Single-phase or two-phase distribution

page 34

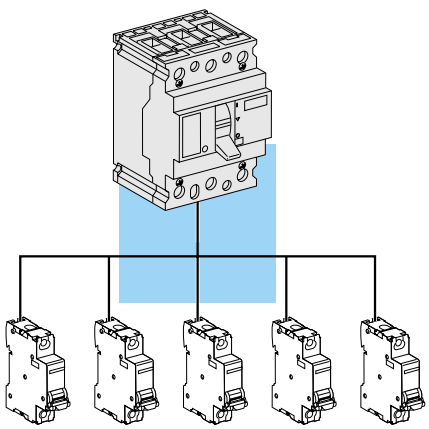
Rated current (A)		16… 100		125… 160		160… 250
Compact		NS100 1P/2P		NS160 1P/2P		NS250 1P
		86099 		86101 		Built-in thermal-magnetic trip units
Breaking capacity (kA rms) 220 V		1P	2P	1P	2P	1P
	N	25	85	25	85	25
	H	40	100	40	100	-

1000 V distribution

page 36

Rated current (A)	60… 400
Compact	NS400 1000V
	053182 
	Breaking capacity: 10 kA rms at 1000 V STR23SP electronic trip unit specially designed for 1000 V applications

Rated current (A)	250 … 630	320 … 800	400 … 1000	500… 1250	640… 1600
Compact	NS630b	NS800	NS1000	NS1250	NS1600
	E45151 				
	Breaking capacity: 25 kArms at 1000 V Micrologic control units are designed for 1000 V applications as well				

E21000 

Final distribution

Page 38

Rated current (A)	16… 160
Compact installation on a symmetrical rail	NSA160
	048016 
	Breaking capacity (kA rms) 380/415 V: E : 16 kA N : 30 kA Built-in trip unit

Protection of distribution systems
Compact NB circuit breakers up to 600 A

Compact NB50N

Compact NB250N

Compact NB400N

Compact circuit breakers

Number of poles			
Control	manual	toggle direct or extended rotary handle	
	electric		
Connections	fixed	front connection rear connection	
	withdrawable	front connection rear connection	
Mounting	backplate or rails symmetrical rail		
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)	**In**	50 °C	
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz DC	
Type of circuit breaker			
ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V 380 V 415 V 440 V 500 V 660/690 V
		DC	250 V (1P) 500 V (2P in series)
Service breaking capacity	**Ics**	% Icu	
Suitability for isolation			
Utilisation category			
Endurance (C-O cycles)	mechanical electrical	 440 V - In	
Electrical characteristics as per Nema AB1			
Breaking capacity (kA)		240 V 480 V 600 V	
Protection			
Trip units	thermal-magnetic		
Overload protection current setting (A)	**Ir**	at 50 °C at 60 °C	
Instantaneous short-circuit protection current setting (x Ir)	**Im**		
Indication and control auxiliaries			
Indication contacts			
Voltage releases	MX shunt release MN undervoltage release		
Remote communication by bus			
Communicating auxiliary contacts			
Installation			
Accessories	terminal extensions and spraders terminal shields and phase barriers escutcheons plate for symmetrical rail		
Dimensions (mm)	W x H x D		
Weight (kg)			
Source changeover system			
Manual source changeover systems			

NB50	NB100	NB250	NB400	NB600
3	3	3	3	3
■	■	■	■	■
-	-	-	-	-
-	-	-	-	-
■	■	■	■	■
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
■	■	■	■	■
■	■	-	-	-
50	100	250	400	600
690	690	690	690	690
6	6	6	6	6
500	500	500	500	500
-	-	-	-	-
N	**F** **N**	**N**	**N**	**N**
	15 15	25	30	30 30
10	10 18	18	25	25
10	10 15	15	25	25
7.5	5 7.5	15	18	18
5	2.5 5	7.5	15	15
-	- -	-	-	-
-	- -	-	-	-
-	- -	-	-	-
50 %	50 %	50 %	50 %	50 %
-	-	■	■	■
A	A	A	A	A
10000	10000	8000	5000	5000
1500	1500	1000	1000	1000
N	**F** **N**	**N**	**N**	**N**
15	15 25	30	30	30
7.5	5 7.5	15	18	18
-	- -	-	-	-
non interchangeable	non interchangeable	non interchangeable	non interchangeable	non interchangeable
15 20 30 40 50	15 20 30 40 50 60 80 100	100 125 150 175 200 225 250	250 300 350 400	500 600
15 20 30 40 50	15 20 30 40 50 60 80 100	94 119 142 165 190 210 230	250 300 350 -	500 -
11 10 11 11 9	11 10 11 11 9 12 8 11	12 12 12 12 12 12 11	10 10 10 10	10 10
■	■	■	■	■
■	■	■	■	■
-	-	■	■	■
-	-	-	-	-
-	-	■	■	■
-	-	■	■	■
-	-	■	■	■
■	■	-	-	-
75 x 130 x 68	90 x 155 x 68	105 x 161 x 86	140 x 255 x 110	140 x 255 x 110
0.7	1.2	1.9	6.0	6.0
-	-	-	-	-

Protection of distribution systems
Compact NS circuit breakers up to 630 A

045345

Compact NS250H

048286

Compact NS630L

Compact circuit breakers

Number of poles			
Control	manual	toggle direct or extended rotary handle	
	electric		
Connections	fixed		front connection rear connection
	withdrawable sur socle		front connection rear connection
	withdrawable (on chassis)		front connection rear connection
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)	**In**	40 °C 65 °C	
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz DC	
Type of circuit breaker			
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V 380/415 V 440 V 500 V 525 V 660/690 V
		DC	250 V (1P) 500 V (2P in series)
Service breaking capacity	**Ics**	% Icu	
Suitability for isolation			
Utilisation category			
Endurance (cycles F/0)	mechanical		
	electric	440 V	In/2 In
Electrical characteristics as per NEMA AB1			
Breaking capacity (kA)		240 V 480 V 600 V	
Electrical characteristics as per UL508			
Breaking capacity (kA)		240 V 480 V 600 V	
Protection			
Trip units			
Overload protection	long time	**Ir** (In x …)	
Short-circuit protection	short time	**Isd** (Ir x …)	
	instantaneous	**Ii** (In x …)	
Earth-fault protection		**Ig** (In x …)	
Zone selective interlocking		**ZSI**	
Additional earth-fault protection		add-on Vigi module combination with Vigirex relay	
Current measurements			
Additional measurement, indication and control auxiliaries			
Indication contacts			
MX shunt and MN undervoltage releases			
Voltage-presence indicator			
Current-transformer module and ammeter module			
Insulation-monitoring module			
Remote communication by bus			
Device-status indication			
Device remote operation			
Transmission of settings			
Indication and identification of protection devices and alarms			
Transmission of measured current values			
Installation			
Accessories	terminal extensions and spreaders terminal shields and phase barriers escutcheons		
Dimensions (mm) W x H x D	fixed, front connections	2-3P / 4P	
Weight (kg)	fixed, front connections	3P / 4P	
Source changeover system (see section on source changeover systems)			
Manual, remote-controlled and automatic source changeover systems			

(1) *2P in 3P case for type N only*
(2) *specific trip units are available for operational voltages > 525 V*
(3) *operational voltage ⩽ 500 V.*

NS125E	NS100	NS160	NS250	NS400	NS630
3, 4	2[1], 3, 4	2[1], 3, 4	2[1], 3, 4	3, 4	3, 4
■	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
■	■	■	■	■	■
■	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
125	**100**	**160**	**250**	**400**	**630**
-	**100**	**150**	**220**	**320**	**500**
750	750	750	750	750	750
8	8	8	8	8	8
500	690	690	690	690	690
-	500	500	500	500	500
E	**N H L**	**N H L**	**N H L**	**N H L**	**N H L**
25	85 100 150	85 100 150	85 100 150	85 100 150	85 100 150
16/10	25 70 150	36 70 150	36 70 150	45 70 150	45 70 150
10	25 65 130	35 65 130	35 65 130	42 65 130	42 65 130
6	18 50 100	30 50 70	30 50 70	30 50 100	30 50 70
-	18 35 100	22 35 50	22 35 50	22 35 100	22 35 50
-	8 10 75	8 10 20	8 10 20	10[2] 20[2] 75[2]	10[2] 20[2] 35[2]
	50 85 100	50 85 100	50 85 100	- 85 -	- 85 -
	50 85 100	50 85 100	50 85 100	- 85 -	- 85 -
50%	100%	100%	100%	100%	100%[3]
■	■	■	■	■	■
A	A	A	A	A	A
10 000	50 000	40 000	20 000	15 000	15 000
6 000	50 000	40 000	20 000	12 000	8 000
6 000	30 000	20 000	10 000	6 000	4 000
E	**N H L**	**N H L**	**N H L**	**N H L**	**N H L**
5	85 100 200	85 100 200	85 100 200	85 100 200	85 100 200
5	25 65 130	35 65 130	35 65 130	42 65 130	42 65 130
-	10 35 50	20 35 50	20 35 50	20 35 50	20 35 50
E	**N H L**	**N H L**	**N H L**	**N H L**	**N H L**
-	85 85 -	85 85 -	85 85 -	85 85 -	85 85 -
-	25 65 -	35 65 -	35 65 -	42 65 -	42 65 -
-	10 10 -	10 10 -	18 18 -	18 18 -	30 30 -
non interchangeable	TM (thermal-magnetic)	STR22 (electronic)		STR23 (electronic)	STR53 (electronic)
12.5… 125 (A)	■	■		■	■
-	-	■		■	■
-	■	■		■	■
-	-	-		-	■
-	-	-		-	■
■	■	■		■	■
■	■	■		■	■
-	-	-		-	■
■	■			■	
■	■			■	
-	■			■	
-	■			■	
-	■			■	
-	■	■		■	■
-	■	■		■	■
-	-	-		-	■
-	-	-		-	■
-	-	-		-	■
■	■			■	
■	■			■	
■	■			■	
105 x 161 x 86	105 x 161 x 86 / 140 x 161 x 86			140 x 255 x 110 / 185 x 255 x 110	
1.7 / 2.3	1.6 to 1.9 / 2.1 to 2.3			6.0 / 7.8	
-	■			■	

Protection of distribution systems
Compact NS circuit breakers from 630 up to 3200 A

E45151

Compact NS800H

E45178

Compact NS2000H

Compact circuit breakers

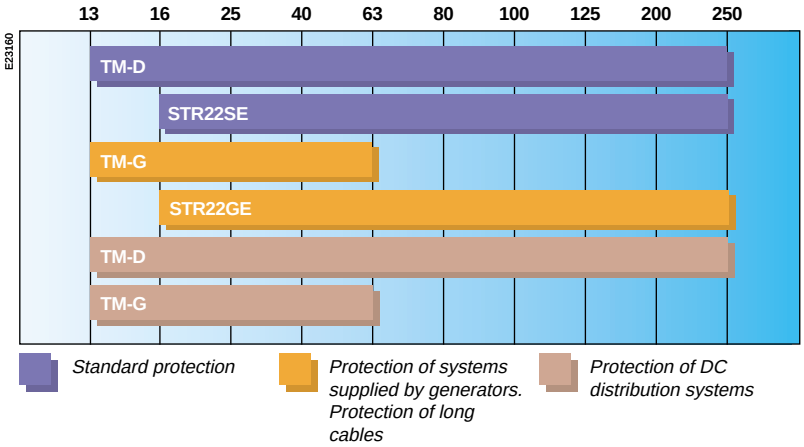
Number of poles			
Control	manual	toggle direct	
		or extended rotary handle	
	electric		
Type of circuit breaker			
Connections	fixed	front connection	
		rear connection	
	withdrawable (on chassis)	front connection	
		rear connection	
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)	**In**	50 °C	
		65 °C	
Rated insulation voltage (V)	**Ui**		
Rated impulse withstand voltage (kV)	**Uimp**		
Rated operational voltage (V)	**Ue**	AC 50/60 Hz	
		DC	
Type of circuit breaker			
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V
			380/415 V
			440 V
			500/525 V
			660/690 V
		DC	250 V
			500 V
Service breaking capacity (kA rms)	**Ics**	Value or % Icu	75%
Short-time withstand current (kA rms)	**Icw**	0.5 s	
V AC 50/60 Hz		1 s	
Suitability for isolation			
Utilisation category			
Endurance (C-O cycles)	mechanical		
	electric	440 V	In/2
			In
		690 V	In/2
			In
Pollution degree			
Electrical characteristics as per Nema AB1			
Breaking capacity (kA)			240 V
			480 V
			600 V
Protection and measurements			
Interchangeable control units			
Overload protection	long time	**Ir** (In x …)	
Short-circuit protection	short time	**Isd** (Ir x …)	
	instantaneous	**Ii** (In x …)	
Earth-fault protection		**Ig** (In x …)	
Residual current protection		**IΔn**	
Zone selective interlocking		**ZSI**	
Protection of the fourth pole			
Current measurements			
Additional indication and control auxiliaries			
Indication contacts			
Voltage releases	MX shunt release		
	MN undervoltage release		
Remote communication by bus			
Device-status indication			
Device remote operation (1)			
Transmission of settings			
Indication and identification of protection devices and alarms			
Transmission of measured current values			
Installation			
Accessories	terminal extensions and spreaders		
	terminal shields and phase barriers		
	escutcheons		
Dimensions fixed devices, front connections (mm)		3P	
W x H x D		4P	
Weight fixed devices, front connections (kg)		3P	
		4P	
Source changeover system (see section on source changeover systems)			
Manual, remote-controlled and automatic source changeover systems			

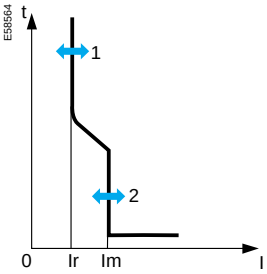
(1) *NS1600b to NS3200, only for opening*

NS630b	NS800	NS1000	NS1250	NS1600	NS1600b	NS2000	NS2500	NS3200
3, 4			**3, 4**		**3, 4**			
■			■		■			
■			■		-			
■			■		-			
N	**H**	**L**	**N**	**H**	**N**	**H**		
■	■	■	■	■	■	■		
■	■	■	■	■	-	-		
■	■		■	■	-	-		
■	■		■	■	-	-		
630	800	1000	1250	1600	1600	2000	2500	3200
630	800	1000 (**L**: 950)	1090	1160	1600	2000	2500	3200
750			750		750			
8			**8**		**8**			
690			690		690			
500			500		500			
N	**H**	**L**	**N**	**H**	**N**	**H**		
50	70	150	50	70	85	125		
50	70	150	50	70	70	85		
50	65	130	50	65	65	85		
40	50	100	40	50	65	-		
30	42	25	30	42	65	-		
-	-	-	-	-	-	-		
-	-	-	-	-	-	-		
50%	100%		75%	50%	65 kA	75%		
25	25	10	25	25	30	30		
17	17	7	17	17	21	21		
■			■		■			
B	B	A	B	B	B	B		
10000			10000		6000			
6000			5000	5000	3000			
5000			4000	2000	2000			
4000			3000	2000	2000			
2000			2000	1000	1000			
III			III		III			
N	**H**	**L**	**N**	**H**	**N**	**H**		
50	70	150	50	70	85	125		
42	65	100	42	65	65	85		
30	42	25	30	42	50	-		
Micrologic 2.0		Micrologic 5.0		Micrologic 2.0 A	Micrologic 5.0 A		Micrologic 6.0 A	Micrologic 7.0 A
■		■		■	■		■	■
-		■		-	■		■	■
■		■		■	■		■	■
-		-		-	-		■	-
-		-		-	-		-	■
-		-		■	■		■	■
■		■		■	■		■	■
-		-		■	■		■	■
■							■	
■							■	
■							■	
■		■		■	■		■	■
■		■		■	■		■	■
-		-		■	■		■	■
-		-		■	■		■	■
-		-		■	■		■	■
■							-	
■							-	
■							■	
327 x 210 x 147							350 x 420 x 160	
327 x 280 x 147							350 x 535 x 160	
14							24	
18							36	
■								

Protection of distribution systems
TM and STR trip units for Compact NS100 to 250

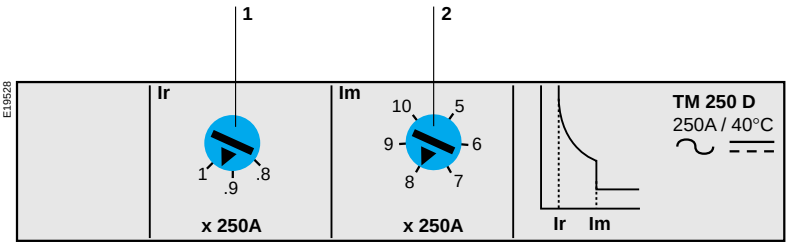
Compact NS100 to 250 circuit breakers, types N, H and L, may be equipped with either a TM thermal-magnetic trip unit or an STR22 electronic trip unit. A mechanical mismatch-protection system avoids breaker and trip unit mismatches.





1 *overload protection threshold*
2 *short-circuit protection pick-up*

TM thermal-magnetic trip units



Protection

The protection functions may be set using the adjustment dials.

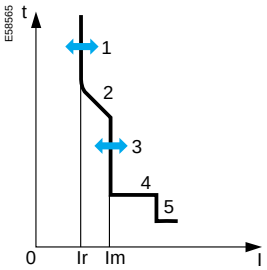
Overload protection
Thermal protection with an adjustable threshold.

Short-circuit protection
Magnetic protection with a fixed or adjustable pick-up, depending on the rating.

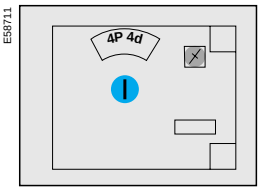
Protection of the fourth pole
On four-pole circuit breakers, the trip units can be of the,
4P 3d type (neutral unprotected),
4P 3d+Nr type (neutral protection at 0.5 In) or 4P 4d type (neutral protection at In).

TM thermal-magnetic trip units		**TM16D to 250D**												**TM16G to 63G**			
Ratings (A)	**In** at 40 °C	**16**	**25**	**32**	**40**	**50**	**63**	**80**	**100**	**125**	**160**	**200**	**250**	**16**	**25**	**40**	**63**
Circuit breaker	Compact NS125 E	■	■	■	■	■	■	■	■	■	-	-	-	■	■	■	■
	Compact NS100	■	■	■	■	■	■	■	■	-	-	-	-	■	■	■	■
	Compact NS160	■	■	■	■	■	■	■	■	■	■	-	-	■	■	■	■
	Compact NS250	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Overload protection (thermal)																	
Current setting (A)	**Ir**	adjustable from 0.8 to 1 x In												adjustable from 0.8 to 1 x In			
Short-circuit protection (magnetic)																	
Current setting (A)	**Im**	fixed											adjustable	fixed			
	Compact NS100	190	300	400	500	500	500	640	800					63	80	80	125
	Compact NS160/250	190	300	400	500	500	500	1000	1250	1250	1250	5 à 10 x In		63	80	80	125
Protection of the fourth pole																	
Neutral unprotected	4P 3d	no protection												no protection			
Neutral protection at 0.5 In	4P 3d + N/2							56	56	63	0.5 x Ir						
Neutral protection at In	4P 4d	1 x Ir												1 x Ir			

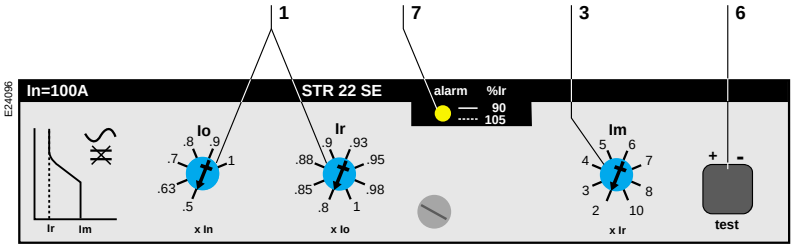
STR22 electronic trip units



1 *long-time current setting (overload protection)*
2 *long-time tripping delay*
3 *short-time pick-up (short-circuit protection)*
4 *short-time tripping delay*
5 *instantaneous pick-up (short-circuit protection)*
6 *test connector*
7 *percent load indication*



Protection of the fourth pole



Protection

The protection functions may be set using the adjustment dials.

Overload protection
True rms long-time protection with an adjustable threshold.

Short-circuit protection
Short-time and instantaneous protection:
- short-time protection with an adjustable pick-up and fixed tripping delay;
- instantaneous protection with fixed pick-up.

Protection of the fourth pole
On four-pole circuit breakers, neutral protection is set using a three-position switch to 4P 3d (neutral unprotected), 4P 3d + N/2 (neutral protection at 0.5 In) or 4P 4d (neutral protection at In).

Indications

A LED on the front indicates the percent load:
- ON - load is > 90% of Ir setting
- flashing - load is > 105% of Ir setting.

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.

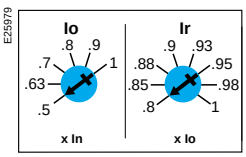
STR electronic trip units		STR22SE					STR22GE			
Ratings (A)	**In** 20 to 70 °C (*)	**40**	**80**	**100**	**160**	**250**(*)	**40**	**100**	**160**	**250**(*)
Circuit breaker	Compact NS100 N/H/L	■	-	■	-	-	■	■	-	-
	Compact NS160 N/H/L	■	■	■	■	-	■	■	■	-
	Compact NS250 N/H/L	■	■	■	■	■	■	■	■	■
Overload protection (Long Time)										
Current setting	**Ir** = In x …	0.4...1					0.4...1			
		48 settings					48 settings			
Time delay (s)	at 1.5 x Ir	90...180					12…15			
(min.…max.)	at 6 x Ir	5...7.5					-			
	at 7.2 x Ir	3.2...5.0					-			
Short-circuit protection (Short Time)										
Pick-up (A)	**Im** = Ir x …	2...10					2...10			
Accuracy ± 15 %		8 settings					8 settings			
Time delay (ms)		fixed					fixed			
	max. resettable time									
	max. break time	⩽ 40					⩽ 40			
	temps total de coupure	⩽ 60					⩽ 60			
Protection contre les courts-circuits (Instantaneous)										
Pick-up (A)	**Ii**	fixed ⩾ 11 x In					fixed ⩾ 11 x In			
Protection of the fourth pole										
Neutral unprotected	4P 3d	no protection					-			
Neutral protection at 0.5 In	4P 3d + N/2	0.5 x Ir					-			
Neutral protection at In	4P 4d	1 x Ir					-			

(*) If the STR22SE and STR22GE 250 A trip units are used in high-temperature environments, the setting must take into account the thermal limitations of the circuit breaker. The overload protection setting may not exceed 0.95 at 60° C or 0.9 at 70° C.

Setting example

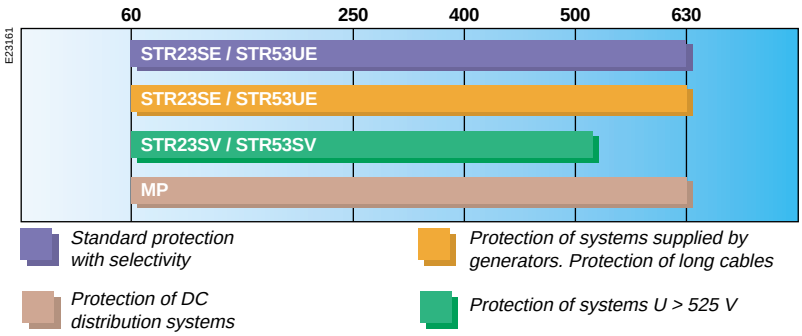
What is the overload-protection threshold of a Compact NS250 circuit breaker equipped with an STR22SE 160 A trip unit set to Io = 0.5 and Ir = 0.8 ?

Answer:
In x Io x Ir = 160 x 0.5 x 0.8 = 64 A.



Protection of distribution systems
MP and STR trip units for Compact NS400 to 630

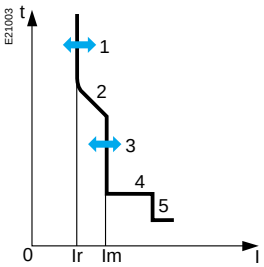
Compact NS400 to 630 circuit breakers, types N, H and L, 3-pole and 4-pole, may be equipped with any of the STR23SE, STR23SV, STR53UE and STR53SV electronic trip units.
The STR53UE and STR53SV trip units offer a wider range of settings and the STR53UE offers a number of optional protection, measurement and communications functions.
For DC applications, the Compact NS400H and 630H circuit breakers are equipped with a built-in MP magnetic trip unit.



Selection of the trip unit depends on the type of distribution system protected and the operational voltage of the circuit breaker.

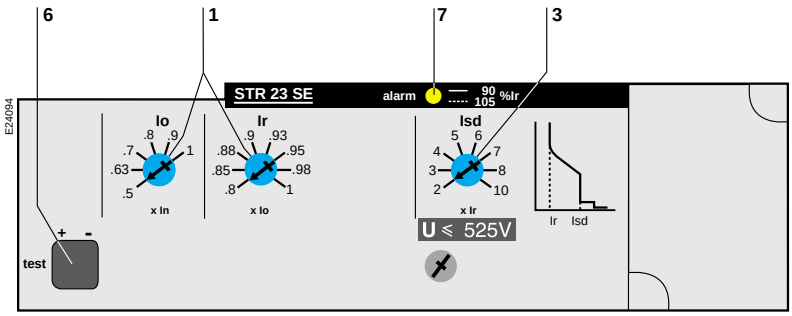
Protection for all types of circuits, from 60 to 630 A, is possible with only four trip-unit catalogue numbers, whatever the circuit-breaker operational voltage:
- U ⩽ 525 V: STR23SE or STR53UE
- U > 525 V: STR23SV or STR53SV.

Trip units do not have a predefined rating. The tripping threshold depends on the circuit breaker rating and the LT (long time) current setting.
For example, for an STR23SE trip unit set to the maximum value, the tripping threshold is:
- ◻ 250 A, when installed on a Compact NS400 250 A
- ◻ 630 A, when installed on a Compact NS630.



1 *long-time current setting (overload protection)*
2 *long-time tripping delay*
3 *short-time pick-up (short-circuit protection)*
4 *short-time tripping delay*
5 *instantaneous pick-up (short-circuit protection)*
6 *test connector*
7 *percent load indication*

STR23SE (U ⩽ 525 V) and STR23SV (U > 525 V) electronic trip units



Protection

The protection functions may be set using the adjustment dials.

Overload protection
Long-time protection with an adjustable threshold and fixed tripping delay:
- Io base setting (6-position dial from 0.5 to 1)
- Ir fine adjustment (8-position dial from 0.8 to 1).

Short-circuit protection
Short-time and instantaneous protection:
- short-time protection with an adjustable pick-up and fixed tripping delay
- instantaneous protection with fixed pick-up.

Protection of the fourth pole
On four-pole circuit breakers, neutral protection is set using a three-position switch to 4P 3d (neutral unprotected), 4P 3d + Nr (neutral protection at 0.5 In) or 4P 4d (neutral protection at In).

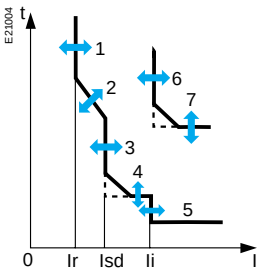
Indications

A LED on the front indicates the percent load:
- ON - load is > 90% of Ir setting
- flashing - load is > 105% of Ir setting.

Test

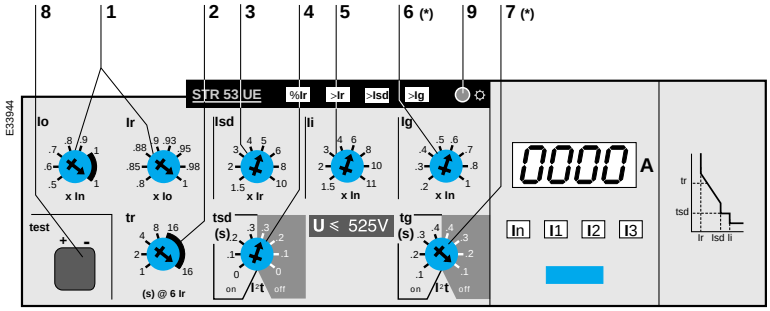
A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation after installing the trip unit or accessories.

STR53UE (U ⩽ 525 V) and STR53SV (U > 525 V) electronic trip units



1 *long-time current setting (overload protection)*
2 *long-time tripping delay*
3 *short-time pick-up (short-circuit protection)*
4 *short-time tripping delay*
5 *instantaneous pick-up (short-circuit protection)*
6 *optional earth-fault pick-up*
7 *optional earth-fault tripping delay*
8 *test connector*
9 *battery and lamp test pushbutton*

Earth-fault protection (T) (see the "Options for the STR53UE electronic trip unit" section on the following pages).
With the earth-fault option (T) on the STR53UE electronic trip unit, an external neutral current transformer can be installed (situation for a three-pole circuit breaker in a distribution system with a neutral). Available ratings of external neutral CTs: 150, 250, 400, 630 A.



Protection

The protection functions may be set using the adjustment dials.

Overload protection
Long-time protection with adjustable threshold and tripping delay:
■ Io base setting (6-position dial from 0.5 to 1)
■ Ir fine adjustment (8-position dial from 0.8 to 1).

Short-circuit protection
Short-time and instantaneous protection:
■ short-time protection with adjustable pick-up and tripping delay, with or without constant I+t
■ instantaneous protection with adjustable pick-up.

Protection of the fourth pole
On four-pole circuit breakers, neutral protection is set using a three-position switch to 4P 3d (neutral unprotected), 4P 3d + Nr (neutral protection at 0.5 In) or 4P 4d (neutral protection at In).

Overload LED (% Ir)

A LED on the front indicates the percent load:
■ when ON, the load is > 90% of Ir setting
■ when flashing, the load is > 105% of Ir setting.

Fault indications

A LED signals the type of fault:
■ overload (long-time protection) or abnormal component temperature (> Ir)
■ short-circuit (short-time protection) or instantaneous (> Isd)
■ earth fault (if earth-fault protection option installed) (> Ig)
■ microprocessor malfunction:
□ both (> Ig) and (> Isd) LEDs ON
□ (> Ig) LED ON (if earth-fault protection option (T) installed).
Battery powered. Spare batteries are supplied in an adapter box. The LED indicating the type of fault goes OFF after approximately ten minutes to conserve battery power. The information is however stored in memory and the LED can be turned back ON by pressing the battery/LED test pushbutton. The LED automatically goes OFF and the memory is cleared when the circuit breaker is reset.

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. The test pushbutton tests the battery and the (% Ir), (> Ir), (> Isd) and (> Ig) LEDs.

Self monitoring

The circuit breaker trips if a microprocessor fault or an abnormal temperature is detected.

Options

Four options are available:
■ earth-fault protection **T**
■ ammeter **I**
■ zone selective interlocking **ZSI**
■ communications option **COM**.

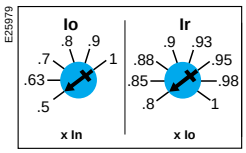
Protection of distribution systems
MP and STR trip units for Compact NS400 to 630 (cont.)

Trip units		**STR23SE** (U ⩽ 525V) **STR23SV** (U > 525V)				**STR53UE** (U ⩽ 525V) **STR53SV** (U > 525V)				
Ratings (A)	**In** 20 to 70 ° C (1)	**150**	**250**	**400**	**630**	**150**	**250**	**400**	**630**	
Circuit breaker	Compact NS400 N/H/L	■	■	■	-	■	■	■	-	
	Compact NS630 N/H/L	-	-	-	■	-	-	-	■	
Overload protection (Long time)										
Current setting	**Ir** = In x …	0.4...1 adjustable 48 settings				0.4...1 adjustable 48 settings				
Time delay (s)		fixed				adjustable				
(min.…max.)	at 1.5 x Ir	90...180				8...15	34...50	69...100	138...200	277...400
	at 6 x Ir	5...7.5				0.4...0.5	1.5...2	3...4	6...8	12...16
	at 7.2 Ir	3.2...5.0				0.2...0.74	1...1.4	2...2.8	4...5.5	8.2...11
Short-circuit protection (Short time)										
Pick-up (A) accuracy ± 15 %	**Isd** = Ir x …	2...10 adjustable 8 settings				1.5...10 adjustable 8 settings				
Time delay (ms)	max. resettable time	fixed ⩽ 40				adjustable, 4 settings + constant "I^2t" option ⩽ 15	⩽ 60	⩽ 140	⩽ 230	
	max. break time	⩽ 60				⩽ 60	⩽ 140	⩽ 230	⩽ 350	
Short-circuit protection (instantaneous)										
Pick-up (A)	**Ii** = In x …	11 fixed				1.5...11 adjustable 8 settings				
Protection of the fourth pole										
Neutral unprotected	4P 3d	no protection				no protection				
Neutral protection at 0.5 In	4P 3d + Nr	0.5 x Ir				0.5 x Ir				
Neutral protection at In	4P 4d	1 x Ir				1 x Ir				
Options										
Indication of fault type		-				■ (standard)				
Zone selective interlocking	**ZSI**	-				■ (2)				
Communications	**COM**	-				■ (2)				
Built-in ammeter	**I**	-				■ (2)				
Earth-fault protection	**T**	-				■ (2)				

(1) If the trip units are used in high-temperature environments, the setting must take into account the thermal limitations of the circuit breaker. The overload protection setting may not exceed 0.95 at 60° C or 0.9 at 70° C for the Compact NS400, and 0.95 at 50° C, 0.9 at 60° C or 0.85 at 70° C for the Compact NS630.
(2) This option is not available for the STR53SV trip unit.

Setting example

What is the overload-protection threshold of a Compact NS400 circuit breaker equipped with an STR23SE (or STR23SV) trip unit set to Io = 0.5 and Ir = 0.8 ?



Answer.
In x Io x Ir = 400 x 0.5 x 0.8 = 160 A.
The identical trip unit, with identical settings but installed on a Compact NS630 circuit breaker, will have an overload-protection threshold of:
630 x 0.5 x 0.8 = 250 A.

Possible combinations:

- ■ I
- ■ T
- ■ I + T
- ■ I + COM
- ■ I + T + COM
- ■ ZSI
- ■ ZSI + I
- ■ ZSI + T
- ■ ZSI + I + T
- ■ ZSI +I + COM
- ■ ZSI + I + T + COM

Options for the STR53UE electronic trip unit

Earth-fault protection (T)

Type		Residual
Pick-up Accuracy ± 15%	**Ig** = In x …	0.2 to 1 adjustable, 8 settings
Time delay "constant I+t" function	max. resettable time	adjustable, 4 settings 60 140 230 350
	max. break time	⩽ 140 ⩽ 230 ⩽ 350 ⩽ 500

Ammeter (I)

A digital display continuously indicates the current of the phase with the greatest load. The value of each current (I1, I2, I3, Ineutral) may be successively displayed by pressing a scroll button.
LEDs indicate the phase for which the current is displayed.

Ammeter display limits:

- ■ minimum current ⩾ 0.2 x In. Lower currents are not displayed
- ■ maximum current ⩽ 10 x In.

Zone selective interlocking (ZSI)

A number of circuit breakers are interconnected one after another by a pilot wire. In the event of a short-time or earth fault:

- ■ if a given STR53UE trip unit detects the fault, it informs the upstream circuit breaker, which applies the set time delay
- ■ if the STR53UE trip unit does not detect the fault, the upstream circuit breaker trips after its shortest time delay.

In this manner, the fault is cleared rapidly by the nearest circuit breaker.
The thermal stresses on the circuits are minimised and time discrimination is maintained throughout the installation.
The STR53UE trip unit can handle only the downstream end of a zone selective interlocking function. Consequently, the ZSI option cannot be implemented between two Compact NS circuit breakers.

Opto-electronic outputs

Using opto-transistors, these outputs ensure total isolation between the internal circuits of the trip unit and the circuits wired by the user.

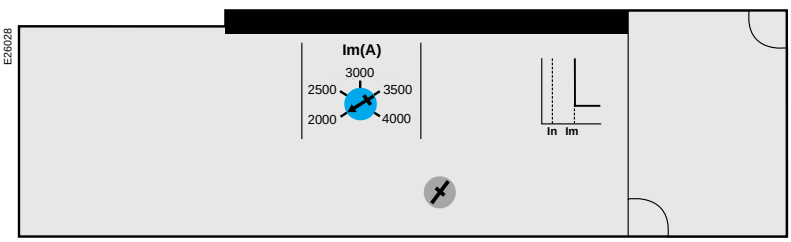
Communications option (COM)

This option transmits data to Digipact distribution monitoring and control modules.

Transmitted data:

- ■ settings
- ■ phase and neutral currents (rms values)
- ■ highest current of the three phases
- ■ overload-condition alarm
- ■ cause of tripping (overload, short-circuit, etc.).

MP DC trip units

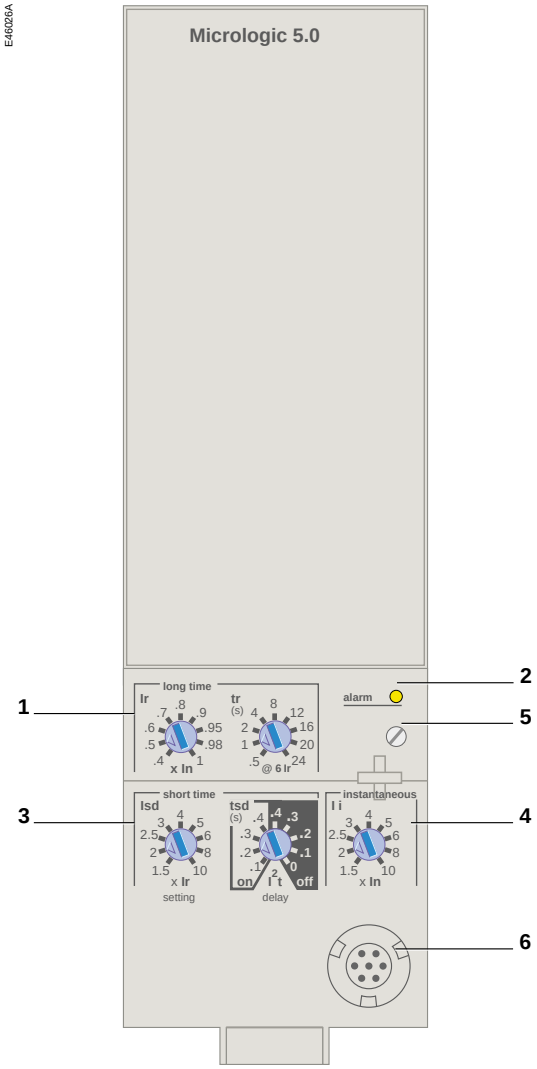


Magnetic trip units for Compact NS400/630 three-pole, type H circuit breakers. These trip units are specifically designed to protect DC distribution systems.

They are not interchangeable. The circuit breaker and trip unit are supplied fully assembled.

Built-in trip units		MP1	MP2	MP3
Circuit breaker	Compact NS400H	■	■	-
	Compact NS630H	■	■	■
Short-circuit protection (magnetic)				
Pick-up (A)	**Im**	adjustable 800...1600	adjustable 1250...2500	adjustable 2000...4000

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



1 *long-time current setting and tripping delay*
2 *overload signal (LED)*
3 *short-time pick-up and tripping delay*
4 *instantaneous pick-up*
5 *fixing screw for long-time rating plug*
6 *test connector*

Protection settings

Protection thresholds and delays are set using the adjustment dials.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.

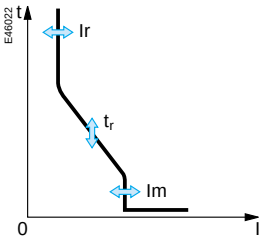
Short-circuit protection
Short-time (rms) and instantaneous protection.
Selection of I^2t type (ON or OFF) for short-time delay.

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 In (4P 3d + N/2) or neutral protection at In (4P 4d).

Note.
Micrologic control units that do not include measurement functions are equipped with a transparent lead-seal cover as standard.

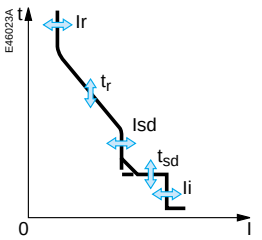
Protections — Micrologic 2.0

Long time											
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 Ir			other ranges or disable by changing rating plug								
Time delay (s)	**t r** at 1.5 x Ir		12.5	25	50	100	200	300	400	500	600
accuracy 0 to -20%	**t r** at 6 x Ir		0.5	1	2	4	8	12	16	20	24
	t r at 7.2 x Ir		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
Instantaneous											
Pick-up (A) accuracy ± 10%	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Time delay			fixed: 20 ms								



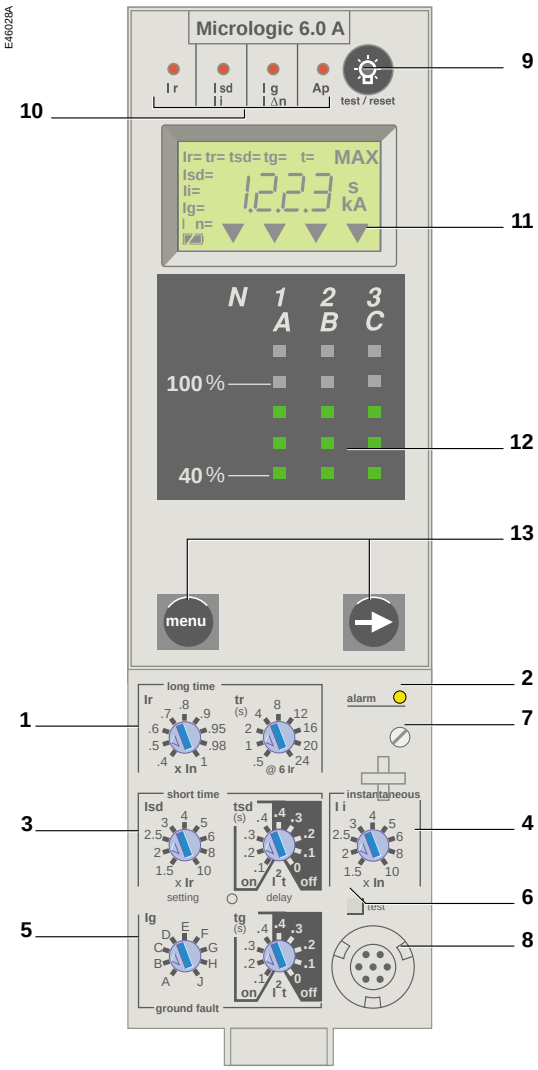
Protections — Micrologic 5.0

Long time											
Current setting (A)	**Ir** = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
Tripping between 1.05 and 1.20 Ir			other ranges or disable by changing rating plug								
Time delay (s)	**t r** at 1.5 x Ir		12.5	25	50	100	200	300	400	500	600
accuracy 0 to -20%	**t r** at 6 x Ir		0.5	1	2	4	8	12	16	20	24
	t r at 7.2 x Ir		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
Short time											
Pick-up (A) accuracy ± 10%	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
Time delay (ms) at 10 x Ir	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	t sd (max resettable time)		20	80	140	230	350				
	t sd (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A) accuracy ± 10%	**Ii** = In x …		2	3	4	6	8	10	12	15	off



Protection of distribution systems
Micrologic A control units for Compact NS630b to 3200 (cont.)

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



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

Protection settings
Protection thresholds and delays are set using the adjustment dials.
The selected values are momentarily displayed on the screen, in amperes and in seconds.
Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.

Overload protection
True rms long-time protection.
Thermal memory: thermal image before and after tripping.

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

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

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

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

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

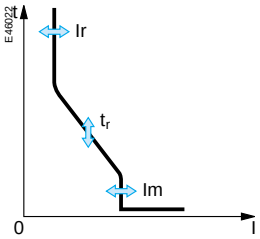
"Ammeter" measurements
Micrologic A control units measure the true (rms) value of currents.
A digital LCD screen continuously displays the most heavily loaded phase (Imax) or displays the I_1, I_2, I_3, I_N, I_g,$I_{\Delta n}$, stored-current (maximeter) and setting values by successively pressing the navigation button.
The optional external power supply makes it possible to display currents < 20% In.

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

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

Protections — Micrologic 2.0 A

Long time											
Current setting (A)	**Ir** = In x …	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
tripping between 1.05 and 1.20 Ir		other ranges or disable by changing rating plug								
Time delay (s)	**t_r** at 1.5 x Ir	12.5	25	50	100	200	300	400	500	600
accuracy 0 to -20%	**t_r** at 6 x Ir	0.5	1	2	4	8	12	16	20	24
	t_r at 7.2 x Ir	0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping								
Instantaneous										
Pick-up (A)	**Im** = Ir x …	1.5	2	2.5	3	4	5	6	8	10
accuracy ±10 %										

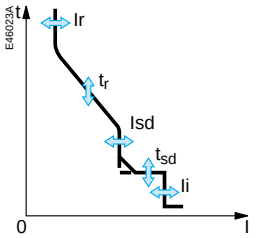


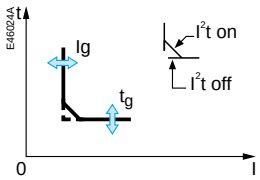
Ammeter — Micrologic 2.0 A

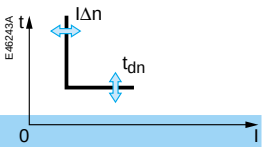
Continuous current measurements						
Measurements from 0.2 to 2 x In	I_1	I_2	I_3	I_N	I_{max}	
accuracy 1.5% (including sensors)	no auxiliary source (where I > 0.2 x In)					

Protections — Micrologic 5.0 A / 6.0 A / 7.0 A

Long time			**Micrologic 5.0 / 6.0 / 7.0 A**								
Current setting (A)	Ir = In x …		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
tripping between 1.05 and 1.20 Ir			other ranges or disable by changing rating plug								
Time delay (s)	t_r at 1.5 x Ir		12.5	25	50	100	200	300	400	500	600
accuracy 0 to -20%	t_r at 6 x Ir		0.5	1	2	4	8	12	16	20	24
	t_r at 7.2 x Ir		0.34	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
Short time											
Pick-up (A)	**Isd** = Ir x …		1.5	2	2.5	3	4	5	6	8	10
accuracy ±10 %											
Time delay (ms.) at 10 x Ir	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
	t_{sd} (max resettable time)		20	80	140	230	350				
	t_{sd} (max break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)	**Ii** = In x …		2	3	4	6	8	10	12	15	off
accuracy ±10 %											
Earth fault			**Micrologic 6.0 A**								
Pick-up (A)	**Ig** = In x …		A	B	C	D	E	F	G	H	I
accuracy ±10 %	Ig ⩽ 400 A		0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	400 A < In ⩽ 1200 A		0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
	Ig > 1200 A		500	640	720	800	880	960	1040	1120	1200
Time delay (ms.)	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
at In or 1200 A		I^2t On		0.1	0.2	0.3	0.4				
	t_g (max resettable time)		20	80	140	230	350				
	t_g (max break time)		80	140	200	320	500				
Residual earth leakage (Vigi)			**Micrologic 7.0 A**								
Sensitivity (A)	**IΔn**		0.5	1	2	3	5	7	10	20	30
accuracy 0 to -20%											
Time delay (ms.)	settings		60	140	230	350	800				
	$t_{\Delta n}$ (max resettable time)		80	140	230	350	800				
	$t_{\Delta n}$ (max break time)		140	200	320	500	1000				







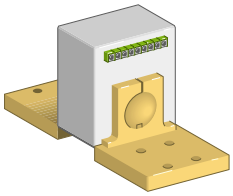
Ammeter — Micrologic 5.0 A / 6.0 A / 7.0 A

Continuous current measurements							
Measurements from 0.2 to 2 x In	I_1	I_2	I_3	I_N	I_g	I_{max}	
accuracy 1.5% (including sensors)	no auxiliary source (where I > 0.2 x In)						

Note.
All current-based protection functions require no auxiliary source.
The reset button resets alarms, maximeter and stored

Accessories for Micrologic control units

E47477



External sensor (CT)

056467

External sensor for source ground return protection

External sensors

External sensor for earth-fault protection
The sensor is used with 3P circuit breakers and the Micrologic 6.0 A control unit. It is installed on the neutral conductor for residual type earth-fault protection.
The rating of the sensor (CT) must be compatible with the rating of the circuit breaker:
- NS630b to NS1600 - 400/1600 CT
- NS1600b to NS2000 - 400/2000 CT
- NS2000 to NS3200 - 1000/3200 CT.

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

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

Voltage measurement inputs
Voltage measurement inputs are required for earth-leakage protection.
As standard, the Micrologic 7.0 control unit is supplied by internal voltage measurement inputs placed downstream of the pole for voltages between 100 and 690 V AC. On request, it is possible to replace the internal voltage measurement inputs by an external connector which enables the control unit to draw power directly from the distribution system upstream of the circuit breaker.

056412

Long-time rating plug

Four interchangeable plugs may be used to limit the long-time setting range for higher accuracy.
As standard, control units are equipped with the 0.4 to 1 plug.

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

025173

External power-supply module

Used in conjunction with the Micrologic A control units, this module maintains three functions when the circuit breaker is OFF or the current is less than 20% In:
- display of measurements
- screen backlighting
- operation of maximeters.

Characteristics:
- power supply: 24 to 240 V AC / DC (+10% - 15%)
- output voltage: 24 V DC.

056429

Lead-seal cover for Micrologic A

Spare parts for Micrologic control units

Lead-seal cover for Micrologic A

A transparent, lead-seal cover controls access to the adjustment dials.
When the cover is closed, it is still possible to access:
- the test connector
- the test button for the earth-fault and earth-leakage protection function.

Spare battery

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

Protection of distribution systems
Single-phase and two-phase systems

86099

Compact NS160H single pole

86101

Compact NS100N two poles

Compact circuit breakers

Number of poles			
Control	manual		toggle direct or extended rotary handle
	electric		
Connections	fixed		front connection rear connection
	withdrawable		front connection rear connection
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)		**In**	
Rated insulation voltage (V)		**Ui**	
Rated impulse withstand voltage kV)		**Uimp**	
Rated operational voltage (V)		**Ue**	AC 50/60 Hz DC
Type of circuit breaker			
Ultimate breaking capacity (kA rms)		**Icu**	AC 50/60 Hz: 220 V, 277 V, 380/415 V, 440 V, 500 V, 525 V, 660/690 V DC: 250 V (1P), 500 V (2P)
Service breaking capacity (kA rms)		**Ics**	% Icu
Suitability for isolation			
Utilisation category			
Endurance (C-O cycles)	mechanical		
	electric	277 V	In/2 In
Electrical characteristics as per NEMA AB1			
Breaking capacity (kA) V AC 50/60 Hz			240 V 277 V 480 V 600 V
Protection and measurements			
Type of trip units			
Ratings			**In**
Overload protection (thermal)		long time current setting	**Ir**
Short-circuit protection (magnetic)		instantaneous current setting	**Im**
Additional earth-fault protection		add-on Vigi module combination with Vigirex relay	
Additional indication and control auxiliaries			
Indication contacts			
Voltages releases		MX shunt release MN undervoltage release	
Remote communication by bus			
Device status indication via communicating auxiliary contacts			
Installation			
Accessories		terminal extensions and spreaders terminal shields and phase barriers escutcheons	
Dimensions (mm)		W x H x D	
Masses (kg)			
Source changeover system			
Interlocking systems			

NS100										NS160				NS250
1										**1**		**2**		**1**
■										■		■		■
-										-		-		-
-										-		-		-
■										■		■		■
■										■		■		■
-										-		-		-
-										-		-		-
100										**160**		**160**		**250**
750										750		750		750
8										8		8		8
277										277		690		277
250										250		500		250
N		**H**								**N**		**H**		**N**
25		40								25		40		25
25		40								25		40		25
-		-								-		-		-
-		-								-		-		-
-		-								-		-		-
-		-								-		-		-
-		-								-		-		-
25		40								25		40		25
-		-								-		-		-
100%										100%				100%
■										■				■
A										A				A
20 000										20 000				10 000
20 000										20 000				10 000
10 000										10 000				5 000
N		**H**								**N**		**H**		**N**
25		40								25		40		25
25		40								25		40		25
-		-								-		-		-
-		-								-		-		-
built-in thermal-magnetic										built-in thermal-magnetic				built-in thermal-magnetic
16	20	25	30	40	50	63	80	100		125	160			160	200	250
fixed										fixed				fixed		
16	20	25	30	40	50	63	80	100		125	160			160	200	250
fixed										fixed				fixed		
190	300	300	300	500	500	500	640	800		1000	1250			850	850	850
-										-				-		
■										■				■		
-										-		■		-		
-										-		■		-		
-										-		■		-		
-										-		■		-		
■										■		■		■		
■										■		■		■		
■										■		■		■		
35 x 161 x 86										35 x 161 x 86		70 x 161 x 86		35 x 161 x 86		
0.7										0.7		1.2		0.7		
-										-		-		-		

Protection of distribution systems
1000 V systems

053182

Compact NS400 1000 V

E45151

Compact NS800 1000 V

Compact circuit breakers

Number of poles			
Rating of sensors (A)			
Control	manual		toggle direct or extended rotary handle
	electric		
Connections	fixed		front connection rear connection
	plug-in (on base)		front connection rear connection
	withdrawable (on chassis)		front connection rear connection
Electrical characteristics			
Rated operational voltage (V)		**Ue**	AC 50/60 Hz
Ultimate breaking capacity (kA rms)		**Icu**	AC 1000 V
Service breaking capacity		**Ics**	% Icu
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)		**In**	
Rated insulation voltage (V)		**Ui**	
Rated impulse withstand voltage kV)		**Uimp**	
Rated operational voltage (V)		**Ue**	AC 50/60 Hz
Ultimate breaking capacity (kA rms)		**Icu**	AC 1000 V
Service breaking capacity		**Ics**	% Icu
Suitability for isolation			
Short-time withstand current (kA rms)		**Icw**	0.5 s
V AC 50/60 Hz			1 s
Utilisation category			
Endurance (C-O cycles)	mechanical		
	electrical		1000 V In/2 In
Pollution degree			
Protection and measurements			
Interchangeable trip units			
Overload protection		long time	**Ir** (In x …)
Short-circuit protection		short time	**Isd** (Ir x …)
		instantaneous	**Ii** (In x …)
Earth-fault protection			**Ig** (In x …)
Residual current protection			**IΔn**
Zone selective interlocking			**ZSI**
Protection of the fourth pole			
Additional earth-fault protection		combination with Vigirex relay	
Current measurements			
Additional indication and control auxiliaries			
Indication contacts			
Voltage releases		MX shunt release MN undervoltage release	
Remote communication by bus			
Device-status indication			
Device remote operation			
Transmission of settings			
Indication and identification of protection devices and alarms			
Transmission of measured current values			
Installation			
Accessories		terminal extensions and spreaders terminal shields and phase barriers escutcheons	
Dimensions (mm)		fixed	3P
W x H x D			4P
Weight (kg)		fixed	3P
			4P
Source changeover system			
Interlocking systems			

NS400 1000V	NS630b	NS800	NS1000	NS1250	NS1600
3	**3, 4**			**3, 4**	
150, 250, 400	630	400, 800	1000	1250	1600
■	■			■	
■	■			■	
■	■			■	
■	■			■	
consult us	■			■	
consult us	-			-	
consult us	-			-	
consult us	■			■	
consult us	■			■	
1150	1150			1150	
10	20			20	
100%	100%			100%	
150, 250, 400	630	400, 800	1000	1250	1600
1250	1250			1250	
8	12			12	
1000	1000			1000	
10	20			20	
100%	100%			100%	
■	■			■	
standardised	25			25	
standardised	17			17	
A	B			B	
15000	10000			10000	
4000	2000			1500	1000
2000	1000			800	500
III	III			III	

STR23SP	Micrologic 2.0	Micrologic 5.0	Micrologic 2.0 A	Micrologic 5.0 A	Micrologic 6.0 A	Micrologic 7.0 A
■	■	■	■	■	■	■
■	-	■	-	■	■	■
■	■	■	■	■	■	■
-	-	-	-	-	■	-
■	-	-	-	-	-	■
-	-	-	■	■	■	■
-	■	■	■	■	■	■
■	■	■	■	■	■	■
-	-	-	■	■	■	■
■	■					
■	■					
■	■					
■	■	■	■	■	■	■
■	■	■	■	■	■	■
-	-	-	■	■	■	■
-	-	-	■	■	■	■
-	-	-	■	■	■	■
■	■					
■	■					
■	■					
480 x 140 x 110	327 x 210 x 147					
-	327 x 280 x 147					
13	14					
-	18					
consult us						

These are incoming circuit breakers, specially designed to operate upstream of Multi 9 modular circuit breakers.
Features include:
■ *reinforced breaking capacity at 380/415 V, by cascading up to 25 kA*
■ *easy installation in Pragma and Prisma G enclosures:*
□ *standard 45 mm front cut-out*
□ *circuit breaker clips onto a symmetrical rail*
□ *reduced depth (82.5 mm).*
A switch-disconnector version is also available (NSA125NA and NSA160NA).

048016

Compact NSA160

Compact circuit breakers				**NSA160**	
Number of poles				3, 4	
Control	manual - toggle direct			■	
	or extended rotary handle			■	
	electric			-	
Connections	fixed		Front connection	■	
			Rear connection	-	
	withdrawable		Front connection	-	
			Rear connection	-	
Mounting on symmetrical rail				■	
Front-panel cut-out				height 45 mm	
Electrical characteristics as per IEC 60947-2					
Rated current (A)	**In**	40 °C		160	
Rated insulation voltage (V)	**Ui**			500	
Rated impulse withstand volt. (kV)	**Uimp**			8	
Rated operational voltage (V)	**Ue**	AC 50/60 Hz		500	
		DC		250	
Type of circuit breaker				**E**	**N**
Ultimate breaking capacity	**Icu**	AC	220 / 240 V	25	50
(kA rms)		50/60 Hz	380 / 415 V	16	30
			440 V	10	15
		DC	125 V	5	10
			250 V (2P)	5	10
Service breaking capacity	**Ics**	% Icu		50%	
Utilisation category				A	
Suitability for isolation				■	
Endurance (C-O cycles)	mechanical			10 000	
	electrical (In - 440 V)			5 000	
Protection					
Built-in thermal-magnetic trip unit					
Ratings In	16	25	32	40	50	63	80	100	125	160
Thermal overload protection **Ir**	fixed current setting									
	16	25	32	40	50	63	80	100	125	160
Magnetic short-circuit protection **Im**	fixed pick-up									
	600	600	600	600	1000	1000	1000	1250	1250	1250
Additional earth-fault protection	add-on Vigi module combination with Vigirex relay									
Indication and control auxiliaries					
Indication contacts				1 OF + 1 SD	
Voltage releases				MN or MX	
Installation and connections					
Connections	terminals			1.5 to 70 mm^2 cables	
Accessories	terminal shields			■	
	depth adjuster			■	
Dimensions (mm)	Compact		3-poles	90 x 120 x 82.5	
W x H x D			4-poles	120 x 120 x 82.5	
	Vigicompact		3-poles	210 x 120 x 82.5	
			4-poles	240 x 120 x 82.5	
Weight (kg)	Compact		3-poles	1.1	
			4-poles	1.4	
	Vigicompact		3-poles	2.6	
			4-poles	3.1	
Source changeover system					
Interlocking systems				-	

Vigicompact NSA

Vigi earth-fault protection module

The Vigi earth-fault protection module may be installed to the right of the circuit breaker. Connections with the circuit breaker are possible to the top or bottom of the Vigi module (two versions). The connection is supplied with the Vigi module.

Characteristics		
Number of poles		3, 4
Sensitivity (A)		0.03 / 0.3 / 1 / 3
Time delay	intentional (ms)	0 60 **(1)** 150 **(1)**
	max. break time	< 40 < 140 < 150
Rated voltage (V)	50/60 Hz	200 to 440 V
Reset		pushbutton
Test		pushbutton
Protection against nuisance tripping		■
DC-component withstand		class A

(1) *If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.*

Auxiliaries and accessories

Available auxiliaries include:

- 1 ON/OFF indication contact (OF)
- 1 trip-indication contact (SD)
- 1 voltage release (MN undervoltage release or MX shunt trip)
- 1 extended rotary handle with door locking, directly accessible from outside the enclosure.

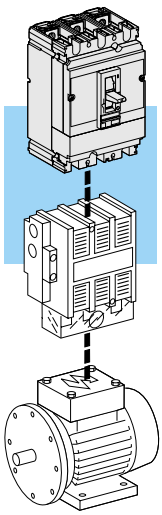
Depth adjuster

This accessory is required to align the front of Multi 9 devices when they are installed next to a Compact NSA125 or NSA160. Maximum width 324 mm (36 modules).

Motor protection
Overview of solutions

The circuit breakers presented here provide protection against short circuits and are suitable for isolation as defined by standard IEC 60947-2.
For complete protection of the motor and its control device, overload protection may be provided by either the circuit breaker or a separate Telemecanique thermal relay.
The control device may be of the direct on-line type (with or without reversing) or of the "star-delta" type.
Combinations are governed by standard IEC 60947-4.1.

E26988



Protection coordination (as defined by IEC 60947-4)
Whatever the power of the motor, the coordination between the circuit breaker, contactor and relay can be of either type 1 or 2.
Selection depends on operational requirements concerning continuity of service and the technical skills of servicing personnel.
All type 2 Merlin Gerin/Telemecanique combinations have been tested under the conditions defined by standards and they are certified ASEFA/LOAG.

Motor protection up to 37 kW

Motor rating (kW)		**0.37 … 37**
Compact		NS80
		046751 
Breaking capacity (kA rms) 380/415 V	H	70

General circuit-breaker characteristics **page 46**
The Compact NS80H-MA circuit breaker is specially designed for motor protection.

Accompanying trip unit **page 46**
A built-in MA magnetic trip unit provides short-circuit protection.

Motor protection up to 250 kW

Motor rating (kW)		**1.1 … 110**		**18.5…250**
Compact		NS100	NS160/250	NS400/630
		041624 		045198 
Breaking capacity (kA rms) 380/415 V	N	25	36	45
	H	70	70	70
	L	150	150	150

General circuit-breaker characteristics **page 22**
Compact NS100 to 630 circuit breakers for motor protection are the same as those for distribution systems, but are fitted with specific motor trip units.

Accompanying trip units **pages 47 to 49**
MA magnetic trip units provide short-circuit protection. Interchangeable ME electronic trip units provide protection against short-circuits, overloads and phase imbalance.

Motor protection up to 750 kW

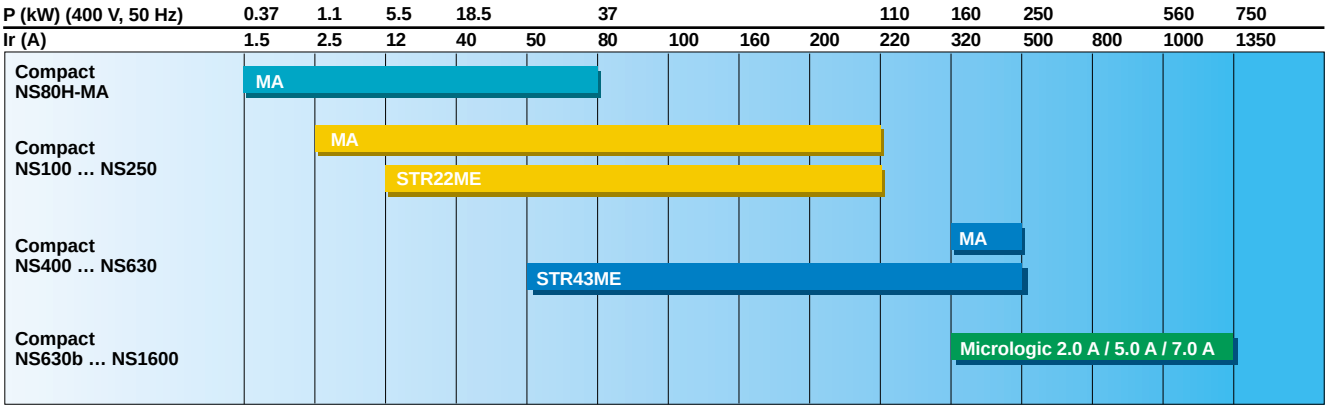
Motor rating (kW)		**160…750**
Compact		NS630b to 1600
		E45151 
Breaking capacity (kA rms) 380/415 V	N	50
	H	70
	L	150

General circuit-breaker characteristics **page 24**
Compact NS630b to 1600 circuit breakers equipped with Micrologic control units are the same as those for distribution systems.

Accompanying control units **page 28**
Micrologic electronic control units may be used on all Compact NS630b to 1600 circuit breakers.
Micrologic 2.0 A and 5.0 A electronic control units provide protection against short-circuits and overloads. Micrologic 7.0 A provides the same protection functions, plus earth-leakage protection.

Selection of a trip unit or Micrologic control unit

E26530



Motor protection
Compact NS80H-MA

This circuit breaker is specially designed for the protection of motors rated up to 37 kW:
- *due to its high current-limiting capacity, it effectively protects motor starters (type-2 coordination as per IEC 60947-4, with contactors)*
- *small size for easy installation in motor control centre (MCC) switchboards.*

Compact NS80 H-MA

Compact circuit breakers			NS80 H-MA
Number of poles			3
Control	manual toggle		■
	direct or extended rotary handle		■
	electric		-
Connections	fixed	front connection	■
		rear connection	-
	withdrawable	front connection	-
		rear connection	-
Electrical characteristics as per IEC 60947-2			
Rated current (A)	**In** 65 °C		80
Rated insulation voltage (V)	**Ui**		750
Rated impulse withstand voltage (kV)	**Uimp**		8
Rated operational voltage (V)	**Ue** CA 50/60 Hz		690
Ultimate breaking capacity (kA rms)	**Icu** CA 50/60 Hz	220 / 240 V	100
		380 / 415 V	70
		440 V	65
		500V	25
		525V	25
		660/690V	6
Service breaking capacity	**Ics** % Icu		100%
Utilisation category			A
Suitability for isolation			■
Endurance (C-O cycles)	mechanical		20 000
	electrical 440 V	In/2	10 000
		In	7 000
Electrical characteristics as per Nema AB1			
Breaking capacity (kA)		240 V	100
		480 V	65
		600 V	10
Protection			
Magnetic trip unit	built-in		
Rating In	1.5 2.5 6.3 12.5 25 50 80		
Instantaneous short-circuit **Im** protection	adjustable pick-up 6 … 14 x In		
Earth-leakage protection	combination with Vigirex relay		
Indication and control auxiliaries			
Indication contacts			1 OF + 1 SD
Voltage releases			MN or MX
Installation and connections			
Connections			Built-in terminals
Terminal extensions and spreaders			-
Terminal shields			■
Phase barriers			-
Plate for symmetrical rail (DIN)			■
Dimensions (mm)	W x H x D		90 x 120 x 80
Weight (kg)			1.0

Compact NS100 to 630 circuit breakers with MA magnetic trip units

Compact NS100 to 630 circuit breakers, equipped with an MA magnetic trip unit with adjustable thresholds, offer:
- *short-circuit protection*
- *suitability for isolation.*

Compact NS100 to 630 circuit breakers and the trip unit are supplied already assembled.

General circuit-breaker characteristics page 18

MA trip units

Rating (A)		In	2.5	6.3	12.5	25	50	100	150	220	320	500
Compact	N/H/L	NS100	■	■	■	■	■	■	-	-	-	-
circuit breaker		NS160	-	-	-	■	■	■	■	-	-	-
		NS250	-	-	-	-	-	■	■	■	-	-
	H/L	NS400	-	-	-	-	-	-	-	-	■	-
		NS630	-	-	-	-	-	-	-	-	-	■
Short-circuit protection (magnetic)												
Pick-up		**Im**	setting 6...14 x In						setting 9...14 x In		setting 9...14 x In	

041624

Compact NS250H

045198

Compact NS400H-MA

Motor protection
Compact NS100 to 250 circuit breakers with STR22ME electronic trip unit

Compact NS100 to 250 circuit breakers, equipped with an STR22ME electronic trip unit with adjustable thresholds, offer:
- *short-circuit protection*
- *phase-imbalance protection*
- *overload protection*
- *suitability for isolation.*

052163

Compact NS250 equipped with an STR22ME electronic trip unit

Compact NS100 to 250 circuit breakers
See the circuit breakers for distribution systems on page 16.

STR22ME electronic trip unit

Protection

Overload protection
LT (long time) protection with adjustable Ir threshold, in compliance with tripping class 10 as defined by IEC 60947-4.

Short-circuit protection
Short-time and instantaneous protection:
- short-time protection with fixed pick-up (Im = 13 x Ir) and tripping delay
- instantaneous protection with fixed pick-up (15 x In).

Phase-imbalance protection
This function complies with the stipulations of standard IEC 60947-4.1 and trips the circuit breaker whenever a phase-current imbalance of 40 % or more occurs. The circuit-breaker opening time is between 3.5 and 6 seconds.

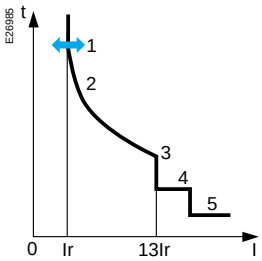
Indications
A LED on the front indicates the percent load:
- ON - load is > 90% of Ir setting
- flashing - load is ⩾ 1.05% of Ir setting.

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.

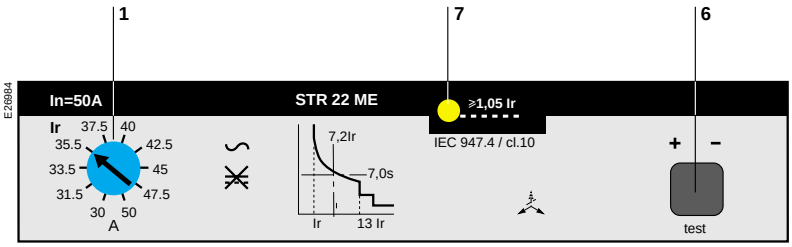
Optional SDTAM contactor tripping module
(Early-break thermal-fault signal)
This module opens the contactor if an overload occurs, thus making it possible to:
- differentiate between tripping due to overloads and short-circuits
- improve continuity of service (no manual reset following tripping due to an overload).

This module can also be used to signal a thermal fault.

Characteristics
- manual reset (local or remote).
- compatible with the following control voltages:
  - 24 to 72 V DC and 24 to 48 V AC
  - 110 to 240 V AC / DC.
- replaces the MN and MX voltage releases.



1 *long-time current setting*
2 *tripping class 10 as defined by IEC 60947-4*
3 *short-time pick-up*
4 *short-time tripping delay*
5 *instantaneous pick-up*
6 *test connector*
7 *percent load indication*



STR22ME trip unit

Ratings (A)	20 to 70 °C	20…100	150	220
	NS100N/H/L	■	-	-
	NS160N/H/L	■	■	-
	NS250N/H/L	■	■	■
Overload protection (Long Time)				
Current setting	**Ir**	adjustable, 10 settings 0.6...1 x In		
Tripping class (IEC 60947-4)		10		
Time delay (s)		fixed		
(min…max.)	at 1,5 x Ir	120…320		
	at 6 x Ir	6…15		
	at 7,2 Ir	4…10		
Motor-overload indication		LED		
Phase-imbalance protection in compliance with IEC 60947-4.1				
Tripping threshold		⩾ 40% imbalance		
Time delay		3.5 to 6 seconds		
Short-circuit protection (Short Time)				
Pick-up	**Isd**	fixed 13 x Ir		
Accuracy		± 20 %		
Max. resettable time (ms)		fixed 10		
Max. break time		60		
Short-circuit protection (Instantaneous)				
Pick-up	**Ii**	fixed 15 x In		
Options				
SDTAM module		■		

Overload protection settings (A)

rating (A)	**thresholds (A)**									
20	12	12.6	13.4	14.2	15	16	17	18	19	20
25	15	15.7	16.7	17.7	18.7	20	21.2	22.5	23.7	25
40	24	25.5	27	28.5	30	32	34	36	38	40
50	30	31.5	33.5	35.5	37.5	40	42.5	45	47.5	50
80	48	51	54	57	60	64	68	72	76	80
100	60	63	67	71	75	80	85	90	95	100
150	90	95	101	107	113	120	127	135	142	150
220	132	140	148	157	166	177	187	198	209	220

Motor protection
Compact NS400 to 630 circuit breakers with STR43ME electronic trip unit

Compact NS400 to 630 circuit breakers, equipped with an STR43ME electronic trip unit with adjustable thresholds, offer:
- *short-circuit protection*
- *phase-imbalance protection*
- *overload protection*
- *suitability for isolation.*

053192

Compact NS630 equipped with an STR43ME electronic trip unit

Compact NS400 to 630 circuit breakers
See the circuit breakers for distribution systems on page 16.

STR43ME electronic trip unit

Protection

Overload protection

True (rms) long-time protection with an adjustable threshold:
- Io base setting (5 settings from 0.5 to 0.8) and Ir fine adjustment (8 settings from 0.8 to 1)
- adjustable tripping delay, in compliance with tripping classes 10A, 10 and 20 as defined by IEC 60947-4.

The STR43ME offers two motor-cooling time constants, associated with the motor starting class:
- short cooling time constant (the same as the heating time constant), providing maximum continuity of service and satisfactory motor protection
- long cooling time constant (four times the heating time constant), providing maximum motor protection.

Short-circuit protection

Short-time and instantaneous protection:
- short-time protection with adjustable pick-up and fixed tripping delay
- instantaneous protection with fixed pick-up.

Phase-imbalance protection

This function complies with the stipulations of standard IEC 60947-4.1 and trips the circuit breaker whenever a phase-current imbalance of 40% or more occurs. The circuit-breaker opening time is 4 seconds ±10%.

Overload LED (%Ir)

The LED flashes when the current is greater than the long-time threshold Ir.

Fault indications

LEDs indicate the type of fault that caused tripping:
- overload (long-time protection) or abnormal component temperature (> Ir)
- short-circuit (short-time protection) or instantaneous (> Isd)
- phase imbalance (LED on the right)
- microprocessor malfunction:
  - all four (% Ir), (> Ir), (> Isd) and (phase imbalance) LEDs ON.

Battery powered. Spare batteries are supplied in an adapter box. When a fault occurs, the LED indicating the type of fault goes OFF after approximately ten minutes to conserve battery power. The information is however stored in memory and the LED can be turned back ON by pressing the battery/LED test pushbutton. The LED automatically goes OFF and the memory is cleared when the circuit breaker is reset.

Test

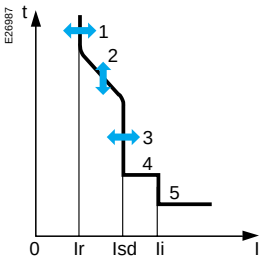
A mini test kit or a portable test kit may be connected to the test connector on the front to check circuit-breaker operation after installing the trip unit or accessories. The test pushbutton tests the battery and the LEDs.

Self monitoring

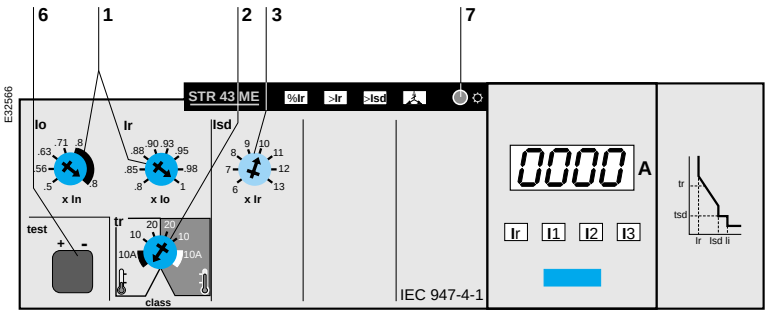
The circuit breaker trips if a microprocessor fault or an abnormal temperature is detected.

Options

Three options are available:
- ammeter **(I)**
- contactor tripping module **(SDTAM)**
- communication **(COM)**.



1 *long-time current setting*
2 *tripping class 10 as defined by IEC 60947-4*
3 *short-time pick-up*
4 *short-time tripping delay*
5 *instantaneous pick-up*
6 *test connector*
7 *percent load indication*



STR43ME trip unit

Ratings (A)	20 to 70 °C	120	200	320	500
Circuit breakers	NS400N/H/L	■	■	■	-
	NS630N/H/L	-	-	-	■
Overload protection (Long Time)					
Current setting	**Ir**	adjustable, 40 settings - 0.4...0.8 x In			
Tripping class (IEC 60947-4)		10A, 10, 20			
Time delay (s)		adjustable			
(min. ... max.)	at 1.5 x Ir	144…198	270…357	433…595	
	at 6 x Ir	5.8…7.3	10.9…13.1	17.4…21.8	
	at 7.2 Ir	4…5	7.3…9.1	12…15	
Phase-imbalance protection in compliance with IEC 60947-4.1					
Tripping threshold		⩾ 40% imbalance			
Time delay		4 s ± 10 %			
Short-circuit protection (Short Time)					
Pick-up	**Isd**	adjustable, 8 settings - 6...13 x Ir			
Accuracy		± 15 %			
Max. resettable time (ms)		fixed			
		10			
Max. break time (ms)		60			
Short-circuit protection (Instantaneous)					
Pick-up	**Ii**	fixed - 13 x Ir max.			
Other functions					
Motor-overload LED		■			
Indications module		■			
Options					
Ammeter (I)		■			
SDTAM module		■			
Communication (COM)		■			

Possible combinations:
■ I
■ I + COM
■ SDTAM
■ SDTAM + I
■ SDTAM + I + COM

Options for STR43ME trip unit

Ammeter (I)

A digital display continuously indicates the current of the phase with the greatest load. The value of each current I_1, I_2, I_3 and the long-time current setting Ir may be successively displayed by pressing a scroll button.
LEDs indicate the phase for which the current is displayed.

Ammeter display limits
■ minimum current ⩾ 0.2 x In. Lower currents are not displayed.
■ maximum current ⩽ 10 x In.

Optional SDTAM contactor tripping module

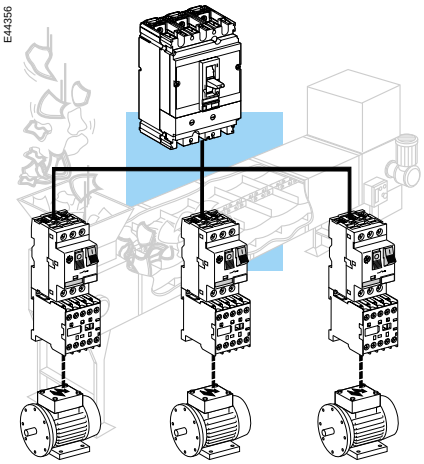
(Early-break thermal-fault signal)
See the information on this optional module on page 44.

Communication (COM)

This option transmits data to Digipact distribution monitoring and control modules.
Transmitted data:
■ settings;
■ phase currents (rms values);
■ highest current of the three phases;
■ overload-condition alarm;
■ cause of tripping (overload, short-circuit, etc.).

Protection of industrial control panels
Overview of solutions

Compact NS circuit breakers are specially designed to protect incoming feeders and groups of outgoing circuits on industrial control panels:
- *compliance with standards applicable worldwide including IEC 60947-2 and UL 508 / CSA 22-2 no. 14*
- *overload and short-circuit protection*
- *isolation with positive contact indication, making it possible to service machines safely by isolating them from all power sources*
- *installation in universal and functional type enclosures*
- *NA switch-disconnector version.*



Compact NSC100 (UL 508 / IEC 60947-2 / CSA22-2)

Rated current (A)		12.5…100
		054556 
Breaking capacity (kA rms) 380/480 V	N	18

General circuit-breaker characteristics **page 53**

Compact NSC100 circuit breakers are specially designed to protect industrial control panels.

Accompanying trip unit **page 53**

The built-in TMD thermal-magnetic trip unit provides:
- overload protection (adjustable-threshold thermal device)
- short-circuit protection (fixed-pick-up magnetic device).

Compact NS100 to 630 (UL 508 / IEC 60947-2 / CSA22-2)

Rated current (A)		12.5 … 100	12.5 ... 160	12.5 ... 250	60... 400	250... 630
Compact		NS100	NS160	NS250	NS400	NS630
		041624 			045198 	
Breaking capacity (kA rms) 380/480 V	N	25	35	35	42	42
	H	65	65	65	65	65

General circuit-breaker characteristics **page 16**

Compact NS100 to 630 circuit breakers are designed for protection of distribution systems and are also suitable for protection of industrial control panels.

Accompanying trip unit **page 22**

The trip units are interchangeable.
Compact NS100 to 250 circuit breakers are equipped with TMD thermal-magnetic or STR electronic trip units.
Compact NS400 to 630 circuit breakers are equipped exclusively with STR electronic trip units.

Circuit breaker NSC100N

Compact NS100N circuit breakers are specially designed to protect incoming feeders and groups of outgoing circuits on industrial control panels.
The NSC100NA switch-disconnector version is also available.

Compact NSC100N

Compact circuit breaker				NSC100N
Number of poles				3, 4
Control	manual - toggle			■
	direct or extended rotary handle			■
	electric			-
Connections	fixed	front connection		■
		rear connection		-
	with-drawable	front connection		-
		rear connection		-
Mounting on symmetrical rail				■
Electrical characteristics as per IEC 60947-2				
Rated current (A)	**In** 40 °C			100
Rated insulation voltage (V)	**Ui**			750
Rated impulse withstand voltage (kV)	**Uimp**			8
Rated operational voltage (V)	**Ue**	AC 50/60 Hz		690
		DC		250
Ultimate breaking capacity (kA rms)	**Icu**	AC 50/60 Hz	220/240 V	42
			380/415 V	18
			440 V	18
			500 V	10
			525 V	10
		DC	125 V	5
			250 V (2 P)	5
Service breaking capacity	**Ics**	% Icu		100%
Utilisation category				A
Suitability for isolation				■
Endurance (C-O cycles)	mechanical			20 000
	electrical	440 V	In/2	10 000
			In	7 000
Electrical characteristics as per UL 508				
Breaking capacity (kA)	AC 50/60 Hz		240 V	42
			480 V	18
			600 V	10
Protection				
Built-in thermal-magnetic trip unit				
Ratings In	16 20 25 32 40 50 63 70 80 100			
Instantaneous short-circuit protection (A)	**Im**	fixed pick-up		
	600 600 600 600 1000 1000 1000 1000 1000 1250			
Additional earth-fault protection	add-on Vigi module combination with Vigirex relay			
Indication and control auxiliaries				
Auxiliary contacts				■
Early-make or early-break contact				■
Voltage releases				MN or MX
Installation and connections				
Connection	built-in terminals			
Accessories	terminal shields			■
	phase barriers			-
	escutcheons			■
Dimensions (mm)	3 P			90 x 120 x 80
W x H x D	4 P			120 x 120 x 80
Weight (kg)	3 P			1.0
	4 P			1.3

Vigicompact NSC100N

Vigi earth-fault protection module

The Vigi earth-fault protection module may be installed to the right of the circuit breaker. Connections with the circuit breaker are possible to the top or bottom of the Vigi module (two versions). The connection is supplied with the Vigi module.

Characteristics			
Number of poles			3, 4
Sensitivity (A)			0.03 / 0.3 / 1 / 3
Time delay	intentional (ms)		0 60(1) 150(1)
	max. break time		< 40 < 140 < 150
Rated voltage (V)	50/60 Hz		200 to 440 V
Reset			pushbutton
Test			pushbutton
Protection against nuisance tripping			■
DC-component withstand			class A

***(1)** If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.*

Protection of industrial control panels
UL 508 / CSA 22-2 no. 14 marking

The UL 508 / CSA 22-2 no. 14 approval is for a “Manual Motor Controller” (“across the line starter” or “general use”).
The circuit breakers are 100% rated.

E42651

LISTED MAN. MOTOR. CTRL. 34XL

NSC100N-NA

This MMC is suitable for use on a circuit capable of delivering not more than the short-circuit current rating of this MMC indicated here below, or the upstream protective device interrupting capability, whichever is less, when protected by any protective device for Group fusing or Group installation.

SC current rating kA 50/60 Hz	
Vac	
240	42
480	25
600	10

Vac	115		230		460		575	
	1 ph	3 ph	1 ph	3 ph	1 ph	3 ph	1 ph	3 ph
ratings (A)	hp							
16	1	2	2	5	5	10	7.5	10
20	1.5	3	3	5	7.5	10	10	15
25	2	3	3	7.5	10	15	10	20
32	2	5	5	10	10	20	15	30
40	3	5	7.5	10	15	30	20	30
50	3	7.5	10	15	20	30	25	40
63	5	10	10	20	25	40	30	60
70	5	10	15	25	30	50	40	60
80	7.5	10	15	30	30	60	40	75
100	10	15	20	30	40	75	50	100

tripping current 125% — 100% rated

temperature rating 75°C / wire size	tightening torque lb-inch	tightening torque Nm
14 AWG to 3/0 AWG Cu	50	5.5
12 AWG to 4/0 AWG Al		

UL / CSA logo

Breaking capacity

Horsepower rating

Cable cross-section and tightening torques

NSC100 device marking
(circuit breaker with built-in trip unit)

E42650

LISTED MAN. MOTOR. CTRL. 34XL

NS100-160-250 N/H/NA

Equipped with TMD/DE or STR trip unit

This MMC is suitable for use on a circuit capable of delivering not more than the short-circuit current rating of this MMC indicated here below, or the upstream protective device interrupting capability, whichever is less, when protected by any protective device for Group fusing or Group installation.

SC current rating kA 50/60 Hz

Vac	NS100		NS160		NS250	
	N	H	N	H	N	H
240	85	85	85	85	85	85
480	25	65	35	65	35	65
600	10	10	10	10	18	18

tripping current 125% — 100% rated

temperature rating 75°C / wire size	tightening torque lb-inch	tightening torque Nm	Terminal kit reference 3P	Terminal kit reference 4P
14 AWG to 3/0 AWG Cu	130	11.3	29242	29243
12 AWG to 4/0 AWG Al				
4 AWG to 2 AWG Cu,Al	180	20	29259	29260
1 AWG to 350 kcmil Cu,Al	230	26		

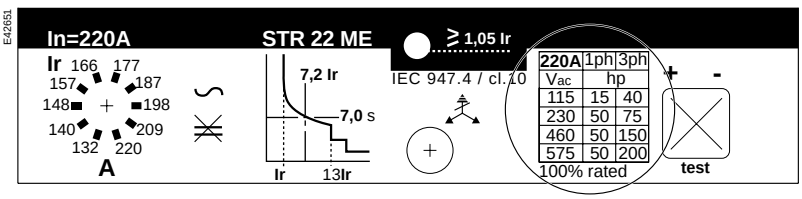
UL / CSA logo

Breaking capacity

Cable cross-section and tightening torques

NS100 to 250 device marking
(circuit breaker with interchangeable trip unit)

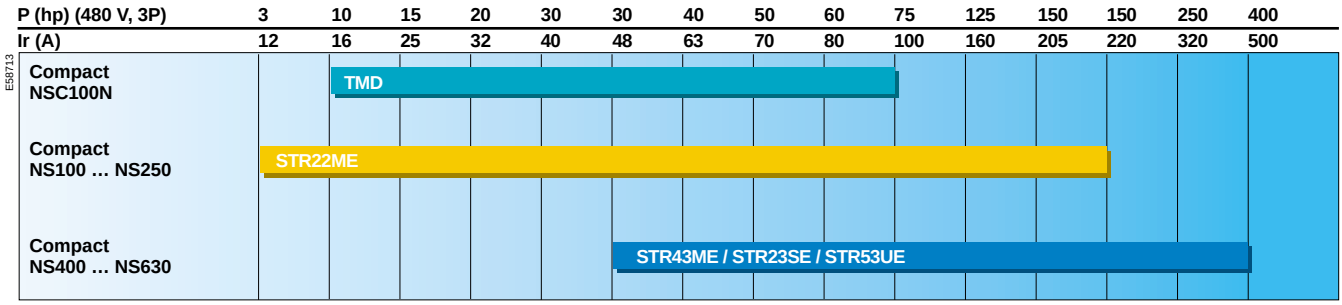
E42651



Trip-unit marking

Trip units, auxiliaries, installation enclosures

Trip-unit selection



STR electronic trip units are designed for:
- short-circuit protection
- overload protection
- phase-failure protection (STR22ME and STR43ME).

TMD thermal-magnetic trip units are designed for:
- short-circuit protection
- overload protection.

Type NA devices are switch-disconnectors which must always be protected upstream in accordance with applicable installation standards.

Circuit breakers	trip units	approvals
NSC100N	TMD NA	"Manual Motor Controller: Across the line starter & General use"
NS100/160/250 N/H	STR22ME NA	"Manual Motor Controller: Across the line starter"
	TMD STR22SE/GE	"Manual Motor Controller: General Use"
NS400/630 N/H	STR43ME NA STR23SE STR53UE	"Manual Motor Controller: Across the Line Starter"

Auxiliaries

All auxiliaries can be added to the circuit breaker by the user:
- padlocking devices (in the OFF position);
- rotary handle
- status-indication auxiliary contacts (ON, OFF and tripped)
- shunt (MX) or undervoltage (MN) releases
- early-make or early-break contacts.

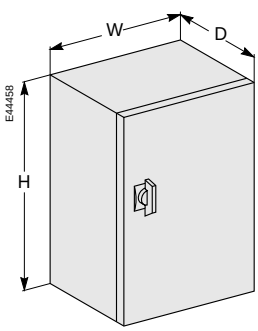
Rotary handle

Available in direct or extended versions for mounting up to 590 mm behind front. Versions include:
- black front with black handle
- yellow front with red handle (for machine tools or emergency off as per IEC 204 / VDE 0013).

All rotary handles can be padlocked in the OFF position.
Optional door interlock, recommended for MCC panels (motor control centre).

Early-make or early-break contacts

These auxiliary contacts make it possible to de-energise the downstream auxiliary circuits of the control panel as well as the auxiliary circuits supplying the MN release, if applicable.



Installation enclosure

Installation in an enclosure

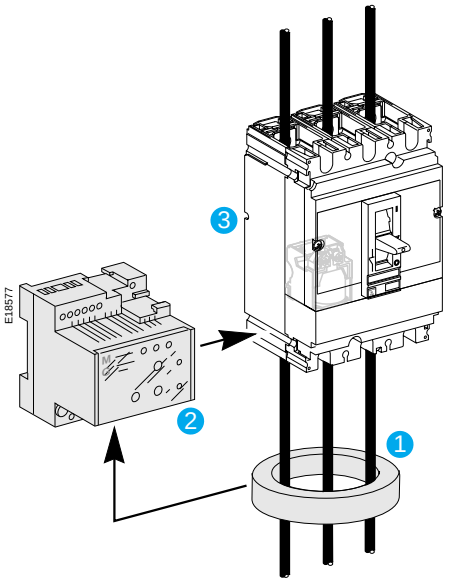
Compact circuit breakers can be installed in a metal enclosure together with other devices (contactors, motor-protection circuit breakers, LEDs, etc.)

Minimum enclosure dimensions

Disjoncteurs	Height (mm)	Depth (mm)	Width (mm)
NSC100N	300	150	200
NS100 N/H	457	130	208
NS160 N/H	457	130	208
NS250 N/H	457	130	208
NS400 N/H	-	-	-
NS630 N/H	-	-	-

Earth-leakage protection
Overview of solutions

Earth-leakage protection is obtained by:
- *fitting a Vigi earth-fault module on the circuit breaker (Compact NS100 to 630)*
- *installing on the circuit breaker a Micrologic 7.0 A control unit offering the earth-leakage function (Compact NS630b to 3200)*
- *using a Vigirex relay and separate toroids (all Compact circuit breakers).*



1 *residual-current measurement toroid*
2 *Vigirex earth-fault detection relay*
3 *MN or MX auxiliary release for earth-fault tripping*

DCircuit breakers equipped with an additional Vigi module (Vigicompact)

Rated current (A)	100… 630	
Vigicompact	NSC100 N NSA160 N/E NS125 E	NS100 à 250 N/H/L NS400 and 630 N/H/L

General circuit-breaker characteristics **page 16 et 53**

Compact NS100 to 630 and NSA160 circuit breakers are presented in the “Protection of distribution systems” section and the Compact NSC100 circuit breaker is presented in the “Protection of industrial control panels” section.

Accompanying Vigi modules

Earth-leakage protection is achieved by installing a Vigi earth-fault protection module directly on the circuit-breaker terminals.

Circuit breakers equipped with a control unit offering integrated earth-leakage protection and an external rectangular sensor

Rated current (A)	630… 3200	
Compact	NS630b to 1000 N/H/L NS1250 and 1600 N/H	NS1600b to 3200

General circuit-breaker characteristics **page 20**

Compact NS630b to 3200 circuit breakers are presented in the “Protection of distribution systems” section.

Accompanying control units **page 28**

Micrologic 7.0 A electronic control units offer earth-leakage protection as standard.

Earth-leakage protection using a Vigirex relay

Vigirex	Earth-fault relay	Separate toroids

Compact circuit breaker + Vigirex relay combination

Vigirex relays may be used to add external earth-fault protection to Compact NS circuit breakers. The circuit breakers must be equipped with an MN or MX voltage release. Vigirex relays are very useful when special time-delay or tripping-threshold values are required, or when there are major installation constraints (circuit breaker already installed and connected, limited space available, etc.).

Vigirex-relay characteristics:
- sensitivity adjustable from 30 mA to 250 mA and eight time-delay settings (0 to 1 second)
- closed toroids (30 to 300 mm in diameter) or split toroids (46 to 110 mm in diameter).

Options:
- trip alarm by a fail-safe contact
- LED and pre-alarm contact (threshold = 0.5 x IΔn)
- 400 Hz distribution systems, etc.

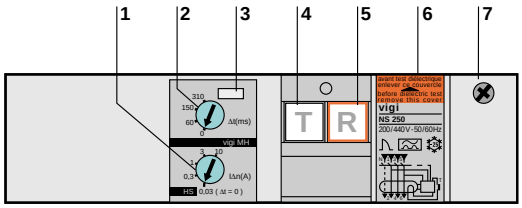
Compliance with standards:
- IEC 60947-2, appendix B
- French decree dated 14 November 1988
- IEC 60255-4 and IEC 60801-2 to 5 covering protection against nuisance tripping due to transient overvoltages, lightning strikes, switching of devices on the distribution system, electrostatic discharges, radiofrequency interference.
- IEC 60755, class A, immunity to DC components up to 6 mA
- VDE 664, operation down to -25° C.

Additional Vigi module (Vigicompact) for Compact NS100 to 630

044333

Vigicompact NS250N

E21007



1 *sensitivity setting*
2 *time-delay setting (for selective earth-leakage protection)*
3 *lead-seal fixture for controlled access to settings*
4 *test button simulating an earth-leakage fault for regular checks on the tripping function*
5 *reset button (reset required after earth-fault tripping)*
6 *rating plate*
7 *housing for SDV auxiliary contact*

Withdrawable circuit breaker
The Vigi module can be installed on a plug-in base. Special accessories are required (see the section on part numbers).

Vigicompact NSA160 and NSC100 circuit breakers with earth-fault protection

See pages 39 and 49, respectively.

DVigicompact NS100 to 630 circuit breakers with earth-fault protection

Addition of the Vigi module does not alter circuit-breaker characteristics:
- compliance with standards
- degree of protection, class II front-face isolation
- positive contact indication
- electrical characteristics
- trip-unit characteristics
- installation and connection modes
- indication, measurement and control auxiliaries
- installation and connection accessories.

Dimensions and weights		NS100/160	NS250	NS400/630
Dimensions	3 poles	105 x 236 x 86		135 x 355 x 110
W x H x D (mm)	4 poles	140 x 236 x 86		180 x 355 x 110
Weight (kg)	3 poles	2.5	2.8	8.8
	4 poles	3.2	3.4	10.8

Vigi earth-leakage protection module

Compliance with standards:
- IEC 60947-2, appendix B
- French decree dated 14 November 1988
- IEC 60255-4 and IEC 60801-2 to 5 covering protection against nuisance tripping due to transient overvoltages, lightning strikes, switching of devices on the distribution system, electrostatic discharges, radiofrequency interference.
- IEC 60755, class A, immunity to DC components up to 6 mA
- VDE 664, operation down to -25° C.

Remote indications
Vigi modules may be equipped with an auxiliary contact to remotely signal tripping due to an earth fault.

Power supply
Vigi modules are self-supplied internally by the distribution-system voltage and therefore do not require any external source. They continue to function even when supplied by only two phases.

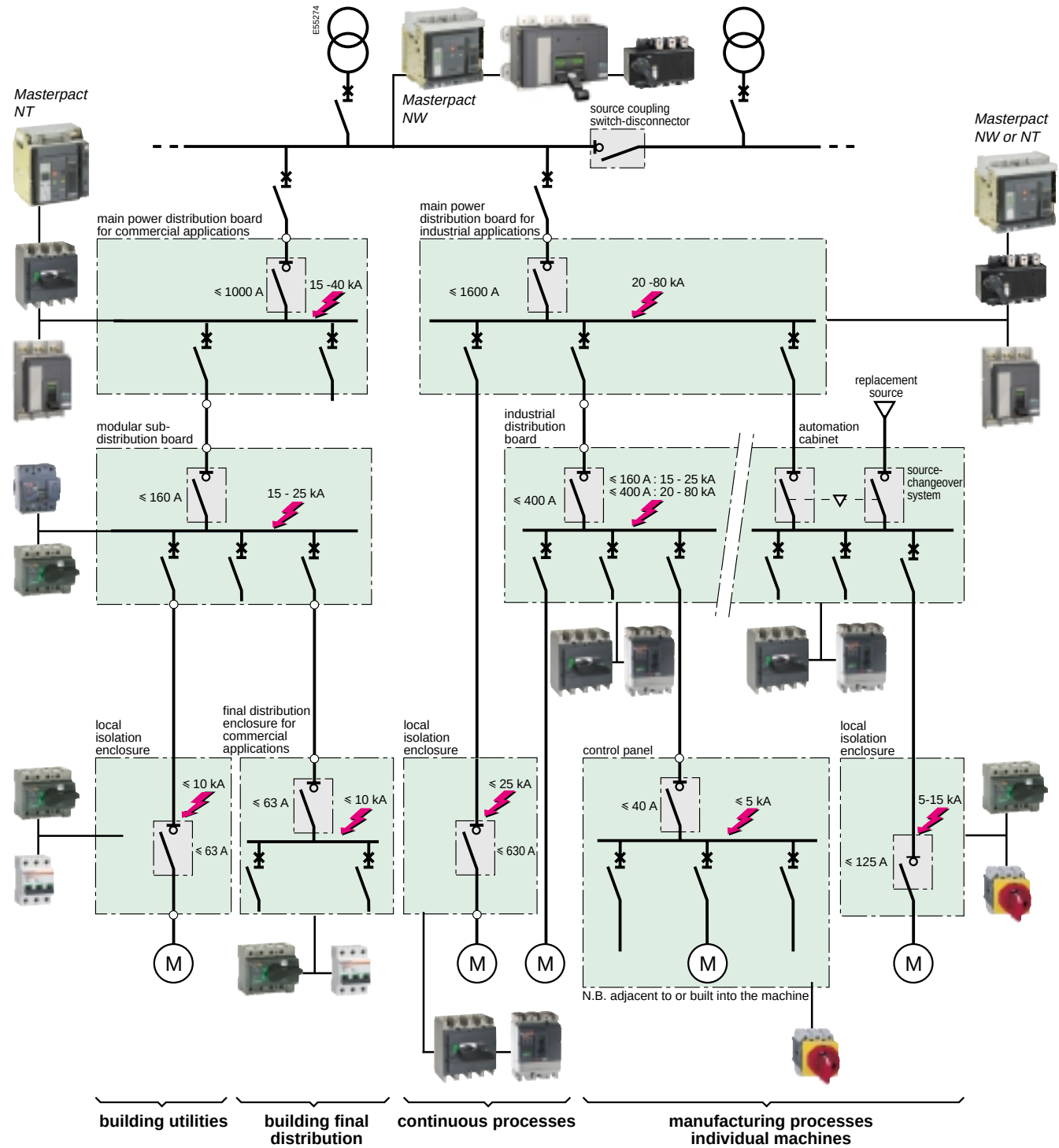
Vigi module selection table

	Vigi ME	Vigi MH	Vigi MB
Number of poles	3, 4 (1)	3, 4 (1)	3, 4 (1)
NS125 E	■	■	-
NS100 N/H/L	■	■	-
NS160 N/H/L	■	■	-
NS250 N/H/L	-	■	-
NS400 N/H/L	-	-	■
NS630 N/H/L	-	-	■
Protection characteristics			
Sensitivity	fixed	adjustable	adjustable
IΔn (A)	0.3	0.03 - 0.3 - 1 - 3 - 10	0.3 - 1 - 3 - 10 - 30
Time delay			
Intentional	fixed	adjustable	adjustable
delay (ms)	< 40	0 60 (2) 150 (2) 310 (2)	0 60 150 310
Max. breaking time (ms)	< 40	< 40 <140 <300 <800	< 40 < 140 < 300 < 800
Rated voltage	200...440	200... 440 - 440...550	200...440 - 440...550
V AC 50/60 Hz			

(1) *Vigi 3P modules may also be used on 2P circuit breakers (3P case)*
(2) *If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.*

Note.
The Vigi module for the Compact NSA160 circuit breaker is presented on page 39.

Control and breaking
Overview of solutions



Legend


E58880 *Masterpact*


056470 *Compact NS*


052164 *Interpact INS*


86087 *Compact NS*


086106 *Vario*


056471 *Compact NS*


035050 *Interpact IN*


056385 *Interpact INS*


054361 *NG125*


054629 *Multi 9*

Compact switch-disconnectors are used to control and isolate electrical distribution circuits. In addition to these basic functions, other functions for safety, remote control and convenience include:

- *earth-fault protection*
- *auxiliary MN/MX releases*
- *remote operation*
- *ammeter, etc.*

Compact switch-disconnectors may be interlocked with another Compact switch-disconnector or circuit breaker to constitute a source-changeover system.

86087

Compact NS250 switch-disconnector

053039

Compact switch-disconnector equipped with a Vigi module

053041

Compact switch-disconnector equipped with a motor mechanism

044313

MN/MX voltage release

Control and disconnection
Compact NSA125NA and NSA160NA switch-disconnectors

Installation standards require upstream protection. However, due to their reflex-tripping capacity, Compact NSA125 and 160NA switch-disconnectors are self protected.

58068

Compact NSA125NA

Compact switch disconnectors				
Number of poles				
Control	manual		toggle	
			direct or extended rotary handle	
	electric			
Connections	fixed		front connection	
			rear connection	
	withdrawable		front connection	
			rear connection	
Built-in connectors	for 1.5 to 90 mm□ cables			
Mounting	symmetrical rail			
Front-panel cutout	45 mm high			
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)		**Ith**	60 °C	
Rated insulation voltage (V)		**Ui**		
Rated impulse withstand voltage (kV)		**Uimp**		
Rated operational voltage (V)		**Ue**	AC 50/60 Hz	
			DC	
Rated operational current		**Ie**	AC 50/60 Hz	
				220/240 V
				380/415 V
				440/480 V (1)
				500 V
Short-circuit making capacity	**Icm**	(kA peak)	minimum (switch-disconnector alone)	
			maximum (with protection circuit breaker upstream)	
Short-time withstand current	**Icw**	(A rms)		1s
				3s
				20s
Suitability for isolation				
Endurance (C-O cycles)	mechanical			
	electrical	AC	690 V	AC 22A
			440 V	AC 23A
	electrical	AC	250 V	AC 23A
Positive contact indication				
Degree of pollution				
Protection				
Additional earth-fault protection			add-on Vigi module	
			combination with Vigirex relay	
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases				
Installation and connection				
Accessories				
Dimensions (mm)		fixed, front connection		2/3P
W x H x D				4P
Weight (kg)		fixed, front connection		3P
				4P
Source-changeover system (see section on source-changeover systems)				
Manual source-changeover systems				

	NSA125NA		NSA160NA	
	3. 4		3. 4	
	■ ■		■ ■	
	-		-	
	■ -		■ -	
	- -		- -	
	■		■	
	■		■	
	■		■	
	125		**160**	
	500		500	
	8		8	
	500 250		500 250	
	AC 22 A	**AC 23 A**	**AC 22 A**	**AC 23 A**
	125 125 125 125	125 125 125 100	160 160 160 160	160 160 160 125
	2.1 330			
	1500 1500 580			
	■			
	10 000			
	5 000 5 000			
	5 000			
	■			
	III			
	■ ■			
	1 OF + 1 SD			
	MN or MX			
	terminal shields depth adjuster			
	90 x 120 x 82.5 120 x 120 x 80			
	1.1 1.4			
	■			

Control and disconnection
Compact NSC100 and NS100 to 630NA switch-disconnectors

Installation standards require upstream protection. However, due to their reflex-tripping capacity, Compact NSA125 and 160NA switch-disconnectors are self protected.

Compact NS100NA

Compact switch disconnectors

Number of poles				
Control	manual		toggle direct or extended rotary handle	
	electric			
Connections	fixed			front connection rear connection
	plug-in (on base)			front connection rear connection
	withdrawable (on chassis)			front connection rear connection
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)	**Ith**		60 °C	
Rated insulation voltage (V)	**Ui**			
Rated impulse withstand voltage (kV)	**Uimp**			
Rated operational voltage (V)	**Ue**		AC 50/60 Hz DC	
Rated operational current	**Ie**		AC 50/60 Hz	
				220/240 V 380/415 V 440/480 V (2) 500/525 V 660/690 V
			DC	
				250 V (1 P) 500 V (2 P in series)
Short-circuit making capacity	**Icm**	(kA peak)	minimum (switch-disconnector alone) maximum (with protection circuit breaker upstream)	
Short-time withstand current	**Icw**	(A rms)		1 s 3 s 20 s
Suitability for isolation				
Endurance (C-O cycles)	mechanical			
	electrical	AC	690 V	AC 22A
			440 V	AC 23A
		DC	250 V	DC 23A
Positive contact indication				
Degree of pollution				
Protection				
Additional earth-fault protection			add-on Vigi module combination with Vigirex relay	
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases		MX shunt release MN undervoltage release		
Voltage-presence indicator				
Current-transformer module				
Ammeter module				
Insulation-monitoring module				
Remote communication by bus				
Device status indications (communicating auxiliary contacts)				
Device remote operation (communicating motor mechanism)				
Installation				
Accessories		terminal extensions and spreaders terminal shields and phase barriers escutcheons		
Dimensions (mm) W x H x D		fixed, front connection		2/3P 4P
Weight (kg)		fixed, front connection		3P 4P
Source-changeover system (see section on source-changeover systems)				
Manual source-changeover systems				
Remote-controlled and automatic source-changeover systems				

(1) *2P in box 3P*
(2) *Suitable for 480 V NEMA*

NSC100NA	NS100NA	NS160NA	NS250NA	NS400NA	NS630NA
3, 4	2 (1), 3,4	2 (1), 3,4	2 (1), 3,4	3, 4	3, 4
■	■	■	■	■	■
■	■	■	■	■	■
-	■	■	■	■	■
■	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
-	■	■	■	■	■
100	**100**	**160**	**250**	**400**	**630**
750	750	750	750	750	750
8	8	8	8	8	8
690	690	690	690	690	690
250	500	500	500	500	500
AC 22 A **AC 23 A**	**AC 22 A** **AC 23 A**	**AC 22 A** **AC 23 A**	**AC 22 A** **AC 23 A**	**AC 22 A** **AC 23 A**	**AC 22 A** **AC 23 A**
100 100	100 100	160 160	250 250	400 400	630 630
100 100	100 100	160 160	250 250	400 400	630 630
100 100	100 100	160 160	250 250	400 400	630 630
100 100	100 100	160 160	250 250	400 400	630 630
- -	100 100	160 160	250 250	400 400	630 630
DC 22 A **DC 23 A**	**DC 22 A** **DC 23 A**	**DC 22 A** **DC 23 A**	**DC 22 A** **DC 23 A**	**DC 22 A** **DC 23 A**	**DC 22 A** **DC 23 A**
- -	100 100	160 160	250 250	400 400	630 630
- -	100 100	160 160	250 250	400 400	630 630
2.1	2.6	3.6	4.9	7.1	8.5
330	330	330	330	330	330
1500	1800	2500	3500	5000	6000
1500	1800	2500	3500	5000	6000
580	690	960	1350	1930	2320
■	■	■	■	■	■
20000	50000	40000	20000	15000	15000
7000	50000	40000	20000	15000	15000
7000	30000 (50000 - In/2)	20000 (40000 - In/2)	10000 (20000 - In/2)	6000 (12000 - In/2)	4000 (8000 - In/2)
7000	30000 (50000 - In/2)	20000 (40000 - In/2)	10000 (20000 - In/2)	6000 (12000 - In/2)	4000 (8000 - In/2)
■	■	■	■	■	■
III	III	III	III	III	III
■	■			■	
■	■			■	
■	■			■	
■	■			■	
■	■			■	
-	■			■	
-	■			■	
-	■			■	
-	■			■	
■	■			■	
-	■			■	
■	■			■	
■	■			■	
■	■			■	
90 x 120 x 80	105 x 161 x 86			140 x 255 x 110	
120 x 120 x 80	140 x 161 x 86			185 x 255 x 110	
0.9	1.5 to 1.8			5.2	
1.2	2.0 to 2.2			6.8	
■ (locking)	■			■	
	■			■	

Control and disconnection
Compact NS630bNA to 1600NA switch-disconnectors

Installation standards require upstream protection. However, due to their reflex-tripping capacity, Compact NS630b to 1600NA switch-disconnectors self protect for all currents higher than 25 kA

E45179

Compact NS800NA

Compact switch disconnectors				
Number of poles				
Control	manual		toggle	
			direct or extended rotary handle	
	electric			
Connections	fixed			front connection
				rear connection
	withdrawable (on chassis)			front connection
				rear connection
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)	**Ith**		60 °C	
Rated insulation voltage (V)			**Ui**	
Rated impulse withstand voltage (kV)	**Uimp**			
Rated operational voltage (V)	**Ue**		AC 50/60 Hz	
			DC	
Rated operational current	**Ie**		AC 50/60 Hz	
				220/240 V
				380/415 V
				440/480 V (1)
				500/525 V
				660/690 V
			DC	
				250 V (1 P)
				500 V (2 P in series)
Short-circuit making capacity	**Icm**	(kA peak)	minimum (switch-disconnector alone)	
			maximum (with protection circuit breaker upstream)	
Short-time withstand current	**Icw**	(A rms)		0.5 s
				1 s
				20 s
Suitability for isolation				
Endurance (C-O cycles)	mechanical			
	electrical	AC	690 V	AC 22A
			440 V	AC 23A
Positive contact indication				
Degree of pollution				
Protection				
Additional earth-fault protection			combination with Vigirex relay	
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases		MX shunt release		
		MN undervoltage release		
Remote communication by bus				
Device status indications (communicating auxiliary contacts)				
Device remote operation (communicating motor mechanism)				
Installation				
Accessories		terminal extensions and spreaders		
		terminal shields and phase barriers escutcheons		
Dimensions (mm)		fixed		3P
W x H x D				4P
Weight (kg)		fixed		3P
				4P
Source-changeover system (see section on source-changeover systems)				
Manual source-changeover systems, remote-controlled and automatic				

(1) *Suitable for 480 V NEMA.*

NS630bNA		NS800NA		NS1000NA		NS1250NA		NS1600NA	
3. 4		3. 4		3. 4		3. 4		3. 4	
■		■		■		■		■	
■		■		■		■		■	
■		■		■		■		■	
■		■		■		■		■	
■		■		■		■		■	
■		■		■		■		■	
■		■		■		■		■	
630		800		1000		1250		1600	
750		750		750		750		750	
8		8		8		8		8	
690		690		690		690		690	
500		500		500		500		500	
AC 22 A	AC 23 A	AC 22 A	AC 23 A	AC 22 A	AC 23 A	AC 22 A	AC 23 A	AC 22 A	AC 23 A
630	630	800	800	1000	1000	1250	1250	1600	1600
630	630	800	800	1000	1000	1250	1250	1600	1600
630	630	800	800	1000	1000	1250	1250	1600	1600
630	630	800	800	1000	1000	1250	1250	1600	1600
630	630	800	800	1000	1000	1250	1250	1600	1600
DC 22 A	DC 23 A	DC 22 A	DC 23 A	DC 22 A	DC 23 A	DC 22 A	DC 23 A	DC 22 A	DC 23 A
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
50		50		50		50		50	
330		330		330		154		154	
25		25		25		25		25	
17		17		17		17		17	
4		4		4		4		4	
■		■		■		■		■	
10000		10000		10000		10000		10000	
8000		8000		8000		8000		8000	
5000		5000		5000		4000		4000	
■		■		■		■		■	
III		III		III		III		III	
■									
■									
■									
■									
■									
■									
■									
■									
■									
327 x 210 x 147									
327 x 280 x 147									
14									
18									
■									

Control and disconnection
Compact NS1600b to 3200NA switch-disconnectors

Installation standards require upstream protection. However, due to their reflex-tripping capacity, Compact NS1600b to 3200NA switch-disconnectors self protect for all currents higher than 30 kA.

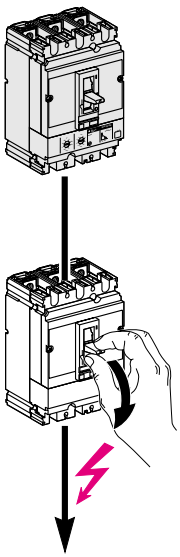
E45182

Compact NS2000NA

Compact switch disconnectors				
Number of poles				
Control	manual		toggle	
			direct or extended rotary handle	
	electric			
Connections	fixed			front connection
				rear connection
	withdrawable (on chassis)			front connection
				rear connection
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A)		**Ith**	60 °C	
Rated insulation voltage (V)			**Ui**	
Rated impulse withstand voltage (kV)		**Uimp**		
Rated operational voltage (V)		**Ue**	AC 50/60 Hz	
			DC	
Rated operational current		**Ie**	AC 50/60 Hz	
				220/240 V
				380/415 V
				440/480 V (1)
				500/525 V
				660/690 V
Short-circuit making capacity	**Icm**	(kA peak)	minimum (switch-disconnector alone)	
			maximum (with protection circuit breaker upstream)	
Short-time withstand current	**Icw**	(A rms)		0.5 s
				1 s
				20 s
Suitability for isolation				
Endurance (C-O cycles)	mechanical			
	electrical	AC	690 V	AC 22A
			440 V	AC 23A
Positive contact indication				
Degree of pollution				
Protection				
Additional earth-fault protection			combination with Vigirex relay	
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases		MX shunt release		
		MN undervoltage release		
Installation				
Accessories		escutcheons		
Dimensions (mm)		fixed		3P
W x H x D				4P
Weight (kg)		fixed		3P
				4P
Source-changeover system (see section on source-changeover systems)				
Manual source-changeover systems, remote-controlled and automatic				

(1) *Suitable for 480 V NEMA.*

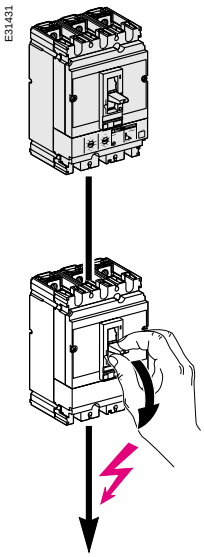
	NS1600bNA		NS2000NA		NS2500NA		NS3200NA	
	3. 4		3. 4		3. 4		3. 4	
	■		■		■		■	
	-		-		-		-	
	-		-		-		-	
	■		■		■		■	
	-		-		-		-	
	-		-		-		-	
	-		-		-		-	
	1600		**2000**		**2500**		**3200**	
	750		750		750		750	
	8		8		8		8	
	690		690		690		690	
	500		500		500		500	
	AC 22 A	**AC 23 A**	**AC 22 A**	**AC 23 A**	**AC 22 A**	**AC 23 A**	**AC 22 A**	**AC 23 A**
	1600	1600	2000	2000	2500	2500	3200	3200
	1600	1600	2000	2000	2500	2500	3200	3200
	1600	1600	2000	2000	2500	2500	3200	3200
	1600	1600	2000	2000	2500	2500	3200	3200
	1600	1600	2000	2000	2500	2500	3200	3200
	63		63		63		63	
	187		187		187		187	
	30		30		30		30	
	21		21		21		21	
	4.7		4.7		4.7		4.7	
	■		■		■		■	
	6000		6000		6000		6000	
	1000		1000		1000		4000	
	1000		1000		1000		2000	
	■		■		■		■	
	III		III		III		III	
	■							
	■							
	■							
	■							
	■							
	350 x 420 x 160							
	350 x 535 x 160							
	23							
	36							
	-							



Info to come

Info to come

E31431



Info to come

Info to come

Source-changeover systems
Presentation

For complete, in-depth information, see the "Interpact, Compact, Masterpact source-changeover systems" catalogue.

87921

Service sector
- *hospital operating rooms.*
- *safety systems for tall buildings.*
- *computer rooms (banks, insurance companies, etc.).*
- *lighting systems in shopping centres.*

029693

Industry
- *assembly lines.*
- *engine rooms on ships.*
- *critical auxiliaries in thermal power stations.*

IMG0021

Infrastructure
- *port and railway installations.*
- *runway lighting systems.*
- *control systems for military installations.*

Manual source-changeover systems
This is the most simple type. Intervention by technical personnel is required, i.e. transfer from the normal source to the replacement source is not immediate.

A manual source-changeover system can be installed on two to three manually-controlled circuit breakers or switch-disconnectors. Interlocking is mechanical. Interlocks prevent connection to both sources at the same time, even momentarily.

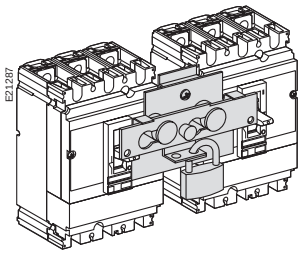
Remote-controlled source-changeover systems
This is the most commonly employed system. No human intervention is required. Switching from the normal to the replacement source is controlled electrically.

A remote-controlled source-changeover system is made up of two or three circuit breakers or switch-disconnectors linked by electrical interlocking system (different configurations possible). Device operation is backed up by a mechanical interlocking fixture that prevents parallel connection if the electrical system malfunctions or if an incorrect manual operation is attempted.

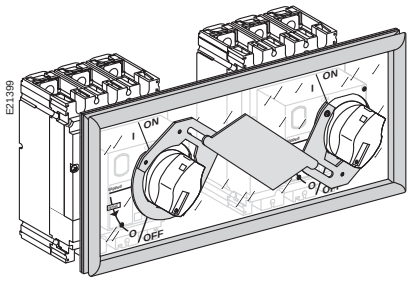
Automatic source-changeover systems
An automatic controller may be added to the remote-controlled source-changeover system for automatic source control according to programmable operating modes. This solution ensures optimum energy management:
- switching to a replacement source depending on external requirements
- management of power sources
- regulation
- emergency source replacement, etc.

The automatic controller may be fitted with an option for communication with a supervisor.

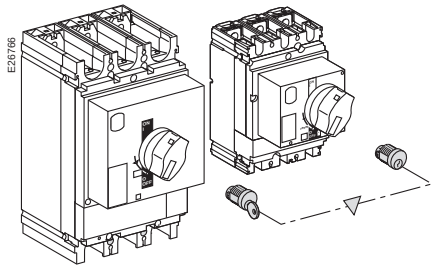
A manual source-changeover system can be installed on two to three manually-controlled circuit breakers or switch-disconnectors. Interlocking is mechanical. Interlocks prevent connection to both sources at the same time, even momentarily.



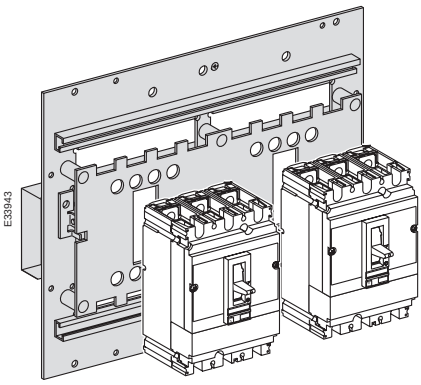
Interlocking of two toggle-controlled devices



Interlocking of two devices with rotary handles



Interlocking with keylocks



Interlocking on base plates

Interlocking of two or three toggle-controlled devices

Two devices can be interlocked using this system. Two identical interlocking systems can be used to interlock three devices installed side by side, in which case one device is in the ON position and the two others are in the OFF position.
The system is locked using one or two padlocks (hasp diameter 5 to 8 mm).

Combination of Normal and Replacement devices

There are two interlocking-system models:
- Compact NS100 to 250
- Compact NS400 to 630 (can also be used for a Compact NS100 to 250).

Devices must be either all fixed or all withdrawable.

Interlocking of two devices with rotary handles

The rotary handles are padlocked with the devices in the OFF position.
The mechanism inhibits the two devices being closed at the same time, but does allow for both to be open (OFF) at the same time.

Combination of Normal and Replacement devices

All Compact NS100 to 1600 circuit breakers and switch-disconnectors with rotary handles can be interlocked. Interlocking of a Compact NS100 to 630 with a Compact NS630b to 1600 is not possible.

Interlocking of a number of devices using keylocks (captive keys)

Interlocking uses two identical keylocks with a single key and a keylock adapter (different for each device). This solution enables interlocking between two devices that are physically distant or that have significantly different characteristics, for example between a low and a medium-voltage device, or between Compact NS circuit breakers and switch-disconnectors.
A system of wall-mounted units with captive keys makes possible a large number of combinations between many devices.

Combination of Normal and Replacement devices

All Compact NS100 to 1600 circuit breakers and switch-disconnectors with rotary handles or motor mechanisms can be interlocked.

Interlocking of two devices on a base plate

A base plate designed for two Compact devices can be installed horizontally or vertically on a mounting rail. Interlocking is carried out on the base plate by a mechanism located behind the devices. Access to the device controls and trip units is not blocked.

Combination of Normal and Replacement devices

All manually controlled Compact NS100 to 630 circuit breakers and switch-disconnectors can be interlocked.
Devices must be fixed or plug-in versions, with or without earth-fault protection or measurement modules.

Source-changeover systems
Remote-controlled systems

Remote-controlled source-changeover system

Auxiliary control plate

Controller

A remote-controlled source-changeover system is made up of:

1 *circuit breaker QN equipped with a motor mechanism and auxiliary contacts, connected to the Normal source*

2 *circuit breaker QR equipped with a motor mechanism and auxiliary contacts, connected to the Replacement source*

3 *mounting base plate with mechanical interlocking (NS100 to 630) or an interlocking system using rods or cables (NS630b to 1600)*

4 *electrical interlocking unit. IVE for NS100 to 630 or an electrical system provided by the installer for NS630b to 1600. Electrical interlocking system example: part no. 51156903 in the source-changeover system catalogue.*

Switching between sources can be automated by adding:

5 *ACP auxiliary control plate*

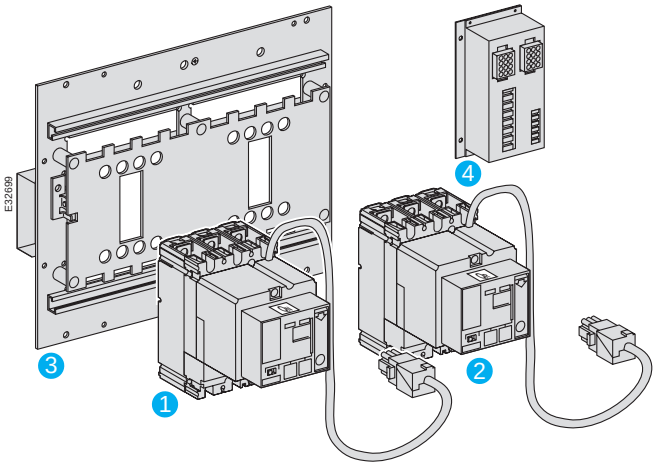
6 *BA or UA controller, or an electrical system provided by the installer for NS630b to 1600. Electrical system example: part no. 51156904 and 51156904 in the source-changeover system catalogue.*

Accessory:

7 *coupling accessory (downstream connection) for NS100 to 630.*

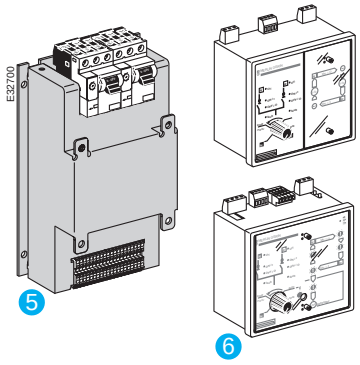
Source-changeover system without a controller

In this case, the automatic-control system to initiate changeovers between the Normal and Replacement sources under predefined conditions must be provided by the installation designer.



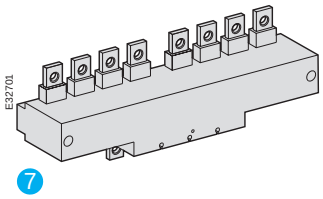
Source-changeover system with a controller

In this case, changeovers between the Normal and Replacement sources under predefined conditions are initiated by a Merlin Gerin controller.



Coupling accessory

This accessory may be used with the source-changeover system (with or without a controller) to facilitate connections.



When used with a remote-controlled source-changeover system, the BA or UA controllers initiate the automatic changeover operations according to user-defined sequences.

BA controller

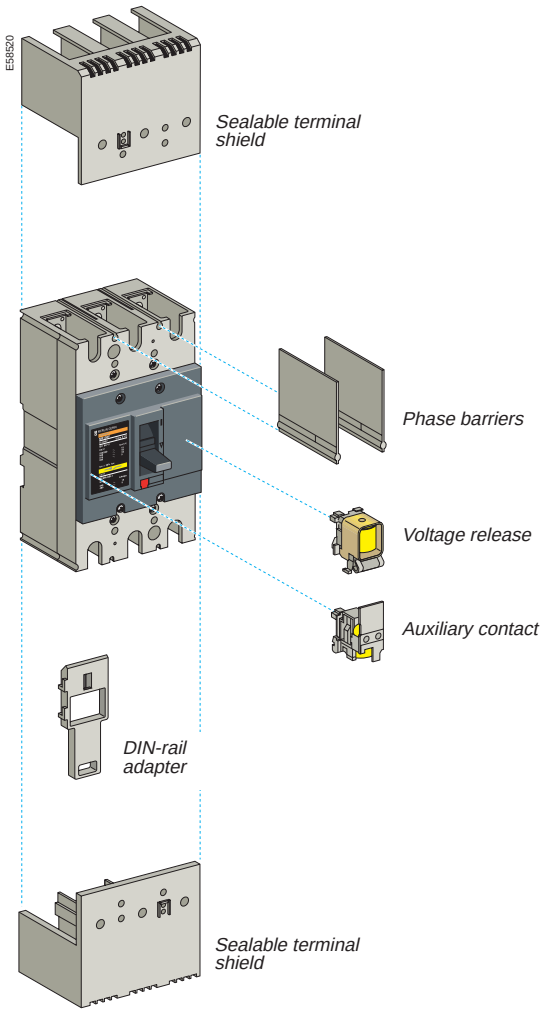
UA controller

Controller		BA	UA
Four-position switch			
Automatic operation		■	■
Forced operation on Normal source		■	■
Forced operation on Replacement source		■	■
Stop (both Normal and Replacement sources OFF)		■	■
Automatic operation			
Monitoring of the Normal source and automatic changeover		■	■
Engine generator set start-up control			■
Delayed shutdown (adjustable) of engine generator set			■
Load shedding and reconnection of non-priority loads			■
Changeover to Replacement source if one of the Normal-source phases is absent			■
Test			
Opening of the P25M circuit breaker upstream of the controller		■	
Test pushbutton on the front of the controller			■
Indications			
Circuit-breaker status indication on the front of the controller: ON, OFF, fault trip		■	■
Automatic-mode indication contact		■	■
Other functions			
Select of type of Normal source (single-phase or three-phase)			■
Voluntary transfer to Replacement source (e.g. energy-management commands)		■	■
During peak-tariff periods (energy-management commands), forced operation on Normal source if Replacement source is not operational			■
Additional control contact (not in controller). Transfer to Replacement source only if contact closed (e.g. UR frequency check)		■	■
Replacement-source maximum start-up time setting			■
Options			
Communications option		■	
Power supply			
Control voltages (1)	220 to 240 V 50/60 Hz	■	■
	380 to 415 V 50/60 Hz	■	■
	440 V 60 Hz	■	■
Operating thresholds			
Undervoltage	0.35 Un ⩽ voltage ⩽ 0.7 Un	■	■
Phase failure	0.5 Un ⩽ voltage ⩽ 0.7 Un		■
Voltage presence	voltage ⩾ 0.85 Un	■	■
Characteristics of output contacts			
Rated thermal current (A)	8		
Minimum load	10 mA at 12 V		

		AC				DC	
Utilisation category (IEC 60947-5-1)		AC12	AC13	AC14	AC15	DC12	DC13
Operational current (A)	24 V	8	7	5	6	8	2
	48 V	8	7	5	5	2	-
	110 V	8	6	4	4	0.6	-
	220/240 V	8	6	4	3	-	-
	250 V	-	-	-	-	0.4	-
	380/415 V	5	-	-	-	-	-
	440 V	4	-	-	-	-	-
	660/690 V	-	-	-	-	-	-

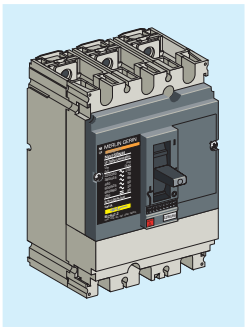
(1) *Power supplied by the ACP auxiliary control plate. The supply voltage must be the same for the ACP plate, the IVE unit and the circuit breaker operating mechanisms. If this voltage is the same as the distribution-system voltage, the Normal and Replacement sources can be used directly for the power supply. If not, a BC-type or equivalent isolation transformer must be used.*

Installation, connection and accessories
Compact NB50 and 100



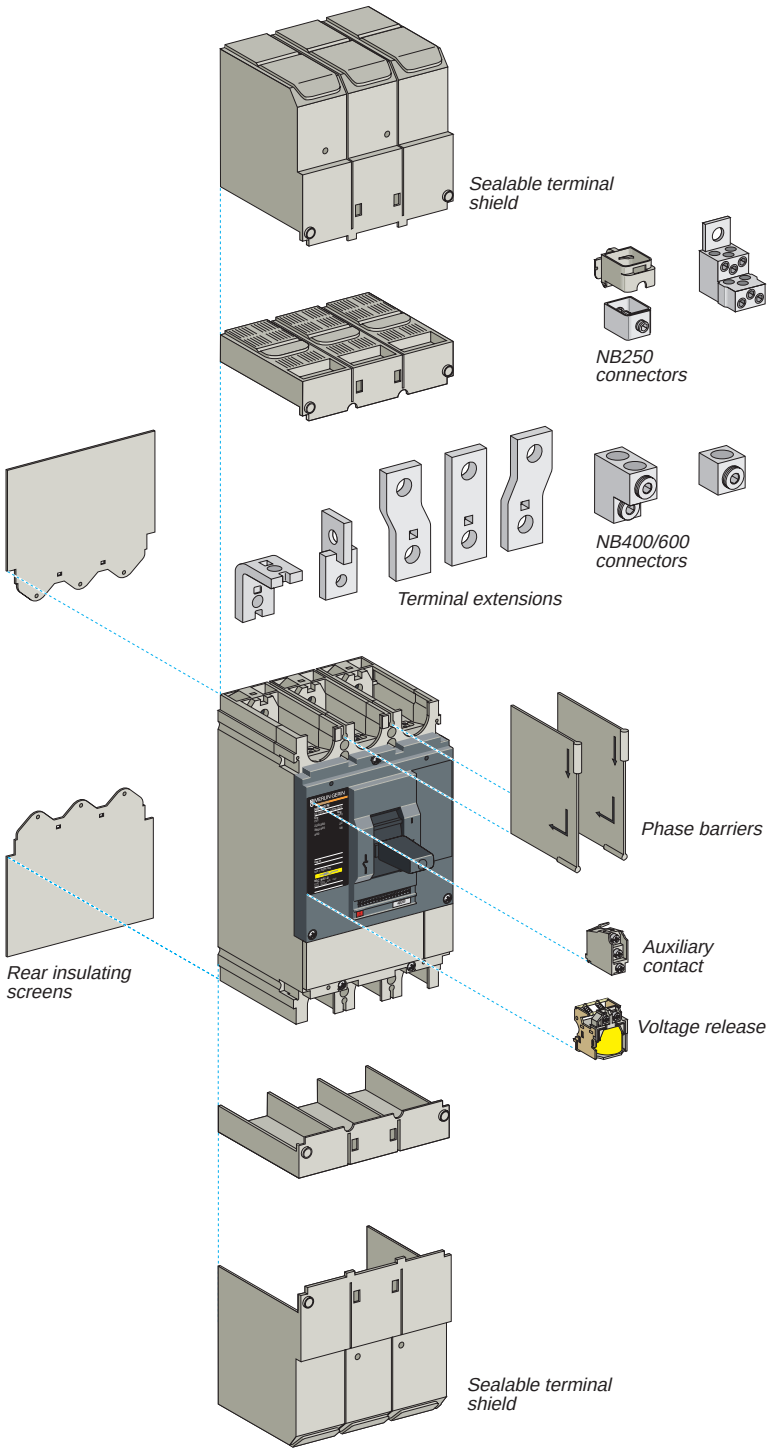
Compact NB250 to 600

E58547



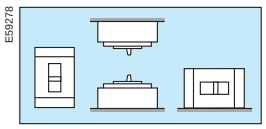
Compact NB250

E58519



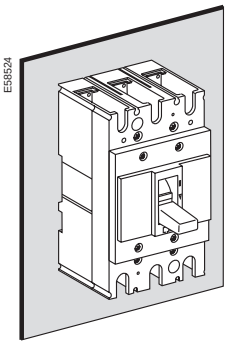
Installation, connection and accessories
Compact NB50 and 100

Installation

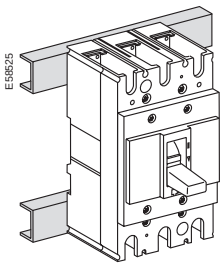


Installation positions

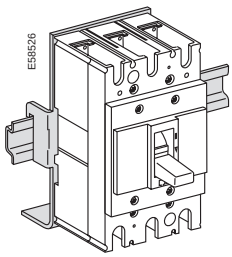
Compact NB50 and 100 circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics.
They are designed for easy installation in the various types of switchboards of each market and country.
Mounting on a DIN rail is possible using a special adapter.
Plug-in and withdrawable versions are not available for these circuit breakers.



Mounting on a backplate

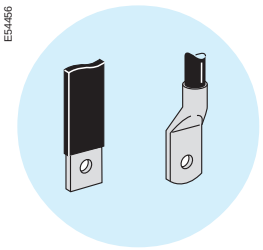


Mounting on rails



Mounting on symmetrical rails (with adapter)

Front connection of bars or cables with lugs

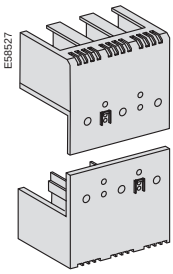


The Compact NB50 to 100 devices are equipped as standard with terminals comprising snap-in nuts with screws (M8) for direct connection to insulated bars or cables with lugs.

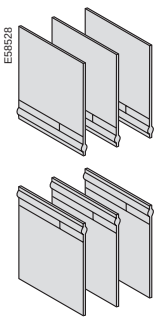
Insulation of live parts

Terminal shields
Terminal shields are sealable insulating accessories used for protection against direct contact with power circuits (degree of protection IP 40, IK07). They are supplied with sealing accessories.

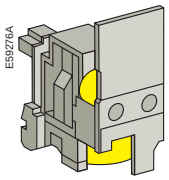
Phase barriers
Phase barriers are safety accessories for maximum insulation at the power-connection points.
- they clip easily onto the circuit breaker.
- not compatible with terminal shields.



Terminal shields



Phase barriers



Common-point changeover contacts can be used to remote circuit-breaker status information for indications, electrical locking, relays, etc.

Indication contacts

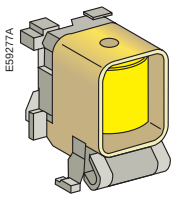
Contacts are available in three versions that all comply with international standard IEC 60947-5 and offer the following indication functions:

- OF (open / closed): indicates the position of the circuit-breaker contacts
- SD (trip indication): indicates that the circuit-breaker has tripped due to:
  - overload
  - short-circuit
  - operation of a voltage release.

  Returns to de-energised state when the circuit breaker is reset.
- OF + SD

Electrical characteristics of indication contacts

Rated thermal current (A)		6			
Minimum load		10 mA at 24 V			
Utilisation category (IEC 60947-5-1)		AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	2.5	1
	48 V	6	6	2.5	0.2
	110 V	6	5	0.8	0.05
	220/240 V	6	4	-	-
	250 V	-	-	0.3	0.03
	380/440 V	6	3	-	-
	660/690 V	6	0.1	-	-



MX shunt release

Remote tripping

MX shunt release

The MX release trips the circuit breaker when the control voltage rises above 0.7 x Un. Control signals can be of the impulse type (≥ 20ms) or maintained.

Operation

When the circuit breaker has been tripped by a release, it must be reset locally. MN or MX tripping has priority over manual closing. In the presence of a standing trip order, the main contacts cannot be closed, even temporarily.

Mechanical characteristics

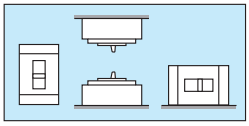
- endurance: 50% of the rated circuit-breaker mechanical endurance
- releases snap in behind the front of the circuit breaker
- connection using wires with a cross-sectional area of up to 1.5 mm^2, to a built-in terminal block.

Electrical characteristics

- consumption:
  - pick-up (MX): < 10 W
  - seal-in (MN): < 5 VA.
- response time < 50 ms.

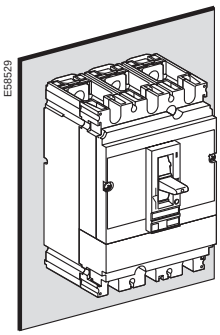
Installation, connection and auxiliaries
Compact NB250 to 600

Installation

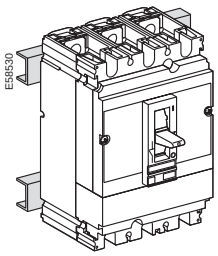

E59278

Installation positions

Compact NB250 to 600 circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics.
They are designed for easy installation in the various types of switchboards used around the world.
Plug-in and withdrawable versions are not available for these circuit breakers.

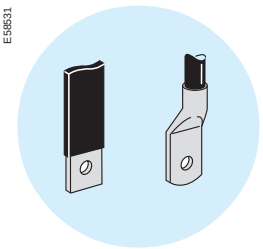

E58529

Mounting on back plate


E58530

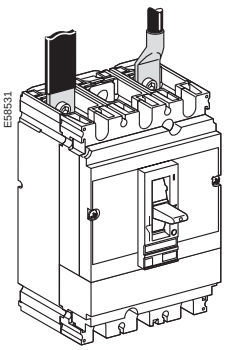
Mounting on rails

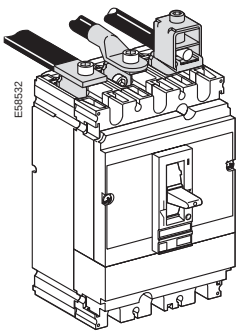
Connection

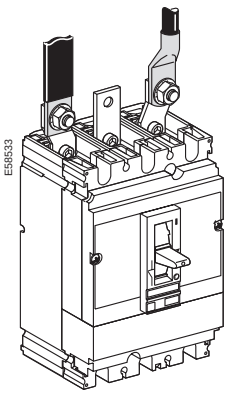

E58531

Front connection to bars or cables with lugs

Compact NB50 and 100 circuit breakers are equipped as standard with terminals receiving snap-in nuts and screws (M8 for NB250, M10 for NB400 and 600) for direct connection of insulated bars or cables with lugs.
Terminal extensions (right-angle, edgewise, spreaders) are available to solve all connection problems. For Compact NB600, connection most often requires the 52.5 mm or 70 mm pitch spreaders.


E58531


E58532

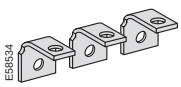

E58533

Lugs

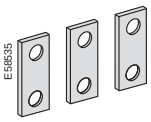
Lugs are different for copper and aluminium cables. They are supplied with phase barriers and are compatible with the long terminal shields.
■ the small lugs for copper cables may be used for cables with the following cross-sectional areas:
□ 120, 150 or 185 mm^2 (NB250)
□ 240 or 300 mm^2 (NB400 and 600).
Crimping by hexagonal barrels or punching
■ the small lugs for aluminium cables may be used for cables with the following cross-sectional areas:
□ 150 or 185 mm^2 (NB250)
□ □ 240 or 300 mm^2 (NB400 and 600).
Crimping by hexagonal barrels.

Spreaders

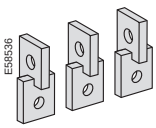
Spreaders increase the pitch of the terminals. They are not compatible with terminal shields.


E58534

Right-angle terminal extensions


E58535

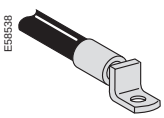
Straight terminal extensions for NB250


E58536

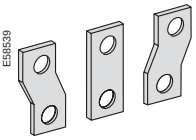
Edgewise terminal extensions for NB400 and 600


E58537

Small lug for copper cables

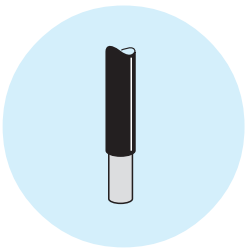

E58538

Small lug for aluminium cables

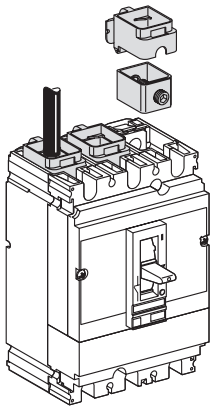

E58539

Spreaders

E54457



E58540



Front connection of bare cables

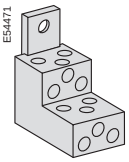
Bare-cable connectors for Compact NB circuit breakers may be used for both copper and aluminium cables.

1-cable connectors for Compact NB250
The connectors snap directly onto the device terminals or clip onto right-angle and straight terminal extensions as well as spreaders.

1-cable and 2-cable connectors for Compact NB400 and 600
The connectors are screwed to device terminals or right-angle terminal extensions.

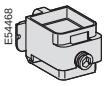
Distribution connectors for Compact NB250
These connectors are screwed directly to device terminals. Phase barriers are supplied with distribution connectors, but may be replaced by long terminal shields. Each connector can receive six cables with cross-sectional areas ranging from 1.5 to 35 mm^2 each.

E54471



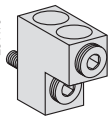
Distribution connector for Compact NB250

E54468



1-cable connector for Compact NB250

E54470



E54469

1-cable and 2-cable connectors for Compact NB400 and 600

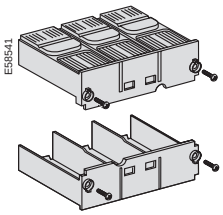
Insulation of live parts

Terminal shields

Sealable insulating accessories are used for protection against direct contact with power circuits (degree of protection IP 40, IK07). They are supplied with sealing accessories.

Terminal-shield selection
- Mandatory for voltages > 400 V
- Special shield for Compact NB400 and 600 with spreaders.

E58541

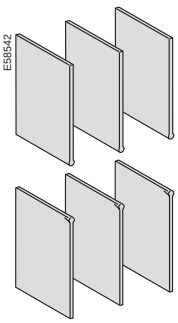


Terminal shields

Phase barriers

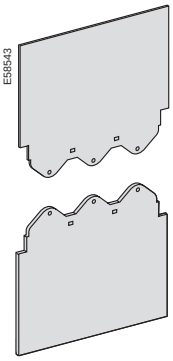
These safety accessories provide maximum insulation between phases at the power connection points. They:
- clip easily onto the circuit breaker
- are not compatible with terminal shields
- version spécifique pour socle.

E58542



Phase barriers

E58543



Rear insulating screens

Installation, connection and auxiliaries
Compact NB250 to 600 (cont.)

044314

Indication contacts

Indication contacts

These common-point changeover contacts can be used to remote circuit-breaker status information for indications, electrical locking, relays, etc.
They comply with international standard IEC 60947-5.

Functions

■ OF (open / closed): indicates the position of the circuit-breaker contacts
■ SD (trip indication): indicates that the circuit-breaker has tripped due to:
□ overload
□ short-circuit
□ operation of a voltage release
□ operation of the “push-to-trip” button
Returns to de-energised state when the circuit breaker is reset.
■ SDE (fault trip indication): indicates that the circuit-breaker has tripped due to:
□ overload
□ short-circuit
Returns to de-energised state when the circuit breaker is reset.
Installation :
■ One model serves for all indication functions, depending on where it is fitted in the circuit breaker. The contacts snap into slots behind the front of the circuit breaker. On a Compact NB250N, the SDE function requires the SDE actuator.

Electrical characteristics of indication contacts

Rated thermal current (A)		6			
Minimum load		10 mA at 24 V			
Utilisation category (IEC 60947-5-1)		AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	2.5	1
	48 V	6	6	2.5	0.2
	110 V	6	5	0.8	0.05
	220/240 V	6	4	-	-
	250 V	-	-	0.3	0.03
	380/440 V	6	3	-	-
	660/690 V	6	0.1	-	-

044313

MX or MN release

Remote tripping

MX or MN releases are used to trip the circuit breaker.

MN undervoltage release

This release trips the circuit breaker when the control voltage drops below the tripping threshold:
■ tripping threshold between 0.35 and 0.7 times the rated voltage
■ circuit-breaker closing is possible only if the voltage exceeds 0.85 times the rated voltage.
Circuit-breaker tripping by an MN release meets the requirements of standard IEC 60947-2.

Delay unit for an MN release

The delay unit eliminates nuisance tripping due to voltage dips lasting ⩽ 200 ms.

It is used in conjunction with:
■ 250 V DC MN release, control voltage 220/240 V AC
■ 48 V DC MN release, control voltage 48 V AC.

MX shunt release

The MX release trips the circuit breaker when the control voltage rises above 0.7 x Un.
Control signals can be of the impulse type (⩾ 20ms) or maintained.

Operation

When the circuit breaker has been tripped by an MN or MX release, it must be reset locally.
MN or MX tripping has priority over manual closing. In the presence of a standing trip order, the main contacts cannot be closed, even temporarily.

Mechanical characteristics

■ endurance: 50% of the rated circuit-breaker mechanical endurance
■ releases snap in behind the front of the circuit breaker
■ connection using wires with a cross-sectional area of up to 1.5 mm^2, to a built-in terminal block.

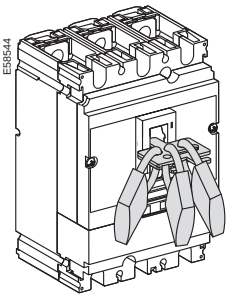
Electrical characteristics

■ consumption:
□ pick-up (MX): < 10 W
□ seal-in (MN): < 5 VA
■ response time < 50 ms.

Padlocking

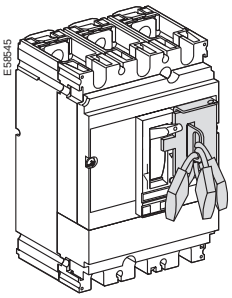
Locking in the OFF position guarantees isolation as defined by the IEC 947-2 standard. Devices may be locked by up to three padlocks, shackle diameter 5 to 8 mm (not supplied).

E58544



Locking of the toggle using a removable device.

E58545

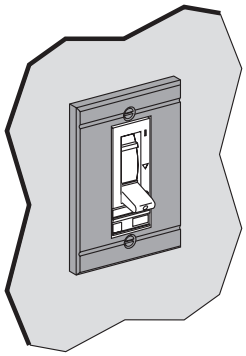


Locking of the toggle using a fixed device.

Front-panel escutcheons

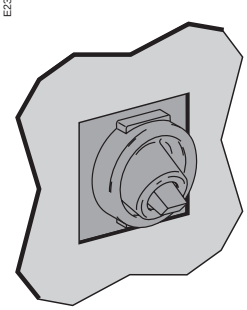
These optional auxiliaries, mounted on the front panel, ensure a degree of protection IP 40, IK 07.

E58546



Front-panel escutcheon, secured to the panel from the front.

E23936

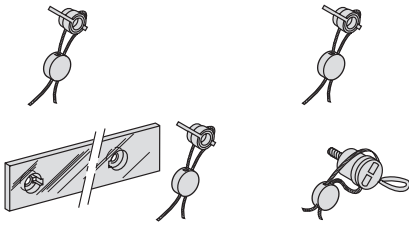


Toggle cover:
■ degree of protection IP 43, IK 07
■ fits on the front of the circuit breaker.

Sealing accessories

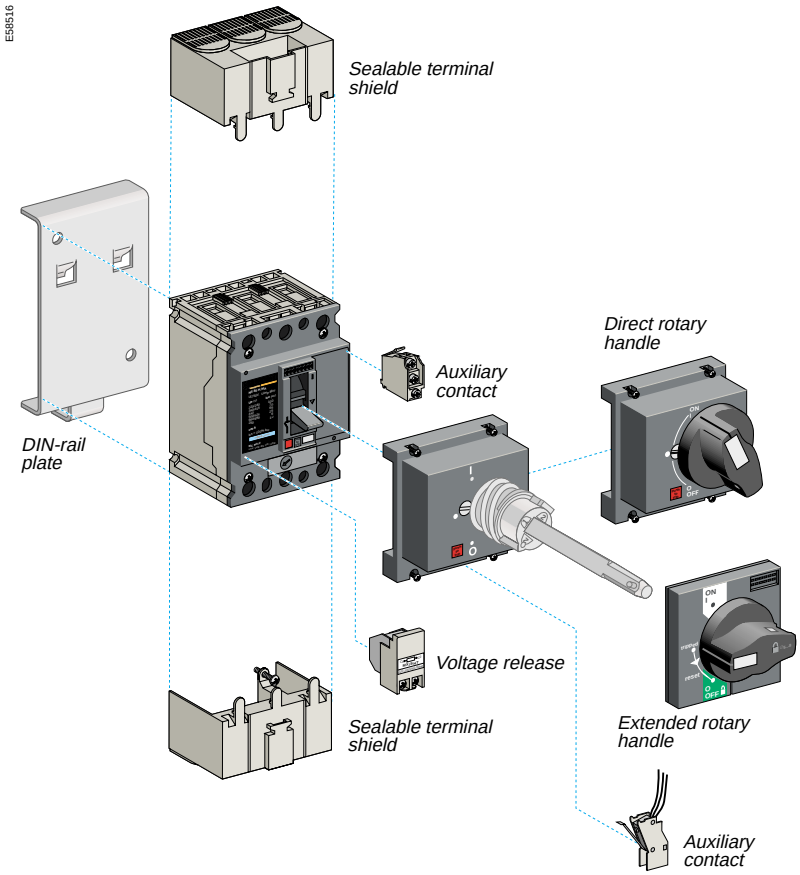
This option includes the elements required to fit lead seals to prevent:
- front removal
- access to auxiliaries
- terminal-shield removal
- access to power connections.

E18596

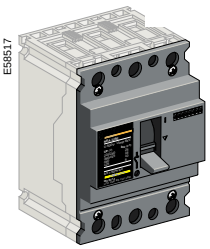


Sealing accessories

Installation, connection and accessories
Compact NS80H-MA, NSC100N

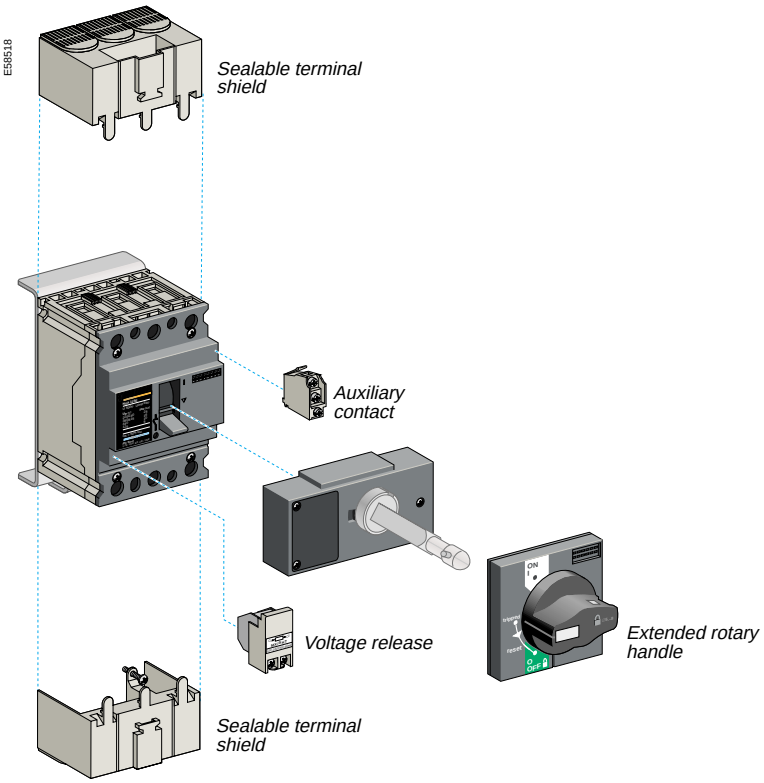


Front accessory for NSC100N (45 mm standard)

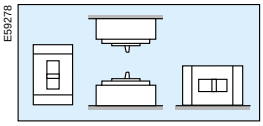


45 mm front

Compact NSA160



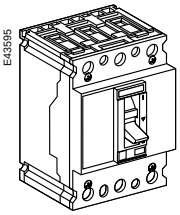
Installation, connection and accessories
Compact NS80H-MA, NSC100N and NSA160



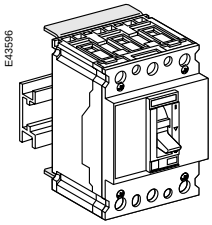
Installation

Installation

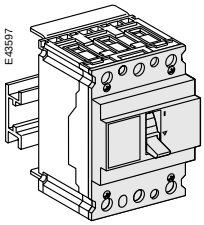
Compact NS80H-MA and NSC100N circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics. They are designed for easy installation in the various types of switchboards of each market and country.
Mounting on a DIN rail is possible using a special adapter.
The NSA160 circuit breaker may be mounted exclusively on a DIN rail.
These three circuit breakers are available in the fixed, front-connection version.



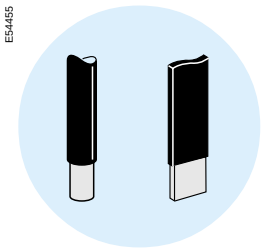
NS80H-MA and NSC100N: mounting on backplate or mounting plate.



NS80H-MA and NSC100N: mounting on DIN rail (optional).
NSA160: mounting on DIN rail (standard).



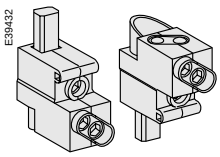
Standard 45 mm front, optional on NSC100N, standard on NSA160.



Front connection of bare cables

Compact NS80H-MA, NSC100N and NSA160 circuit breakers are equipped as standard with terminals for the connection of bare copper or aluminium cables from 1.5 to 70 mm^2.

Distribution connector
This connector screws directly to the circuit-breaker terminal. It is used to connect up to three cables:
- flexible cables from 1 to 10 mm^2
- rigid cables from 1.5 to 16 mm^2
- with crimped or self-crimping ferrules from 1.5 to 4 mm^2.

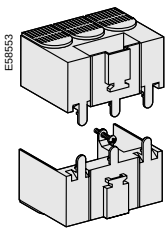


Distribution connector

Insulation of live parts

Terminal shields
Terminal shields are sealable insulating accessories used for protection against direct contact with power circuits (degree of protection IP 40). They are supplied with sealing accessories.

For voltages ⩾ 500 V, terminal shields are mandatory.



Terminal shields

044314

Indication contacts

Common-point changeover contacts provide remote circuit-breaker status information. They can be used for indications, electrical locking, relaying, etc.

Indication contacts

A single type of contact, complying with the IEC 60947-5 international recommendation, provides different indication functions, depending on the position where it is inserted in the device.

■ OF (open/closed) - indicates the position of the circuit breaker contacts
■ SD (trip indication) - indicates that the circuit breaker has tripped due to:
□ an overload
□ a short-circuit
□ an earth fault (Compact NSC100N and NSA160)
□ operation of a voltage release.
Returns to de-energised state when the circuit breaker is reset.
■ SDV (earth fault indication) - inserted in the Vigi module on Compact NSC100N and NSA160 devices, it indicates that the circuit breaker has tripped due to an earth fault. Returns to de-energised state when the circuit breaker is reset.

All the above auxiliary contacts are also available in “low-level” versions capable of switching very low loads (e.g. for the control of PLCs or electronic circuits).

Characteristics

Contacts		**Standard**				**Low level**			
Rated thermal current (A)		6				5			
Minimum load		10 mA at 24 V				1 mA at 4 V			
Utilisation category (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	2.5	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	3	-	-	5	1.5	-	-

054550

MX or MN voltage release

Remote tripping

MX or MN voltage releases are used to trip the circuit breaker.

MN undervoltage release
This release trips the circuit breaker when the control voltage drops below a tripping threshold:
■ tripping threshold between 0.35 and 0.7 times the rated voltage
■ circuit breaker closing is possible only if the voltage exceeds 0.85 times the rated voltage.

Circuit breaker tripping by an MN release meets the requirements of standard IEC 60947-2.

Time-delay unit for an MN release (Compact NS80H-MA)
Eliminates nuisance tripping due to transient voltage dips lasting ⩽ 200 ms :

It is used in conjunction with:
■ a 250 V DC MN release, control voltage 220/240 V AC
■ a 48 V DC MN release, control voltage 48 V AC.

MX shunt release
Trips the circuit breaker when the control voltage rises above 0.7 x Un.
Control signals can be of the impulse type (⩾ 20 ms) or maintained.

Operation
When the circuit breaker has been tripped by an MN or MX release, it must be reset locally.
MN or MX tripping takes priority over manual closing.
In the presence of a standing trip order, closing of the contacts, even temporary, is not possible.

Mechanical characteristics
■ endurance is equal to 50% of the mechanical endurance of the circuit breaker
■ the releases clip in behind the front cover
■ connection using wires up to 1.5 mm^2 to integrated terminal blocks.

Electrical characteristics
■ consumption:
□ pick-up (MX): < 10 W
□ seal-in (MN): < 5 VA
■ response time: < 50 ms.

Installation, connection and accessories
Compact NS80H-MA, NSC100N and NSA160 (cont.)

Compact NS80H-MA with a direct rotary handle

Compact NS80H-MA with an extended rotary handle

Rotary handles

There are two types of rotary handle:
- direct rotary handle
- extended rotary handle.

There are two models:
- standard with a black handle
- VDE with a red handle and yellow front for machine-tool control.

Direct rotary handle (NS80H-MA and NSC100N)

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, hasp diameter Ø 5 to 8 mm (not supplied).

It replaces the circuit-breaker front cover.

Accessories transform the standard direct rotary handle for the following situations:
- motor control centre (MCC) switchboards:
  - door opening disabled when the circuit breaker is ON
  - circuit-breaker closing is disabled if the door is open
- a higher degree of protection (IP43, IK07)
- machine-tool control, complying with CNOMO E03.81.501, IP 54, IK08.

Extended rotary handle

Degree of protection IP 55, IK08.

This handle makes it possible to operate circuit breakers installed inside switchboards, from the switchboard front.

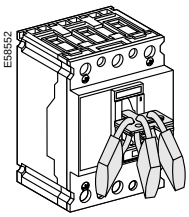
It maintains:
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to trip unit settings, when the switchboard door is open
- circuit breaker locking capability in the OFF position by one to three padlocks, hasp diameter 5 to 8 mm (not supplied).

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 (min/max distance between back of circuit breaker and door is 185/600 mm).

Locking systems

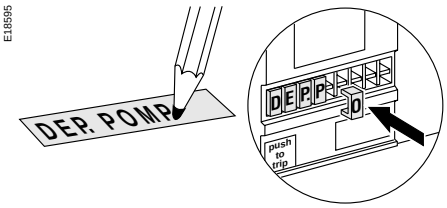
Locking in the OFF position guarantees isolation as per IEC 60947-2.
Padlocking systems can receive up to three padlocks with hasp diameters ranging from 5 to 8 mm (padlocks not supplied).



Toggle locking using a removable device

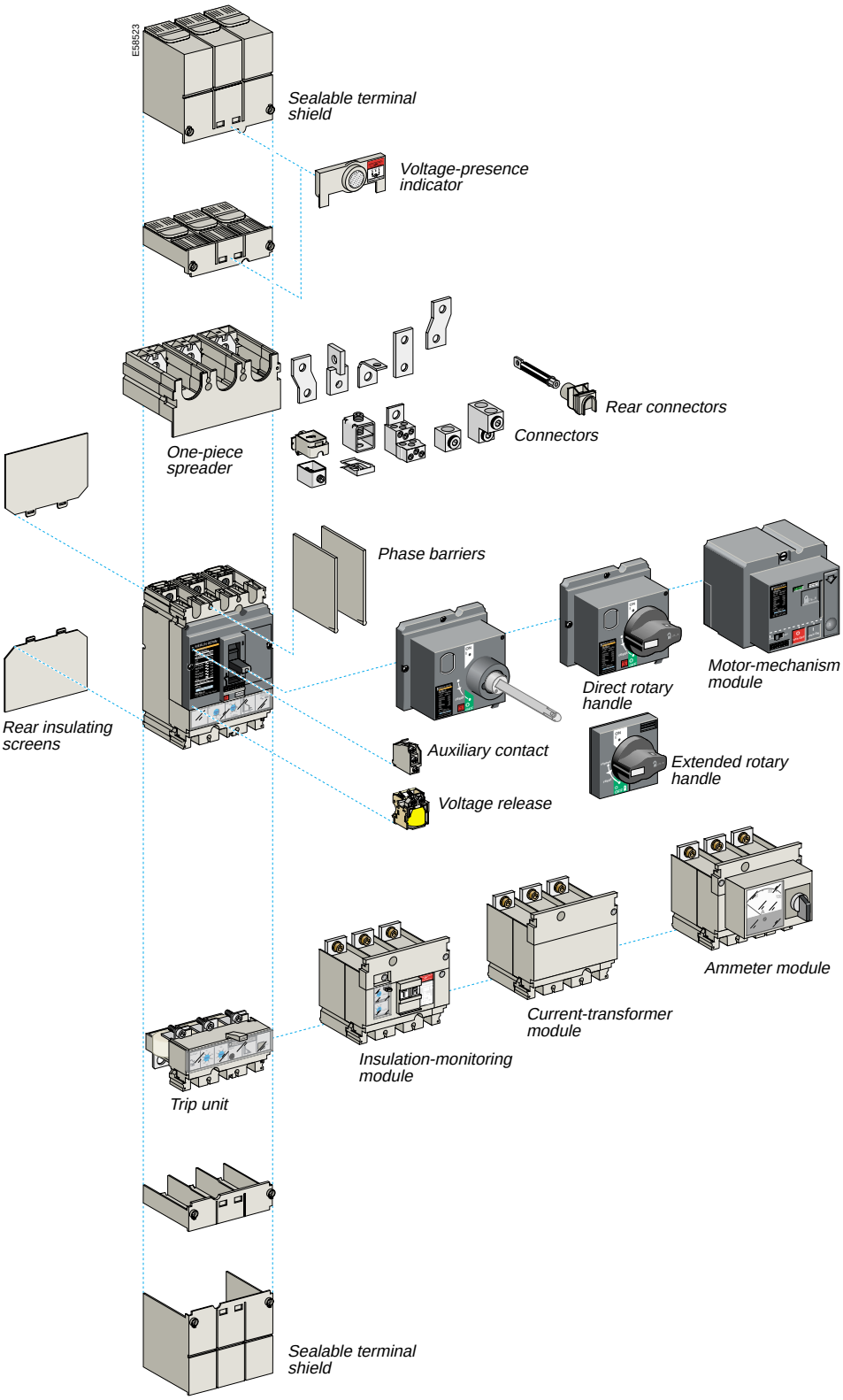
Outgoing-circuit identification

Compact NS80H-MA and NSC100N devices come with clip-in labels for hand-written indications.
It is also possible to use pre-printed Telemecanique labels (part number AB1-** (8 digits).

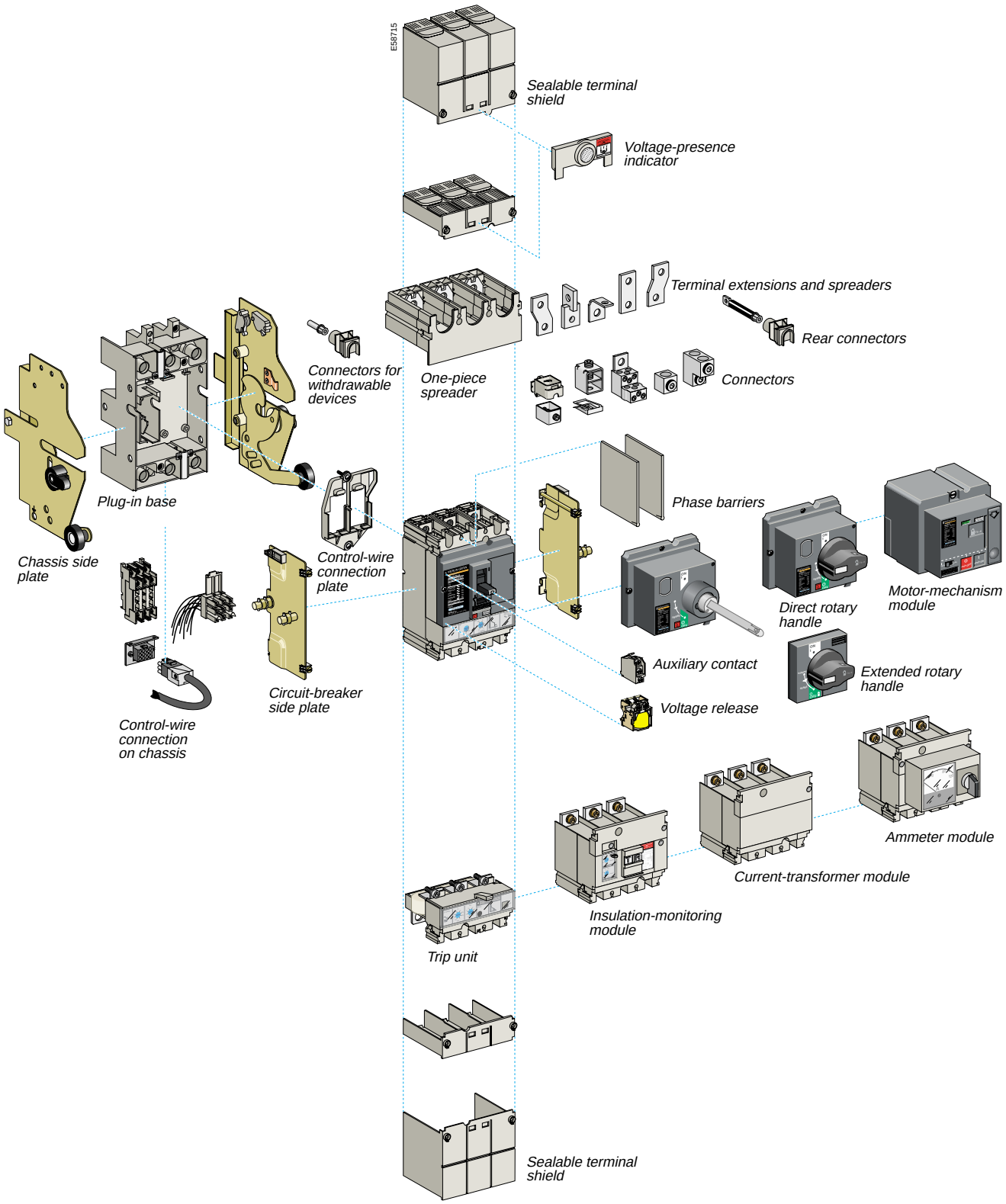


Identification accessories

Installation, connection and accessories
Compact NS100 to 630 (fixed version)

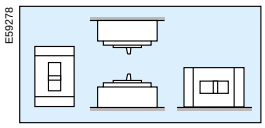


Compact NS100 to 630 (withdrawable version)



Installation, connection and accessories
Compact NS100 to 630

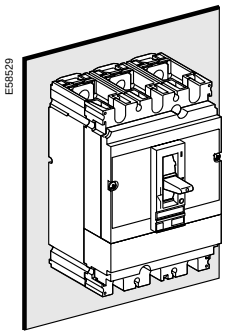
Fixed Compact NS250H



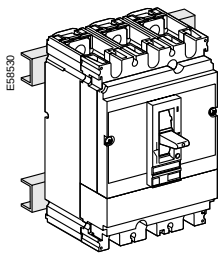
Installation

Installation

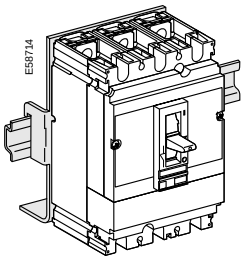
Fixed circuit breakers
Compact circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics. They are designed for easy installation in the various types of switchboards of each market and country.



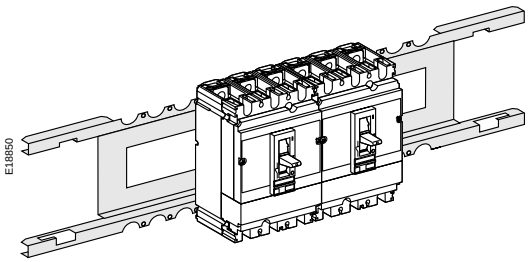
Mounting on a backplate (solid or slotted)



Mounting on rails



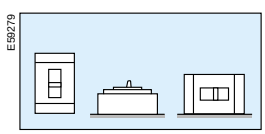
Mounting on symmetrical rails (with adapter)



Mounting on a Prisma functional mounting plate.

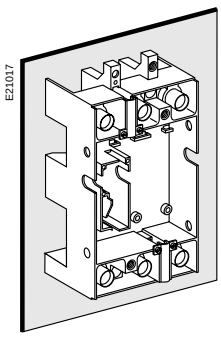
The plug-in configuration makes it possible to:
- *extract and/or rapidly replace the circuit breaker without having to touch connections*
- *allow for the addition of future circuits at a later date.*

Compact NS250H on a plug-in base

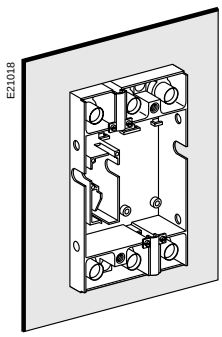


Installation

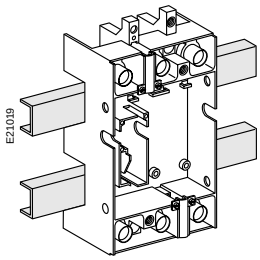
Circuit breaker on a plug-in base



Mounting on a backplate



Mounting through a front panel



Mounting on rails

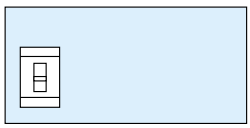
Protection against direct contacts with power circuits
- circuit breaker plugged in = IP4
- circuit breaker removed = IP2.
- circuit breaker removed, base equipped with shutters = IP4

Parts of a plug-in configuration
- Compact circuit breaker
- set of power connectors added to the circuit breaker
- plug-in base for mounting on a backplate or on rails
- insulating screen, for use when the circuit breaker is installed on a backplate with front connections
- safety trip, installed on the circuit breaker, that causes automatic tripping if the circuit breaker is ON, before engaging or withdrawing it. The safety trip does not prevent circuit breaker operation, even when in the disconnected position
- mandatory short terminal shields.

Accessories
Insulating accessories can be used to:
- protect against direct contact
- increase insulation between phases.

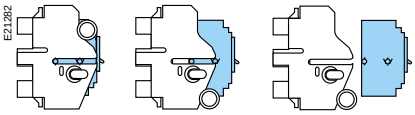
■ *disconnected position - the power circuits are disconnected, but the circuit breaker is still on the chassis and may still be operated (ON, OFF, push-to-trip).*
■ *the circuit breaker may be locked using 1 to 3 padlocks (hasp diameter 5 to 8 mm), to prevent connection.*
■ *the auxiliaries can be tested (with manual auxiliary connector).*

Compact NS250H on a withdrawable chassis



Installation

Circuit breaker on a withdrawable chassis



Connected *Disconnected* *Removed*

The chassis is made up of two side plates installed on the base and two other plates mounted on the circuit breaker.

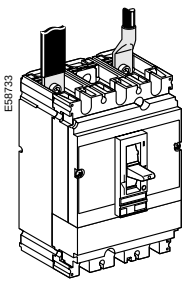
Accessories

■ auxiliary contacts for installation on the fixed part, indicating the “connected” and “disconnected” positions
■ toggle collar for circuit breakers with a toggle mounted through a front panel, intended to maintain the degree of protection whatever the position of the circuit breaker (supplied with a toggle extension)
■ keylock which, depending on the bolt fitted, can be used to:
□ prevent insertion for connection
□ lock the circuit breaker in the connected or disconnected positions.
■ telescopic shaft for extended rotary handles.

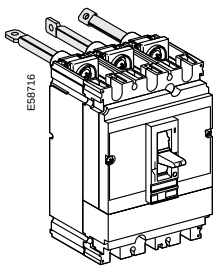
Front and rear connections

Fixed, plug-in and withdrawable Compact devices may all be equipped with front and rear connections.

Fixed device

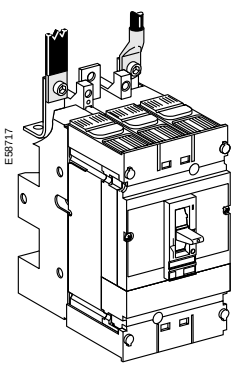


Front connection

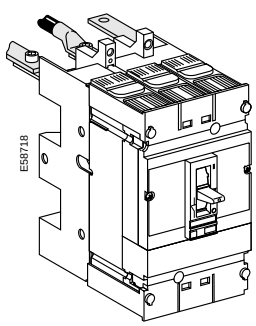


Rear connection

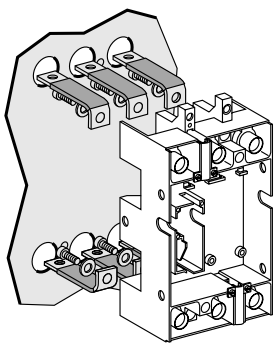
Plug-in and withdrawable devices



Front connection



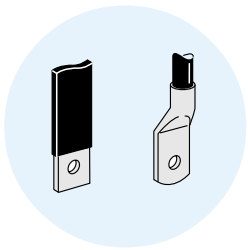
Rear connection

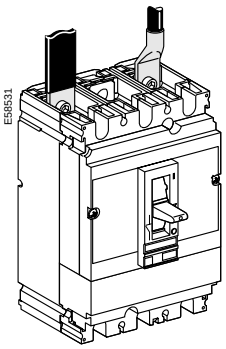


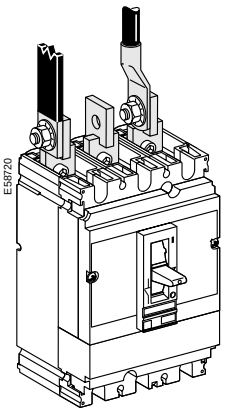
Rear connection through a backplate

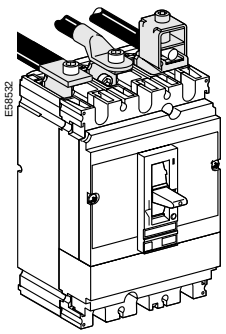
Installation, connection and accessories
Compact NS100 to 630 (cont.)

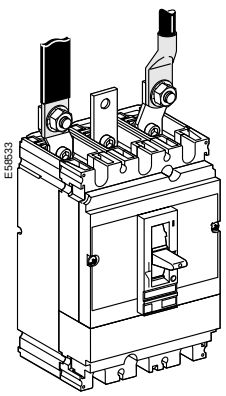
E54456




E58531


E59720


E58532


E58533

Connection of fixed devices

Front connection of bars or cables with lugs

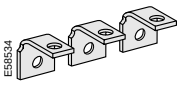
The Compact NS100 to NS630 devices are equipped as standard with terminals comprising snap-in nuts with screws (M8 for NS100 to 250, M10 for NS400 to 630) for direct connection to insulated bars or cables with lugs.
Additional terminal extensions (right-angle, edgewise, spreaders) are available for all connection requirements. Spreaders (52.5 or 70 mm pitch) may be fitted on the Compact NS400 to 630.

Lugs

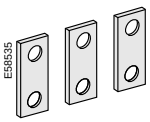
Lugs are different for copper and aluminium cables. They are supplied with phase barriers and are compatible with the long terminal shields.
■ the small lugs for copper cables may be used for cables with the following cross-sectional areas:
□ 120, 150 or 185 mm^2 (NS100 to 250)
□ 240 or 300 mm^2 (NS400 to 630).
Crimping by hexagonal barrels or punching.
■ the small lugs for aluminium cables may be used for cables with the following cross-sectional areas:
□ 150 or 185 mm^2 (NS100 to 250)
□ 240 or 300 mm^2 (NS400 to 630).
Crimping by hexagonal barrels.

Spreaders

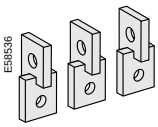
Spreaders increase the pitch of the terminals.
They are not compatible with terminal shields on the Compact NS100 to 250.
The one-piece spreader increases the pitch, thus making it possible to use the connection accessories of a larger device (e.g. a Compact NS100 to 250 can be fitted with the accessories of a Compact NS400 to 630). The one-piece spreader also provides protection against direct contact (see page xxxxx).


E58534

Right-angle terminal extensions


E58535

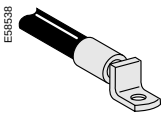
Straight terminal extensions for NS100 to 250


E58536

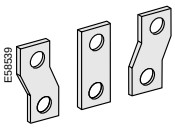
Edgewise terminal extensions for NS400 to 630


E58537

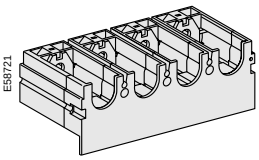
Small lug for copper cables


E58538

Small lug for aluminium cables

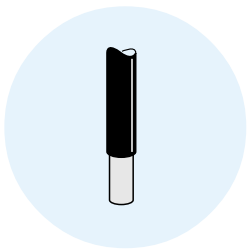

E58539

Spreaders

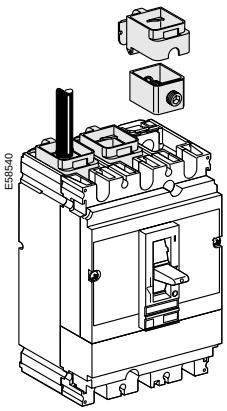

E58721

One-piece spreader

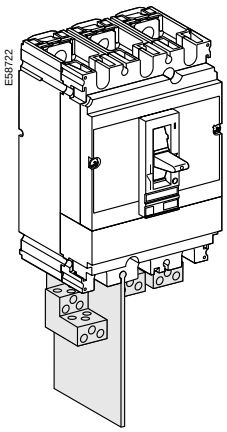
E54457



E58540



E58722



Front connection of bare cables

Bare-cable connectors for Compact NS devices may be used for both copper and aluminium cables.

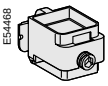
1-cable connectors for Compact NS100 to 250
The connectors snap directly on to the device terminals or clip onto right-angle and straight terminal extensions as well as spreaders.

1-cable and 2-cable connectors for Compact NS400 to 630
The connectors are screwed to device terminals or right-angle terminal extensions.

Distribution connectors for Compact NS100 to 250
These connectors are screwed directly to device terminals. Phase barriers are supplied with distribution connectors, but may be replaced by long terminal shields. Each connector can receive six cables with cross-sectional areas ranging from 1.5 to 35 mm^2 each.

Polybloc distribution block for Compact NS100 to 630
The Polybloc connects directly to the device terminals and is used to connect up to six or nine flexible or rigid cables with cross-sectional areas not exceeding 10 mm^2, to each pole. Connection is made to spring terminals without screws.

E54468

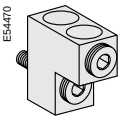


1-cable connector for NS100 to 250

E54469

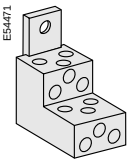
1-cable connector for NS400 to 630

E54470



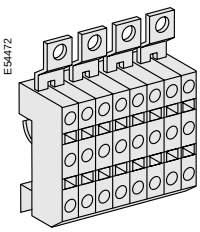
2-cable connector for NS400 to 630

E54471



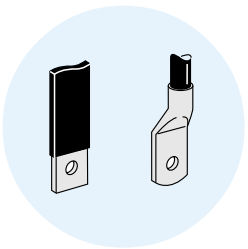
Distribution connector for NS100 to 250

E54472

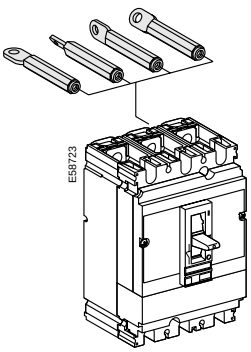


Polybloc distribution block for NS100 to 250

E54456



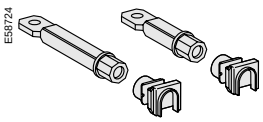
E58723



Rear connection

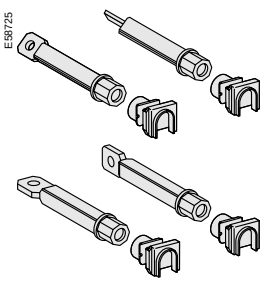
Rear connections for bars or cables with lugs are available in two lengths. Bars may be positioned flat, on edge or at 45° angles depending on how the rear connections are positioned.
The rear connections are simply fitted to the device connection terminals. All combinations of rear connection lengths and positions are possible on a given device. The device is mounted on a backplate.
For the connection of cables without lugs, the 1-cable connectors for Compact NS100 to 250 may be simply clipped onto the rear connections.

E58724



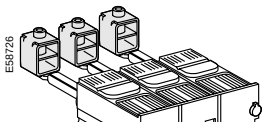
Two lengths

E58725



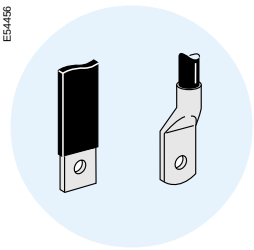
Four positions

E58726



Connection of bare cables to NS100 to 250.

E54456



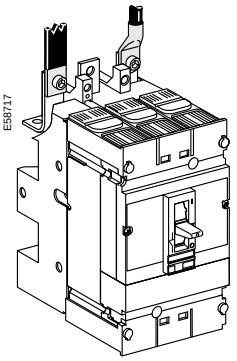
Connection of plug-in devices

Connection of bars or cables with lugs

The plug-in base is equipped with terminals which, depending on their orientation, serve for front and rear connection. For rear connection of a base mounted on a backplate, the terminals must be replaced by insulated, long right-angle terminal extensions.
For Compact NS630 devices, connection most often requires the 52.5 or 70 mm pitch spreaders.

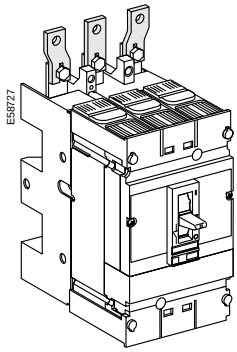
Connection accessories
See the “Connection of fixed devices” section.

E58717



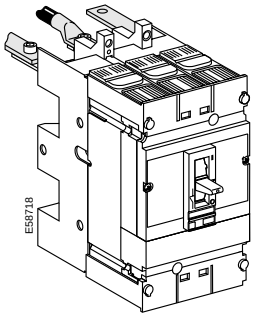
Front connection

E58727



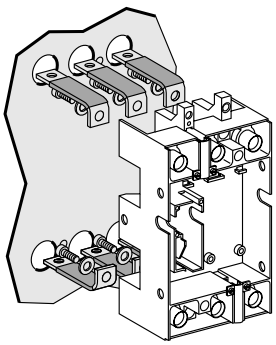
Front connection with spreaders

E58718



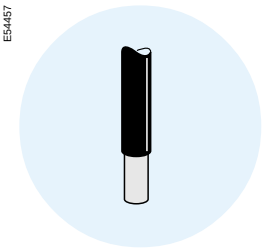
Rear connection

E58719



Rear connection of a base mounted on a backplate

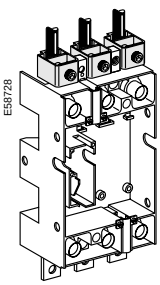
E54457



Connection of bare cables

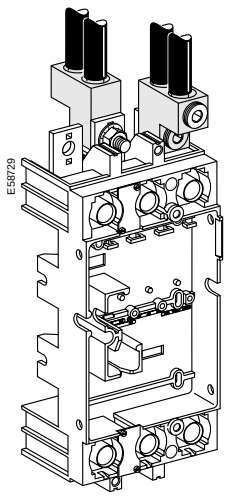
All terminals may be equipped with bare-cable connectors. See the “Connection of fixed devices” section.

E58728



Plug-in base for Compact NS100 to 250 equipped with 1-cable connectors

E58729



Plug-in base for Compact NS400 to 630 equipped with 2-cable connectors

One-piece spreader

One-piece spreader

Connection of large cables may require an increase in the distance between the device terminals. The one-piece spreader is an accessory that can also be fitted on Interpact INS switch-disconnectors. It offers the following features:

■ increases the pitch of the circuit-breaker terminals to correspond to that of the upstream device

■ compatible with all the connection accessories available for the upstream device (connectors, terminal extensions, etc.)

■ enhances insulation between phases in comparison with standard spreaders.

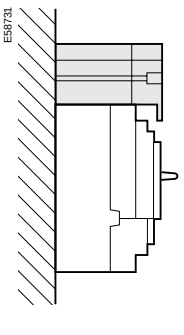
	NS100 to 250	NS400 to 630
Pitch **without** spreaders (mm)	35	45
Pitch **with** standard spreaders (mm)	45	52.5 or 70
Pitch **with** one-piece spreader (mm)	45	70

Mounting

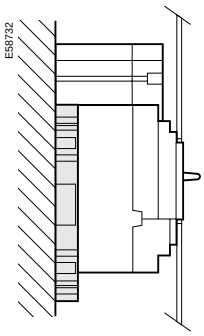
When equipped with a one-piece spreader, Compact NS circuit breakers may be installed either at the back of a switchboard or on the front panel with a raiser.

■ devices with different frame sizes can thus be aligned in the switchboard

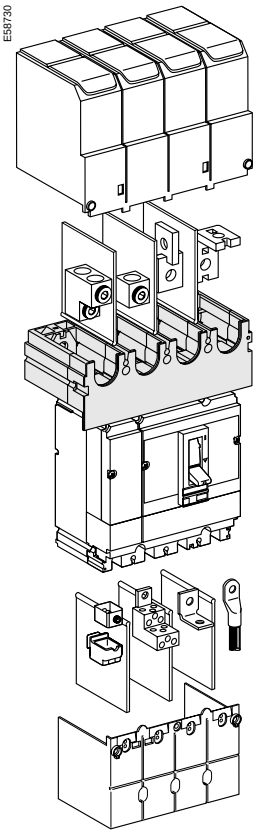
■ the same mounting plate can be used for all devices (including Interpact INS switch-disconnectors).



Mounting at the back of a switchboard

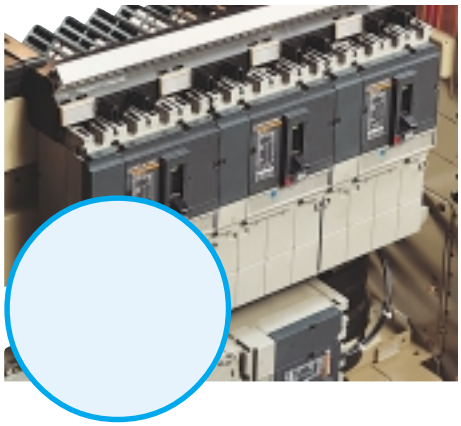


Mounting on the front panel with a raiser



Connection and insulation accessories are identical to those for Interpact INS switch-disconnectors

Installation, connection and accessories
Compact NS100 to 630 (cont.)



Compact NS equipped with terminal shields.

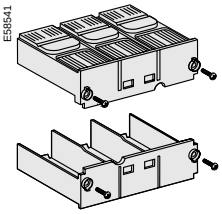
Insulation of live parts

Terminal shields
Terminal shields are sealable insulating accessories used for protection against direct contact with power circuits (degree of protection IP40, IK07). They are supplied with sealing accessories.

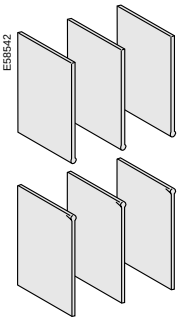
Terminal-shield selection
- fixed circuit breaker, front connection - long terminal shields
- fixed circuit breaker, rear connection - short terminal shields.
- for voltages ⩾ 500 V, terminal shields are mandatory.
- for voltages > 600 V, special connection kit with terminal shields and insulating screens
- for Compact NS400 to 630 with spreaders, special terminal shields for spreaders
- for withdrawable circuit breaker (plug-in and chassis type), short terminal shields on the device are mandatory. Terminal shields on the base are possible.

Long terminal shields for plug-in bases are used to:
- protect against direct contact with power circuits (degree of protection IP40, IK07)
- increase insulation between phases.

Insulating accessories for plug-in bases include:
- an adapter offering the same connection possibilities as the circuit breaker
- long terminal shields for the plug-in base.



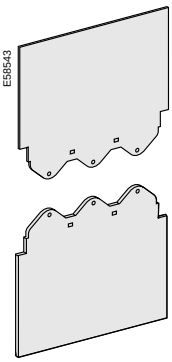
Terminal shields



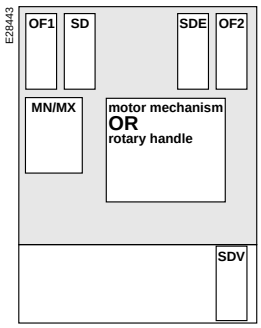
Phase barriers

Phase barriers
Phase barriers are safety accessories for maximum insulation at the power-connection points:
- they clip easily onto the circuit breaker
- not compatible with terminal shields
- special version for plug-in bases.

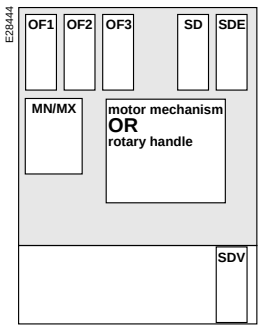
Rear insulating screens
Screens are safety accessories for insulation between connections and the backplate. They are compatible with terminal shields and phase barriers.



Rear insulating screens



Compact NS100/160/250

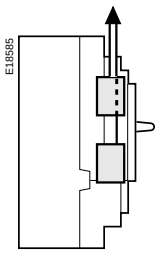


Compact NS400 to 630

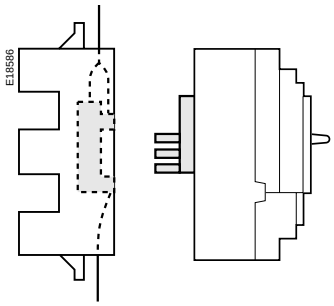
Connection of electrical auxiliaries

Fixed configuration

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



Plug-in and withdrawable configurations



Automatic auxiliary connectors

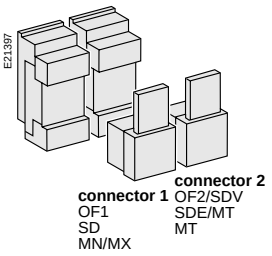
Auxiliary circuits exit the circuit breaker via one to three automatic auxiliary connectors (nine wires each). These are made up of:

■ a moving part, connected to the circuit breaker via a support (one support per circuit breaker)

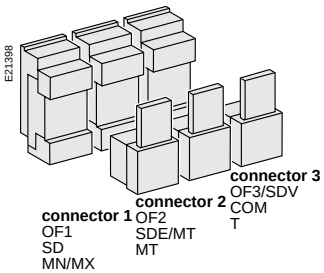
■ a fixed part, mounted on the plug-in base, equipped with connectors for bare cables up to 2.5 mm^2.

Selection of automatic auxiliary connectors.

For Compact NS400 to 630, connection wires for the options installed with trip unit STR53UE also exit via the automatic auxiliary connectors.



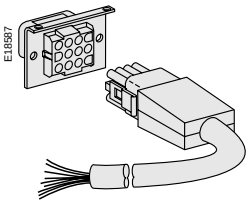
Compact NS100 to 250



Compact NS400 to 630

Manual auxiliary connector for withdrawable configurations

Withdrawable circuit breakers may be equipped with one to three plugs with nine wires each. In “disconnected” position, the auxiliaries remain connected and can therefore be tested by operating the circuit breaker.



Nine-wire manual auxiliary connector

ach auxiliary is equipped with a terminal block with numbered terminals for connection of wires up to:

■ *1.5 mm^2 for auxiliary contacts and voltage releases*

■ *2.5 mm^2 for the motor-mechanism module.*

Installation, connection and accessories
Compact NS100 to 630 (cont.)

044314

Changeover contacts

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).

Indication contacts

Common-point 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 (open/closed) - indicates the position of the circuit breaker contacts
■ SD (trip indication) - indicates that the circuit breaker has tripped due to:
□ an overload
□ a short-circuit
□ an earth 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 fault.
Returns to de-energised state when the circuit breaker is reset.
■ SDV (Earth fault indication) - indicates that the circuit breaker has tripped due to an earth fault.
Returns to de-energised state when the circuit breaker is reset.
■ CAM (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).
■ CE / CD (connected/disconnected position) - microswitch type carriage switches for withdrawable circuit breakers

Installation

■ OF, SD, SDE and SDV functions - a single type of contact provides all these different indication functions, depending on the position where it is inserted in the device. The contacts clip into slots behind the front cover of the circuit breaker (or the Vigi module for the SDV function).
The SDE function on a circuit breaker equipped with a thermal-magnetic trip unit requires the SDE actuator.
■ CAM function - the contact fits into the rotary-handle unit (direct or extended).
■ CE / CD (connected/disconnected) function - two parts must be fitted on the fixed and moving parts of the chassis.

Electrical characteristics of auxiliary contacts

Contacts		**Standard**				**Low level**			
Rated thermal current (A)		6				5			
Minimum load		10 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	2.5	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	3	-	-	5	1.5	-	-
	660/690 V	6	0.1	-	-	-	-	-	-

045349

Compact NS250L with a direct rotary handle

044316

Compact NS250L with an extended rotary handle

Rotary handles

There are two types of rotary handle:
- direct rotary handle
- extended rotary handle.

There are two models:
- standard with a black handle
- VDE with a red handle and yellow front for machine-tool control.

Direct rotary handle

Degree of protection IP40, IK07.
The direct rotary handle maintains:
- visibility of and access to trip unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to the “push to trip” button
- circuit breaker locking capability in the OFF position by one to three padlocks, hasp 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:
- motor control centre (MCC) switchboards:
  - door opening disabled when the circuit breaker is ON
  - circuit-breaker closing is disabled if the door is open
- a higher degree of protection (IP43, IK07)
- machine-tool control, complying with CNOMO E03.81.501, IP54, IK08.

Extended rotary handle

Degree of protection IP 55, IK08.

This handle makes it possible to operate circuit breakers installed inside 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, hasp 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:
  - 185 to 600 mm for Compact NS100 to 250
  - 210 to 625 mm for Compact NS400 to 630.

For withdrawable configurations, the extended rotary handle is also available with a telescopic shaft with two stable positions.

044313

MX or MN voltage release

Remote tripping

MX or MN voltage releases are used to trip the circuit breaker.

MN undervoltage release
This release trips the circuit breaker when the control voltage drops below a tripping threshold:
- tripping threshold between 0.35 and 0.7 times the rated voltage
- circuit breaker closing is possible only if the voltage exceeds 0.85 times the rated voltage.

Circuit breaker tripping by an MN release meets the requirements of standard IEC 60947-2.

Time-delay unit for an MN release
Eliminates nuisance tripping due to transient voltage dips lasting 200 ms.

It is used in conjunction with:
- a 250 V DC MN release, control voltage 220/240 V AC
- a 48 V DC MN release, control voltage 48 V AC.

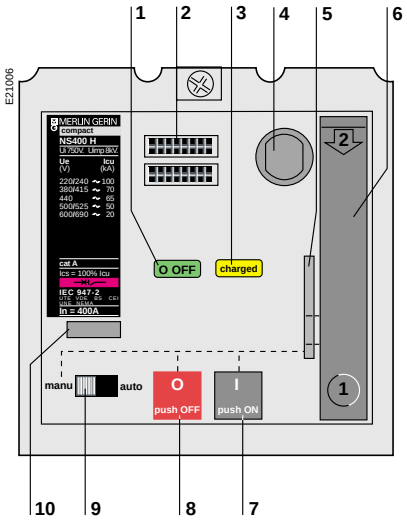
MX shunt release
Trips the circuit breaker when the control voltage rises above 0.7 x Un.
Control signals can be of the impulse type (≥ 20 ms) or maintained.

Operation
When the circuit breaker has been tripped by an MN or MX release, it must be reset locally.
MN or MX tripping takes priority over manual closing.
In the presence of a standing trip order, closing of the contacts, even temporary, is not possible.

Mechanical characteristics
- endurance is equal to 50% of the mechanical endurance of the circuit breaker
- the releases clip in behind the front cover
- connection using wires up to 1.5 mm^2, to integrated terminal blocks.

Electrical characteristics
- consumption:
  - pick-up (MX): < 10 W
  - seal-in (MN and MNR): < 5 VA.
- response time: < 50 ms.

Compact NS250H with motor mechanism



1 *contact position indicator (suitability for isolation)*
2 *outgoing-circuit identification labels*
3 *spring status indicator (charged, discharged)*
4 *locking device (keylock)*
5 *locking device (OFF position), using 1 to 3 padlocks, hasp diameter 5 to 8 mm, not supplied*
6 *manual spring-charging lever*
7 *I (ON) pushbutton*
8 *O (OFF) pushbutton*
9 *manual/auto mode selection switch. The position of this switch can be indicated remotely*
10 *coperations counter (Compact NS400/630)*

Motor-mechanism module

When equipped with a motor-mechanism module, Compact NS circuit breakers feature very high mechanical endurance as well as easy and sure operation:
■ all circuit-breaker indications and information remain visible and accessible, including trip-unit settings and indications;
■ suitability for isolation is maintained and padlocking remains possible;
■ double insulation of the front face.

Applications

■ local motor-driven operation, centralised operation, automatic distribution control
■ normal/standby source changeover or switching to a replacement source to optimise energy costs
■ load shedding and reconnection to optimise energy costs
■ synchrocoupling.

Automatic operation

■ circuit-breaker ON and OFF controlled by two impulse-type or maintained control signals
■ automatic spring charging following voluntary tripping (by MN or MX), with standard wiring
■ mandatory manual reset following tripping due to an electrical fault.

Manual operation

■ transfer to manual mode using a switch (9) with possibility of remote mode indication
■ circuit-breaker ON and OFF controlled by 2 pushbuttons
■ recharging of stored-energy system by pumping the lever 9 times
■ padlocking in OFF position.

Installation and connection

All installation (fixed, plug-in/withdrawable) and connection possibilities are maintained.
Motor-mechanism module connections are made behind its front cover to integrated terminals, for cables up to 2.5 mm^2.

Accessories

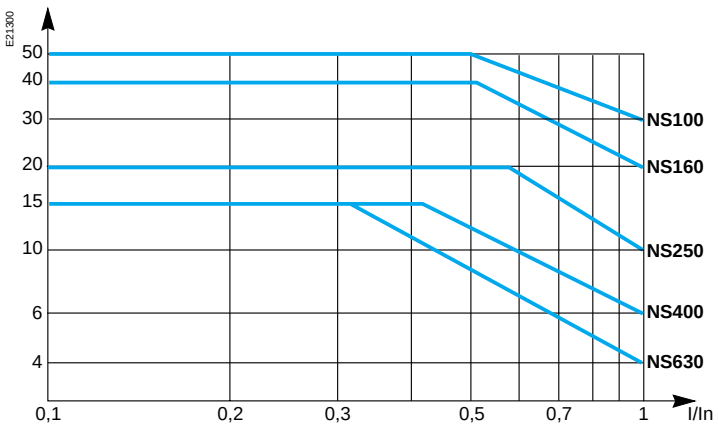
■ keylock for locking in OFF position
■ operations counter for the Compact NS400 and NS630, indicating the number of ON and OFF cycles. The counter must be installed on the front of the motor-mechanism module.

Characteristics

Telecommande			**MT100 to MT630**
Response time (ms)	opening closing		< 600 < 80
Rate	cycles/minute max.		4
Control voltage (V)	DC		24/30 - 48/60 110/130 - 250
	AC 50/60 Hz		48 (50 Hz) - 110/130 220/240 - 380/440
Consumption	DC (W)	opening closing	⩽ 500 ⩽ 500
	AC (VA)	opening closing	⩽ 500 ⩽ 500

Electrical endurance

Circuit breaker + motor-mechanism module, in thousands of operations (IEC 60947-2), at 440 V.



Installation, connection and accessories
Compact NS100 to 630 (cont.)

048287

Compact NS630L with voltage-presence indicator

041892

Compact NS630H with current-transformer module

045212

Compact NS250L with ammeter module

Indications and measurement

Voltage presence indicator

The indicator detects and indicates that circuit breaker terminals are supplied with power.

Installation

- in the long or short terminal shields, via the knockouts
- not compatible with the motor-mechanism module
- upstream or downstream of the circuit breaker
- degree of protection IP40, IK04.

Electrical characteristics

Operates on all networks with voltages ranging from 220 to 550 V AC.

Current-transformer module

This module enables direct connection of a measurement device such as an ammeter or a Dialpact power meter (not supplied).

Installation

- directly on the downstream circuit-breaker terminals
- degree of protection IP40, IK04
- class II insulation between front and the power circuits
- connection to 6 integrated terminals for cables up to 2.5 mm^2.

Electrical characteristics

- transformer with 5 A secondary winding.
- accuracy class 3 for the following output-power consumptions:
  - rating 100 A: 1.6 VA
  - rating 150 A: 3 VA
  - rating 250 A: 5 VA
  - rating 400/630A: 8 VA.

Ammeter and Imax ammeter modules

Ammeter module

Measures and displays (dial-type ammeter) the current of each phase (selection of phases by 3-position switch in front).

Imax ammeter module

Measures and displays (dial-type ammeter) the maximum current flowing in the middle phase. The Imax value can be reset on the front.

Installation

- identical for both types of ammeter module
- directly on the downstream circuit-breaker terminals
- ammeter clips into module in any of four 90° positions, i.e. can be installed of devices mounted both vertically and horizontally
- degree of protection IP40, IK04
- class II insulation between front and the power circuits.

Electrical characteristics

- ammeter module: accuracy clas 4.5
- Imax ammeter module:
  - accuracy ± 6 %
  - maximum currents are displayed only if they last at least 15 minutes.

041896

Compact NS250H with insulation-monitoring module

Insulation-monitoring module

This module detects and indicates an insulation drop on a load circuit (TN-S or TT systems).

Operation is identical to that of a Vigi module, but without circuit-breaker tripping.

Indication by a red LED in front.

An auxiliary contact may be installed for remote insulation-drop indications.

Installation

- directly on the downstream circuit-breaker terminals
- degree of protection: IP40, IK04
- double insulation of the front face.

Electrical characteristics

- settings: 100, 200, 500 and 1000 mA
- accuracy: -50 +0%
- time delay following drop: 5 to 10 seconds
- AC-system voltage: 200 to 440 V AC and 440 to 550 V AC.

053172

Compact NS equipped with communicating auxiliary contacts and motor-mechanism module

Communication

Communicating versions of the auxiliary contacts and the motor-mechanism module also exist for integration in a Digipact communications system. They simply replace the standard electrical auxiliaries.

Using the STR53UE and STR43ME trip units equipped with the COM communications option, it is possible to transmit data to Digipact modules:

- settings
- rms values of phase and neutral currents
- current of the most heavily loaded phase
- overload alarm in progress
- tripping cause (overload, short-circuit, etc.).

054481

Withdrawable Compact NS equipped with communicating auxiliary contacts

Installation, connection and accessories
Compact NS100 to 630 (cont.)

E45193

E45194

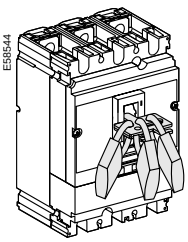
Compact NS with toggle locked using a removable device

Locking systems

Locking in the OFF position guarantees isolation as per IEC 60947-2.
Padlocking systems can receive up to three padlocks with hasp diameters ranging from 5 to 8 mm (padlocks not supplied).

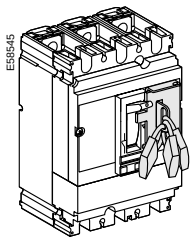
Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	lock in OFF or ON position	padlock	fixed device
Direct rotary handle	ock in OFF position	padlock	
		keylock	locking device + keylock
MCC rotary handle	lock in OFF position	padlock	
Rotary handle	lock in OFF position	padlock	
Extended rotary handle	lock in OFF position, door opening prevented	keylock	keylock
Motor mechanism	lock in OFF position,	padlock	
	motor mechanism locked out	keylock	locking device (keylock incorporated)

E58544



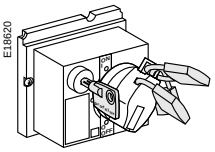
Locking of the toggle using a removable device

E58545



Locking of the toggle using a fixed device

E18620



Locking of the rotary handle using a padlock or a keylock.

Heavy-duty insulating individual enclosure for Compact NS

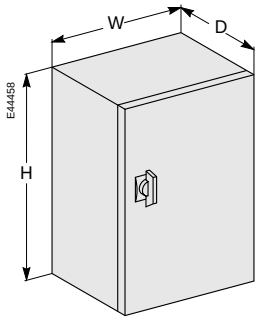
Individual enclosures

Compact and Vigicompact NS devices with two, three or four poles may be installed in individual enclosures.
All fixed, front connections are possible, except right-angle and edgewise terminal extensions. Spreaders may be installed in the enclosures intended for Interpact Compact and Vigicompact NS250 to 630 devices.

There are two models of enclosures:
■ heavy-duty metal individual enclosure, with:
□ metal enclosure
□ door with keylock and cut-out for rotary handle
□ direct rotary handle (CNOMO, IP 55)
□ device mounting plate
□ removable plate (without holes) for cable entry through bottom.
■ heavy-duty insulating individual enclosure, with:
□ insulating enclosure
□ transparent cover, screwed, lead sealable, with cut-out for rotary handle
□ extended rotary handle
□ device mounting plate
□ removable plates (without holes) for cable entry through bottom and/or top.

Dimensions (W x H x D in mm)

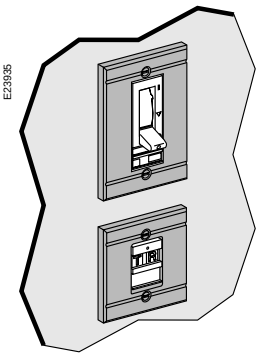
■ metal enclosures:	
□ Compact NS100 to 160:	300 x 400 x 200
□ Vigicompact NS100 to 160:	400 x 500 x 200
□ Compact NS250 to 400:	400 x 600 x 200
□ Compact NS630:	600 x 800 x 275
□ Vigicompact NS250 to 630:	600 x 800 x 275
■ insulating enclosures:	
□ Compact/Vigicompact NS100 to 160:	270 x 360 x 235
□ Compact NS250:	270 x 540 x 235
□ Compact NS400 to 630:	360 x 720 x 235
□ Vigicompact NS250 to 630:	360 x 720 x 235



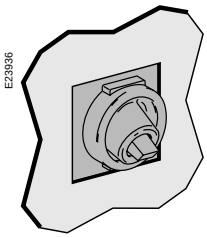
Installation, connection and accessories
Compact NS100 to 630 (cont.)

Escutcheons

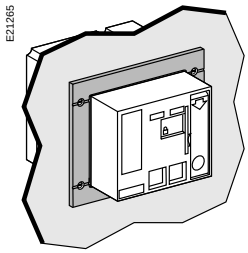
Escutcheons are an optional feature mounted on the switchboard door. They increase the degree of protection to at least IP40, IK07.

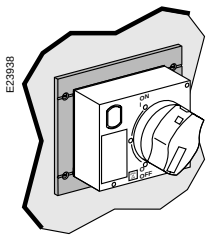


Front-panel escutcheons for toggle and Vigi module (NSA160). Secures to the panel, from the front.

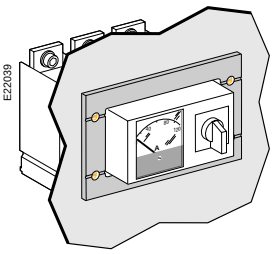


Toggle cover
- *degree of protection IP43, IK07*
- *fits on the front of the circuit breaker.*





Front-panel escutcheon for rotary handle. Secures to the panel by four screws, from the front.



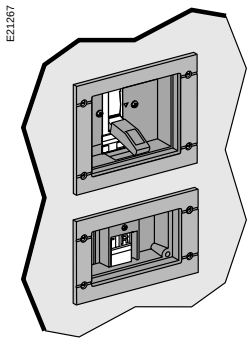
Front-panel escutcheons for toggle and Vigi module (NSA160). Secures to the panel, from the front.

Protection collar for toggle and Vigi module

Protection collars maintain the degree of protection, whatever the position of the device (connected, disconnected).
- front-panel escutcheons are mandatory (same as those for rotary handles and ammeter modules).
- collars are mounted on the device using two screws.
- escutcheons are attached to the switchboard.
- a toggle extension is supplied with the collar.

For the insulation-monitoring module, use the same elements as for the Vigi module.

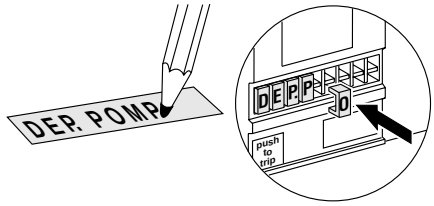
Front-panel escutcheons for motor mechanism, rotary handles, ammeter modules
Same as for fixed devices.



Outgoing-circuit identification

Compact NS100 to 630 devices come with clip-in labels for hand-written indications.
It is also possible to use pre-printed Telemecanique labels part number AB1-** :
□ Compact NS100 to 250: 8 digits
□ Compact NS400 to 630: 16 digits.

E18595

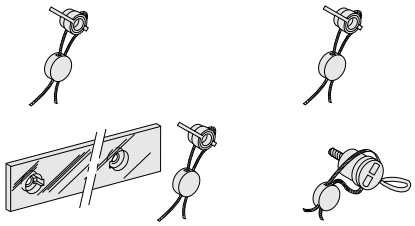


Identification accessories

Sealing accessories

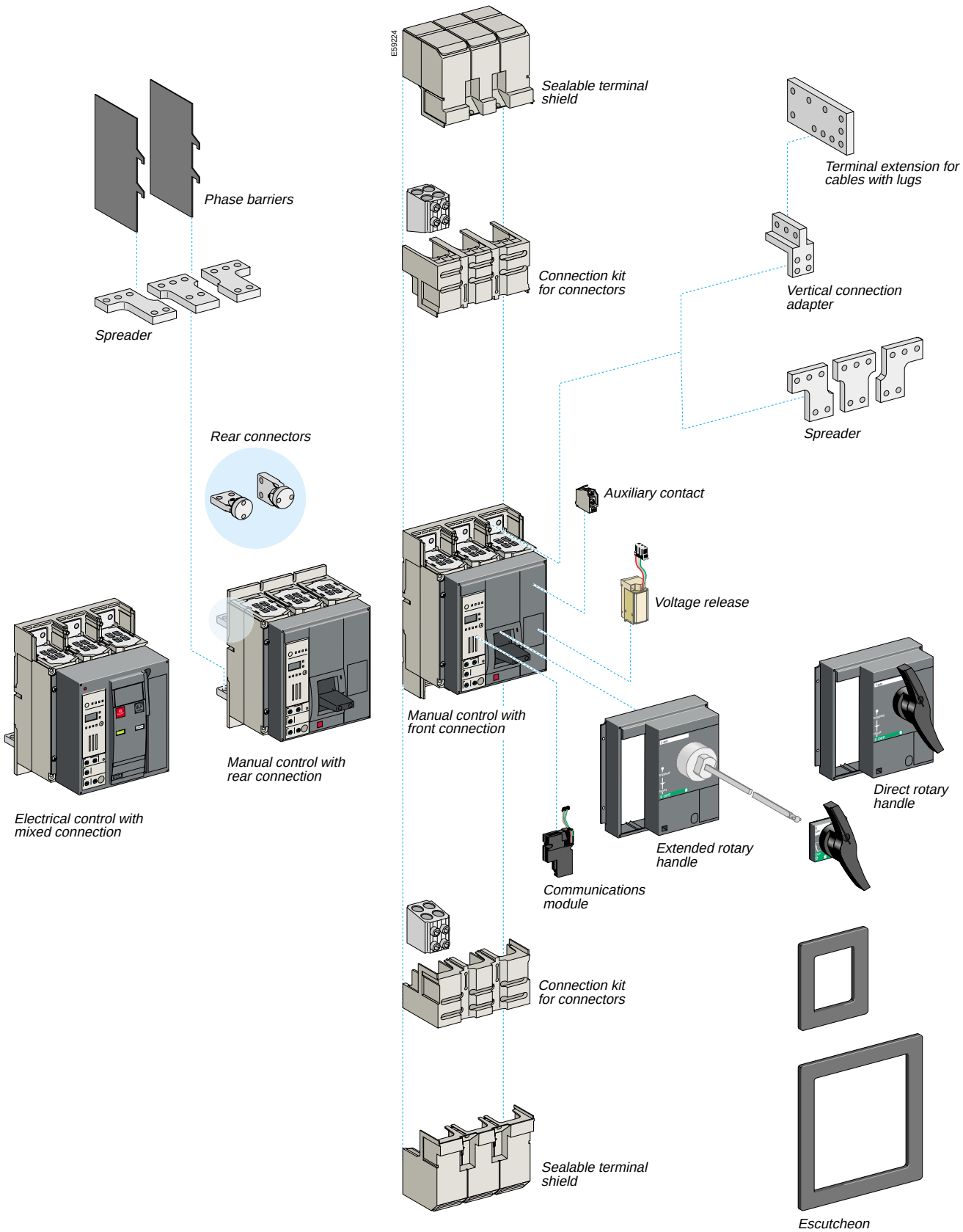
This option includes the elements required to fit lead seals to prevent:
■ front removal
■ rotary-handle removal
■ opening of the motor-mechanism module
■ access to auxiliaries
■ access to trip-unit settings
■ trip-unit removal
■ access to earth-fault protection settings
■ terminal-shield removal
■ access to power connections.

E18596



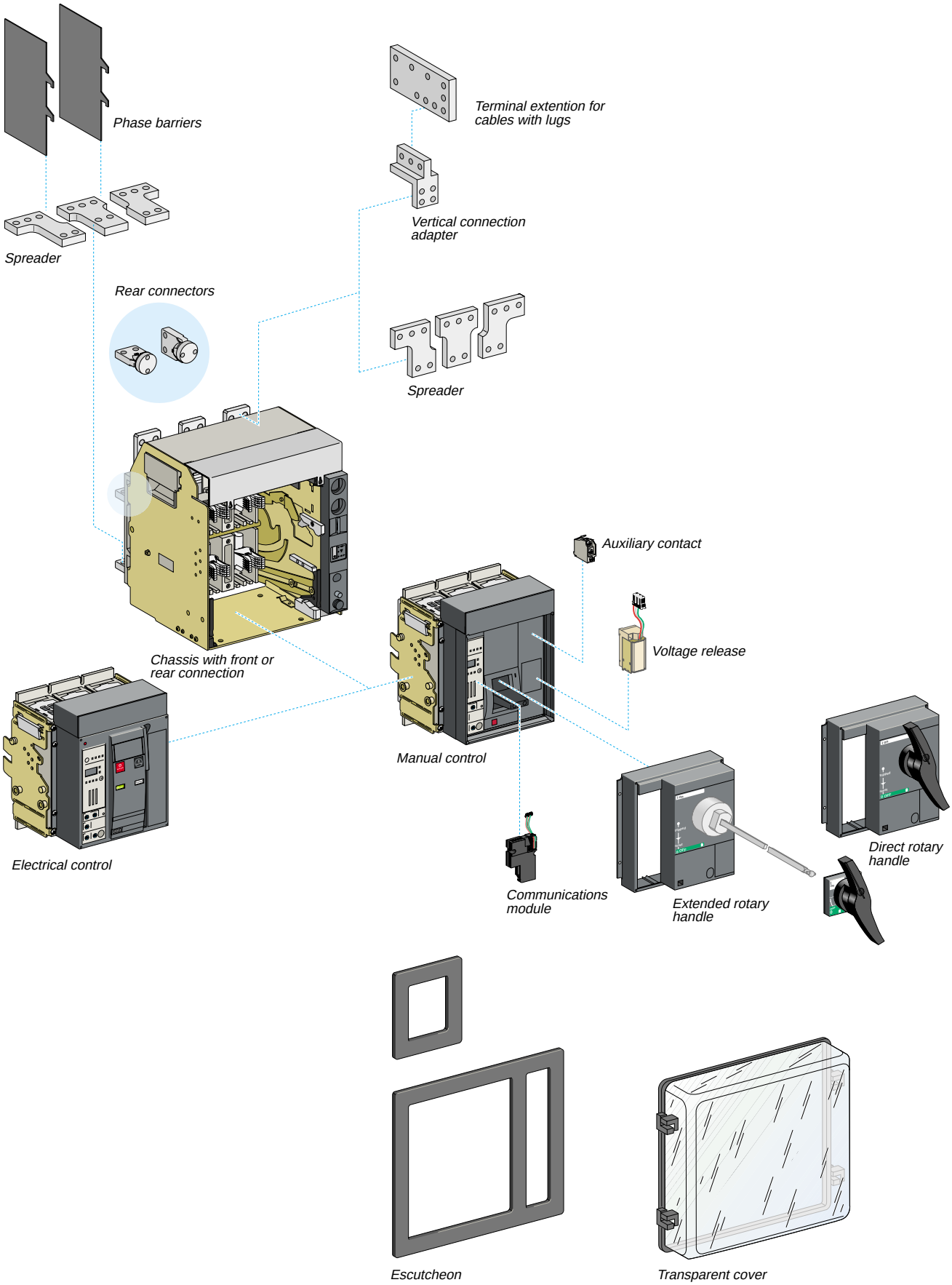
Sealing accessories

Installation, connection and accessories
Compact NS630b to 1600 (fixed version)



Compact NS630 to 1600 (withdrawable version)

E59225

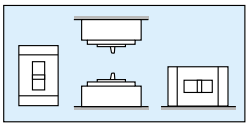


Installation, connection and accessories
Compact NS630b to 1600

E45151

Fixed Compact NS800H

E59278

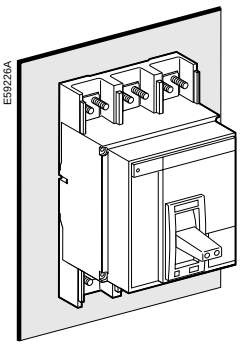


Installation

Fixed configuration

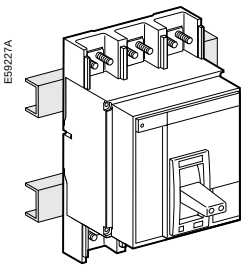
Compact NS630b to 1600 circuit breakers may be installed vertically, horizontally or flat on their back without any derating of characteristics.

E59226A



Mounting on a backplate

E59227A



Mounting on rails

The withdrawable configuration makes it possible to:

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

E45176

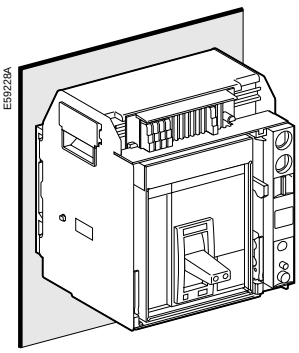
Withdrawable Compact NS800H

E59281A

Withdrawable configuration

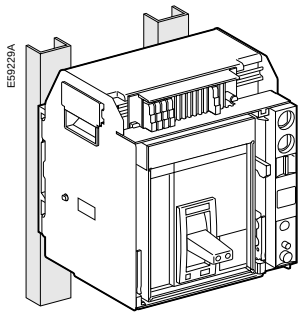
Compact NS630b to 1600 circuit breakers should be installed vertically only.

E59228A



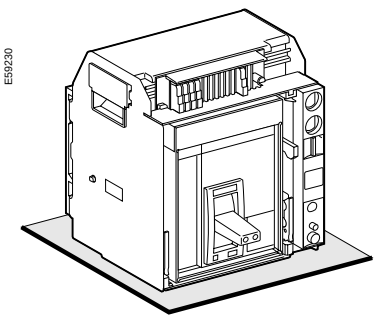
Mounting on a backplate

E59229A



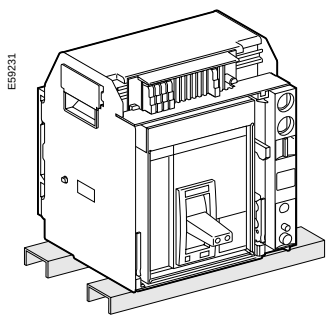
Rear mounting on rails

E59230



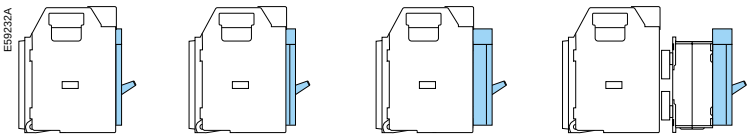
Device on mounting plate

E59231



Device on rails

The device may be in one of four positions on the chassis:
- *connected position. The power circuits and auxiliary contacts are all connected*
- *test position. The power circuits are disconnected. The auxiliary contacts are still connected and the device can be operated electrically*
- *disconnected position. The power circuits and auxiliary contacts are all disconnected, however the device is still mounted on the chassis. It can be operated manually (ON, OFF, "push to trip").*
- *removed position. All circuits are disconnected. The device simply rests on the chassis rails and can be removed.*



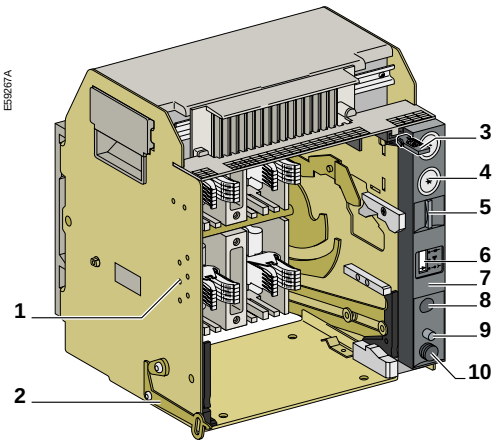
The multifunctional chassis for Compact NS630b to 1600 devices is particularly suited for incoming circuit breakers. Features include:
- device connection and disconnection through a door, using a crank that can be stored in the chassis
- three positions (connected, test and disconnected) that are indicated:
  - locally by a position indicator
  - remotely by carriage switches (3 for the connected position, 2 for the disconnected position and 1 for the test position)
- circuit-breaker ON / OFF commands through a switchboard front panel.

Locking

There are extensive locking possibilities:
- chassis locking in connected, disconnected and test positions using three padlocks and two keylocks, on the switchboard front panel
- door interlock (inhibits door opening with breaker in connected position)
- racking interlock (inhibits racking with door open)
- locking in each of the connected, disconnected and test positions during device connection or disconnection. Continuation to the next position requires pressing a release button to free the crank.

Other safety function

Mismatch protection ensures that a circuit breaker is installed only in a chassis with compatible characteristics.



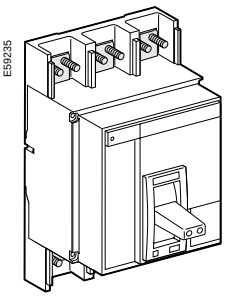
1 *mismatch protection*
2 *door interlock*
3 *racking interlock*
4 *keylock locking*
5 *padlock locking*
6 *position indicator*
7 *chassis front plate (accessible with cubicle door closed)*
8 *crank entry*
9 *reset button*
10 *crank storage*

Installation, connection and accessories
Compact NS630b to 1600 (cont.)

Compact NS630b to 1600 fixed and withdrawable devices can be connected using:
- *horizontal or vertical rear connections*
- *front connections*
- *mixed connections*
- *a combination of front and rear connections.*

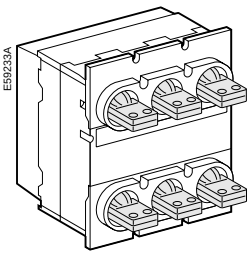
Types of connection

Front connection

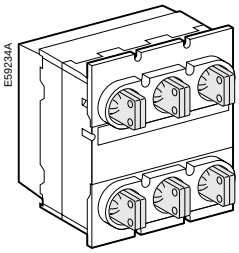


Rear connection

Horizontal

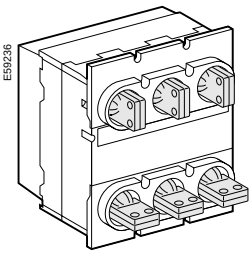


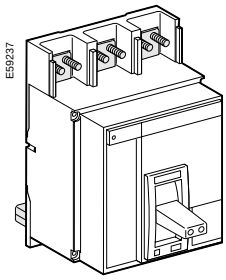
Vertical



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

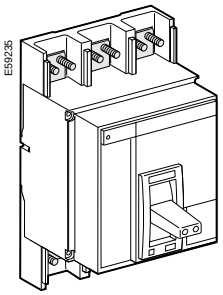
Combination of front and rear connections





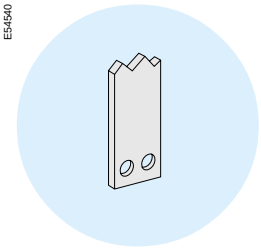
Note.
Compact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors, requiring no particular treatment.

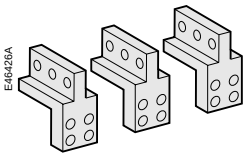
Front connection of fixed devices


E59235

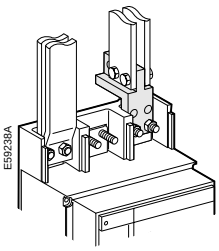
Bars

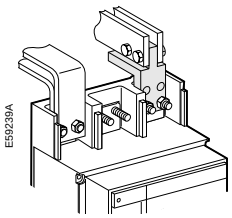
Fixed, front-connection Compact NS630b to 1600 devices are equipped with terminals comprising captive screws for direct connection of bars.
Other connection possibilities for bars include vertical-connection adapters for edge-wise bars and spreaders to increase the pole pitch to 120 mm.

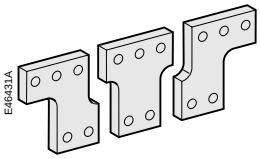

E54540


E46426A

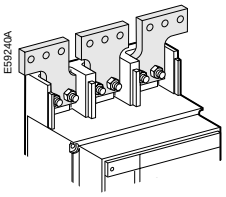
Vertical-connection adapters


E59238A


E59239A

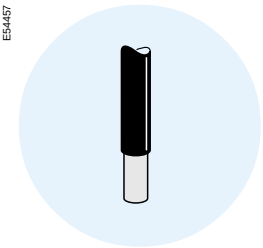

E46431A

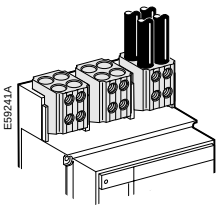
Spreaders.


E59240A

Bare cables

Special sets of connectors and terminal shields may be used to connect up to four 240 mm^2 copper or aluminium cables for each phase.


E54457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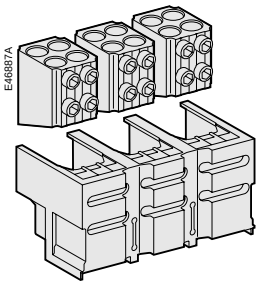

E46887A

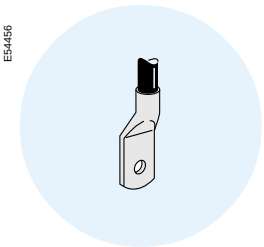
4-cable connectors

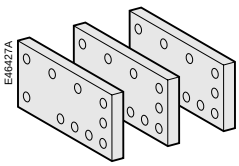
Cables with lugs

Terminal extensions for cables with lugs are combined with the vertical-connection adapters.

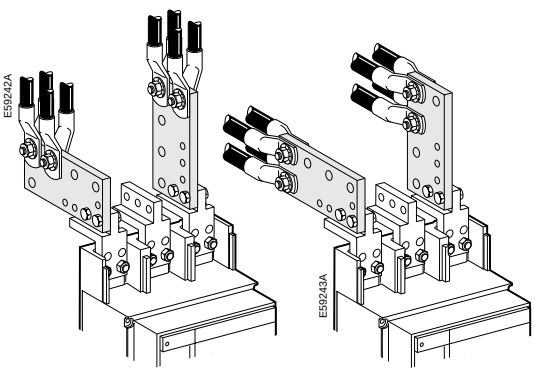
One to four cables with crimped lugs (300 mm^2) may be connected.

To ensure stability, spacers must be positioned between the terminal extensions.


E54456


E46427A

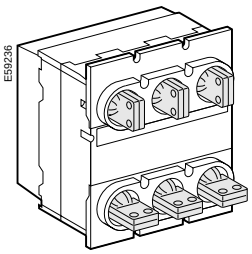
Terminal extensions for cables with lugs

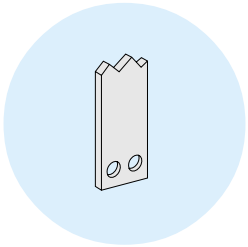

E59242A

E59243A

Installation, connection and accessories
Compact NS630b to 1600 (cont.)

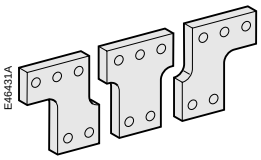
Rear connection of fixed devices


E59236

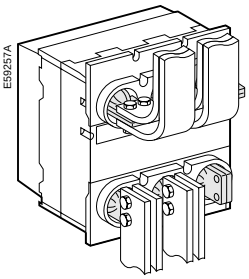

E54540

Bars

Fixed, 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 120 mm.


E46431A

Spreaders.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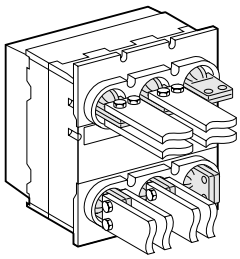
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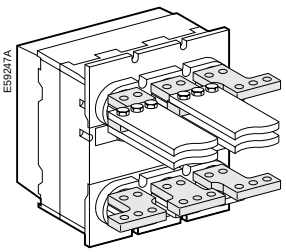
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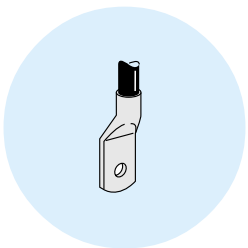
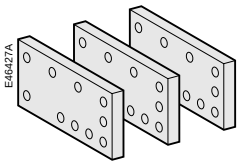

E54456

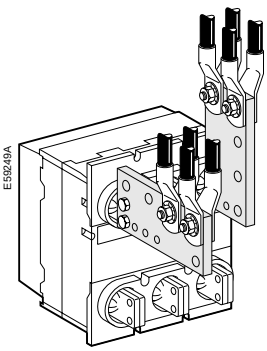
Cables with lugs

Terminal extensions enable connection of one to four cables with crimped lugs (≤ 300 mm^2).

To ensure stability, spacers must be positioned between the terminal extensions.


E46427A

Terminal extensions for cables with lugs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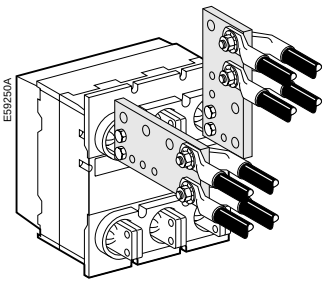
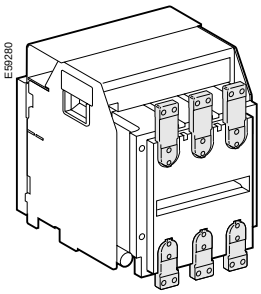
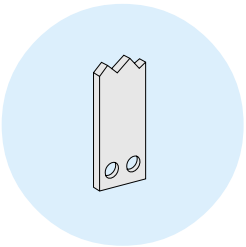

E59250A

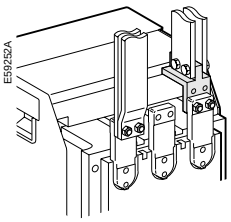
Front connection of withdrawable devices

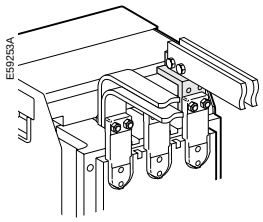
Bars


E59280


E54540

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 edge-wise bars and spreaders to increase the pole pitch to 120 mm.


E59252A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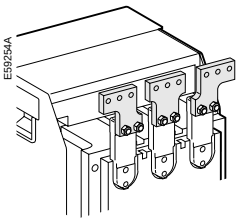
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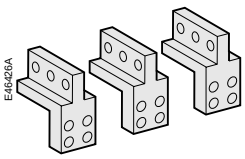
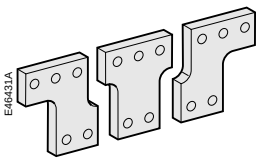

E46426A

Vertical-connection adapters

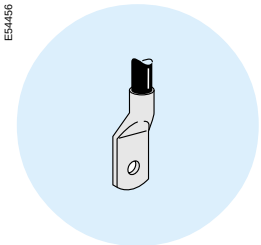

E46431A

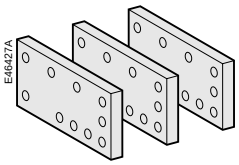
Spreaders

Cables with lugs

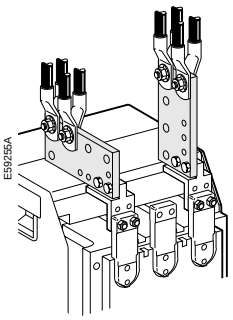
Terminal extensions enable connection of one to four cables with crimped lugs (⩽ 300 mm^2).

To ensure stability, spacers must be positioned between the terminal extensions.


E54456


E46427A

Terminal extensions for cables with lugs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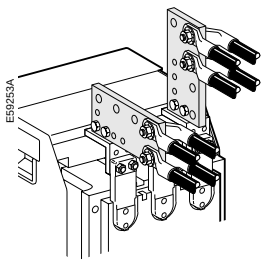
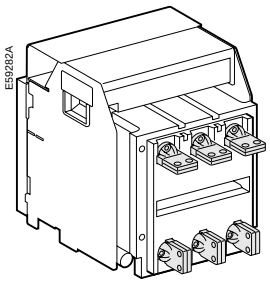
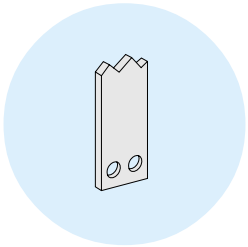

E59253A

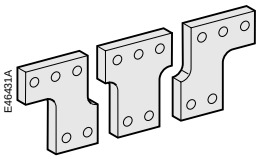
Installation, connection and accessories
Compact NS630b to 1600 (cont.)

Rear connection of withdrawable devices

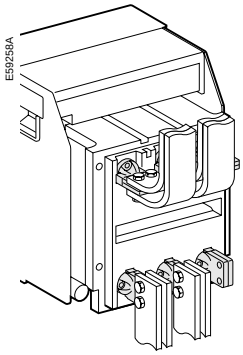


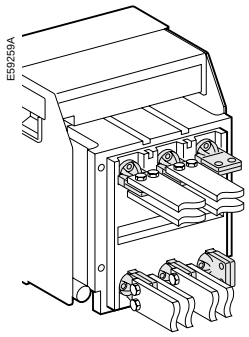


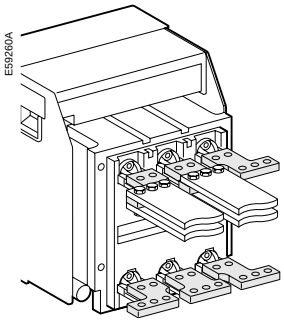
Bars
Withdrawable, rear-connection Compact NS630b to 1600 devices equipped with horizontal or vertical connectors may be directly connected to flat or edge-wise bars, depending on the position of the connectors. Spreaders are available to increase the pole pitch to 120 mm.

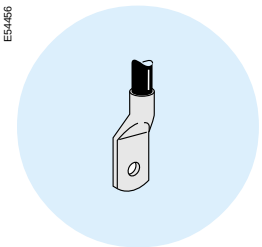


Spreaders



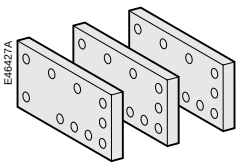




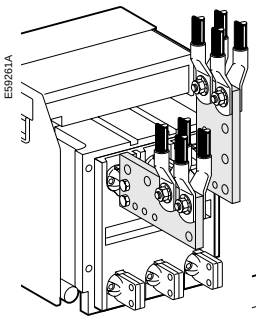


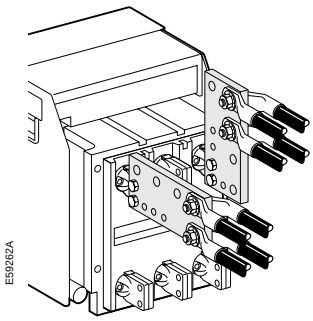
Cables with lugs
Terminal extensions enable connection of one to four cables with crimped lugs (⩽ 300 mm^2).

To ensure stability, spacers must be positioned between the terminal extensions.



Terminal extensions for cables with lugs



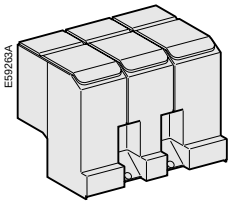


Compact NS equipped with terminal shields

Insulation of live parts

Terminal shields

Mounted on fixed, front-connection devices, terminal shields insulate power-connection points, particularly when cables with lugs are used

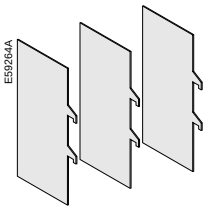


Terminal shields

Phase 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.



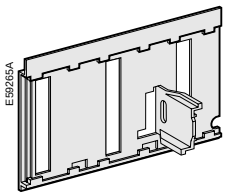
Phase barriers

Safety shutters

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 IP 20). When the device is removed from its chassis, no live parts are accessible.

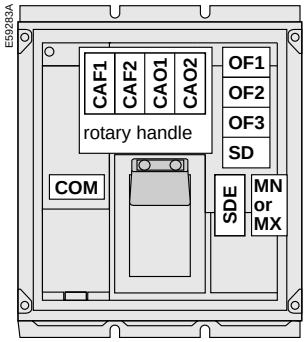
The shutters can be padlocked (padlock not supplied) to:

- prevent connection of the device
- lock the shutters in the closed position.

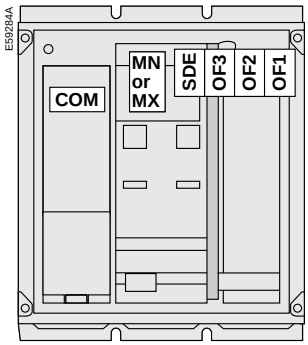


Safety shutters

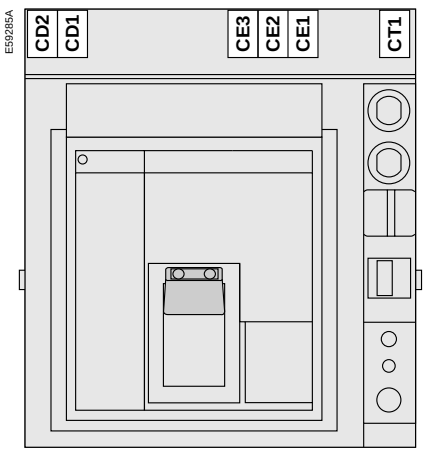
Installation, connection and accessories
Compact NS630b to 1600 (cont.)



Manually operated device



Electrically operated device

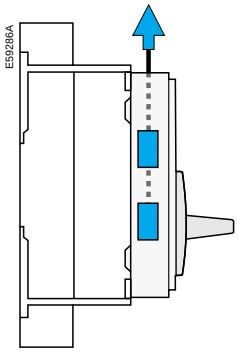


Withdrawable device

Connection of electrical auxiliaries

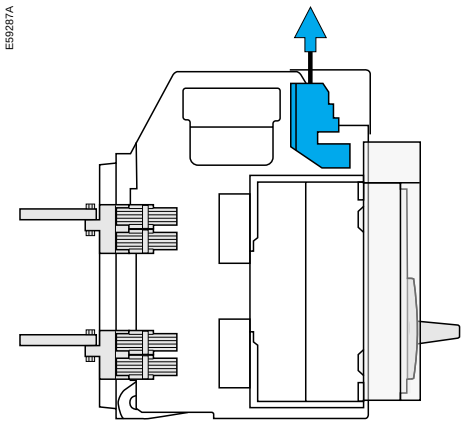
Fixed devices

Connections are made directly to the auxiliaries once the front has been removed. Wires exit the circuit breaker through a knock-out in the top.



Withdrawable devices

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



044314

OF, SD and SDE changeover contacts

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).

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 (open/closed) - 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 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 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 the position where it is inserted in the device. The contacts clip into slots behind the front cover of the circuit breaker.
■ CAF / CAO function - the contact fits into the rotary-handle unit (direct or extended).

Electrical characteristics of the OF/SD/SDE/CAF/CAO auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	2.5	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	3	-	-	5	1.5	-	-
	660/690 V	6	0.1	-	-	-	-	-	-

056456

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

Connected, disconnected, test position carriage switches

A single type of changeover contact can be mounted optionally on the chassis to indicate, depending on the slot where it is installed:
■ the connected (CE) position
■ the disconnected (CD) position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached
■ the test (CT) position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Installation

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

Electrical characteristics of the CE/CD/CT auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		8				5			
Minimum load		100 mA at 24 V				1 mA at 4 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	-	-	-	-	-	-

Installation, connection and accessories
Compact NS630b to 1600 (cont.)

E45159

Compact NS with a direct rotary handle

E45161

Compact NS with an extended rotary handle

Rotary handles

There are two types of rotary handle:
- direct rotary handle
- extended rotary handle.

There are two models:
- standard with a black handle
- VDE with a red handle and yellow front for machine-tool control.

Direct rotary handle

Degree of protection IP 40, IK 07.
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:
- motor control centre (MCC) switchboards:
  - door opening disabled when the circuit breaker is ON;
  - circuit-breaker closing is disabled if the door is open;
- a higher degree of protection (IP 43, IK 07)
- machine-tool control, complying with CNOMO E03.81.501, IP 54, IK 07.

Extended rotary handle

Degree of protection IP 55, IK 07.

This handle makes it possible to operate circuit breakers installed inside 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.

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.

056421

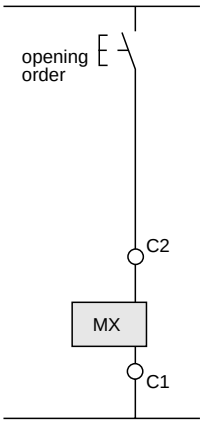
MX voltage release

Remote tripping

This function opens the circuit breaker via an electrical order. It is made up of a shunt release (MX), or an undervoltage release (MN) or a delayed undervoltage release (MN + delay unit).
The delay unit, installed outside the circuit breaker, may be disabled by an emergency power OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function

E59433A



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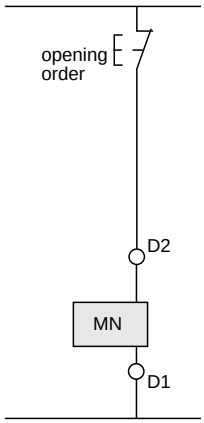

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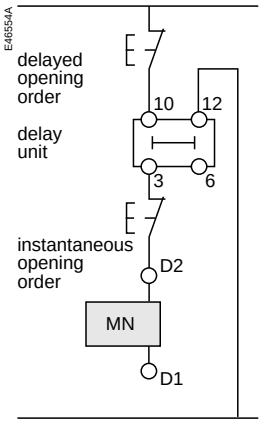


Voltage releases (MX)

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the MX locks the circuit breaker in the OFF position.

Characteristics		
Power supply	V AC 50/60 Hz	24/30- 48/60- 100/130- 200/250- 240/277- 380/480- 500/550
	V DC	1- 24/30- 48/60- 100/130- 200/250
Operating threshold		0.7 to 1.1 Un
Continuous locking function		0.85 to 1.1 Un
Consumption (VA or W)		pick-up: 200 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 the release is not supplied, 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	V AC 50/60 Hz	24/30 - 48/60 - 100/130 - 200/250 - 380/480 - 500/550
	V DC	24/30 - 48/60 - 100/130 - 200/250
Operating threshold	opening	0.35 to 0.7 Un
	closing	0.85 Un
Consumption (VA or W)		pick-up: 200 - 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
V AC 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 (VA or W)		pick-up: 200 - hold: 4.5
Circuit-breaker response time at Un	adjustable	0.5s - 0.9s - 1.5s - 3s
	non-adjustable	0.25s

Electrically operated circuit breakers are equipped as standard with a remote-operating mechanism.
Two solutions are available for electrically operated:
- *a point-to-point solution*
- *a bus solution with the COM communication option.*

E45163

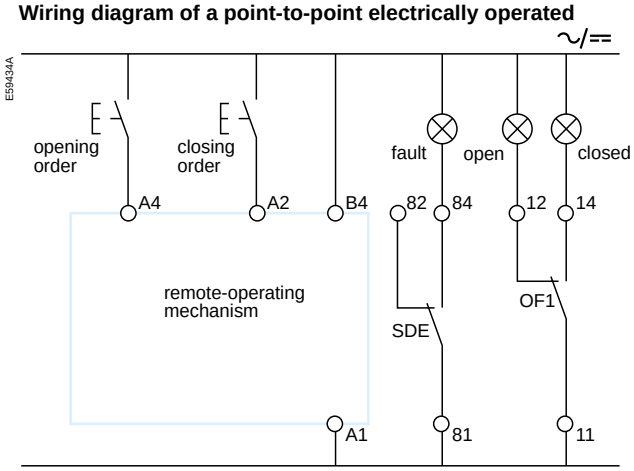
Remotely controlled Compact NS circuit breaker

Electrically operated circuit breaker

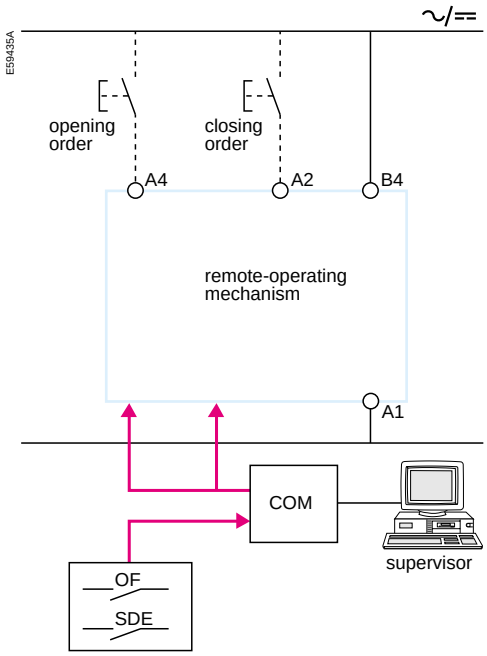
The remote-operating mechanism is used to remotely open and close the circuit breaker. It is made up of a gear motor equipped with an opening release and a closing release.

A remote-operation function is generally combined with:
- device ON / OFF indication (OF)
- "fault-trip" indication (SDE).

Wiring diagram of a point-to-point electrically operated



Wiring diagram of a bus-type electrically operated



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 remote ON / OFF system provides an anti-pumping function by blocking the main contacts in open position.

Remote-operating mechanism		
Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277- 380/415 - 400/440 - 480
	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), except that the operating threshold is from 0.85 to 1.1 Un and the circuit-breaker response time at Un is 70 ms ± 10 .

Electrical opening order

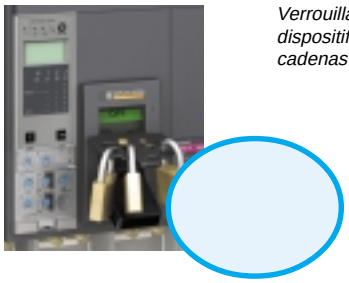
The release instantaneously opens the circuit breaker when energised. The supply can be maintained or automatically disconnected.
Release electrical characteristics are identical to those of an MX release (see above).

"Ready to close" position

The "ready to close" position of the circuit breaker is indicated by a mechanical indicator. This signal indicates that all the following are valid:
■ the circuit breaker is in the OFF position
■ the spring mechanism is charged
■ a maintained closing order is not present
■ a maintained opening order is not present
□ MX energised
□ MN not energised
□ fault trip
□ device not completely racked in
□ device locked in OFF position
□ device interlocked with a second device.

Installation, connection and accessories
Compact NS630b to 1600 (cont.)

E45194



Verrouillage du maneton par dispositif amovible et cadenas

E45159

Rotary handle locked by a keylock

Locks on manually operated devices

Locking in the OFF position guarantees isolation as per IEC 60947-2.
Padlocking systems can receive up to three padlocks with shackle diameters ranging from 5 to 8 mm (padlocks not supplied).

Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	lock in OFF or ON position	padlock	fixed device
Direct rotary handle	lock in	padlock	
	■ OFF position ■ OFF or ON position	keylock	locking device + keylock
CNOMO direct rotary handle	lock in	padlock	
	■ OFF position ■ OFF or ON position	keylock	locking device + keylock
Extended rotary handle **Prolongée**	lock in OFF position, door opening prevented	padlock keylock	 keylock

Locks on electrically operated devices

056447

Access to pushbuttons protected by transparent cover

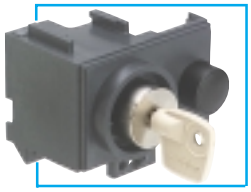
056446

Pushbutton locking using a padlock

056448

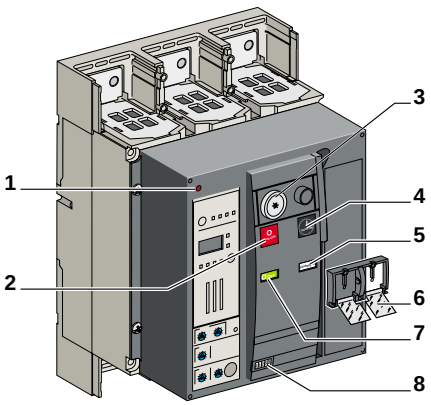
Pushbutton locking using a keylock

056449



OFF position locking using a keylock

E59436A



1 *reset of mechanical tripping indicator*
2 *opening pushbutton*
3 *OFF position locking*
4 *closing pushbutton*
5 *indicator for position of the springs*
6 *pushbutton locking*
7 *indicator for position of the main contacts*
8 *operation counter*

Pushbutton locking

The transparent cover blocks access to the pushbuttons used to open and close the device.
It is possible to independently lock the opening button and the closing button. The locking device is often combined with a remote-operating mechanism.

The pushbuttons may be locked using either:
■ three padlocks (not supplied)
■ lead seal
■ two screws.

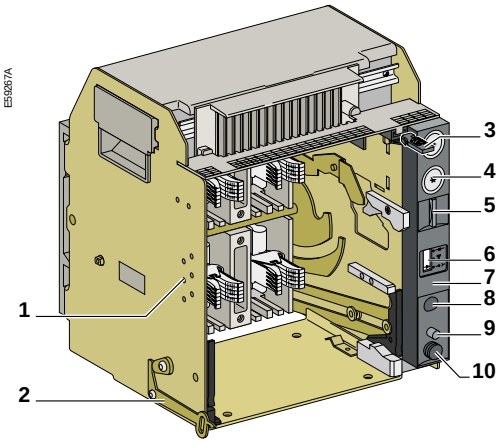
Device locking in the OFF position

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:
■ using padlocks (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).

Locks on the chassis



1 *mismatch protection*
2 *door interlock*
3 *racking interlock*
4 *keylock locking*
5 *padlock locking*
6 *position indicator*
7 *chassis front plate (accessible with cubicle door closed)*
8 *crank entry*
9 *reset button*
10 *crank storage*

056450

Disconnected position locking by padlocks

056451

Disconnected position locking by keylocks

Disconnected position locking

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).

056417

Door interlock

Connected, disconnected and test position locking

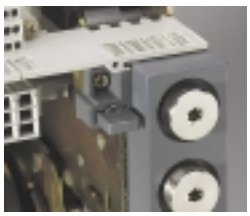
The connected, disconnected and test positions are shown by an indicator.
The exact position is obtained when the racking handle blocks.
A release button is used to free it.

On request, the disconnected position locking system may be modified to lock the circuit breaker in any of the three positions, connected, disconnected and test.

Door interlock

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

056452



Racking interlock

Racking interlock

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

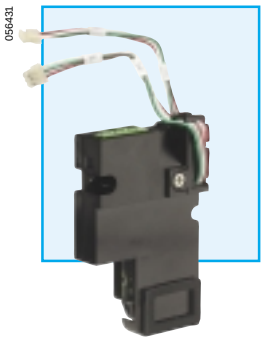
056453

Mismatch protection

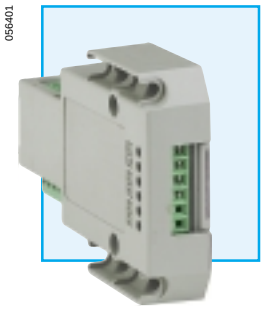
Mismatch protection

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.

Installation, connection and accessories
Compact NS630b to 1600 (cont.)



"Device" communications module



Batibus "chassis" communication module

Communication

The COM communication option is required for integration of the circuit breaker or switch-disconnector in a supervision system.

Compact NS630b to 1600 uses the Digipact or ModBus communications protocol for full compatibility with the Digipact and SMS Powerlogic electrical-installation management systems.
An external gateway is available for communication on other networks:
- Profibus
- Ethernet, etc.

COM communication option

The COM communication option is compatible with all Compact NS630b to 1600 circuit breakers and switch-disconnectors.

For fixed devices, the COM option is made up of a communication module installed in the device and supplied with its set of sensors (OF, SDE ,PF and CH contacts) and its kit for connection to the remote-operating mechanism.

For withdrawable devices, it is made up of:
- a communication module installed in the device and supplied with its set of sensors (OF, SDE, PF and CH contacts) and its kit for connection to the remote-operating mechanism
- a communication module installed on the chassis and supplied with its set of sensors (CE, CD and CT contacts) and its kit for connection to the "device" communication module.

Each installed device has an address that is assigned via the keypad of the control unit (ModBus) or remotely (Batibus). The address of a withdrawable device is assigned to the chassis which keeps the same address if the device is replaced.

Status indication by the COM option is independent of the device indication contacts. These contacts remain available for conventional uses.

"Device" communication module
This module is independent of the control unit. Installed in the device, behind the control unit, it receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.

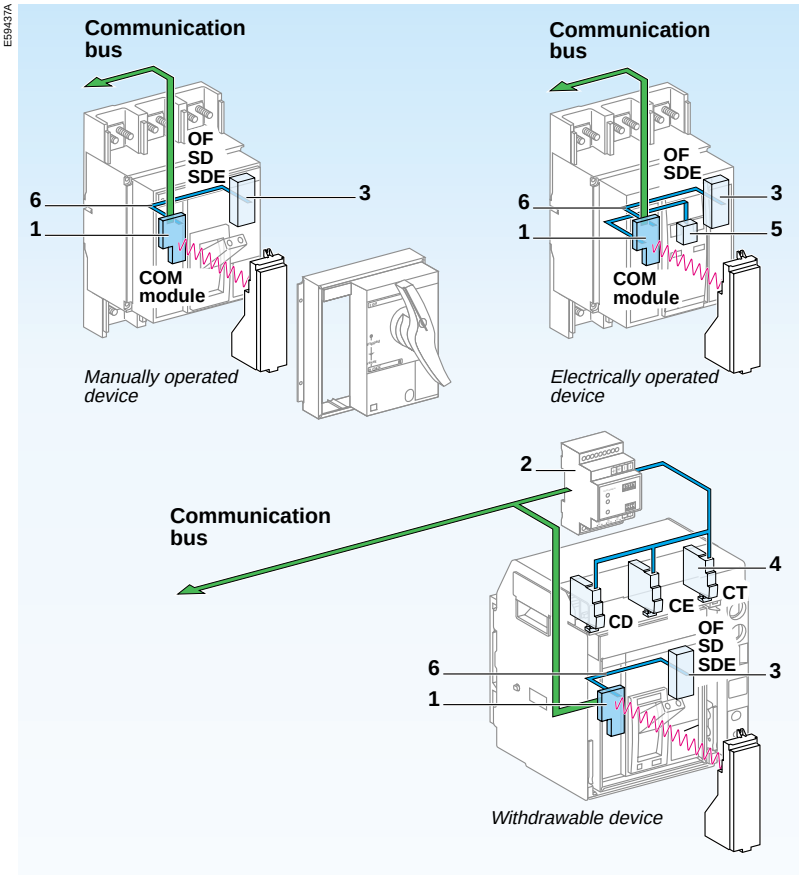
The module connects to:
- a set of sensors that detect device status
- a set of actuators for device control.

"Chassis" communication module
Installed on the chassis, this module makes it possible to address the chassis and to maintain the address when the circuit breaker is in the disconnected position.

The module connects to a set of sensors that detect and communicate the position (connected, disconnected, test) of the device on the chassis.

Remote-operating mechanism
A bus link is used to transmit remote ON/OFF orders to the circuit breaker.
The remote-tripping function (MX or MN) is independent of the communication option.

Communication architecture



1 *"device" communication module*
2 *"chassis" communication module*
3 *OF, SD, SDE "device" sensors*
4 *CE, CD and CT "chassis" sensors*
5 *remote-operating mechanism*
6 *Digipact communication bus*

Compact NS630b to 1600 communication

The COM communication option is compatible with all types of Micrologic control units to:
- identify the device
- indicate status conditions
- control the device

With Micrologic A control units, the COM option also transmits:
- device settings
- current values in the phases and neutral
- maximum current values.

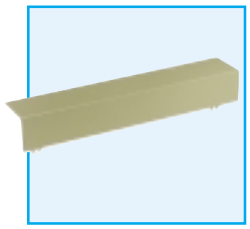
An infra-red link transmits data between the communication module and Micrologic A control units.

Device identification	**Switch-disconnector**	**Circuit breaker**
Address	■	■
Type of device		■
Type of control unit		■
Type of long-time rating plug		■
Status indications		
ON/OFF	■	■
Connected/disconnected/test position	■	■
Fault trip		■
Controls		
Opening / closing	■	■
Settings		**Micrologic A**
Reading of settings on adjustment dials		■
Programmable alarms and protection		■
Current measurements (I1, I2, I3, IN, maximum)		■
Type of fault		■

Note.
See the description of the Micrologic control units for further details on protection, alarms and measurements.

Installation, connection and accessories
Compact NS630b to 1600 (cont.)

056463

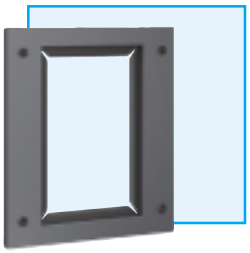


Auxiliary terminal shield

056464

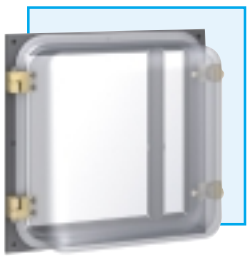
Operation counter

E45184



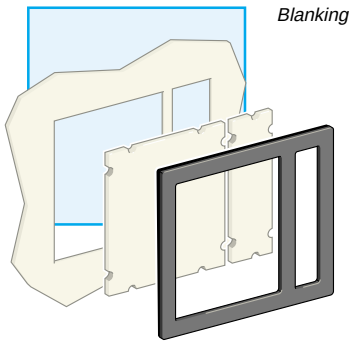
Escutcheon

E45187



Transparent cover

E59987



Blanking plate

Other accessories

Auxiliary terminal shield (CB)

Optional equipment mounted on the chassis, the shield prevents access to the terminal block of the electrical auxiliaries.

Operation counter (CDM)

The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with manual and electrical control functions.

Escutcheon (CDP)

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP 40. It is available in fixed and withdrawable versions.

Transparent cover (CCP) for escutcheon

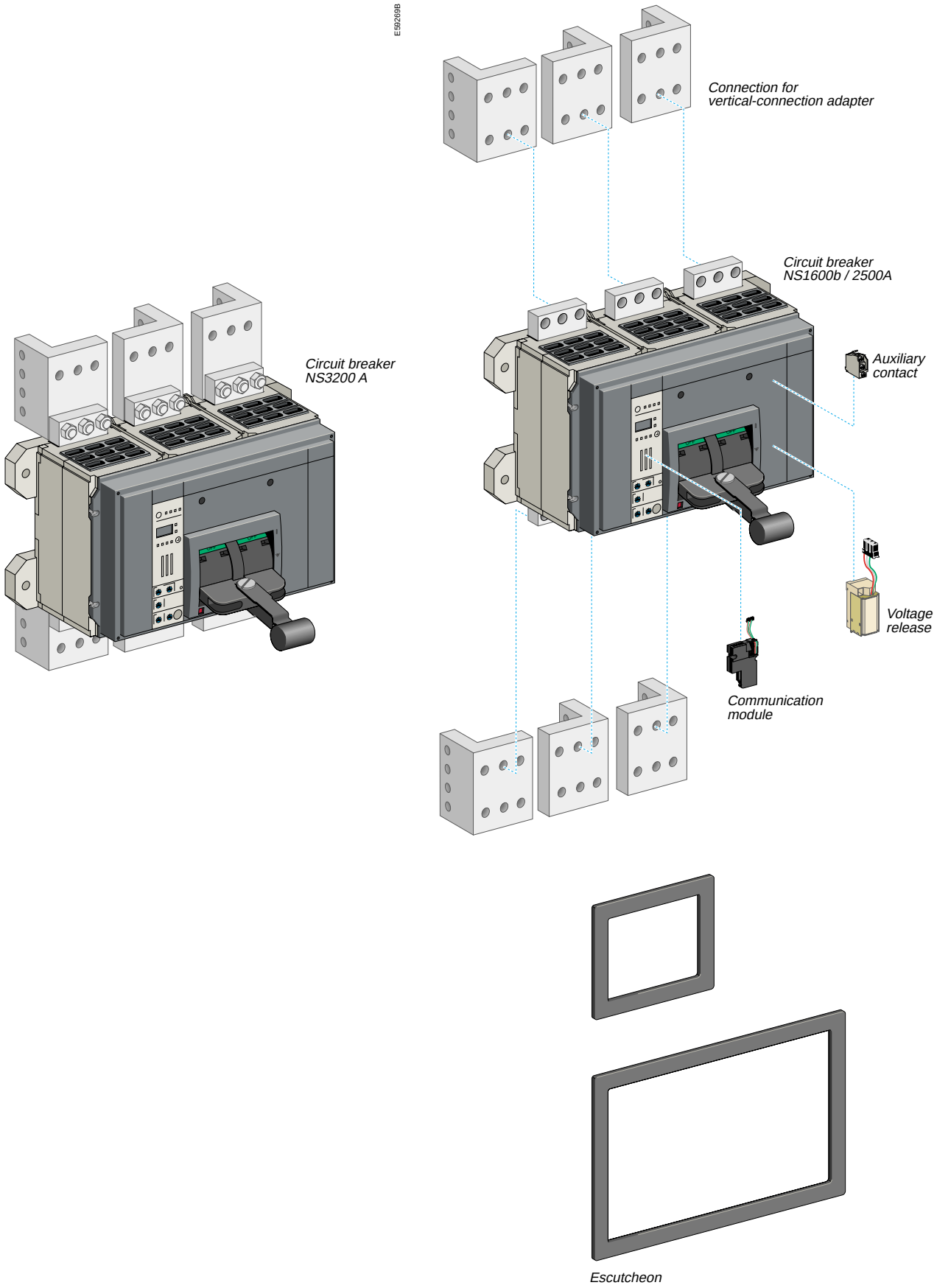
Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP 54 and the degree of protection against mechanical impacts to IK 10. It may be used for withdrawable devices only.

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.

Installation, connection and accessories

Compact NS1600b to 3200 (fixed version)



E45178

Fixed Compact NS

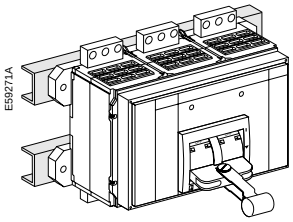
E89281A

Installation

Fixed circuit breakers

Compact NS1600b to 3200 circuit breakers should be installed vertically only.

E59271A



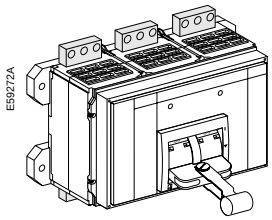
Mounting on rails

Connection

Front connection

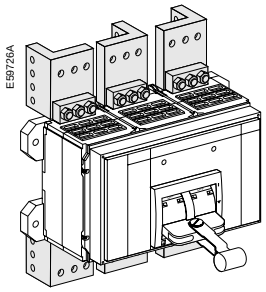
NS1600 to 2500

E59272A



NS3200

E59726A



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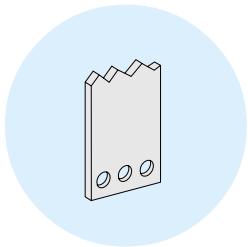
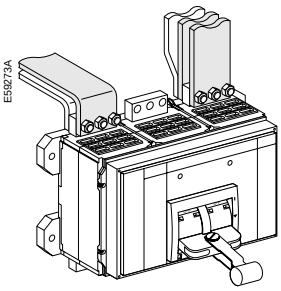


Bars

Bars may be directly connected to the terminals of Compact NS1600b to 3200 circuit breakers.

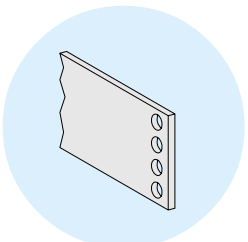
NS1600b to 2500

E59273A



NS1600b to 2500 with connection for vertical-connection adapter or NS3200

E59727A



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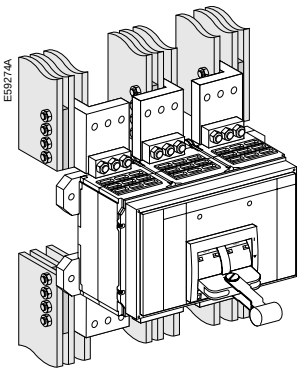

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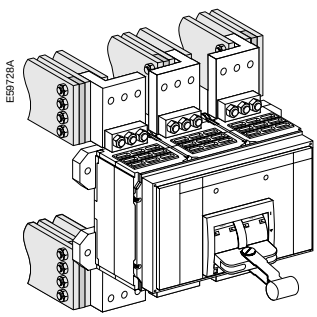

Installation, connection and accessories
Compact NS1600b to 3200 (cont.)

OF, SD and SDE changeover contacts

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).

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 (open/closed) - 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 fault
□ operation of a voltage release
□ operation of the "push to trip" button
Returns to de-energised state when the circuit breaker is reset.
■ SDE (fault indication) - indicates that the circuit breaker has tripped due to:
□ an overload
□ a short-circuit
□ an earth fault.
Returns to de-energised state when the circuit breaker is reset.

Installation

■ OF, SD and SDE functions - a single type of contact provides all these different indication functions, depending on the position where it is inserted in the device.
The contacts clip into slots behind the front cover of the circuit breaker.

Electrical characteristics of the OF/SD/SDE auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation category (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	2.5	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	3	-	-	5	1.5	-	-
	660/690 V	6	0.1	-	-	-	-	-	-

Compact NS1600b to 3200 circuit breakers may be equipped with an MX shunt release, an MN undervoltage release or a delayed undervoltage release (MN + delay unit).

056421

MX voltage release

Remote tripping

This function opens the circuit breaker via an electrical order. It is made up of a shunt release (MX), or an undervoltage release (MN) or a delayed undervoltage release (MN + delay unit).
The delay unit, installed outside the circuit breaker, may be disabled by an emergency power OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function

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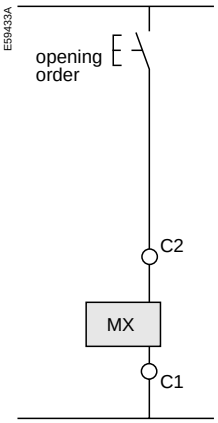

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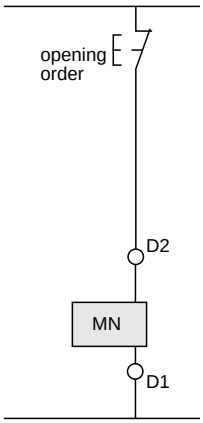

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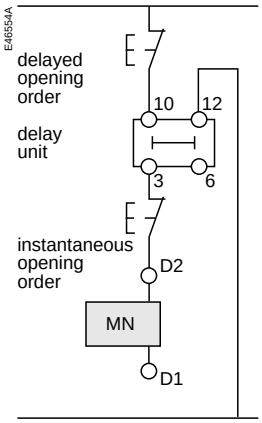


Voltage releases (MX)

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the MX locks the circuit breaker in the OFF position.

Characteristics		
Power supply	V AC 50/60 Hz	24/30- 48/60- 100/130- 200/250- 240/277- 380/480- 500/550
	V DC	1- 24/30- 48/60- 100/130- 200/250
Operating threshold		0.7 to 1.1 Un
Continuous locking function		0.85 to 1.1 Un
Consumption (VA or W)		pick-up: 200 hold: 4.5
Circuit-breaker response time at Un		50 ms ± 10

Instantaneous voltage releases (MN)

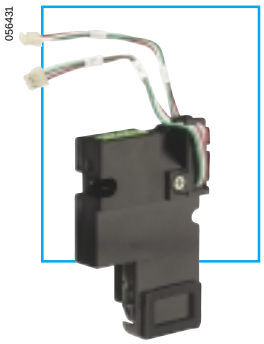
The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35% and 70% of its rated voltage. If the release is not supplied, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect 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	V AC 50/60 Hz	24/30 - 48/60 - 100/130 - 200/250 - 380/480 - 500/550
	V DC	24/30 - 48/60 - 100/130 - 200/250
Operating threshold	opening	0.35 to 0.7 Un
	closing	0.85 Un
Consumption (VA or W)		pick-up: 200 - 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
V AC 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 (VA or W)		pick-up: 200 - hold: 4.5
Circuit-breaker response time at Un	adjustable	0.5s - 0.9s - 1.5s - 3s
	non-adjustable	0.25s



"device" communications module

Communication

The COM communication option is required for integration of the circuit breaker or switch-disconnector in a supervision system.

Compact NS1600b to 3200 uses the Digipact or ModBus communications protocol for full compatibility with the Digipact and SMS Powerlogic electrical-installation management systems.
An external gateway is available for communication on other networks:
- Profibus
- Ethernet, etc.

COM communication option

The COM communication option is compatible with all Compact NS1600b to 3200 circuit breakers and switch-disconnectors.

It is made up of a communication module installed in the device and supplied with its set of sensors (OF, SDE ,PF and CH contacts).

Each installed device has an address that is assigned via the keypad of the control unit (ModBus) or remotely (Batibus).

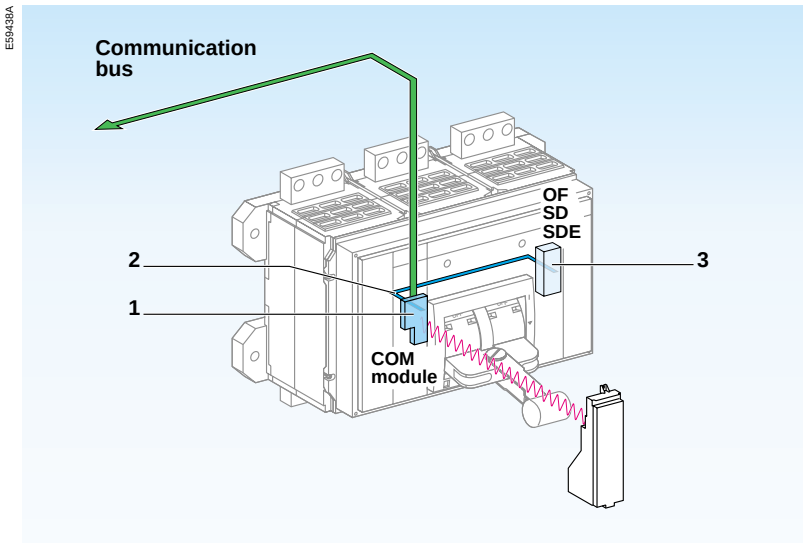
Status indication by the COM option is independent of the device indication contacts. These contacts remain available for conventional uses.

"Device" communication module

This module is independent of the control unit. Installed in the device, behind the control unit, it receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.

The module connects to a set of sensors that detect device status.

Communication architecture



1 module de communication “appareil”
2 bus de communication Digipact
3 capteurs "appareil" OF, SD, SDE

Compact NS1600b to 3200 communication

The COM communication option is compatible with all types of Micrologic control units to:

- identify the device
- indicate status conditions

With Micrologic A control units, the COM option also transmits:

- device settings
- current values in the phases and neutral
- maximum current values.

An infra-red link transmits data between the communication module and Micrologic A control units.

Device identification	**Switch-disconnector**	**Circuit breaker**
Address	■	■
Type of device		■
Type of control unit		■
Type of long-time rating plug		■
Status indications		
ON/OFF	■	■
Connected/disconnected/test position	■	■
Fault trip		■
Controls		
Opening / closing	■	■
Settings		**Micrologic A**
Reading of settings on adjustment dials		■
Programmable alarms and protection		■
Current measurements (I1, I2, I3, IN, maximum)		■
Type of fault		■

Note.
See the description of the Micrologic control units for further details on protection, alarms and measurements.

Installation, connection and accessories
Compact NS1600b to 3200 (cont.)

E45194

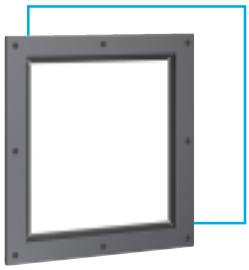
Toggle locked using a removable device and a padlock

Device locking

Locking in the OFF position guarantees isolation as per IEC 60947-2. Padlocking systems can receive up to three padlocks with shackle diameters ranging from 5 to 8 mm (padlocks not supplied).

Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	lock in OFF or ON position	padlock	fixed device

E45185



Escutcheon

Installation accessories

Escutcheon (CDP)

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP 40.

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.

Test equipment

Compact NS100 to 630 test equipment for STR electronic trip units

Mini test kit

Portable test kit

Mini test kit

The mini test kit is a portable unit requiring no external power supply, used to check operation of the electronic trip unit and circuit-breaker tripping.
It connects to the test connector on the front of the circuit breaker.
Required power source: five 9 V alkaline batteries (not supplied).

Portable test kit

The portable test kit is used to check all aspects of the protection functions:
- long time protection
- short time protection
- instantaneous protection
- earth-fault protection.

Required power source: 110 or 220 V AC, 50/60 Hz.

Compact NS630b to 3200 test equipment for Micrologic control units

Portable test kit

Mini test kit

The autonomous hand-held mini test kit may be used to:
- check operation of the control unit and the tripping and pole-opening system by sending a signal simulating a short-circuit
- supply power to the control units for settings via the keypad when the circuit-breaker is open (Micrologic P and H control units).

Required power source: standard LR6-AA battery.

Portable test kit

The portable test kit is available in two versions:
- the autonomous version with built-in keypad and display
- the complete version controlled by a PC.

The autonomous version may be used to check:
- the mechanical operation of the circuit breaker
- the electrical continuity of the connection between the circuit breaker and the control unit
- operation of the control unit:
  - display of settings
  - operating tests on the ASIC electronic component
  - automatic and manual tests on protection functions
  - test on the zone-selective interlocking (ZSI) function
  - inhibition of the earth-fault protection
  - inhibition of the thermal memory.

The complete version controlled by a PC offers in addition:
- comparison of the real tripping curve with the catalogue curves available on the PC
- reset of the M2C / M6C contacts and indications
- reading and modification of settings and counters
- reading of histories and logs
- waveform capture
- analysis of harmonics.

Note.
These test kits are identical for all Compact NS630b to 3200 circuit breakers and all Masterpact NT and NW circuit breakers.

Operating conditions

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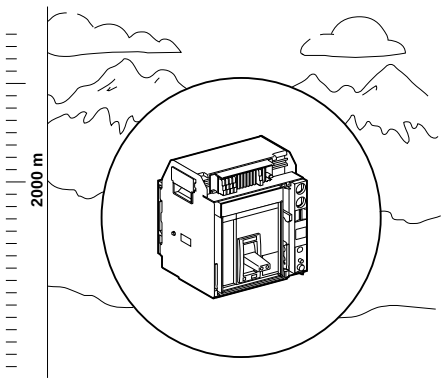

Altitude derating

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 NS80 to 630

Altitude (m)	2000	3000	4000	5000
Dielectric resistance voltage (V)	3000	2500	2100	1800
Average insulation level (V)	750	700	600	500
Maximum utilisation voltage (V)	690	550	480	420
Average thermal current (A) at 40 °C	1 x In	0.96 x In	0.93 x In	0.9 x In

Compact NS630b to 3200

Altitude (m)	2000	3000	4000	5000
Dielectric resistance voltage (V)	3500	3150	2500	2100
Average insulation level (V)	750	750	700	600
Maximum utilisation voltage (V)	690	590	520	460
Average thermal current (A) at 40 °C	1 x In	0.99 x In	0.96 x In	0.94 x In

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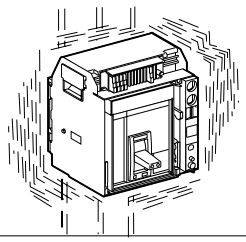

Vibrations

Compact NS devices resist electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 68-2-6 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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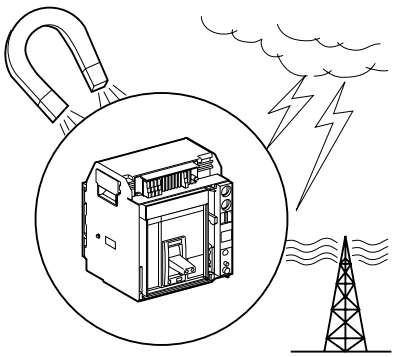
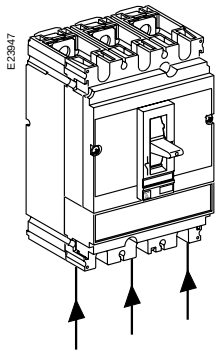


Electromagnetic disturbances

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 earth-fault function).

The above tests guarantee that:
- no nuisance tripping occurs
- tripping times are respected.



Power supply

Compact NS circuit breakers can be supplied from either the top or the bottom without any reduction in performance. This capability facilitates connection when installed in a switchboard.

Weights

		Circuit breaker	Plug-in base	Chassis	Vigi module	Positive contact indication (Interpact INV)	Motor-mechanism module
NS80H-MA	**3P/3D**	1.09					
NSC100N	**3P/3D**	1			1.5		
	4P/4D	1.3			1.7		
NS100N/H	**1P/1D**	0.5					
	2P/2D	1.45					
NS100N	**3P/2D**	1.79	0.8	2.2	0.87	2	1.2
NS100N/H/L	**3P/3D**	2.05	0.8	2.2	0.87	2	1.2
	4P/4D	2.57	1.05	2.2	1.13	2.2	1.2
NS125E	**3P/3D**	1.8	0.8		0.9		
	4P/4D	2.3	1.1		1.2		
NS160N/H	**1P/1D**	0.5					
	2P/2D	1.45					
NS160N	**3P/2D**	1.85	0.8	2.2	0.87	2	1.2
NS160N/H/L	**3P/3D**	2.10	0.8	2.2	0.87	2	1.2
	4P/4D	2.58	1.05	2.2	1.13	2.2	1.2
NS250N	**3P/2D**	1.94	0.8	2.2	0.87	2	1.2
NS250N/H/L	**3P/3D**	2.2	0.8	2.2	0.87	2	1.2
	4P/4D	2.78	1.05	2.2	1.13	2.2	1.2
NS400/630N/H/L	**3P/3D**	6.19	2.4	2.2	2.8	4.6	2.8
	4P/4D	8.13	2.8	2.2	3	4.9	2.8
NS630b to 1600 manual control	**3P**	14		14			
	4P	18		18			
NS630b to 1600 electrical control	**3P**	14		16			
	4P	18		21			
NS1600b to 3200	**3P**	24					
	4P	36					

NSA	**3P/3D**	1.1	1.5
	4P/4D	1.4	1.7
NB50N	**3P/3D**	0.7	
NB100F/N	**3P/3D**	1.2	
NB250N	**3P/3D**	1.94	
NB400/600N	**3P/3D**	6.19	

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.

Installation in switchboards
Safety clearances and minimum distances

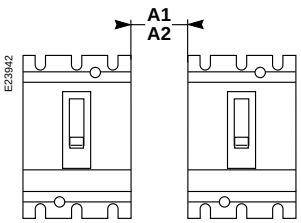
Compact NS80 to 630

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.

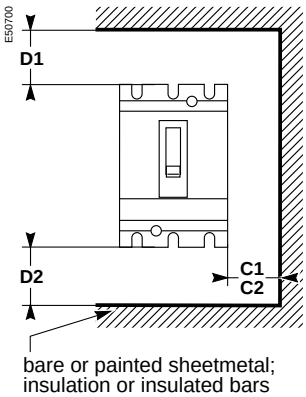
If installation conformity is not checked by type tests, it is also necessary to:
- use insulated bars for circuit-breaker connections
- block off the busbars using insulating screens.

For Compact NS80 to 630 devices, terminal shields, phase barriers and the insulation kit are recommended and may be mandatory depending on the utilisation voltage and the type of installation (fixed, withdrawable). (See page 147.)

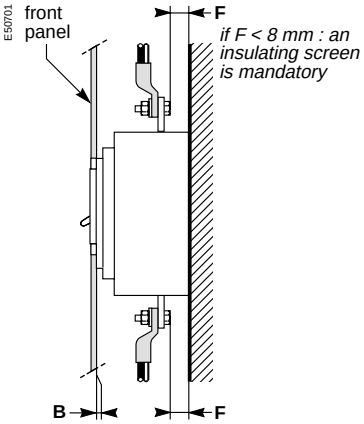
Minimal distance between two adjacent circuit breakers



Minimal distance between the circuit breaker and top, bottom or side panels



Minimal distance between the circuit breaker and front or rear panels



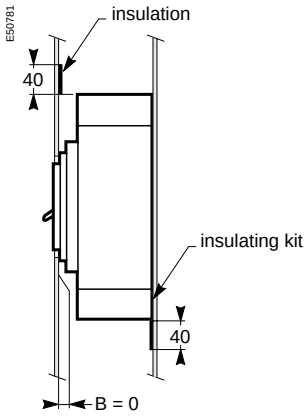
Dimensions (mm)		Insulation, insulated bars or painted sheetmetal			Bare sheetmetal					
Compact circuit breaker		C1	D1	D2	C2	D1	D2	A1 (2)	A2 (3)	B
NS80H-MA	U ⩽ 440 V	0	30	30	5	35	35	0	10	0
NSC100N	U < 600 V	0	30	30	10 **(1)**	35	35	0	20	0
	U ⩾ 600 V	0	30	30	20 **(1)**	35	35	0	40	0
NS100-250	U ⩽ 440 V	0	30	30	5	35	35	0	10	0
	U < 600 V	0	30	30	10 **(1)**	35	35	0	20	0
	U ⩾ 600 V	0	30	30	20 **(1)**	35	35	0	40	0
NS400-630	U ⩽ 440 V	0	30	30	5	60	60	0	10	0
	U < 600 V	0	30	30	10 **(1)**	60	60	0	20	0
	U ⩾ 600 V	0	30	30	20 **(1)**	100	100	0	40	0

(1) *Distance must be doubled with phase barriers.*
(2) *For Compact NS with long or short terminal shields.*
(3) *For Compact NS without terminal shields.*

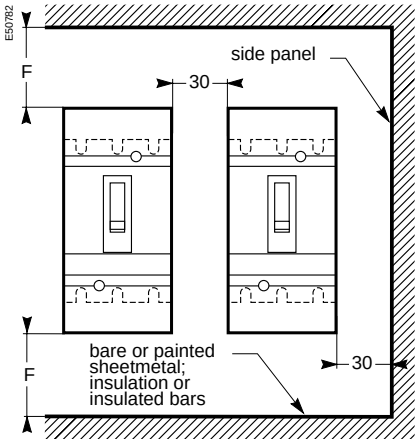
The mandatory distances when installing Compact NS circuit breakers are calculated from the device case, not taking into account the terminal shields or the phase barriers.

Fixed Compact NS400 1000 V AC, front connection

Power supply from the top or bottom. Connection of cables or busbars.

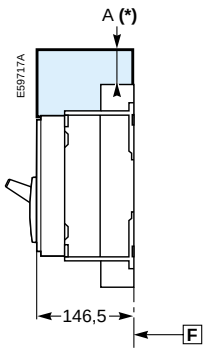


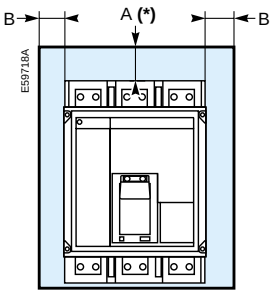
Insulating kit is standard.



Connection using cables with lugs or busbars, F = 100.
Connection using bare cables, F = 150.

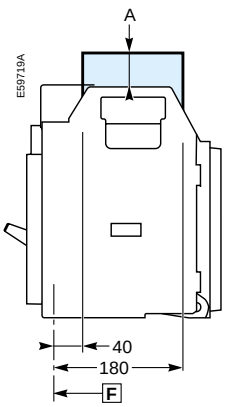
Compact NS630b to 3200 (fixed devices)

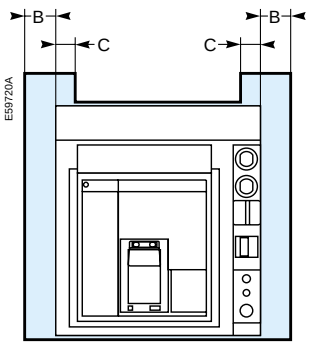




	Insulated parts	Metal parts	Live parts
NS630b to 1600			
A	0	0	180
B	0	0	60
NS1600b to 2500			
A	0	30	180
B	0	0	60
NS3200			
A	0	30	180
B	0	30	60

Compact NS630b to 1600 (withdrawable devices)

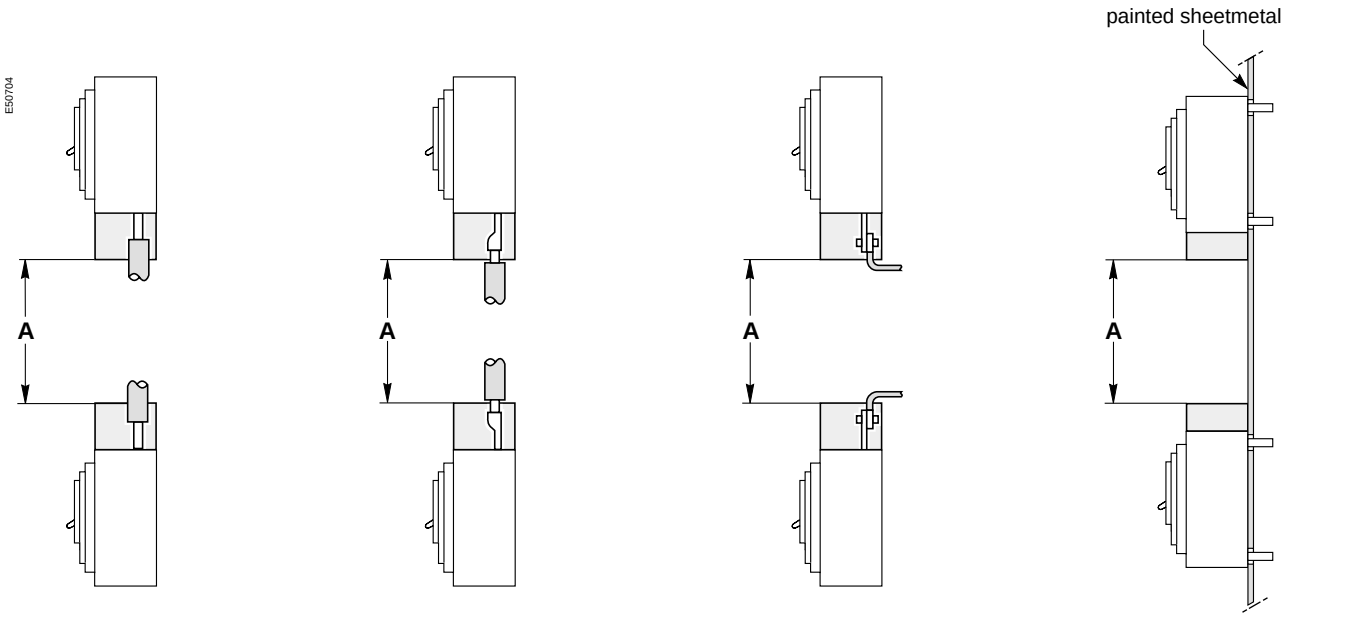




	Insulated parts	Metal parts	Live parts
A	0	0	30
B	10	10	60
C	0	0	90

F *Datum*

Installation in switchboards
Installation example



Direct connection of bare cables, devices with terminal shields.

Connection of cables with lugs, devices with terminal shields.

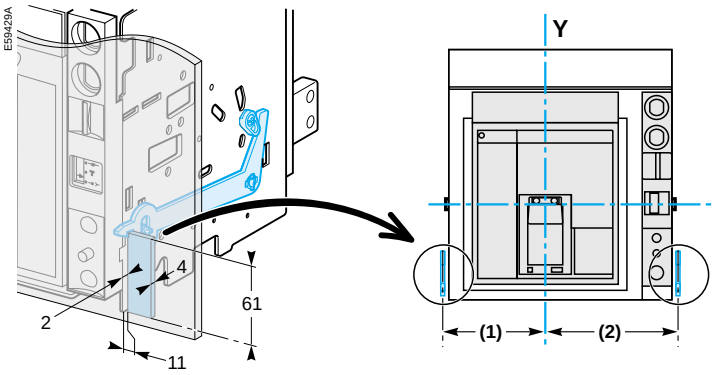
Connection of insulated bars, devices with terminal shields.

Rear connection or plug-in base, devices with terminal shields.

Minimum dimensions (mm) Compact circuit breaker	A
NS80H-MA/NSC100N	0
NS100-630	0
NS630b-1600	250
NS1600b-3200	300

Door interlock
for Compact NS630b to 1600

Mounted on the left or right-hand side of the chassis, this locking device prevents opening of the door if the circuit breaker is in the connected or test positions. If the circuit breaker was connected with the door open, the door may be closed without having to disconnect the circuit breaker.

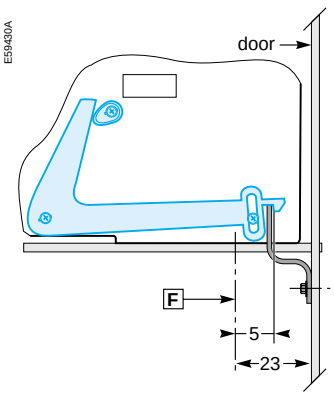


Dimensions (mm)

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

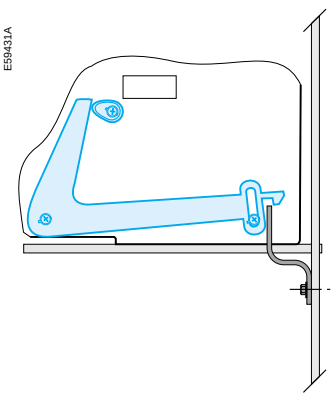
Device in the connected or test positions

Door locked



Device in the disconnected position

Door not locked



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

F *Datum*

Connection of MN and MX voltage releases for Compact NS630b to 3200

Release wiring

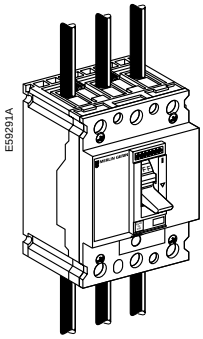
During pick-up, the power drawn is approximately 150 to 200 VA. For low supply voltages (12, 24, 48 V), the maximum cable length therefore depends on the supply voltage and the size of the cables.

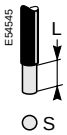
Indicative values for maximum wire lengths (in metres)

		12 V		24 V		48 V	
		2.5 mm²	**1.5 mm²**	**2.5 mm²**	**1.5 mm²**	**2.5 mm²**	**1.5 mm²**
MN	100 % U source	–	–	58	35	280	165
	85 % U source	–	–	16	10	75	45
MX	100 % U source	21	12	115	70	550	330
	85 % U source	10	6	75	44	350	210

Note. *The lengths mentioned are for each of the two supply wires.*

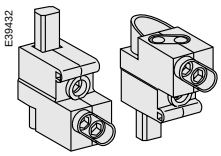
Power connections for Compact NS80H-MA, NSC100N, NSA160





	Standard device	With distribution connector
L (mm)	18	⩽ 10
S (mm^2) Cu / Al	1.5 to 70 rigid 1.5 to *50* flexible	1.5 to 16 rigid **(1)** 1.5 to 10 flexible **(1)**
Tightening torque (Nm)	5	2

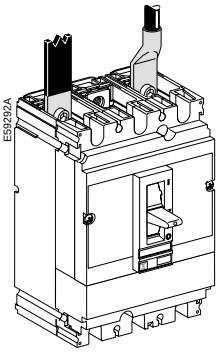
(1) *For flexible cables from 1.5 to 4 mm^2, connection with crimped or self-crimping ferrule.*



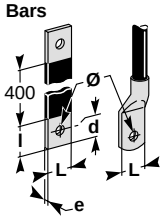
Distribution connector

Power connections for Compact NS100 to 630

Connection of insulated bars or cables with lugs


E59292A

		NS100	NS160/250	NS400/630
Bars	L (mm)	⩽ 25	⩽ 25	⩽ 32
	l (mm)	d + 10	d + 10	d + 15
	d (mm)	⩽ 10	⩽ 10	⩽ 15
	e (mm)	⩽ 6	⩽ 6	3 ⩽ e ⩽ 10
	Ø (mm)	6.5	8.5	10.5
Lugs	L (mm)	⩽ 25	⩽ 25	⩽ 32
	Ø (mm)	6.5	8.5	10.5
Tightening torque (Nm) **(1)**		10	15	50
Tightening torque (Nm) **(2)**		5	5	20

E50702


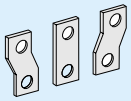
(1) *Tightening torque for lugs or bars on the circuit breaker*
(2) *Tightening torque for rear connections or terminal extensions on plug-in base*

Connections with accessories

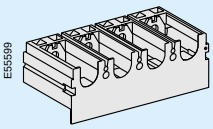
NS100 to 250

Spreader

Separate parts
Tinned copper

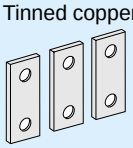
E18599


One-piece spreader

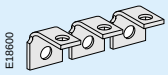
E55599


Where U > 600 V, the mandatory insulation kit means separate spreaders cannot be used. The one-piece spreader must be used.

Straight terminal extensions
Tinned copper.

E18601


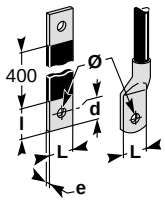
Right-angle terminal extensions
Tinned copper.
Upstream side.

E18600


NS100 to 250

Pole pitch	
Without spreaders	35 mm
With spreaders	45 mm

Dimensions		With spreaders or terminal extensions	
		NS100	**NS160/250**
Bars	L (mm)	⩽ 25	⩽ 25
	l (mm)	20 ⩽ l ⩽ 25	20 ⩽ l ⩽ 25
	d (mm)	⩽ 10	⩽ 10
	e (mm)	⩽ 6	⩽ 6
	Ø (mm)	6.5	8.5
Lugs	L (mm)	⩽ 25	⩽ 25
	Ø (mm)	6.5	8.5
Tighten. torque	(Nm)	10 **(1)**, 5 **(2)**	15 **(1)**, 5 **(2)**

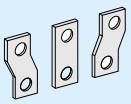
E50702


(1) *Tightening torque for spreaders or terminal extensions on the circuit breaker*
(2) *Tightening torque for spreaders or terminal extensions on plug-in base*

Spreaders, straight and right-angle terminal extensions are supplied with flexible phase barriers.

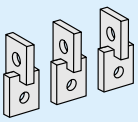
NS400 and 600

Separate spreaders with 52.5 and 70 mm pole pitches
Tinned copper

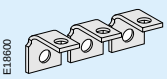
E18599


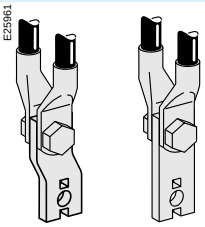
Where U > 600 V, use of the 52.5 mm spreaders requires a specific insulation kit. The 70 mm spreaders may not be used.

Edgewise terminal extension
Tinned copper

E21276


Right-angle terminal extensions
Tinned copper
Upstream side

E18600


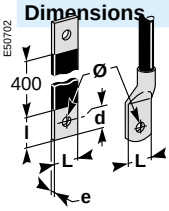
E25961


Close-up view of two cables with lugs.

NS400 and 630

Pole pitch	
Without spreaders	45 mm
With spreaders	52,5 ou 70 mm

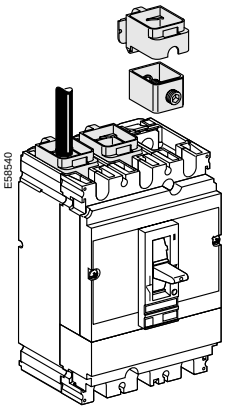
Dimensions		With spreaders	With terminal extensions
Bars	L (mm)	⩽ 40	⩽ 32
	l (mm)	d + 15	30 ⩽ l ⩽ 34
	d (mm)	⩽ 20	⩽ 15
	e (mm)	3 ⩽ e ⩽ 10	3 ⩽ e ⩽ 10
	Ø (mm)	12,5	10,5
Lugs	L (mm)	⩽ 40	⩽ 32
	Ø (mm)	12,5	10,5
Tighten. torque	(Nm)	50 **(1)**, 20 **(2)**	50 **(1)**, 20 **(2)**

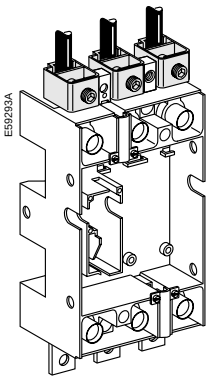
E50702


(1) *Tightening torque for spreaders or terminal extensions on the circuit breaker*
(2) *Tightening torque for spreaders or terminal extensions on plug-in base*

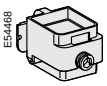
Spreaders, straight and right-angle terminal extensions are supplied with flexible phase barriers.

Connection of bare cables

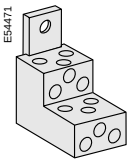




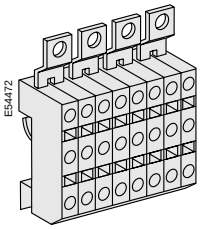
NS100 to 250



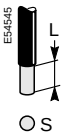
1-cable connector



Distribution connector



Polybloc distribution block

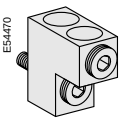


1-cable connector	Steel ⩽ 160A	Aluminium ⩽ 250A		
L (mm)	20	20		
S (mm²) Cu / Al	1.5 to 95 (1)	10…16	25…35	50…185
Tightening torque (Nm)	12 15	20	26	
6-cable distribution connector (copper or aluminium)				
L (mm)	15 or 30			
S (mm²) Cu / Al	1.5 to 6 (1)	8 to 35		
Tightening torque (Nm)	4	6		
Polybloc distribution block (6 or 9 cables)				
L (mm)	12			
S (mm²) Cu / Al	1.5 to 10			

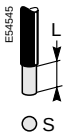
(1) *For flexible cables from 1.5 to 4 mm2, connection with crimped or self-crimping ferrule.*

NS400 and 630

1-cable connector



2-cable connector



	1-cable connector 1 cable	2-cable connector 2 cables
L (mm)	20	30 or 60
S (mm²) Cu / Al	35 to 300 rigid / flexible	2 x 85 to 2 x 240 rigid / flexible
Tightening torque (Nm)	31	31

Power connections for Compact NS100 to 630 (suite)
Insulation of live parts

Fixed Compact NS, front connections

	NS100/250N/H/L	NS400/630N/H	NS400/630L
U < 500 V	Phase barriers or long terminal shields recommended. Insulated bars are mandatory.		Phase barriers or long terminal shields recommended. Insulated bars are mandatory.
500 V ⩽ U ⩽ 600 V	Phase barriers or long terminal shields are mandatory.	Phase barriers or long terminal shields are mandatory.	Phase barriers or long terminal shields are mandatory.
U > 600 V	Insulation kit **(1)**. Insulated bars are mandatory.	Insulation kit **(1)**. Insulated bars are mandatory.	Insulation kit **(1)**. Insulated bars are mandatory.

The insulation kit is not compatible with:
- *separate spreaders for Compact NS100 to 250. The one-piece spreader must be used*
- *separate spreaders (70 mm) for Compact NS400 and 630. For the 52.5 mm spreaders, there is a specific insulation kit.*

Fixed Compact NS, rear connections

	NS100/250N/H/L	NS400/630N/H	NS400/630L
All voltage levels	Short terminal shields recommended.	Short terminal shields recommended.	Short terminal shields recommended.

Withdrawable Compact NS, front and rear connections

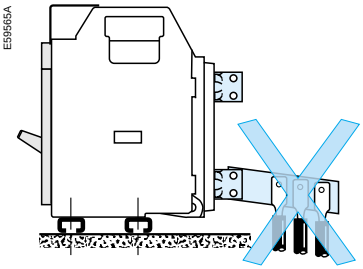
	NS100/250N/H/L	NS400/630N/H	NS400/630L
All voltage levels	Short terminal shields are mandatory. Insulated bars are mandatory.	Short terminal shields are mandatory. Insulated bars are mandatory for U ⩾ 500 V.	Short terminal shields are mandatory. Insulated bars are mandatory.

Use of an insulating screen (supplied with the plug-in base) is mandatory:
- *between the backplate and the plug-in base, for front connection*
- *between the panel and the plug-in base, for rear connection through the backplate with connectors.*

Power connections for Compact NS630b to 3200

Conductor materials and electrodynamic stresses

Compact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors (flexible or rigid bars, cables).
In the event of a short-circuit, thermal and electrodynamic stresses will be exerted on the conductors. They must therefore be correctly sized and maintained in place using supports.
Electrical connection points on all types of devices (switch-disconnectors, contactors, circuit breakers, etc.) should not be used for mechanical support.

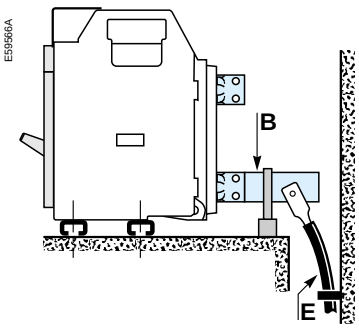


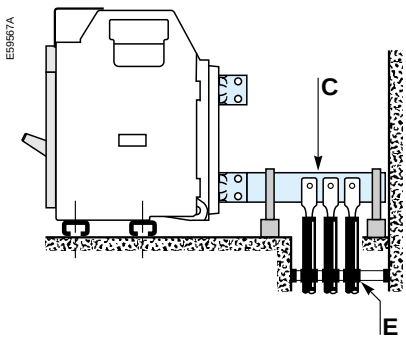
Ties for flexible bars and cables

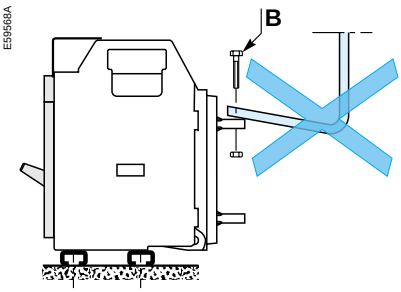
The table below indicates the maximum distance between ties depending on the prospective short-circuit current.
The maximum distance between ties attached to the switchboard frame is 400 mm.

Type of tie	**"Panduit" ties Width: 4.5 mm Maximum load: 22 kg Colour: white**			**"Sarel" ties Width: 9 mm Maximum load: 90 kg Colour: black**				
Maximum distance between ties (mm)	200	100	50	350	200	100	70	50 (double ties)
Short-circuit current (kA rms)	10	15	20	20	27	35	45	100

Note. *For cables ⩾ 50 mm², use 9 mm-wide ties.*







Connection of bars

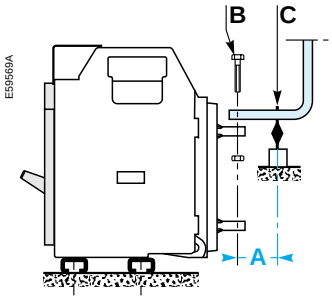
Bars must be adjusted to ensure correct positioning on the terminals before bolting **(B)**

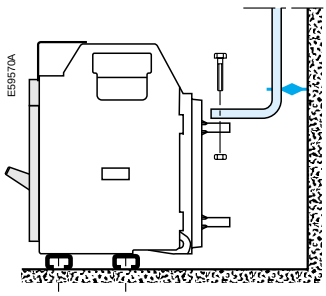
Bars must rest on a support firmly attached to the switchboard frame, such that the circuit-breaker terminals do not bear any weight **(C)**.

Efforts électrodynamiques

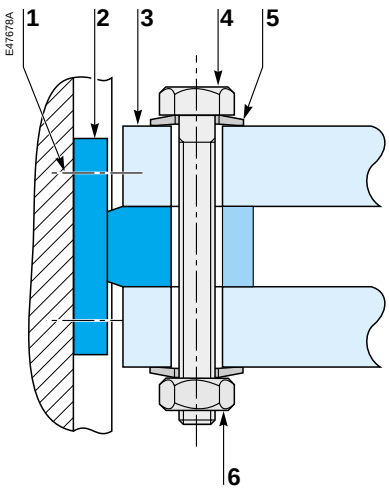
The first spacer between bars must be positioned within a maximum distance (see table below) of the connection point to the circuit breaker. This distance is calculated to resist the electrodynamic stresses exerted between the bars of each phase during a short-circuit.

Maximum distance A between the circuit-breaker connection and the first spacer between bars, depending on the short-circuit current						
Isc (kA)	30	50	65	80	100	150
Distance (mm)	350	300	250	150	150	150





Power connections for Compact NS630b to 3200

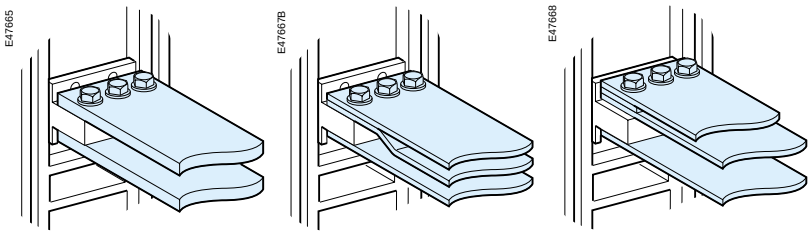


1 *terminal screws, factory tightened to 13 Nm*
2 *circuit-breaker terminal*
3 *bars*
4 *bolt*
5 *washer*
6 *nut*

Connections

The quality of bar connections depends, among other things, on the tightening torques used for the nuts and bolts. Over-tightening may have the same consequences as under-tightening.
The correct tightening torques for the connection of bars to the circuit-breaker terminals are indicated in the table below.
The values below are for copper bars and steel nuts and bolts (class 8.8).
The same values apply to AGS-T52 quality aluminium bars
(French standard NFA 02-104 and American National Standard H-35-1).

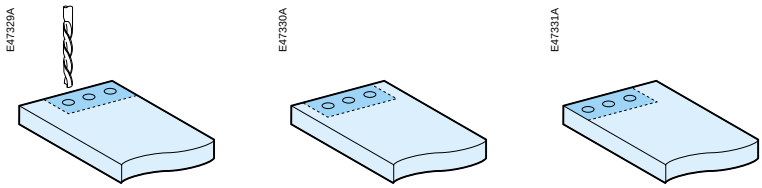
Examples of bar connections



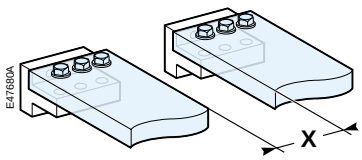
Tightening torque for bars			
Rated diameter (mm)	**Drilling (mm) diameter**	**Tightening torque (Nm) with flat or grower washers**	**Tightening torque (Nm) with contact or split washers**
10	11	37.5	50

Bar drilling

Examples



Insulation distance

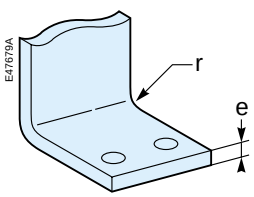


Dimensions (mm)

Utilisation voltage	X minimum
Ui ⩽ 600 V	8 mm
Ui ⩽ 1000 V	14 mm

Bar bending

Bars must be bent taking into account the XXX indicated in the table below. A tighter bend may cause cracks.



Dimensions (mm)

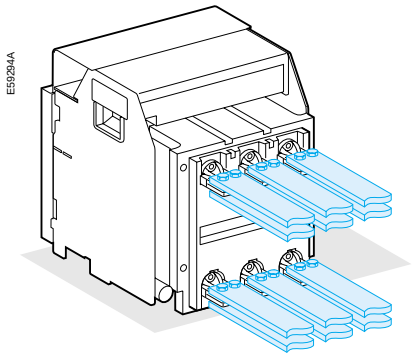
e	XXX r	
	Minimum	Recommended
5	5	7.5
10	15	18 to 20

Sizing of bars

The following tables are based on the following assumptions:
- maximum permissible temperature of bars is 100 °C
- ambient temperature inside the switchboard near the device and its connections is Ti (IEC 60947-2)
- busbars made of copper and not painted.

Note.
The values presented in the tables are the result of trials and theoretical calculations on the basis of the assumptions mentioned above.
These tables are intended as an aid in designing connections, however, the actual values must be confirmed by tests on the installation.

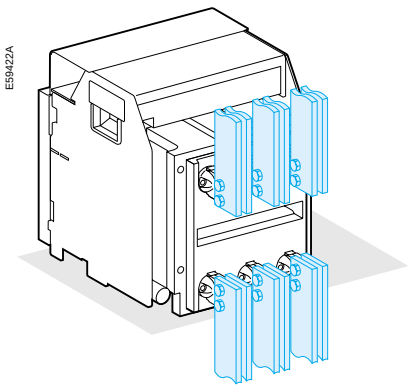
Front or horizontal rear connections



Compact	Maximum service current	T_i : 40 °C Number of bars		T_i : 50 °C Number of bars		T_i : 60 °C Number of bars	
		5 mm thick	10 mm thick	5 mm thick	10 mm thick	5 mm thick	10 mm thick
NS630b	**400**	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NS630b	**630**	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NS800	**800**	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.63 x 10
NS1000	**1000**	3b.50 x 5	1b.63 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
NS1250	**1250**	3b.50 x 5	2b.40 x 10	3b.50 x 5	2b.50 x 10	3b.63 x 5	2b.50 x 10
		2b.80 x 5	2b.40 x 10	2b.80 x 5			
NS1600 / 1600b	**1400**	3b.50 x 5	2b.40 x 10	2b.80 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NS1600 / 1600b	**1600**	3b.63 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10	3b.80 x 5	3b.50 x 10
NS2000	**1800**	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NS2000	**2000**	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	3b.100 x 5	3b.63 x 10
NS2500	**2200**	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	4b.80 x 5	2b.100 x 10
NS2500	**2500**	4b.100 x 5	2b.100 x 10	4b.100 x 5	2b.100 x 10	4b.100 x 5	3b.80 x 10
NS3200	**2800**	4b.100 x 5	3b.80 x 10	4b.100 x 5	3b.80 x 10	5b.100 x 5	3b.100 x 10
NS3200	**3000**	5b.100 x 5	3b.80 x 10	6b.100 x 5	3b.100 x 10	8b.100 x 5	4b.80 x 10
NS3200	**3200**	6b.100 x 5	3b.100 x 10	8b.100 x 5	3b.100 x 10		4b.100 x 10

Power connections for Compact NS630b to 3200
Sizing of bars

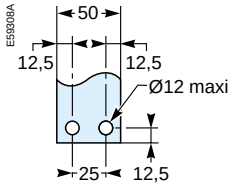
Vertical rear connections



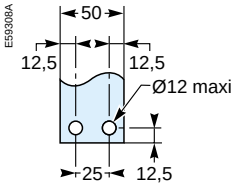
Compact	Maximum service current	T_i : 40 °C Number of bars		T_i : 50 °C Number of bars		T_i : 60 °C Number of bars	
		5 mm thick	10 mm thick	5 mm thick	10 mm thick	5 mm thick	10 mm thick
NS630b	**400**	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NS630b	**630**	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40 x 10
NS800	**800**	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10
NS1000	**1000**	2b.50 x 5	1b.50 x 10	2b.50 x 5	1b.50 x 10	2b.63 x 5	1b.63 x 10
NS1250	**1250**	2b.63 x 5	1b.63 x 10	2b.63 x 5	1b.63 x 10	3b.50 x 5	2b.50 x 10
NS1600	**1400**	2b.63 x 5	1b.63 x 10	2b.63 x 5	1b.63 x 10	3b.50 x 5	2b.50 x 10
NS1600	**1600**	2b.80 x 5	1b.80 x 10	2b.80 x 5	1b.80 x 10	3b.63 x 5	2b.50 x 10

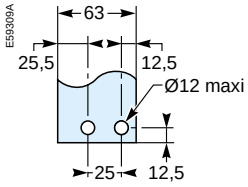
Power connections for Compact NS630b to 1600
Recommended drilling dimensions

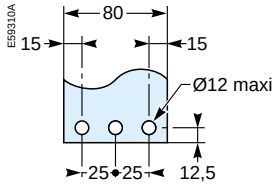
Rear connection

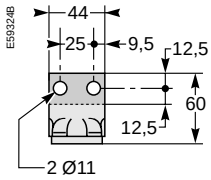


Rear connection with spreaders

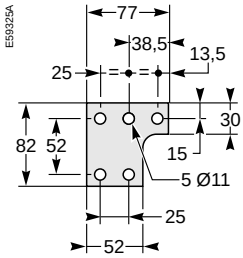




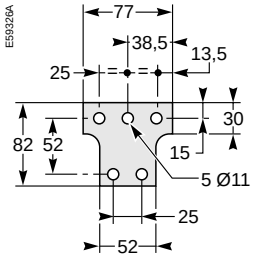




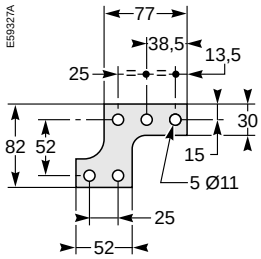
Middle left or middle right spreader for 4P



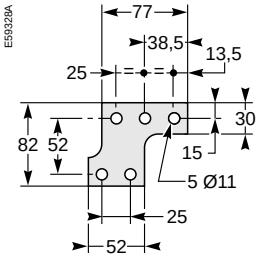
Middle spreader for 3P



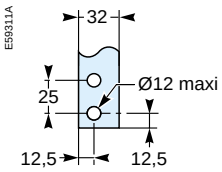
Left or right spreader for 4P

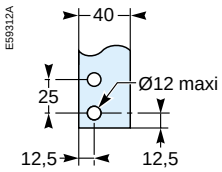


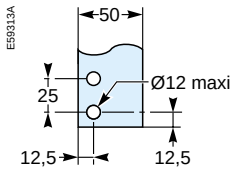
Left or right spreader for 3P

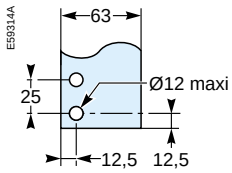


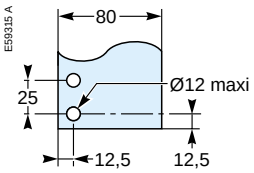
Vertical rear connection

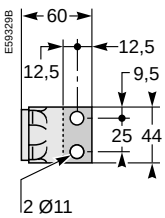




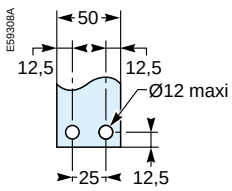




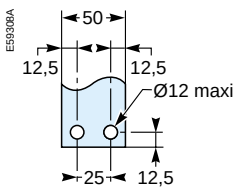


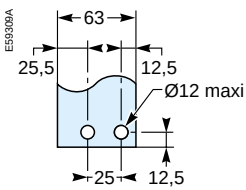


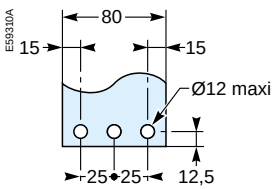
Front connection



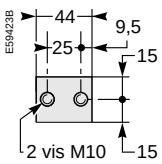
Front connection with vertical-connection adapter



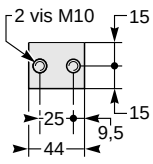


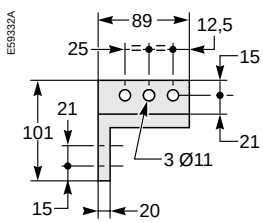


Top terminal



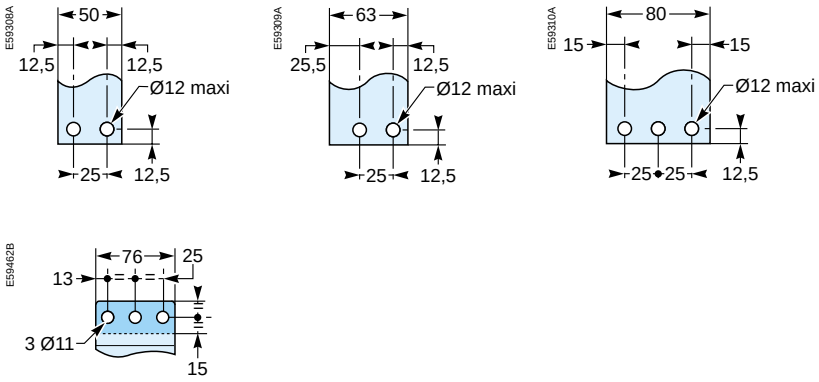
Bottom terminal



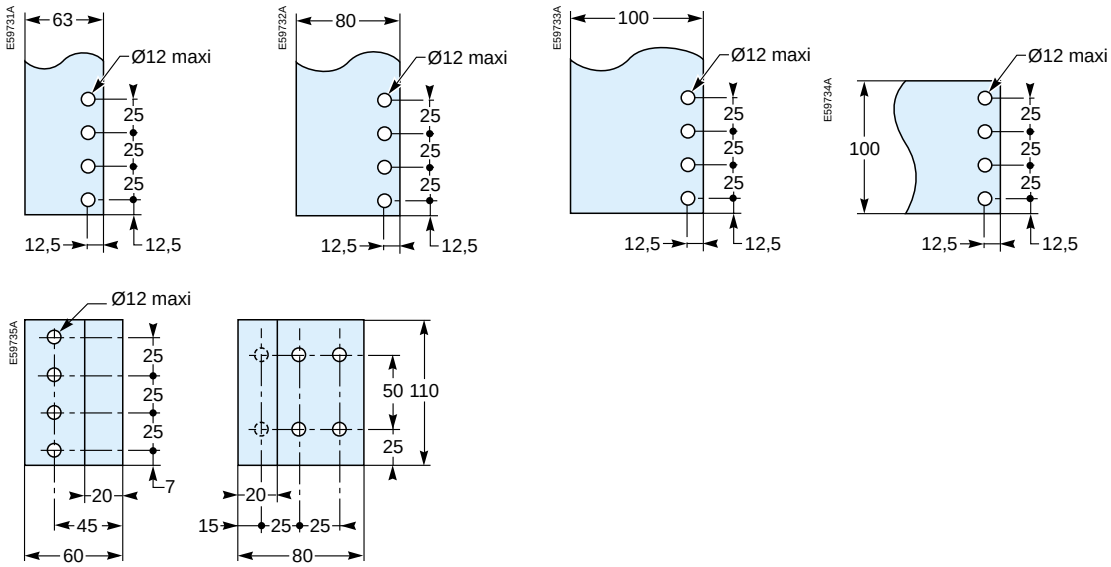


Power connections for Compact NS1600b to 3200
Recommended drilling dimensions

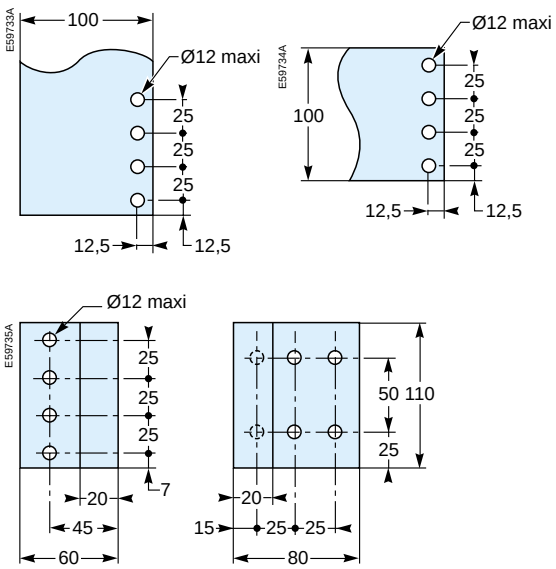
Front connection (NS1600b to 2500)



Front connection with vertical-connection adapter (NS1600b to 2500)



Front connection (NS3200)



Temperature derating
Compact NS devices equipped with thermal-magnetic trip units

The values opposite are not modified for **fixed** circuit breakers equipped with one of the following modules:
- Vigi module
- ammeter module
- insulation-monitoring module
- current-transformer module.

They also apply to **plug-in / withdrawable** circuit breakers equipped with one of the following modules:
- ammeter module
- current-transformer module.

However, for **plug-in / withdrawable** circuit breakers equipped with a Vigi module or an insulation-monitoring module, the coefficients in the table below must be applied.

Trip unit	Coefficient
TM16 to TM125	1
TM160 to TM250	0.9

When the ambient temperature is greater than 40 °C, overload-protection characteristics are slightly modified.
To determine tripping times using time/current curves, use Ir values corresponding to the thermal setting on the device, multiplied by the coefficients in the tables below.

Single-pole and two-pole Compact NS

Rating (A)	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
16	16	15.6	15.2	14.8	14.5	14	13.8
25	25	24.5	24	23.5	23	22	21
40	40	39	38	37	36	35	34
63	63	61.5	60	58	57	55	54
80	80	78	76	74	72	70	68
100	100	97.5	95	92.5	90	87.5	85
125	125	122	119	116	113	109	106
160	160	156	152	147.2	144	140	136
200	200	195	190	185	180	175	170
250	250	244	238	231	225	219	213

Compact NS100 to 250 equipped with TM-D and TM-G trip units

Rating (A)	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
16	16	15.6	15.2	14.8	14.5	14	13.8
25	25	24.5	24	23.5	23	22	21
32	32	31.3	30.5	30	29.5	29	28.5
40	40	39	38	37	36	35	34
50	50	49	48	47	46	45	44
63	63	61.5	60	58	57	55	54
80	80	78	76	74	72	70	68
100	100	97.5	95	92.5	90	87.5	85
125	125	122	119	116	113	109	106
160	160	156	152	147.2	144	140	136
200	200	195	190	185	180	175	170
250	250	244	238	231	225	219	213

Compact NSA160

Rating (A)	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
16	16	15.6	15.2	14.8	14.5	14	13.8
25	25	24.5	24	23.5	23	22	21
32	32	31.3	30.5	30	29.5	29	28.5
40	40	39	38	37	36	35	34
50	50	49	48	47	46	45	44
63	63	61.5	60	58	57	55	54
80	80	78	76	74	72	70	68
100	100	97.5	95	92.5	90	87.5	85
125	125	122	119	116	113	109	106
160	160	156	152	147.2	144	140	136

Compact NB50…NB600

NB50 / NB100	40 °C	45 °C	50 °C	55 °C	60 °C
NB50N	1	1	1	1	1
NB100F/N	1	1	1	1	1

NB250N Rating (A)	50 °C	55 °C	60 °C	65 °C	70 °C
125	125	122	119	116	113
150	150	146	143	139	135
175	175	171	166	162	158
200	200	195	190	185	180
225	225	220	214	208	203

NB400N Rating (A)	50 °C	55 °C	60 °C	65 °C	70 °C
400	400	390	380	370	360

NB600N Rating (A)	50 °C	55 °C	60 °C	65 °C	70 °C
600	600	585	570	550	535

Temperature derating
Compact NS devices equipped with electronic trip units

The values opposite are not modified for **fixed** circuit breakers equipped with one of the following modules:
- Vigi module
- ammeter module
- insulation-monitoring module
- current-transformer module.

They also apply to **plug-in / withdrawable** circuit breakers equipped with one of the following modules:
- ammeter module
- current-transformer module.

However, for **plug-in / withdrawable** circuit breakers equipped with a Vigi module or an insulation-monitoring module, the coefficients in the table below must be applied.

Circuit breaker	Trip unit	Coeff.
NS100N/H/L	STR22SE/GE 40 to 100	1
NS160N/H/L	STR22SE/GE 40 to 160	1
NS250N/H/L	STR22SE/GE 100 and 160	1
NS250N/H/L	STR22SE/GE 250	0.86

The values opposite are not modified for **fixed or plug-in / withdrawable** circuit breakers equipped with one of the following modules:
- ammeter module
- current-transformer module.

However, for **fixed or plug-in / withdrawable** circuit breakers equipped with a Vigi module or an insulation-monitoring module, the coefficients in the table below must be applied.

Circuit breaker	Trip unit	Coeff.
NS400N/H/L	STR23SE and 53UE STR23SV and 53SV	0.97
NS630N/H/L	STR23SE and 53UE STR23SV and 53SV	0.9

Note. *To provide the Visu function, Compact NS circuit breakers, with or without a Vigi module, are combined with INV switch-disconnectors. Tripping values for the selected combination are indicated in the Interpact catalogue.*

Electronic trip units are not affected by variations in temperature. However, the maximum permissible current in the circuit breaker still depends on the ambient temperature.

Compact NS100...NS250

The table below indicates the maximum long-time (LT) protection setting depending on the ambient temperature.

NS100N/H/L	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
In: 40 to 160 A	no derating						
Ir max	1	1	1	1	1	1	1
NS250N/H/L	**40 °C**	**45 °C**	**50 °C**	**55 °C**	**60 °C**	**65 °C**	**70 °C**
In: 100 to 160A	no derating						
Ir max	1	1	1	1	1	1	1
In: 250A	250	250	250	237.5	237.5	225	225
Ir max	1	1	1	0.95	0.95	0.90	0.90

Compact NS400 and NS630

The table below indicates the maximum long-time (LT) protection setting depending on the ambient temperature.

NS400N/H/L		40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
Fixed	**In: 400A**	400	400	400	390	380	370	360
	Io/Ir max	1/1	1/1	1/1	1/0.98	1/0.95	1/0.93	1/0.9
Plug-in /	**In: 400**	400	390	380	370	360	350	340
withdrawable	**Io/Ir max**	1/1	1/0.98	1/0.95	1/0.93	1/0.9	1/0.88	1/0.85
NS630N/H/L		**40 °C**	**45 °C**	**50 °C**	**55 °C**	**60 °C**	**65 °C**	**70 °C**
Fixed	**In: 630A**	630	615	600	585	570	550	535
	Io/Ir max	1/1	1/0.8	1/0.95	1/0.93	1/0.9	1/0.88	1/0.85
Plug-in /	**In: 570A**	570	550	535	520	505	490	475
withdrawable	**Io/Ir max**	1/0.9	1/0.88	1/0.85	1/0.83	1/0.8	0.8/0.98	0.8/0.95

Compact NS630b to NS1600 (2)

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.
For ambient temperatures higher than 60 °C, please consult us.

Version	**Fixed device**									
Connection	**Front or horizontal rear**					**Vertical rear**				
temp. Ti (1)	**40**	**45**	**50**	**55**	**60**	**40**	**45**	**50**	**55**	**60**
NS630b N/H/L	630	630	630	630	630	630	630	630	630	630
NS800 N/H/L	800	800	800	800	800	800	800	800	800	800
NS1000 N/H/L	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
NS1250 N/H	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
NS1600 N/H	1600	1600	1600	1600	1550	1600	1600	1600	1600	1600

Version	**Withdrawable device**									
Connection	**Front or horizontal rear**					**Vertical rear**				
temp. Ti (1)	**40**	**45**	**50**	**55**	**60**	**40**	**45**	**50**	**55**	**60**
NS630b N/H/L	630	630	630	630	630	630	630	630	630	630
NS800 N/H/L	800	800	800	800	800	800	800	800	800	800
NS1000 N/H/L	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
NS1250 N/H	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
NS1600 N/H	1600	1600	1520	1480	1430	1600	1600	1600	1560	1510

Compact NS1600b à 3200

Version	**Fixed device**									
Connection	**Front (horizontal)**					**Front (vertical)**				
temp. Ti (1)	**40**	**45**	**50**	**55**	**60**	**40**	**45**	**50**	**55**	**60**
NS1600b N/H	1600	1600	1600	1600	1600	1600	1600	1600	1600	1600
NS2000 N/H	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
NS2500 N/H	2500	2500	2500	2500	2500	2500	2500	2500	2350	2110
NS3200 N/H	3200	3200	3200	3200	3200	3200	3200	3200	3000	2700

(1) *Ti is the temperature inside the switchboard, near the circuit breaker and its connections (IEC 60947-2).*

(2) *For device installed horizontally, use the temperature deratings indicated for front or horizontal rear connection.*

Power dissipation / Resistance
Compact NS devices equipped with thermal-magnetic trip units

Power dissipated per pole (P/pole) in Watts (W).
Resistance per pole (R/pole) in milliohms (mΩ).
Total power dissipation is the value measured at In, 50/60 Hz, for a three-pole or four-pole circuit breaker (values above power $P = 3RI^2$).

Compact NSC100N

		Fixed device		Additional modules	
3/4 poles	**Rat. (A)**	**R/pole**	**P/pole**	**Vigi (N, L3)**	**Vigi (L1, L2)**
NSC100N	16	15	4	0.06	0.06
	20	11.2	4.5	0.1	0.1
	25	8	5	0.16	0.16
	32	5.4	5.5	0.26	0.26
	40	3.7	6	0.4	0.4
	50	2.8	7	0.63	0.63
	63	2	8	1	1
	70	2	10	1.3	1.3
	80	1.4	9	1.6	1.6
	100	1	10	2.5	2.5
NSC100NA	100	0.6	6	2.5	2.5

Compact NS100 to 250 equipped with TM-D and TM-G trip units

		Fixed device		Additional modules				
3/4 poles	**Rat. (A)**	**R/pole**	**P/pole**	**Vigi (N, L3)**	**Vigi (L1, L2)**	**With-drawable**	**Ammeter module**	**Transfo. module**
NS100N/H/L	16	11.42	2.92	0	0	0	0	0
	25	6.42	4.01	0	0	0.1	0	0
	40	3.42	5.47	0.10	0.05	0.2	0.1	0.1
	63	2.17	8.61	0.3	0.15	0.4	0.1	0.1
	80	1.37	8.77	0.4	0.2	0.6	0.1	0.1
	100	0.88	8.8	0.7	0.35	1	0.2	0.2
NS160N/H/L	80	1.26	8.06	0.4	0.2	0.6	0.1	0.1
	100	0.77	7.7	0.7	0.35	1	0.2	0.2
	125	0.69	10.78	1.1	0.55	1.6	0.3	0.3
	160	0.55	13.95	1.8	0.9	2.6	0.5	0.5
NS250N/H/L	125	0.61	9.45	1.1	0.55	1.6	0.3	0.3
	160	0.46	11.78	1.8	0.9	2.6	0.5	0.5
	200	0.39	15.4	2.8	1.4	4	0.8	0.8
	250	0.3	18.75	4.4	2.2	6.3	1.3	1.3

Compact NS80 and NS100 to 630 equipped with MA trip units

		Fixed device		Additional modules				
3 poles	**Rat. (A)**	**R/pole**	**P/pole**	**Vigi (N, L3)**	**Vigi (L1, L2)**	**With-drawable**	**Ammeter module**	**Transfo. module**
NS80H	1.5	93.3	0.21					
	2.5	89.6	0.56					
	6.3	75.6	3					
	12.5	12.8	2					
	25	2.24	1.4					
	50	1.04	2.6					
	80	0.94	6.02					
NS100N/H/L	2.5	148.42	0.93	0	0	0	0	0
	6.3	99.02	3.93	0	0	0	0	0
	12.5	4.05	0.63	0	0	0	0	0
	25	1.66	1.04	0	0	0.1	0	0
	50	0.67	1.66	0.2	0.1	0.3	0.1	0.1
	100	0.52	5.2	0.7	0.35	1	0.2	0.2
NS160N/H/L	150	0.38	8.55	1.35	0.68	2.6	0.45	0.45
NS250N/H/L	220	0.3	14.52	2.9	1.45	4.89	0.97	0.97
NS400H/L	320	0.12	12.29	3.2	1.6	6.14	1.54	1.54
NS630H/L	500	0.1	25	13.99	7	15	3.75	3.75

Single-pole and two-pole Compact NS100 to 160

		Fixed device	
1/2 poles	**Rat. (A)**	**R/pole**	**P/pole**
NS100N/H	16	11.3	2.89
	20	6.3	2.52
	30	2.9	2.61
	40	2.9	4.64
	50	1.4	3.5
	63	1.4	5.56
	80	1.25	8
	100	0.76	7.6
NS160N/H	125	0.63	9.84
	160	0.48	12.29

Power dissipation / Resistance
Compact NS devices equipped with electronic trip units

Power dissipated per pole (P/pole) in Watts (W). Resistance per pole (R/pole) in milliohms (mΩ) (measured cold). Total power dissipation is the value measured at In, 50/60 Hz, for a three-pole or four-pole circuit breaker (values above power $P = 3RI^2$).

Compact NS100 to NS630

		Fixed device		Additional modules				
3/4 poles	**Rat. (A)**	**R/pole**	**P/pole**	**Vigi (N, L3)**	**Vigi (L1, L2)**	**With-drawable**	**Ammeter module**	**Transfo. module**
NS100N/H/L	40	0.84	1.34	0.1	0.05	0.2	0.1	0.1
	100	0.468	4.68	0.7	0.35	1	0.2	0.2
NS160N/H/L	40	0.73	1.17	0.4	0.2	0.6	0.1	0.1
	100	0.36	3.58	0.7	0.35	1	0.2	0.2
	160	0.36	9.16	1.8	0.9	2.6	0.5	0.5
NS250N/H/L	100	0.27	2.73	1.1	0.55	1.6	0.2	0.2
	250	0.28	17.56	4.4	2.2	6.3	1.3	1.3
NS400N/H/L	400	0.12	19.2	3.2	1.6	9.6	2.4	2.4
NS630N/H/L	630 **(1)**	0.1	39.69	6.5	3.25	19.49	5.95	5.95

(1) *The dissipation values for the Vigi modules and withdrawable circuit breakers are given for 570 A*

Compact NSA160

		Fixed device		Additional modules	
3/4 poles	**Rat. (A)**	**R/pole**	**P/pole**	**Vigi (N, L3)**	**Vigi (L1, L2)**
NSA160	16	15	4	0.06	0.06
	25	8	5	0.16	0.16
	32	5.4	5.5	0.26	0.26
	40	3.7	6	0.4	0.4
	50	2.8	7	0.63	0.63
	63	2	8	1	1
	80	1.4	9	1.6	1.6
	100	1	10	2.5	2.5
	125	0.8	12.5	3.9	3.9
	160	0.6	15.4	6.4	6.4
NSA125NA	125	0.7	11		
NSA160NA	160	0.6	15.4		

Compact NS630b to 1600

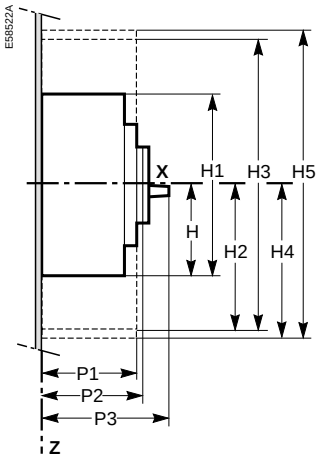
Version	**Fixed device**	
	Dissipated power	**Input/output resistance**
NS630b N/H/L	30/45	0.026/0.039
NS800 N/H/L	45/60	0.026/0.039
NS1000 N/H/L	65/100	0.026/0.039
NS1250 N/H	130	0.026
NS1600 N/H	220	0.026

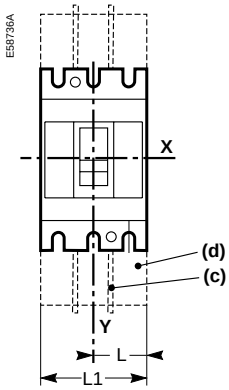
Version	**Withdrawable device**	
	Dissipated power	**Input/output resistance**
NS630 N/H/L	55/115	0.05
NS800 N/H/L	90/120	0.05
NS1000 N/H/L	150/230	0.05
NS1250 N/H	250	0.036
NS1600 N/H	460	0.036

Compact NS1600b à 3200

Version	**Fixed device**	
	Dissipated power	**Input/output resistance**
NS1600b N/H	250	0.019
NS2000 N/H	250	0.013
NS2500 N/H	300	0.008
NS3200 N/H	420	0.008

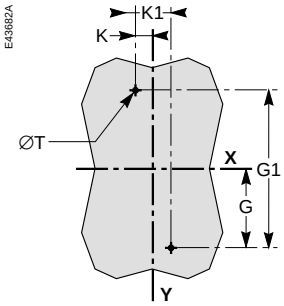
Compact NB50N and 100F/N dimensions

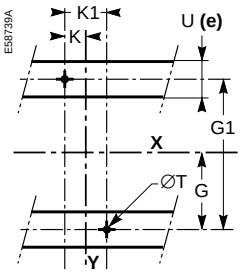




(c) *phase barriers*
(d) *terminal shields.*

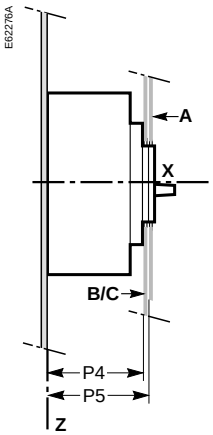
Compact NB50N and 100F/N mounting

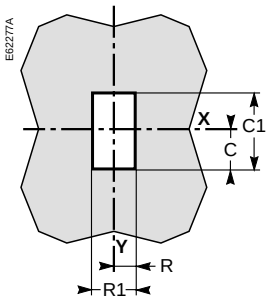


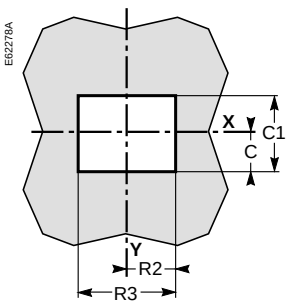


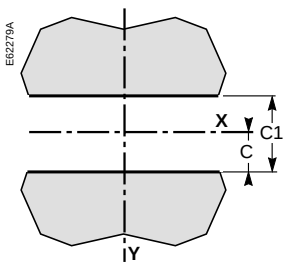
Door cutout

Cutout **(A)** **(B, C)**





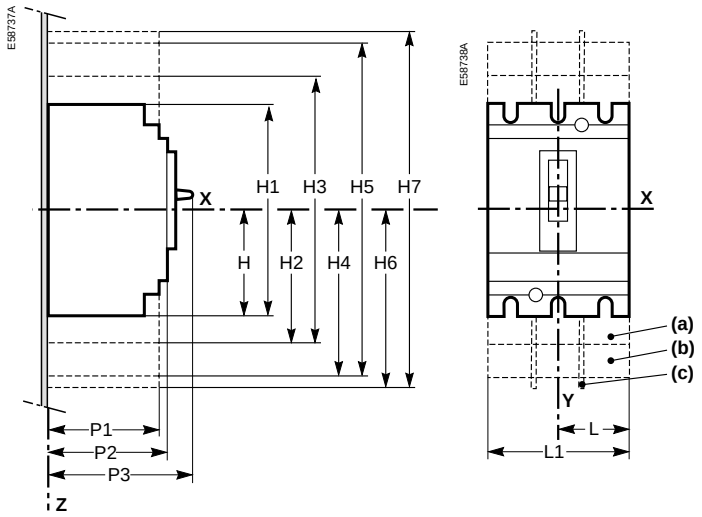




Dimensions (mm)

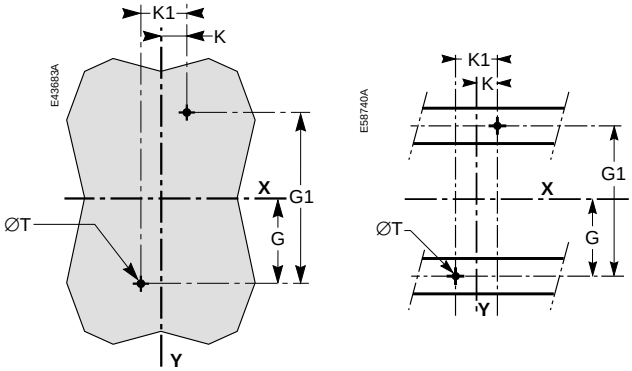
Type	C	C1	G	G1	H	H1	H2	H3	H4	H5	K	K1	L	L1	P1	P2	P3	P4	P5	R	R1	R2	R3	ØT	U (e)
NB50N	27	54	55.5	111	65	130	??	??	??	??	12.5	25	37.5	75	68	72	90	70	74	12.5	25	30.5	61	6	⩽32
NB100F/N	27	54	66	132	77.5	155	??	??	??	??	15	30	45	90	68	72	90	70	74	12.5	25	43.5	87	6	⩽32

Compact NB250/600N dimensions



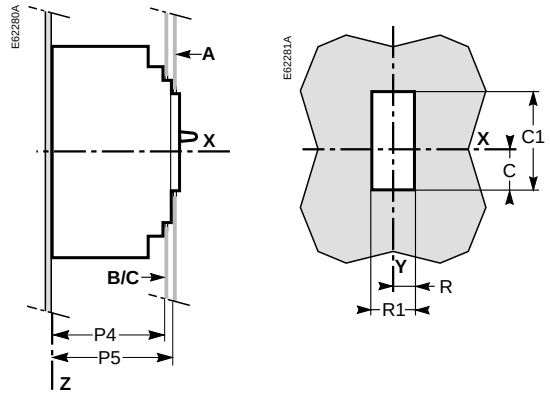
(a) *short terminal shields.*
(b) *long terminal shields (available for spreaders on NB400 to 600, pitch 52.5 : L1 = 157.5 mm).*
(c) *phase barriers.*

Compact NB250 to 600N mounting

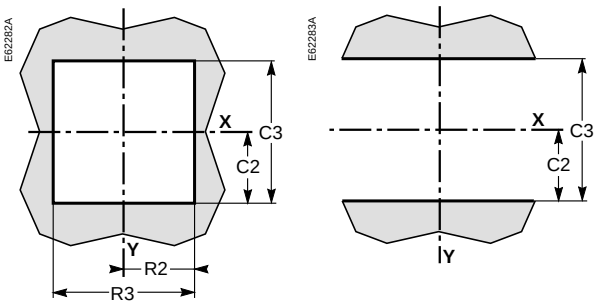


Door cutout

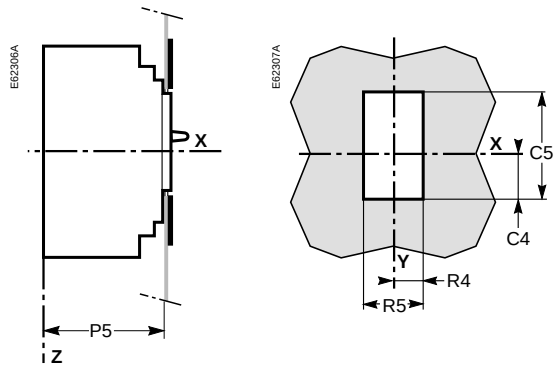
Cutout **(A)**



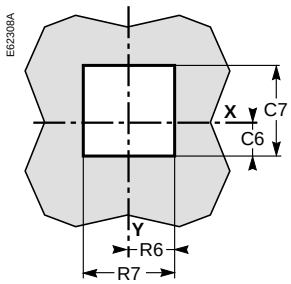
(B, C)



With escutcheon



With toggle cover

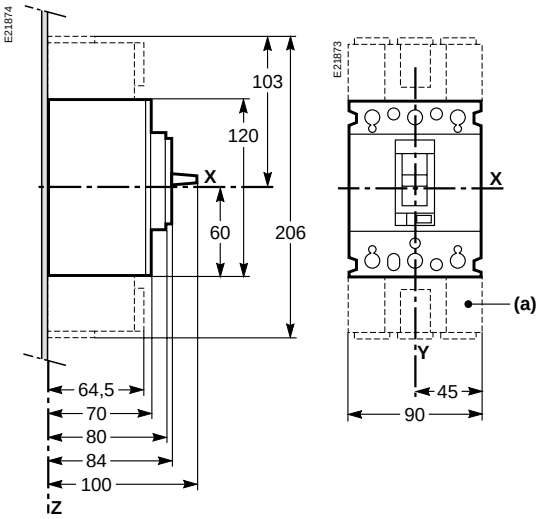


Dimensions (mm)

Type	C	C1	C2	C3	C4	C5	C6	C7	G	G1	H	H1	H2	H3	H4	H5	H6	H7	K	K1	L	L1
NB250N	29	76	54	108	43	104	34	86	62.5	125	80.5	161	94	188	160.5	321	178.5	357	17.5	35	52.5	105
NB400/600N	41.5	116	92.5	184	56.5	146	46.5	126	100	200	127.5	255	142.5	285	240	480	237	474	22.5	45	70	140

Type	P1	P2	P3	P4	P5	R	R1	R2	R3	R4	R5	R6	R7	ØT	U (e)
NB250N	81	86	111	83	88	14.5	29	54	108	29	58	43	86	6	⩽32
NB400/600N	95.5	110	168	117	112	31.5	63	71.5	143	46.5	93	63	126	6	⩽32

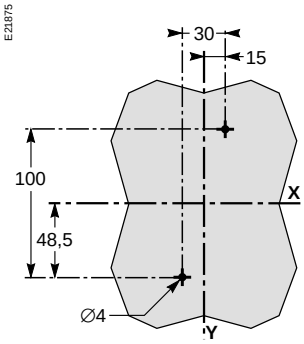
Dimensions



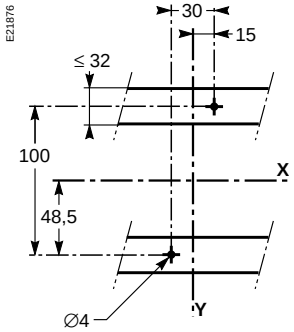
(a) *long terminal shields*

Mounting

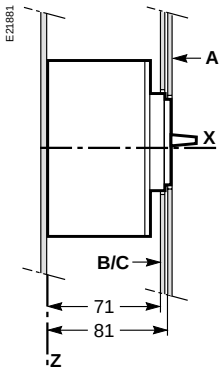
On backplate



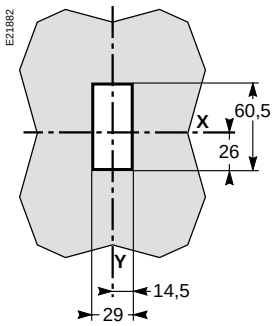
On rails



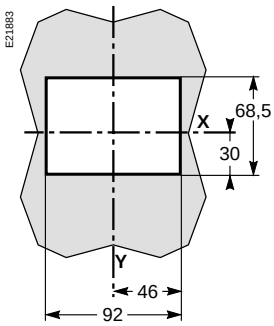
Front-panel cutouts



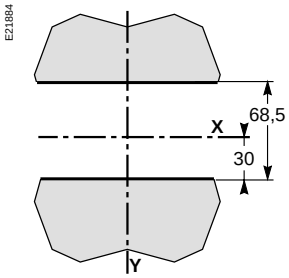
Cutout A



Cutout B

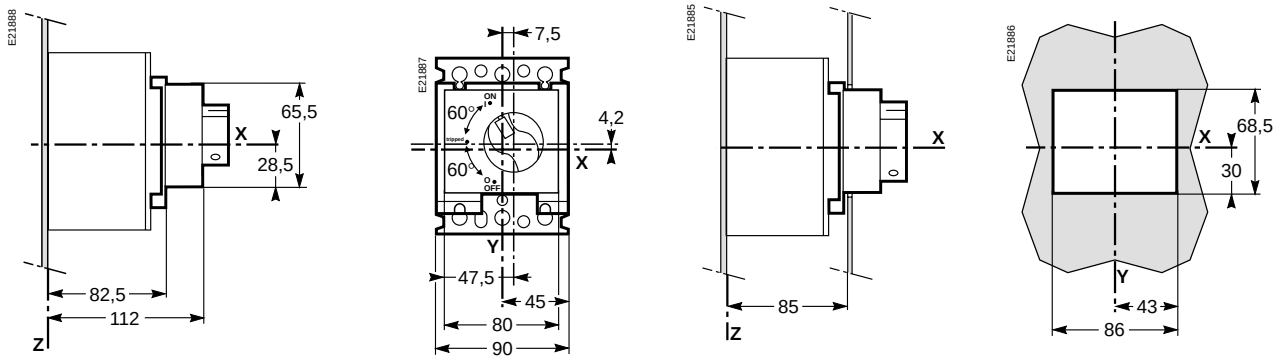


Cutout C



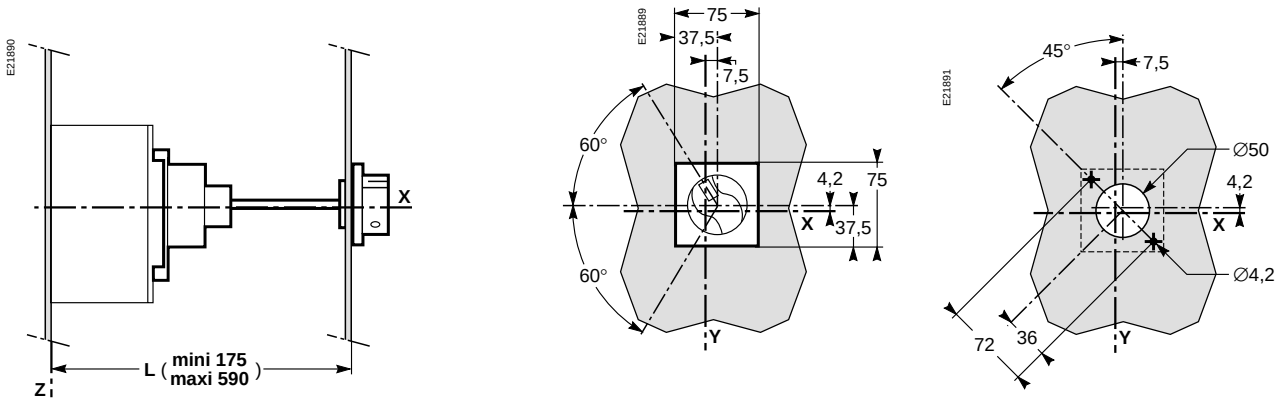
Standard direct rotary handle

Front-panel cutout



Extended rotary handle

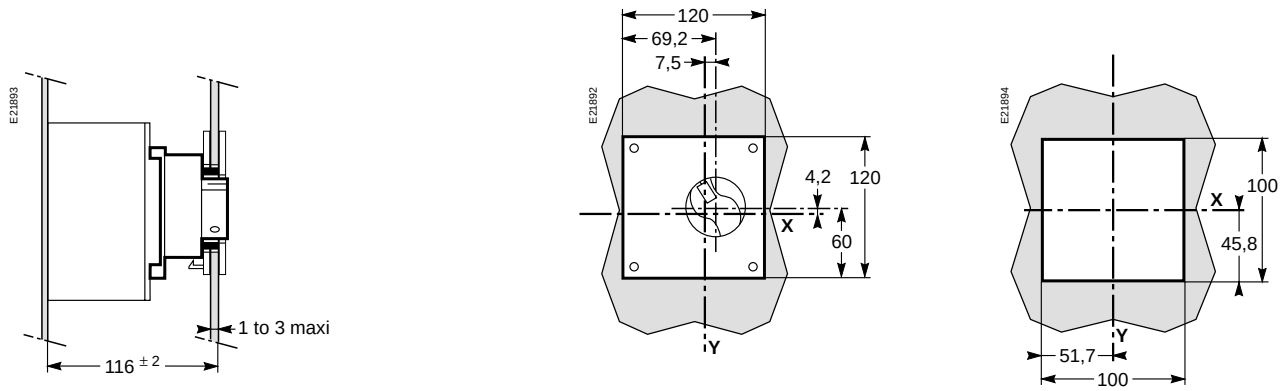
Front-panel cutout

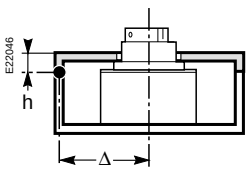


shaft length = **L** – 109

CCM direct rotary handle

Front-panel cutout

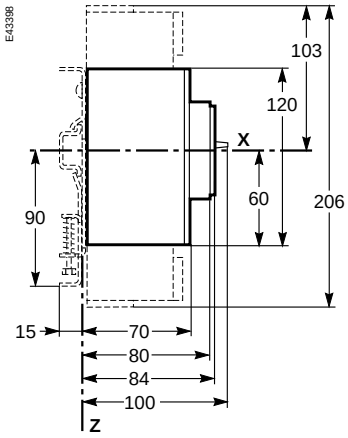




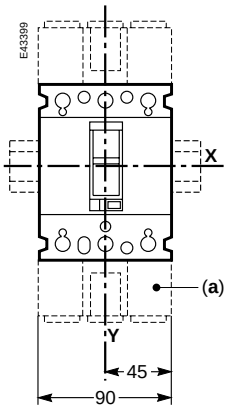
Note.
Door cutout dimensions are given for a device position in the enclosure where Δ ≥ 100 + (h x 5) with respect to the door hinge.

Dimensions

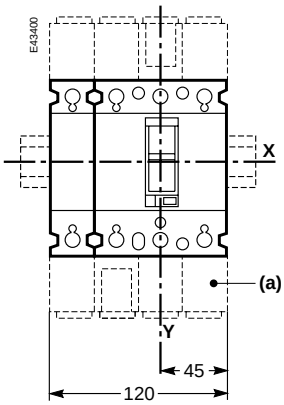
Compact NSC100



3 poles

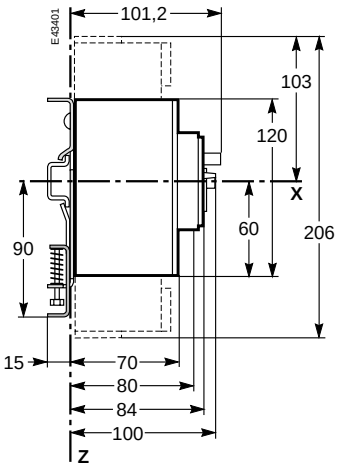


4 poles

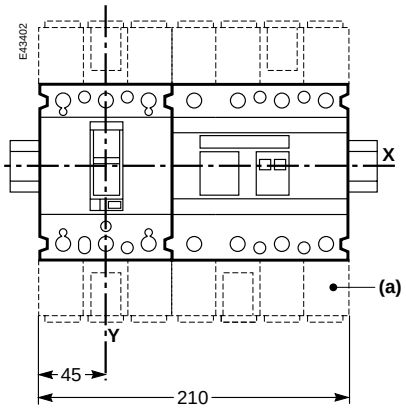


(a) *long terminal shields*

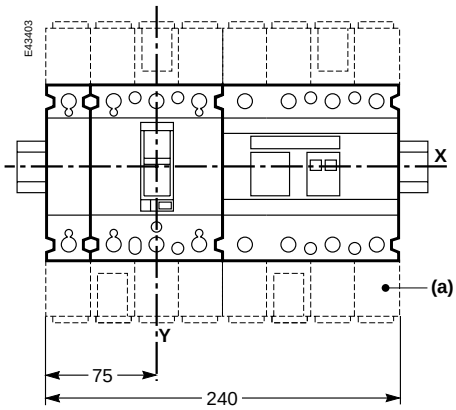
Vigicompact NSC



3 poles

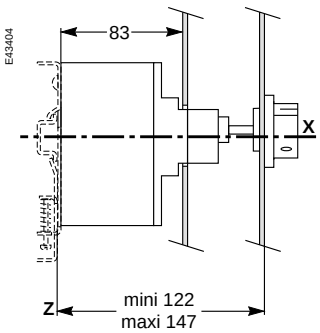


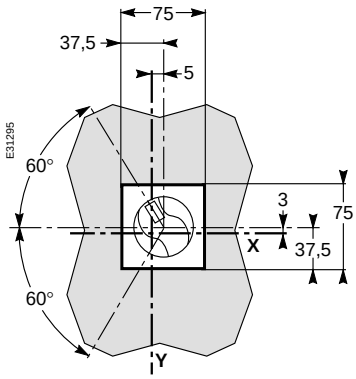
4 poles



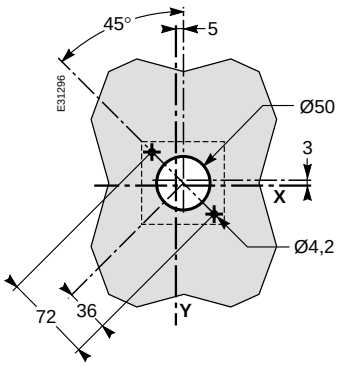
(a) *long terminal shields.*

Extended rotary handle





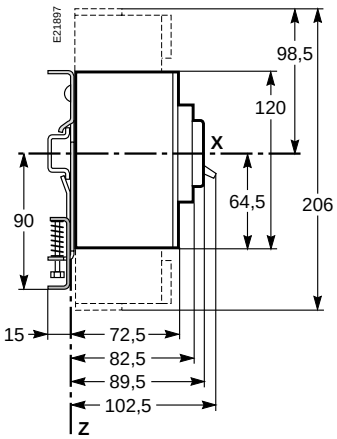
Front-panel cutout



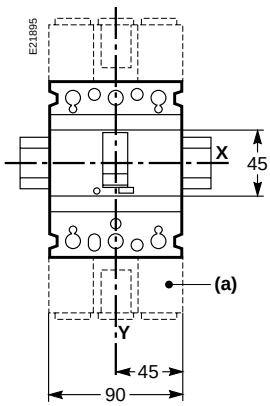
Note.
Centre line X indicates the centre of the mounting rail.

Dimensions

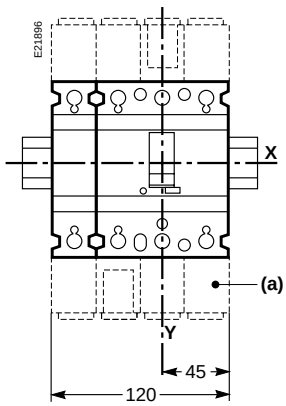
Compact NSA160



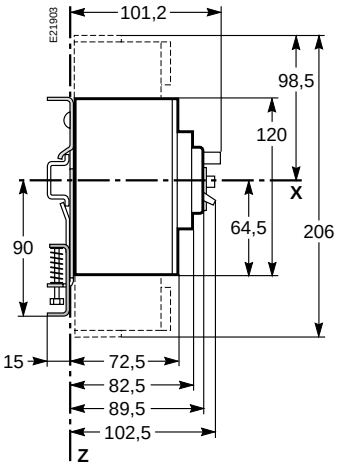
3 poles



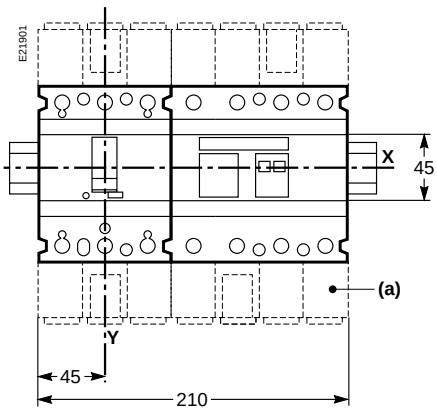
4 poles



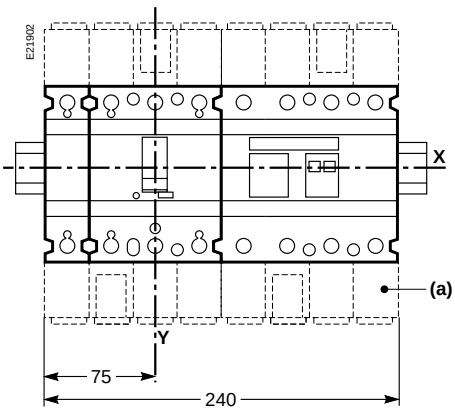
Vigicompact NSA160



3 poles

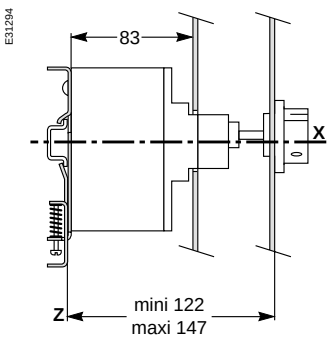


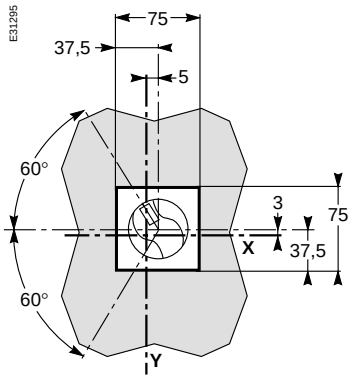
4 poles



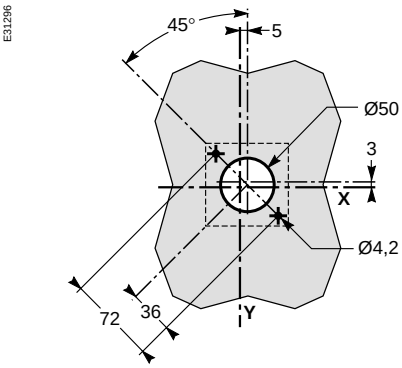
Extended rotary handle

Dimensions





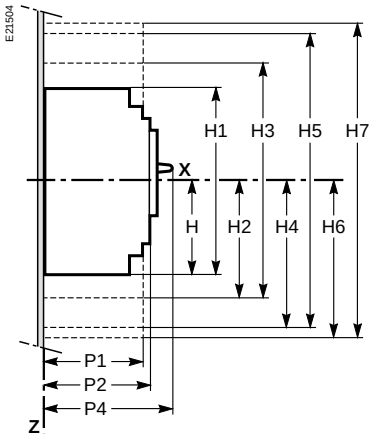
Front-panel cutout



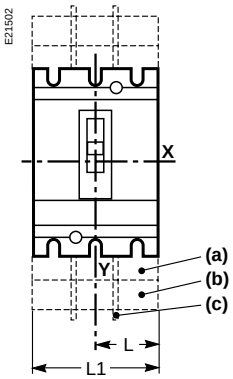
Note.
Centre line X indicates the centre of the mounting r ail.

Compact NS100 to 630 (fixed version)

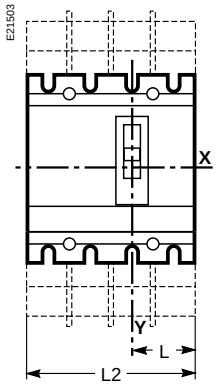
Dimensions



2 poles or 3 poles



4 poles

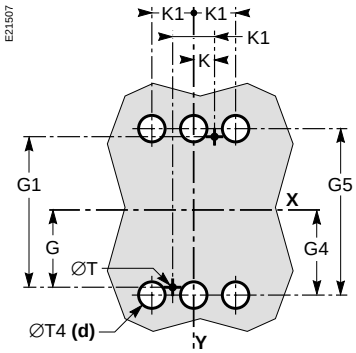


(a) *short terminal shields.*
(b) *long terminal shields (available for spreaders on NS400 to 630, pitch 52.5 : L1 = 157.5 mm, L2 = 210 mm).*
(c) *phase barriers.*

Mounting

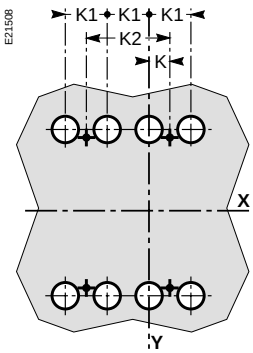
On backplate

2 poles or 3 poles



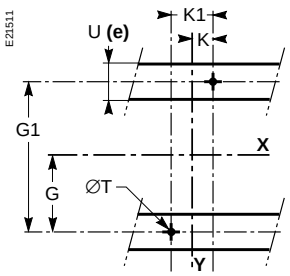
(d) *for rear connection only. For two-pole circuit breakers, the centre hole is not necessary.*

4 poles

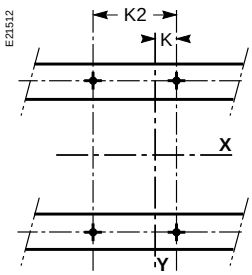


On rails

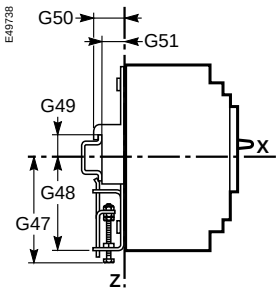
2 poles or 3 poles



4 poles



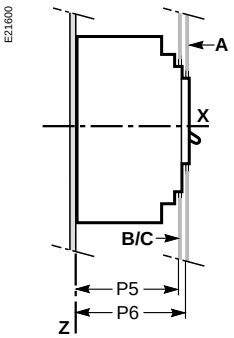
On DIN rail with adaptation plate

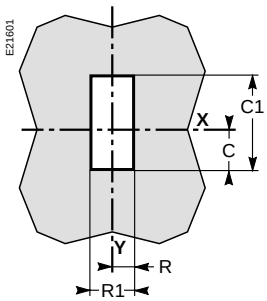


Front-panel cutouts

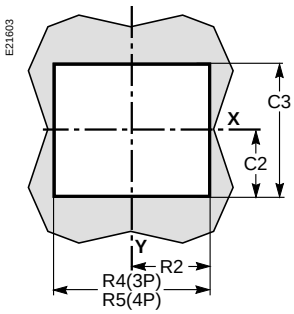
Fixed or plug-in circuit breaker

Cutout A

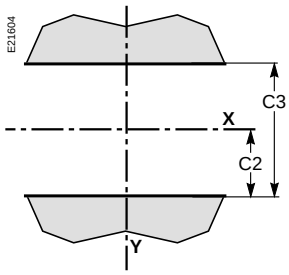




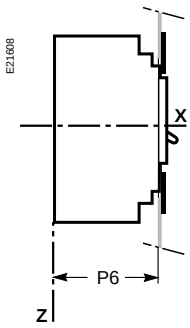
Cutout B

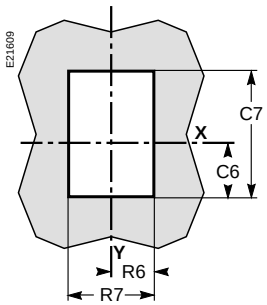


Cutout C

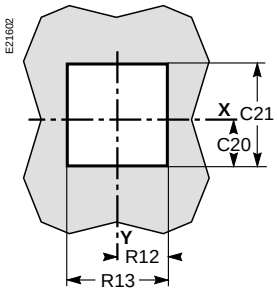


With escutcheon





With toggle cover



Dimensions (mm)

Type	C	C1	C2	C3	C6	C7	C20	C21	G	G1	G4
NS100/160/250N/H/L	29	76	54	108	43	104	34	86	62.5	125	70
NS400/630N/H/L	41.5	116	92.5	184	56.5	146	46.5	126	100	200	113.5

Type	G5	G47	G48	G49	G50	G51	H	H1	H2	H3	H4
NS100/160/250N/H/L	140	95	75	13.5	23	17.5	80.5	161	94	188	160.5
NS400/630N/H/L	227						127.5	255	142.5	285	240

Type	H5	H6	H7	K	K1	K2	L	L1	L2	P1	P2
NS100/160/250N/H/L	321	178.5	357	17.5	35	70	52.5	105	140	81	86
NS400/630N/H/L	480	237	474	22.5	45	90	70	140	185	95.5	110

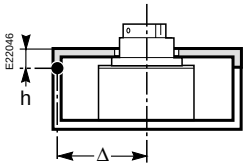
Type	P4	P5	P6	R	R1	R2	R4	R5	R6	R7	R12
NS100/160/250N/H/L	111(1)	83	88	14.5	29	54	108	143	29	58	43
NS400/630N/H/L	168	107	112	31.5	63	71.5	143	188	46.5	93	63

(1) *: P4 = 126 mm for Compact NS250N/H/L.*

Type	R13	ØT	ØT4	U(e)
NS100/160/250N/H/L	86	6	22	≤ 32
NS400/630N/H/L	126	6	32	≤ 32

(e) *U ≤ 20 mm if automatic auxiliary connectors are used (NS100 to 250).*

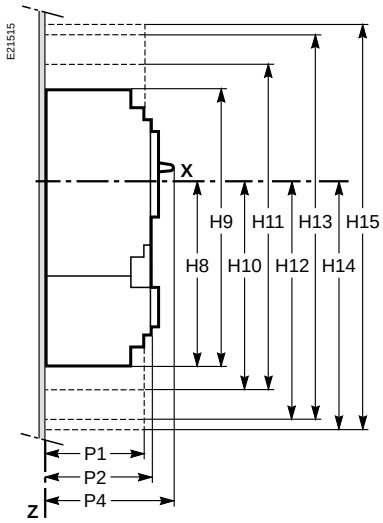
***N**ota :*
lDoor cutout dimensions are given for a device position in the enclosure where Δ ≥ 100 + (h x 5) with respect to the door hinge.

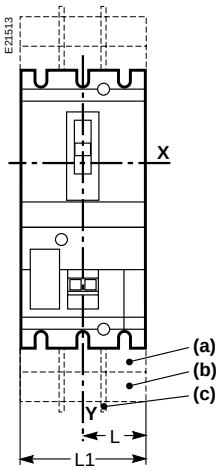


Vigicompact NS100 to 630 (fixed version)

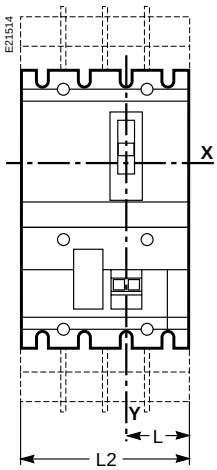
Dimensions

2 poles or 3 poles





4 poles

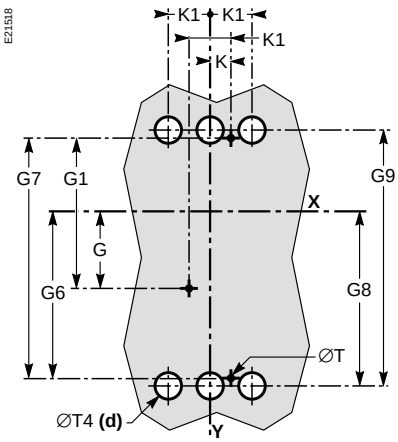


(a) *short terminal shields*
(b) *long terminal shields*
(c) *phase barriers*

Mounting

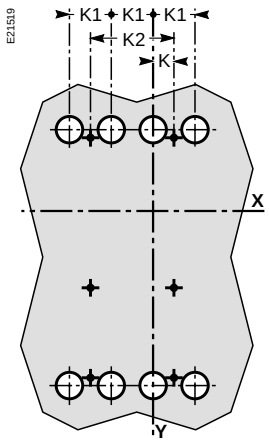
On backplate

2 poles or 3 poles



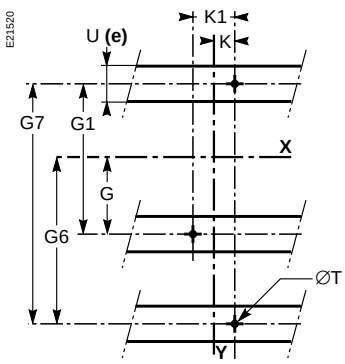
(d) *for rear connection only. For two-pole circuit breakers, the centre hole is not necessary.*

4 poles

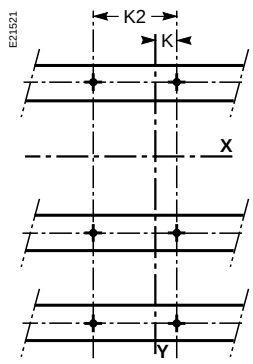


On rails

2 poles or 3 poles

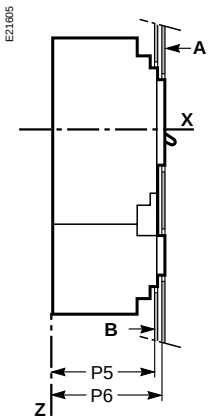


4 poles

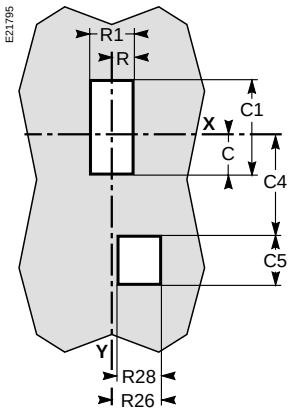


Front-panel cutouts

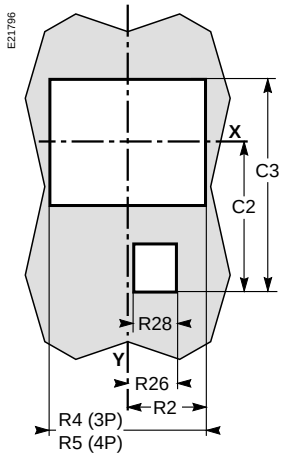
Fixed or plug-in circuit breaker



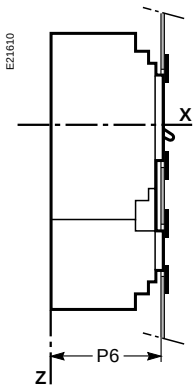
Cutout A

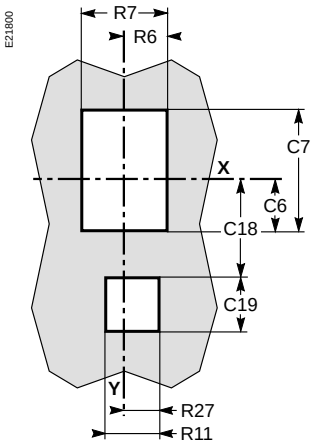


Cutout B



With escutcheons





Dimensions (mm)

Type	C	C1	C2	C3	C4	C5	C6	C7	C18	C19	C20	C21	G	G1	G6	G7	G8	G9
NS100/160/250N/H/L	29	76	130	184	86	37	43	104	71	68	34	86	62.5	125	137.5	200	145	215
NS400/630N/H/L	41.5	116	192	276	147.5	37	56.5	146	132	68	46.5	126	100	200	200	300	213.5	327

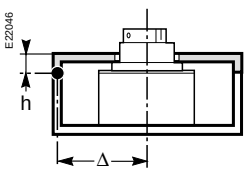
Type	H8	H9	H10	H11	H12	H13	H14	H15	K	K1	K2	L	L1	L2	P1	P2	P4	P5
NS100/160/250N/H/L	155.5	236	169	263	235.5	396	253.5	432	17.5	35	70	52.5	105	140	81	86	111[1]	83
NS400/630N/H/L	227.5	355	242.5	385	340	580	337	574	22.5	45	90	70	140	185	95.5	110	168	107

(1) *P4 = 126 mm for Compact NS250N/H/L.*

Type	P6	R	R1	R2	R4	R5	R6	R7	R11	R12	R13	R26	R27	ØT	ØT4	U[e]
NS100/160/250N/H/L	88	14.5	29	54	108	143	29	58	58	43	86	14.5	29	6	22	≤ 32
NS400/630N/H/L	112	31.5	29	71.5	143	188	46.5	93	58	63	126	32	47	6	32	≤ 32

(e) *U ≤ 20 mm if automatic auxiliary connectors are used (NS100 to 250).*

Note.
Door cutout dimensions are given for a device position in the enclosure where Δ ≥100 + (h x 5) with respect to the door hinge.

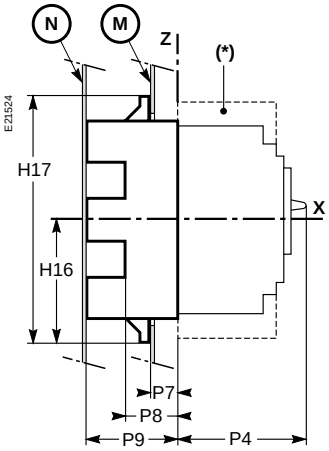


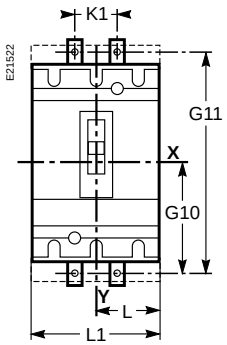
Compact NS100 to 630 (plug-in and withdrawable versions)

Dimensions

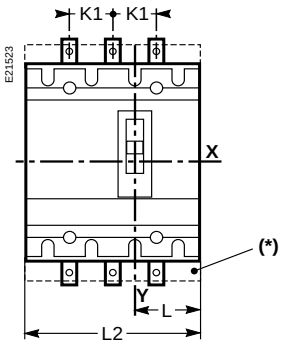
Plug-in base

2 poles or 3 poles



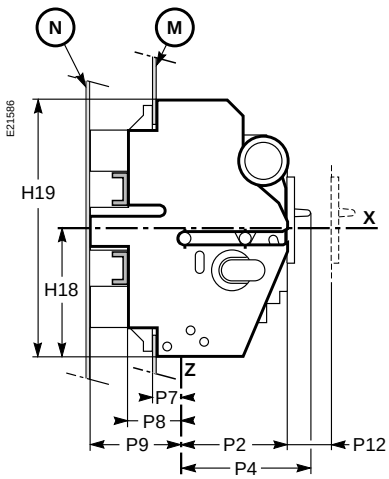


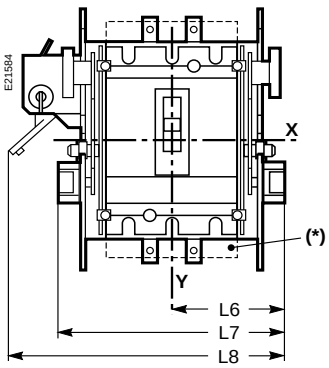
4 poles



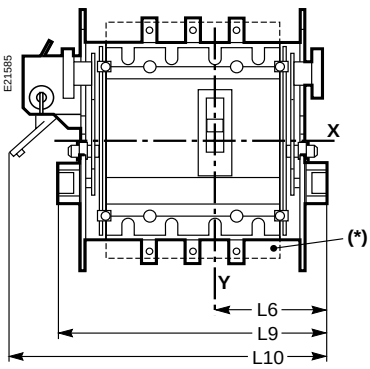
Chassis

2 poles or 3 poles





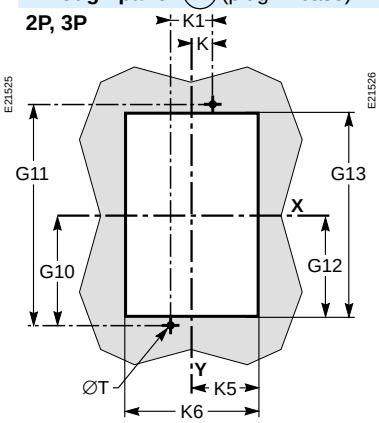
4 poles



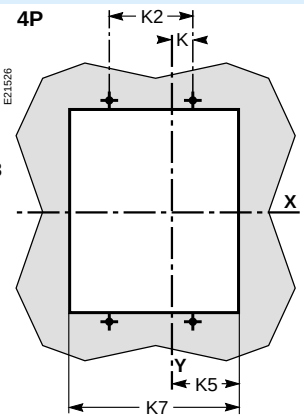
Mounting

Through panel (M) (plug-in base)

2P, 3P

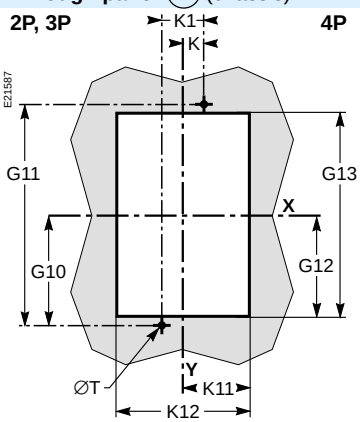


4P

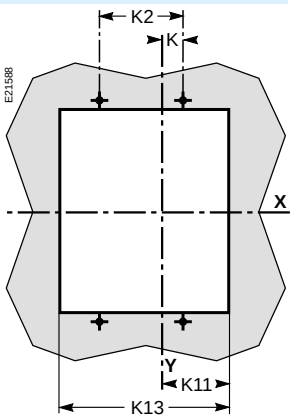


Through panel (M) (chassis)

2P, 3P

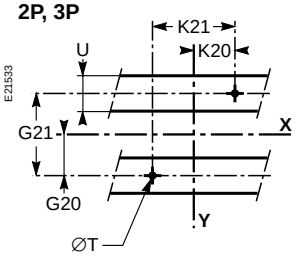


4P

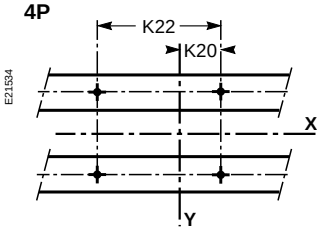


On rails (plug-in base or chassis)

2P, 3P



4P



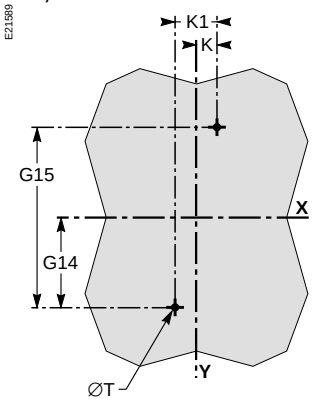
(*) *short terminal shields are mandatory.*

Nota :
Door cutout dimensions are given for a device position in the enclosure where Δ ≥100 + (h x 5) with respect to the door hinge.

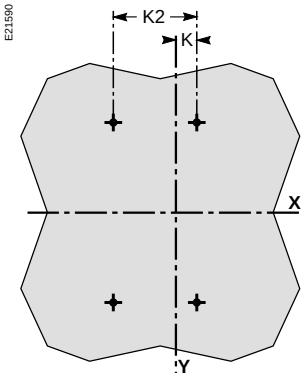
On backplate Ⓝ (plug-in base or chassis)

Front connection (insulating screen is mandatory between the backplate and the base, supplied with the base)

2P, 3P

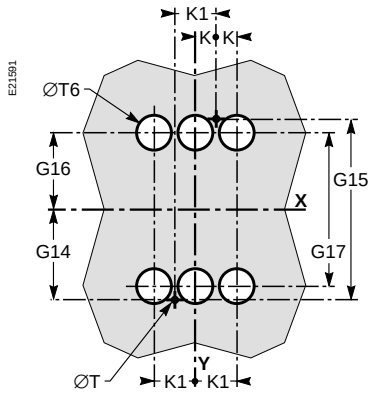


4P

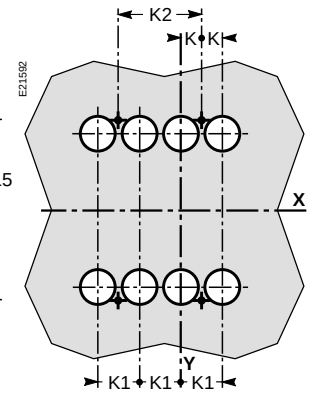


Interior rear connection

2P, 3P

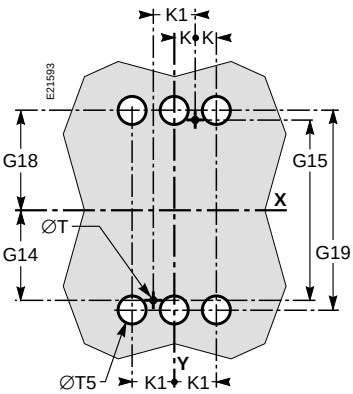


4P

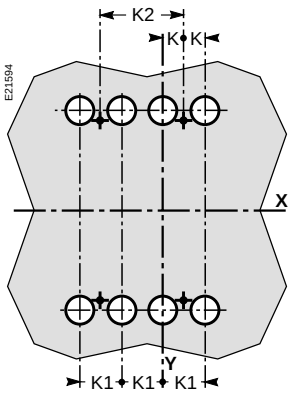


Exterior rear connection

2P, 3P

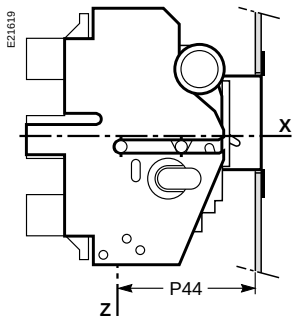


4P

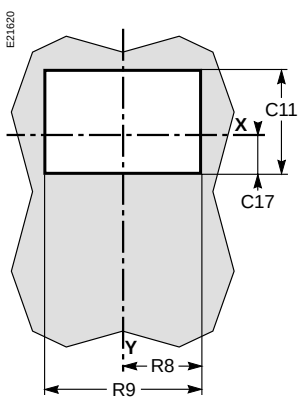


Front-panel cutouts

Plug-in base



Chassis with protection collar and escutcheons



Dimensions (mm)

Type	C11	C17	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	G23	G24
NS100/160/250N/H/L	103	42.5	95	190	87	174	77.5	155	66	132	82	164	37.5	75	111	222	190
NS400/630N/H/L	155	56	150	300	137	274	125	250	101	202	126	252	75	150	170.5	341	283.5
Type	**G25**	**G26**	**G27**	**H16**	**H17**	**H18**	**H19**	**K**	**K1**	**K2**	**K5**	**K6**	**K7**	**K11**	**K12**	**K13**	**K20**
NS100/160/250N/H/L	380	208	416	102.5	205	103.5	210	17.5	35	70	54.5	109	144	74	148	183	35
NS400/630N/H/L	567	318.5	637	157.5	315	140	280	22.5	45	90	71.5	143	188	91.5	183	228	50
Type	**K21**	**K22**	**L**	**L1**	**L2**	**L6**	**L7**	**L8**	**L9**	**L10**	**P2**	**P4**	**P7**	**P8**	**P9**	**P10**	**P12**
NS100/160/250N/H/L	70	105	52.5	105	140	92.5	185	216	220	251	86	111(1)	27	45	75	64	32
NS400/630N/H/L	100	145	70	140	185	110	220	250	265	295	110	168	27	45	100	86	32
Type	**P44**	**R8**	**R9**	**U(2)**	**ØT**	**ØT5**	**ØT6**										
NS100/160/250N/H/L	123	74	148	≤ 32	6	24	30										
NS400/630N/H/L	147	90	180	≤ 32	6	33	33										

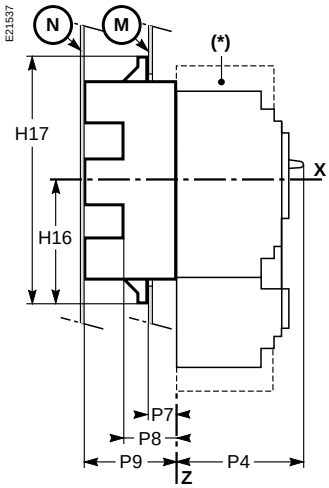
(1) *P4 = 126 mm for Compact NS250N/H/L*

(2) *U ≤ 20 mm if automatic auxiliary connectors are used (NS100 to 250).*

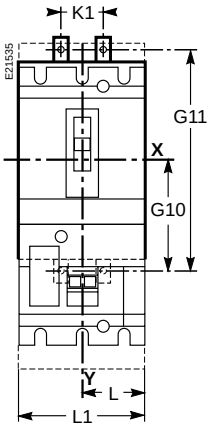
Vigicompact NS100 to 630 (plug-in and withdrawable versions)

Dimensions

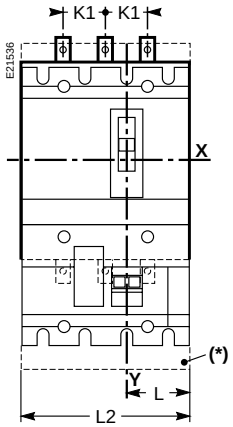
Plug-in base



2 poles or 3 poles



4 poles



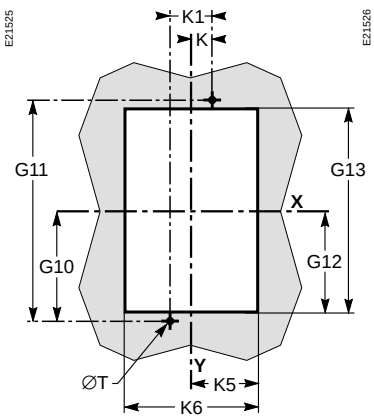
Chassis

See withdrawable Compact, page XXX.

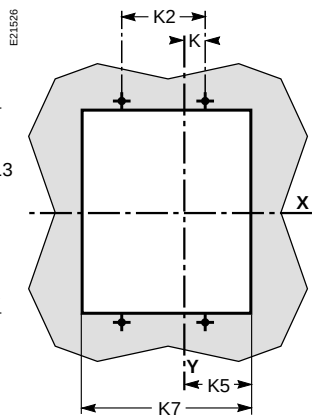
Mounting

Through panel (M) (plug-in base)

2P, 3P

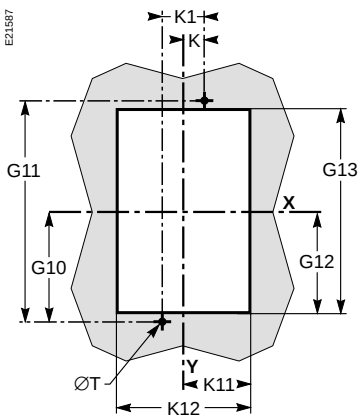


4P

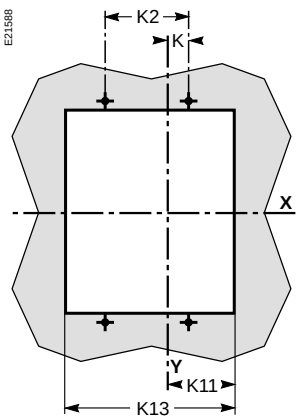


Through panel (M) (chassis)

2P, 3P

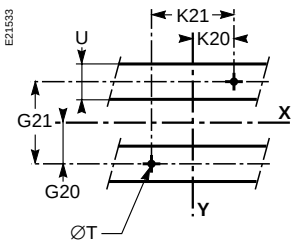


4P

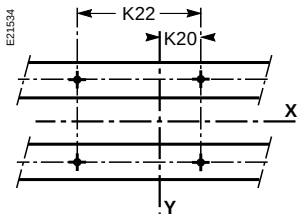


On rails (plug-in base or chassis)

2P, 3P



4P



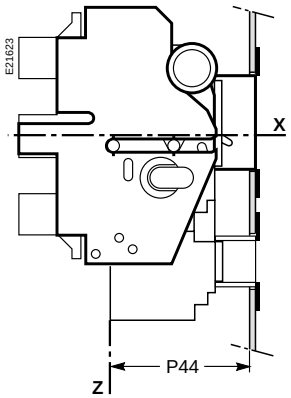
(*) short terminal shields are mandatory

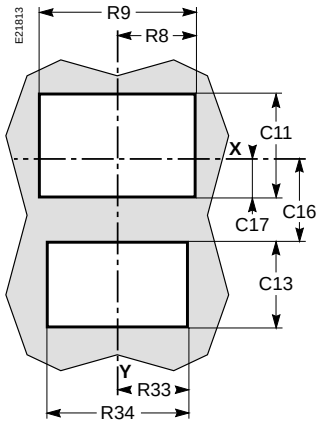
Front-panel cutouts

Plug-in base

See fixed Compact, page XXX.

Chassis with protection collar and escutcheons





Dimensions (mm)

Type	C11	C13	C16	C17	G10	G11	G12	G13	G20	G21	H16
NS100/160/250N/H/L	103	84	55	42.5	95	190	87	174	37.5	75	102.5
NS400/630N/H/L	155	84	116.5	56	150	300	137	274	75	150	157.5

Type	H17	K	K1	K2	K5	K6	K7	K11	K12	K13	K20
NS100/160/250N/H/L	205	17.5	35	70	54.5	109	144	74	148	183	35
NS400/630N/H/L	315	22.5	45	90	71.5	143	188	91.5	183	228	50

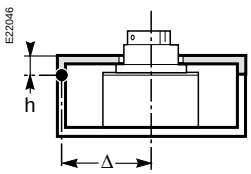
Type	K21	K22	L	L1	L2	P4	P7	P8	P9	P44	R8
NS100/160/250N/H/L	70	105	52.5	105	140	111(1)	27	45	75	123	74
NS400/630N/H/L	100	145	70	140	185	168	27	45	100	147	90

(1) *P4 = 126 mm for Compact NS250N/H/L.*

Type	R9	R33	R34	ØT	U(2)
NS100/160/250N/H/L	148	74	148	6	≤ 32
NS400/630N/H/L	180	91.5	148	6	≤ 32

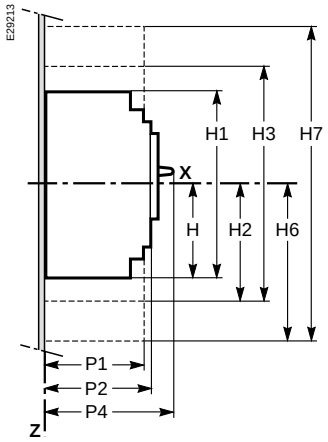
(2) *U ≤ 20 mm if automatic auxiliary connectors are used (NS100 to 250).*

Note.
Door cutout dimensions are given for a device position in the enclosure where Δ ≥100 + (h x 5) with respect to the door hinge.

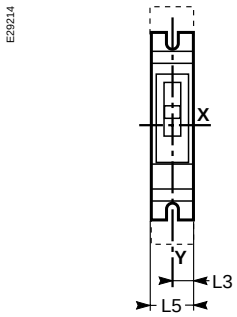


Compact NS100 to 250 (single-pole and two-pole versions)

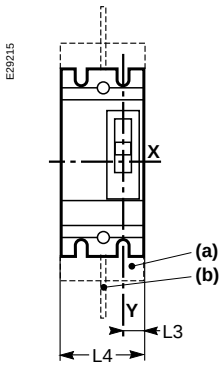
Dimensions



1 pole



2 poles

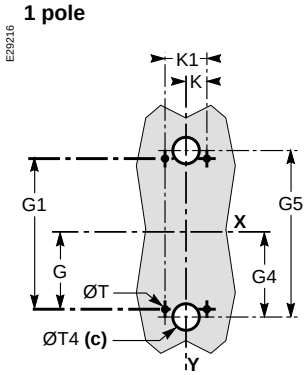


(a) *short terminal shields*
(b) *phase barriers*

Mounting

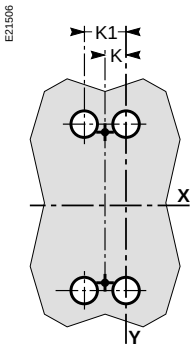
On backplate

1 pole



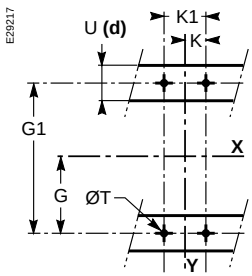
(c) *for rear connection only*

2 poles

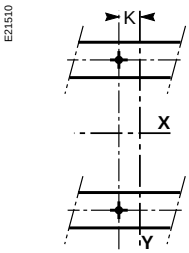


On rails

1 pole

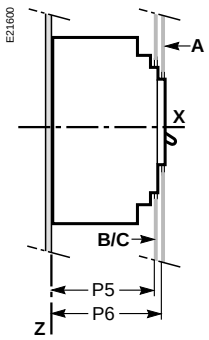


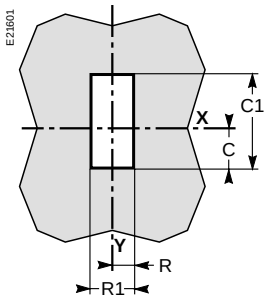
2 poles

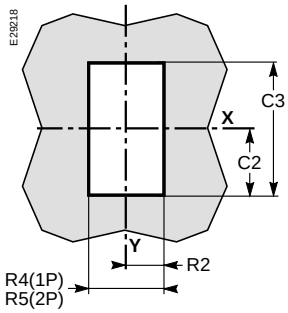


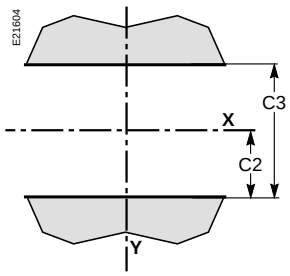
(d) *U ≤ 20 mm if automatic auxiliary connectors are used*

Front-panel cutout

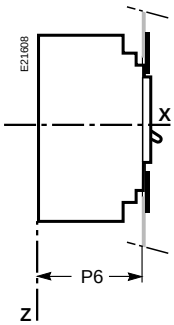


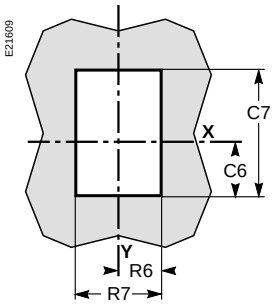






With escutcheon





Dimensions (mm)

Type	C	C1	C2	C3	C6	C7	G	G1	G4	G5	H
NS100/160/250	29	76	54	108	43	104	62.5	125	70	140	80.5

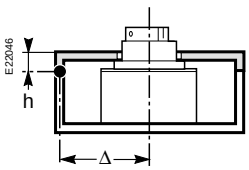
Type	H1	H2	H3	H4	H6	H7	K	K1	L3	L4	L5
NS100/160/250	161	94	188	160.5	178.5	357	17.5	35	17.5	70	35

Type	P1	P2	P4	P5	P6	R	R1	R2	R4	R5	R6
NS100/160/250	81	86	111	83	88	14.5	29	19	38	73	29

Type	R7	ØT	ØT4	U[(d)]
NS100/160/250	58	6	22	≤ 32

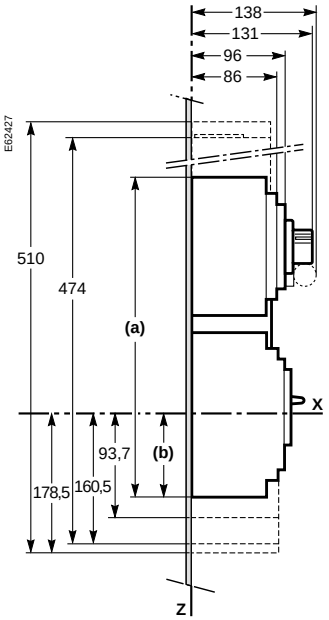
(d) *U ≤ 20 mm if automatic auxiliary connectors are used*

Note.
Door cutout dimensions are given for a device position in the enclosure where Δ ≥100 + (h x 5) with respect to the door hinge.



Visu function for Compact NS100 to 630 (combination with Interpact INV)

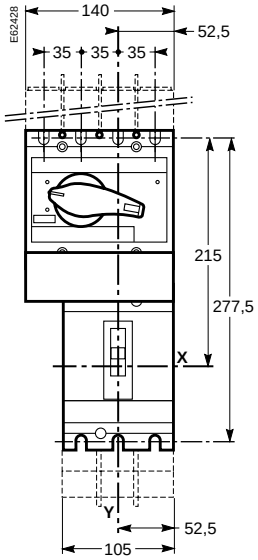
Fixed Compact NS100 to 250 with Visu function Interpact INV100 to 250



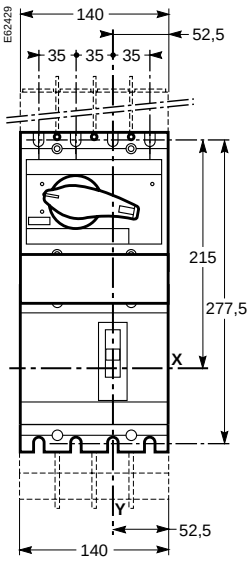
(a)
314 for front connection.
316.5 for rear connection.
322.5 with connectors.

(b)
80.5 for front connection.
83 for rear connection.
89 with connectors.

3 poles

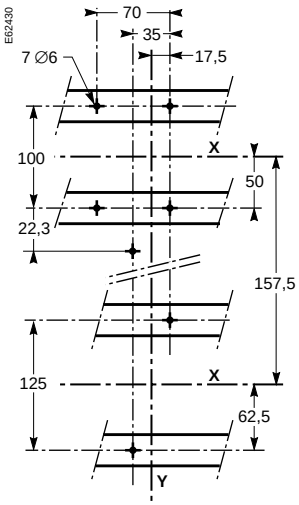


4 poles

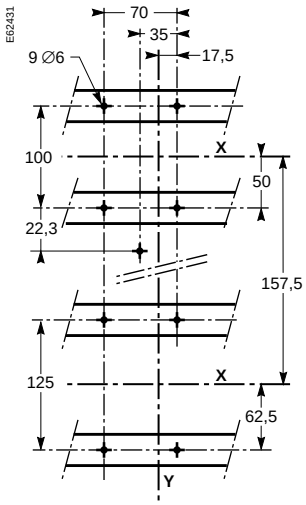


Mounting on rails

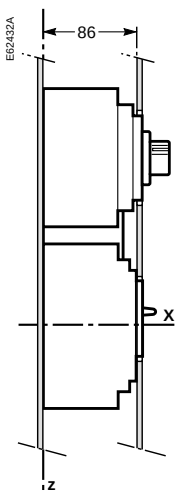
3 poles

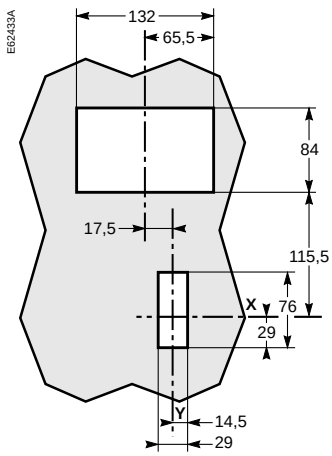


4 poles

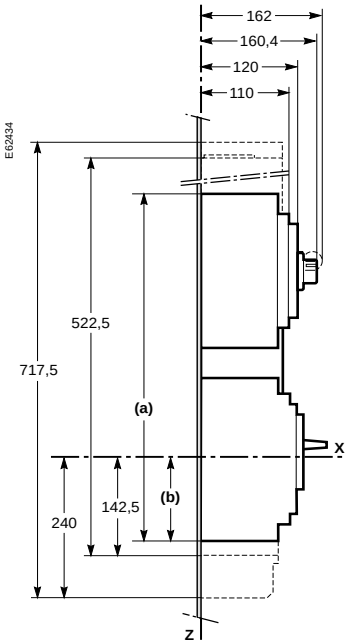


Front-panel cutout





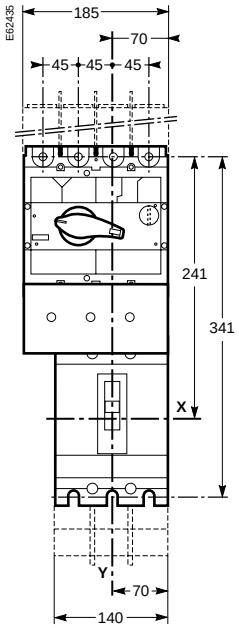
Fixed Compact NS400 to 630 with Visu function



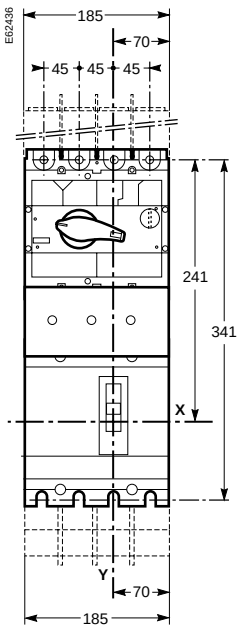
(a)
492.5 for front connection
493.5 for rear connection
512.5 with right-angle terminal extensions
536.5 with edgewise terminal extensions
532.5 with spreaders
525 with 2-cable connectors.

(b)
127.5 for front connection
128.5 for rear connection
147.5 with right-angle terminal extensions
171.5 with edgewise terminal extensions
167.5 with spreaders
160 with 2-cable connectors.

3 poles

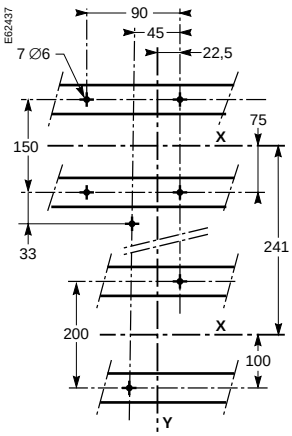


4 poles

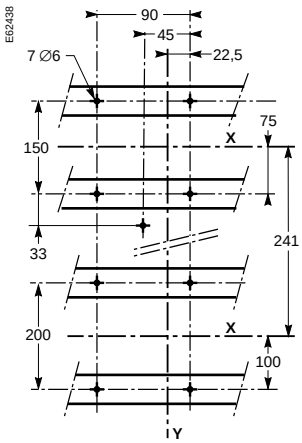


Mounting on rails

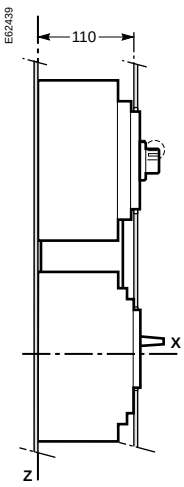
3 poles

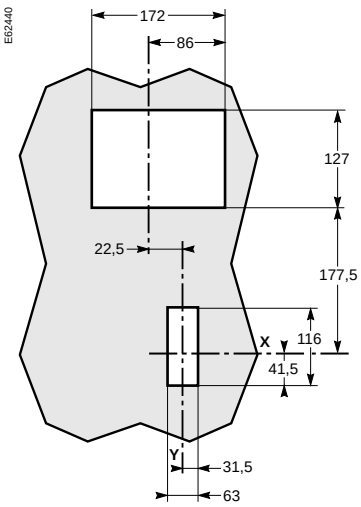


4 poles



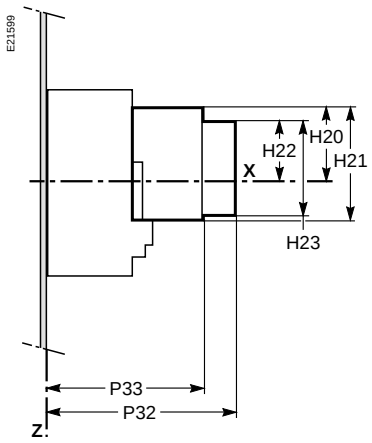
Front-panel cutout



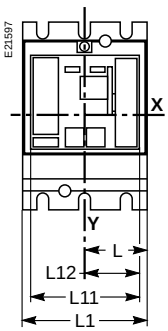


Motor-mechanism module for Compact NS100 to 630

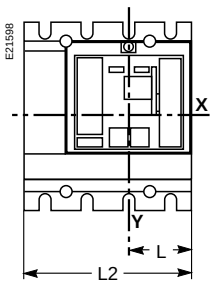
Dimensions



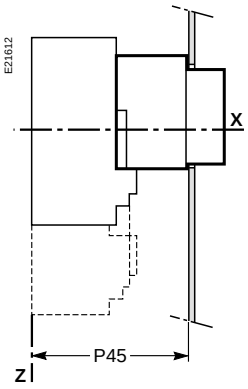
3 poles

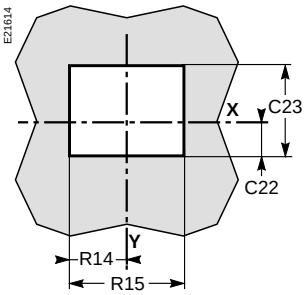


4 poles

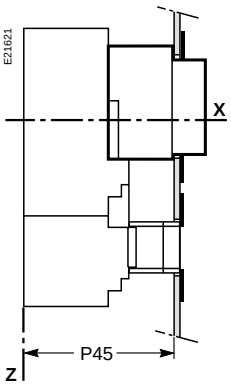


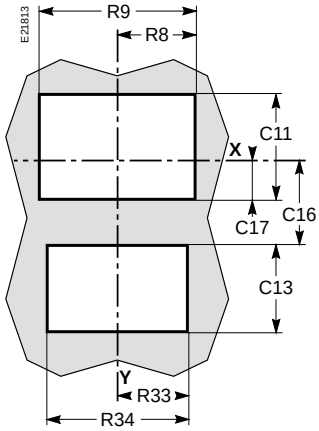
Front-panel cutouts

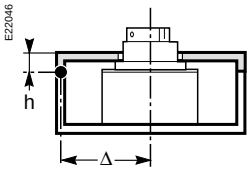




With IP 40, IK 07 escutcheons and protection collar for Vigi module







Note.
Door cutout dimensions are given for a device position in the enclosure where Δ ≥ 100 + (h x 5) with respect to the door hinge.

Dimensions (mm)

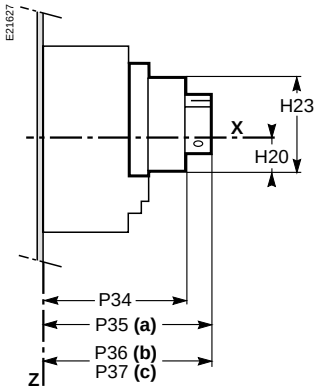
Type	C11	C13	C16	C17	C22	C23	H20	H21	H22	H23	L	L1
NS100/160/250N/H/L	103	84	56	42.5	29	76	62.5	97	45.5	73	52.5	105
NS400/630N/H/L	155	84	116.5	56	41.5	126	100	152	83	123	70	140

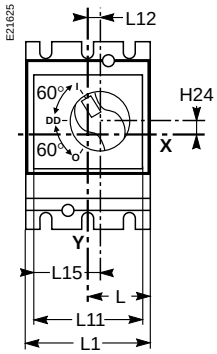
Type	L2	L11	L12	P32	P33	P45	R8	R9	R14	R15	R33	R34
NS100/160/250N/H/L	140	91	45.5	178	143	145	74	148	48.5	97	74	148
NS400/630N/H/L	185	123	61.5	250	215	217	90	180	64.5	129	91.5	148

Rotary handle for Compact NS100 to 630

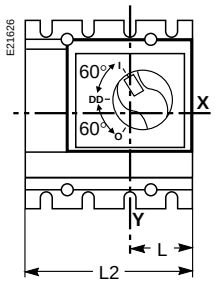
direct rotary handle

3 poles





4 poles

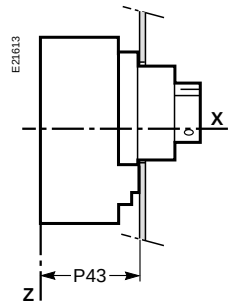


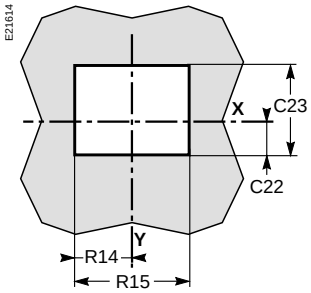
(a) *without keylock*
(b) *with Ronis keylock*
(c) *with Profalux keylock*

Front-panel cutouts

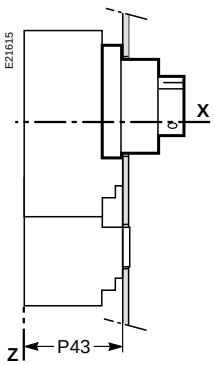
Fixed or plug-in circuit breaker

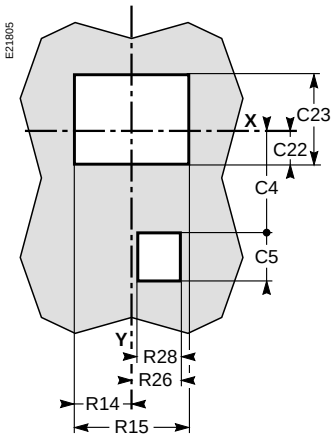
Compact





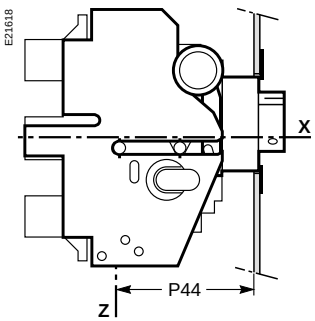
Vigicompact

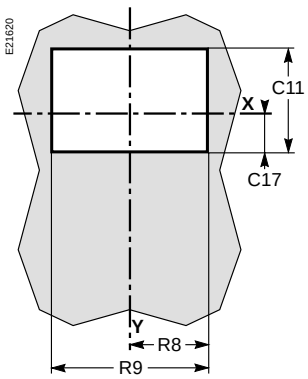




Withdrawable circuit breaker

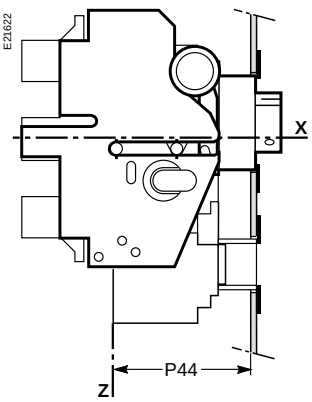
Compact

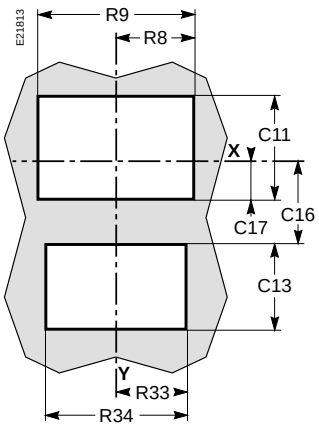




An escutcheon is mandatory

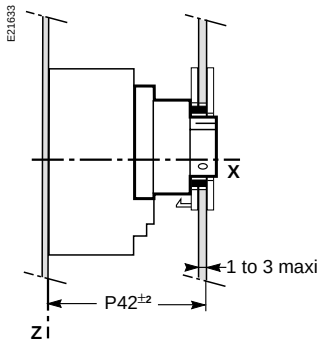
Vigicompact

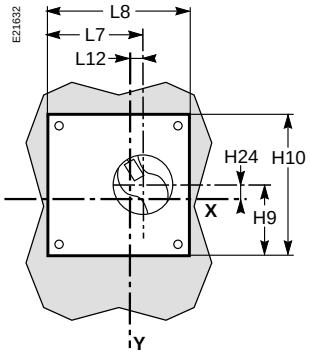




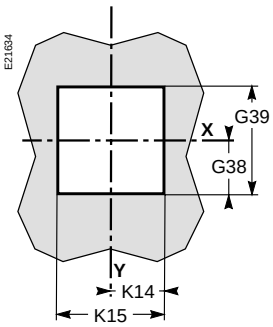
Protection collar for Vigi module is mandatory.
Escutcheons are mandatory for rotary handles and Vigi protection collars.

MCC direct rotary handle





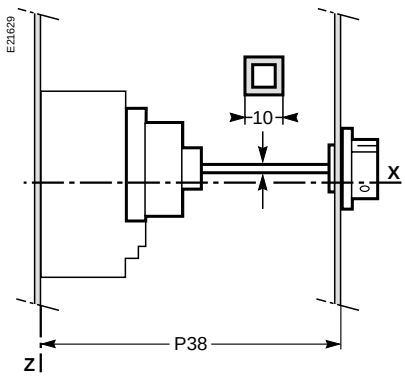
Front-panel cutout

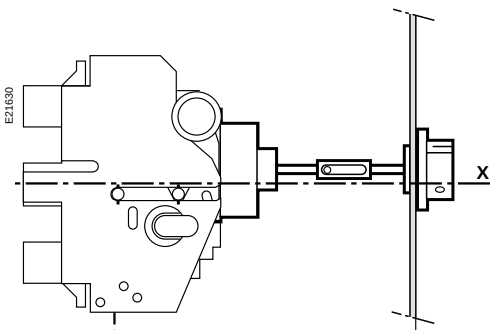


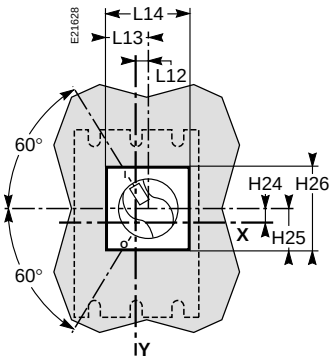
Extended rotary handle

Fixed or plug-in circuit breaker
Cut shaft at length:
P38-126 mm (NS100 to 250)
P38-150 mm (NS400 to 630)

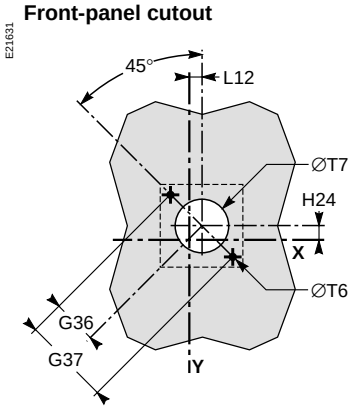
Withdrawable circuit breaker
Cut shaft at length:
P40-122 mm (NS100 to 250)
P40-150 mm (NS400 to 630)







Front-panel cutout



Dimensions (mm)

Type	C4	C5	C11	C13	C16	C17	C22	C23	G36	G37	G38	G39	H9	H10	H20	H23	H24
NS100/160/250N/H/L	86	37	103	84	55	42,5	29	76	36	72	41	100	60	120	28	73	9
NS400/630N/H/L	147,5	37	155	84	116,5	56	41,5	126	36	72	51	145	83	160	40	123	24,5

Type	H25	H26	K14	K15	L	L1	L2	L7	L8	L11	L12	L13	L14	L15	P34	P35	P36
NS100/160/250N/H/L	37,5	75	50	100	52,5	105	140	69	120	91	9,25	37,5	75	55	121	155	156
NS400/630N/H/L	37,5	75	72,5	145	70	140	185	85	160	123	5	37,5	75	66,5	145	179	180

Type	P37	P38(1)	P40(1)	P42	P43	P44	R1	R8	R9	R14	R15	R26	R33	R34	ØT6	ØT7
NS100/160/250N/H/L	164	≥ 185	≥ 248	125	89	123	29	74	148	48,5	97	14,5	74	148	4,2	50
NS400/630N/H/L	188	≥ 209	≥ 272	149	112	147	29	90	180	64,5	129	32	91,5	148	4,2	50

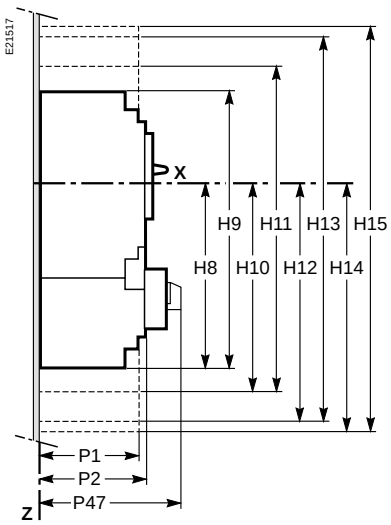
(1) *≤ 600 mm.*

Nota :
Door cutout dimensions are given for a device position in the enclosure where Δ ≥ 100 + (h x 5) with respect to the door hinge.

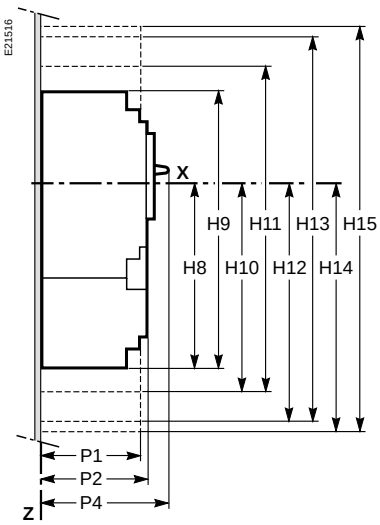
Indication and measurement modules for Compact NS100 to 630

Dimensions

Circuit breaker with ammeter module



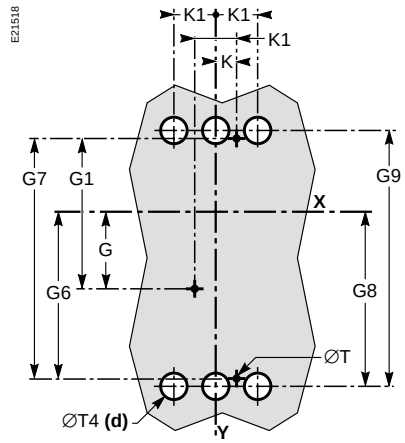
Circuit breaker with current-transformer module



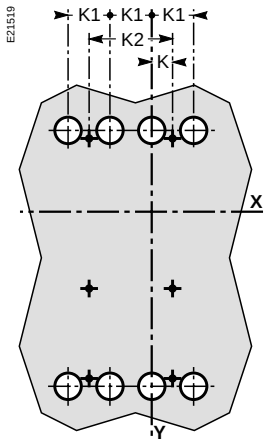
Mounting

On backplate

2 poles or 3 poles



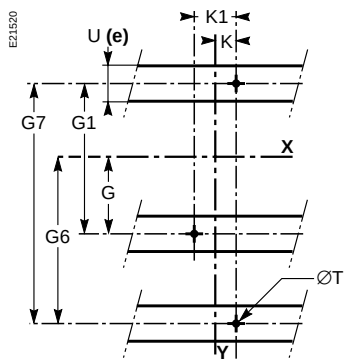
4 poles



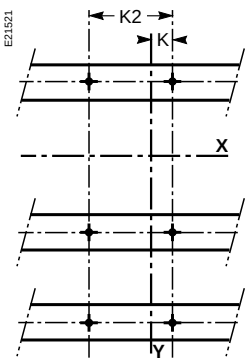
(d) *for rear connection only. For two-pole circuit breakers, the centre hole is not necessary.*

On rails

2 poles or 3 poles

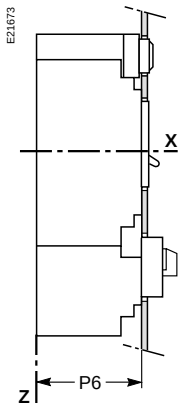


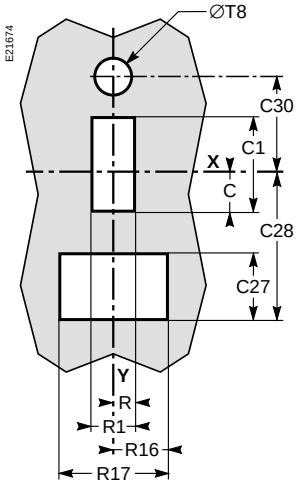
4 poles

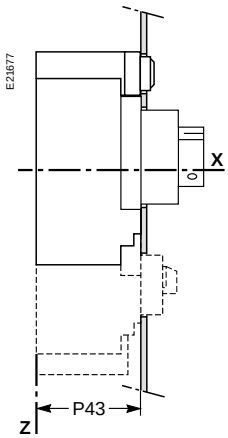


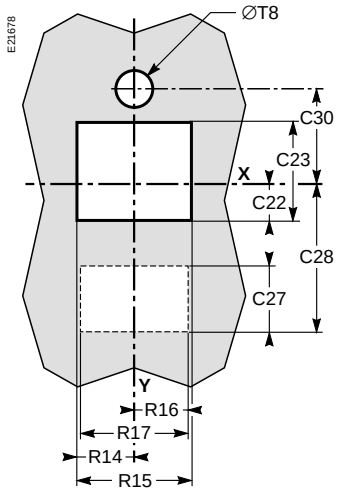
Front-panel cutout

Circuit breaker with ammeter module and voltage-presence indicator









Dimensions (mm)

Type	C	C1	C22	C23	C27	C28	C29	C30	G	G1	G6	G7	G8	G9	H8	H9	H10
NS100/160/250N/H/L	28	76	28	76	56.5	124	30	78.5	62.5	125	137.5	200	145	215	155.5	236	169
NS400/630N/H/L	41.5	116	41.5	126	56.5	185.5	30	122	100	200	200	300	213.5	327	227.5	355	242.5

Type	H11	H12	H13	H14	H15	K	K1	K2	P1	P2	P4	P6	P43	P47	P48	R	R1
NS100/160/250N/H/L	263	235.5	396	253.5	432	17.5	35	70	81	86	111(1)	88	89	137	128	14.5	29
NS400/630N/H/L	385	340	580	337	574	22.5	45	90	95.5	110	168	112	112	162	154	31.5	63

Type	R14	R15	R16	R17	ØT	ØT4	U(2)
NS100/160/250N/H/L	48.5	97	46.5	93	6	22	≤ 32
NS400/630N/H/L	64.5	129	64.5	93	6	32	≤ 32

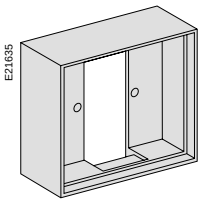
(1) *P4 = 126 mm for Compact NS 250N/H/L*

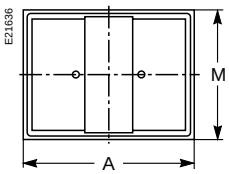
(2) *U ≤ 20 mm if automatic auxiliary connectors are used (NS100 to 250).*

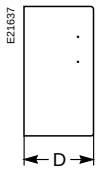
Front accessories for Compact NS100 to 630

Protection collar

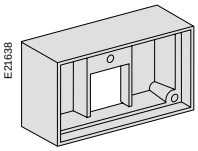
Toggle protection collar

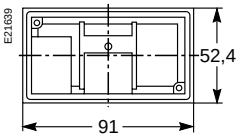




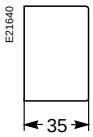


Vigi-module protection collar

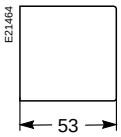




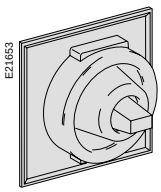
Circuit breaker with toggle or rotary handle

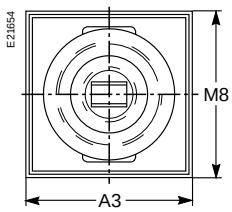


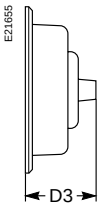
Circuit breaker with motor-mechanism module



Toggle cover

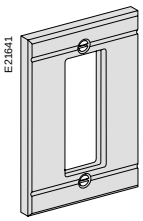


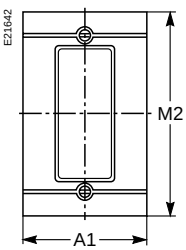


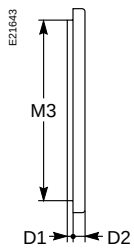


Front-panel escutcheons

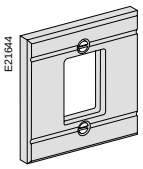
For toggle

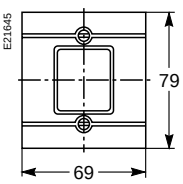


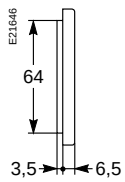




For Vigi module

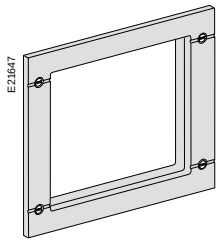


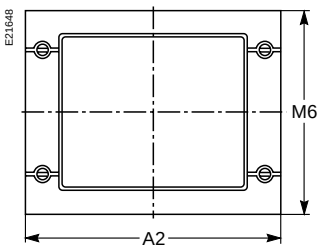


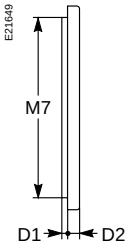


Front-panel escutcheons

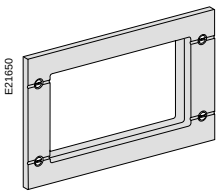
For protection collar, motor mechanism or rotary handle

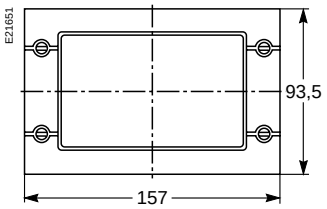


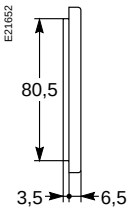




For Vigi module with protection collar or measurement module







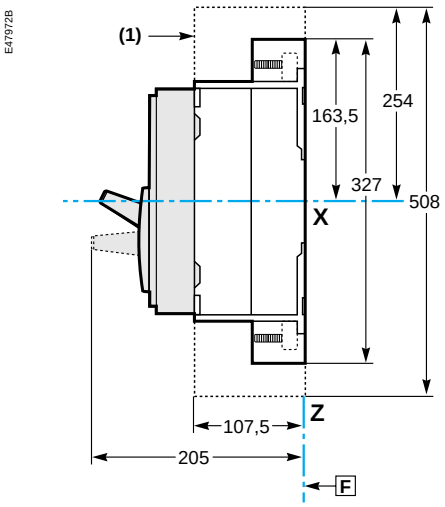
Dimensions (mm)

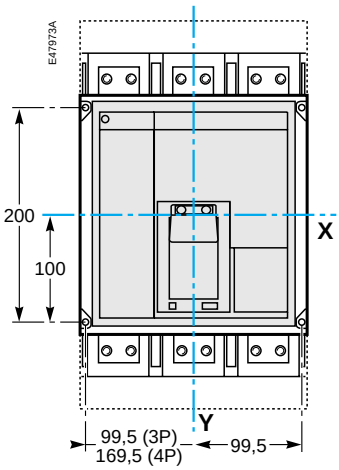
Type	A	A1	A2	A3	D	D1	D2	D3	M	M2	M3	M6	M7	M8
NS100/160/250N/H/L	91	69	157	94	35	3.5	6.5	40	73	115	102	114	101	94
NS400/630N/H/L	123	102	189	35	134	3.5	6.5	60	123	155	142	164	151	134

Compact NS630b to 1600 (fixed version)
Dimensions

Manual control

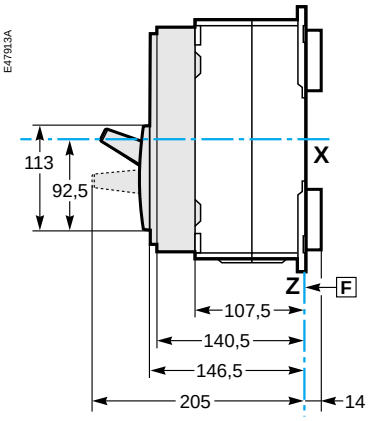
Front connection

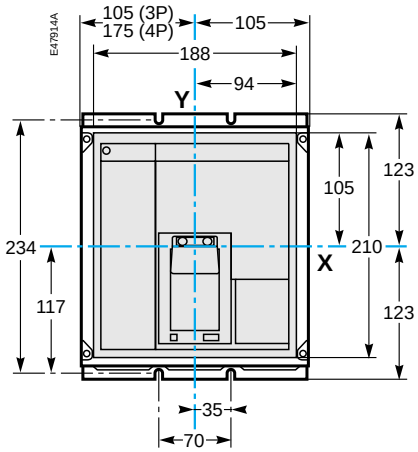




(1) *terminal shields are optional*

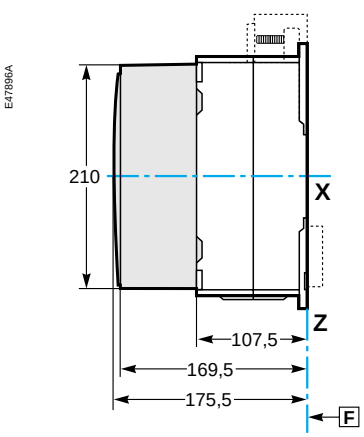
Rear connection

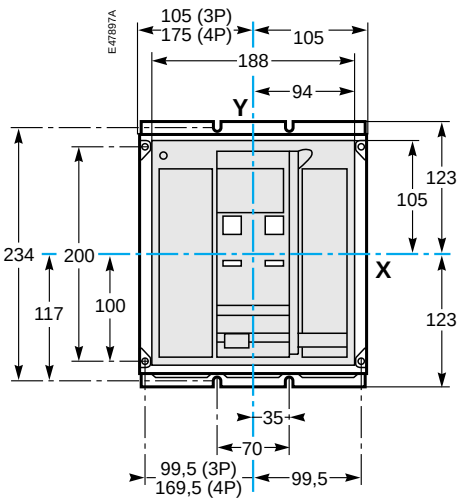




Electrical control

Front and rear connection



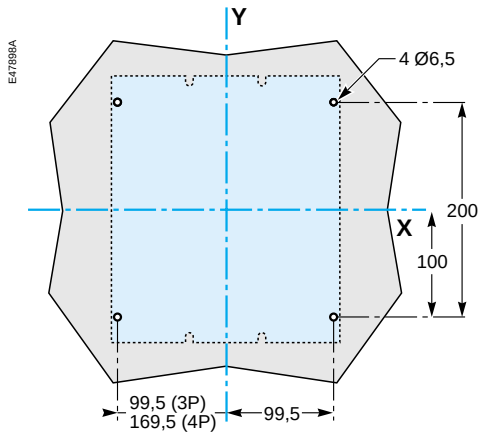


F : *Datum*

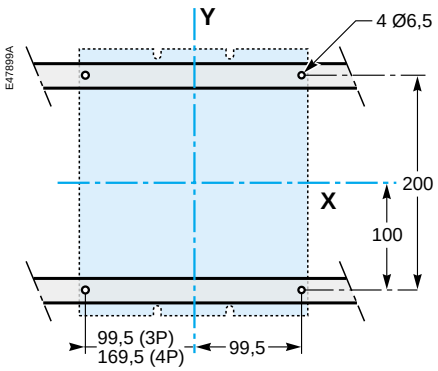
Note.
Dimensions for front and rear connection on electrically operated devices are identical to those for manually operated devices.

Front connection

On rails



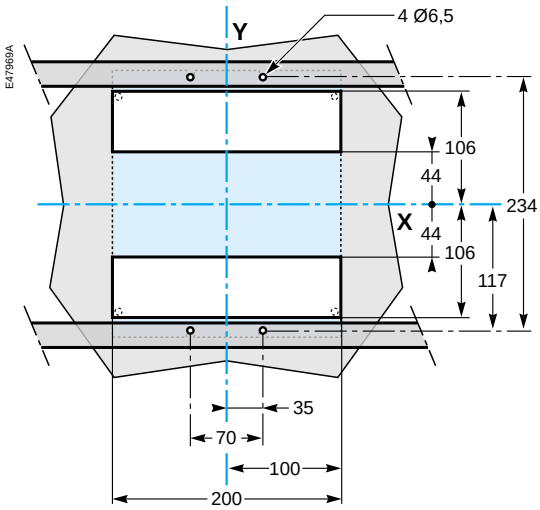
On backplate



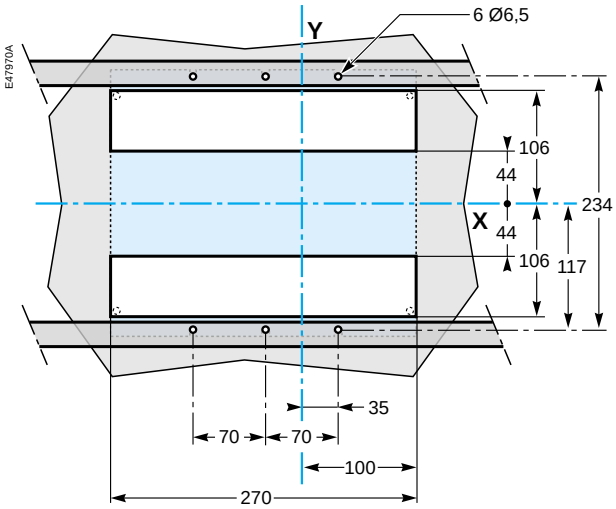
Rear connection

On backplate or rails

3P



4P

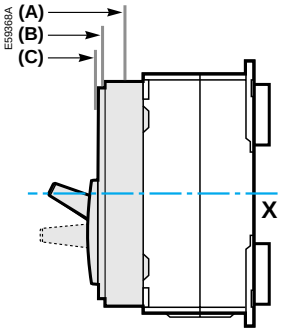


Note.
Mounting parameters for electrically operated devices are identical to those for manually operated devices.

***X** and **Y** are the symmetry planes for a 3-pole device*
***Z** is the back plane of the device.*

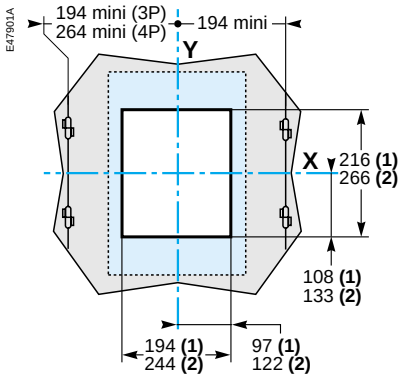
Compact NS630b to 1600 (fixed version) (cont.)
Front-panel cutouts

Toggle control

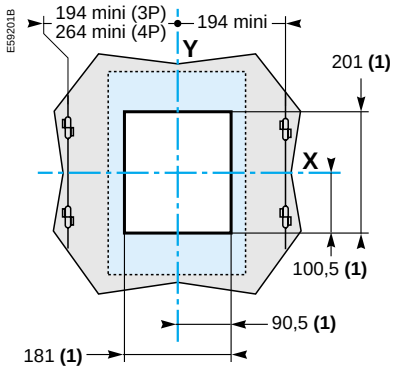


Door cutout

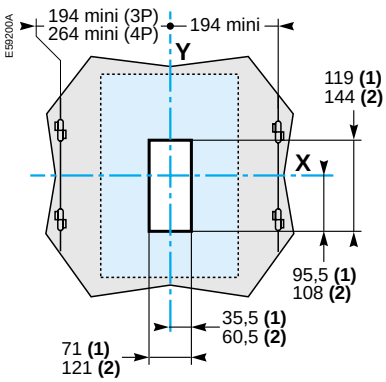
A



B

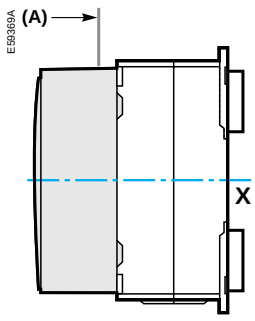


C



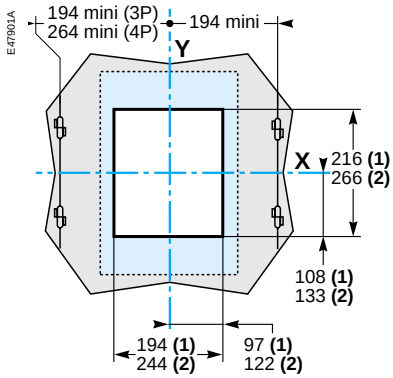
(1) *Without escutcheon*
(2) *With escutcheon*

Electrical control



Door cutout

A

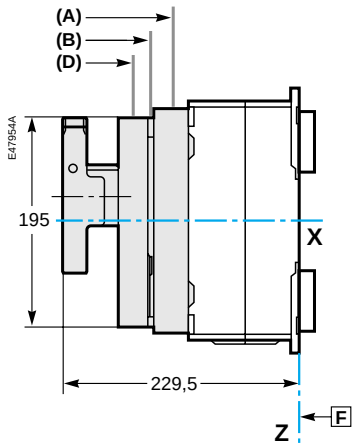


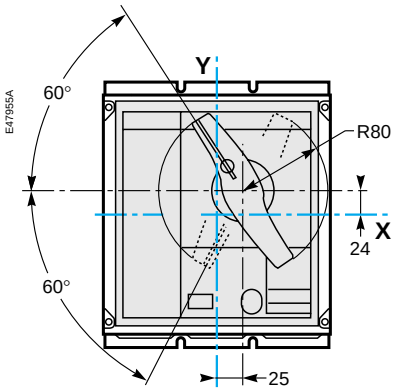
(1) *Without escutcheon*
(2) *With escutcheon*

Rotary handle

Direct rotary handle

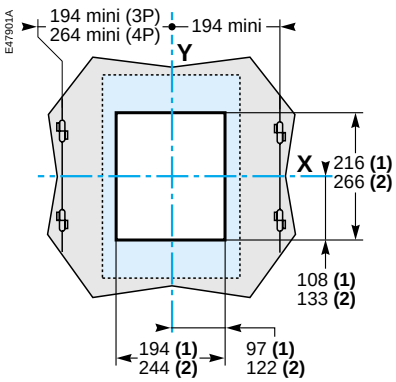
Dimensions



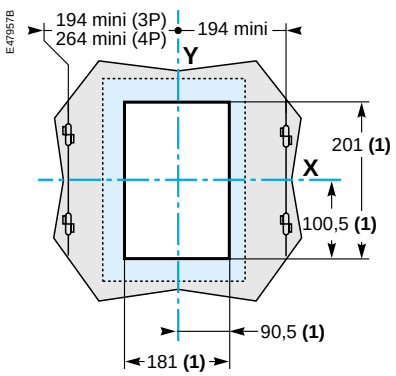


Door cutout

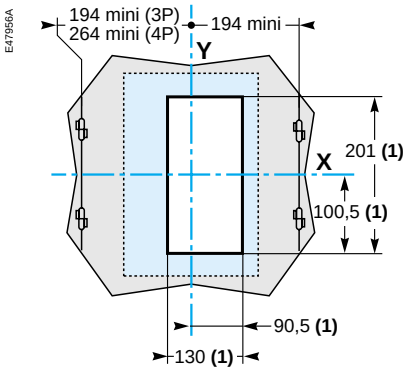
A



B



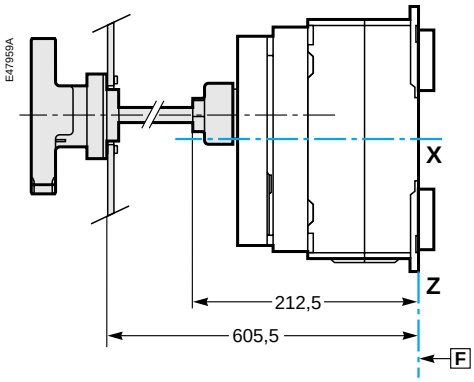
D

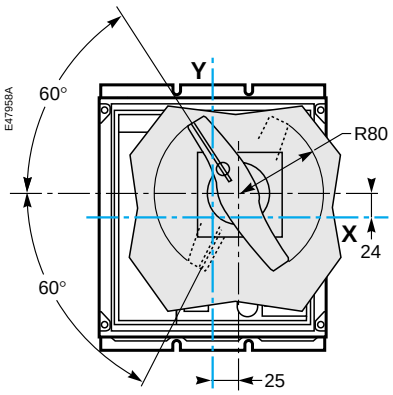


(1) *Without escutcheon*
(2) *With escutcheon*

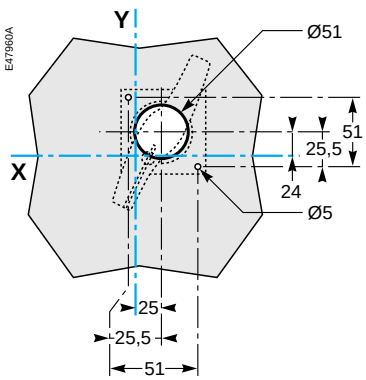
Extended rotary handle

Dimensions





Door cutout



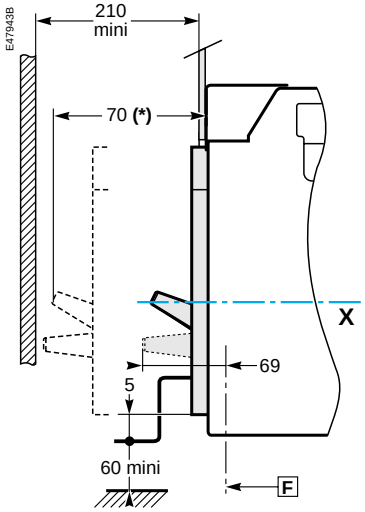
Note.
X *and* ***Y*** *are the symmetry planes for a 3-pole device*
Z *is the back plane of the device.*

F : *Datum*

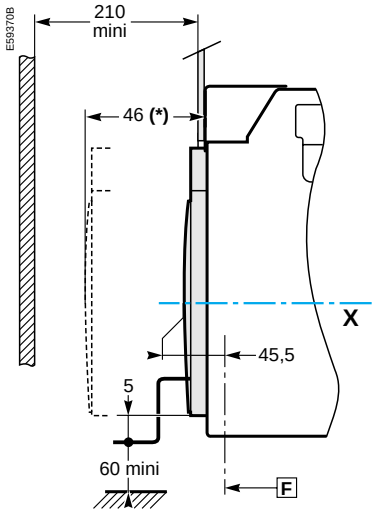
Compact NS630b to 1600 (withdrawable version)
Dimensions, mounting and cutouts

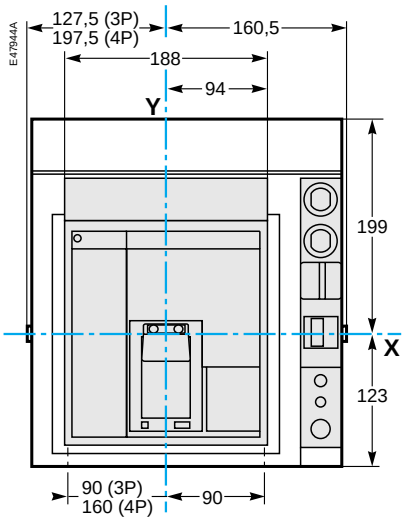
Dimensions

Manual control



Electrical control

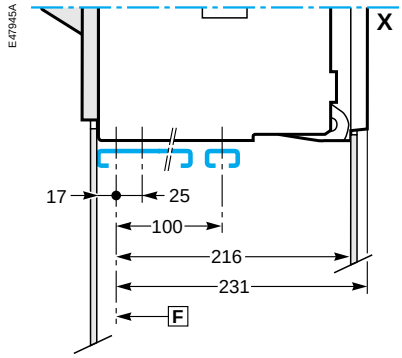


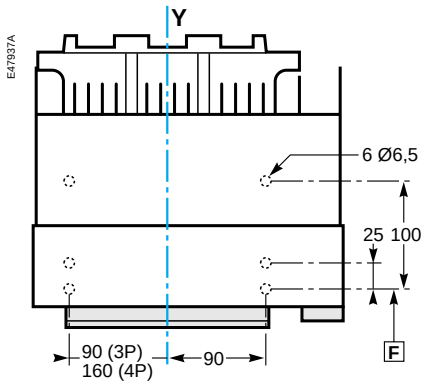


***(*)** Widrawable position*

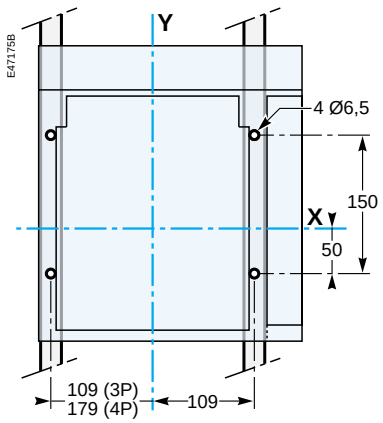
Mounting

Bottom mounting on base plate or rails



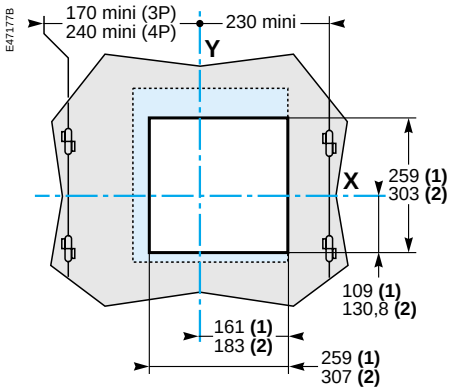


Vertical on uprights or backplate

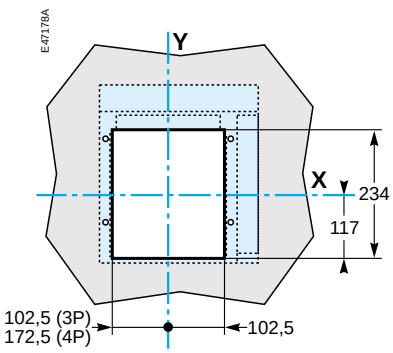


Cutouts

Door cutout



Rear panel cutout



***(1)** Without escutcheon*
***(2)** With escutcheon*

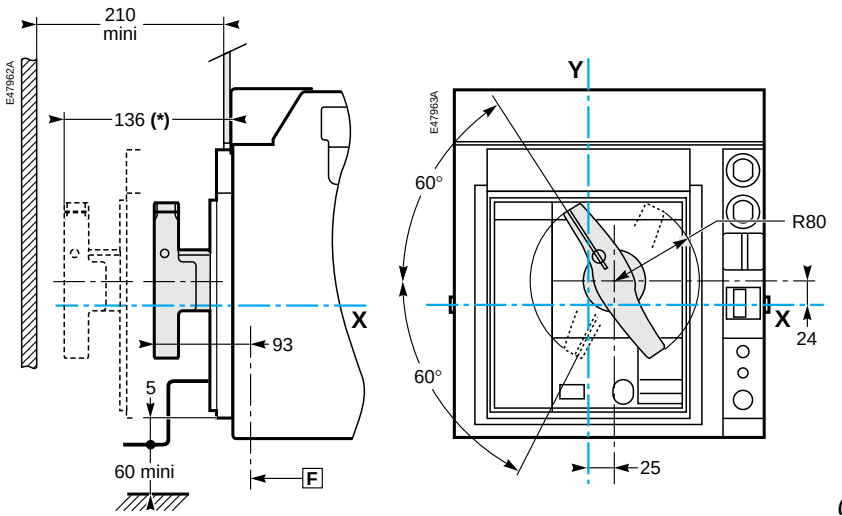
F *: Datum*

Note.
***X** and **Y** are the symmetry planes for a 3-pole device.*

Rotary handle

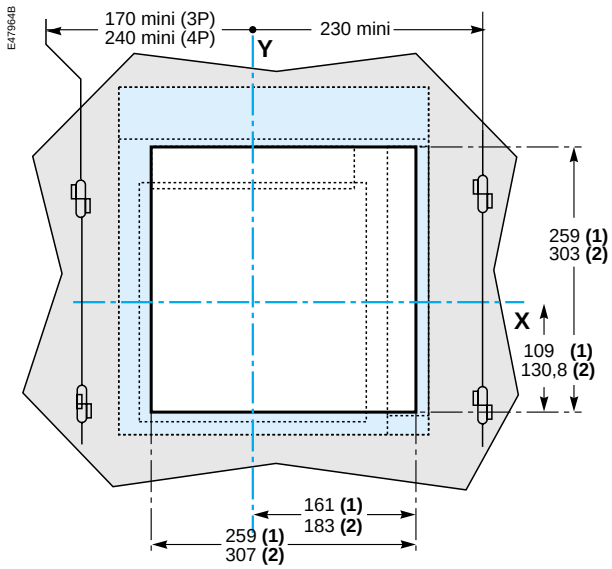
Direct rotary handle

Dimensions



(*) Widrawable position

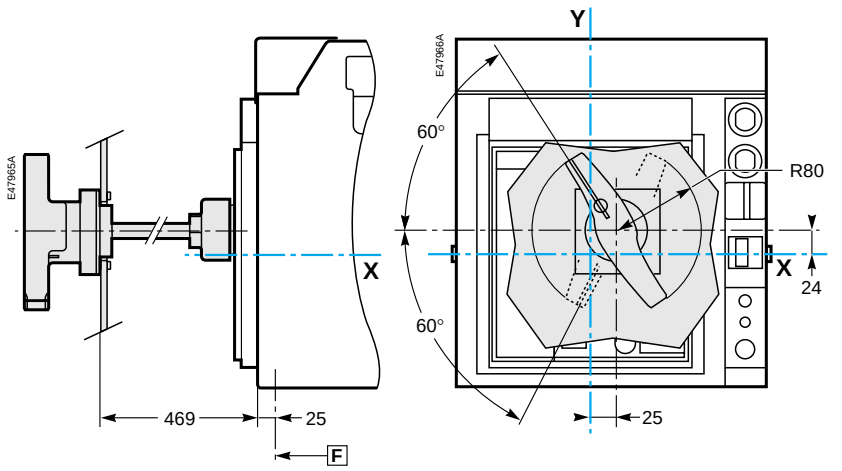
Door cutout



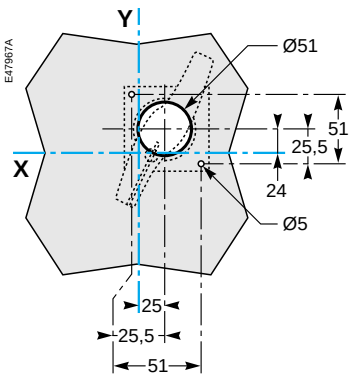
***(1)** Without escutcheon*
***(2)** With escutcheon*

Extended rotary handle

Dimensions



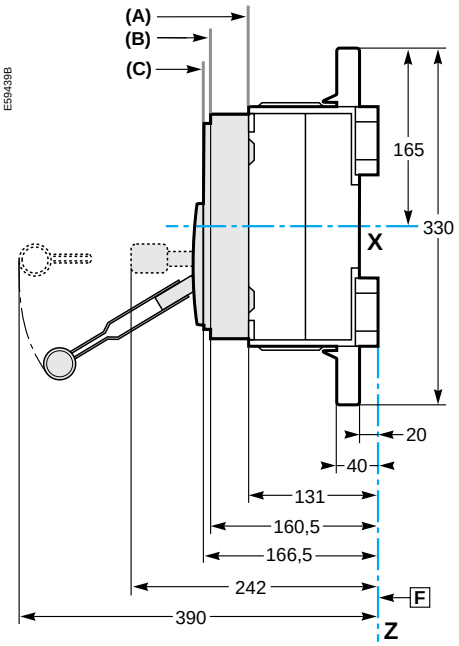
Door cutout

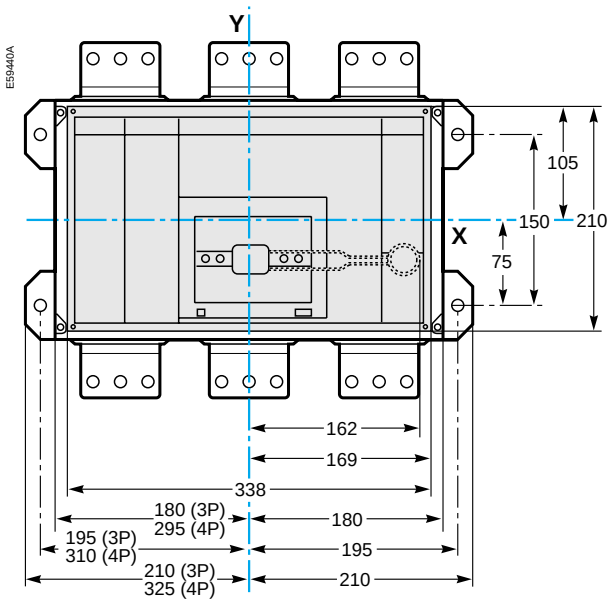


Note.
***X** and **Y** are the symmetry planes for a 3-pole device*

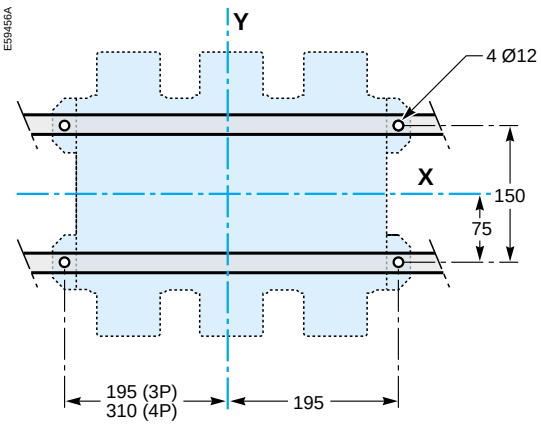
Compact NS1600b to 3200 (fixed version)
Dimensions

Dimensions





Mounting on rails

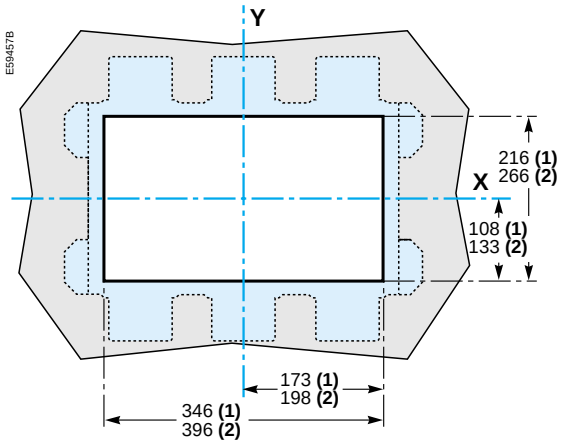


F : Datum

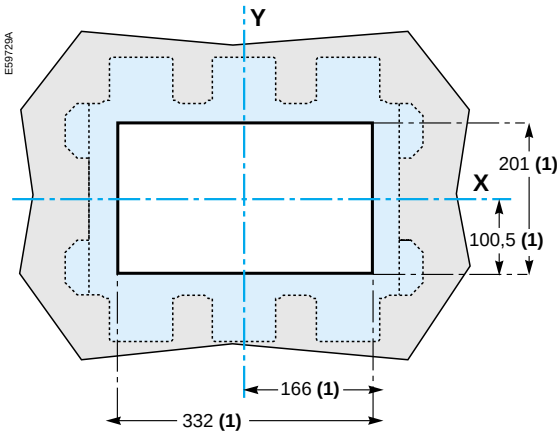
Note.
***X** and **Y** are the symmetry planes for a 3-pole device*

Door cutout

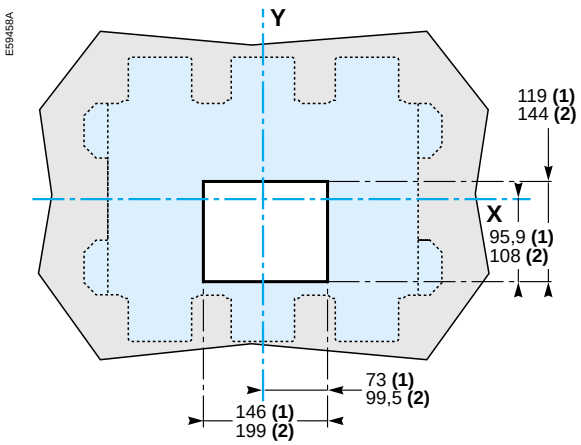
A



B



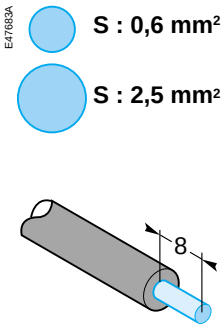
C

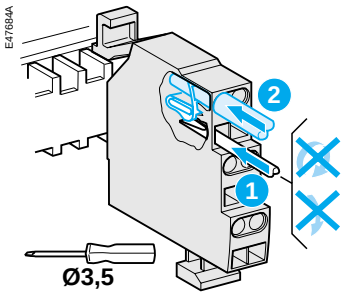


(1) *Without escutcheon*
(2) *With escutcheon*

Note.
X *and* ***Y*** *are the symmetry planes for a 3-pole device*

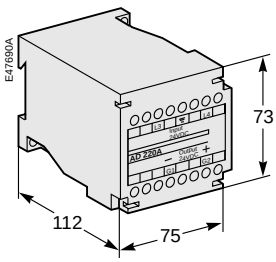
Control-wire connections to terminal block

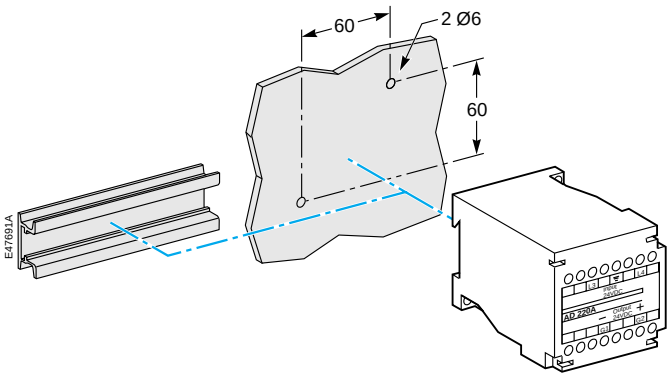




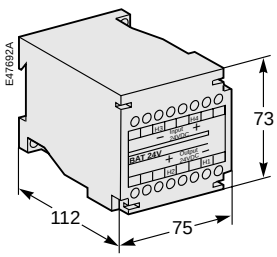
Only one wire per terminal.

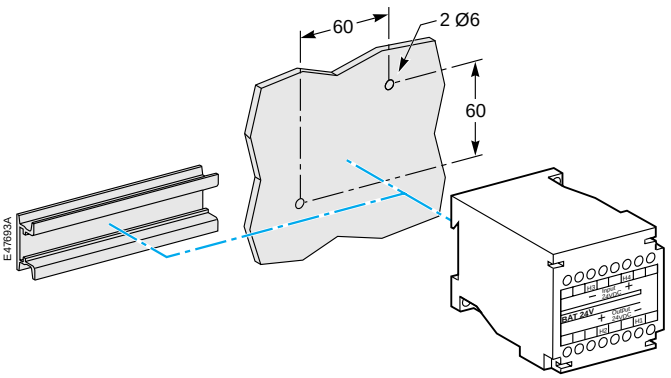
External power-supply module (AD)



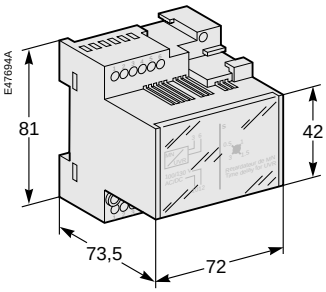


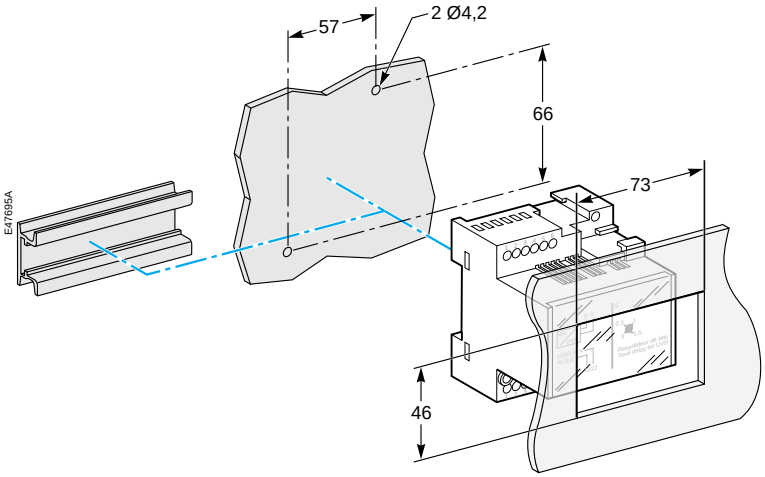
Battery module (BAT)





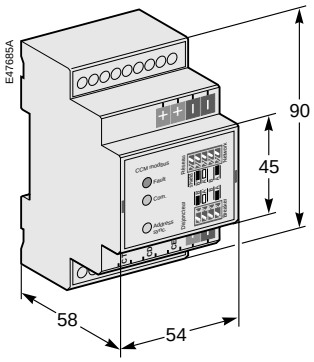
MN delay unit



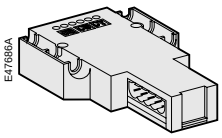


Chassis communication module

ModBus

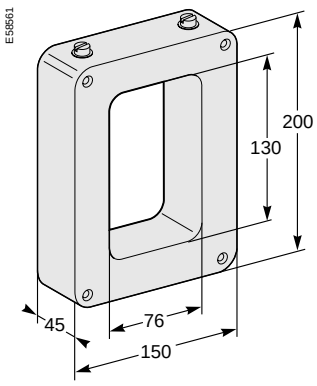


Digipact internal bus

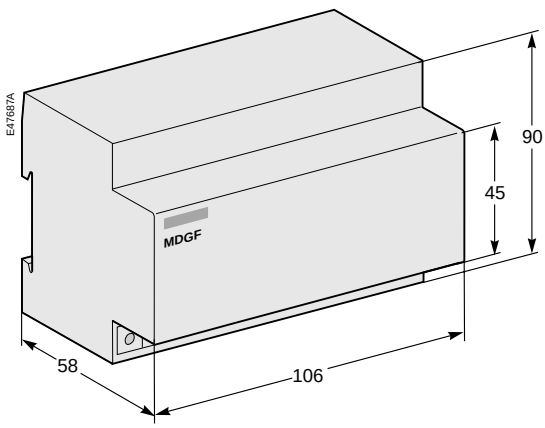


External sensor for source ground return (SGR) protection

External sensor

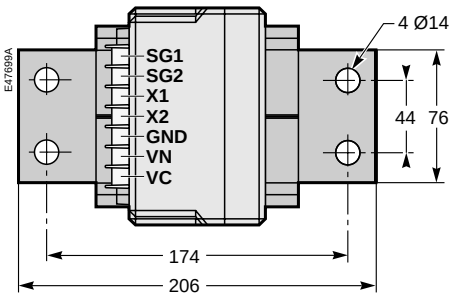


"MGDF" summer box

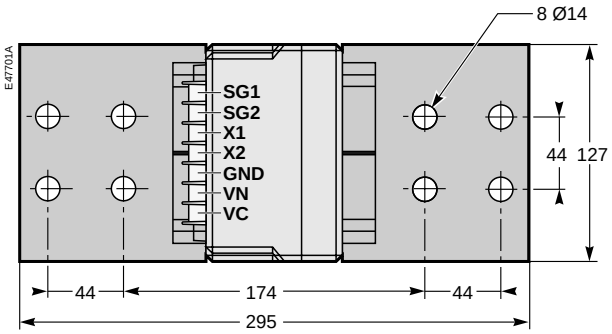


Current-transformer for external neutral

400/1600 A (NS630b to 1600)

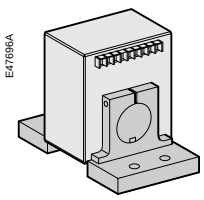


1000/4000 A (NS1600b to 3200)

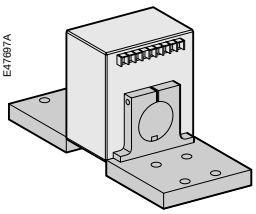


Installation

400/1600

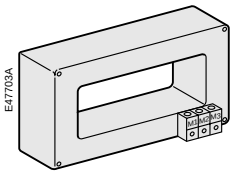


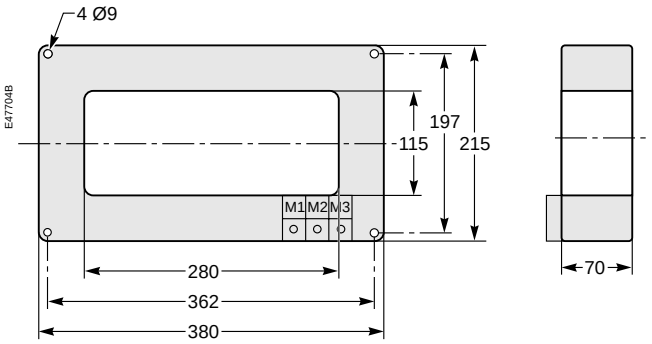
1000/4000 A



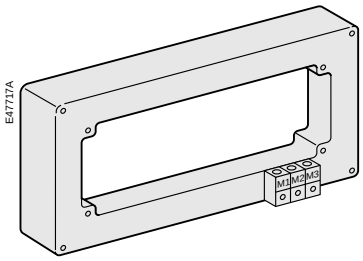
Vigi rectangular sensor

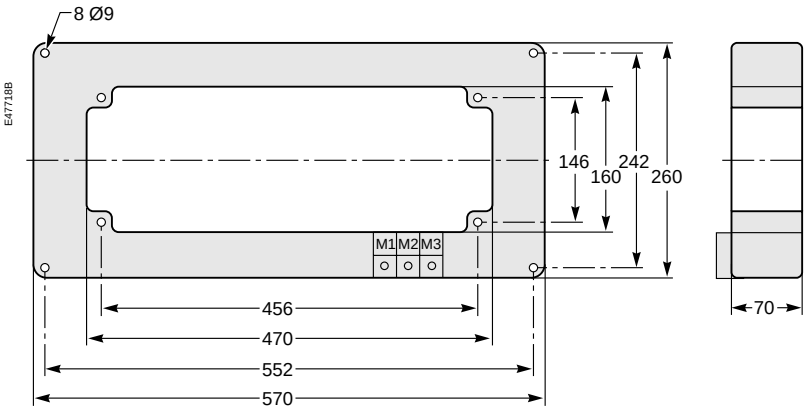
280 x 115 mm inside dimensions



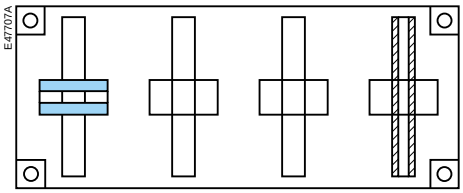


470 x 160 mm inside dimensions





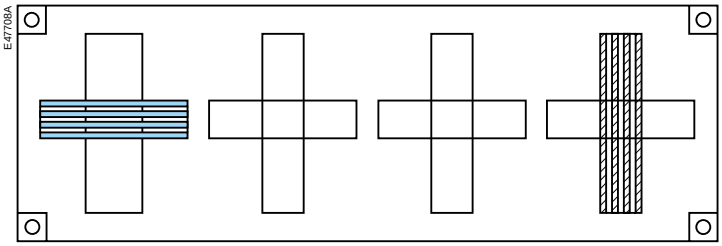
Busbars	I ⩽ 1600 A	I ⩽ 3200 A
Sensor	280 x 115	470 x 160
Weight (kg)	14	18



280 x 115 sensor
Busbars with 70 mm pitch

Two 50 x 10 bars

Two 100 x 5 bars



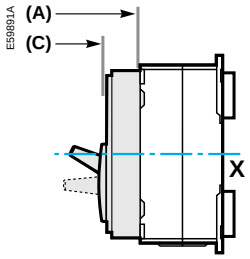
470 x 160 sensor
Busbars with 115 mm pitch

Four 100 x 5 bars

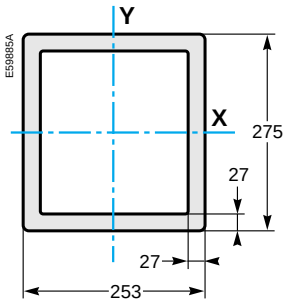
Four 125 x 5 bars

Escutcheon

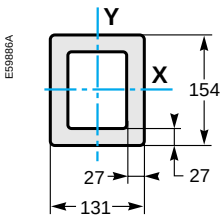
NS630b to 1600 (fixed control)



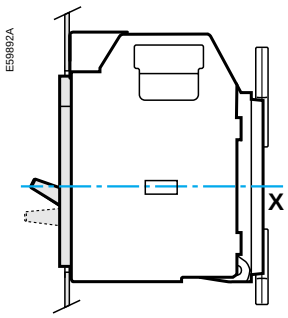
A

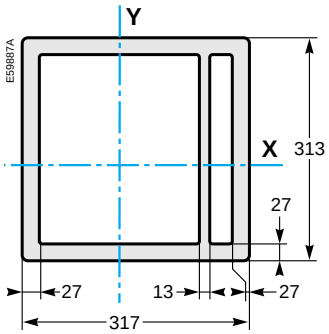


C

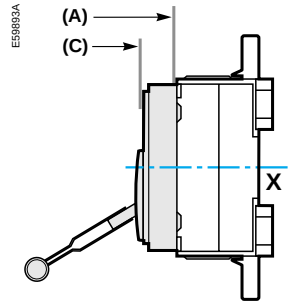


NS630b to NS1600 (withdrawable control)

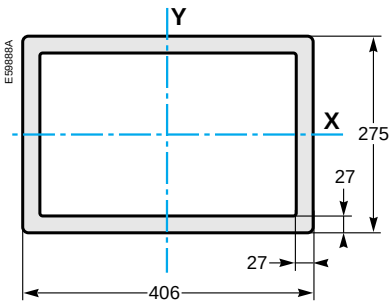




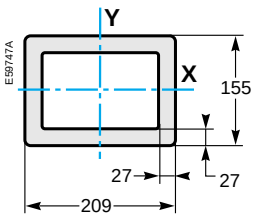
NS1600b to NS3200



A

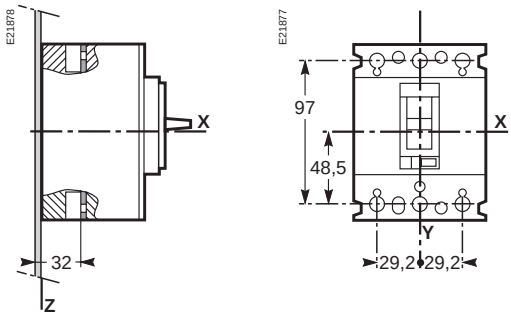


C

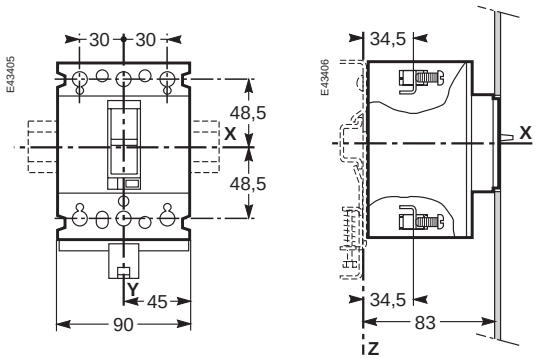


Compact NS80H-MA, NSC100N and NSA160

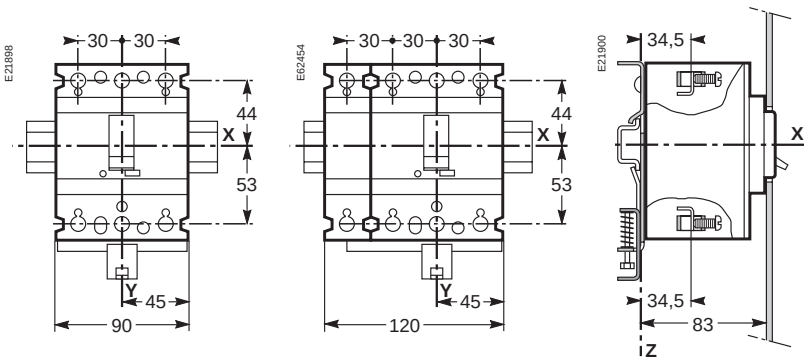
Compact NS80H-MA



Compact NSC100N



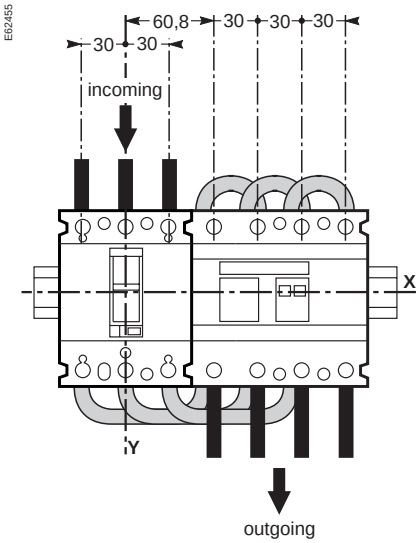
Compact NSA160



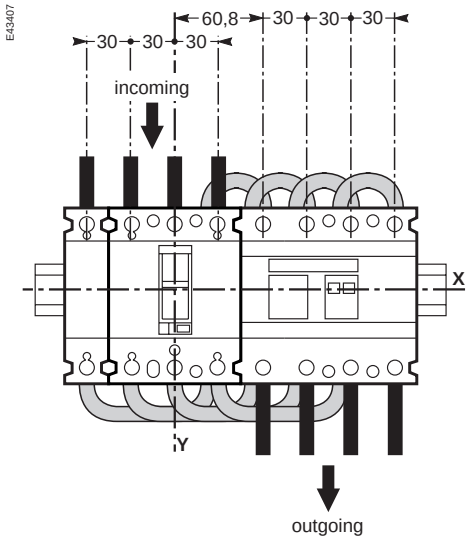
Vigicompact NSC and NSA

Bottom connection

3 poles

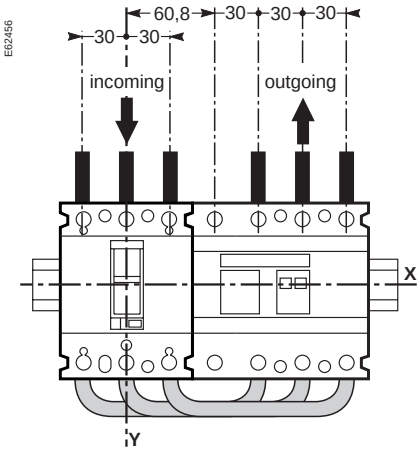


4 poles

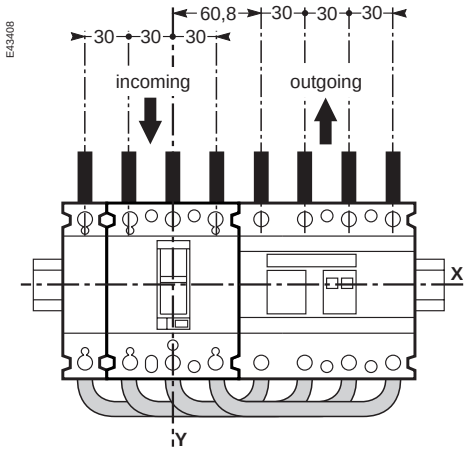


Top connection

3 poles

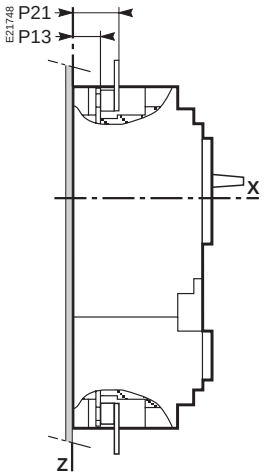


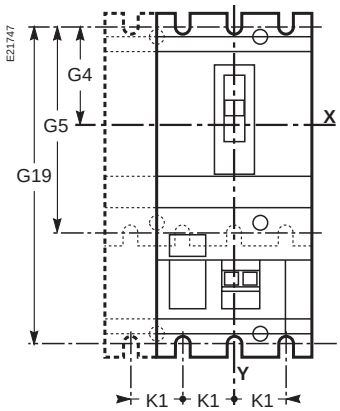
4 poles



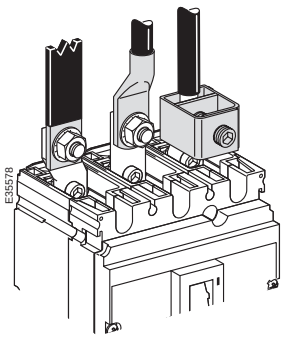
Compact, Vigicompact
NS100 to 630 (fixed version)

Connection dimensions



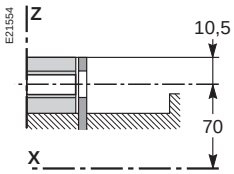


Front connection

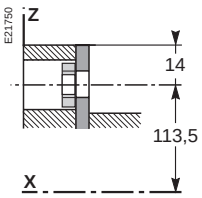


Terminals

NS100/160/250

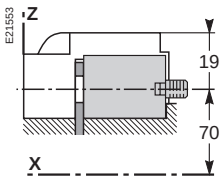


NS400/630

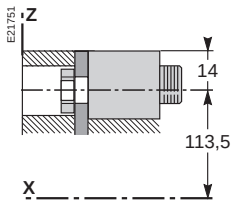


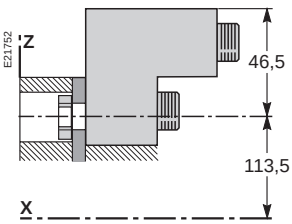
Connectors

NS100/160/250

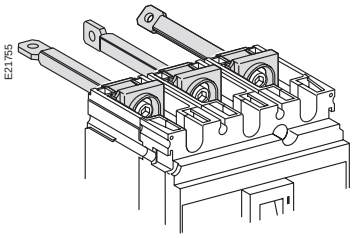


NS400/630

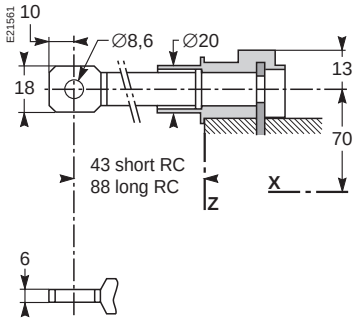




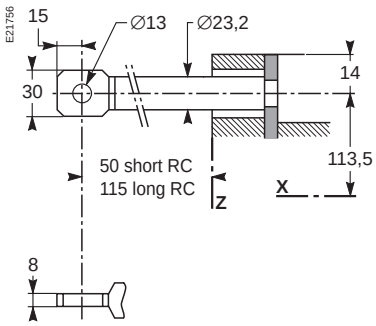
Rear connection



NS100/160/250



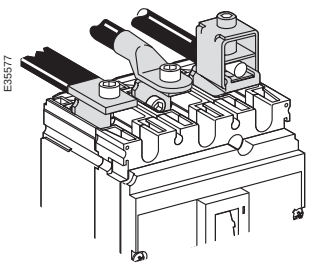
NS400/630



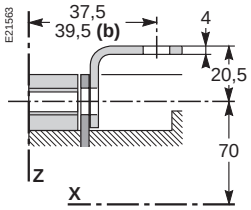
(*) Short RC / long RC

Connection with accessories

Right-angle terminal extensions (upstream only)

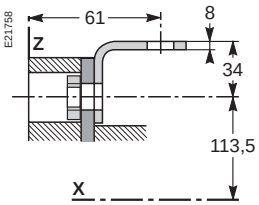


NS100/160/250

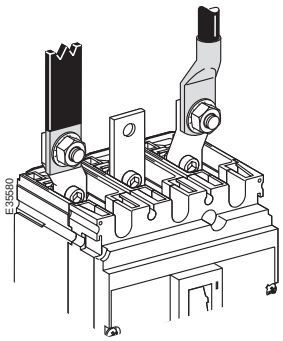


***(b)** Vigi module or NS250.*

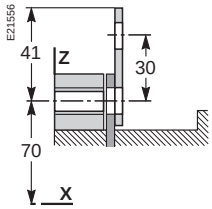
NS400/630



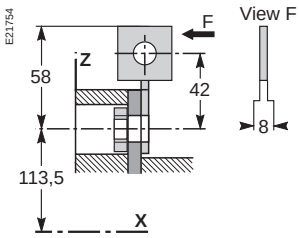
Straight or edgewise terminal extensions



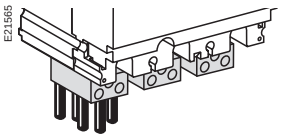
NS100/160/250



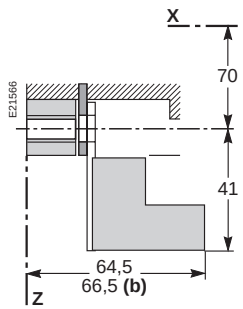
NS400/630



Distribution connectors (phase barriers mandatory)

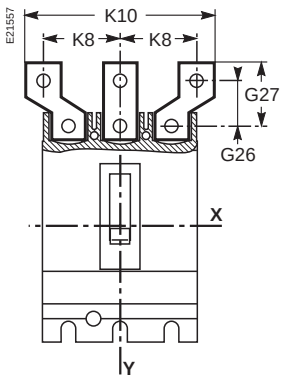


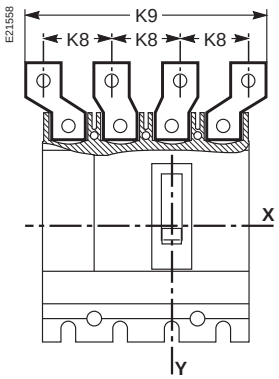
NS100/160/250



***(b)** Vigi module or NS250.*

Spreader





Dimensions (mm)

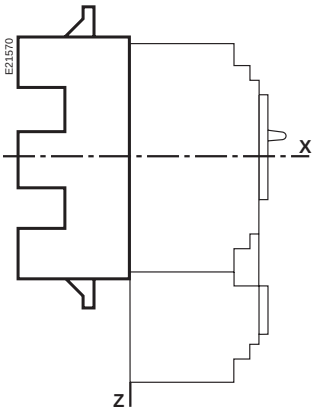
Type	G4	G5	G19	G26	G27	K1	K8	K9	K10	P13	P21
NS100/160/250N/H/L	70	140	215	30	41	35	45	159	114	19.5(1)	
NS400/630N/H/L	113.5	227	327	39 52,5	54 67,5	45	52.5 70	187.5 240	135 170	26	44

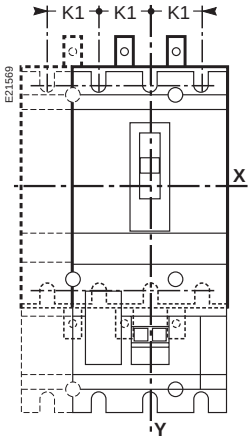
***(1)** P13 = 21.5 mm for NS250N/H/L and Vigi MH module*

Note.
For dimensions of conductors, see pages 00 to 00

Compact, Vigicompact NS100 to 630 (plug-in and withdrawable versions)

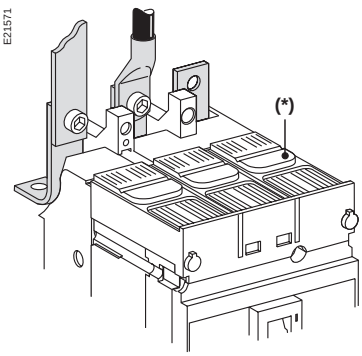
Plug-in base or chassis



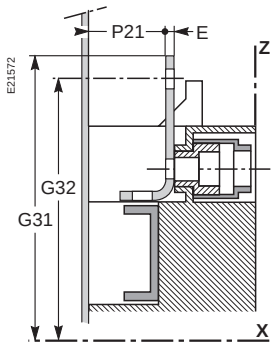


Front connection

Terminals

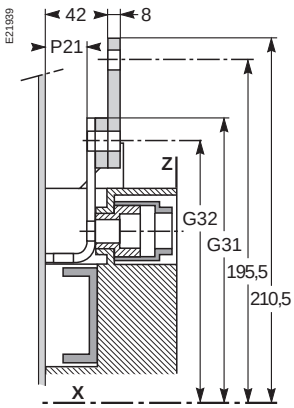


NS100/160/250
Mounting through backplate or on rails **(1)**

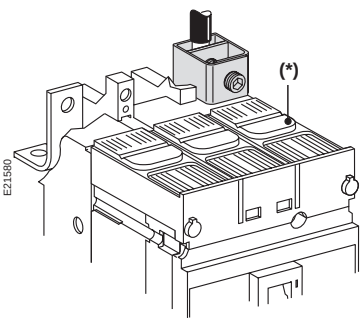


(1) *For backplate mounting, the insulating screen, supplied with the plug-in base, must be installed.*

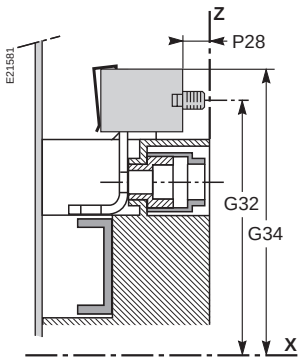
NS400/630
With spreaders



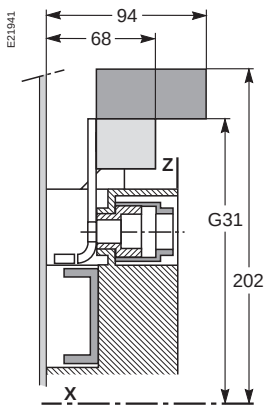
Connectors



NS100/160/250
Mounting through backplate or on rails **(1)**

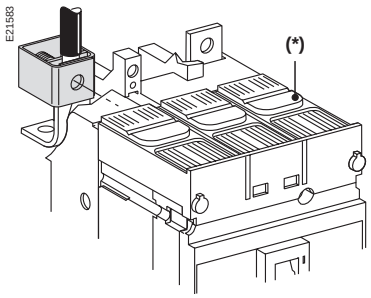


NS400/630
With spreaders

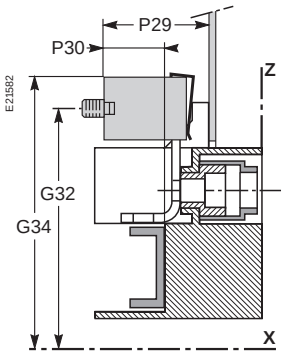


(*) *short terminal shields are mandatory.*

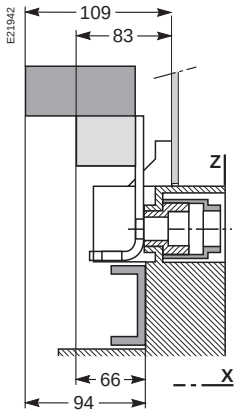
Connectors



NS100/160/250
Mounting through backplate or on rails

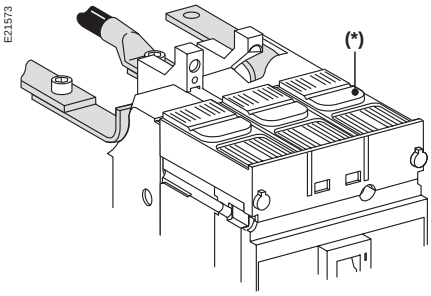


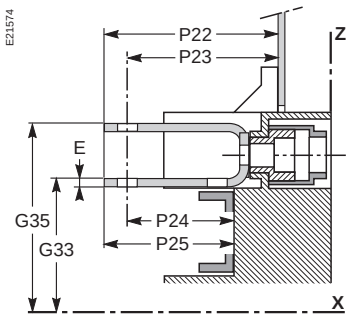
NS400/630



Rear connection

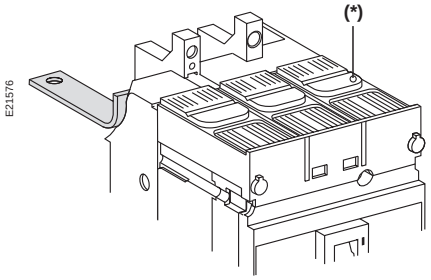
Mounting through backplate or on rails

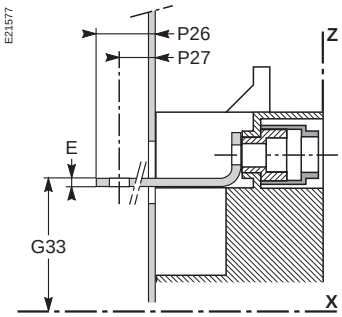




Mounting on backplate

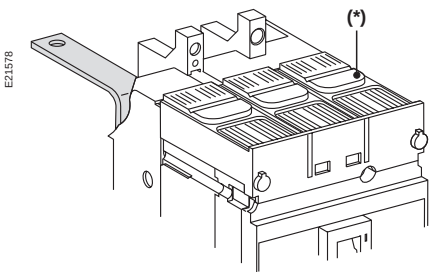
Right-angle extensions (mounted down and out)

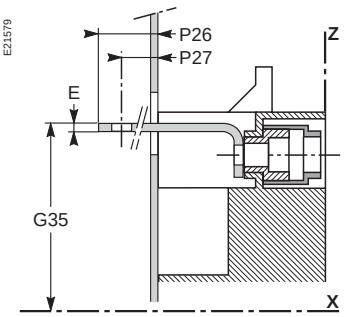




Long, insulated right-angle terminal extensions are mandatory.

Right-angle extensions (mounted down and out)





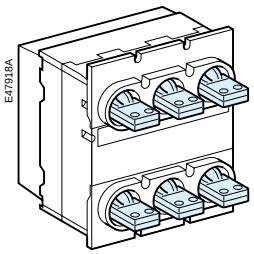
(*) *short terminal shields are mandatory.*

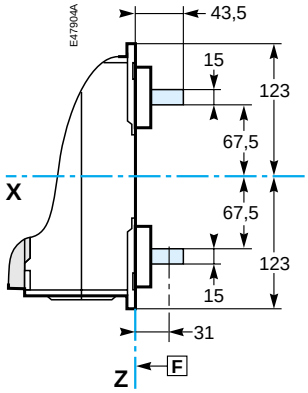
Dimensions (mm)

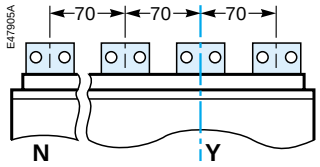
Type	E	G31	G32	G33	G34	G35	K1	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30
NS100/160/250N/H/L	4	108.5	100	63.5	110	80.5	35	19	75.5	67	49	57.5	75.5	67	26.5	54.5	36.5
NS400N/H/L	6	171	156.5	104		129	45	26	114.5	100	82	96.5	108.5	94			
NS630N/H/L	6	181	166.5	104		129	45	26	124.5	110	92	104.5	108.5	94			

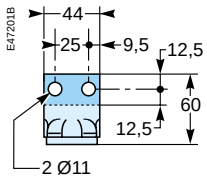
Compact NS630b to 1600 (fixed version)
Bars

Horizontal rear connection

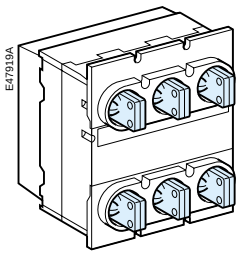


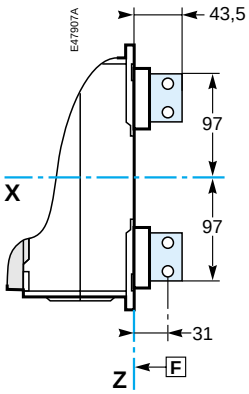


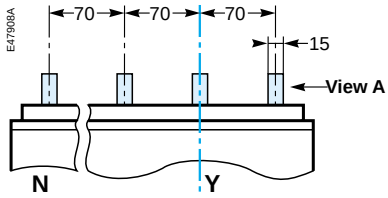


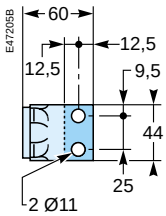


Vertical rear connection



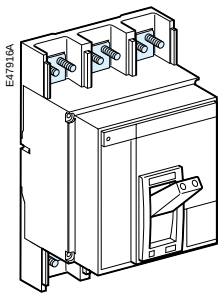


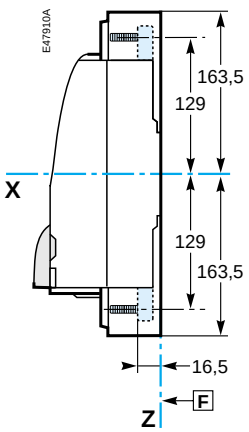


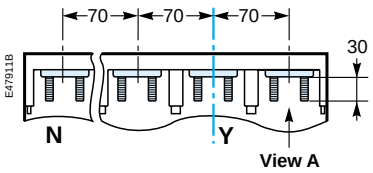


View A detail

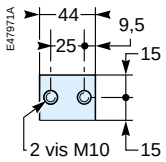
Front connection



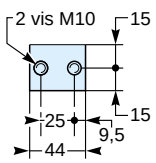




Top terminal



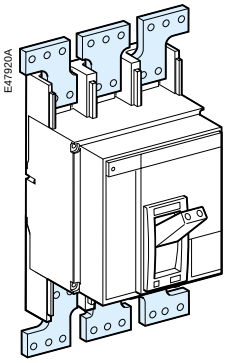
Bottom terminal

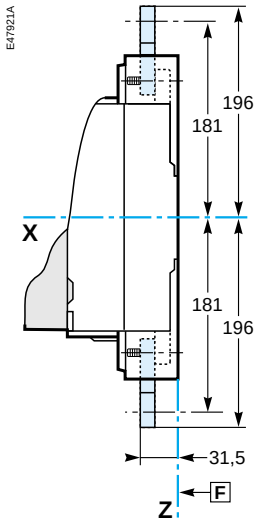


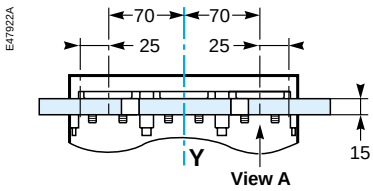
View A detail

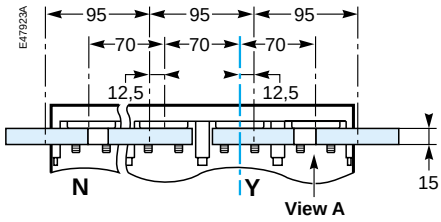
Note.
Recommended connection screws: ***M10*** *class 8.8*
Tightening torque: ***50 Nm*** *with contact washer*

Front connection with spreaders

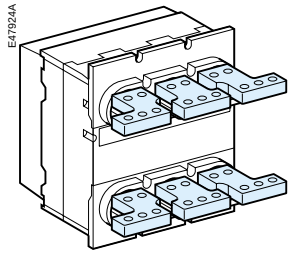


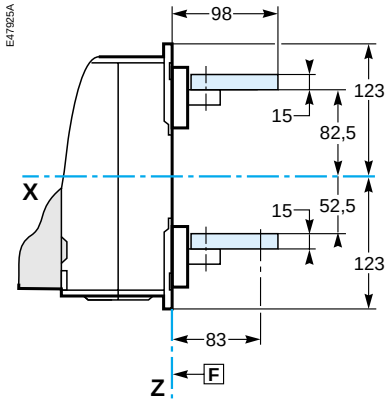


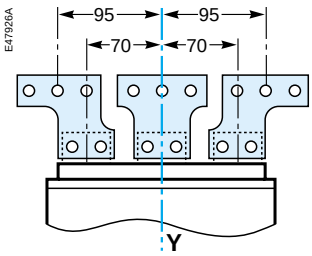


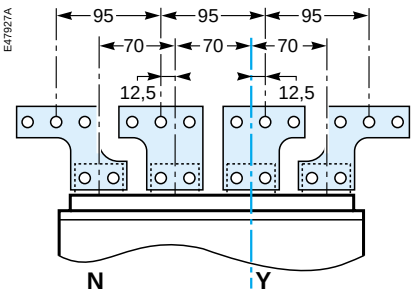


Rear connection with spreaders



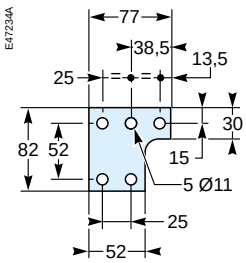




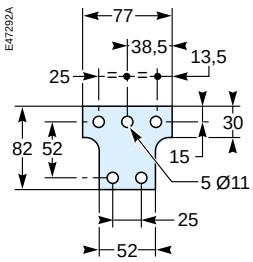


Spreader detail

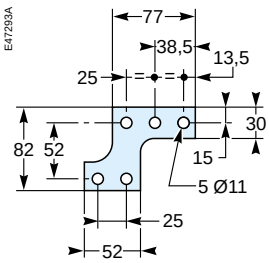
Middle left or middle right spreader for 4P



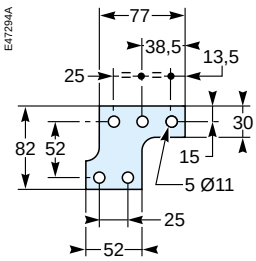
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P



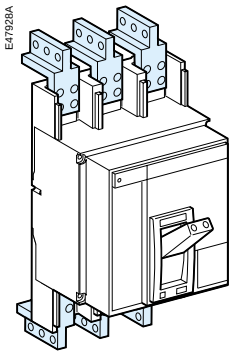
View A detail

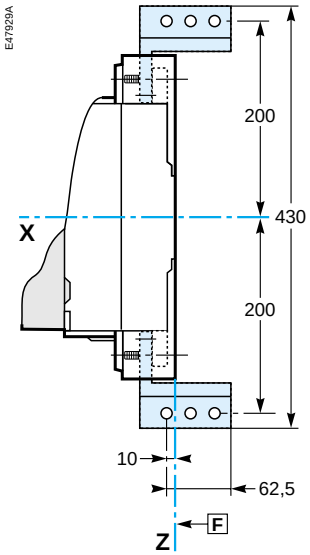
F : *Datum*

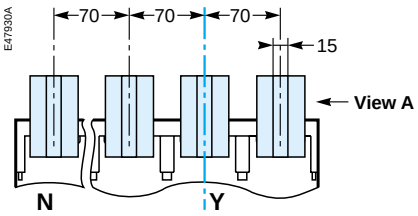
Note.
X *and* ***Y*** *are the symmetry planes for a 3-pole device.*

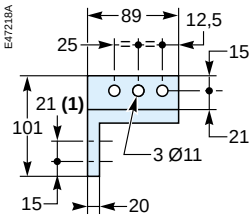
Compact NS630b to 1600 (fixed version) (cont.)
Bars

Front connection with vertical-connection adapters







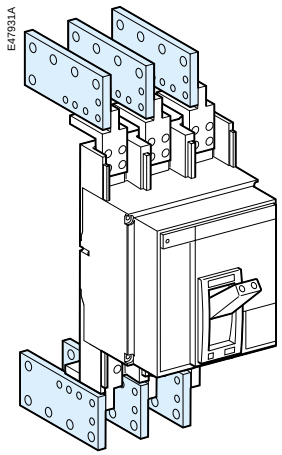


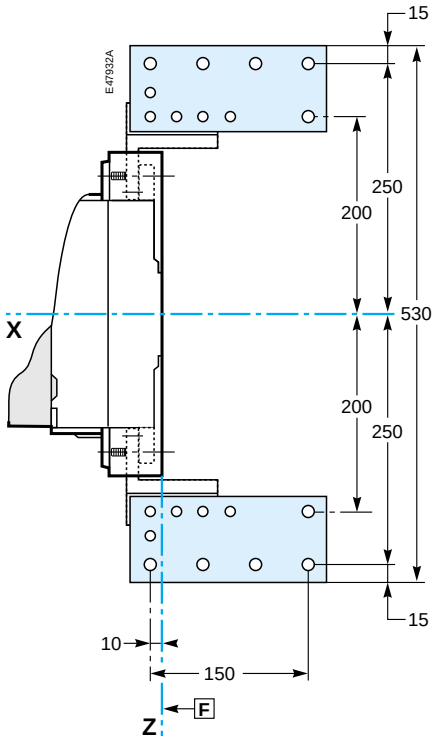
View A detail

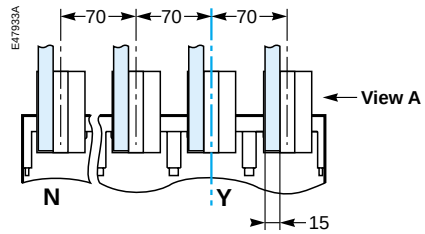
Note.

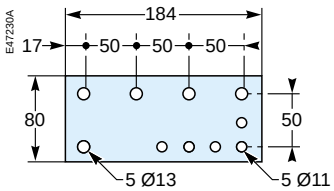
(1) *two mounting possibilities for vertical-connection adapters (pitch 21 mm).*
Recommended connection screws: ***M10*** *class 8.8*
Tightening torque: ***50 Nm*** *with contact washer*

Front connection with vertical-connection adapters and terminal extensions for cables with lugs



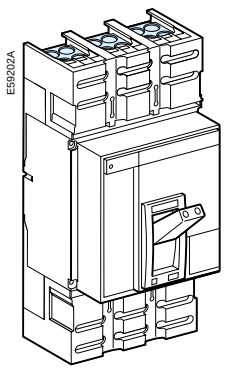


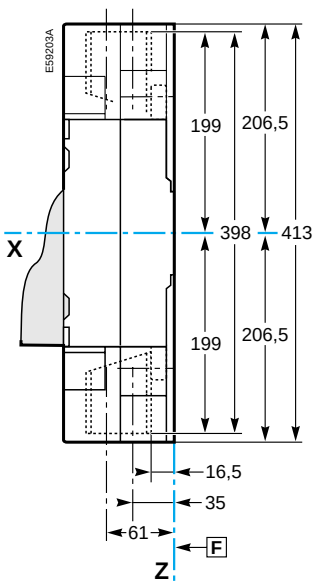


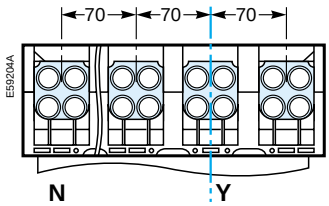


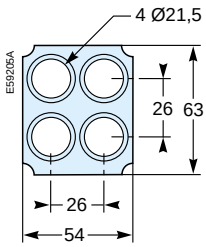
View A detail

Fixed circuit breaker with 4-cable bare-cable connectors (240 mm²)



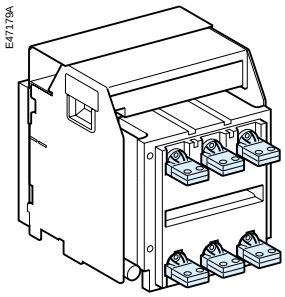


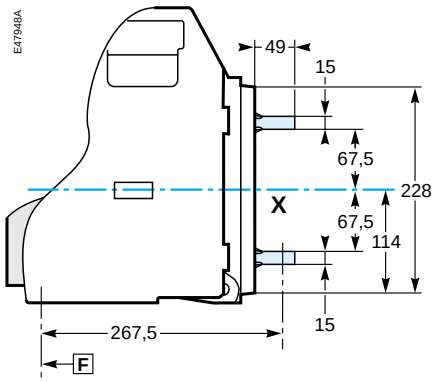


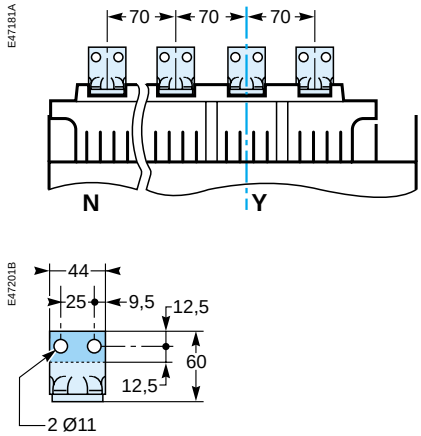


Compact NS630b to 1600
(plug-in and withdrawable versions)
Bars

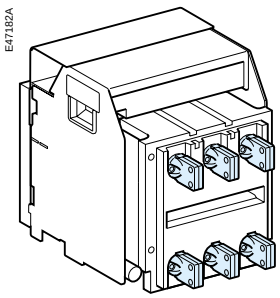
Horizontal rear connection

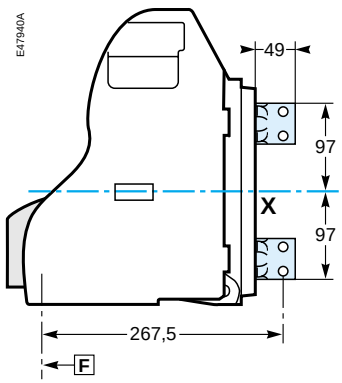


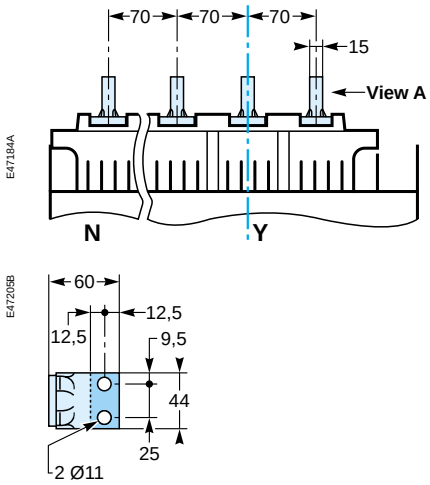




Vertical rear connection

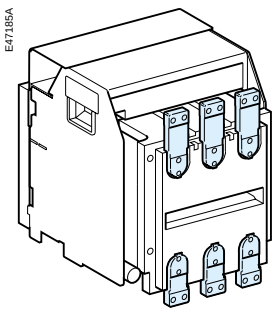


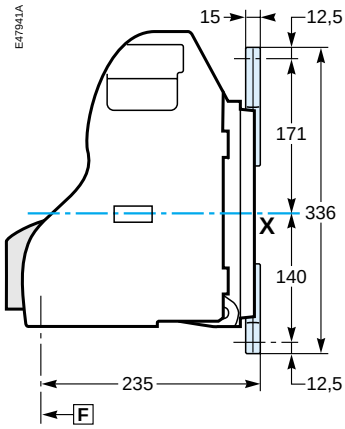


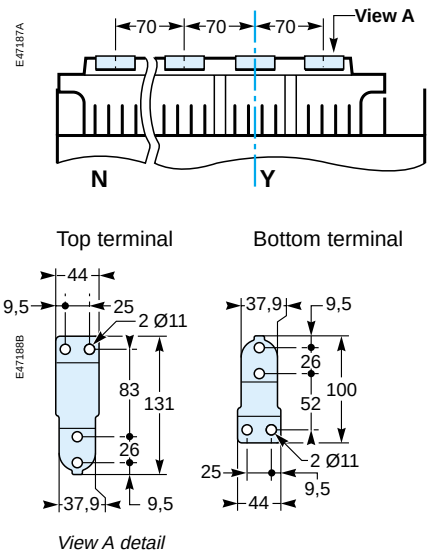


View A detail

Front connection



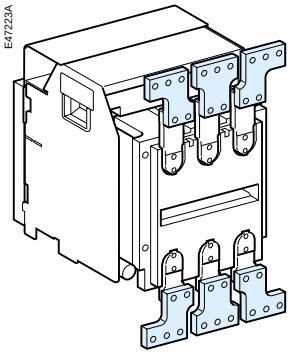


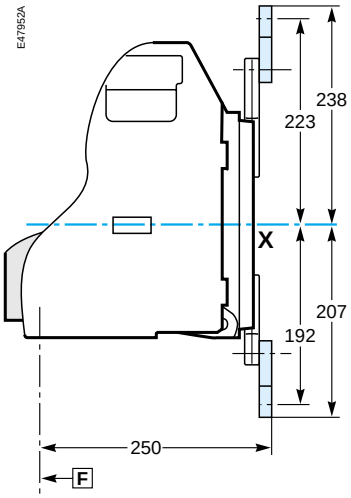


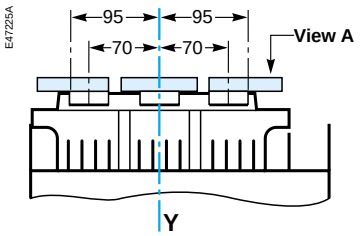
View A detail

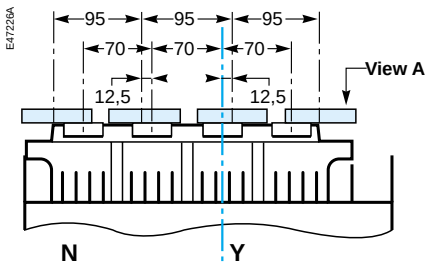
Note.
Recommended connection screws: ***M10*** *class 8.8*
Tightening torque: ***50 Nm*** *with contact washer*

Front connection with spreaders



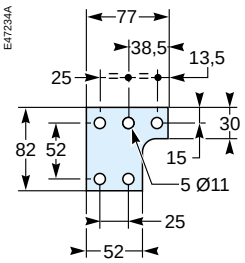




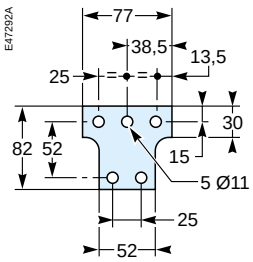


Spreader detail

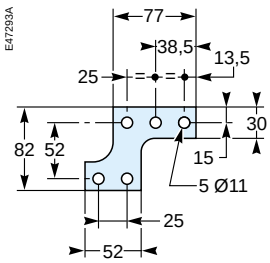
Middle left or middle right spreader for 4P



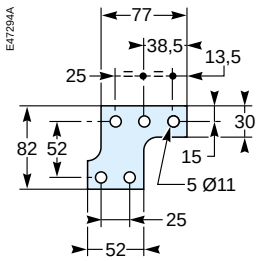
Middle spreader for 3P



Left or right spreader for 4P



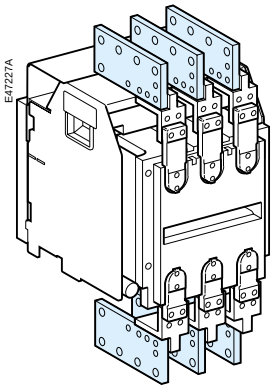
Left or right spreader for 3P

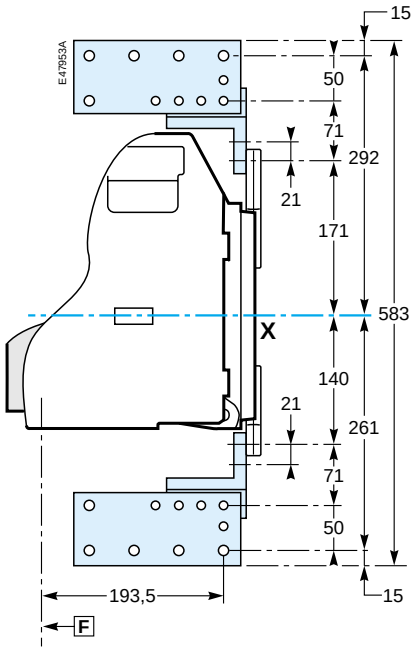


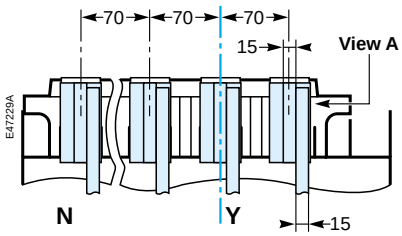
View A detail

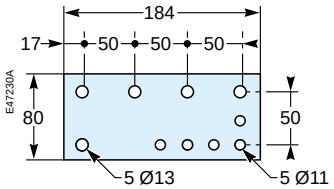
Compact NS630b to 1600
(plug-in and withdrawable versions) (cont.)
Cables with lugs

Front connection with vertical-connection adapters









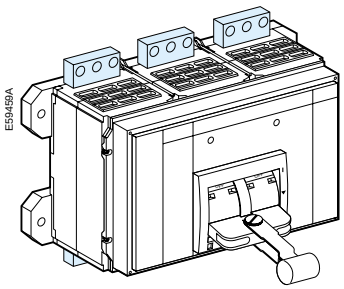
View A detail

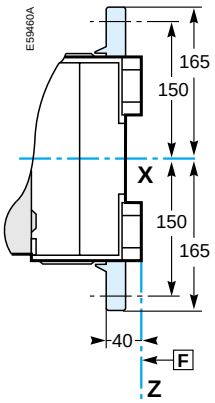
F : *Datum*

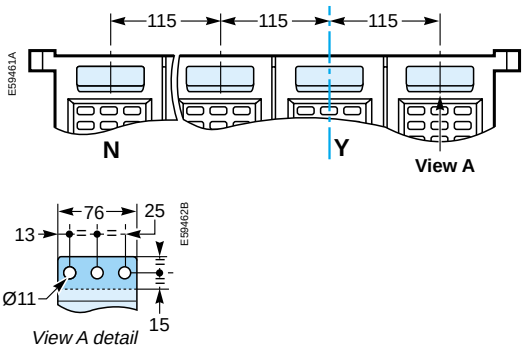
Note.
X *and* ***Y*** *are the symmetry planes for a 3-pole device.*
Tightening torque: ***50 Nm*** *with contact washer*
X *and* ***Y*** *are the symmetry planes for a 3-pole device*

Compact NS1600b to 3200 (fixed version)

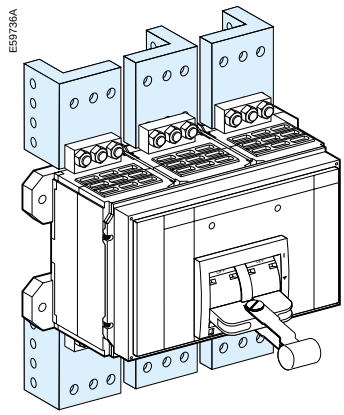
Front connection (NS1600b to 2500)

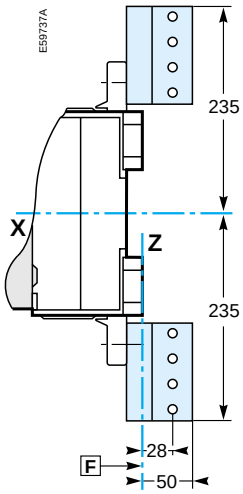


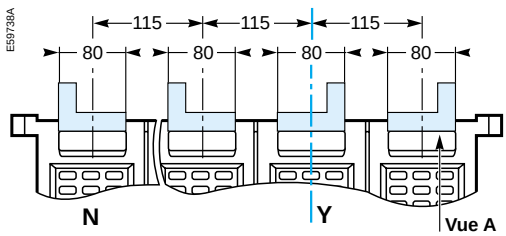


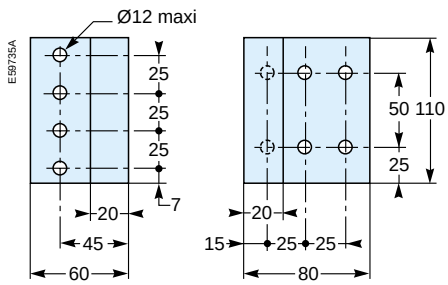


Front connection with vertical-connection adapters (NS1600b to 2500)

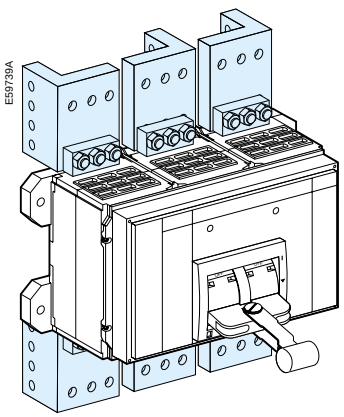


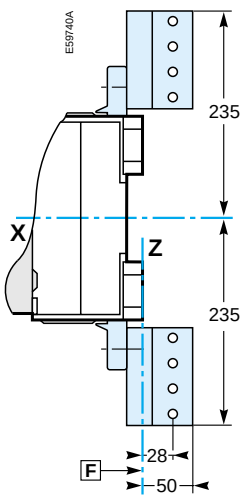


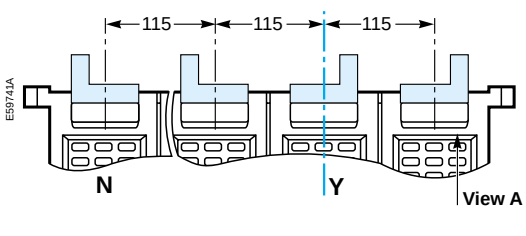


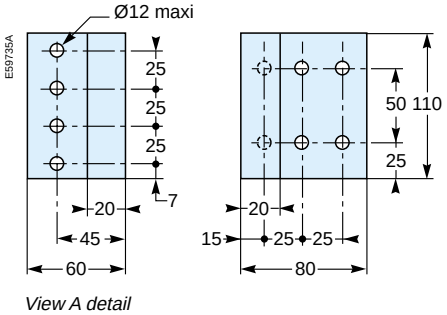


Front connection (NS3200)







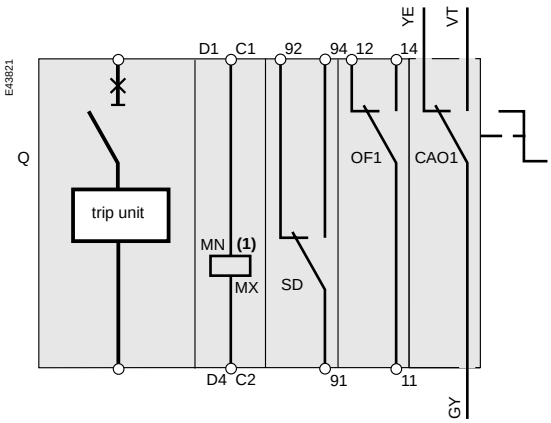


Note.
Recommended connection screws: ***M10*** *class 8.8*
Tightening torque: ***50 Nm*** *with contact washer*

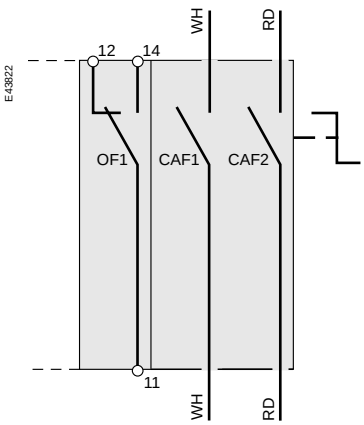
Compact NSC100
Compact NS80H-MA
Indication contacts

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

With OF1 and CAO1

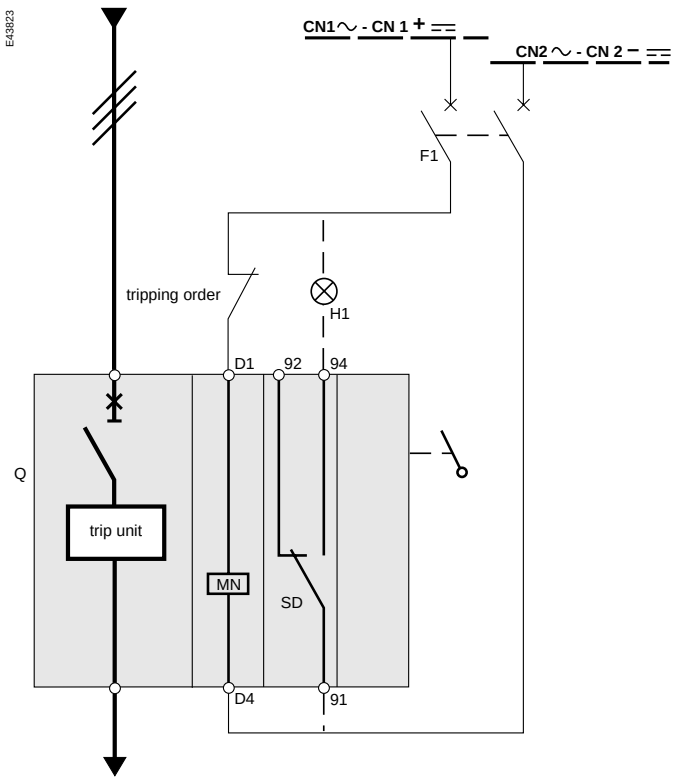


With OF1 and CAF1/CAF2

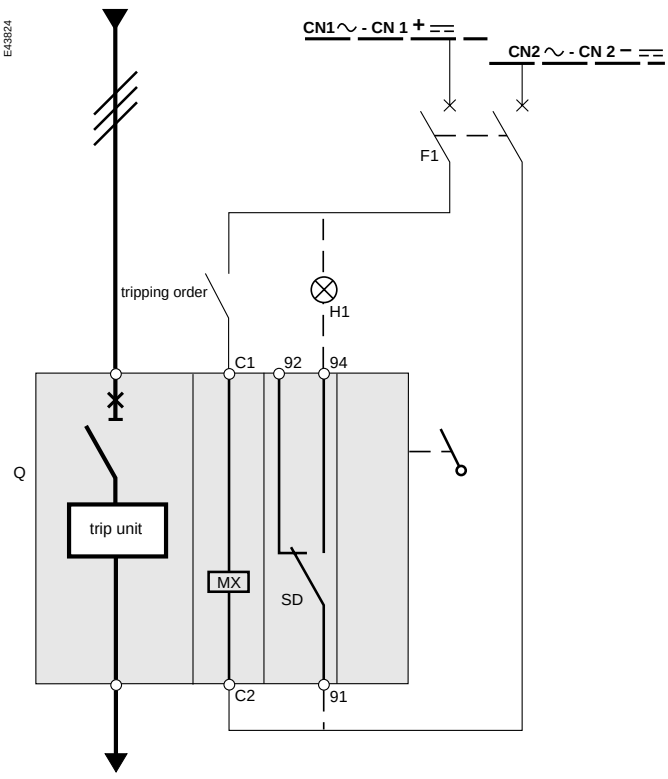


(1) *MN or MX (MN: D1, D4; MX: C1, C2)*

With MN



With MX



Symbols

Q	*Compact NS*
SD	*trip indication contact*
OF	*ON / OFF indication contact*
MN	*undervoltage release*
MX	*shunt release*
CAO	*early-break contact of rotary handle*
CAF	*early-make contact of rotary handle*
XI	*terminal block for CAF wiring (must be ordered)*
F1	*breaker for the protection of MN/MX*
H1	*lamp signalling tripped position*

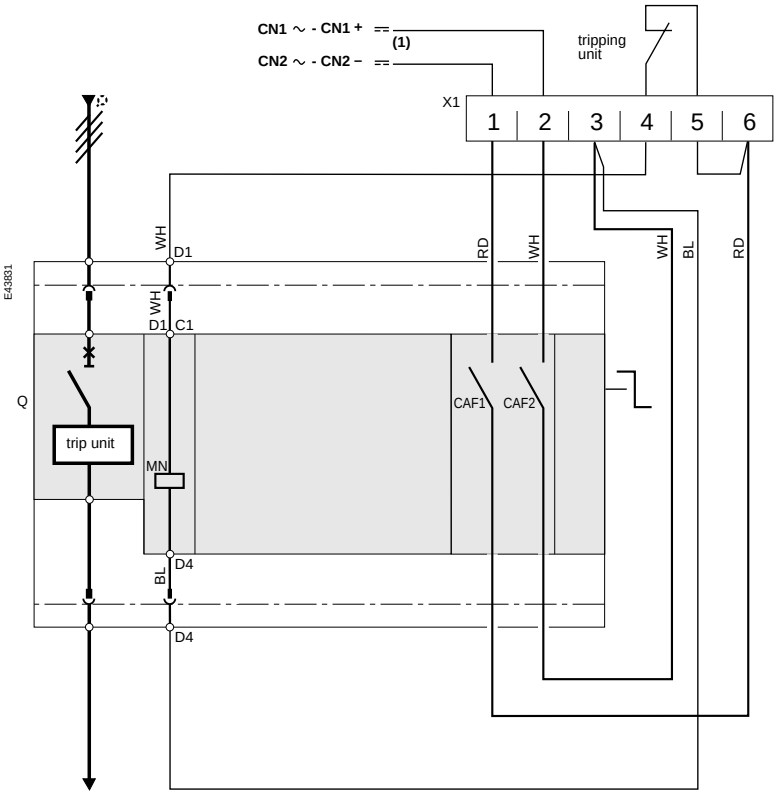
Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
WH	*white*

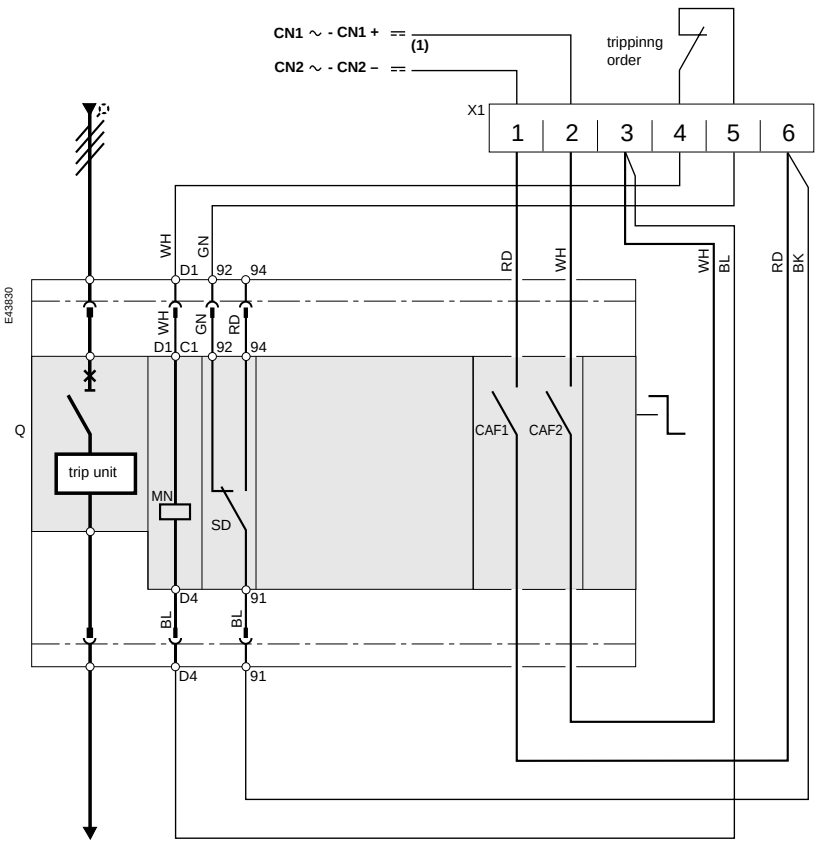
Early-make contacts

Following tripping due to an electrical fault, reset must be carried out locally and manually.

With MN



With MN + SD



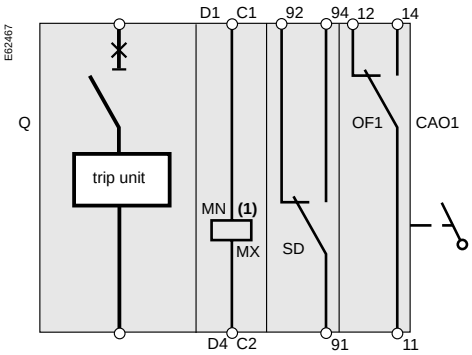
(1) *independent auxiliary source.*

Remark
NS80H-MA and NSC100 circuit breakers are not plug-in or withdrawable devices. As a result, there is no automatic auxiliary connector. Connections are made directly to the device.

Compact NSA160
Indication contacts

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

With OF1



(1) *MN or MX (MN: D1, D4; MX: C1, C2)*

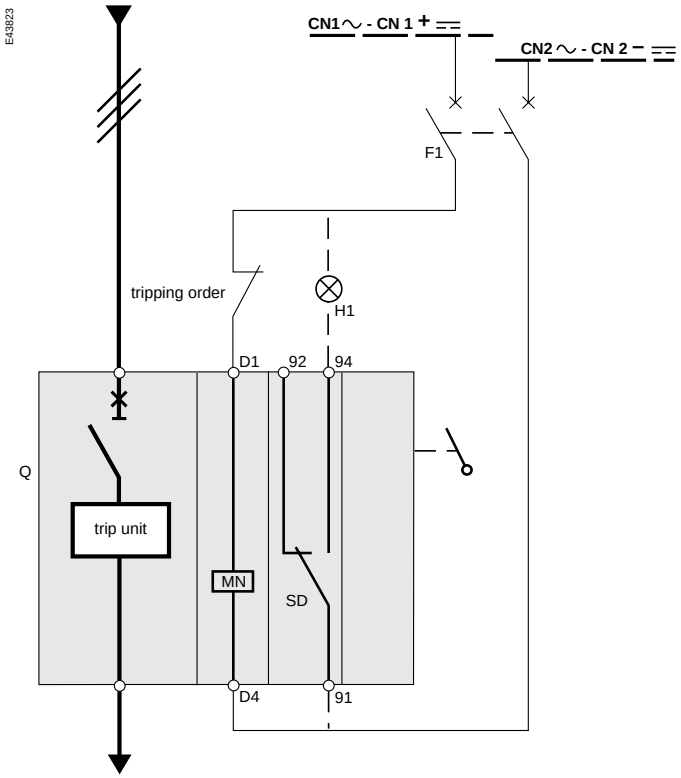
Symbols

Q	*Compact NS*
SD	*trip indication contact*
OF	*ON / OFF indication contact*
MN	*undervoltage release*
MX	*shunt release*
CAO	*early-break contact of rotary handle*
CAF	*early-make contact of rotary handle*
XI	*terminal block for CAF wiring (must be ordered)*
F1	*breaker for the protection of MN/MX*
H1	*lamp signalling tripped position*

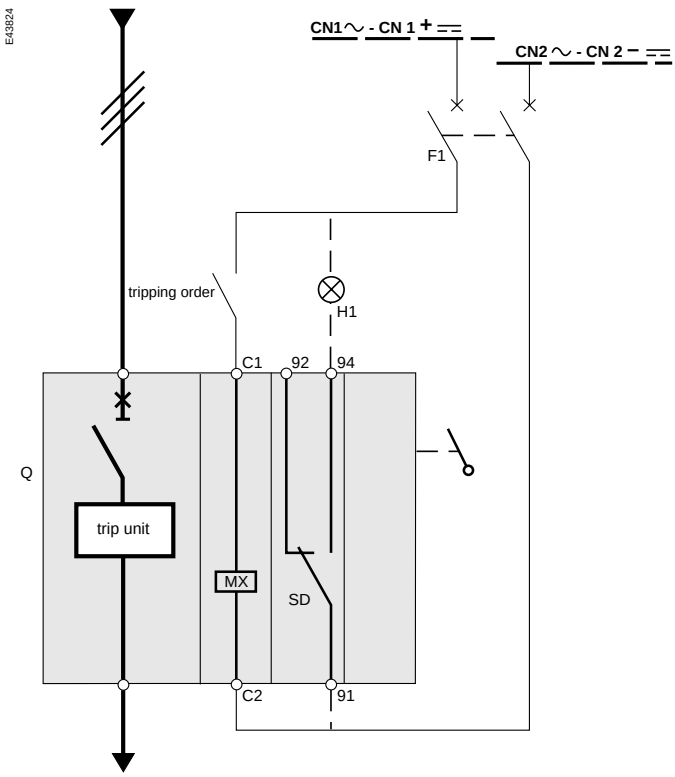
Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
WH	*white*

With MN



With MX

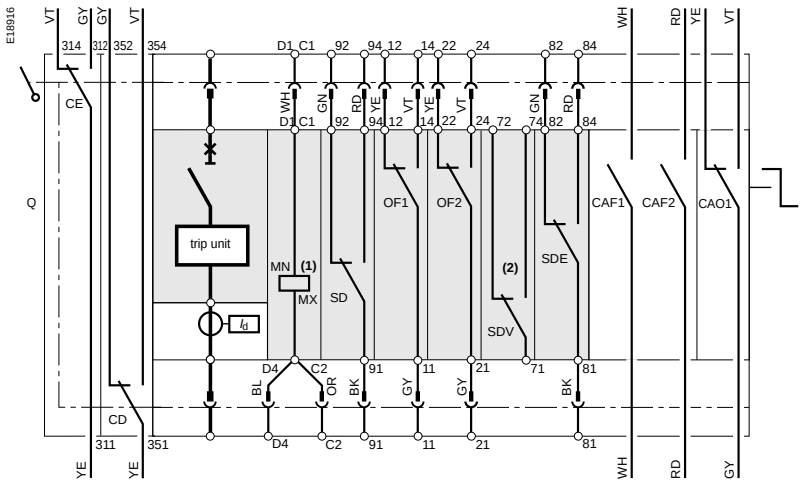


Compact NS100 to 630
Indication contacts

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

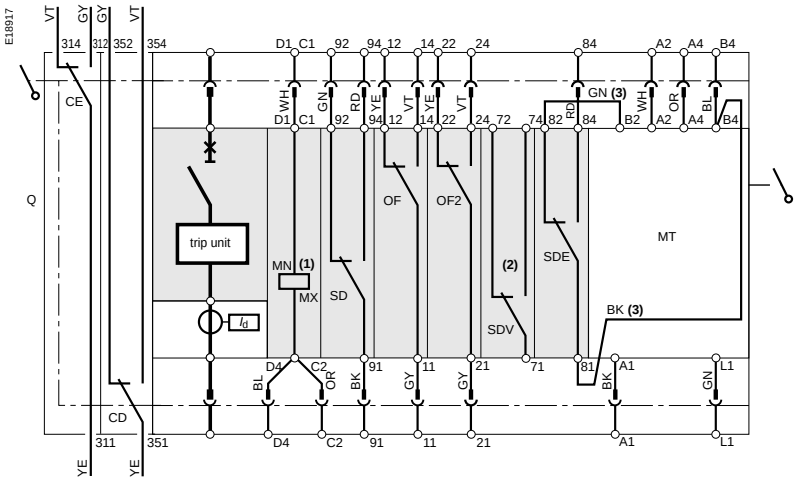
Compact NS100 to 250

Manually operated circuit breaker



(1) *MN or MX (MN: D1, D4; MX: C1, C2)*
(2) *for the withdrawable and plug-in versions, SDV and OF2 contacts can be installed in the circuit breaker, but only one can be connected to the automatic auxiliary connectors.*

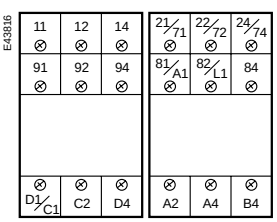
Circuit breaker with motor mechanism



(1) *MN or MX (MN: D1, D4; MX: C1, C2)*
(2) *for the withdrawable and plug-in versions, SDV and OF2 contacts can be installed in the circuit breaker, but only one can be connected to the automatic auxiliary connectors*
(3) *wires supplied, must be connected to ensure correct operation.*

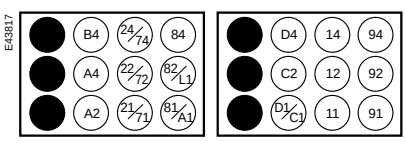
Auxiliary wiring for plug-in / withdrawable circuit breaker

Automatic auxiliary
connectors (wires 0.75 to 2.5 mm^2)



Fixed part
(front view looking into base)

Fixed part (front view looking into base)
connectors (wires 0.75 to 2.5 mm^2)



Fixed part (rear view).

Symbols

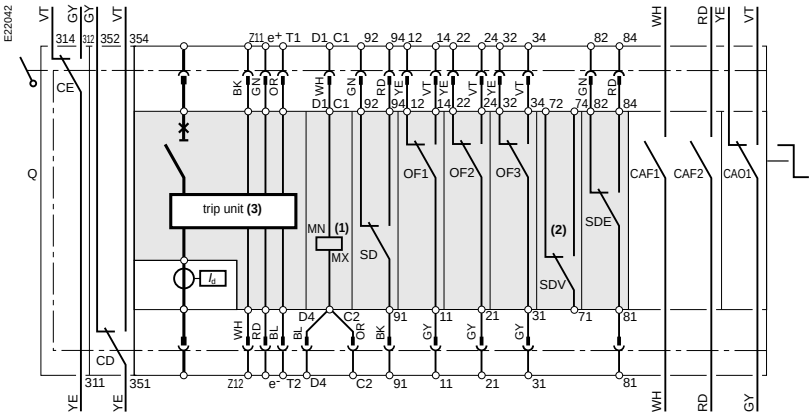
Q	*Compact NS100 to 250*
SD	*trip indication contact*
SDE	*fault indication contact*
SDV	*earth-fault indication contact*
OF	*ON / OFF indication contact*
MN	*undervoltage release*
MX	*shunt release*
MT	*motor-mechanism module*
CAO	*early-break contact of rotary handle*
CAF	*early-make contact of rotary handle*
CE	*connected-position carriage switch*
CD	*disconnected-position carriage switch*

Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
VT	*violet*
YE	*yellow*
GY	*grey*
BL	*blue*
OR	*orange*
WH	*white*

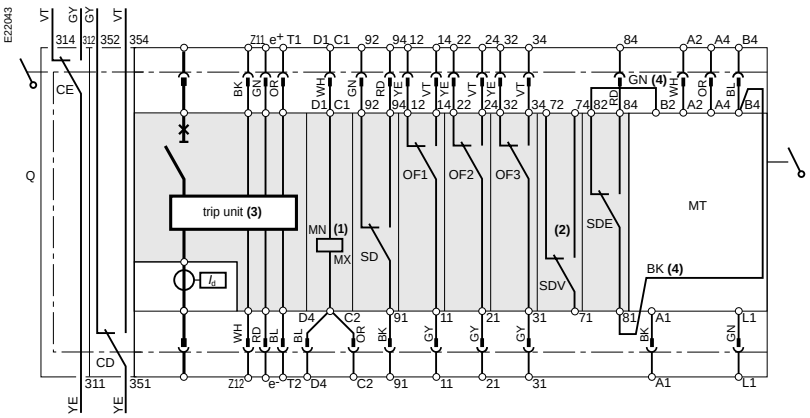
Compact NS400 to 630

Manually operated circuit breaker



(1) *MN or MX (MN: D1, D4; MX: C1, C2).*
(2) *for the withdrawable and plug-in versions, SDV and OF3 contacts can be installed in the circuit breaker, but only one can be connected to the automatic auxiliary connectors.*
(3) *options available with trip unit STR53UE only.*

Circuit breaker with motor mechanism

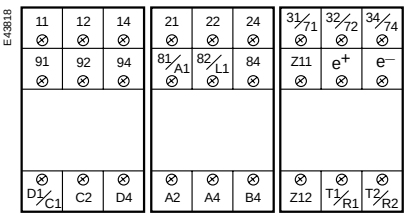


(1) *MN or MX (MN: D1, D4; MX: C1, C2).*
(2) *for the withdrawable and plug-in versions, SDV and OF3 contacts can be installed in the circuit breaker, but only one can be connected to the automatic auxiliary connectors.*
(3) *options available with trip unit STR53UE only.*
(4) *wires supplied, must be connected to ensure correct operation.*

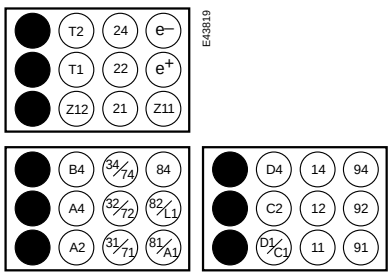
Auxiliary wiring for plug-in / withdrawable circuit breaker

Automatic auxiliary
connectors (wires 0.75 to 2.5 mm²)

Fixed part (front view looking into base)
connectors (wires 0.75 to 2.5 mm²)



Fixed part(front view looking into base)



Fixed part (rear view).

Symbols

Q	*Compact NS100 to 250*
SD	*trip indication contact*
SDE	*fault indication contact*
SDV	*earth-fault indication contact*
OF	*ON / OFF indication contact*
MN	*undervoltage release*
MX	*shunt release*
MT	*motor-mechanism module*
CAO	*early-break contact of rotary handle*
CAF	*early-make contact of rotary handle*
CE	*connected-position carriage switch*
CD	*disconnected-position carriage switch*

Colour code for auxiliary wiring

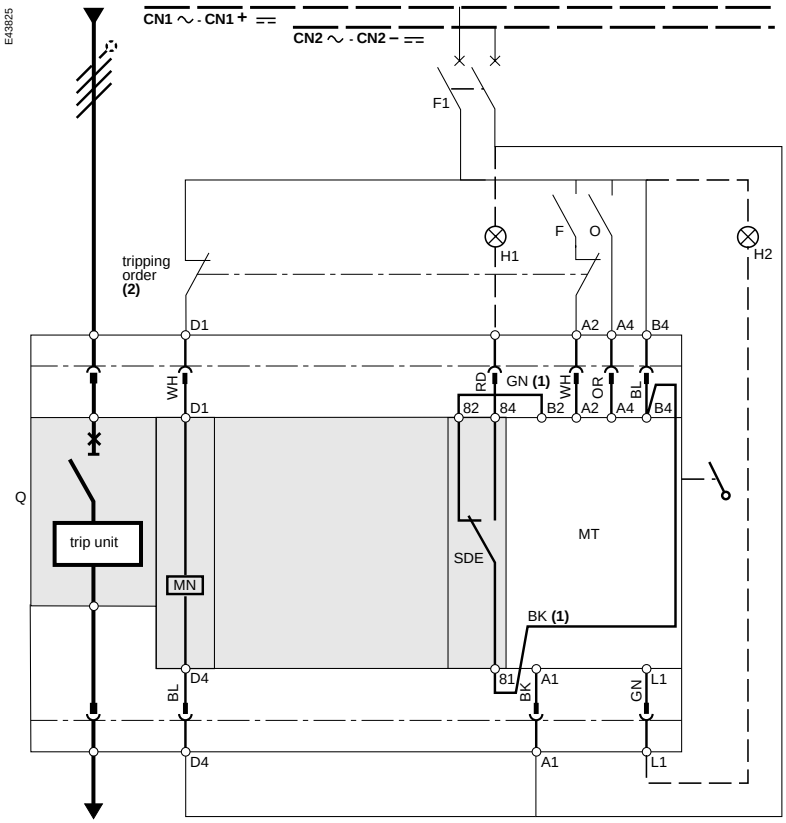
RD	*red*
GN	*green*
BK	*black*
VT	*violet*
YE	*yellow*
GY	*grey*
BL	*blue*
OR	*orange*
WH	*white*

Compact NS100 to 630
Motor mechanism (automatic reset)

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

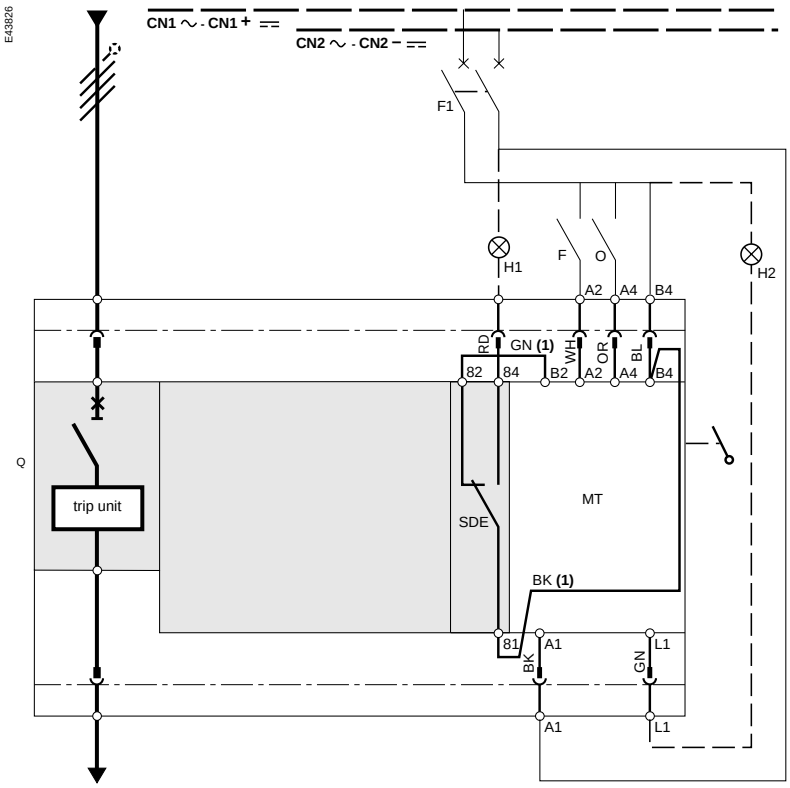
Following tripping due to an electrical fault, reset must be carried out locally and manually.

Automatic reset with MN



(1) *wires supplied, must be connected to ensure correct operation.*
(2) *the tripping order must lock out the closing order.*

Automatic reset with MX



(1) *wires supplied, must be connected to ensure correct operation.*
(2) *the tripping order must lock out the closing order.*

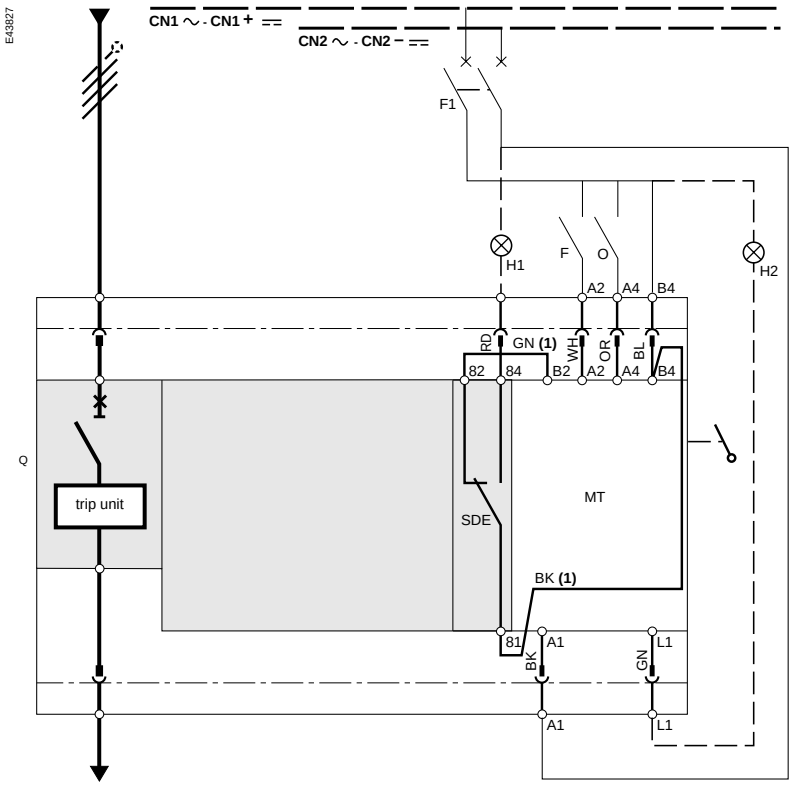
Symbols

Q	*Compact NS100 to 630*
SDE	*fault indication contact*
MT	*motor-mechanism module*
F1	*breaker for protection of motor-mechanism module circuits*
H1	*lamp signalling an electrical fault*
H2	*lamp signalling motor mechanism in manual position*
F	*closing order*
O	*opening order (must be > 150 ms)* — *orders must not be simultaneous*

Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
OR	*orange*
WH	*white*

Automatic reset without auxiliary

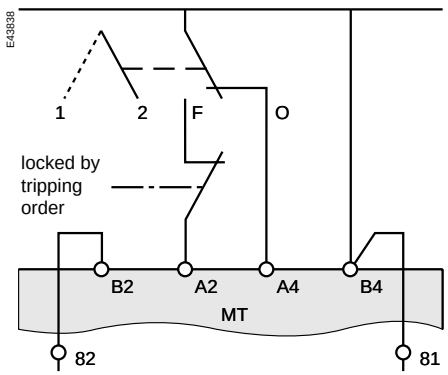


(1) wires supplied, must be connected to ensure correct operation.

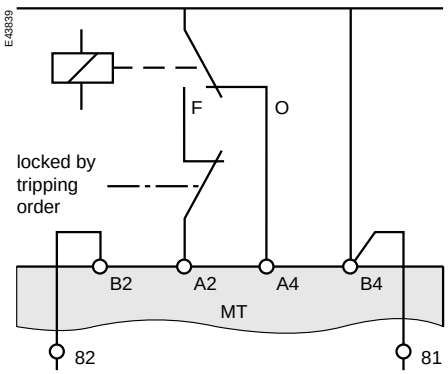
Control via switch or relay

With MN/MX

Controlled by switch

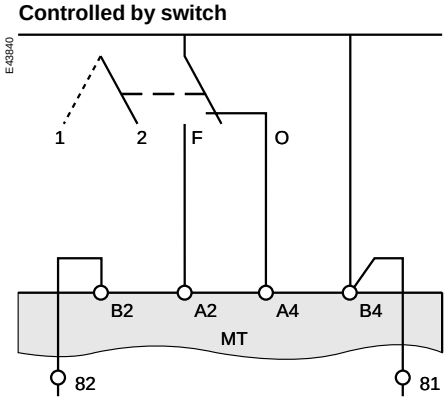


Controlled by relay

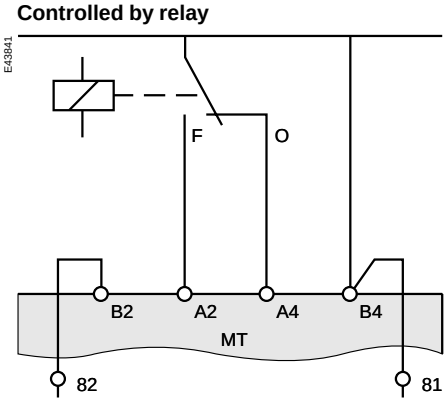


Without auxiliary

Controlled by switch



Controlled by relay

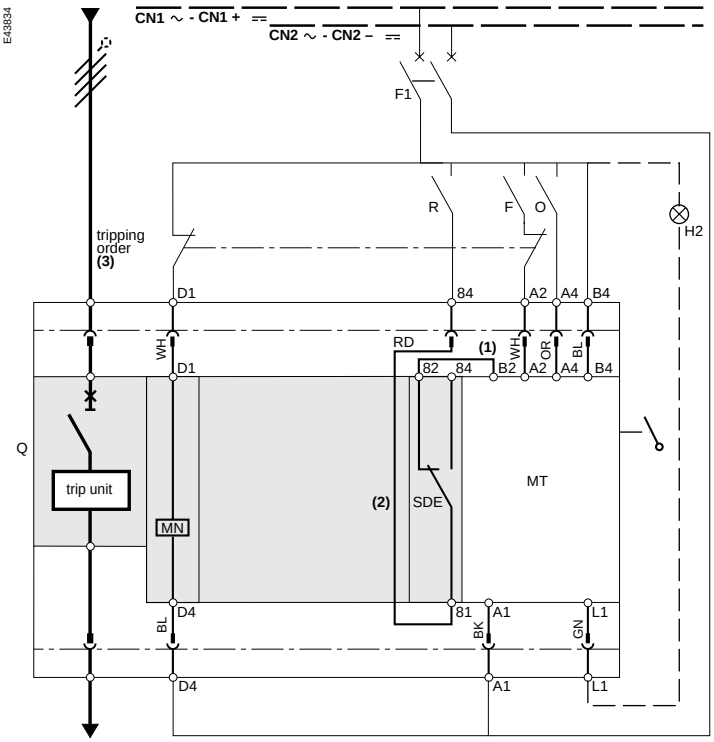


Compact NS100 to 630
Motor mechanism (automatic reset)

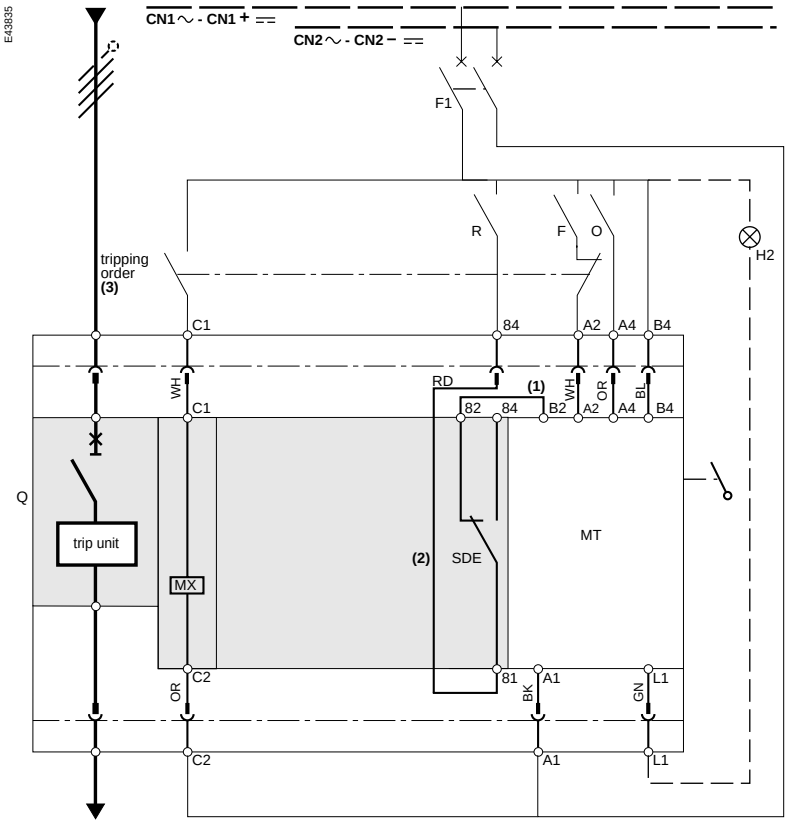
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Following tripping due to an electrical fault, reset must be carried out locally and manually.

Remote reset with MN



Remote reset with MX



(1) *wires supplied, must be connected to ensure correct operation.*
(2) *connect SDE terminal 81 to auxiliary-connector terminal 84.*
(3) *the tripping order must lock out the closing order.*

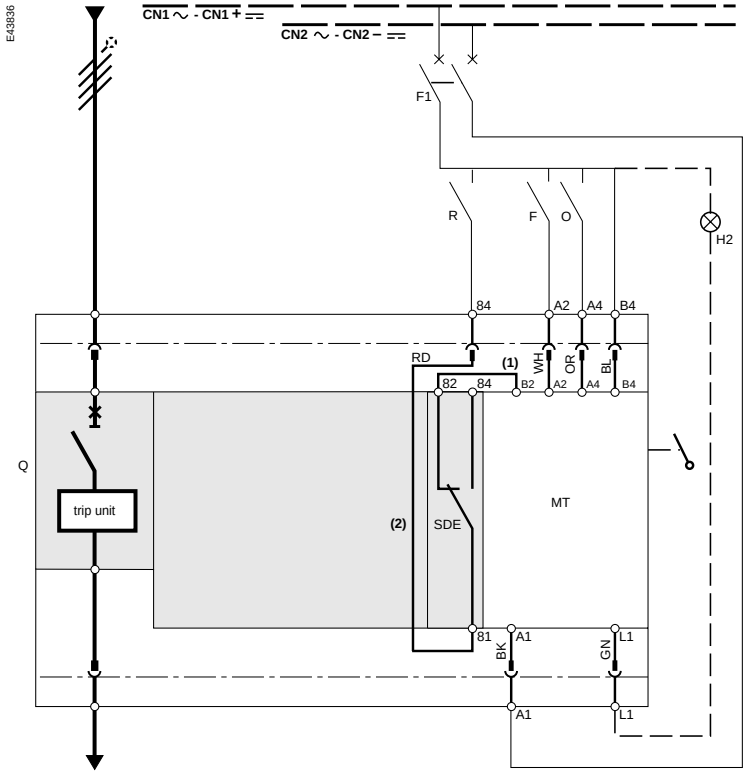
Symbols

Q	*Compact NS100 to 630*	
SDE	*fault indication contact*	
MN	*undervoltage release*	
MX	*shunt release*	
MT	*motor-mechanism module*	
F1	*breaker for protection of motor-mechanism module circuits and MN/MX*	
H2	*lamp signalling motor mechanism in manual position*	
R	*reset order (must be > 150 ms)*	*orders must not be simultaneous*
F	*closing order*	
O	*opening order (must be > 150 ms, has priority over F order)*	

Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
OR	*orange*
WH	*white*

Remote reset without auxiliary

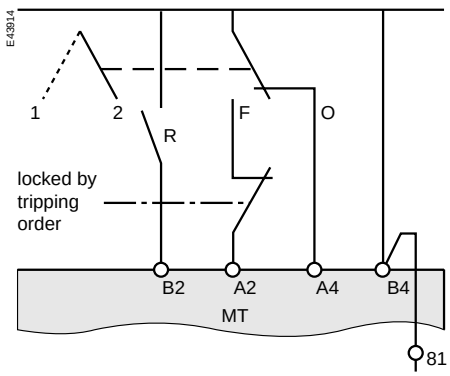


(1) wires supplied, must be connected to ensure correct operation.
(2) connect SDE terminal 81 to auxiliary-connector terminal 84.

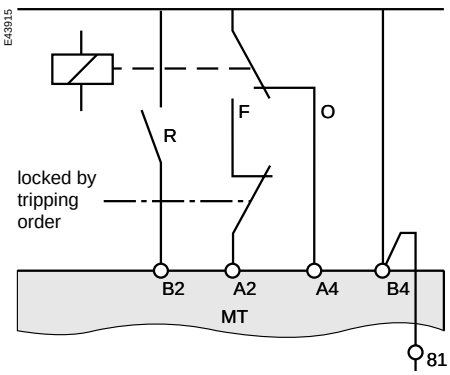
Control via switch or relay

With MN/MX

Controlled by switch

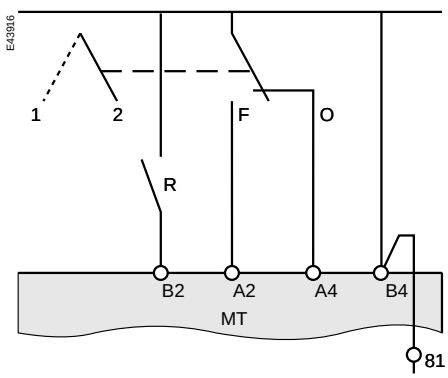


Controlled by relay

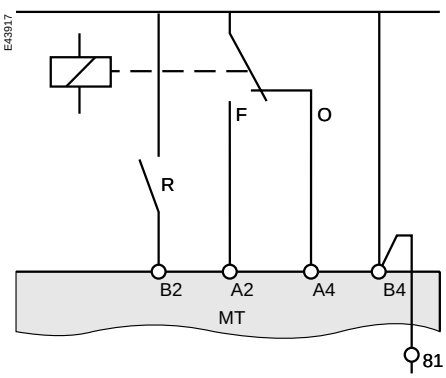


Without auxiliary

Controlled by switch



Controlled by relay

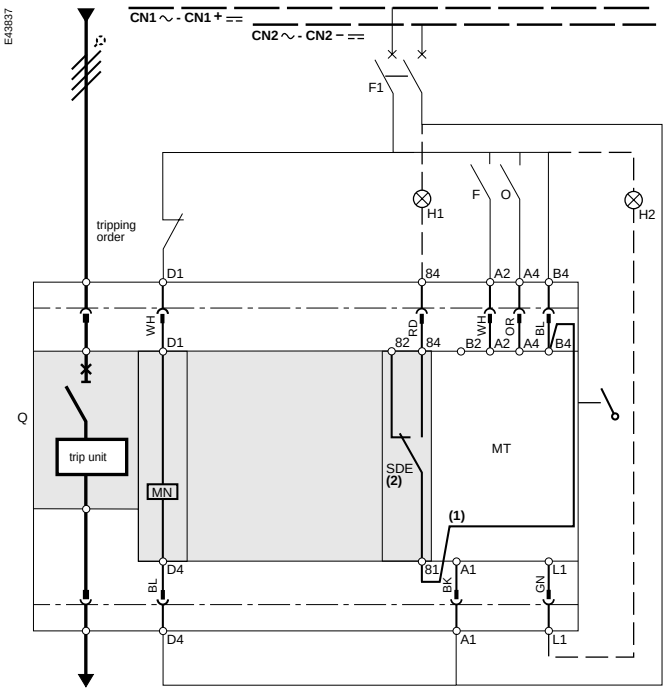


Compact NS100 to 630
Motor mechanism (local reset)

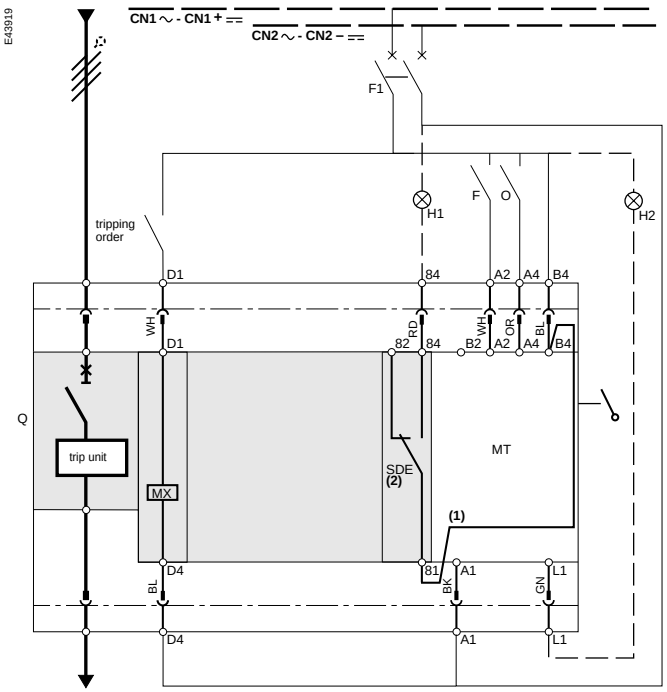
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Following tripping due to an electrical fault, reset must be carried out locally and manually.

Local reset with MN



Local reset with MX



(1) (2) *required to ensure correct indication of an electrical fault.*

Symbols

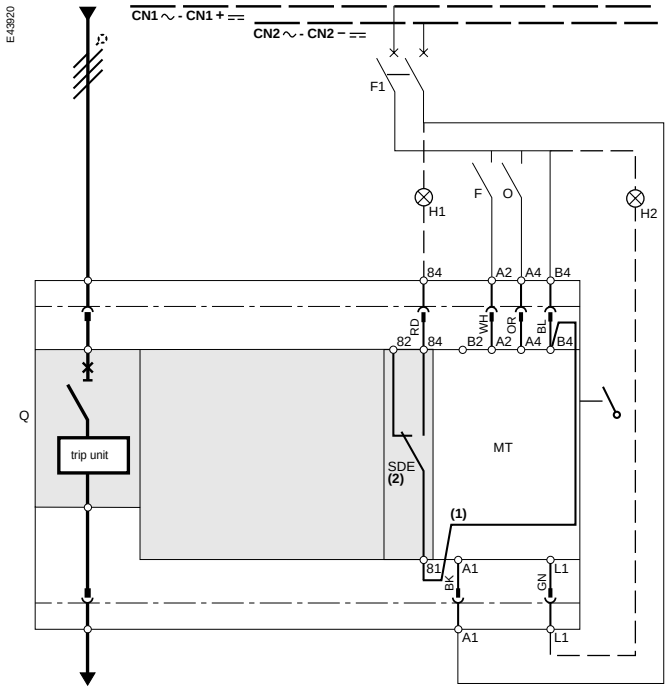
Q	*Compact NS100 to 630*
SDE	*fault indication contact*
MN	*undervoltage release*
MX	*shunt release*
MT	*motor-mechanism module*
F1	*breaker for protection of motor-mechanism module circuits and MN/MX*
H1	*lamp signalling an electrical fault*
H2	*lamp signalling motor mechanism in manual position*
F	*closing order*
O	*opening order (must be > 150 ms, has priority over F order)*

orders must not be simultaneous

Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
OR	*orange*
WH	*white*

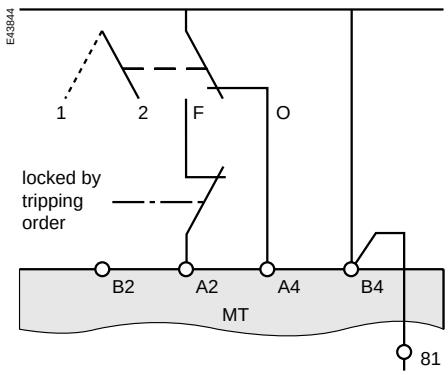
Local reset without auxiliary

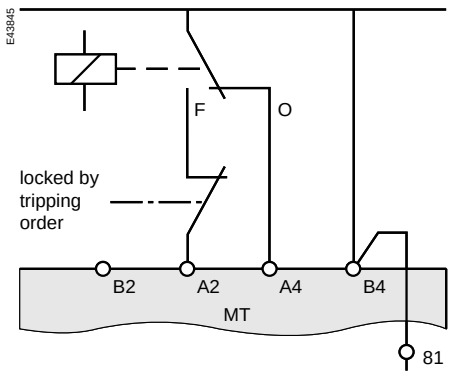


(1) (2) *required to ensure correct indication of an electrical fault.*

Control via switch or relay

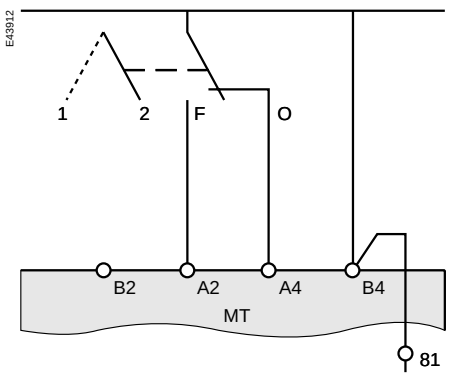
With MN/MX



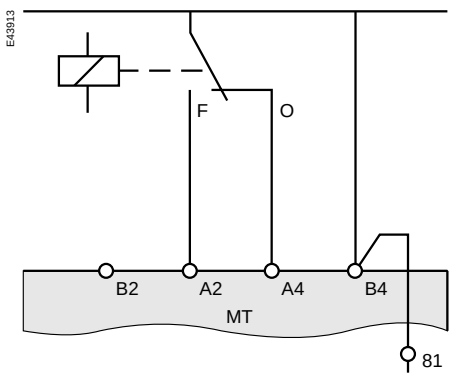


Without auxiliary

Controlled by switch



Controlled by relay

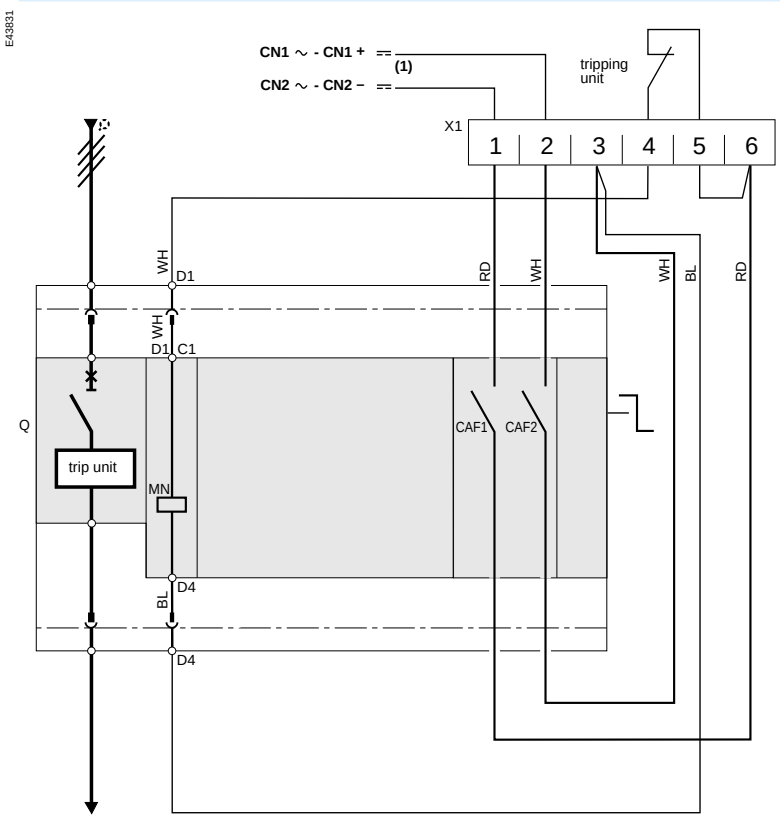


Compact NS100 to 630
Early-make contacts

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Following tripping due to an electrical fault, reset must be carried out locally and manually.

With MN



(1) *independent auxiliary source*

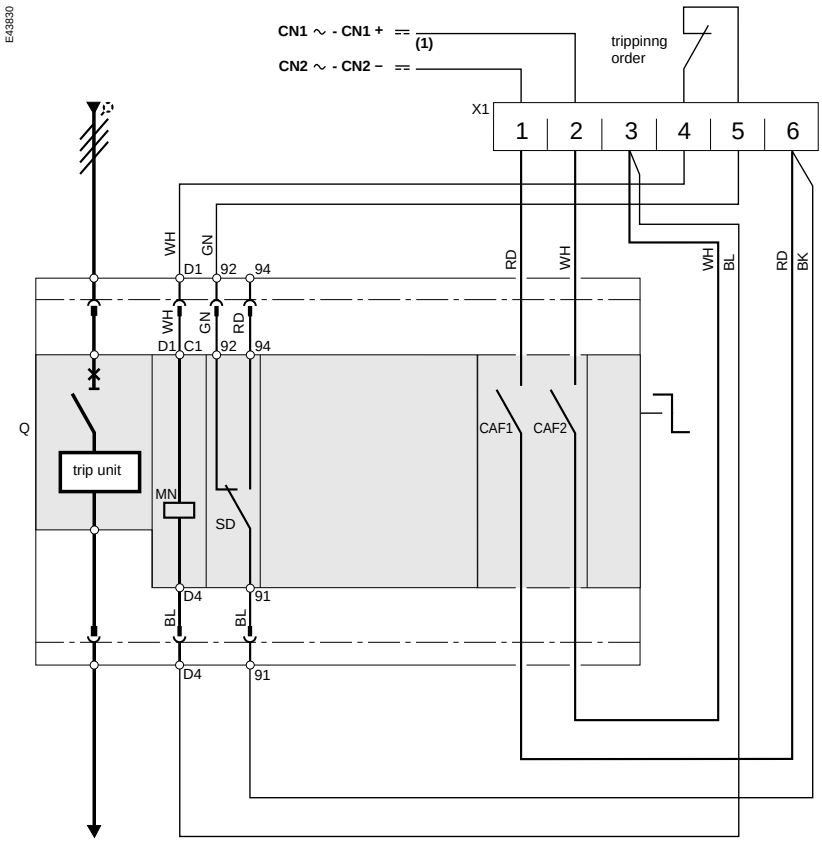
Symbols

Q	*Compact NS*
SD	*trip indication contact*
MN	*undervoltage release*
CAF	*early-make contact of rotary handle*
XI	*terminal block for CAF wiring (must be ordered)*

Colour code for auxiliary wiring

RD	*red*
GN	*green*
BK	*black*
BL	*blue*
WH	*white*

With MN + SD

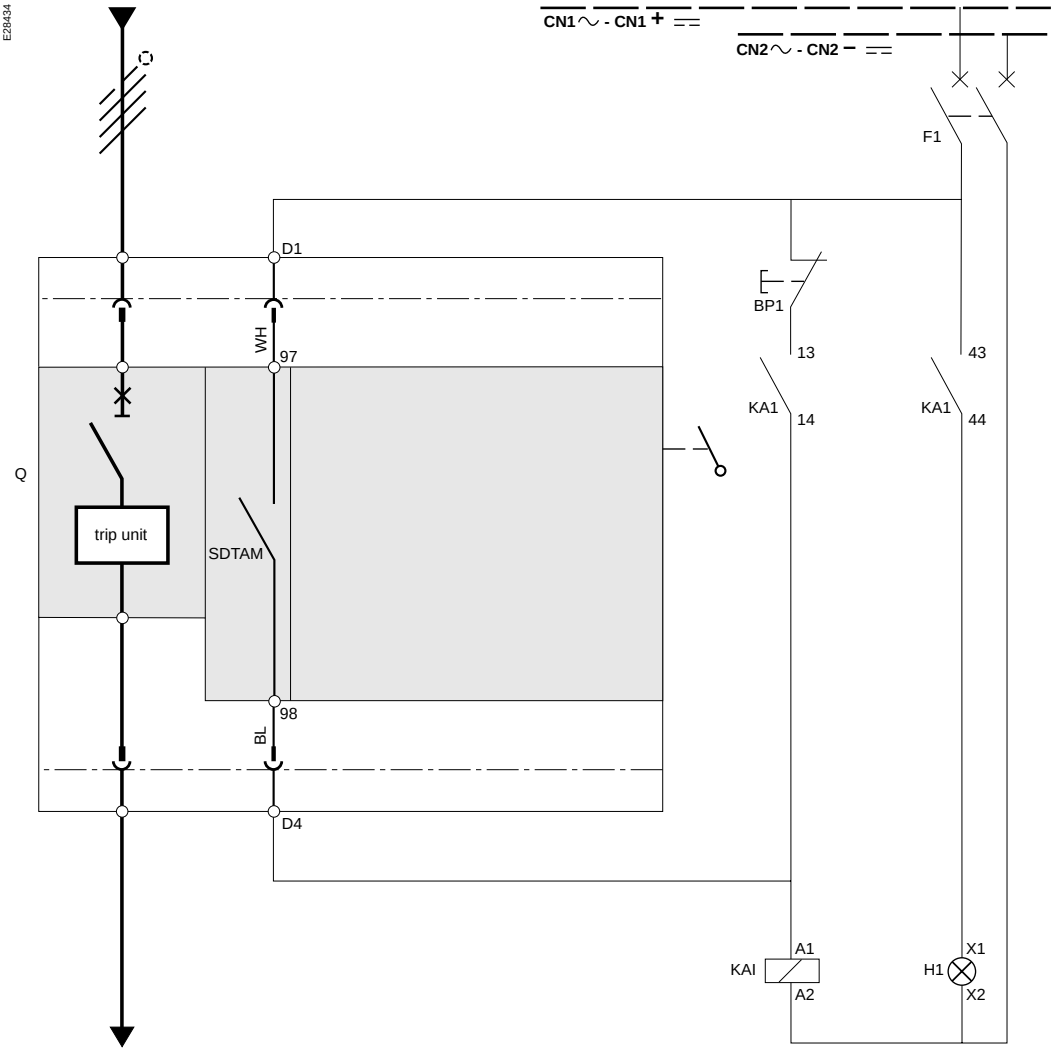


(1) *independent auxiliary source*

Compact NS100 to 630
Motorr protection
Trip unit STR22/43ME

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Thermal-fault indication



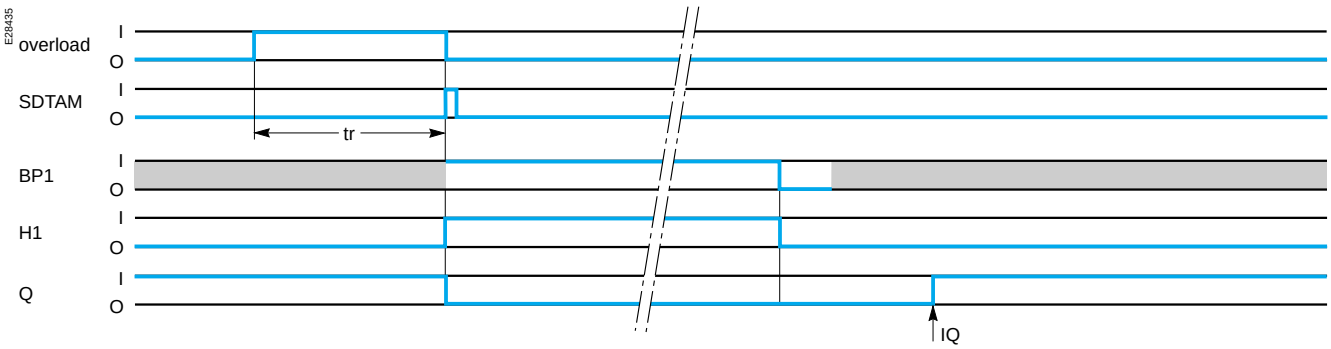
Symbols

Q	*Compact NS100 to 630*
F1	*breaker for protection of the auxiliary circuit*
SDTAM	*thermal-fault early-break signal*
BP1	*SDTAM reset button*
KA1	*auxiliary relay - Telemecanique CA...DN31 or CA...DN22*
H1	*lamp signalling SDTAM fault*

Colour code for auxiliary wiring

BL	*blue*
WH	*white*

Automatic operation



tr *overload (long-time) protection tripping time*
overload *current greater than Ir (long-time tripping threshold)*
IQ *closing order for circuit breaker Q*

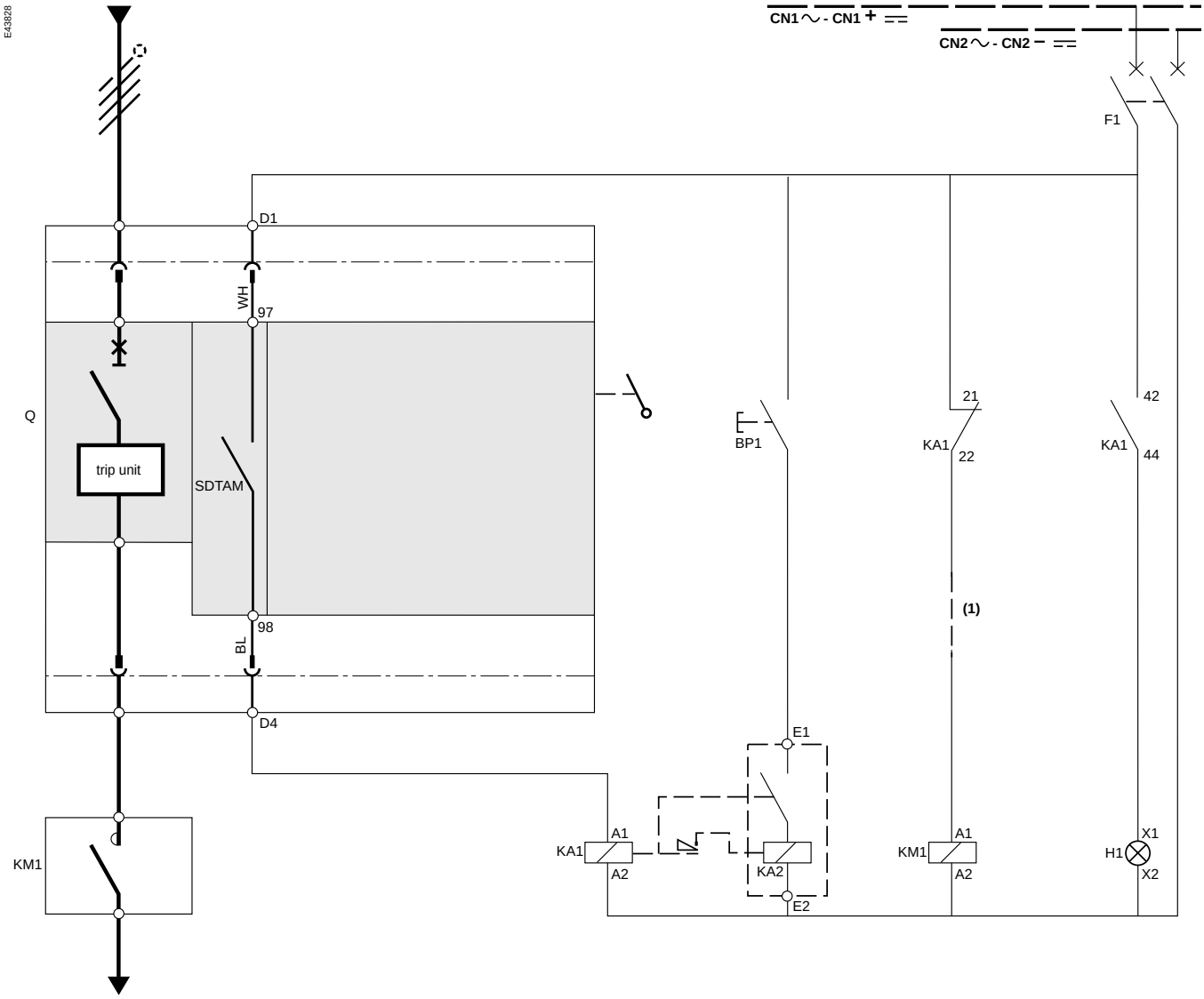
Legend
- *O: OFF (circuit open)*
- *I: ON (circuit closed)*
- *: either ON or OFF*

Note.
For a short-circuit or earth fault, only circuit breaker Q opens.
The above automatic control sequence is not run.

Compact NS100 to 630
Motor protection
Trip unit STR22/43ME

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Thermal-fault indication and tripping



(1) *KM1 operating conditions must be inserted between 22 and A1.*

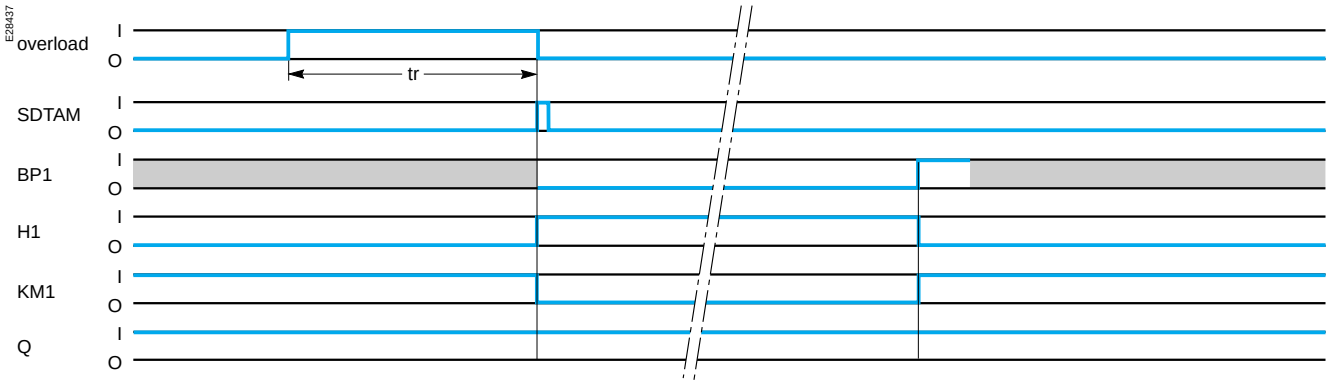
Symbols

Q	*Compact NS100 to 630*
F1	*breaker for protection of the auxiliary circuit*
SDTAM	*thermal-fault early-break signal*
BP1	*SDTAM reset button*
KA1	*auxiliary relay - Telemecanique CA...DN31 or CA...DN22*
KA2	*mechanical latching unit - Telemecanique LA6 DK1*
RHK	*bistable relay - Telemecanique RHK-41*
H1	*lamp signalling SDTAM fault*
KM1	*power contactor*

Colour code for auxiliary wiring

BL	*blue*
WH	*white*

Automatic operation

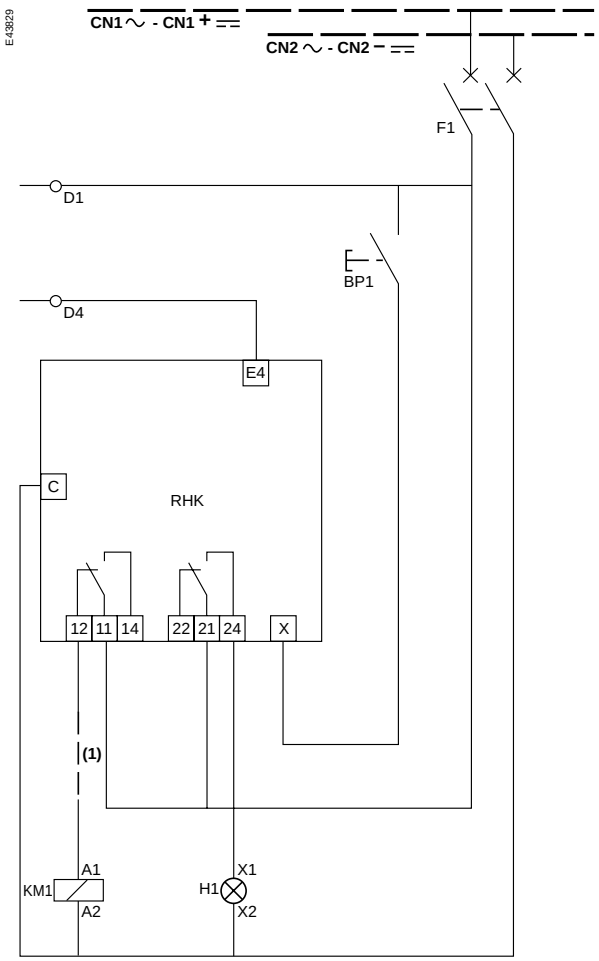


tr *overload (long-time) protection tripping time*
overload *current greater than Ir (long-time tripping threshold)*

Note.
For a short-circuit or earth fault, only circuit breaker Q opens.
The above automatic control sequence is not run.

Legend
- *O: OFF (circuit open)*
- *I: ON (circuit closed)*
- *: either ON or OFF*

Same automatic system using a bistable relay

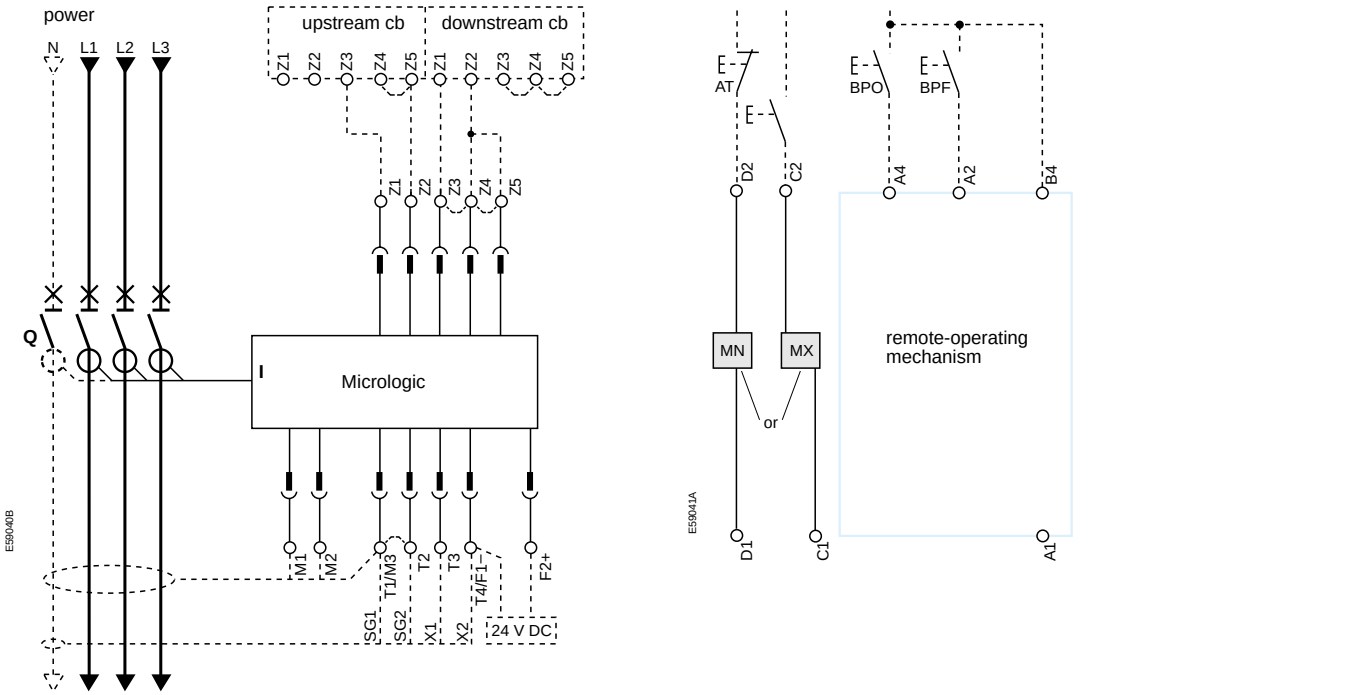


(1) *KM1 operating conditions must be inserted between 12 and A1.*

Compact NS630b to 1600
Fixed circuit breakers

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Power | **Control unit** | **Remote operation**



– (basic)	A	Control unit
■	■	E1-E6 communication
	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)
	■	T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	F2+, F1- external 24 V DC power supply

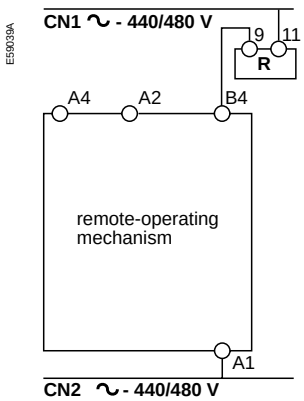
–: basic Micrologic control unit
***A**: digital ammeter*

Remote operation

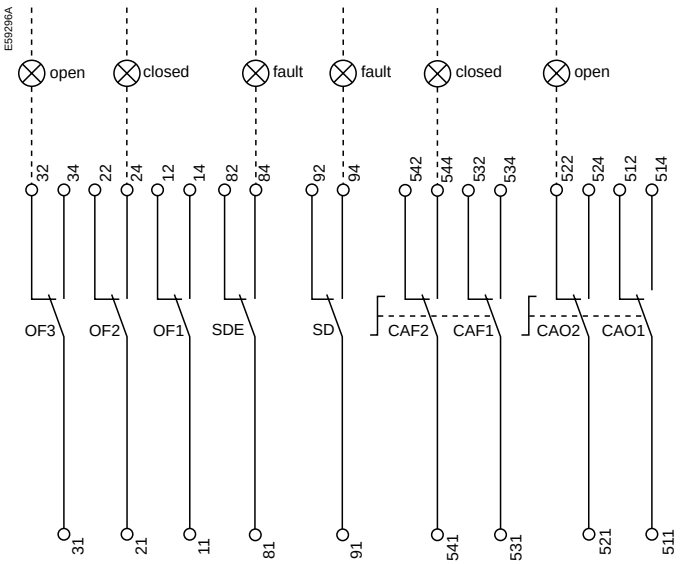
MN : undervoltage release
or
MX : shunt release

Remote-operating mechanism (*)
A4 : electrical opening order
A2 : electrical closing order
B4, A1 : power supply for control devices and gear motor

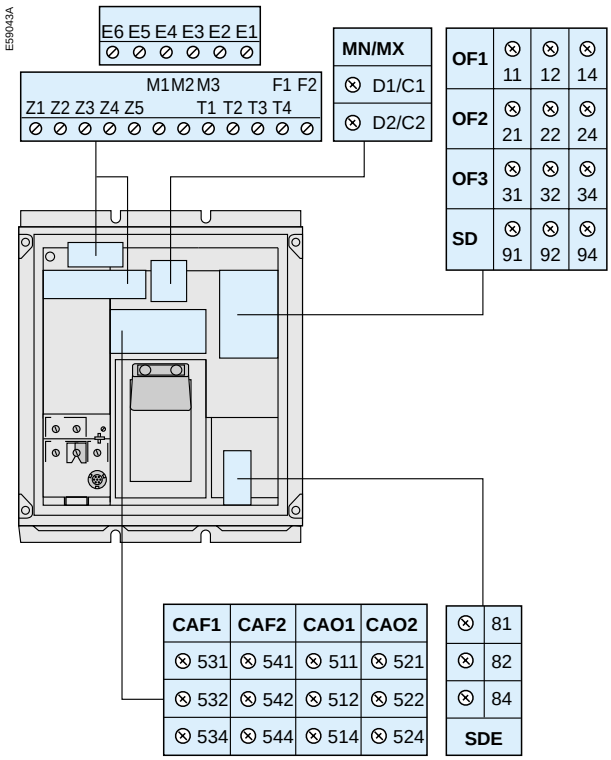
(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)



Indication contacts



Terminal-block marking (manual operation)



Indication contacts

OF3 / OF2 / OF1 : indication contacts

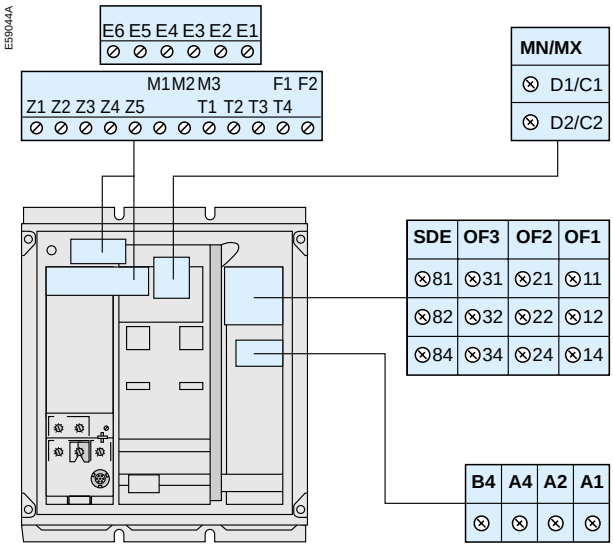
SDE : fault-trip indication contact (short-circuit, overload, earth fault)

SD : trip indication contact (manual operation)

CAF2/CAF1 : early-make contact (rotary handle)

CAO2 / CAO1 : early-break contact (rotary handle)

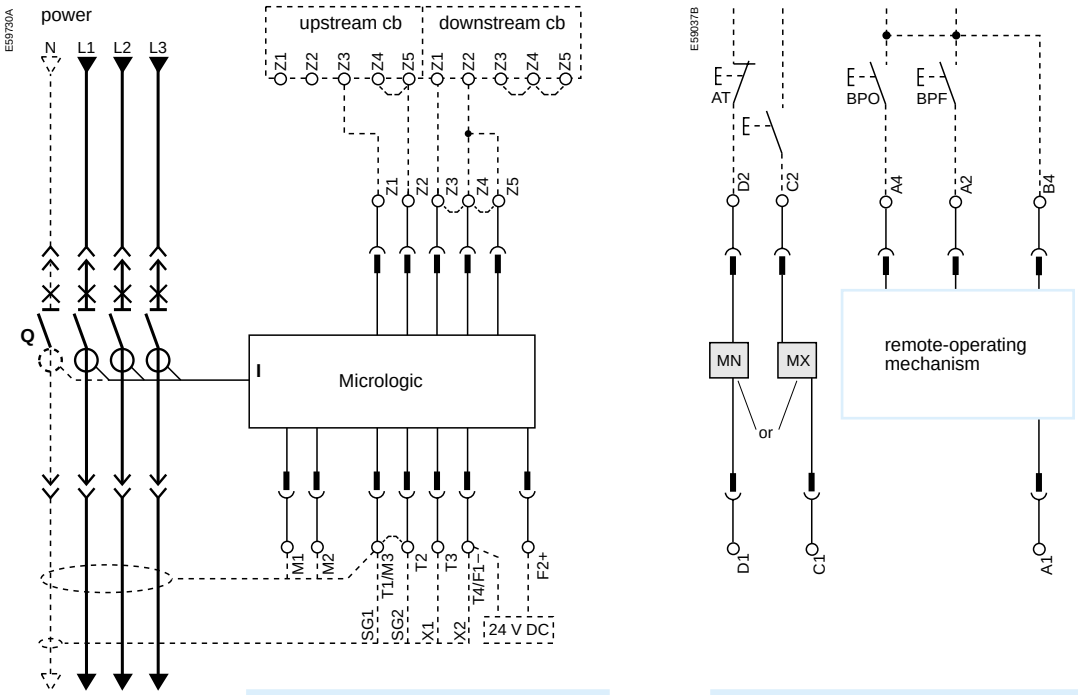
Terminal-block marking (with motor mechanism)



Compact NS630b to 1600
Plug-in / withdrawable circuit breakers

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Power | **Control unit** | **Remote operation**



Terminal-block marking

Control unit

Com	UC1	UC2	UC3
E5 E6	Z5 M1	M2 M3	F2+
E3 E4	Z3 Z4	T3 T4	
E1 E2	Z1 Z2	T1 T2	F1 –

Remote operation

MN / MX	MT2	MT1
D2 C2	A4	A2
		B4
D1 C1		A1

– (basic)	A	Control unit
■	■	**Com** : E1-E6 communication
	■	**UC1** : Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)
	■	**UC2** : T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	**UC3** : F2+, F1- external 24 V DC power supply

–: basic Micrologic control unit
***A**: digital ammeter*

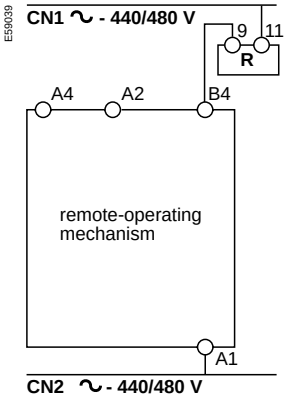
Remote operation

MN : undervoltage release
or
MX : shunt release

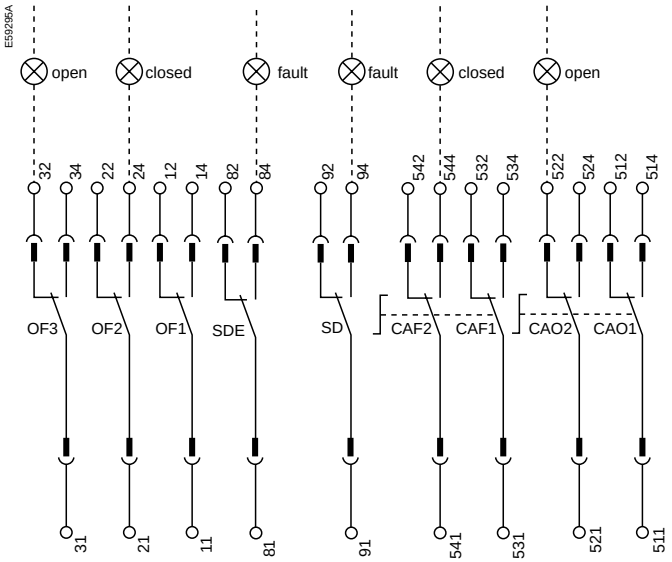
Remote-operating mechanism (*)
MT2 : **A4** : electrical opening order

MT1 : **A2** : electrical closing order
B4, A1 : power supply for control devices and gear motor (MCH)

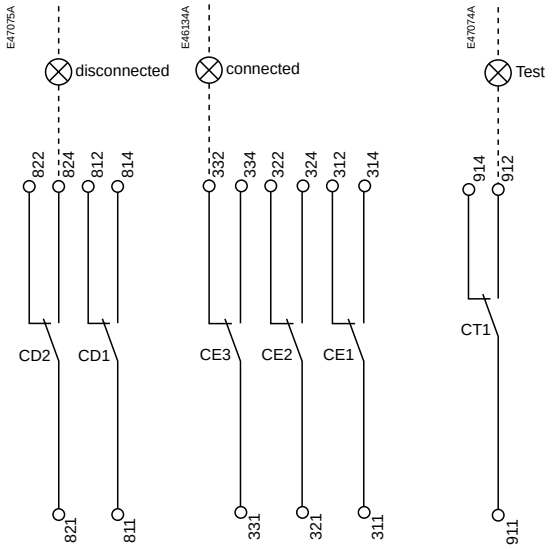
(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)



Indication contacts



Carriage switches



Indication contacts

CAF2	CAF1	SDE	SD	CAO2	CAO1	OF3	OF2	OF1
544	534	84	94	524	514	34	24	14
542	532	82	92	522	512	32	22	12
541	531	81	91	521	511	31	21	11

Carriage switches

CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

OF3 / OF2 / OF1 : indication contacts

SDE : fault-trip indication contact (short-circuit, overload, earth fault)

SD : trip indication contact (manual operation)

CAF2/CAF1 : early-make contact (rotary handle)

CAO2 / CAO1 : early-break contact (rotary handle)

Carriage switches

CD2 : disconnected position
CD1

CE3 : connected position
CE2
CE1

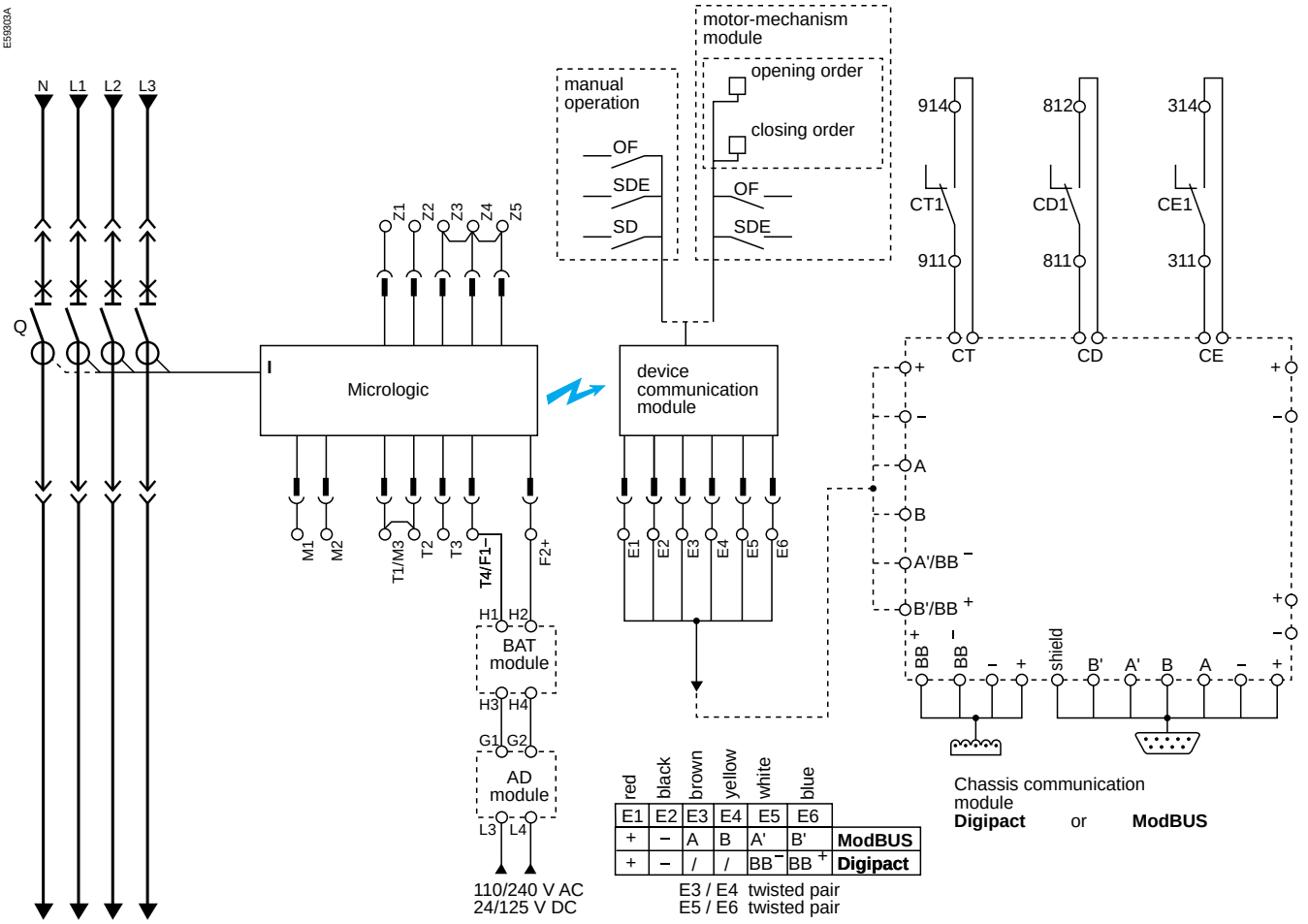
CT1 : test position

Legend

Connected
(only one wire per connection point)

Compact NS630b to 3200
Communications option
24 V DC external power supply

Connection of the communications option



None of the control-unit protection functions require an auxiliary source. However, the 24 V DC external power supply (AD module) is required for certain operating configurations as indicated in the table below.

Circuit breaker	Closed	Open
Communications option	no	no
Fonction protection	no	no
Display function	no (1)	yes
Circuit-breaker status indications and control communications bus	no	no

(1) except if current < 20% In

If the 24 V DC external power supply (AD module) is used, the maximum cable length between the 24 V DC external power supply (G1, G2) and the Micrologic control unit (F1-, F2+) is ten metres.

The communications bus requires its own 24 V DC power source (E1, E2). This source is not the same as the 24 V DC external power-supply module (F1-, F2+).

The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.

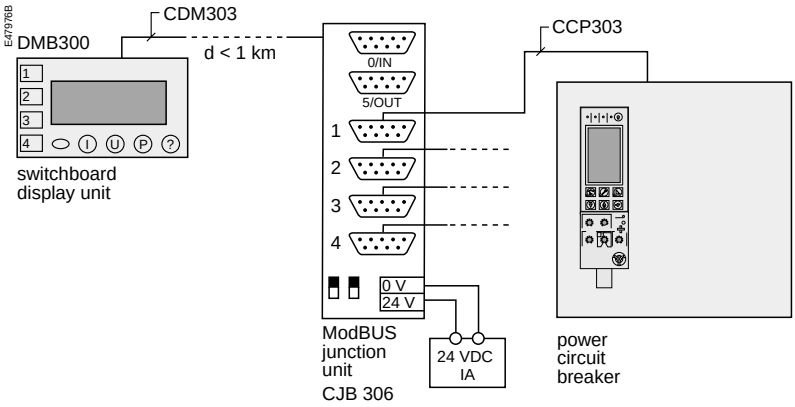
Examples using the COM communications option

Switchboard display unit

This architecture provides remote display of the variables managed by Micrologic control units equipped with the Eco COM ModBus module.

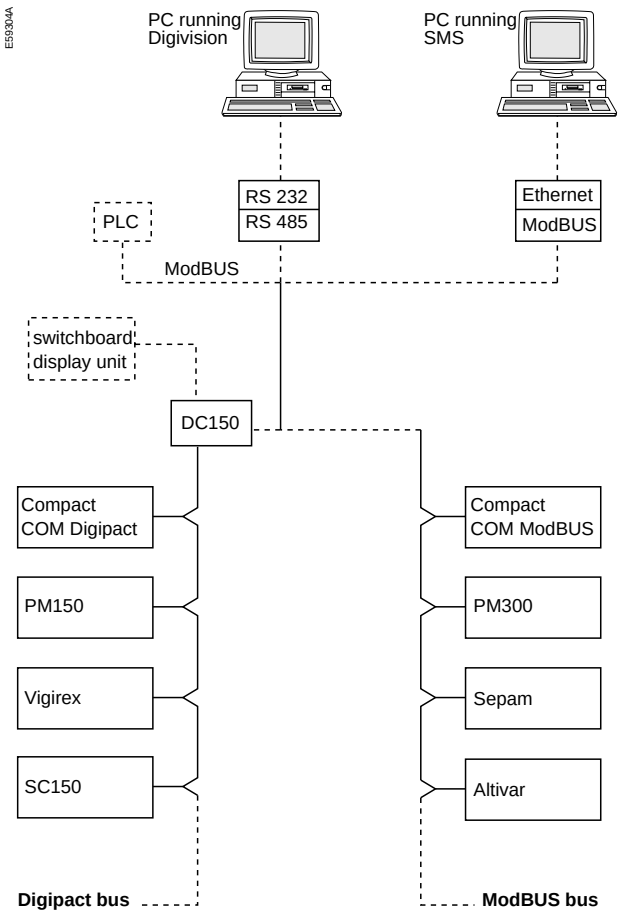
■ I (Micrologic A)

No programming is required.



Communicating switchboard

This configuration provides remote display and control of Compact devices equipped with the ModBus or Digipact COM module. The Digipact bus can be combined with the ModBus bus.



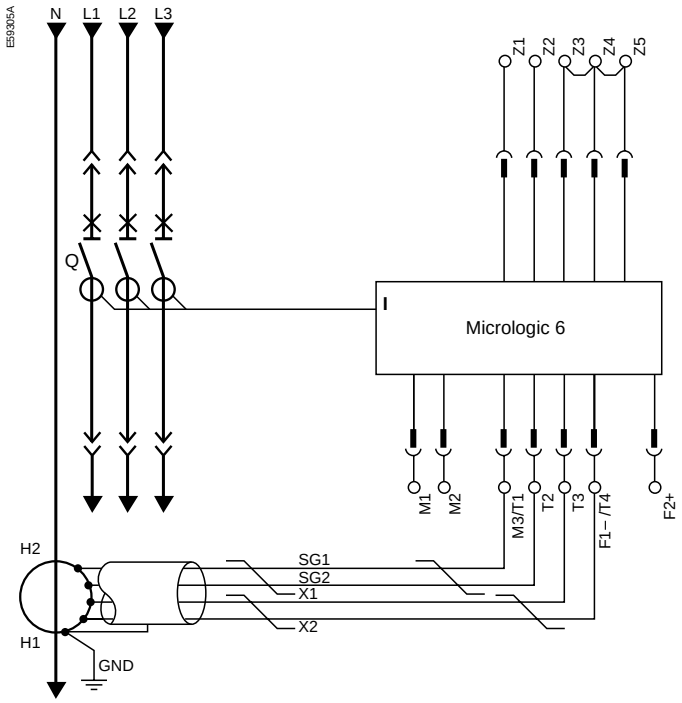
Compact NS630b to 3200
Earth-fault and earth-leakage protection
Zone selective interlocking

External sensor (CT) for residual earth-fault protection

Connection of current-transformer secondary circuit for external neutral
Compact equipped with a Micrologic 6 A:
- shielded cable with 2 twisted pairs
- SG1 twisted with SG2
- X1 twisted with X2
- shielding connected to GND on one end only
- maximum length 5 metres
- cable cross-sectional area 0.4 to 1.5 mm^2
- recommended cable: Belden 9552 or equivalent.

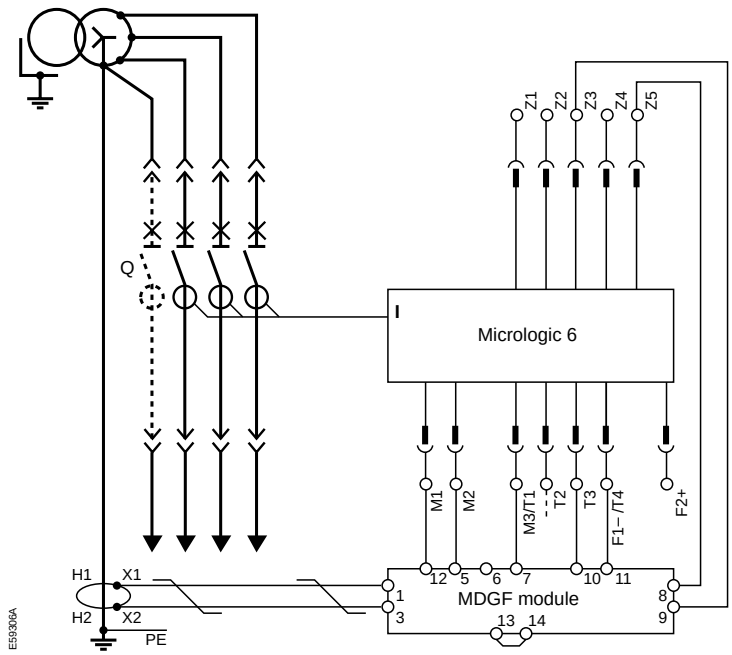
f supply is via the bottom, control and power wiring is identical (H1 connected to the source side, H2 to the load side).

For four-pole versions, for residual earth-fault protection, the current transformer for the external neutral is not necessary.



External transformer for source ground return (SGR) earth-fault protection

Connection of the secondary circuit
Compact equipped with a Micrologic 6 A:
- unshielded cable with 1 twisted pair
- maximum length 150 metres
- cable cross-sectional area 0.4 to 1.5 mm^2
- recommended cable: Belden 9409 or equivalent.

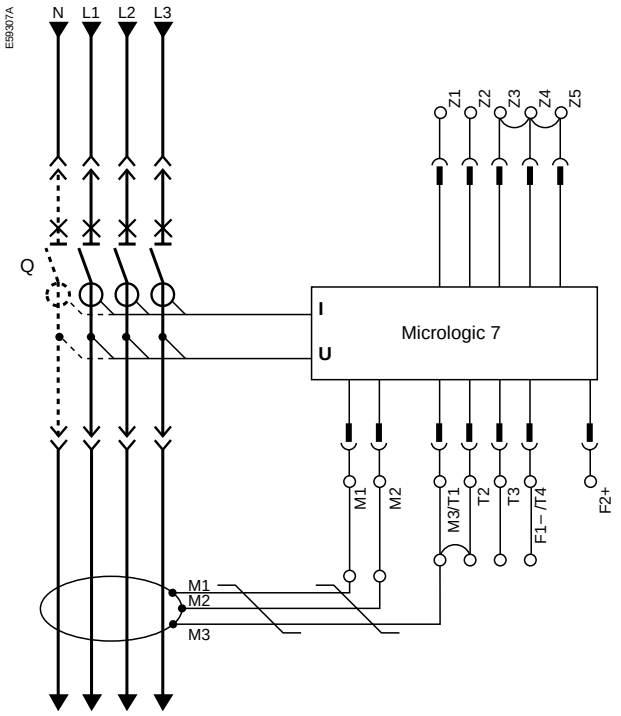


Earth-leakage protection

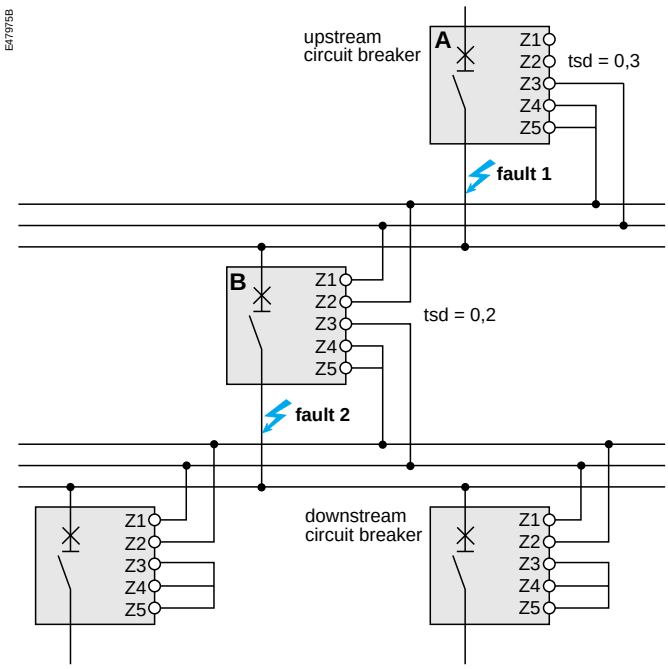
Connection of the rectangular-sensor secondary circuit

Compact equipped with a Micrologic 7 A:

- ■ unshielded cable with 3 twisted conductors:
- □ M1, M2, M3 twisted together
- ■ maximum length 4 metres
- ■ cable cross-sectional area 0.4 to 1.5 mm^2
- ■ recommended cable: Belden 9493 or equivalent.



Zone selective interlocking



A pilot wire interconnects a number of circuit breakers equipped with Micrologic A control units, as illustrated in the diagram above.
The control unit detecting a fault sends a signal upstream and checks for a signal arriving from downstream. If there is a signal from downstream, the circuit breaker remains closed for the full duration of its tripping delay. If there is no signal from downstream, the circuit breaker opens immediately, whatever the tripping-delay setting.

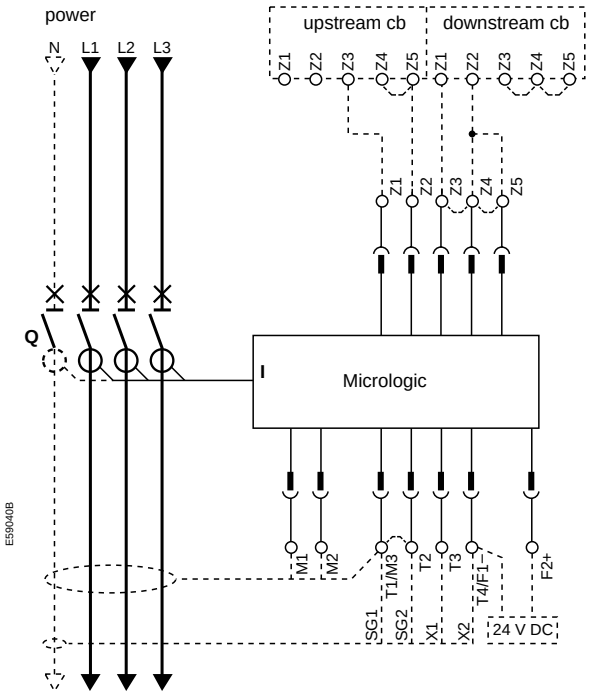
Fault 1.
Only circuit breaker A detects the fault. Because it receives no signal from downstream, it immediately opens in spite of its tripping delay set to 0.3.

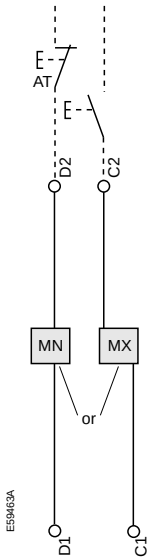
Fault 2.
Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.

Note. *The maximum permissible distance between two devices is 3000 metres and the maximum number of devices is 100.*

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Power | **Control unit** | **Remote operation**





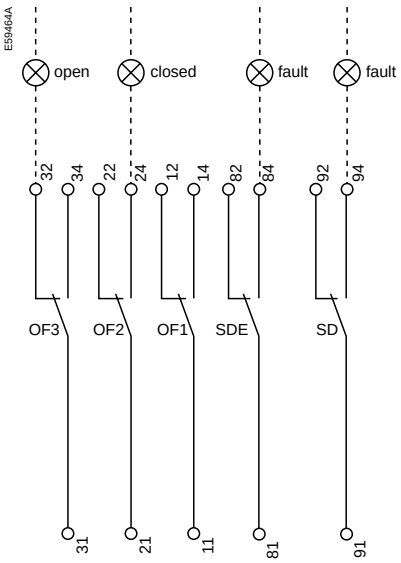
– (basic)	A	Control unit
■	■	E1-E6 communication
	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)
	■	T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	F2+, F1- external 24 V DC power supply

: basic Micrologic control unit
***A**: digital ammeter*

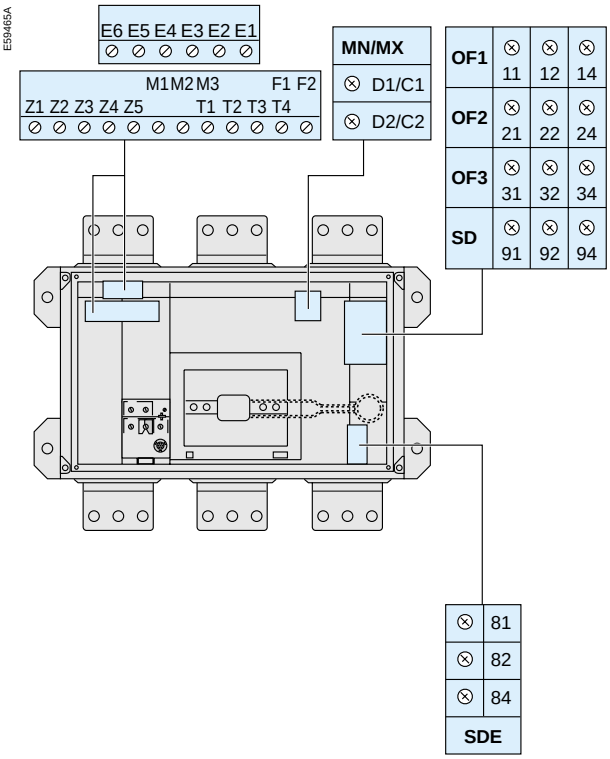
Remote operation

MN : undervoltage release
or
MX : shunt release

Indication contacts



Terminal-block marking



Indication contacts

OF3 / OF2 / OF1 : ON / OFF indication contacts

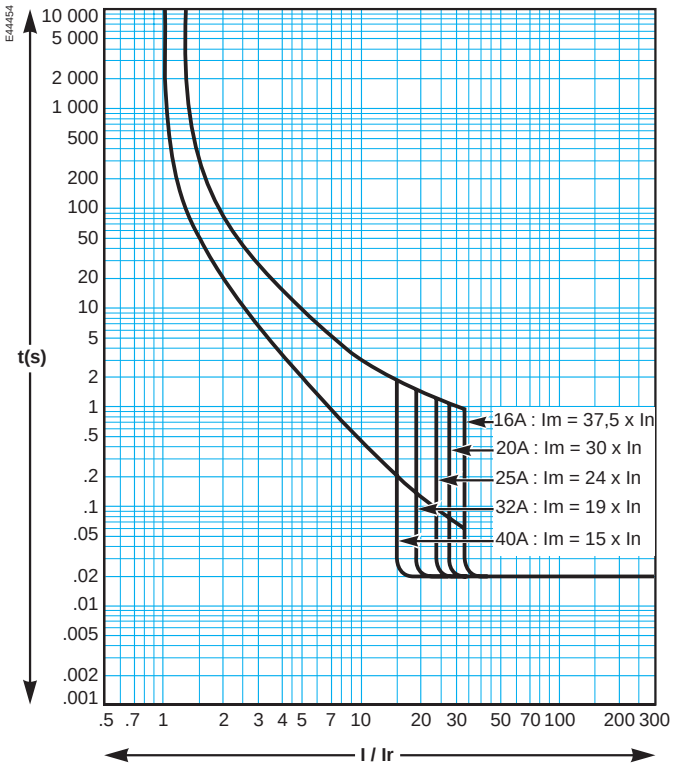
SDE : fault-trip indication contact
(short-circuit, overload, earth fault)

SD : trip indication contact

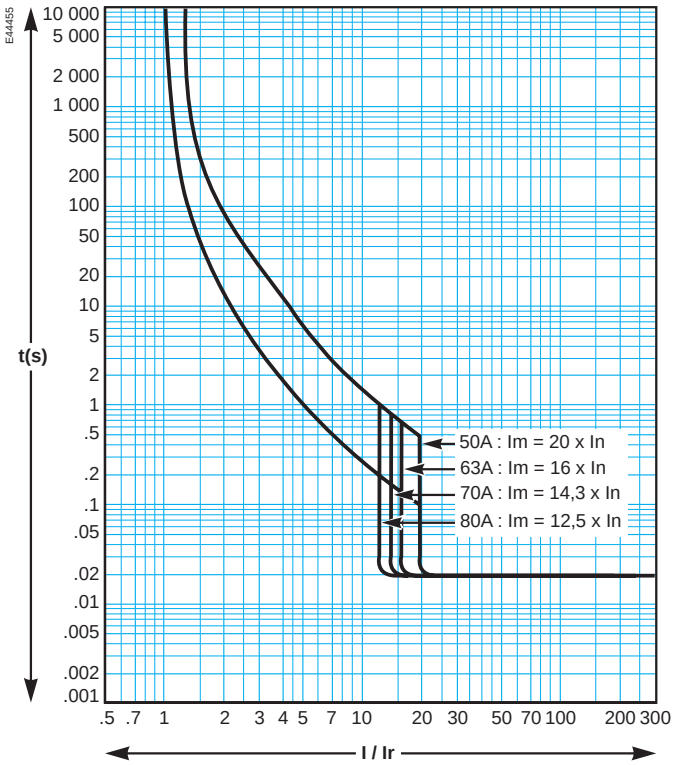
Tripping curves
Compact NSC100

Compact NS100 to 630 devices incorporate the exclusive reflex-tripping system.
This system breaks very high fault currents by mechanically tripping the device via a "piston" actuated directly by the pressure produced in the breaking units resulting from a short-circuit.
For high short-circuits, this system provides a faster break and a trip guarantee, as well as natural total discrimination.
Reflex-tripping curves are exclusively a function of the circuit-breaker rating.

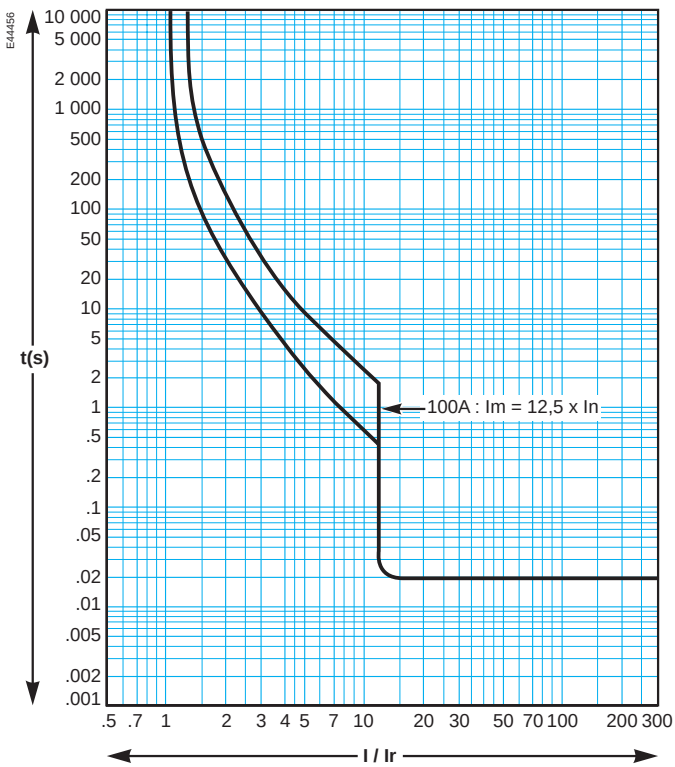
16…40 A



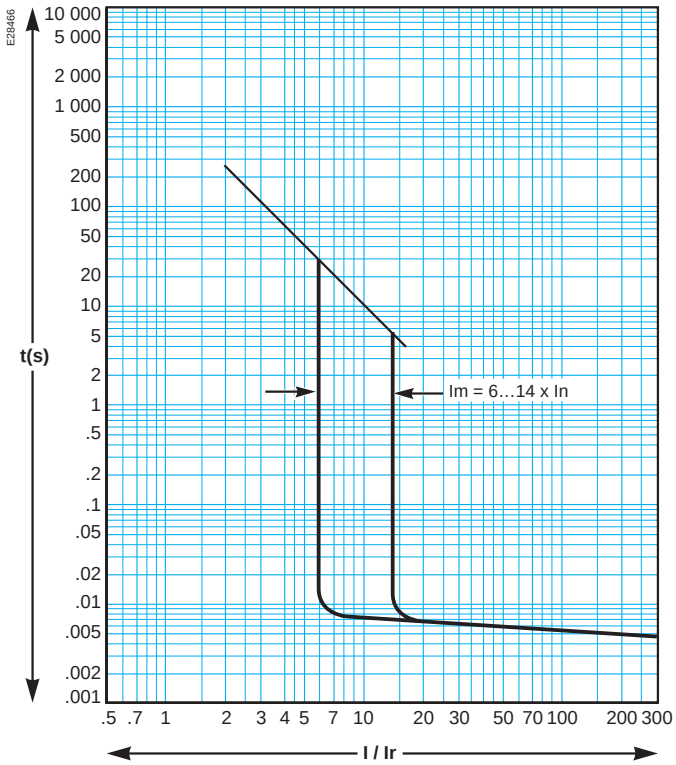
50…80 A



100 A

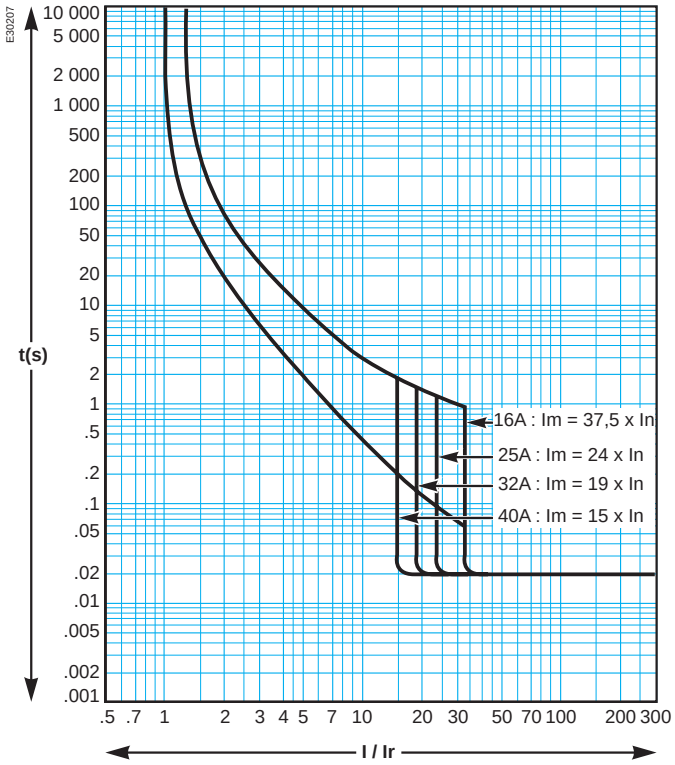


MA1.5...MA80

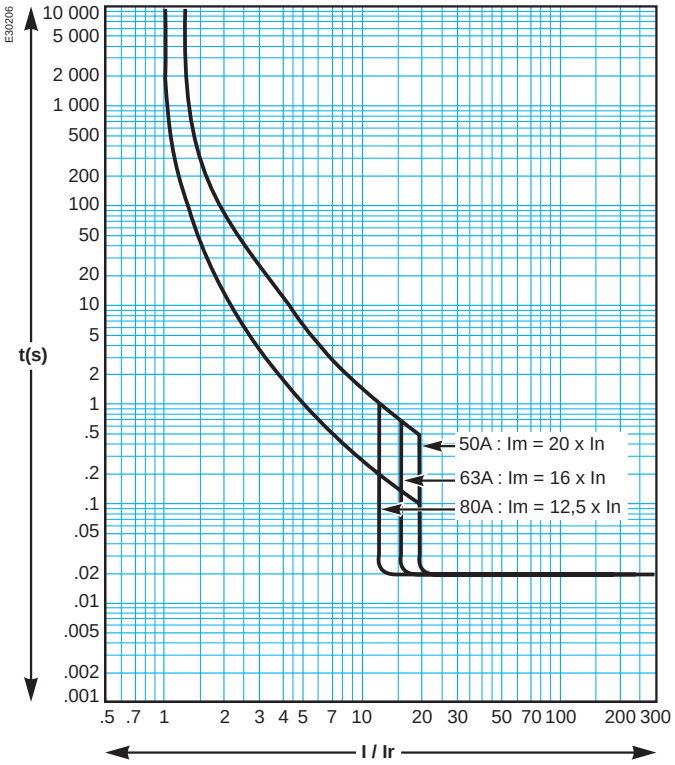

E28466
10 000
5 000
2 000
1 000
500
200
100
50
20
10
5
2
1
.5
.2
.1
.05
.02
.01
.005
.002
.001
t(s)
Im = 6...14 x In
.5 .7 1 2 3 4 5 7 10 20 30 50 70 100 200 300
I / Ir

Tripping curves
Compact NSA160

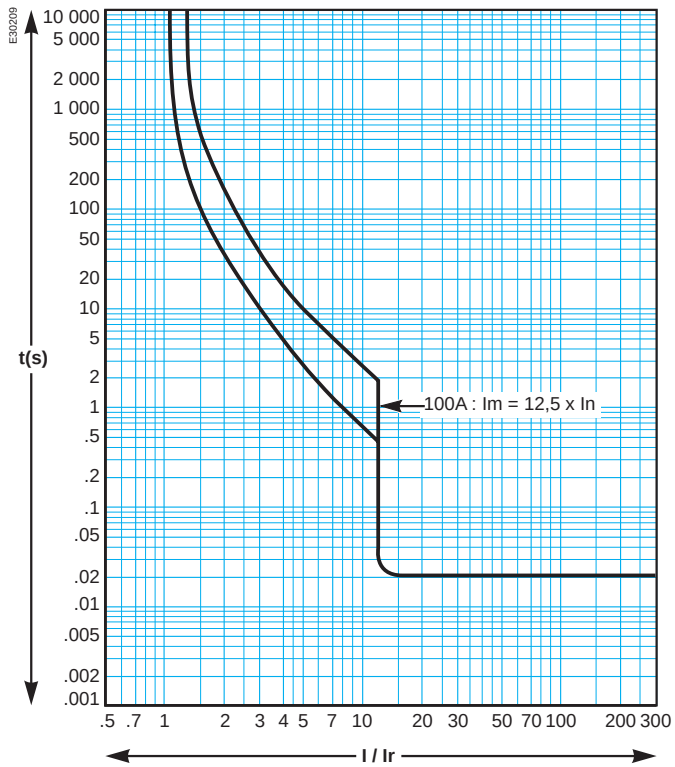
16…40 A



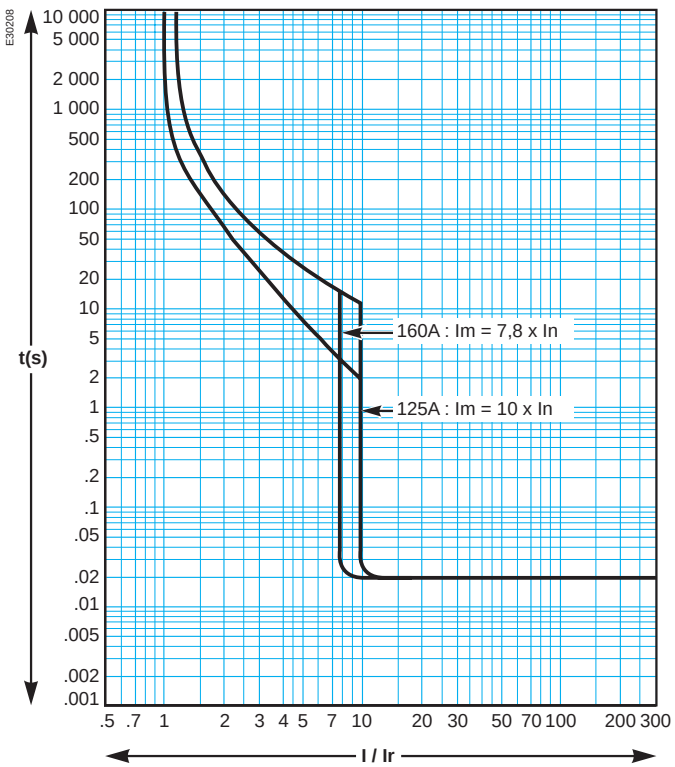
50…80 A



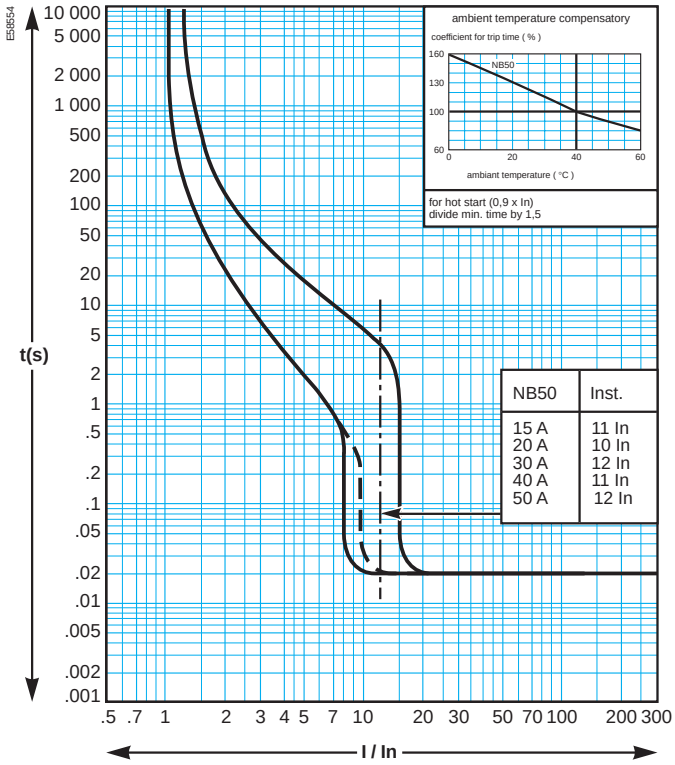
100 A



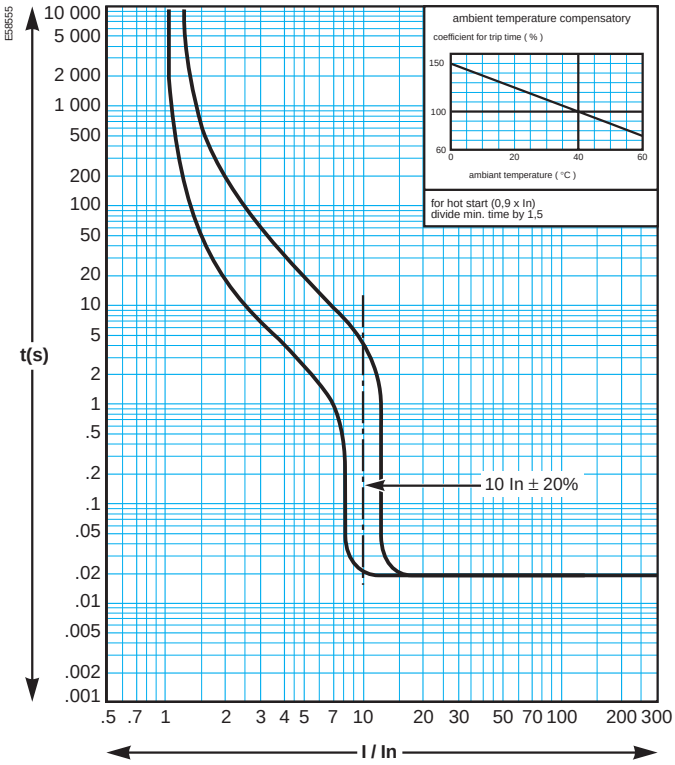
125…160 A



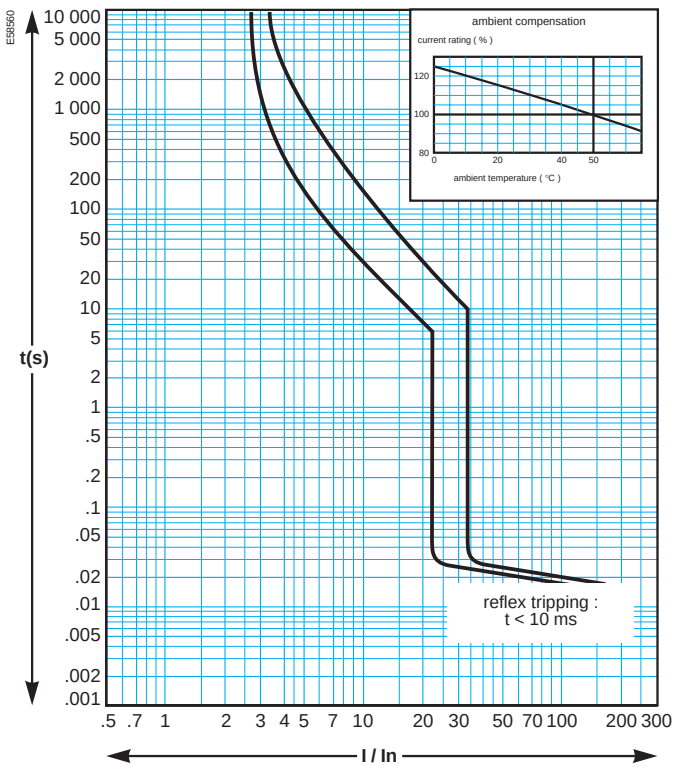
NB50 / NB100 - 15…50 A



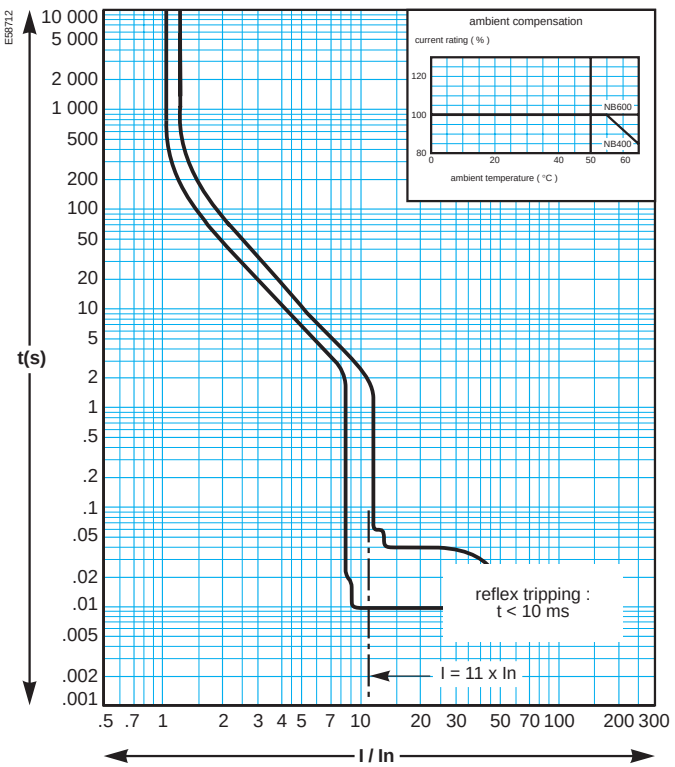
NB100 - 50…100 A



NB250



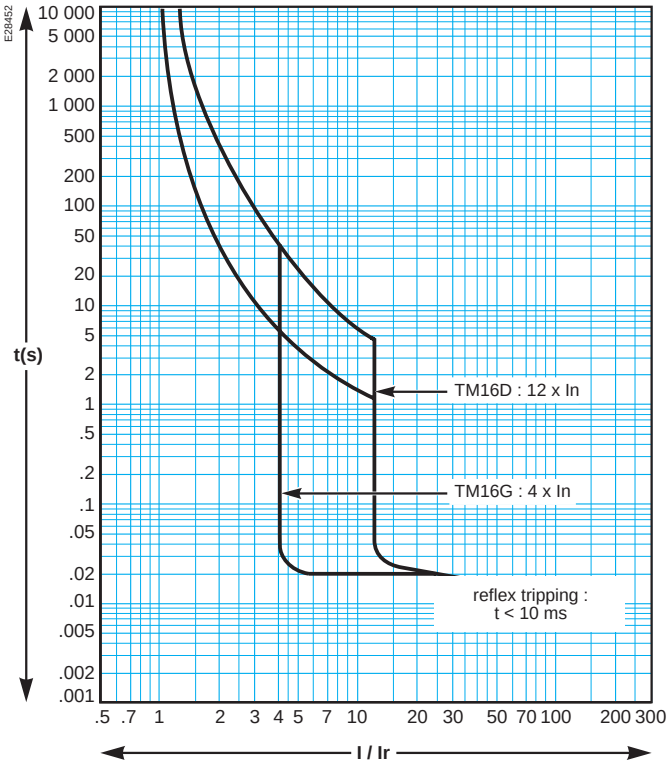
NB400 / 600



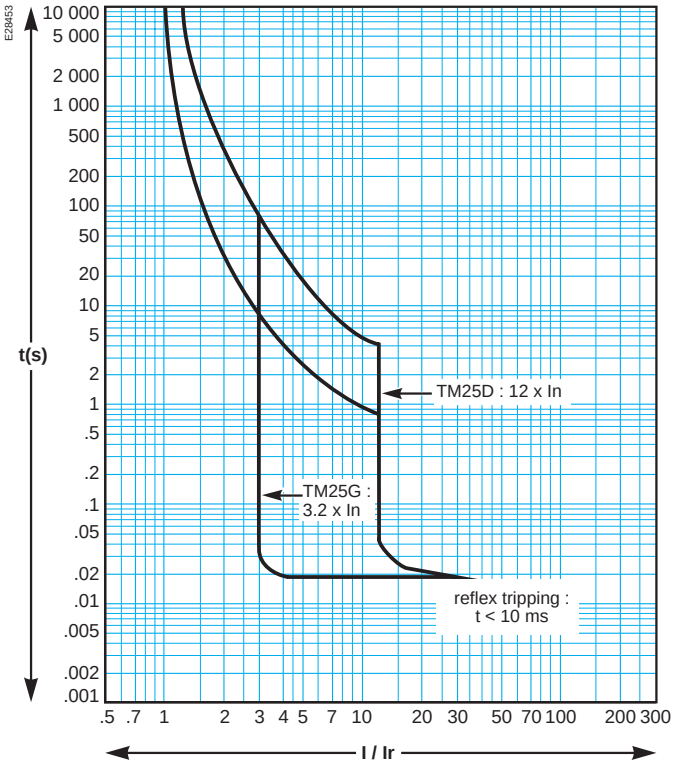
Tripping curves
Compact NS100 to 250
Protection of distribution systems

TM magnetic trip units

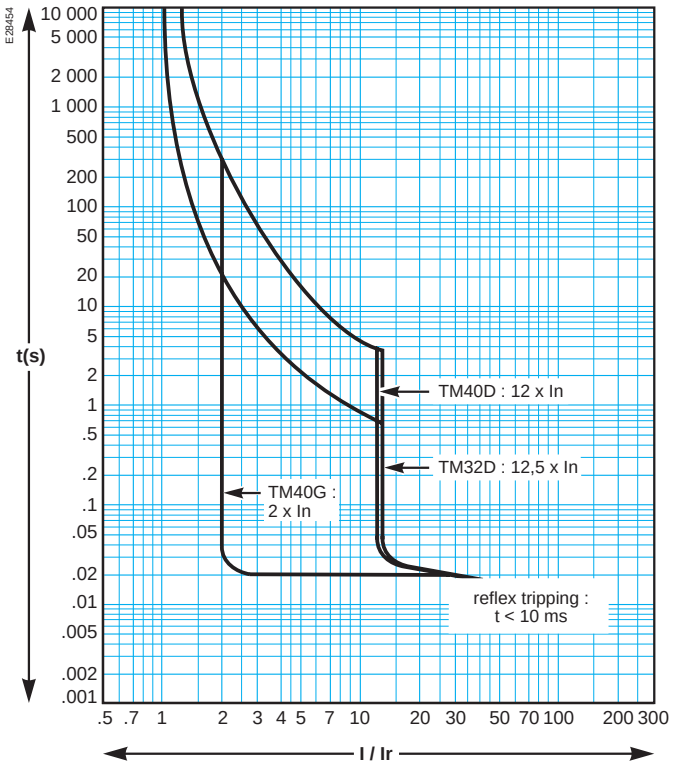
TM16D / TM16G



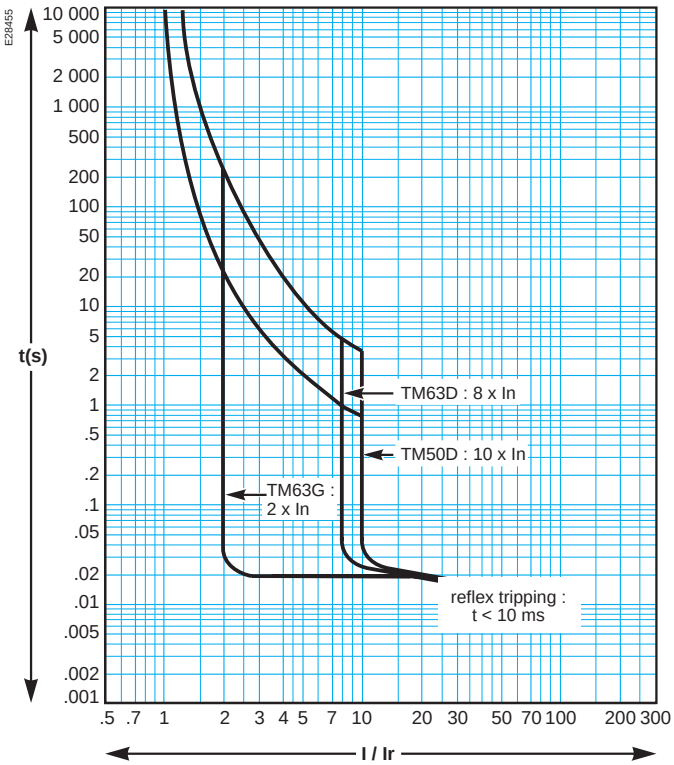
TM25D / TM25G



TM32D / TM40D / TM40G

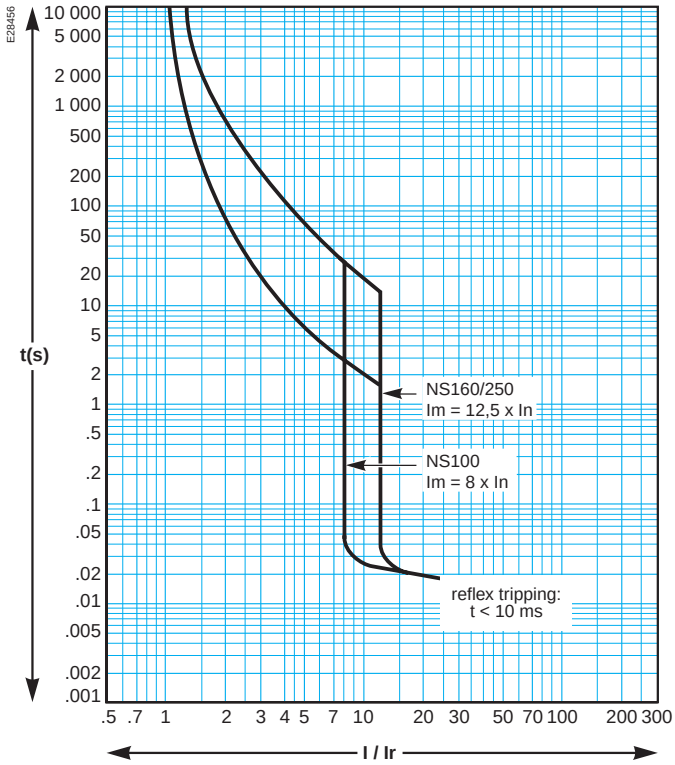


TM50D / TM63D / TM63G

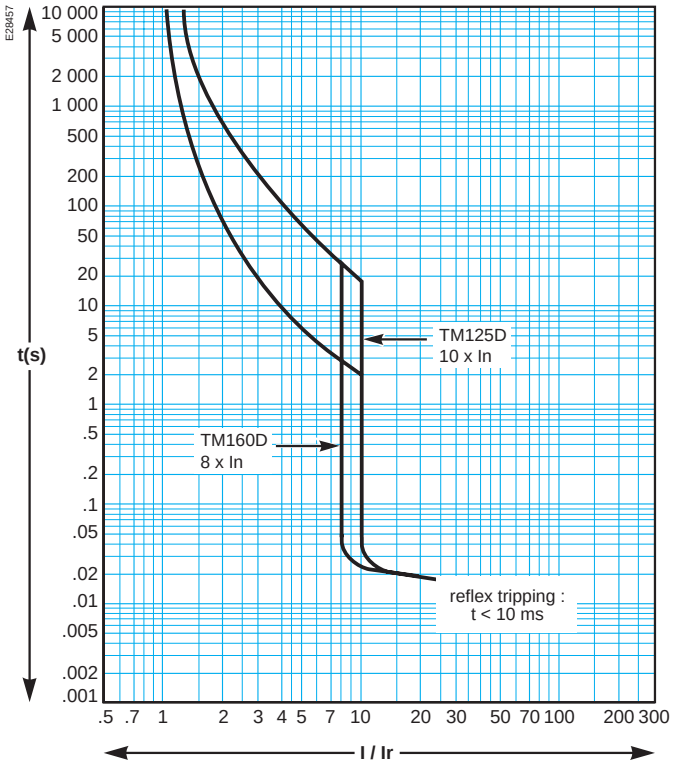


TM magnetic trip units (cont.)

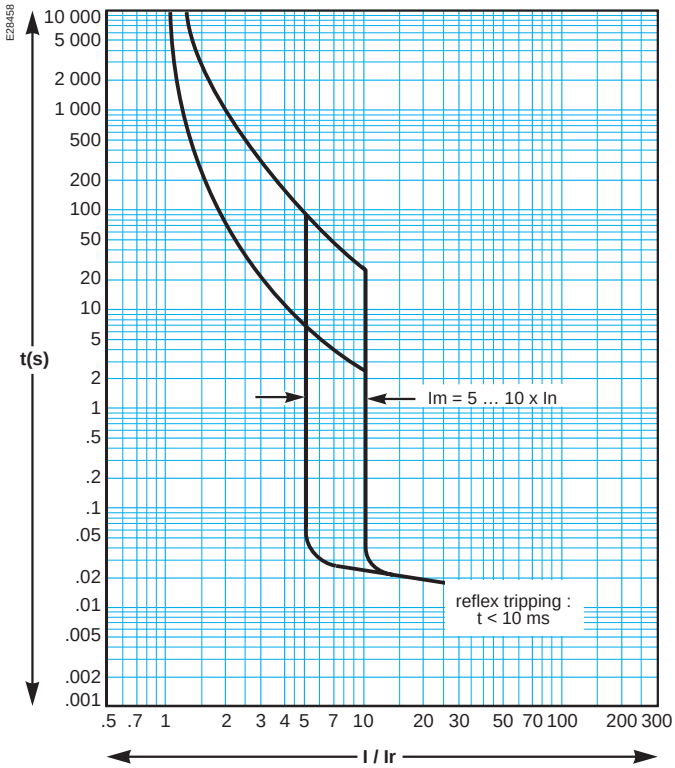
TM80D / TM100D



TM125D / TM160D



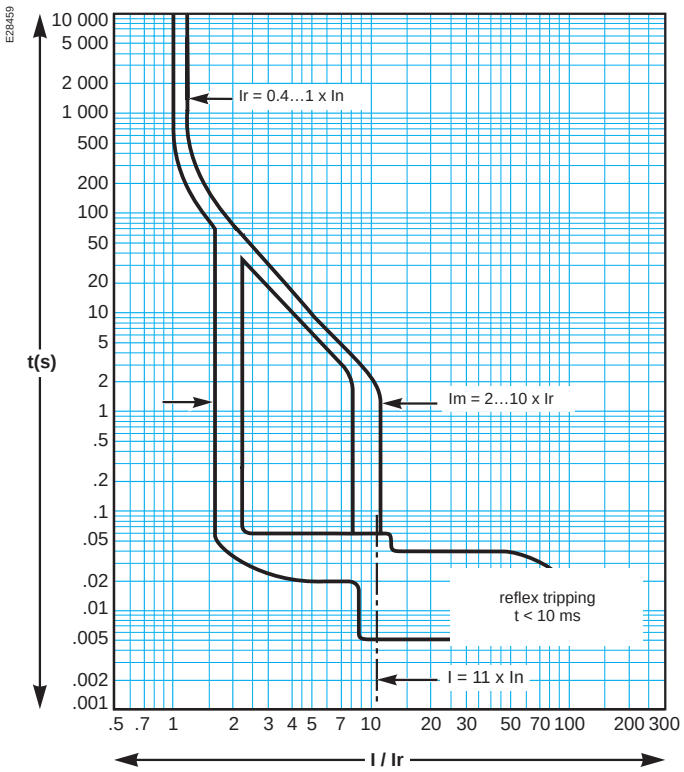
TM200D / TM250D



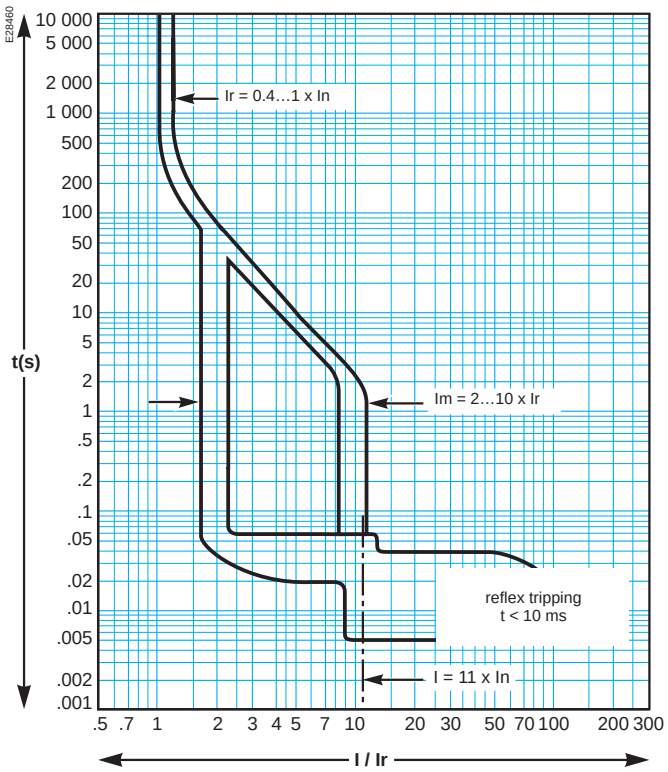
Tripping curves
Compact NS100 to 250
Protection of distribution systems (cont.)

STR22SE and STR22GE electronic trip units

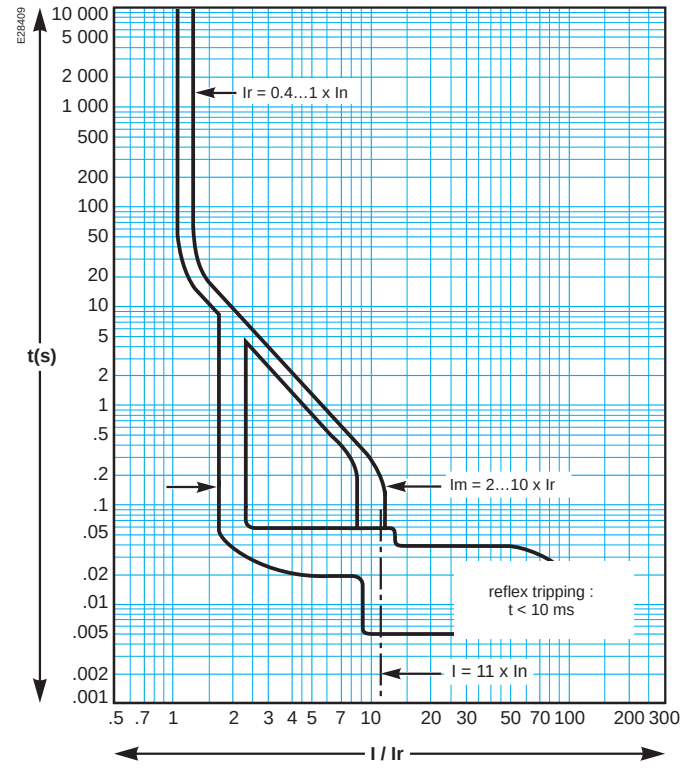
STR22SE - 40…100 A



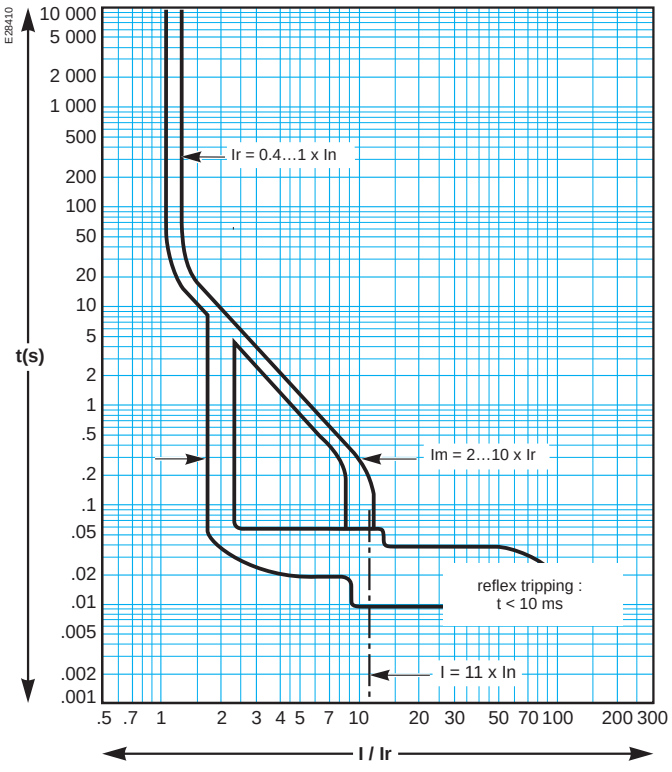
STR22SE - 160…250 A



STR22GE - 40…100 A

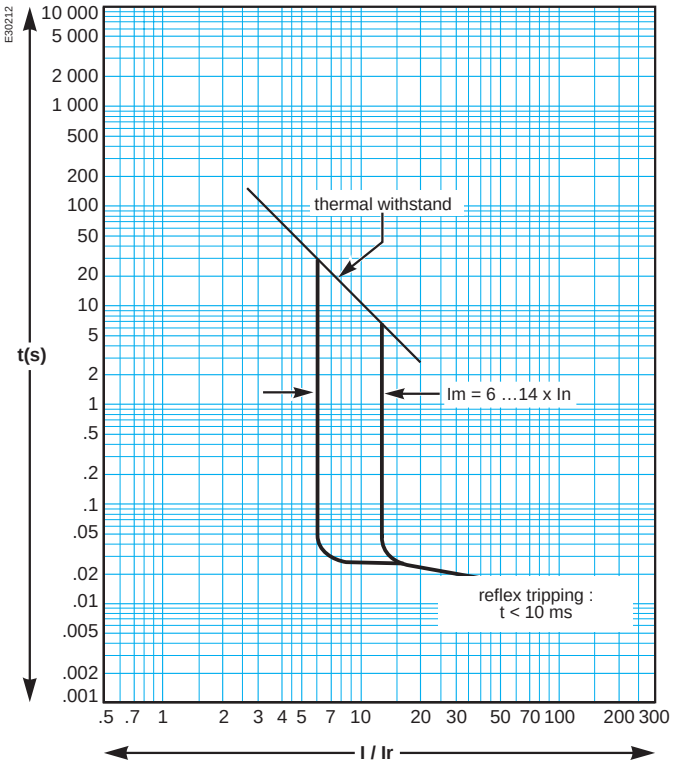


STR22GE - 160…250 A

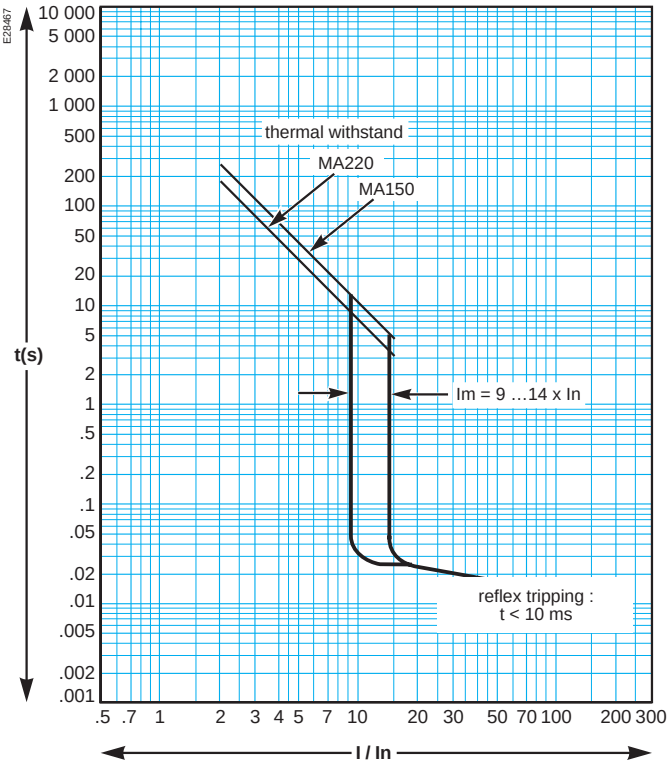


MA magnetic trip units

MA2,5...MA100

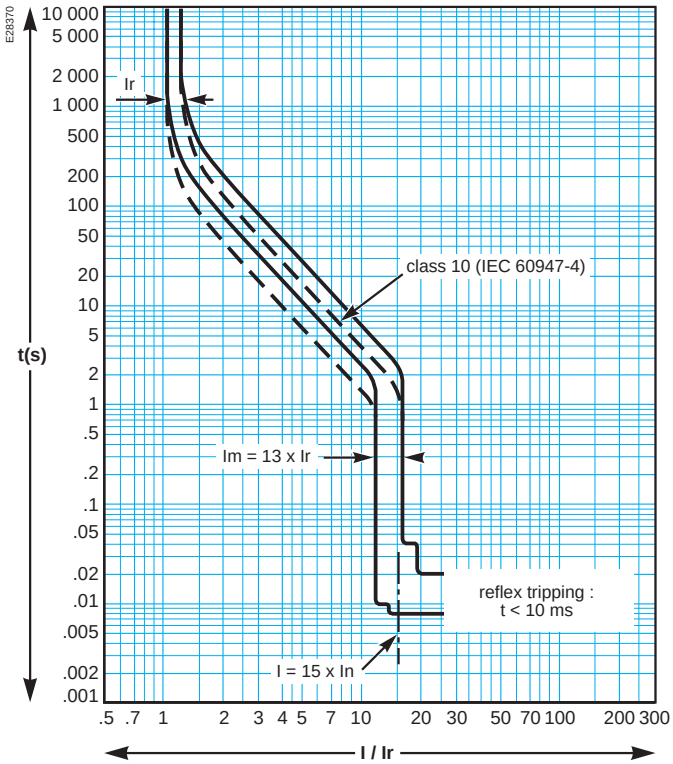


MA150 and MA220



STR22ME electronic trip units

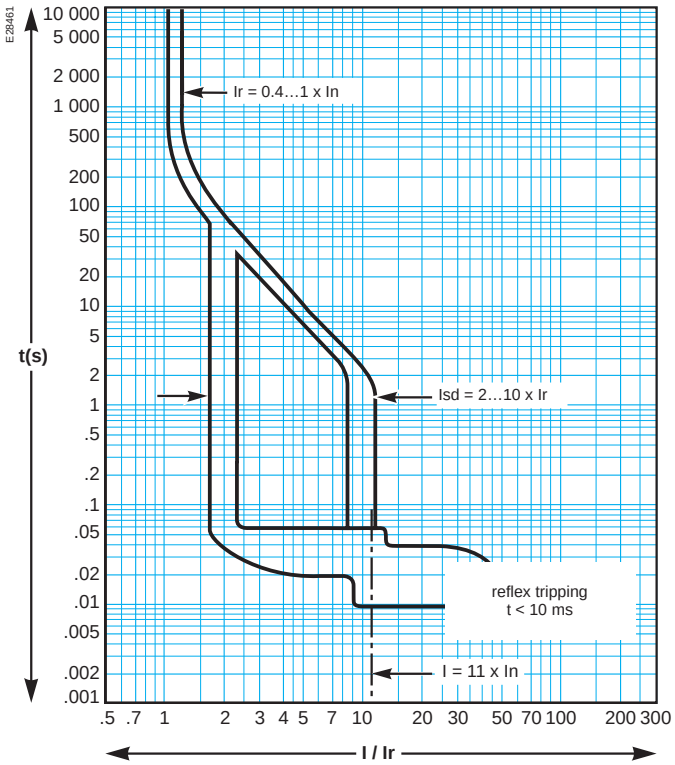
STR22ME - 10...220 A



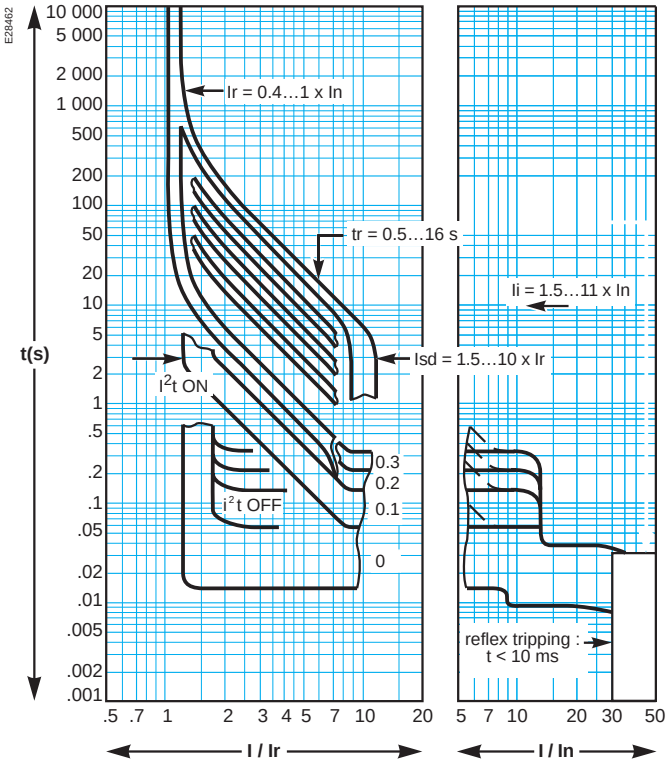
Tripping curves
Compact NS400 to 630
Protection of distribution systems

STR23 and STR53 electronic trip units

STR23SE / STR23SV

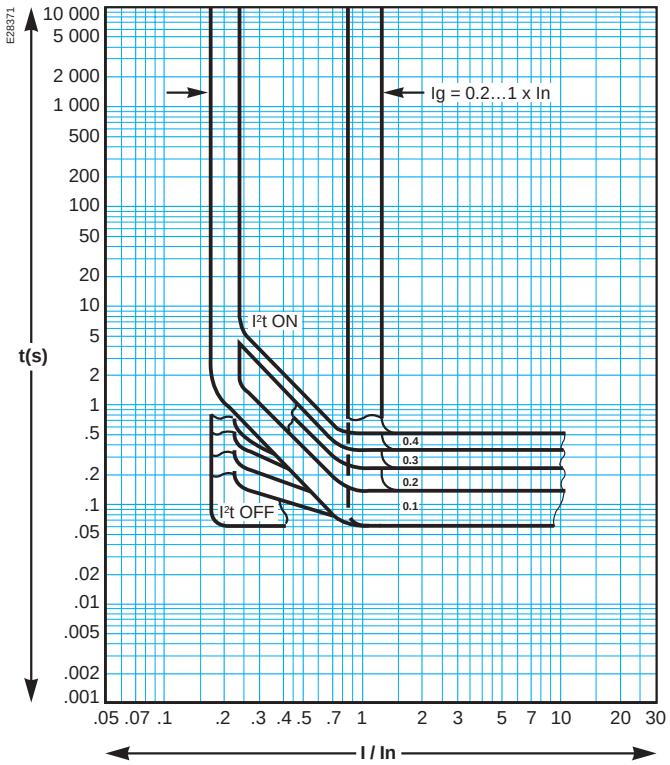


STR53UE / STR53SV



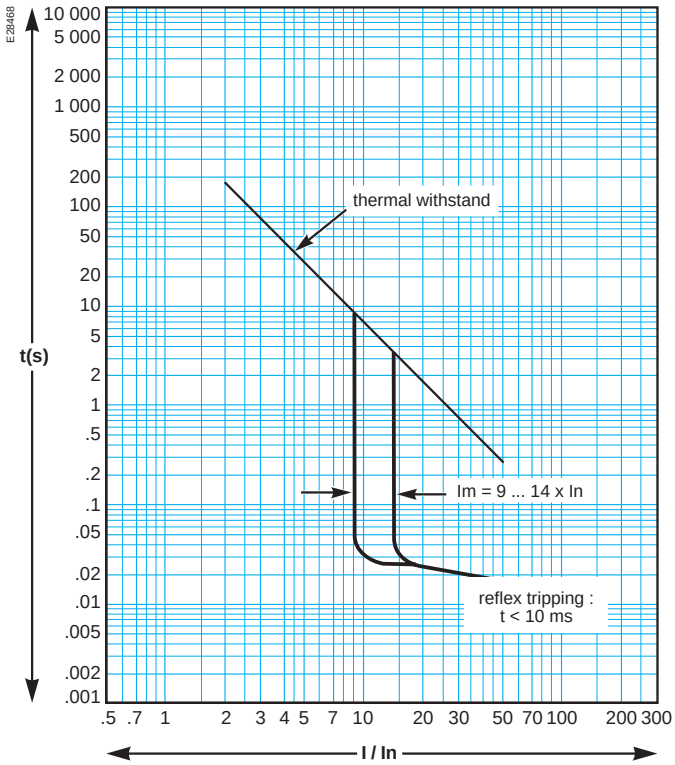
Options for STR53UE

Earth-fault protection

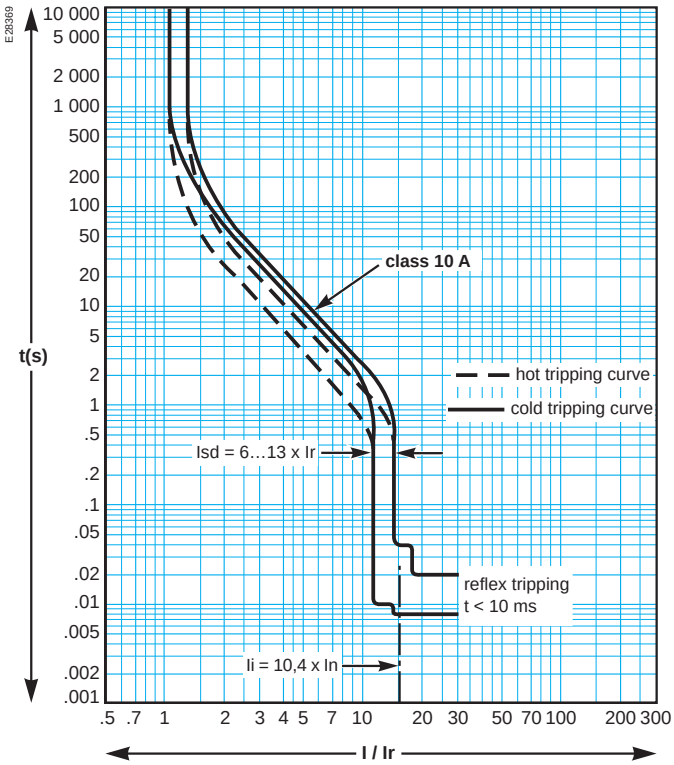


MA magnetic and STR43ME electronic trip units

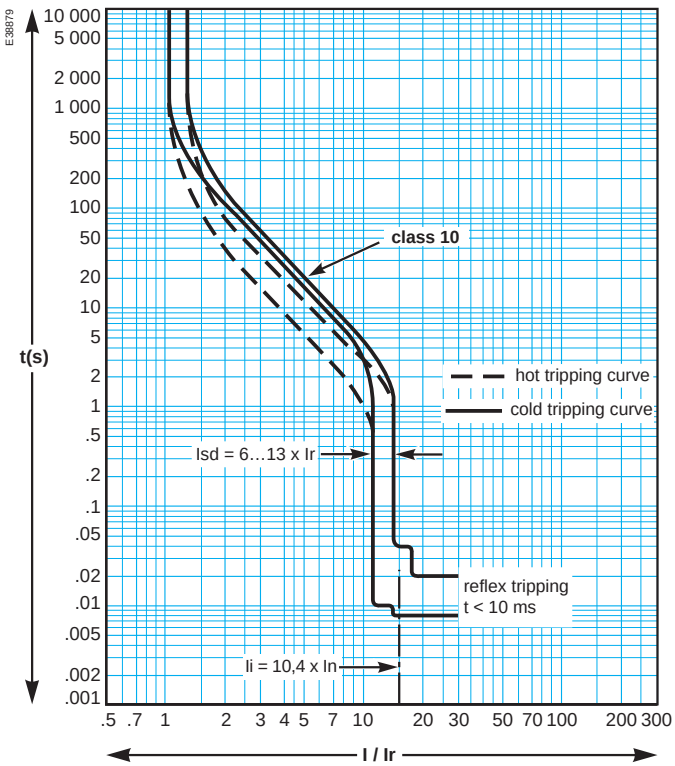
MA320…MA500



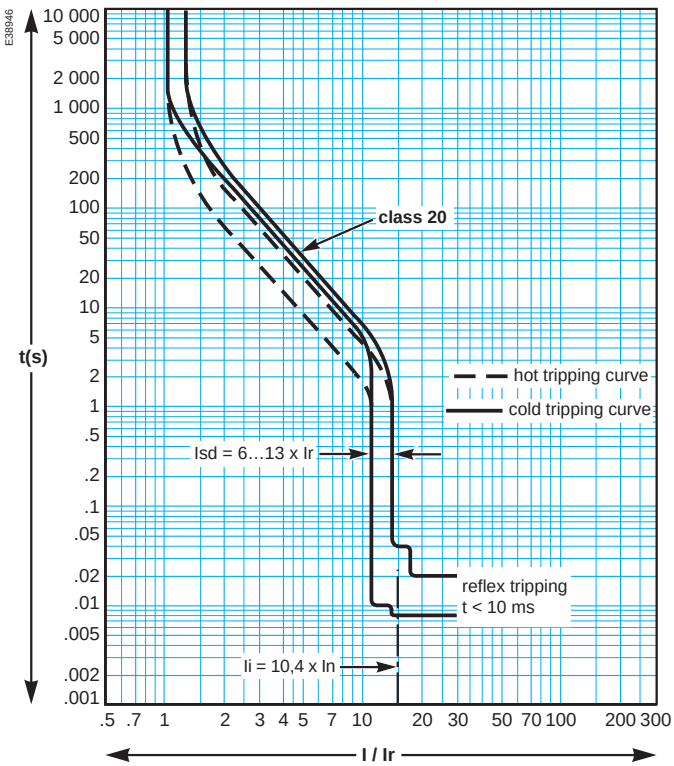
STR43ME - 120 to 500 A - class 10 A



STR43ME - 120 to 500 A - class 10



STR43ME - 120 to 500 A - class 20

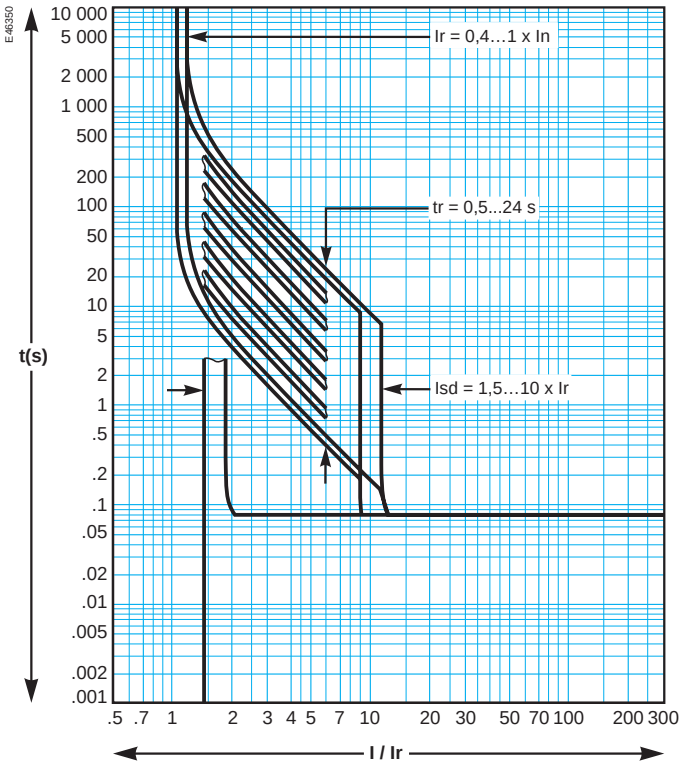


Thermal-withstand capacities are given for circuit breakers operating in an ambient temperature of 65° C.

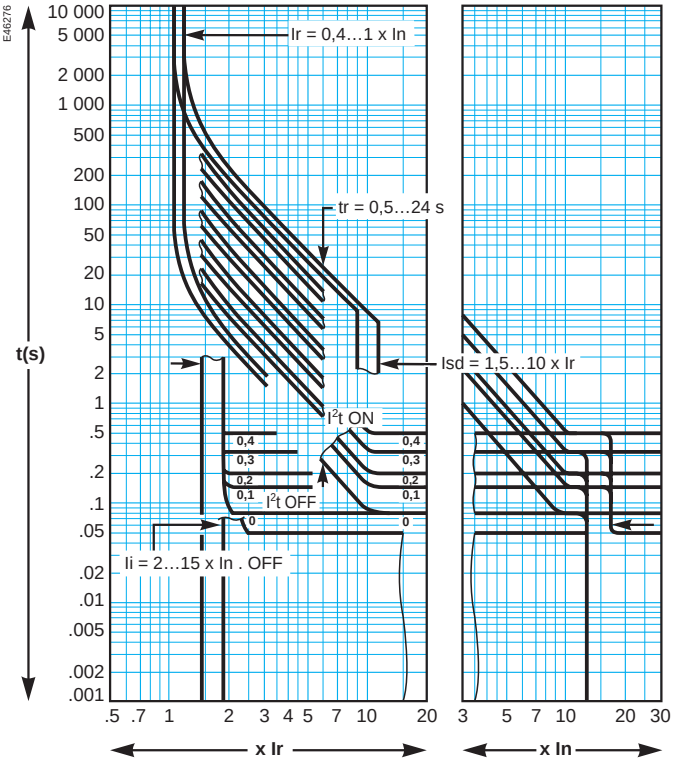
Tripping curves
Compact NS630b to 3200

Micrologic electronic control units

Micrologic 2.0

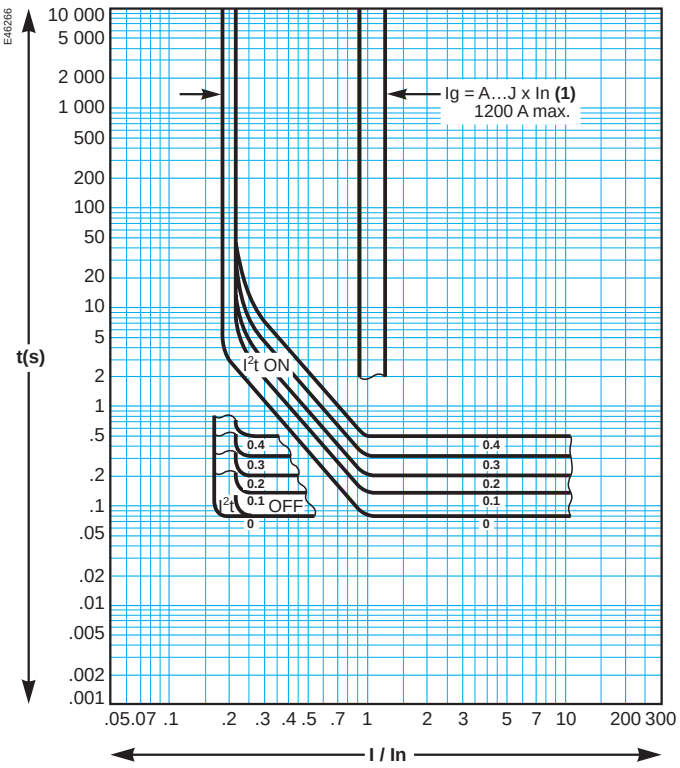


Micrologic 5.0, 6.0, 7.0 - Micrologic 5.0A, 6.0A, 7.0A



Options for Micrologic electronic control units

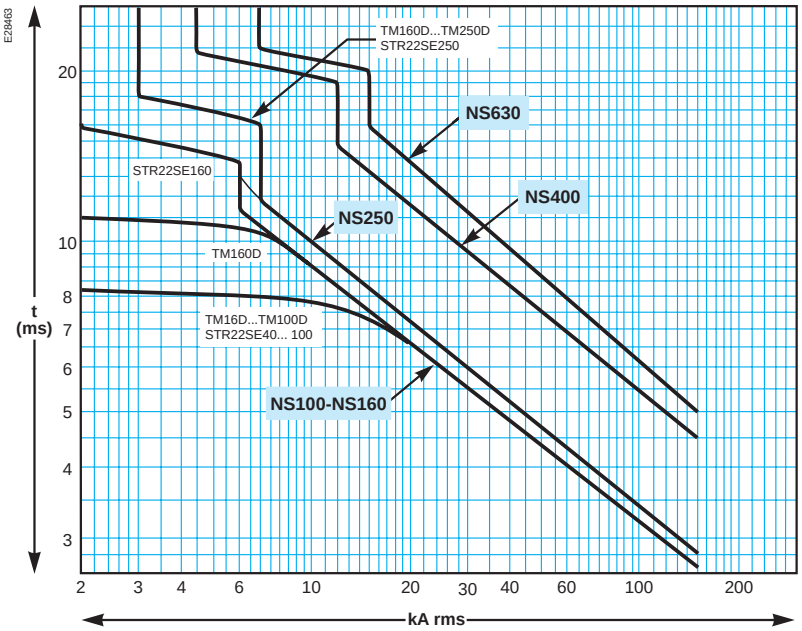
Earth-fault protection (Micrologic 6.0)



(1)

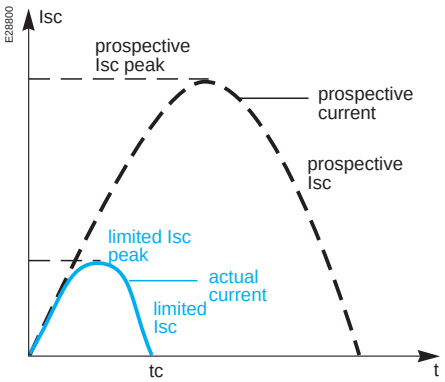
Ig = In x...	A	B	C	D	E	F	G	H	J
Ig < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ⩽ Ig ⩽ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Ig > 1200 A	500	640	720	800	880	960	1040	1120	1200

Reflex tripping



Current-limiting curves

The limiting capacity of a circuit breaker is its aptitude to limit short-circuit currents.



The exceptional limiting capacity of the Compact NS range is due to the rotating double-break technique (very rapid natural repulsion of contacts and the appearance of two arc voltages in-series with a very steep wave front).

Ics = 100% Icu

The exceptional limiting capacity of the Compact NS range greatly reduces the forces created by fault currents in devices.
The result is a major increase in breaking performance. In particular, the service breaking capacity Ics is equal to 100% of Icu.
The Ics value, defined by IEC standard 60947-2, is guaranteed by tests comprising the following operations:

- ■ break three times consecutively a fault current equal to 100% of Icu
- ■ check that the device continues to function normally:
- □ it conducts the rated current without abnormal temperature rise
- □ protection functions perform within the limits specified by the standard
- □ suitability for isolation is not impaired.

Longer service life of electrical installations

Current-limiting circuit breakers greatly reduce the negative effects of short-circuits on installations.

Thermal effects
Less temperature rise in conductors, therefore longer service life for cables.

Mechanical effects
Reduced electrodynamic forces, therefore less risk of electrical contacts or bus bars being deformed or broken.

Electromagnetic effects
Less disturbances for measuring devices located near electrical circuits.

Economy by means of cascading

Cascading is a technique directly derived from current limiting. Circuit breakers with breaking capacities less than the prospective short-circuit current may be installed downstream of a limiting circuit breaker. The breaking capacity is reinforced by the limiting capacity of the upstream device.
It follows that substantial savings can be made on downstream equipment and enclosures.

Current-limiting curves

The current-limiting capacity of a circuit breaker is expressed by two curves which are a function of the prospective short-circuit current (the current which would flow if no protection devices were installed):

- ■ the actual peak current (limited current),
- ■ thermal stress (A^2s), i.e. the energy dissipated by the short-circuit in a conductor with a resistance of 1 Ω.

Example
What is the real value of a 150 kA rms prospective short-circuit (i.e. 330 kA peak) limited by an NS250L upstream ?
Answer: 30 kA peak (see next page).

Maximum permissible cable stresses

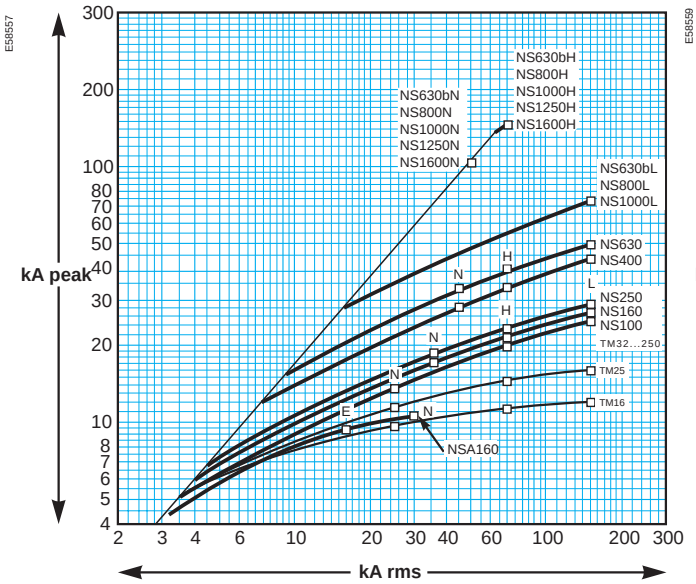
The table below indicates the maximum permissible thermal stresses for cables depending on their insulation, conductor (Cu or Al) and their cross-sectional area (CSA). CSA values are given in mm^2 and thermal stresses in A^2s.

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

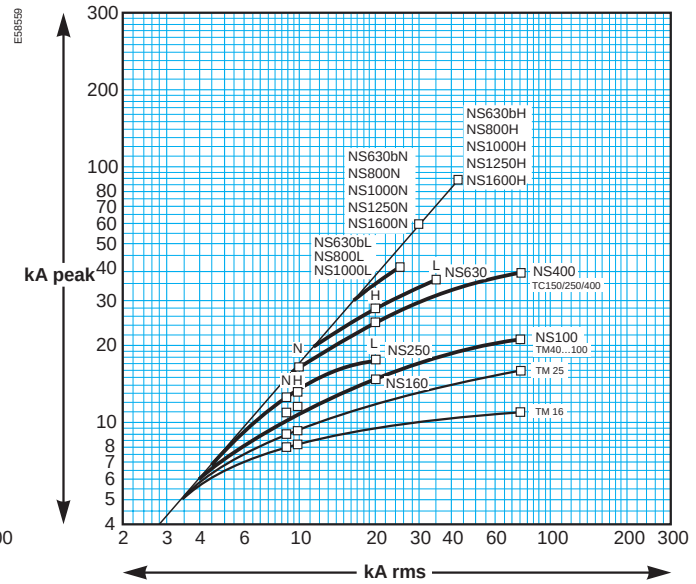
Example
Is a Cu/PVC cable with a CSA of 10 mm^2 adequately protected by an NS160N?
The table above indicates that the permissible stress is $1.32\ 10^6\ A^2s$.
All short-circuit currents at the point where an NS160N (Icu = 35 kA) is installed are limited with a thermal stress less than $6 \times 10^5\ A^2s$ (see next page).
Cable protection is therefore ensured up to the limit of the breaking capacity of the circuit breaker.

Current-limiting curves

Voltage 380/415 V AC

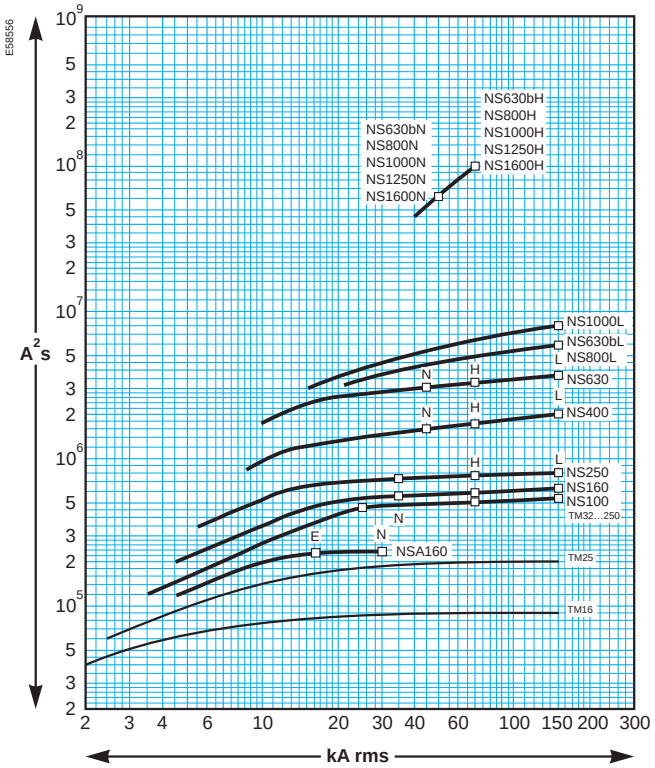


Voltage 660/690 V AC



Thermal-stress curves

Voltage 380/415 V AC



Voltage 660/690 V AC