

Compact NS from 80 to 3200 A

LV circuit breakers and switch-disconnectors

Catalogue
2008





Compact NS80 A.



Compact NS100 to 250 A.



Compact NS400 to 630 A.



Compact NS630 to 1600 A.



Compact NS1600 to 3200 A.

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 1600 circuit breakers now offer built-in power and energy metering in addition to electrical measurement and analysis functions.

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

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

Compact NS, simply a step ahead...

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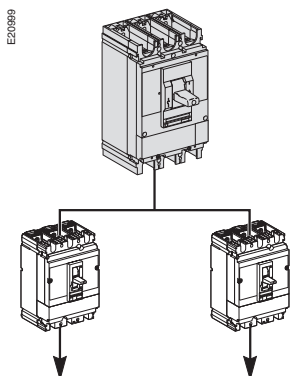
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Compact NS, even more applications...

Protection of LV distribution systems

page A-4



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 DIN rails (see page A-40)

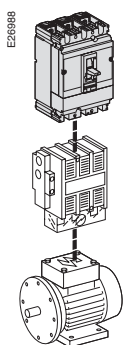
Special applications:

- single-phase and two-phase systems (see page A-26)
- 1000 V distribution systems (see page A-28)
- 400 Hz distribution systems (see page A-30)
- DC systems (see page A-32).

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

page A-42

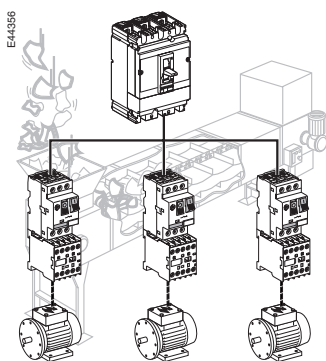


When combined with a motor starter, Compact NS circuit breakers protect the cables and the starter against short-circuits. Equipped with an electronic trip unit, Compact NS circuit breakers also protect the cables, starter and motor against overloads.

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

page A-50

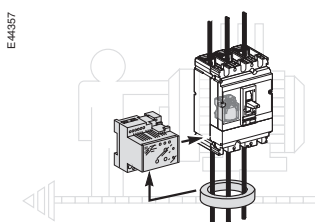


The different circuit-breaker versions in the Compact NS range are designed to meet the specific requirements of machines:

- 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 and functional enclosures.

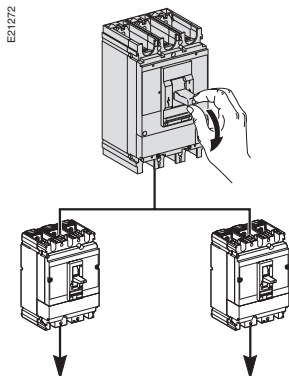
Earth-leakage protection

page A-54



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 Vigì module to the circuit breaker
- using a specific Micrologic control unit
- using a Vigirex relay and separate toroids.

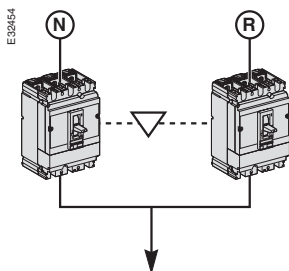


A switch-disconnector version of Compact NS circuit breakers exists for circuit control and isolation.

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.



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 operated when an electrical interlocking function is added
- automatic when a controller is added to manage switching from one source to the other on the basis of external parameters.

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

...a solution for all installation configurations

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 electrical operation.
- Compact NS1600 to 3200 A, fixed, front connection, manual operation.

DB105159

Merlin Gerin Compact NS100 N			
Ui 750 V Uimp 8 kV			
Ue (V)	Icu(kA)	Ics%	
220/240 ~	85	100	
380/415 ~	36	100	
440 ~	35	100	
500 ~	25	50	
525 ~	22	50	
660/690 ~	8	50	
250 =	50	100	
50/60Hz cat A			
IEC / EN 60947-2 AS UNE CEI BSUTE VDE NEMA			

N: standard breaking capacity.

DB105164

Merlin Gerin Compact NS100 SX			
Ui 750 V Uimp 8 kV			
Ue (V)	Icu(kA)	Ics%	
220/240 ~	90		
380/415 ~	50		
440 ~	50		
500 ~	36		
525 ~	35		
660/690 ~	10		
250 =	70		
Ics = 100% Icu			
50/60Hz cat A			
IEC / EN 60947-2 AS UNE CEI BSUTE VDE NEMA			

SX: reinforced breaking capacity.

DB105165

Merlin Gerin Compact NS100 H			
Ui 750 V Uimp 8 kV			
Ue (V)	Icu(kA)	Ics%	
220/240 ~	100		
380/415 ~	70		
440 ~	65		
500 ~	50		
525 ~	35		
660/690 ~	10		
250 =	85		
Ics = 100% Icu			
50/60Hz cat A			
IEC / EN 60947-2 AS UNE CEI BSUTE VDE NEMA			

H: high breaking capacity.

DB105166

Merlin Gerin Compact NS100 L			
Ui 750 V Uimp 8 kV			
Ue (V)	Icu(kA)	Ics%	
220/240 ~	150		
380/415 ~	150		
440 ~	130		
500 ~	100		
525 ~	100		
660/690 ~	75		
250 =	100		
Ics = 100% Icu			
50/60Hz cat A			
IEC / EN 60947-2 AS UNE CEI BSUTE VDE NEMA			

L: very high breaking capacity.

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

Compact NS100 to 630

Breaking capacity
Icu at 415 V

DB101838

L 150 kA					
H 70 kA					
SX 50 kA					
N 50 kA					
N 36 kA					
	NS100	NS160	NS250	NS400	NS630

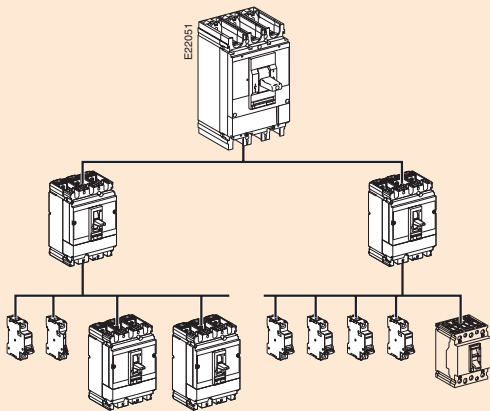
Compact NS630b to 1600

Breaking capacity
Icu at 415 V

DB107683

LB 200 kA					
L 150 kA					
H 70 kA					
N 50 kA					
	NS630b	NS800	NS1000	NS1250	NS1600

Total discrimination as standard



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

Breaking capacity
Icu at 415 V

E58551

H 85 kA					
N 70 kA					
	NS1600b	NS2000	NS2500	NS3200	



*Manual Compact NS250
with thermal-magnetic
trip unit*



*Compact NS400 with
electronic trip unit*



*Compact NS250 with motor
mechanism*



*Plug-in Compact NS250
on base*



*Withdrawable Compact
NS250 on chassis*



Manually operated Compact NS800



Electrically operated Compact NS800



Compact NS2000 (manually operated only)

...simplified installation

Compact circuit breakers make it possible to standardise switchboards for faster installation and fewer errors. All type L (150 kA) and LB (200 kA) Compact circuit breakers 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.

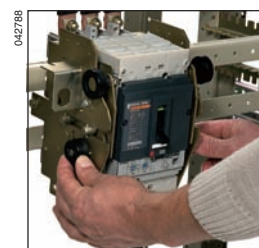


Connection parts for Compact NS

Plug-in and withdrawable versions

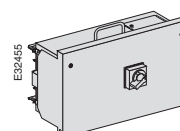
Plug-in and withdrawable versions for:

- 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.



...optimised protection and accurate measurements

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 (see page A-72).



Compact NS250



TM thermal-magnetic trip unit



Voltage presence indication module



STR electronic trip unit



Ammeter module

Compact NS630b to 3200

Compact NS630b to 3200 circuit breakers are equipped with Micrologic control units that are interchangeable on site.

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

Micrologic A control units continuously display the current flowing (I_1 , I_2 , I_3 , I_g , $I_{\Delta n}$) and can measure maximum currents (I_{max}) with an accuracy of 1.5 %.

Micrologic P control units calculate all electrical values (V, A, W, Var, VA, Wh, VARh, VAh, Hz), power factors and $\cos \phi$ values in real time.



Compact NS800



Micrologic 2.0, 5.0



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



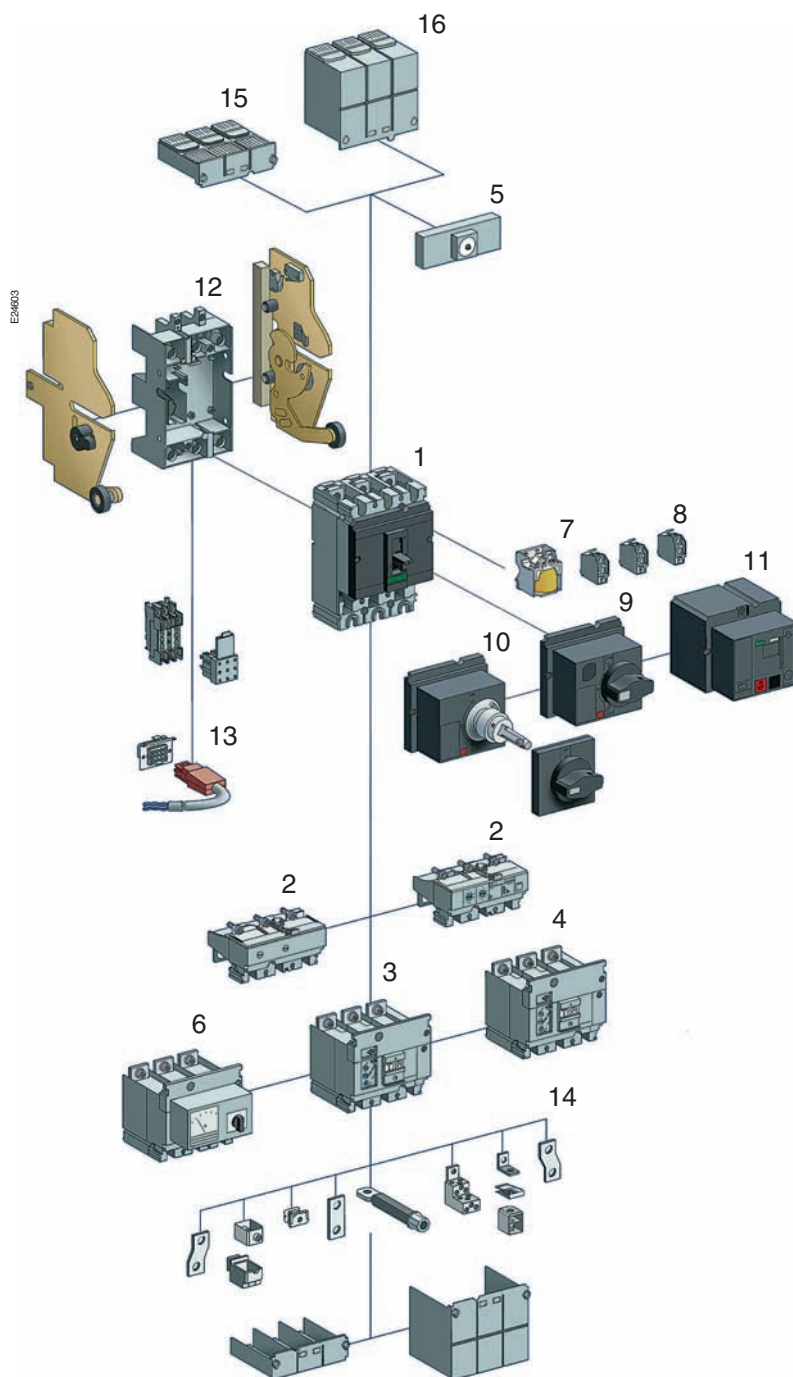
5.0 P, 6.0 P, 7.0 P

...an optimised range

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-leakage 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

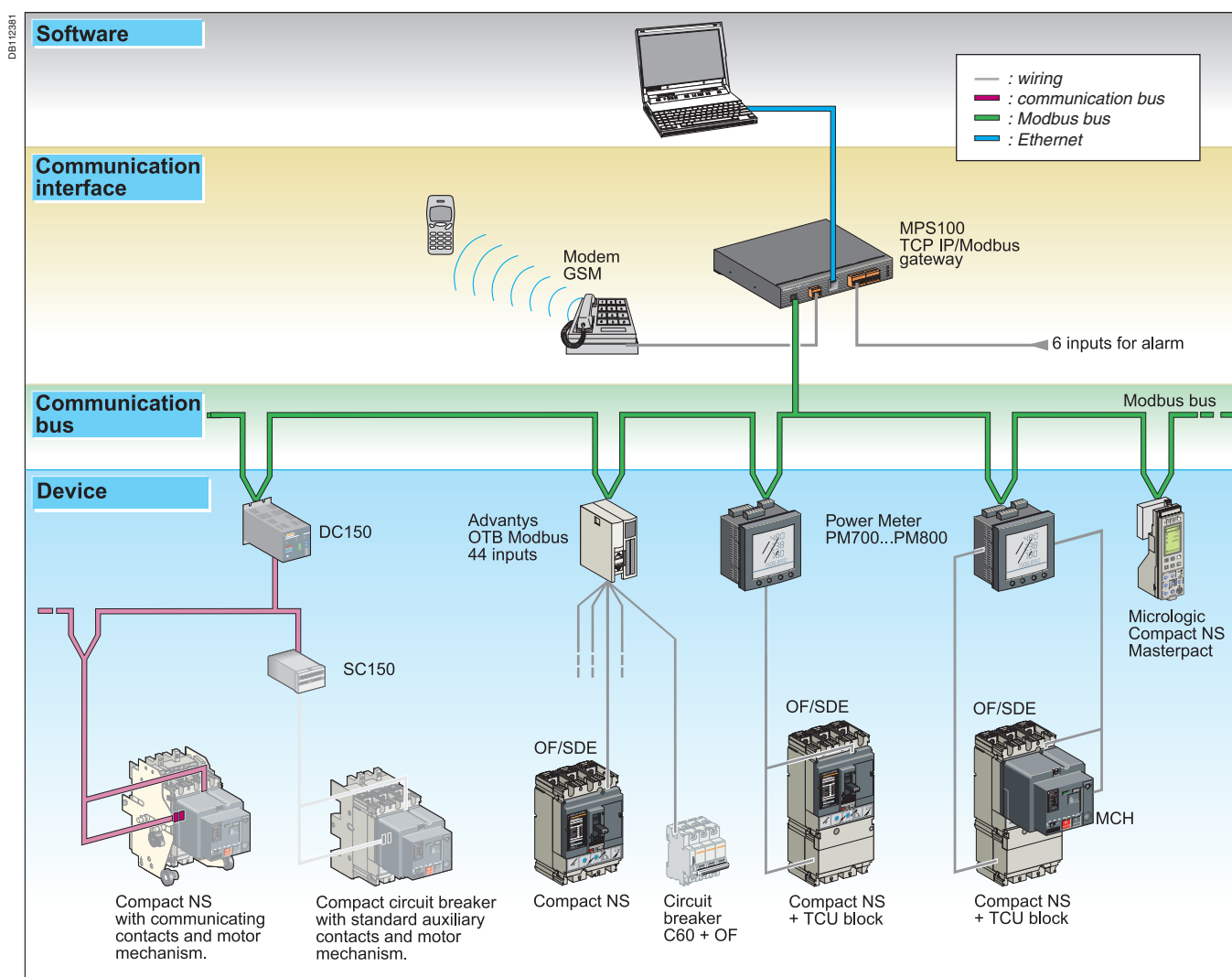
Open communication...

For integration in supervision systems, Compact NS circuit breakers can be equipped with optional communication solutions.

For Compact NS100 to NS630, two solutions are available:

- NS100 to NS630 circuit breakers equipped with any trip unit and:
 - a TCU measurement module associated with a Power Meter to handle all measurements. In this case, an optional Power Meter input/output module can be used to display the status of the different contacts and initiate remote control functions
 - an Adventys OTB Modbus network interface module with integrated inputs/outputs. This OTB module communicates the status of all auxiliary contacts via the Modbus network
- NS400 or NS630 circuit breakers associated with a Modbus DC150 interface and:
 - STR53UE or STR43ME electronic trip units with the communication option
 - communicating contacts
 - communicating motor mechanisms.

Compact NS630 to NS3200 can be equipped with Micrologic control units and communication modules.



... 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 ISO 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 circuit breaker depends on the application requiring protection (distribution systems, motor feeders, etc.) and on the prescribed installation conditions (see section "Installation, connection and accessories").

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DB105167

Merlin Gerin

Compact

NS160 H

Ui 750 V Uimp 8 kV

Ue (V)		Icu(kA)
220/240	~	100
380/415	~	70
440	~	65
500	~	50
525	~	35
660/690	~	10
250	=	85

Ics = 100% Icu

50/60Hz

cat A

IEC / EN 60947-2

AS UNE CEI BS UTE VDE NEMA

Standardised characteristics indicated on the rating plate:

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

Compliance with standards

Compact NS circuit breakers and auxiliaries comply with the following:

■ international recommendations:

- IEC 60947-1 - general rules
- IEC 60947-2 - circuit breakers
- IEC 60947-3 - switches, disconnectors, switch-disconnectors, etc.
- IEC 60947-4 - contactors and motor starters
- IEC 60947-5.1 and following - control circuit devices and switching elements; automatic control components

■ European (EN 60947-1 and EN 60947-2) and the corresponding national standards:

- France NF
- Germany VDE
- U.K. BS
- Australia AS
- Italy CEI

■ the specifications of the marine classification companies (Veritas, Lloyd's Register of Shipping, Det Norske Veritas, etc.)

■ French standard NF C 79-130 and the recommendations issued by the CNOMO organisation for the protection of machine tools.

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

Pollution degree

Compact NS circuit breakers are certified for operation in pollution-degree 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 60068-2-1 - dry cold (-55 °C)
- IEC 60068-2-2 - dry heat (+85 °C)
- IEC 60068-2-30 - damp heat (95 % relative humidity at 55 °C)
- IEC 60068-2-52 - salt mist (severity level 2).

Environmental protection

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

Ambient temperature

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

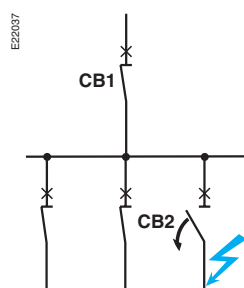
For temperatures higher than 40 °C (65 °C for circuit breakers used to protect motor feeders), devices must be derated as indicated in the documentation.

■ circuit-breakers should be put into service under normal ambient operating-temperature conditions. Exceptionally, the circuit breaker may be put into service when the ambient temperature is between -35 °C and -25 °C.

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

Discrimination

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



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



Positive contact indication

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

- the isolation position corresponds to the O (OFF) position
 - the operating handle cannot indicate the "OFF" position unless the contacts are effectively open
 - padlocks may not be installed unless the contacts are open.
- Installation of a rotary handle or a motor mechanism does not alter the reliability of the position-indication system.
- The isolation function is certified by tests guaranteeing:
- the mechanical reliability of the position indication system
 - the absence of leakage currents
 - overvoltage withstand capacity between upstream and downstream connections.

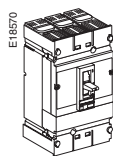
Installation in class II switchboards

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

Degree of protection

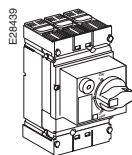
As per standards IEC 60529 (IP degree of protection) and EN 50102 (IK degree of protection against external mechanical impacts).

Bare circuit breaker with terminal shields



With toggle

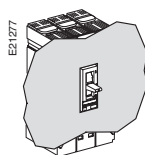
IP40 IK07



With direct rotary handle
standard / VDE

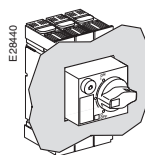
IP40 IK07

Circuit breaker installed in a switchboard



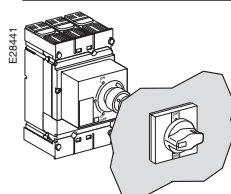
With toggle

IP40 IK07



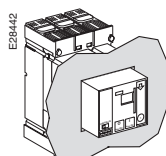
With direct rotary handle
standard / VDE
MCC
CNOMO

IP40 IK07
IP435
IP547



With extended rotary handle

IP55 IK08

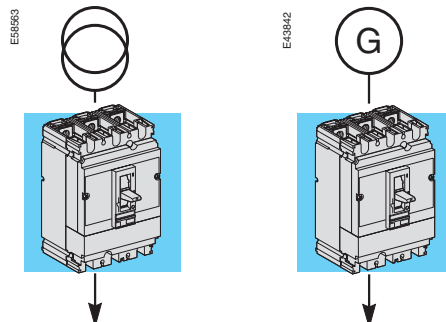
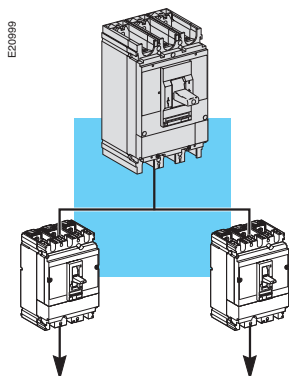


With motor mechanism

IP40 IK07

Protection of distribution systems means protection of:

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



Power distribution

Selection of circuit breakers up to 630 A page A-6

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

PB101043_12



PB101044_15



Breaking capacity (kA rms) 380/415 V	E	16				
	N		36	36	36	50
	SX		50	50	50	
	H		70	70	70	70
	L		150	150	150	150

Accompanying trip units up to 630 A page A-8

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 A-10

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

DB12531



Breaking capacity (kA rms) 380/415 V	N	50	50	50	50
	H	70	70	70	70
	L	150	150	-	-
	LB	200	200	-	-

Rated current (A)	640 ... 1600	800 ... 2000	1000 ... 2500	1250 ... 3200
Compact	NS1600b	NS2000	NS2500	NS3200

E45179R_40

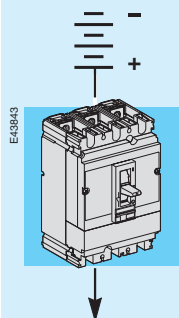


Breaking capacity (kA rms) 380/415 V	N	70	70	70
	H	85	85	85

Accompanying control units up to 3200 A page A-16

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

DC systems, see page 550E2150/2



A special range of circuit breakers is available for DC applications. The Compact NS DC range, from 16 A to 630 A, offers solutions for the many types of DC installations. Features include:

- 1, 2, 3 and 4 pole versions up to 160 A and 3 and 4 pole versions from 250 A to 630 A
- high breaking capacities for DC voltages from 12 to 750 V
- compatibility with the many accessories of the standard Compact NS range
- accessories for isolation and series or parallel connection of poles, designed for the special needs of DC applications.

Power distribution (cont.)

Single-phase or two-phase distribution page A-26

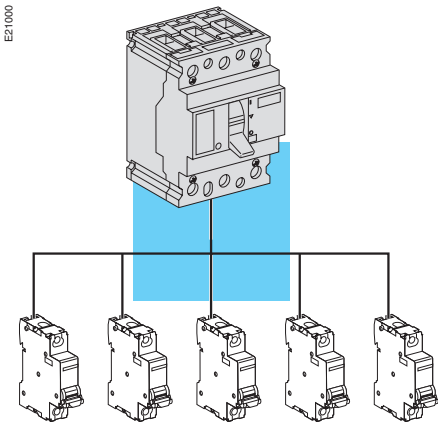
Rated current (A)	16... 100	125... 160	160... 250
Compact	NS100 1P/2P	NS160 1P/2P	NS250 1P
	Built-in thermal-magnetic trip units		
Breaking capacity (kA rms) 220 V	1P	2P	1P
	N	25 85	25
	H	40 100	-

1000 V distribution page A-28

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

Incoming circuit breakers in final distribution page A-40

Rated current (A)	16... 160
Compact installation on a DIN rail	NSA160
	Breaking capacity (kA rms) 380/415 V: E: 16 kA N: 36 kA
	Built-in trip unit





Compact NS250H



Compact NS630N

Compact circuit breakers

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 60947-2 and EN 60947-2

Rated current (A)	I_n	40 °C
		65 °C
Rated insulation voltage (V)	U_i	
Rated impulse withstand voltage (kV)	U_{imp}	
Rated operational voltage (V)	U_e	AC 50/60 Hz
		DC

Type of circuit breaker			
Ultimate breaking capacity (kA rms)	I _{cu}	AC 50/60 Hz	220/240 V 380/415 V 440 V 500 V 525 V 660/690 V
Service breaking capacity (kA rms)	I _{cs}	% I _{cu}	
Suitability for isolation			
Utilisation category			
Durability (C-O cycles)	mechanical		
	electrical	440 V	In/2 In

Electrical characteristics as per NEMA AB1 (H.I.C.)

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	I_r (I _n x ...)
Short-circuit protection	short time	I_{sd} (I _r x ...)
	instantaneous	I_i (I _n x ...)
Earth-fault protection		I_g (I _n x ...)
Zone selective interlocking		ZSI
Add-on earth-leakage 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 interphase 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-operated 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) NS100N et U ≥ 500 V: I_{cs} = 50 % I_{cu}

(4) 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
	-	750	750	750	750	750
	E	N SX H L	N SX H L	N SX H L	N H L	N H L
	25	85 90 100 150	85 90 100 150	85 90 100 150	85 100 150	85 100 150
	16/10	36 50 70 150	36 50 70 150	36 50 70 150	50 70 150	50 70 150
	10	35 50 65 130	35 50 65 130	35 50 65 130	42 65 130	42 65 130
	6	25 36 50 100	30 36 50 70	30 36 50 70	30 50 100	30 50 70
	-	22 35 35 100	22 35 35 50	22 35 35 50	22 35 100	22 35 50
	-	8 10 10 75	8 10 10 20	8 10 10 20	10 ⁽²⁾ 20 ⁽²⁾ 75 ⁽²⁾	10 ⁽²⁾ 20 ⁽²⁾ 35 ⁽²⁾
	50 %	100 % ⁽³⁾	100 %	100 %	100 %	100 % ⁽⁴⁾
	■	■	■	■	■	■
	A	A	A	A	A	A
	10000	50000	40000	20000	15000	15000
	6000	50000	40000	20000	12000	8000
	6000	30000	20000	10000	6000	4000
	E	N SX H L	N SX H L	N SX H L	N H L	N H L
	5	85 90 100 200	85 90 100 200	85 90 100 200	85 100 200	85 100 200
	5	35 50 65 130	35 50 65 130	35 50 65 130	42 65 130	42 65 130
	-	8 20 35 50	20 20 35 50	20 20 35 50	20 35 50	20 35 50
	E	N SX H L	N SX H L	N SX H L	N H L	N H L
	-	85 85 85 -	85 85 85 -	85 85 85 -	- - -	- - -
	-	25 50 65 -	35 50 65 -	35 50 65 -	- - -	- - -
	-	10 10 10 -	10 10 10 -	18 18 18 -	- - -	- - -
	non interchangeable	TM (thermal-magnetic)	STR22 (electronic)		STR23 (electronic)	STR53 (electronic)
	12.5... 125 (A)	■	■		■	■
	-	-	■		■	■
	-	■	■		■	■
	-	-	-		-	■
	-	-	-		-	■
	■	■	■		■	■
	■	■	■		■	■
	-	-	-		-	■
	■	■			■	
	■	■			■	
	-	■			■	
	-	■			■	
	-	■	■		■	■
	-	■	■		■	■
	-	-	-		-	■
	-	-	-		-	■
	-	-	-		-	■
	■	■			■	
	■	■			■	
	■	■			■	
	105 x 161 x 86 / 140 x 161 x 86				140 x 255 x 110 / 185 x 255 x 110	
	2.0 to 2.2 / 2.6 to 2.8				6.2 to 8.1	
	-	■			■	



Compact NS800L



Compact NS2000H

Compact circuit breakers

Number of poles			
Control	manual	toggle	
	electric	direct or extended rotary handle	
Type of circuit breaker			
Connections	fixed	front connection	
		rear connection	
		front connection with bare cables	
	withdrawable (on chassis)	front connection	
		rear connection	
Electrical characteristics as per IEC 60947-2 and EN 60947-2			
Rated current (A)	In	50 °C	
		65 °C ⁽¹⁾	
Rated insulation voltage (V)	Ui		
Rated impulse withstand voltage (kV)	Uimp		
Rated operational voltage (V)	Ue	AC 50/60 Hz	
Type of circuit breaker			
Ultimate breaking capacity (kA rms)	Icu	AC	220/240 V
		50/60 Hz	380/415 V
			440 V
			500/525 V
			660/690 V
Service breaking capacity (kA rms)	Ics	Value or % Icu	manual operation
			electrical operation
Short-time withstand current (kA rms)	Icw	AC 50/60 Hz	1 s
			3 s
Integrated instantaneous protection		kA peak ±10 %	
Suitability for isolation			
Utilisation category			
Durability (C-O cycles)	mechanical		
	electrical	440 V	In/2
			In
		690 V	In/2
			In
Pollution degree			
Electrical characteristics as per Nema AB1			
Breaking capacity at 60 Hz (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	I _{sd} (Ir x ...)	
	instantaneous	I _i (In x ...)	
Earth-fault protection		I _g (In x ...)	
Residual earth-leakage protection		I _{Δn}	
Zone selective interlocking		ZSI	
Protection of the fourth pole			
Current measurements			
Power measurements			
Advanced protection			
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			
Additional indication and control auxiliaries			
Indication contacts			
Voltage releases		MX shunt release/MN undervoltage release	
Installation			
Accessories		terminal extensions and spreaders	
		terminal shields and interphase barriers	
		escutcheons	
Dimensions fixed devices, front connections (mm)		3P	
H x W x D		4P	
Weight fixed devices, front connections (kg)		3P	
		4P	
Source changeover system (see section on "source changeover systems")			
Manual, remote-operated and automatic source changeover systems			

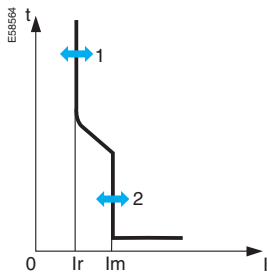
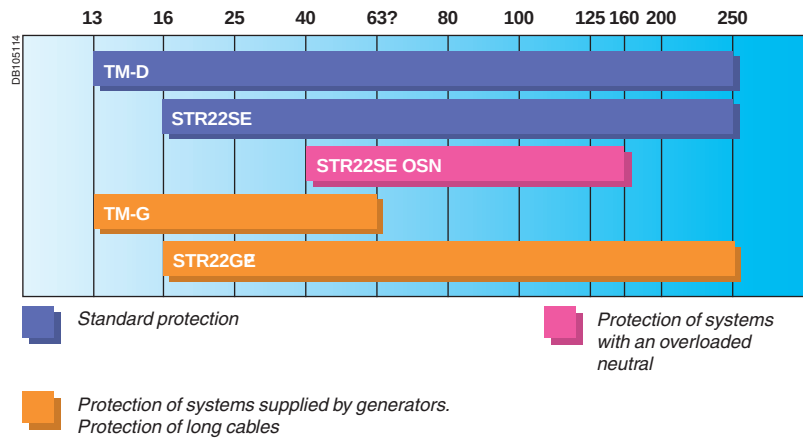
(1) 65 °C with vertical connections. See the temperature derating tables for other types of connections.

(2) Ics: 100 % Icu for breaking capacity 440V/500V/660V
Ics: 75 % Icu for breaking capacity 220V/380V.

(3) Except 1600b-3200.

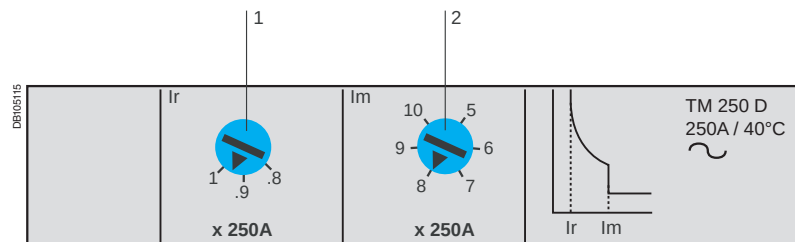
	NS630b NS800				NS1000			NS1250		NS1600		NS1600b NS2000 NS2500 NS3200			
	3, 4				3, 4			3, 4		3, 4		3, 4			
	■				■			■		■		■			
	■				■			■		■		-			
	■ (except LB)				■			■		■		-			
	N	H	L	LB	N	H	L	N	H	N	H	N	H		
	■	■	■	-	■	■	■	■	■	■	■	■	■		
	■	■	■	■	■	■	■	■	■	■	■	-	-		
	■	■	-	-	■	■	-	■	■	-	-	-	-		
	■	■	■	■	■	■	■	■	■	■	■	-	-		
	■	■	■	■	■	■	■	■	■	■	■	-	-		
	630				1000			1250		1600		1600			
	630				1000			1250		1510		1550			
	800				800			800		800		800			
	8				8			8		8		8			
	690				690			690		690		690			
	N	H	L	LB	N	H	L	N	H	N	H	N	H		
	50	70	150	200	50	70	150	50	70	50	70	85	125		
	50	70	150	200	50	70	150	50	70	50	70	70	85		
	50	65	130	200	50	65	130	50	65	50	65	65	85		
	40	50	100	100	40	50	100	40	50	40	50	65	-		
	30	42	-	75	30	42	-	30	42	30	42	65	-		
	100 %	75 %	100 %	100 %	100 %	75 %	100 %	100 %	75 %	75 %	50 %	100 % ⁽²⁾	75 %		
	75 %	50 %	100 %	-	75 %	50 %	100 %	75 %	50 %	75 %	50 %	100 % ⁽²⁾	75 %		
	19.2	19.2	-	-	19.2	19.2	-	19.2	19.2	19.2	19.2	-	-		
	-	-	-	-	-	-	-	-	-	-	-	32	32		
	40	40	-	-	40	40	-	40	40	40	40	130	130		
	■				■			■		■		■			
	B	B	A	A	B	B	A	B	B	B	B	B	B		
	10000				10000			10000		10000		5000			
	6000	6000	4000	4000	6000	6000	4000	5000		5000		3000			
	5000	5000	3000	3000	5000	5000	3000	4000		2000		2000			
	4000	4000	3000	3000	4000	4000	3000	3000		2000		2000			
	2000	2000	2000	2000	2000	2000	2000	2000		1000		1000			
	III				III			III		III		III			
	N	H	L	LB	N	H	L	N	H	N	H	N	H		
	50	65	125	200	50	65	125	50	65	50	65	85	125		
	35	50	100	200	35	50	100	35	50	35	50	65	85		
	25	50	-	100	25	50	-	25	50	25	50	50	-		
	Micrologic 2.0				Micrologic 5.0			Micrologic 2.0 A		Micrologic 5.0 A		Micrologic 6.0 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			
	■											-			

Compact NS100 to 250 circuit breakers, types N, SX, 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.

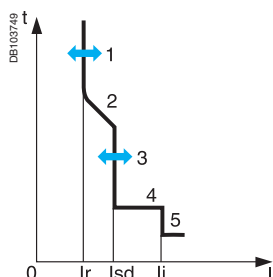
Protection of the fourth pole

On four-pole circuit breakers, the trip units can be of the:

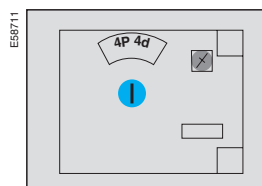
4P 3d type (neutral unprotected),

4P 3d + N/2 type (neutral protection at 0.5 I_n) or 4P 4d type (neutral protection at I_n).

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)	I _r	adjustable from 0.8 to 1 x I _n												adjustable from 0.8 to 1 x I _n			
Short-circuit protection (magnetic)																	
Current setting (A)	I _m	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 to 10 x I _n		63	80	80	125
Protection of the fourth pole																	
Neutral unprotected	4P 3d	no protection												no protection			
Neutral protection at 0.5 I _n	4P 3d + N/2	56 56 63 0.5 x I _r															
Neutral protection at I _n	4P 4d	1 x I _r												1 x I _r			

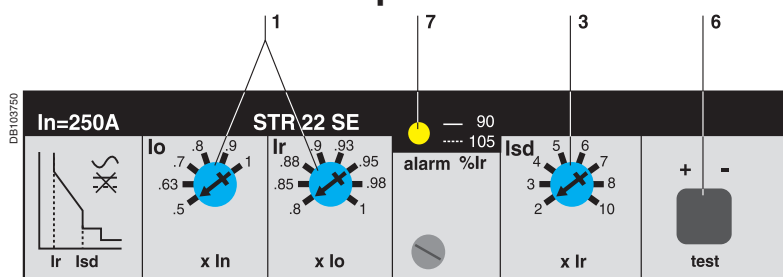


- 1 long-time threshold (overload protection) I_r
- 2 long-time tripping delay
- 3 short-time pick-up (short-circuit protection) I_{sd}
- 4 short-time tripping delay
- 5 instantaneous pick-up (short-circuit protection) I_i
- 6 test connector
- 7 percent load indication



Protection of the fourth pole

STR22 electronic trip units



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 I_n) or 4P 4d (neutral protection at I_n).

Protection of an overloaded neutral (OSN):

For 4-pole circuit breakers, special protection of systems with high 3rd order harmonic contents. In position 4P 4d, the switch sets the neutral protection threshold to 1.6 x I_r .

Indications

A LED on the front indicates the percent load:

- ON - load is > 90 % of I_r setting
- flashing - load is > 105 % of I_r 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					STR22SE OSN		STR22GE			
Ratings (A)	In 20 to 70 °C ⁽¹⁾	40	80	100	160	250 ⁽¹⁾	160	250 ⁽¹⁾	40	100	160	250 ⁽¹⁾
Circuit breaker	Compact NS100	■	-	■	-	-	-	-	■	■	-	-
	Compact NS160	■	■	■	■	-	■	-	■	■	■	-
	Compact NS250	■	■	■	■	■	■	■	■	■	■	■
Overload protection (Long Time)												
Current setting	I _r = In x ...	0.4...1 48 settings					0.25...0.63 48 settings		0.4...1 48 settings			
Time delay (s) (min....max.)	at 1.5 x I _r	90...180					90...180		12...15			
	at 6 x I _r	5...7.5					5...7.5		-			
	at 7.2 x I _r	3.2...5.0					3.2...5.0		-			
Short-circuit protection (Short Time)												
Pick-up (A)	I _{sd} = I _r x ...	2...10					2...10		2...10			
Accuracy ±15 %		8 settings					8 settings		8 settings			
Time delay (ms)		fixed					fixed		fixed			
	max. resettable time	≤ 40					≤ 40		≤ 40			
	max. break time	≤ 60					≤ 60		≤ 60			
Short-circuit protection (Instantaneous)												
Pick-up (A)	I _i	fixed ≥ 11 x In					fixed ≥ 7 x In		fixed ≥ 11 x In			
Protection of the fourth pole												
Neutral unprotected	4P 3d	no protection					no protection		-			
Neutral protection at 0.5 In	4P 3d + N/2	0.5 x I _r					0.8 x I _r		-			
Neutral protection at In	4P 4d	1 x I _r					1.6 x I _r		-			

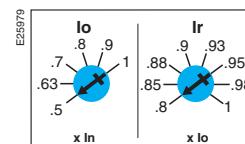
⁽¹⁾ If the STR22SE, STR22SE OSN and STR22GE 250 A trip units are used in high-temperature environments, the setting must take into account the thermal limitations of the circuit breaker. The overload protection setting may not exceed 0.95 at 60 °C or 0.9 at 70 °C.

Setting example

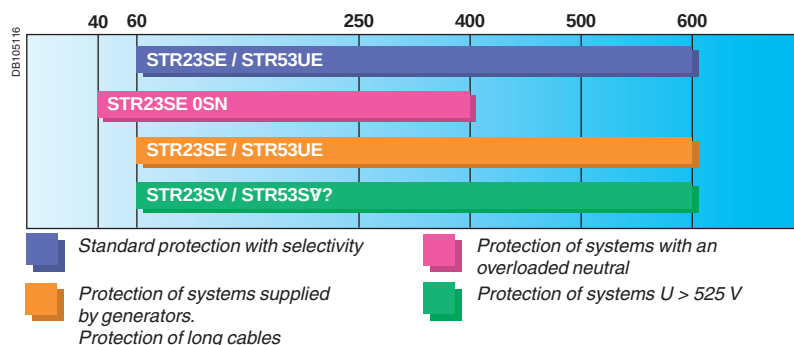
What is the overload-protection threshold of a Compact NS250 circuit breaker equipped with an STR22SE 160 A trip unit set to $I_o = 0.5$ and $I_r = 0.8$?

Answer:

$I_n \times I_o \times I_r = 160 \times 0.5 \times 0.8 = 64 \text{ A}.$



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.



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 five trip-unit catalogue numbers, whatever the circuit-breaker operational voltage:

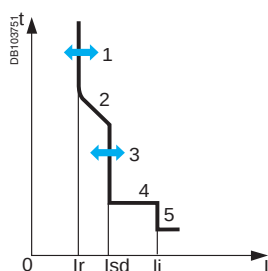
- $U \leq 525$ V: STR23SE, STR23SE 0SN or STR53UE
- $U > 525$ V: STR23SV or STR53SV.

Trip units do not have a predefined rating. The tripping threshold depends on the circuit breaker rating and the LT (long time) current setting.

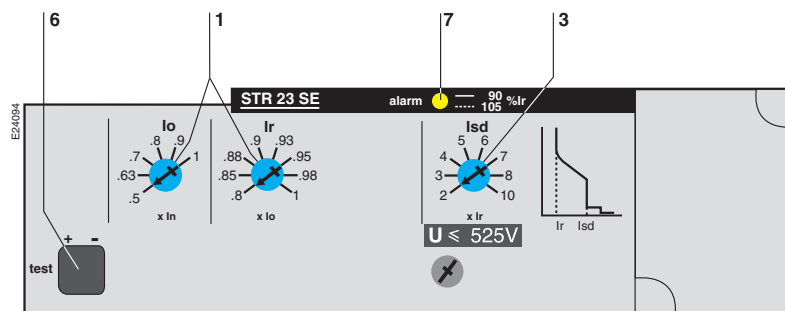
For example, for an STR23SE trip unit set to the maximum value, the tripping threshold is:

- 250 A, when installed on a Compact NS400 250 A
- 630 A, when installed on a Compact NS630.

STR23SE ($U \leq 525$ V) and STR23SV ($U > 525$ V) electronic trip units



- 1 long-time threshold (overload protection) I_r
- 2 long-time tripping delay
- 3 short-time pick-up (short-circuit protection) I_{sd}
- 4 short-time tripping delay
- 5 instantaneous pick-up (short-circuit protection) I_i
- 6 test connector
- 7 percent load indication



Protection

The protection functions may be set using the adjustment dials.

Overload protection

Long-time protection with an adjustable threshold and fixed tripping delay:

- I_o base setting (6-position dial from 0.5 to 1)
- I_r 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 + N/2 (neutral protection at 0.5 I_n) or 4P 4d (neutral protection at I_n).

Protection of an overloaded neutral (OSN):

For 4-pole circuit breakers, special protection of systems with high 3rd order harmonic contents. In position 4P 4d, the switch sets the neutral protection threshold to $1.6 \times I_r$.

Indications

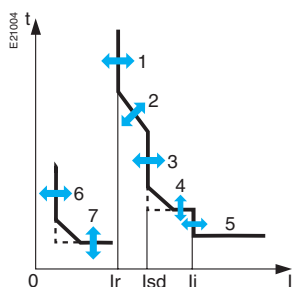
A LED on the front indicates the percent load:

- ON - load is $> 90\%$ of I_r setting
- flashing - load is $> 105\%$ of I_r 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.

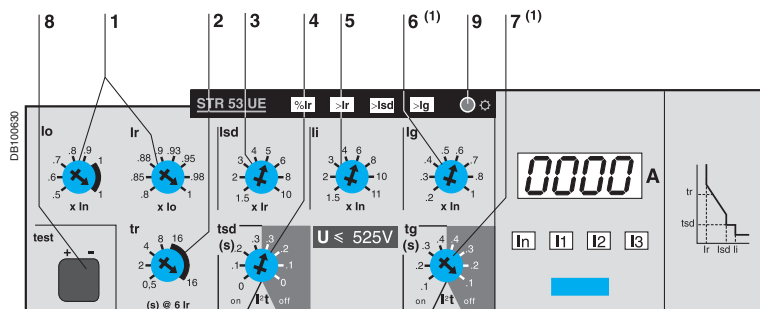
STR53UE ($U \leq 525$ V) and STR53SV ($U > 525$ V) electronic trip units



- 1 long-time threshold (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

(1) 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 sensor can be installed (situation for a three-pole circuit breaker in a distribution system with a neutral). Available ratings of external neutral sensors: 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:

- I_o base setting (6-position dial from 0.5 to 1)
- I_r 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^2t
- 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 + N/2 (neutral protection at $0.5 I_n$) or 4P 4d (neutral protection at I_n).

Overload LED (% I_r)

A LED on the front indicates the percent load:

- when ON, the load is $> 90\%$ of I_r setting
- when flashing, the load is $> 105\%$ of I_r setting.

Fault indications

A LED signals the type of fault:

- overload (long-time protection) or abnormal internal temperature ($> I_r$)
- short-circuit (short-time protection) or instantaneous ($> I_{sd}$)
- earth fault (if earth-fault protection option installed) ($> I_g$)
- microprocessor malfunction:

□ both ($> I_g$) and ($> I_{sd}$) LEDs ON

□ ($> I_g$) 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 (% I_r), ($> I_r$), ($> I_{sd}$) and ($> I_g$) 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.

Trip units		U ≤ 525V U > 525V	STR23SE STR23SV	STR23SE OSN -	STR53UE STR53SV
Ratings (A) of circuit breaker	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	I _r = I _n x ...		0.4...1 adj., 48 settings	0.25...0.63 adjustable, 48 settings	adjustable, 48 settings
Time delay (s) (min....max.)			fixed	fixed	adjustable
	at 1.5 x I _r		90...180	90...180	8...15 34...50 69...100 138...200 277...400
	at 6 x I _r		5...7.5	5...7.5	0.4...0.5 1.5...2 3...4 6...8 12...16
	at 7.2 I _r		3.2...5.0	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 %	I _{sd} = I _r x ...		2...10 adj., 8 settings	2...10 adjustable, 8 settings	1.5...10 adjustable, 8 settings
Time delay (ms)			fixed	fixed	adjustable, 4 settings + "constant I ² t" option
	max. resettable time		≤ 40	≤ 40	≤ 15 ≤ 60 ≤ 140 ≤ 230
	max. break time		≤ 60	≤ 60	≤ 60 ≤ 140 ≤ 230 ≤ 350
Short-circuit protection (instantaneous)					
Pick-up (A)	I _{li} = I _n x ...		11 fixed	7 fixed	1.5...11 adjustable, 8 settings
Protection of the fourth pole					
Neutral unprotected	4P 3d		no protection	no protection	no protection
Neutral protection at 0.5 I _n	4P 3d + N/2		0.5 x I _r	0.8 x I _r	0.5 x I _r
Neutral protection at I _n	4P 4d		1 x I _r	1.6 x I _r	1 x I _r
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

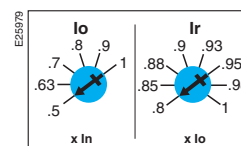
What is the overload-protection threshold of a Compact NS400 circuit breaker equipped with an STR23SE (or STR23SV) trip unit set to I_o = 0.5 and I_r = 0.8 ?

Answer.

I_n x I_o x I_r = 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
- I + T
- I + COM
- I + T + COM
- ZSI
- ZSI + I
- 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	$I_g = I_n \times \dots$	0.2 to 1
Accuracy $\pm 15\%$		adjustable, 8 settings
Time delay		adjustable, 4 settings
"constant I^2t " function	max. resettable time	60 140 230 350
	max. break time	$\leq 140 \leq 230 \leq 350 \leq 500$

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 $\geq 0.2 \times I_n$. Lower currents are not displayed
- maximum current $\leq 10 \times I_n$.

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 equipped with STR53UE trip units.

The ZSI option of the STR53UE trip unit operates only with an upstream circuit breaker equipped with a Micrologic A, P control unit.

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.

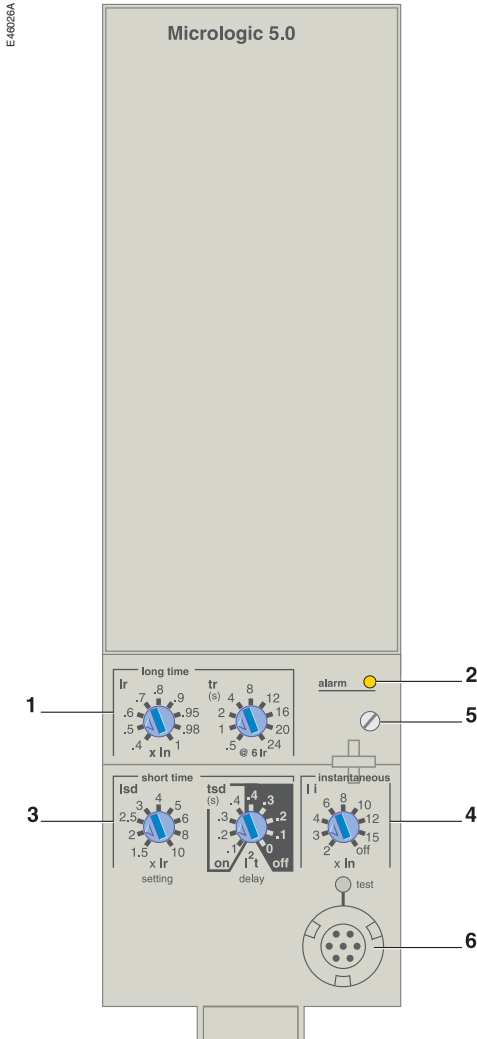
Communications option (COM)

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.).

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 threshold and tripping delay
- 2 overload alarm (LED)
- 3 short-time pick-up and tripping delay
- 4 instantaneous pick-up
- 5 fixing screw for long-time rating plug
- 6 test connector

Protection

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.

Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I^2t type (ON or OFF) for short-time delay.

Neutral protection

On three-pole circuit breakers, neutral protection is not possible.

On four-pole circuit breakers, neutral protection may be set using a three-position switch: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2) or neutral protection at Ir (4P 4d).

Indications

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

Test

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

Note.

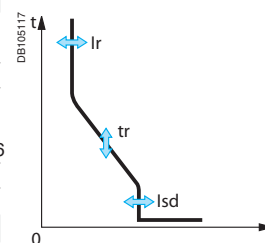
Micrologic control units are equipped with a transparent lead-seal cover as standard.



Protection

Micrologic 2.0

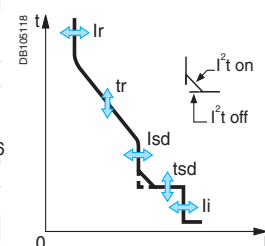
Long time											
Current setting (A)	$I_r = I_n \times \dots$		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
tripping between 1.05 and 1.20 x I_r			other ranges or disable by changing long-time rating plug								
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
⁽¹⁾ 0 to -40 % - ⁽²⁾ 0 to -60 %											
Instantaneous											
Pick-up (A)	$I_{sd} = I_r \times \dots$		1.5	2	2.5	3	4	5	6	8	10
accuracy: ± 10 %											
Time delay		max. resettable time: 20 ms; max break time: 50 ms									



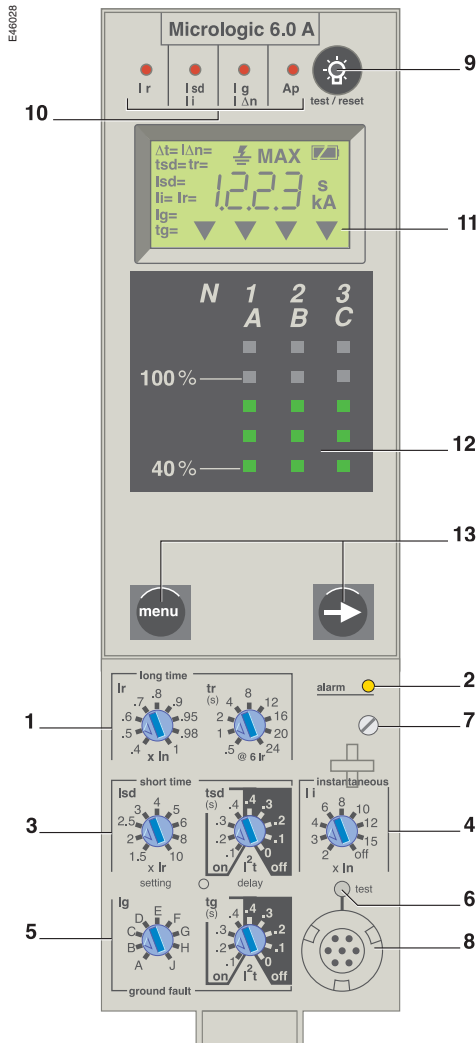
Protection

Micrologic 5.0

Long time			Micrologic 5.0								
Current setting (A)		$I_r = I_n \times \dots$	0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1
tripping between 1.05 and 1.20 x I_r			other ranges or disable by changing long-time rating plug								
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory			20 minutes before and after tripping								
⁽¹⁾ 0 to -40 % - ⁽²⁾ 0 to -60 %											
Short time											
Pick-up (A)		$I_{sd} = I_r \times \dots$	1.5	2	2.5	3	4	5	6	8	10
accuracy: ± 10 %											
Time setting t_{sd} (s)	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x I_r (I^2t off or I^2t on)	t_{sd} (max. resettable time)		20	80	140	230	350				
	t_{sd} (max. break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A)		$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	off
accuracy: ± 10 %											
Time delay			max. resettable time: 20 ms; max break time: 50 ms								



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



- 1 long-time threshold and tripping delay
- 2 overload alarm (LED) at 1, 125 I_r
- 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

Protection thresholds and delays are set using the adjustment dials.

Overload protection

True rms long-time protection.

Thermal memory: thermal image before and after tripping.

Setting accuracy may be enhanced by limiting the setting range using a different long-time rating plug.

Overload protection can be cancelled using a specific LT rating plug "Off".

Short-circuit protection

Short-time (rms) and instantaneous protection.

Selection of I^2t type (ON or OFF) for short-time delay.

Earth-fault protection

Residual or source ground return earth fault protection.

Selection of I^2t type (ON or OFF) for delay.

Residual earth-leakage protection (Vigi).

Operation without an external power supply.

$\perp$ Protected against nuisance tripping.

$\sim$ 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 I_r (4P 3d + N/2), neutral protection at I_r (4P 4d).

Zone selective interlocking (ZSI)

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

Overload alarm

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

"Ammeter" measurements

Micrologic A control units measure the true (rms) value of currents.

They provide continuous current measurements from 0.2 to 20 I_n and are accurate to within 1.5% (including the sensors).

A digital LCD screen continuously displays the most heavily loaded phase (I_{max}) 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% I_n .

Below 0.05 I_n , measurements are not significant. Between 0.05 and 0.2 I_n , accuracy is to within 0.5% I_n + 1.5% of the reading.

Communication option

In conjunction with the COM communication option, the control unit transmits the following:

- settings
- all "ammeter" measurements
- tripping causes
- maximeter readings.

Fault indications

LEDs indicate the type of fault:

- overload (long-time protection I_r)
- short-circuit (short-time I_{sd} or instantaneous I_l protection)
- earth fault or earth leakage (I_g or $I_{\Delta n}$)
- internal fault (A_p).

Battery power

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

Test

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

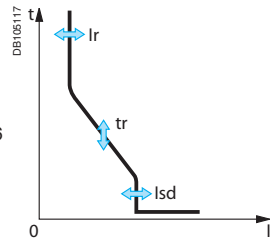
Note.

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

Protection

Micrologic 2.0 A

Long time		Micrologic 2.0 A									
Current setting (A) $I_r = I_n \times \dots$		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
tripping between 1.05 and 1.20 x I_r		other ranges or disable by changing long-time rating plug									
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
(1) 0 to -40 % - (2) 0 to -60 %											
Instantaneous											
Pick-up (A) $I_{sd} = I_r \times \dots$		1.5	2	2.5	3	4	5	6	8	10	
accuracy: ± 10 %											
Time delay		max resettable time: 20 ms; max break time: 50 ms									



Ammeter

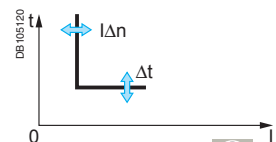
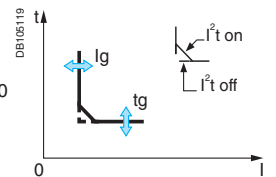
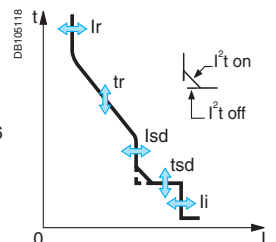
Micrologic 2.0 A

Continuous current measurements		Micrologic 2.0 A			
Display from 20 to 200 % of I_n		I_1	I_2	I_3	I_N
accuracy: 1.5 % (including sensors)		no auxiliary source (where $I > 20$ % I_n)			
Maximeters		I_1 max.	I_2 max.	I_3 max.	I_N max.

Protection

Micrologic 5.0 / 6.0 / 7.0 A

Long time		Micrologic 5.0 / 6.0 / 7.0 A									
Current setting (A) $I_r = I_n \times \dots$		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1	
tripping between 1.05 and 1.20 x I_r		other ranges or disable by changing long-time rating plug									
Time setting		t_r (s)	0.5	1	2	4	8	12	16	20	24
Time delay (s)	accuracy: 0 to -30 %	1.5 x I_r	12.5	25	50	100	200	300	400	500	600
	accuracy: 0 to -20 %	6 x I_r	0.7 ⁽¹⁾	1	2	4	8	12	16	20	24
	accuracy: 0 to -20 %	7.2 x I_r	0.7 ⁽²⁾	0.69	1.38	2.7	5.5	8.3	11	13.8	16.6
Thermal memory		20 minutes before and after tripping									
(1) 0 to -40 % - (2) 0 to -60 %											
Short time											
Pick-up (A) $I_{sd} = I_r \times \dots$		1.5	2	2.5	3	4	5	6	8	10	
accuracy: ± 10 %											
Time setting t_{sd} (s)	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
Time delay (ms) at 10 x I_r (I^2t off or I^2t on)	t_{sd} (max. resettable time)		20	80	140	230	350				
	t_{sd} (max. break time)		80	140	200	320	500				
Instantaneous											
Pick-up (A) $I_i = I_n \times \dots$		2	3	4	6	8	10	12	15	off	
accuracy: ± 10 %											
Time delay		max. resettable time: 20 ms ; max. break time: 50 ms									
Earth fault		Micrologic 6.0 A									
Pick up (A)	$I_g = I_n \times \dots$	A	B	C	D	E	F	G	H	J	
	$I_n \leq 400$ A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	400 A < I_n < 1250 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	
	$I_n \geq 1250$ A	500	640	720	800	880	960	1040	1120	1200	
Time setting t_g (s)	settings	I^2t Off	0	0.1	0.2	0.3	0.4				
		I^2t On		0.1	0.2	0.3	0.4				
Time delay (ms) at I_n or 1200 A (I^2t off or I^2t on)	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) $I_{\Delta n}$		0.5	1	2	3	5	7	10	20	30	
accuracy: 0 to -20 %											
Time delay Δt (ms)	settings	60	140	230	350	800					
	Δt (max. resettable time)	60	140	230	350	800					
	Δt (max. break time)	140	200	320	500	1000					



Ammeter

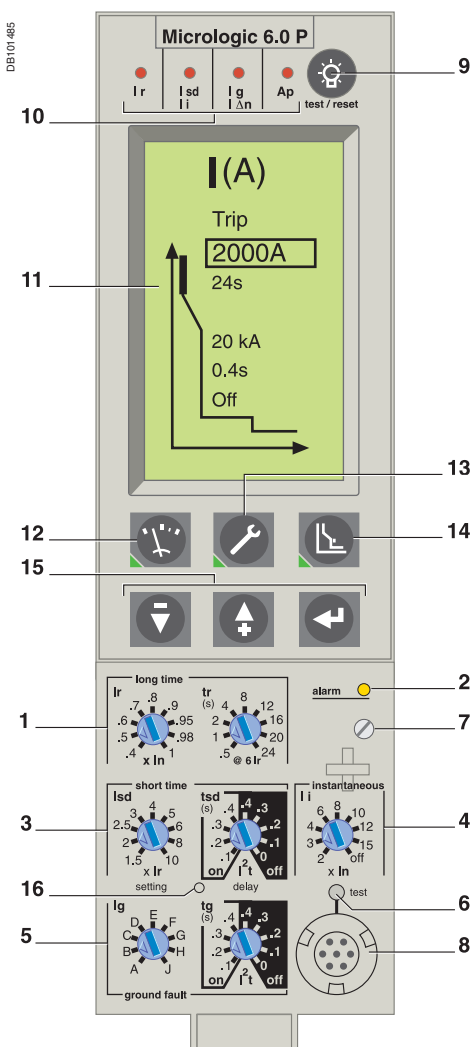
Micrologic 5.0 / 6.0 / 7.0 A

Continuous current measurements		Micrologic 5.0 / 6.0 / 7.0 A					
Display from 20 to 200 % of I_n		I_1	I_2	I_3	I_N	I_g	$I_{\Delta n}$
accuracy: 1.5 % (including sensors)		no auxiliary source (where $I > 20$ % I_n)					
Maximeters		I_1 max.	I_2 max.	I_3 max.	I_N max.	I_g max.	$I_{\Delta n}$ max.

Note.

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

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



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

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

Protection settings

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

Fine adjustment

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

IDMTL (Inverse Definite Minimum Time Lag) setting

Coordination with fuse-type or medium-voltage protection systems is optimised by adjusting the slope of the overload-protection curve. This setting also ensures better operation of this protection function with certain loads.

Neutral protection

On three-pole circuit breakers, neutral protection may be set using the keypad or remotely using the COM option, to one of four positions: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d) and neutral protection at 1,6 Ir (4P 3d + 1,6N). Neutral protection at 1,6 Ir is used when the neutral conductor is twice the size of the phase conductors (major load imbalance, high level of third order harmonics).

On four-pole circuit breakers, neutral protection may be set using a three-position switch or the keypad: neutral unprotected (4P 3d), neutral protection at 0.5 Ir (4P 3d + N/2), neutral protection at Ir (4P 4d). Neutral protection produces no effect if the long-time curve is set to one of the IDMTL protection settings.

Programmable alarms and other protection

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

Load shedding and reconnection

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

Measurements

The Micrologic P control unit calculates in real time all the electrical values (V, A, W, VAR, VA, Wh, VARh, VAh, Hz), power factors and cosφ factors.

The Micrologic P control unit also calculates demand current and demand power over an adjustable time period. Each measurement is associated with a minimeter and a maximeter.

In the event of tripping on a fault, the interrupted current is stored. The optional external power supply makes it possible to display the value with the circuit breaker open or not supplied.

Histories and maintenance indicators

The last ten trips and alarms are recorded in two separate history files. Maintenance indications (contact wear, operation cycles, etc.) are recorded for local access.

Indication option via programmable contacts

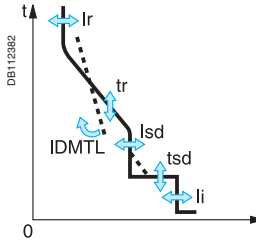
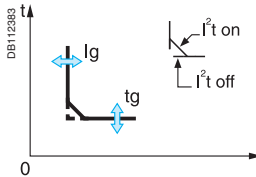
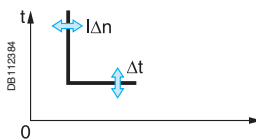
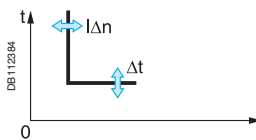
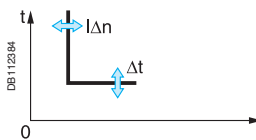
The M6C (six contacts) auxiliary contacts may be used to signal threshold overruns or status changes. They can be programmed using the keypad on the Micrologic P control unit or remotely using the COM option.

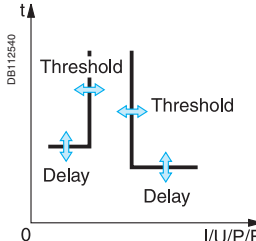
Communication option (COM)

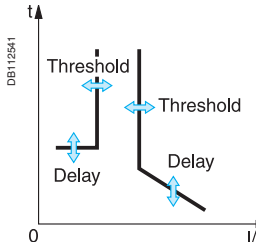
The communication option may be used to:

- remotely read and set parameters for the protection functions
- transmit all the calculated indicators and measurements
- signal the causes of tripping and alarms
- consult the history files and the maintenance-indicator register.
- maximeter reset.

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

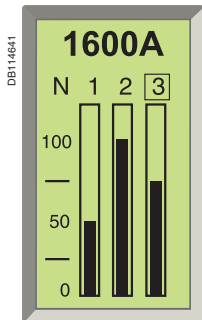
Protection			Micrologic 5.0 / 6.0 / 7.0 P											
Long time (rms)			Micrologic 5.0 / 6.0 / 7.0 P											
Current setting (A)	$I_r = I_n \times \dots$		0.4	0.5	0.6	0.7	0.8	0.9	0.95	0.98	1			
Tripping between 1.05 and 1.20 x I_r			Other ranges or disable by changing long-time rating plug								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

Alarms and other protection			Micrologic 5.0 / 6.0 / 7.0 P		
Current		Threshold	Delay		
Current unbalance	$I_{unbalance}$	0.05 to 0.6 Iaverage	1 to 40 s		
Max. demand current	$I_{max\ demand} : I_1, I_2, I_3, I_n$	0.2 I_n to I_n	15 to 1500 s		
Earth fault alarm					
	I_{ϕ}	10 to 100 % $I_n^{(1)}$	1 to 10 s		
Voltage					
Voltage unbalance	$U_{unbalance}$	2 to 30 % x Uaverage	1 to 40 s		
Minimum voltage	U_{min}	100 to U_{max} between phases 1.2 to 10 s			
Maximum voltage	U_{max}	U_{min} to 1200 between phases 1.2 to 10 s			
Power					
Reverse power	rP	5 to 500 kW	0.2 to 20 s		
Frequency					
Minimum frequency	F_{min}	45 to F_{max}	1.2 to 5 s		
Maximum frequency	F_{max}	F_{min} to 440 Hz	1.2 to 5 s		
Phase sequence					
Sequence (alarm)	$\Delta\emptyset$	$\emptyset 1/2/3$ or $\emptyset 1/3/2$	0.3 s		

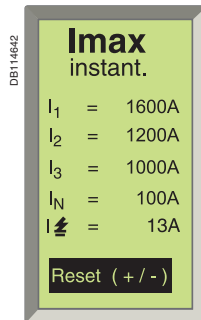
Load shedding and reconnection			Micrologic 5.0 / 6.0 / 7.0 P		
Measured value		Threshold	Delay		
Current	I	0.5 to 1 I_r per phases	20 % t_r to 80 % t_r		
Power	P	200 kW to 10 MW	10 to 3600 s		

(1) $I_n \leq 400$ A 30 %
400 A < $I_n < 1250$ A 20 %
 $I_n \geq 1250$ A 10 %

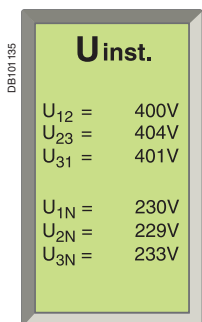
Note : all current-based protection functions require no auxiliary source.
Voltage-based protection functions are connected to AC power via a voltage measurement input built into the circuit breaker.



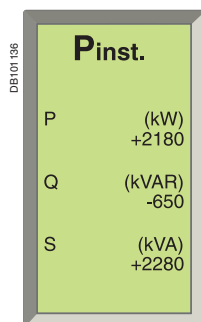
Default display.



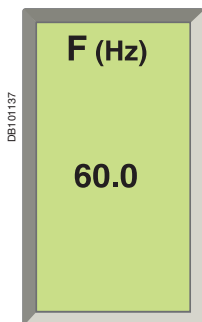
Display of a maximum current.



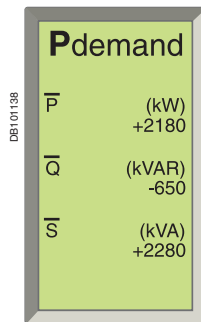
Display of a voltage.



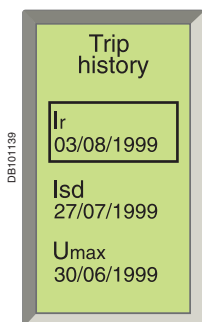
Display of a power.



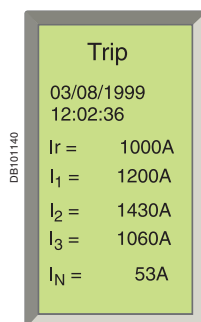
Display of a frequency.



Display of a demand power.



Display of a tripping history.



Display after tripping.

Navigation from one display to another is intuitive. The six buttons on the keypad provide access to the menus and easy selection of values. When the setting cover is closed, the keypad may no longer be used to access the protection settings, but still provides access to the displays for measurements, histories, indicators, etc.

Measurements

Instantaneous values

The value displayed on the screen is refreshed every second.

Minimum and maximum values of measurements are stored in memory (minimeters and maximeters).

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

Demand metering

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

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

Minimeters and maximeters

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

Histories

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

tripping history:

- ☐ type of fault
- ☐ date and time
- ☐ values measured at the time of tripping (interrupted current, etc.)

alarm history:

- ☐ type of alarm
- ☐ date and time
- ☐ values measured at the time of the alarm.

Maintenance indicators (with COM option)

A number of maintenance indicators may be called up on the screen:

- ☒ contact wear
- ☒ operation counter:
 - ☐ cumulative total
 - ☐ total since last reset.

DB101523

Time	Event	Module
04/21/98 08:49:00	Net Server Shutdown	User: master Level: 1 PowerLogic Network...
04/21/98 08:49:01	User Log Out	User: master Level: 1 SMS-3000 Client...
04/21/98 08:48:38	DB Table Change	User: master Level: 1 TSD Event Table Alarm Setup...
04/21/98 08:48:30	DB Table Change	User: master Level: 1 TSD Events Alarm Setup...
04/21/98 08:48:15	DB Table Change	User: master Level: 1 TSD Events Alarm Setup...
04/21/98 08:38:19	User Log In	User: master Level: 1 SMS-3000 Client...
04/21/98 08:38:06	Security Check	User: master Level: 1 PowerLogic Network...
04/21/98 08:38:05	Net Server Started	User: master Level: 1 PowerLogic Network...
04/21/98 08:38:57	User Log In	User: master Level: 1 EventAlarmNetwork...
04/21/98 08:30:44	Net Server Shutdown	User: master Level: 1 PowerLogic Network...
04/21/98 08:26:21	Security Check	User: master Level: 1 PowerLogic Network...
04/21/98 08:26:20	Net Server Started	User: master Level: 1 PowerLogic Network...
04/21/98 08:24:20	User Log In	User: master Level: 1 EventAlarmNetwork...
04/21/98 08:18:07	IPC Error	User: MA Error: 100 Logger Template Devices...
04/21/98 07:54:05	DB Table Change	User: -1 Logger Template Devices...
04/21/98 07:53:59	DB Table Change	User: -1 Logger Template Devices...
04/21/98 07:53:54	DB Table Change	User: -1 Logger Template Devices...
04/21/98 07:51:46	DB Table Change	User: master Level: 1 Analog Levels Assigned...
04/21/98 07:51:23	DB Table Change	User: master Level: 1 Analog Levels Assigned...
04/21/98 07:51:23	DB Table Change	User: master Level: 1 Analog Levels Assigned...
04/21/98 07:50:17	DB Table Change	User: master Level: 1 Analog Levels Assigned...
04/21/98 07:50:17	DB Table Change	User: master Level: 1 Analog Levels Assigned...
04/21/98 07:48:13	Setup: Device Name Change	Device: MicroLogic Breaker User: master Device Setup...
04/21/98 07:48:07	Setup: Device Added	Device: MicroLogic Breaker User: master Device Setup...
04/21/98 07:48:38	Setup: Device Name Change	Device: Transformer User: master Device Setup...
04/21/98 07:48:22	Setup: Device Added	Device: Transformer User: master Device Setup...
04/21/98 07:46:54	User Log In	User: master Level: 1 SMS-3000 Client...
04/21/98 07:46:59	Security Check	User: master Level: 1 PowerLogic Network...
04/21/98 07:44:59	Net Server Started	User: master Level: 1 PowerLogic Network...

Ready ONLINE: DEMO No working system 9:30

Display of an event log on a supervisor.

With the communication option

Additional measurements, maximeters and minimeters

Certain measured or calculated values are only accessible with the COM communication option:

- $I_{peak} / \sqrt{2}$, $(I_1 + I_2 + I_3)/3$, $I_{unbalance}$
- load level in % Ir
- total power factor.

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

Event log

All events are time stamped.

- trips
- beginning and end of alarms
- modifications to settings and parameters
- counter resets
- system faults:
- fallback position
- thermal self-protection
- loss of time
- overrun of wear indicators
- test-kit connections
- etc.

Maintenance register

Used as an aid in troubleshooting and to better plan for device maintenance operations.

- highest current measured
- operation counter
- number of test-kit connections
- number of trips in operating mode and in test mode
- contact wear indicator.

Additional technical characteristics

Setting the display language

System messages may be displayed in six different languages. The desired language is selected via the keypad.

Protection functions

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

Measurement functions

Measurement functions are independent of the protection functions.

The high-accuracy measurement module operates independently of the protection module, while remaining synchronised with protection events.

Measurement-calculation mode

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

Accuracy of measurements (including sensors)

- voltage (V) 0.5 %
- current (A) 1.5 %
- frequency (Hz) 0.1 %
- power (W) and energy (Wh) 2 %.

Stored information

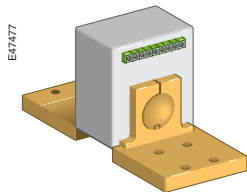
The fine setting adjustments, the last 100 events and the maintenance register remain in the control-unit memory even when power is lost.

Time-stamping

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

Reset

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



External sensor (CT)



External sensor for source ground return protection



Accessories for Micrologic control units

Neutral external voltage measurement input (option ENVT)

The neutral voltage input is necessary for Micrologic P power measurements on 3-pole circuit breakers used on installations with a distributed neutral.

It is used to connect the neutral to the Micrologic control unit to take into account the possible energy consumption caused by current flowing in the neutral.

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 NS3200 - 1000/4000 CT.

Rectangular sensor for earth-leakage protection

The sensor is installed around the busbars (phases + neutral) to detect the zero-phase sequence current required for the earth-leakage protection.

Rectangular sensors are available in two sizes.

Inside dimensions (mm)

- 280 x 115 up to 1600 A
- 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 A control unit to provide the source ground return (SGR) protection.

Long-time rating plug

Four interchangeable plugs may be used to limit the long-time threshold setting range for higher accuracy.

The time delay settings indicated on the plugs are for an overload of 6 Ir.

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

Setting ranges

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

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

External 24 V DC power-supply module

The external power-supply module makes it possible to use the display even if the circuit breaker is open or not supplied (for the exact conditions of use, see the "Electrical diagrams" part of this catalogue).

This module powers both the control unit (100 mA) and M6C programmable contacts (100 mA).

If the COM communication option is used, the communication bus requires its own 24 VDC power supply, independent with respect to that of the Micrologic control unit. With the Micrologic A control unit, this module makes it possible to display currents of less than 20 % In.

With the Micrologic P, it can be used to display fault currents after tripping.

Characteristics:

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

Battery module

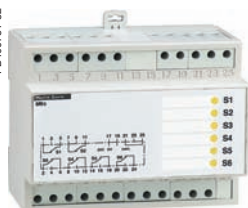
The battery module maintains display operation and communication with the supervisor if the power supply to the Micrologic control units is interrupted.

It is installed in series between the Micrologic control unit and the AD module.

Characteristics:

- battery run-time: 4 hours (approximately)
- mounted on vertical backplate or symmetrical rail.

PB 100781-32



M6C.

Spare parts for Micrologic control units

M6C programmable contacts

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

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

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

Lead-seal covers

A lead-seal cover controls access to the adjustment dials.

When the cover is closed:

- it is impossible to modify settings using the keypad unless the settings lockout pin on the cover is removed
- the test connector remains accessible
- the test button for the earth-fault and earth-leakage protection function remains accessible.

Characteristics

- transparent cover for basic Micrologic and Micrologic A control units
- non-transparent cover for Micrologic P control units.

Spare battery

A battery supplies power to the LEDs identifying the tripping causes. Battery service life is approximately ten years.

A test button on the front of the control unit is used to check the battery condition. The battery may be replaced on site when discharged.

056429



Lead-seal cover.



Compact NS160N single-pole



Compact NS160N two-pole

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	40 °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	220 V 50/60 Hz 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			

Durability (C-O cycles)	mechanical		
	electrical	277 V	In/2 In

Electrical characteristics as per NEMA AB1

Breaking capacity (kA)	240 V
V AC 50/60 Hz	277 V 480 V 600 V

Protection and measurements

Type of trip units		
Ratings		In
Overload protection (thermal)	long time threshold	Ir
Short-circuit protection (magnetic)	instantaneous pickup	Im value indicated for AC ⁽¹⁾ real value for DC
Add-on earth-leakage 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 interphase barriers escutcheons
Dimensions (mm)	W x H x D
Weight (kg)	

Source changeover system

Interlocking systems

⁽¹⁾ The thresholds for TMD and TMG 1-pole and 2-pole magnetic trip units up to 63 A are indicated for AC. The real DC thresholds are indicated on the following line.

NS100		NS160		NS250	
1	2	1	2	1	
■	■	■	■	■	
-	-	-	-	-	
-	-	-	-	-	
■	■	■	■	■	
■	■	■	■	■	
-	-	-	-	-	
-	-	-	-	-	
100	100	160	160	250	
750	750	750	750	750	
8	8	8	8	8	
277	690	277	690	277	
250	500	250	500	-	
N H	N H	N H	N H	N	
25 40	85 100	25 40	85 100	25	
25 40	- -	25 40	- -	25	
- -	25 70	- -	36 70	-	
- -	25 65	- -	35 65	-	
- -	18 50	- -	30 50	-	
- -	18 35	- -	22 35	-	
- -	8 10	- -	8 10	-	
50 85	85 100	50 85	85 100	-	
- -	85 100	- -	85 100	-	
100 %	100 %	100 %	100 %	100 %	
■	■	■	■	■	
A	A	A	A	A	
20000	20000	20000	20000	10000	
20000	20000	20000	20000	10000	
10000	10000	10000	10000	5000	
N H	N H	N H	N H	N	
25 40	85 100	25 40	85 100	25	
25 40	- -	25 40	- -	25	
- -	25 65	- -	25 65	-	
- -	10 35	- -	10 35	-	
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	
190 190 300 300 500 500 500 640 800		1000 1250		850 850 850	
260 260 400 400 700 700 700 800 1000		1200 1250		- - -	
-		-		-	
■		■		■	
-	■	-	■	-	
-	■	-	■	-	
-	■	-	■	-	
-	■	-	■	-	
■	■	■	■	■	
■	■	■	■	■	
■	■	■	■	■	
35 x 161 x 86	70 x 161 x 86	35 x 161 x 86	70 x 161 x 86	35 x 161 x 86	
0.7	1.2	0.7	1.2	0.7	
-	-	-	-	-	



1000 V Compact NS400

For ratings above 400 A,
see the Masterpact
catalogue.

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	40 °C
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 1 s
V AC 50/60 Hz		
Utilisation category		
Durability (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	I_{sd} (Ir x ...)
	instantaneous	Ii (In x ...)
Earth-fault protection		Ig (In x ...)
Residual earth-leakage protection		IΔn
Zone selective interlocking		ZSI
Protection of the fourth pole		
Add-on earth-leakage 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 interphase barriers	
	escutcheons	
Dimensions (mm)	fixed	3P
W x H x D		4P
Weight (kg)	fixed	3P
		4P

Source changeover system

Interlocking systems

	NS400 1000 V	For ratings above 400 A, see the Masterpact catalogue
	3	
	150, 250, 400	
	■	
	■	
	■	
	■	
	consult us	
	consult us	
	consult us	
	consult us	
	consult us	
	1150	
	10	
	100 %	
	150, 250, 400	
	1250	
	8	
	1000	
	10	
	100 %	
	■	
	standardised	
	standardised	
	A	
	15000	
	4000	
	2000	
	III	
	STR23SP	
	■	
	■	
	■	
	-	
	■	
	-	
	-	
	■	
	-	
	■	
	■	
	■	
	■	
	■	
	-	
	-	
	-	
	■	
	■	
	■	
	480 x 140 x 110	
	-	
	13	
	-	
	consult us	

Tripping thresholds

The 400 Hz current settings are obtained by multiplying the 50 Hz values by the following coefficient:

- K1 for thermal trip units;
- K2 for magnetic trip units.

On adjustable trip units, these adaptation coefficients are independent of the unit adjustment knob position.

Thermal trip units

The current settings are lower at 400 Hz than at 50 Hz ($K1 < 1$).

Magnetic trip units

The current settings are conversely higher at 400 Hz than at 50 Hz ($K2 > 1$).

Adjustable trip units should be set to minimum, or use Compact circuit breakers equipped with low magnetic trip units (type G).

Electronic trip units

The use of electronics offers the advantage of greater operating stability when the frequency is varied. However, the devices are still subjected to frequency related temperature effects which may sometimes pose restrictions on their use.

Column K1 of the table gives the maximum permissible current to be used for the current setting (knob position).

Thermal-magnetic trip units

Circuit breaker	Trip unit	Thermal setting K1 at 40 °C		Magnetic setting	K2
NS100N	TM16G	16	0.95	63	1.6
	TM25G	25	0.95	80	1.6
	TM40G	40	0.95	80	1.6
	TM63G	63	0.95	125	1.6
NS250N	TM16D	16	0.95	240	1.6
	TM25D	25	0.95	300	1.6
	TM40D	40	0.95	500	1.6
	TM63D	63	0.95	500	1.6
	TM80D	80	0.9	650	1.6
	TM100D	100	0.9	800	1.6
	TM125D	125	0.9	1000	1.6
	TM160D	160	0.9	1250	1.6
	TM200D	200	0.9	1000 ⁽¹⁾	1.6
	TM250D	250	0.9	1250 ⁽¹⁾	1.6

⁽¹⁾ for TM200D and TM250D, I_m must be set to its maximum

Electronic trip units

Compact adaptation coefficients					
Circuit breaker	Trip unit	Rating I_r at 50 Hz (A at 40 °C)	Long-time I_r maxi K1	Short-time I_{rm} at 50 Hz (A)	K2
NS100N	STR22SE	40...100	0.4 to 1	2 to 10 I_r	1
NS250N	STR22SE	100...250	0.4 to 0.9	2 to 10 I_r	1
NS400N	STR23SE	400	0.4 to 0.8	1.5 to 10 I_r	1
NS630N	STR23SE	630	0.4 to 0.8	1.5 to 10 I_r	1
NS400N	STR53SE	400	0.4 to 0.8	1.5 to 10 I_r	1
NS630N	STR53SE	630	0.4 to 0.8	1.5 to 10 I_r	1
C1001N	STR35SE	1000	0.4 to 0.75	1.5 to 10 I_r	0.97
C1251N	STR35SE	1250	0.4 to 0.75	1.5 to 10 I_r	0.97

Breaking capacity of Compact NS and Compact circuit breakers at 400 Hz

At 440 V, 400 Hz

Circuit breaker	Breaking capacity
NS100N	12 kA
NS250N	4,5 kA
NS400N	10 kA
NS630N	10 kA
C1001N	25 kA
C1251N	25 kA

MN or MX auxiliary releases

For Compact NS100-630

For circuit breakers on 400 Hz systems, only 125 V DC rated releases can be used. The release must be supplied by the 400 Hz system via a rectifier bridge (to be selected from the table below) and an additional resistor with characteristics depending on the system voltage and the type of circuit breaker.

U (V) 400 Hz	Rectifier	Additional resistor
220/240 V	Thomson 110 BHz or General Instrument W06 or Semikron SKB at 1,2/1,3	4.2 kΩ-5 W
380/420 V	Semikron SKB at 1,2/1,3	10.7 kΩ-10 W

Note: other models of rectifier bridges can be used if their characteristics are at least equivalent to those stated above.

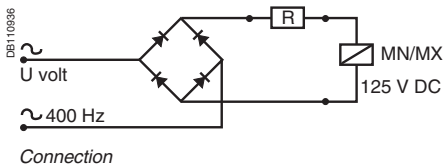
For Compact C1001-1251

The following auxiliary releases are designed to operate at 400 Hz.

U (V) 400 Hz	Catalogue number
MN 110/130 V	44925
MN 208/250 V	44926
MN 380/415 V	44932
MX 380/415 V	44914

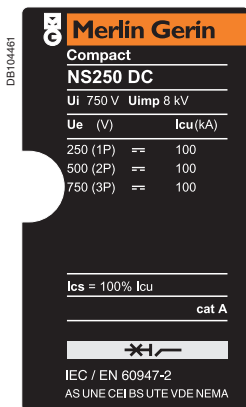
For Compact NS630b-3200

The standard auxiliary releases can be used at 400 Hz, up to an ambient temperature of 55 °C.



Compact NS direct-current (DC) circuit breakers are used to protect and control low-voltage distribution systems. They are installed in main low-voltage switchboards (MLVS) and in distribution switchboards (as incomers and outgoers). They can use all the accessories and auxiliaries for the AC ranges and are thus suitable for most DC systems and applications.

For full details, please refer to the "Direct current 16 to 4000 A" catalogue.



NS250DC rating plate.

Compact NS 16 to 630 A

The Compact NS range is designed for DC voltages from 24 to 750 V and offers:

- a wide selection of models suited to the many applications:
 - 1, 2, 3 and 4 poles up to 160 A
 - 3 and 4 poles from 250 to 630 A
- high breaking capacities, with three performance levels N, H and DC:
 - N
 - 50 kA in a 1-pole version, for systems ≤ 250 V
 - 85 kA in a 2-pole version, for systems ≤ 500 V
 - H
 - 85 kA in a 1-pole version, for systems ≤ 250 V
 - 100 kA in a 2-pole version, for systems ≤ 500 V
 - DC
 - 100 kA in a 3 or 4-pole version, for systems ≤ 750 V
- fewer frame sizes: just two pole pitches (35 and 45 mm) for easy integration in installation systems (enclosures, machines, etc.)
- accessories for insulation and series or parallel connection of poles, suited to the particularities of DC applications
- fixed and withdrawable versions (3 and 4 poles, DC type).

Breaking capacity Icu for 250 V per pole and L/R = 15 ms ⁽¹⁾
(1P: 250 V, 2P: 500 V, 3P: 750 V)

DB105148	3P/4P	DC	100 kA / 750 V					
	2P	H	100 kA / 500 V					
		N	85 kA / 500 V					
	1P	H	85 kA / 250 V					
		N	50 kA / 250 V					
				NS100	NS160	NS250	NS400	NS630

⁽¹⁾ L/R = time constant of the distribution system (see "Direct current 16 to 4000 A" catalogue).

PE10 1047-15



NS160 DC -1P.

PE10 1048-22



NS160 DC -2P.

PE10 1055-30



NS160 DC -3P.

PE10 0905-40



NS630 DC -4P.

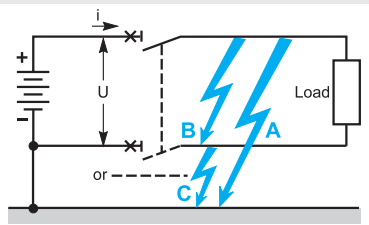
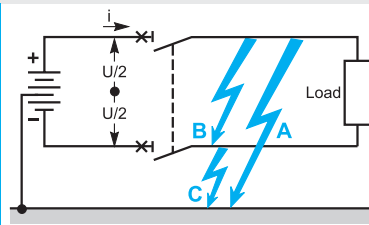
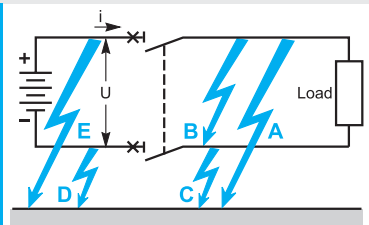
There are three types of DC distribution systems (see the table).

The operational voltage in conjunction with one of the three systems determines the number of poles taking part in current interruption.

Types of DC distribution systems

Selection of a circuit breaker depends essentially on the distribution-system parameters presented below which are used to determine the corresponding characteristics:

- type of system - determines the type of product and the number of poles connected in series for each polarity
- rated voltage - determines the number of series poles taking part in current interruption
- nominal current - determines the rated current of the circuit-breaker
- maximum short-circuit current at the point of installation - determines the breaking capacity.

Types of systems			
	Earthed systems		Isolated systems
	The source has one earthed polarity ⁽¹⁾	The source has an earthed mid-point	
Diagrams and different faults			
Fault analysis (neglecting resistance of earth electrodes)			
Fault A	■ maximum I_{sc} at U ■ only protected polarity concerned ■ all poles of protected polarity must have breaking capacity $\geq I_{sc}$ max. at U	■ maximum I_{sc} at U/2 ■ only positive polarity concerned ■ all poles of positive polarity must have breaking capacity $\geq I_{sc}$ max. at U/2	■ no consequences ■ the fault must be indicated by an IMD (insulation-monitoring device) and cleared (standard IEC/EN 60364)
Fault B	■ maximum I_{sc} at U ■ if only one polarity (the positive here) is protected, all poles of protected polarity must have breaking capacity $\geq I_{sc}$ max. at U ■ if both polarities are protected, to enable disconnection, all poles of the two polarities must have breaking capacity $\geq I_{sc}$ max. at U	■ maximum I_{sc} at U ■ both polarities are concerned ■ all poles of the two polarities must have breaking capacity $\geq I_{sc}$ max. at U	■ maximum I_{sc} at U ■ both polarities are concerned ■ all poles of the two polarities must have breaking capacity $\geq I_{sc}$ max. at U
Fault C	No consequences	■ same as fault A ■ all poles of the negative polarity must have breaking capacity $\geq I_{sc}$ max. at U/2	■ same as fault A with the same obligations
Double fault A and D or C and E	Double fault not possible, system trips on first fault	Double fault not possible, system trips on first fault	■ maximum I_{sc} at U ■ only positive polarity (cases A and D) or negative (C and E) concerned ■ all poles of each polarity must have breaking capacity $\geq I_{sc}$ max. at U
Most unfavourable cases	Fault A and fault B (if only one polarity is protected)	Fault B	Double fault A and D or C and E
Conclusion: selection of number of poles and breaking capacity			
Layout of protection poles	■ on only one polarity ⁽¹⁾	■ identical for each polarity	■ identical for each polarity
Number of series poles			
Per polarity	■ all on same polarity	■ equal	■ equal
Total	■ 1, 2 or 3 without disconnection ■ 2, 3 or 4 with disconnection	■ 2 or 4 ⁽²⁾	■ 2 or 4 ⁽²⁾
Breaking capacity	■ all poles of the protected polarity $\geq I_{sc}$ max. at U	■ all poles of both polarities $\geq I_{sc}$ max. at U ■ all poles of each polarity $\geq I_{sc}$ max. at U/2	■ all poles of each polarity $\geq I_{sc}$ max. at U
Disconnection of both polarities ⁽³⁾	Possible by adding a pole to the non-protected polarity	■ ensured	■ ensured
Creation	See the selection table opposite		

⁽¹⁾ Positive or negative, depending on the polarity connected to the exposed conductive parts.

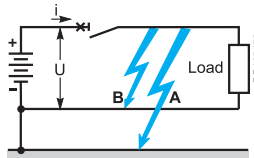
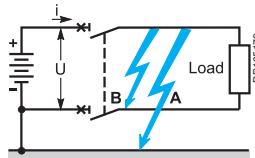
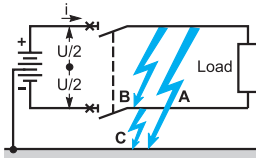
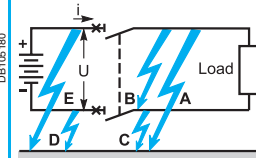
⁽²⁾ A 3P circuit breaker can be used if a 2P version does not exist. In this case, the central pole is not connected.

⁽³⁾ Circuit breaker suitable for multi-pole operation.

Solutions depending on the distribution system and the voltage

Series connection of poles

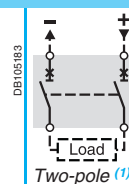
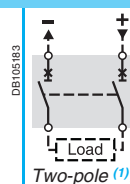
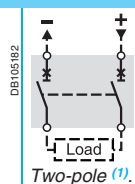
Type of distribution system

Type	Earthed		Mid-point connected to earth	Isolated
Source	One polarity (negative here) connected to earth (or exposed conductive parts)		Mid-point connected to earth	Isolated polarities
Protected polarities	1 (disconnection of 1P)	2 (disconnection of 2P)	2	2
Diagrams (and types of faults)				

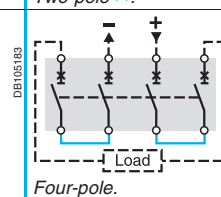
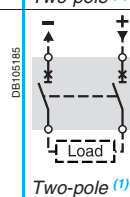
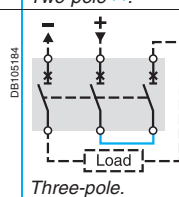
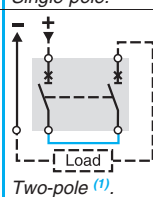
Selection of circuit breaker and pole connection

Compact NS

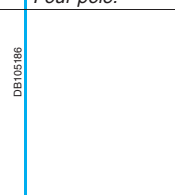
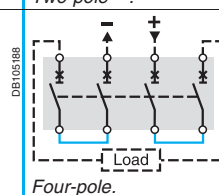
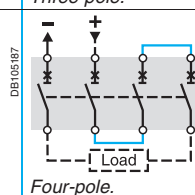
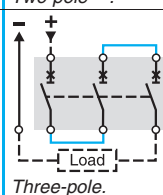
24 V ≤ Un ≤ 250 V



250 V < Un ≤ 500 V



500 V < Un ≤ 750 V



⁽¹⁾ A 3P circuit breaker can be used if a 2P version does not exist. In this case, the central pole is not connected.



Compact circuit breaker

Number of poles

Electrical characteristics as per IEC 60947-1/ 60947-2 and EN 60947-1 / 60947-2

Rated current at 40 °C	In	(A)
Rated insulation voltage	Ui	(V)
Rated impulse withstand voltage	Uimp	(kV peak)
Rated operational voltage	Ue	(V DC)

Type of circuit breaker

Ultimate breaking capacity (L/R = 5 ms and L/R = 15 ms)	Icu	(kA rms)	V DC	48-125 V (1P) ⁽¹⁾
				250 V (1P) ⁽¹⁾
				500 V (2P) ⁽¹⁾
				750 V (3P) ⁽¹⁾

Service breaking capacity	Ics	% Icu
Rated making capacity	Icm	% Icu

Utilisation category

Breaking time (ms)

Suitability for isolation

Pollution degree (as per IEC 60664-1)

Protection against overcurrents (see trip-unit table page A-38)

Trip units	Built-in
	Interchangeable
Protection	Overloads
	Short-circuits

Durability

(O/C cycles)	Mechanical
	Electrical
	250 V In
	250 V In/2
	500 V In
	500 V In/2
	750 V In
	750 V In/2

Indication and control auxiliaries

Auxiliary contacts

Voltage release	MX shunt release
	MN undervoltage release

Installation and connections

Fixed	Front connection
	Rear connection
Plug-in (base)	Front connection
	Rear connection
Withdrawable (chassis)	Front connection
	Rear connection

Dimensions and weight

Dimensions	Fixed	1P
H x W x D (mm) connected in series		2P
		3P
		4P
Weight (kg)	Fixed	1P
connected in series		2P
		3P
		4P

⁽¹⁾ Number of poles taking part in current interruption.

Example. The NS100N circuit breaker exists in the following versions:

- 1 pole with an Icu of 50 kA, for systems ≤ 250 V
- 2 poles with an Icu of 85 kA, for systems ≤ 500 V; 1 pole can be used in a 250 V system.

NS100					NS160					NS250	NS400	NS630
1		2		3/4	1		2		3/4	3/4	3/4	3/4
100					160					250	400	550
800					800					800	800	800
8					8					8	8	8
250		500		750	250		500		750	750	750	750
N	H	N	H	DC	N	H	N	H	DC	DC	DC	DC
50	85	85	100	100	50	85	85	100	100	100	100	100
50	85	85	100	100	50	85	85	100	100	100	100	100
-	-	85	100	100	-	-	85	100	100	100	100	100
-	-	-	-	100	-	-	-	-	100	100	100	100
100 %												
100 %												
A												
< 10 ms												
■												
III												
■	■	■	■	-	■	■	■	■	-	-	-	-
-	-	-	-	■	-	-	-	-	■	■	■	■
■	■	■	■	■	■	■	■	■	■	-	-	-
■	■	■	■	■	■	■	■	■	■	■	■	■
10000										5000		
5000										1000		
10000										2000		
5000										1000		
10000										2000		
5000										1000		
10000										2000		
■												
■												
■												
■												
-	-	-	-	■	-	-	-	-	■	■	■	■
-	-	-	-	■	-	-	-	-	■	■	■	■
-	-	-	-	■	-	-	-	-	■	■	■	■
-	-	-	-	■	-	-	-	-	■	■	■	■
161 x 35 x 86		-		-	161 x 35 x 86		-		-	-		
-		161 x 70 x 86		-	-		161 x 70 x 86		-	-		
-		-		161 x 105 x 86	-		-		161 x 105 x 86	255 x 140 x 110		
-		-		161 x 140 x 86	-		-		161 x 140 x 86	225 x 185 x 110		
0.7		-		-	0.7		-		-	-		
-		1.2		-	-		1.2		-	-		
-		-		1.6 to 1.9	-		-		1.6 to 1.9	6.0		
-		-		2.1 to 2.3	-		-		2.1 to 2.3	7.8		

Depending on the version, Compact NS DC circuit breakers are equipped with:

■ **1P/2P:**

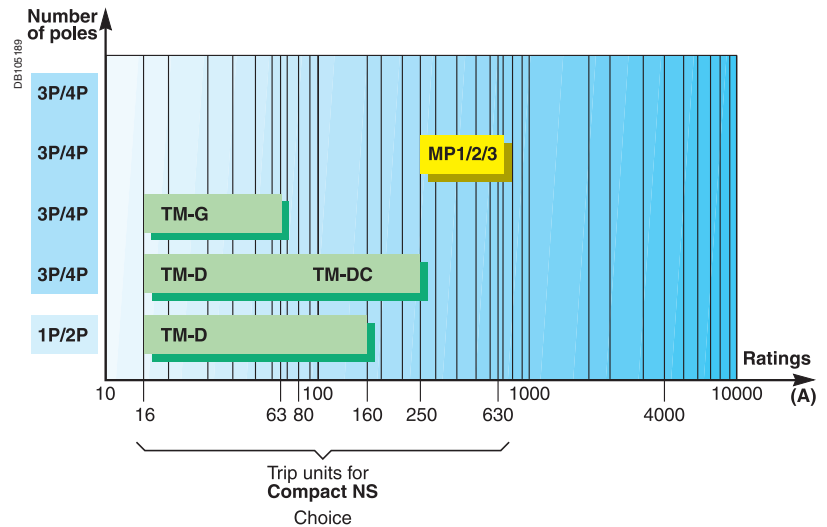
TM-D built-in thermal-magnetic trip units

■ **3P/4P:**

□ up to 250 A, TM-D, TM-DC or TM-G interchangeable thermal-magnetic trip units
□ for 400 and 630 A,

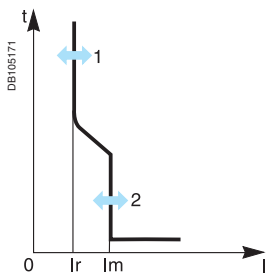
MP1, MP2, MP3 built-in magnetic trip units.

Types of trip units

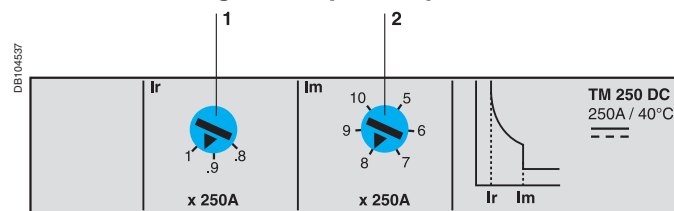


Trip units for Compact NS

TM thermal-magnetic trip unit up to 250 A



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



Up to 250 A for Compact NS, protection is provided by thermal-magnetic trip units.

For 1 or 2 poles, trip units are built in

- TM-D up to 160 A: fixed thermal threshold and magnetic pick-up

For 3 or 4 poles, trip units are interchangeable

- TM-D up to 63 A: adjustable thermal threshold and fixed magnetic pick-up
■ TM-DC from 80 to 250 A: adjustable thermal threshold and fixed or adjustable (200 and 250 A) magnetic pick-up
■ TM-G, up to 63 A: adjustable thermal threshold and fixed low magnetic pick-up to protect long cables.

Trip units for Compact NS100 - NS160 - NS250

Single-pole and two-pole (built-in trip units)

Type of trip unit		TM-D										
Rating	In (A) at 40 °C	16	20	25	32	40	50	63	80	100	125	160
Compact circuit breaker	NS100N/H	■	■	■	■	■	■	■	■	■	-	-
	NS160N/H	-	-	-	-	-	-	-	-	-	■	■
Overload protection (thermal)												
Tripping threshold		Fixed										
Ir (A) at 40 °C		16	20	25	32	40	50	63	80	100	125	160
Protection against short-circuits (magnetic)												
Pick-up	Im (A)	Fixed										
Compact circuit breaker	NS100/160N/H	Marked AC value ⁽¹⁾										
	True DC value	190	190	300	300	500	500	500	640	800	1000	1250
		260	260	400	400	700	700	700	800	1000	1200	1250

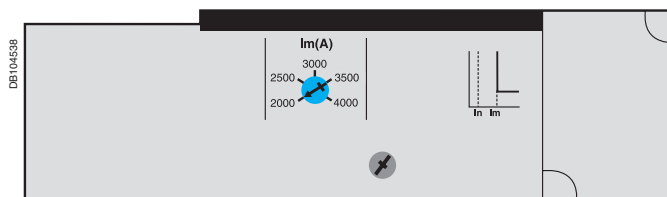
Three-pole 3P-3d and four-pole 4P-4d (interchangeable trip units)

Type of trip unit		TM-D						TM-DC						TM-G				
Rating (A)	In (A) at 40 °C	16	25	32	40	50	63	80	100	125	160	200	250	16	25	40	63	
Compact circuit breaker	NS100DC	■	■	■	■	■	■	■	■	-	-	-	-	■	■	■	■	
	NS160DC	■	■	■	■	■	■	■	■	■	■	-	-	■	■	■	■	
	NS250DC	-	-	-	-	-	-	■	■	■	■	■	■	-	-	-	-	
Overload protection (thermal)																		
Tripping threshold (A)	Ir (at 40 °C)	Adjustable																
		0.8 to 1 x In																
Protection against short-circuits (magnetic)																		
Pick-up (A)	Im	Fixed											Adjustable		Fixed			
Compact circuit breaker	NS100/160/250DC	Marked AC value ⁽¹⁾																
		190	300	400	500	500	500	-	-	-	-	-	-	63	80	80	125	
		True DC value																
		260	400	550	700	700	700	800	800	1250	1250	5 to 10 x In		80	100	100	150	

⁽¹⁾ The pick-up values for single-pole and two-pole, TMD and TMG magnetic trip units up to 63 A are marked with AC values. A correction coefficient is required to obtain the DC pick-up values indicated on the next line.

The magnetic-protection pick-up values for TM-DC trip units are indicated directly in DC values.

MP magnetic trip unit for 400 and 630 A



Above 250 A, the protection of Compact NS 400 A and 630 A circuit breakers is ensured by built-in magnetic trip units supplied mounted on the circuit breaker and offering one of three protection levels MP1, MP2 and MP3.

Compact NS400 - NS630 trip units

Three-pole 3P-3D and four-pole 4P-3d (built-in trip units)

Type of trip unit		MP1	MP2	MP3
Circuit breaker	Compact NS400DC	■	■	
	Compact NS630DC	■	■	■
Protection against short-circuits (magnetic)				
Pick-up (A)	Im	Adjustable		
		800...1600	1250...2500	2000...4000

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 DIN rail

- reduced depth (82.5 mm).

A switch-disconnector version is also available (NSA125NA and NSA160NA).



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 DIN 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 (kA rms)	Icu	AC	220 / 240 V	25	70					
		50/60	380 / 415 V	16	36					
		Hz	440 V	10	18					
		DC	125 V	5	10					
			250 V (2P)	5	10					
Service breaking capacity	Ics	% Icu		50 %	100 %					
Utilisation category				A						
Suitability for isolation				■						
Durability (C-O cycles)	mechanical		10000							
	electrical (In - 440 V)		5000							
Protection										
Built-in thermal-magnetic trip unit										
Ratings In	16	25	32	40	50	63	80	100	125	160
Thermal overload protection Ir	fixed threshold									
	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
Add-on earth-leakage 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 mm² cables						
Accessories	terminal shields			■						
	depth adjuster			■						
Dimensions (mm)	Compact	3-poles		90 x 120 x 82.5						
		4-poles		120 x 120 x 82.5						
W x H x D	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				-						

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Vigicompact NSA

Vigi earth-leakage protection module

The Vigi earth-leakage 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.

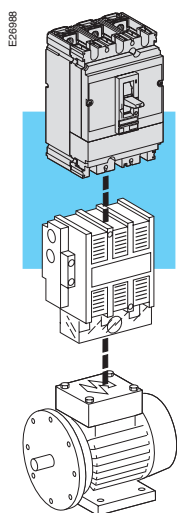
Depth adjuster

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).

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.



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/LOVAG.

Motor protection up to 37 kW

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

General circuit-breaker characteristics page A-44

The Compact NS80H-MA circuit breaker is specially designed for motor protection.

Accompanying trip unit page A-44

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
			
Breaking capacity (kA rms) 380/415 V	N	36	50
	SX	50	-
	H	70	70
	L	150	150

General circuit-breaker characteristics page A-6

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 A-45 to A-49

MA magnetic trip units provide short-circuit protection. Interchangeable ME electronic trip units provide protection against short-circuits, overloads and phase unbalance.

Motor protection up to 750 kW

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

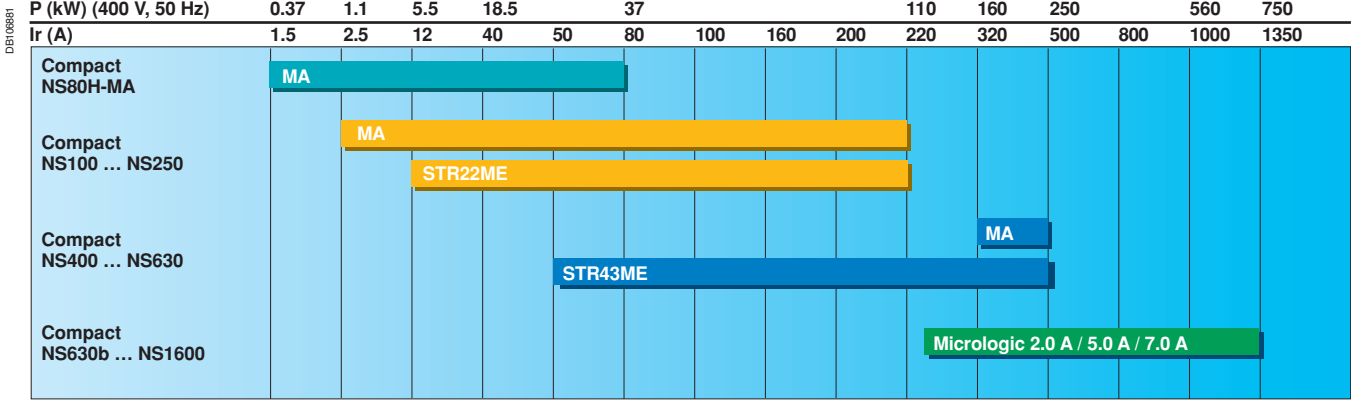
General circuit-breaker characteristics page A-8

Compact NS630b to 1600 circuit breakers equipped with Micrologic control units are the same as those for distribution systems.

Accompanying control units page A-16

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



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 NS80H-MA

Compact circuit breakers		NS80H-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 AC 50/60 Hz	690
Ultimate breaking capacity (kA rms)	Icu AC 50/60 Hz	220 / 240 V 100
		380 / 415 V 70
		440 V 65
		500 V 25
		525 V 25
		660/690 V 6
Service breaking capacity	Ics % Icu	100 %
Utilisation category		A
Suitability for isolation		■
Durability (C-O cycles)	mechanical	20000
	electrical 440 V In/2	10000
	In	7000
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		■
Interphase barriers		-
DIN rail plate		■
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.



Compact NS250H-MA



Compact NS400H-MA

General circuit-breaker characteristics page A-6

MA trip units													
Rating (A)	at 65 °C		In	2.5	6.3	12.5	25	50	100	150	220	320	500
Compact circuit breaker	N/H/L	NS100	■	■	■	■	■	■	■	-	-	-	-
		NS160	-	-	-	■	■	■	■	■	-	-	-
		NS250	-	-	-	-	-	-	■	■	■	-	-
	H/L	NS400	-	-	-	-	-	-	-	-	-	■	-
		NS630	-	-	-	-	-	-	-	-	-	-	■
Short-circuit protection (magnetic)													
Pick-up	Im		setting							setting		setting	
NS100			6...14 x In							-		-	
NS160/250			-							9...14 x In		-	
NS400 (HMA 320)			-							-		6...14 x In	
NS400 (LMA 320)			-							-		5...10 x In	
NS630 H/L MAE500			-							-		6...13 x In	

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-unbalance protection
- overload protection
- suitability for isolation.



Compact NS250 equipped with an STR22ME electronic trip unit

Compact NS100 to 250 circuit breakers

See the circuit breakers for distribution systems on page A-6 .

STR22ME electronic trip unit

Protection

Overload protection

LT (long time) protection with adjustable I_r 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 ($I_m = 13 \times I_r$) and tripping delay
- instantaneous protection with fixed pick-up ($15 \times I_n$).

Phase-unbalance protection

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

Overload LED (% I_r)

A LED on the front indicates the percent load:

- OFF: $I < 1.05 I_r$
- flashing: $I \geq 1.05 I_r$.

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)

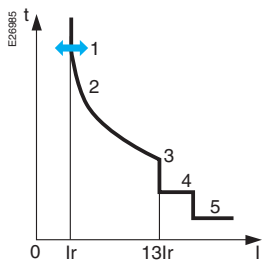
This module can be installed in place of the MN or MX release. It operates 300 ms before the circuit breaker trips on an overload.

The SDTAM module can be used to open a contactor when an overload occurs, thereby avoiding the opening of the circuit breaker.

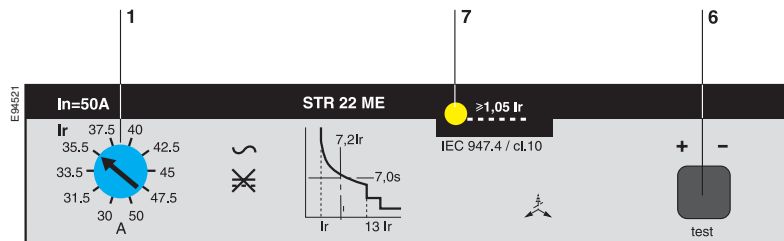
It can also be used without a contactor to provide an overload indication on the STR22ME trip unit, thereby making it possible to differentiate between tripping on overloads and short-circuits.

Characteristics

- 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 threshold
- 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	In	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) (min...max.)	at 1.5 x Ir at 6 x Ir at 7.2 Ir	fixed 120...320 6...15 4...10
Motor-overload indication		LED

Phase-unbalance protection in compliance with IEC 60947-4.1

Tripping threshold	≥ 40 % unbalance
Time delay	3.5 to 6 seconds

Short-circuit protection (Short Time)

Pick-up	I _{sd}	fixed 13 x Ir
Accuracy		±20 %
Max. resettable time (ms)		fixed 10
Max. break time		60

Short-circuit protection (Instantaneous)

Pick-up	I _i	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-unbalance protection
- overload protection
- suitability for isolation.



Compact NS630 equipped with an STR43ME electronic trip unit

Compact NS400 to 630 circuit breakers

See the circuit breakers for distribution systems on page A-6.

STR43ME electronic trip unit

Protection

Overload protection

True (rms) long-time protection with an adjustable threshold:

- I_o base setting (5 settings from 0.5 to 0.8) and I_r 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 prot

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

Indications: Overload LED (% I_r)

A LED on the front indicates the percent load:

- OFF: $I < 1.05 I_r$
- flashing: $I \geq 1.05 I_r$

Fault indications

LEDs indicate the type of fault that caused tripping:

- overload (long-time protection) or abnormal component temperature ($> I_r$)
- short-circuit (short-time protection) or instantaneous ($> I_{sd}$)
- phase unbalance (LED on the right)
- microprocessor malfunction:

□ all four (% I_r), ($> I_r$), ($> I_{sd}$) and (phase unbalance) 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.

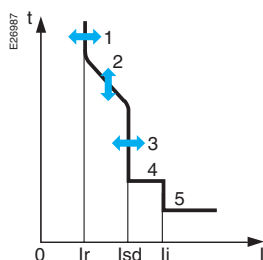
Self monitoring

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

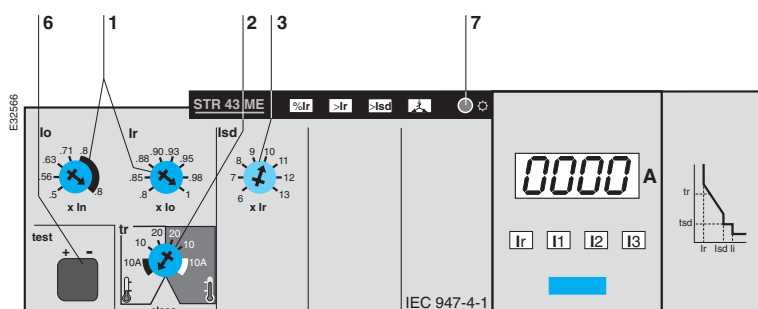
Options

Three options are available:

- ammeter (**I**)
- contactor tripping module (**SDTAM**)
- communication (**COM**).



- 1 long-time threshold
- 2 tripping class
- 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	Ir	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-unbalance protection in compliance with IEC 60947-4.1

Tripping threshold	≥ 40 % unbalance
Time delay	4 s ± 10 %

Short-circuit protection (Short Time)

Pick-up	Ird	adjustable, 8 settings - 6...13 x Ir
Accuracy		± 15 %
Time delay (ms)		fixed
	max. resettable time	10
	max. break time	60

Short-circuit protection (Instantaneous)

Pick-up	Ii	fixed - 13 x Ir max.
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Other functions

Motor-overload LED	■
Indications module	■

Options

Ammeter (I)	■
SDTAM module	■
Communication (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 I1, I2, I3 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 A-42.

Communication (COM)

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

Transmitted data:

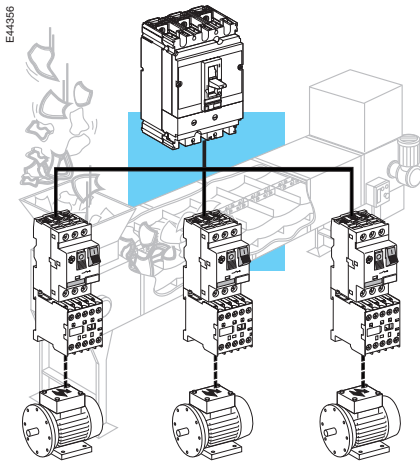
- settings
- phase currents (rms values)
- highest current of the three phases
- overload-condition alarm
- cause of tripping (overload, short-circuit, etc.).

Possible combinations:

- I
- I + COM
- SDTAM
- SDTAM + I
- SDTAM + I + COM

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

Rated current (A)		12.5...100
Breaking capacity (kA rms) 380/480 V		18
General circuit-breaker characteristics		page A-51
Compact NSC100 circuit breakers are specially designed to protect industrial control panels.		
Accompanying trip unit		page A-52
The built-in TMD thermal-magnetic trip unit provides:		
■ overload protection (adjustable-threshold thermal device)		
■ short-circuit protection (fixed-pick-up magnetic device).		

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UL 508 / IEC 60947-2 / CSA22-2

Compact NS100 to 630

Rated current (A)		12.5 ...	12.5 ...	12.5 ...	60...	250...
		100	160	250	400	630
Compact		NS100	NS160	NS250	NS400	NS630
						
		UL 508 / IEC 60947-2 / CSA22-2			IEC 60947-2	
Breaking capacity (kA rms)	N	35	35	35	42	42
	SX	50	50	50	-	-
380/480 V	H	65	65	65	65	65
General circuit-breaker characteristics					page A-6	
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					pages A-10 to A-15	
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.						

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UL 508 / IEC 60947-2 / CSA22-2

PB101051_13



IEC 60947-2

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 DIN 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 220/240 V		42							
		50/60 380/415 V		18							
		Hz 440 V		18							
		500 V		10							
		525 V		10							
		DC 125 V		5							
		250 V (2P)		5							
Service breaking capacity		Ics	% Icu		100 %						
Utilisation category				A							
Suitability for isolation				■							
Durability (C-O cycles)	mechanical			20000							
	electrical	440 V	In/2 In	10000							
7000											
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)		fixed pick-up									
Add-on earth-leakage protection		600	600	600	600	1000	1000	1000	1000	1000	1250
		add-on Vigirex 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			■							
	interphase 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-leakage protection module

The Vigi earth-leakage 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

Trip units, auxiliaries, installation enclosures

Trip-unit selection

P (hp) (480 V, 3P)	3	10	15	20	30	30	40	50	60	75	125	150	150	250	400
I _r (A)	12	16	25	32	40	48	63	70	80	100	160	205	220	320	500
Compact NSC100N		TMD													
Compact NS100 É NS250		STR22ME													
Compact NS400 É NS630							STR43ME / STR23SE / STR53UE								

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	UL/CSA approvals
NSC100N	TMD NA	"Manual Motor Controller: Across the line starter & General use"
NS100/160/250 N/SX/H	STR22ME NA TMD STR22SE/GE	"Manual Motor Controller: Across the line starter" "Manual Motor Controller: General Use"
NS400/630 N/H	STR43ME NA STR23SE STR53UE	

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 centres).

Early-make or early-break contacts

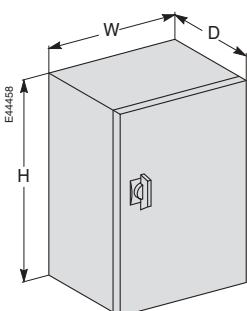
These auxiliary contacts make it possible to de-energise the downstream auxiliary circuits of the control panel as well as the auxiliary circuits supplying the MN release, if applicable.

Installation 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

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



Installation enclosure

UL508 / CSA 22-2 no. 14 marking

The UL508 / 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.

E42851

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

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

UL / CSA logo

Breaking capacity

Horsepower rating

Cable cross-section and tightening torques

E42850

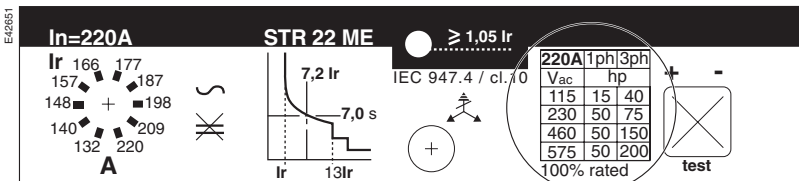
 LISTED MAN. MOTOR. CTRL. 34XL 	
NS100-160-250 N/H/NA	
Equipped with TMD/DE or STR trip unit	
This MMC is suitable for use on a circuit capable of delivering not more than the short-circuit current rating of this MMC indicated here below, or the upstream protective device interrupting capability, whichever 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	tightening torque
75°C	
wire size	lb-inch Nm
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

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

UL / CSA logo

Breaking capacity

Cable cross-section and tightening torques



Trip-unit marking

Earth-leakage protection is obtained by:

- fitting a *Vigi* module on the circuit breaker (Compact NS100 to 630)
- installing a *Micrologic 7.0 A* control unit (Compact NS630b to 3200)
- using a *Vigirex* relay and separate sensors (all Compact circuit breakers).

Circuit breakers equipped with an add-on *Vigi* module (Vigicompact)

Rated current (A)	100... 630	
Vigicompact	NSC100 N NSA160 N/E NS125 E	NS100 to 250 NS400 and 630
		

General circuit-breaker characteristics

pages A-6, A-40 and A-51

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* 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 A-8

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

Accompanying control units

page A-18

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

Earth-leakage protection using a *Vigirex* relay

Earth-leakage relay	Separate toroids	Rectangular sensors
		

Compact circuit breaker + *Vigirex* relay combination

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

Vigirex-relay characteristics:

- sensitivity adjustable from 30 mA to 250 mA and 9 time-delay settings (0 to 4.5 second)
- closed toroids up to 630 A (30 to 300 mm in diameter), split toroids up to 250 A (46 to 110 mm in diameter) or rectangular sensors up to 3200 A
- 400 Hz distribution systems.

Options:

- trip alarm by a fail-safe contact
- pre-alarm LED and contact, etc.

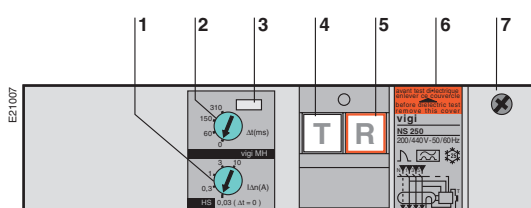
Compliance with standards:

- IEC 60947-2, appendix M
- IEC/EN 60755: general requirements for residual current operated protective devices
- IEC/EN 6100-4-2 to 4-6: immunity tests
- CISPR11: radio-frequency radiated and conducted emission tests
- UL1053 and CSA22.2 No. 144 for RH10, RH21 and RH99 relays at supply voltages up to and including 220/240 V.

Add-on Vigi module (Vigicompact) for Compact NS100 to 630



Vigicompact NS250N



- 1 sensitivity setting
- 2 time-delay setting (for selective earth-fault protection)
- 3 lead-seal fixture for controlled access to settings
- 4 test button simulating an earth-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

Plug-in 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-leakage protection

See pages A-41 and A-51, respectively.

Vigicompact NS100 to 630 circuit breakers with earth-leakage 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
	4 poles	140 x 236 x 86		180 x 355 x 110
W x H x D (mm)	3 poles	2.5	2.8	8.8
	4 poles	3.2	3.4	10.8
Weight (kg)				

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 (SDV) 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

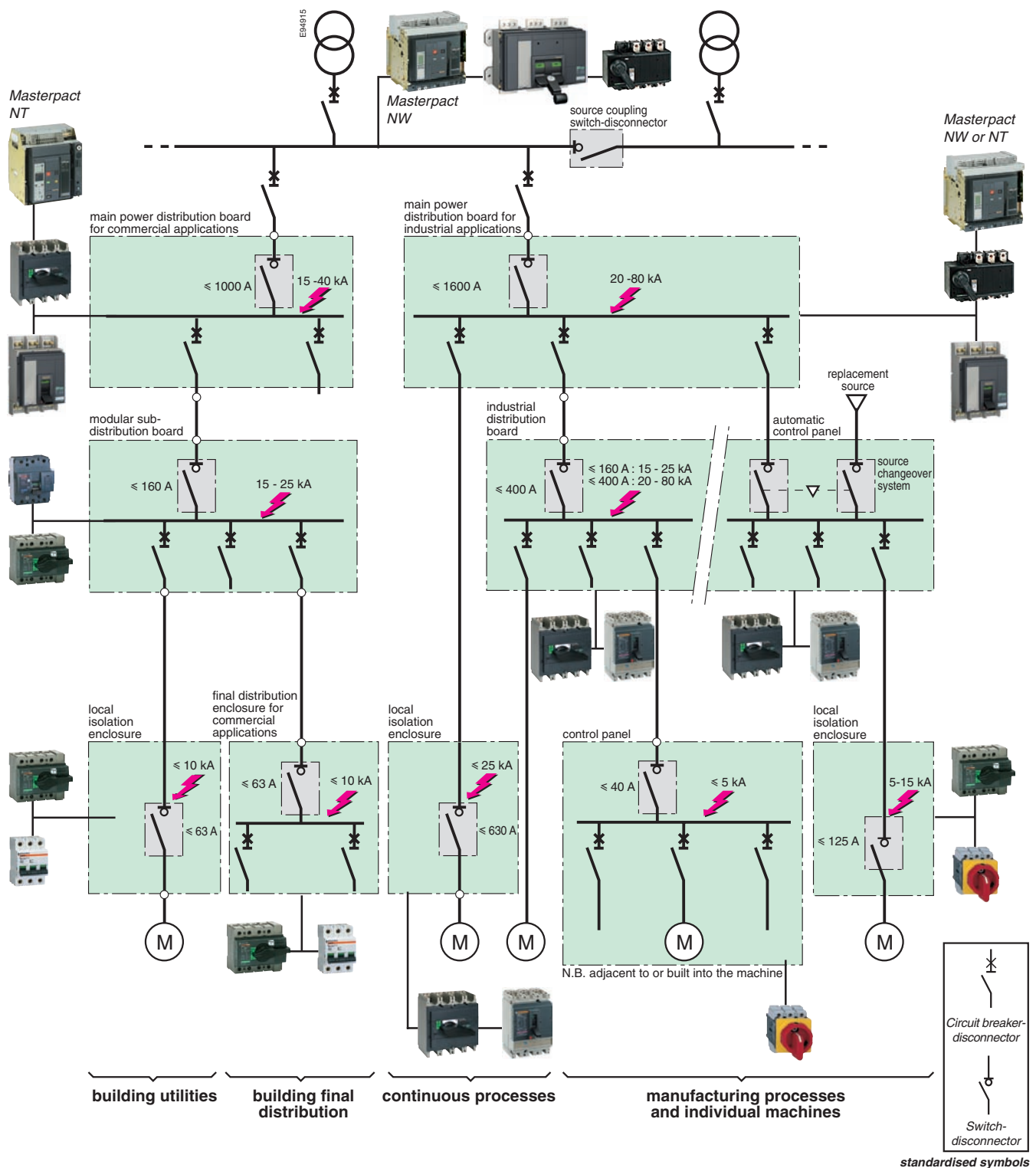
	Vigi ME	Vigi MH	Vigi MB
Number of poles	3, 4 ⁽¹⁾	3, 4 ⁽¹⁾	3, 4 ⁽¹⁾
NS125 E	■	■	-
NS100	■	■	-
NS160	■	■	-
NS250	-	■	-
NS400	-	-	■
NS630	-	-	■
Protection characteristics			
Sensitivity	fixed	adjustable	adjustable
I_{Δn} (A)	0.3	0.03 - 0.3 - 1 - 3 - 10	0.3 - 1 - 3 - 10 - 30
Time delay			
Intentional delay (ms)	fixed	adjustable	adjustable
	< 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 3P circuit breakers used for single-phase or two-phase protection.

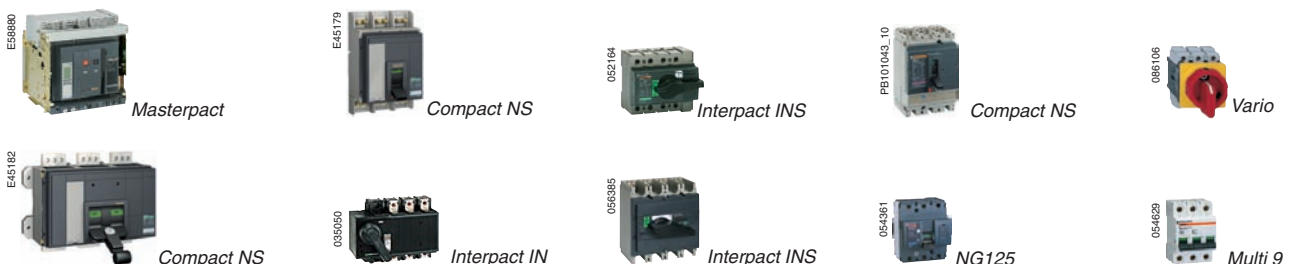
⁽²⁾ If the sensitivity is set to 30 mA, there is no time delay, whatever the time-delay setting.

Note.

The Vigi module for the Compact NSA160 circuit breaker is presented on page 550E2200/3.



Switch-disconnectors



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

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

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



Compact NS250 switch-disconnector



Compact switch-disconnector equipped with a Vigi earth-leakage module



Compact switch-disconnector equipped with a motor mechanism



MN/MX voltage release

Installation standards require upstream protection. However, due to their high-set magnetic release, Compact NSA125NA and NSA160NA switch-disconnectors are self protected.



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 ² cables				
Mounting	on DIN rail				
Front-panel cutout	45 mm high				
Electrical characteristics as per IEC 60947-3 and EN 60947-3					
Conventional thermal current (A)	I _{th}	60 °C			
Rated insulation voltage (V)	U _i				
Rated impulse withstand voltage (kV)	U _{imp}				
Rated operational voltage (V)	U _e	AC 50/60 Hz			
		DC			
Rated operational current	I _e	AC 50/60 Hz			
		220/240 V			
		380/415 V			
		440/480 V			
Short-circuit making capacity	I _{cm}	(kA peak)	minimum (switch-disconnector alone)		
			maximum (with protection circuit breaker upstream)		
Short-time withstand current	I _{cw}	(A rms)	1 s		
			3 s		
			20 s		
Suitability for isolation					
Durability (C-O cycles)	mechanical	AC	440 V	AC22A	
			440 V	AC23A	
			DC	250 V	DC23A
Positive contact indication					
Pollution degree					
Protection					
Add-on earth-leakage 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		500	
250		250	
AC22A	AC23A	AC22A	AC23A
125	125	160	160
125	125	160	160
125	125	160	160
2.1			
330			
1500			
1500			
580			
■			
10000			
5000			
5000			
5000			
■			
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 NSC100NA and NS100NA to 630NA switch-disconnectors

Installation standards require upstream protection. However, due to their high-set magnetic release, Compact NSC100NA and NS100NA to 630NA 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)	I_{th}	60 °C		
Rated insulation voltage (V)	U_i			
Rated impulse withstand voltage (kV)	U_{imp}			
Rated operational voltage (V)	U_e	AC 50/60 Hz DC		
Rated operational current	I_e	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	I_{cm}	(kA peak)	minimum (switch-disconnector alone) maximum (with protection circuit breaker upstream)	
Short-time withstand current	I_{cw}	(A rms)	1 s 3 s 20 s	
Suitability for isolation				
Durability (C-O cycles)	mechanical			
	electrical	AC	690 V	AC22A
			440 V	AC23A
		DC	250 V	DC23A
Positive contact indication				
Pollution degree				
Protection				
Add-on earth-leakage protection	add-on Vigì 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 interphase barriers escutcheons			
Dimensions (mm)	fixed, front connection		2/3P 4P	
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				
Remote-operated and automatic source-changeover systems				

⁽¹⁾ 2P in 3P case

⁽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	
	AC22A	AC23A	AC22A	AC23A	AC22A	AC23A	AC22A	AC23A	AC22A	AC23A	AC22A	AC23A
	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
	DC22A	DC23A	DC22A	DC23A	DC22A	DC23A	DC22A	DC23A	DC22A	DC23A	DC22A	DC23A
	-	-	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 NS1600NA switch-disconnectors

Installation standards require upstream protection.



Compact NS800NA

Compact switch-disconnectors

Number of poles				
Control	manual	toggle direct or extended rotary handle		
	electric			
Connections	fixed	front connection rear connection		
	withdrawable (on chassis)	front connection rear connection		
Electrical characteristics as per IEC 60947-3 and EN 60947-3				
Conventional thermal current (A) I _{th}	60 °C			
Rated insulation voltage (V)	U _i			
Rated impulse withstand voltage (kV)	U _{imp}			
Rated operational voltage (V)	U _e	AC 50/60 Hz		
Rated operational current	I _e	AC 50/60 Hz		
		220/240 V 380/415 V 440/480 V ⁽¹⁾ 500/525 V 660/690 V		
Short-circuit making capacity	I _{cm}	(kA peak)		
Short-time withstand current	I _{cw}	(A rms)	0.5 s 20 s	
Suitability for isolation				
Durability (C-O cycles)	mechanical			
	electrical	AC	440 V	AC23A/In
Positive contact indication				
Pollution degree				
Protection				
Add-on earth-leakage protection	combination with Vigirex relay			
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases	MX shunt release MN undervoltage release			
Remote communication by bus				
Device status indications (communicating auxiliary contacts)				
Device remote operation (communicating motor mechanism)				
Installation				
Accessories	terminal extensions and spreaders terminal shields and interphase barriers escutcheons			
Dimensions (mm)	fixed	3P 4P		
W x H x D		4P		
Weight (kg)	fixed	3P 4P		
Source-changeover system (see section "on source-changeover systems")				
Manual source-changeover systems, remote-operated and automatic				

⁽¹⁾ Suitable for 480 V NEMA.

	NS630bNA	NS800NA	NS1000NA	NS1250NA	NS1600NA
	3, 4	3, 4	3, 4	3, 4	3, 4
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	■	■	■	■	■
	630	800	1000	1250	1600
	800	800	800	800	800
	8	8	8	8	8
	690	690	690	690	690
	AC23A	AC23A	AC23A	AC23A	AC23A
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1600
	630	800	1000	1250	1520
	52	52	52	52	52
	25	25	25	25	25
	4	4	4	4	4
	■	■	■	■	■
	10000	10000	10000	10000	10000
	2000	2000	2000	2000	1000
	■	■	■	■	■
	III	III	III	III	III
	■				
	■				
	■				
	■				
	■				
	■				
	■				
	■				
	■				
	327 x 210 x 147				
	327 x 280 x 147				
	14				
	18				
	■				

Control and disconnection
Compact NS1600bNA to 3200NA
switch-disconnectors

Installation standards require upstream protection. However, Compact NS1600b to 3200NA switch-disconnectors are self-protected for all currents higher than 130 kA peak.



Compact NS2000NA

Compact switch-disconnectors

Number of poles				
Control	manual	toggle		
		direct or extended rotary handle		
Connections	electric			
	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)	I_{th}	60 °C		
Rated insulation voltage (V)	U_i			
Rated impulse withstand voltage (kV)	U_{imp}			
Rated operational voltage (V)	U_e	AC 50/60 Hz		
Rated operational current	I_e	AC 50/60 Hz		
		220/240 V		
		380/415 V		
		440/480 V ⁽¹⁾		
		500/525 V		
		660/690 V		
Short-circuit making capacity	I_{cm}	(kA peak)		
Short-time withstand current	I_{cw}	(kA rms) 3 s		
Integrated instantaneous protection (kA peak ±10 %)				
Suitability for isolation				
Durability (C-O cycles)	mechanical			
	electrical	AC	440 V	AC23A/In
Positive contact indication				
Pollution degree				
Protection				
Add-on earth-leakage protection	combination with Vigirex relay			
Additional indication and control auxiliaries				
Indication contacts				
Voltage releases	MX shunt release			
	MN undervoltage release			
Installation				
Accessories	escutcheons			
Dimensions (mm)	fixed	3P		
W x H x D		4P		
Weight (kg)	fixed	3P		
		4P		
Source-changeover system (see section "on source-changeover systems")				
Manual source-changeover systems, remote-operated and automatic				

⁽¹⁾ Suitable for 480 V NEMA.

	NS1600bNA	NS2000NA	NS2500NA	NS3200NA
	3, 4	3, 4	3, 4	3, 4
	■	■	■	■
	-	-	-	-
	-	-	-	-
	■	■	■	■
	-	-	-	-
	-	-	-	-
	-	-	-	-
	1600	2000	2500	3200
	800	800	800	800
	8	8	8	8
	690	690	690	690
	AC23A	AC23A	AC23A	AC23A
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	1600	2000	2500	3200
	135	135	135	135
	32	32	32	32
	130	130	130	130
	■	■	■	■
	6000	6000	6000	6000
	1000	1000	1000	1000
	■	■	■	■
	III	III	III	III
	■			
	■			
	■			
	■			
	■			
	350 x 420 x 160			
	350 x 535 x 160			
	23			
	36			
	-			



Manual source-changeover system

This is the most simple type. It is controlled manually by an operator and consequently the time required to switch from the normal to the replacement source can vary.

A manual source-changeover system is made up of two or three mechanically interlocked manually-operated circuit breakers or switch-disconnectors.

Remote-operated source-changeover system

This is the most commonly employed system for devices with high ratings (above 400 A). No human intervention is required. Transfer 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 an electrical interlocking system that may have different configurations. In addition, a mechanical interlocking system protects against electrical malfunctions or incorrect manual operations.

Automatic source-changeover systems

An automatic controller may be added to a remote-operated source-changeover system for automatic source control according to programmable operating modes. This solution ensures optimum energy management:

- transfer to a replacement source according to 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.

Communication option

The communication option must not be used to control the opening or closing of source-changeover system circuit breakers. It should be used only to transmit measurement data or circuit-breaker status.

The eco COM option is perfectly suited to these equipments.



Commercial and service sector:

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



Industry:

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

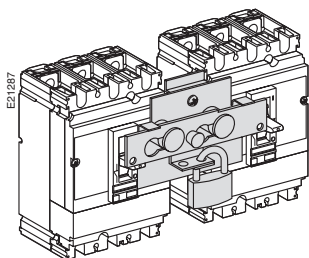


Infrastructures:

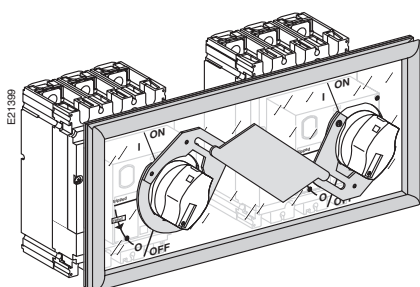
- port and railway installations
- runway lighting systems
- control systems on military sites...

Mechanical interlocking

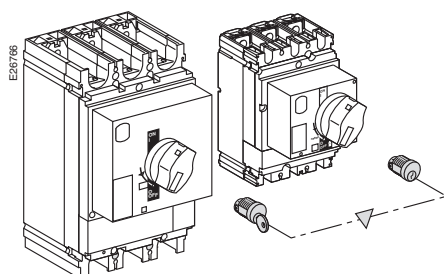
A manual source-changeover system can be installed on two to three manually-operated circuit breakers or switch-disconnectors. Interlocking is mechanical. Interlocks prevent connection to both sources at the same time, even momentarily.



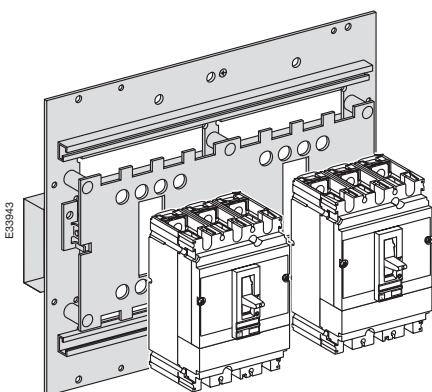
Interlocking of two toggle-controlled devices



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 (shackle diameter 5 to 8 mm).

Combinations 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.

Combinations 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. This solution enables interlocking between two devices that are physically distant or that have significantly different characteristics, for example between a low and a medium-voltage device, or between Compact NS circuit breakers and switch-disconnectors.

A system of wall-mounted units with captive keys makes possible a large number of combinations between many devices.

Combinations of Normal and Replacement devices

All Compact 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.

Combinations of Normal and Replacement devices

All manually operated Compact NS100 to 630 circuit breakers and switch-disconnectors can be interlocked.

Devices must be fixed or plug-in versions, with or without earth-leakage protection or measurement modules.

Electrical interlocking is used with the mechanical interlocking system. It electrically interlocks the two circuit breakers and implements the time delays required for proper operation of the system. An automatic controller may be added to take into account information from the distribution system.

Electrical interlocking is carried out by an electrical control device. For Compact NS up to 630 A, electrical interlocking is implemented by the IVE unit integrating control circuits and an external terminal block. The integrated control circuits implement the time delays required for correct source transfer.

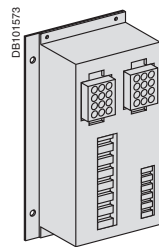
For Compact NS630b to 1600, this function can be implemented in one of two ways:

- using the IVE unit
- by an electrician based on the diagrams presented in the “Electrical diagrams” part of this catalogue.

Characteristics of the IVE unit

- external connection terminal block:
 - inputs: circuit breaker control signals
 - outputs: status of the SDE contacts on the “Normal” and “Replacement” source circuit breakers
- 2 connectors for the two “Normal” and “Replacement” source circuit breakers:
 - inputs:
 - status of the OF contacts on each circuit breaker (ON or OFF)
 - status of the SDE contacts on the “Normal” and “Replacement” source circuit breakers
 - outputs: power supply for operating mechanisms
- control voltage:
 - 24 to 250 V DC
 - 48 to 415 V 50/60 Hz - 440 V 60 Hz.

The IVE unit control voltage must be same as that of the circuit breaker operating mechanisms.



IVE unit.

Necessary equipment

For Compact NS100 to 630, each circuit breaker must be equipped with:

- a motor mechanism
- an OF contact
- an SDE contact.

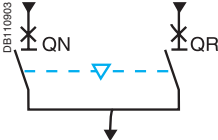
The components are supplied ready for assembly and the circuit breakers prewired. The prewiring must not be modified.

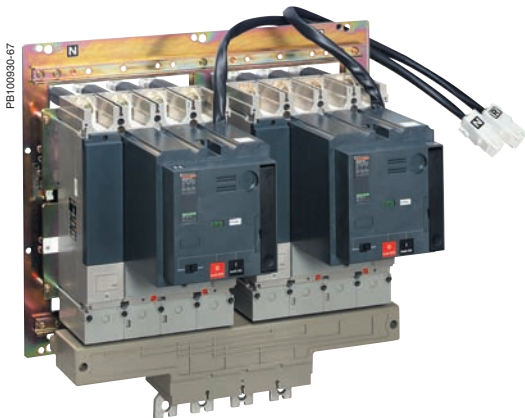
For Compact NS630b to 1600, each circuit breaker must be equipped with:

- a motor mechanism
- an available OF contact
- a CE connected-position contact (carriage switch) on withdrawable circuit breakers
- an SDE contact.

Standard configurations

Compact NS

Types of mechanical interlocking	Possible combinations		Typical electrical diagrams	Diagram no.
2 devices	QN	QR		
	0	0	Compact NS100 to 630: ■ electrical interlocking without emergency power off (EPO) auxiliaries:	51201177
	1	0	□ with EPO by MN	51201178
	0	1	□ with EPO by MX	51201179
			Compact NS630b to 1600: ■ electrical interlocking with lockout after fault: □ permanent replacement source (without IVE) □ with EPO by MX (without IVE) □ with EPO by MN (without IVE) □ permanent replacement source (with IVE) □ with EPO by MX (with IVE) □ with EPO by MN (with IVE) ■ automatic control without lockout after fault: □ permanent replacement source (without IVE) □ engine generator set (without IVE)	51201180 51201181 51201182 51201183 51201184 51201185 51201186 51201187



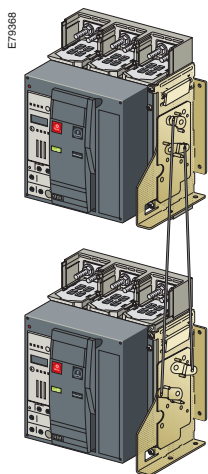
Remote-operated source-changeover system



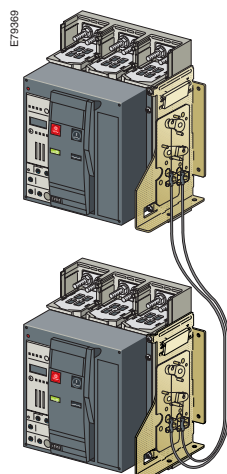
Auxiliary control plate



Controller



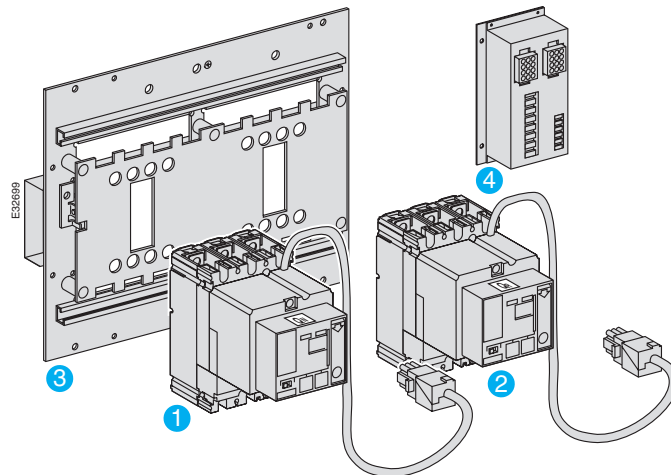
Compact NS630b to 1600
Interlocking by rods



Interlocking by cables

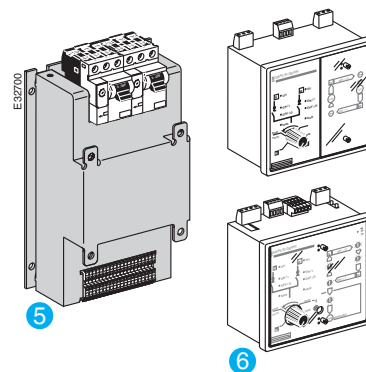
Source-changeover system without a controller

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.



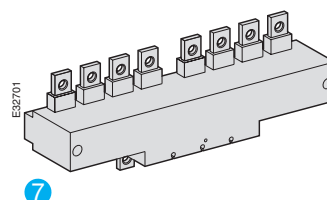
Source-changeover system with a controller

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.



A remote-operated 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.

Associated controllers

By combining a remote-operated source-changeover system with an integrated BA or UA automatic controller, it is possible to automatically control source transfer according to user-selected sequences. These controllers can be used on source-changeover systems comprising 2 circuit breakers.

For source-changeover systems comprising 3 circuit breakers, the automatic control diagram must be prepared by the installer as a complement to diagrams provided in the "electrical diagrams" section of this catalogue.



BA controller.



UA controller

Controller	BA	UA
4-position switch		
Compatible circuit breaker	All Compact NS circuit breaker	
Automatic operation	■	■
Forced operation on "Normal" source	■	■
Forced operation on "Replacement" source	■	■
Stop (both Normal and Replacement sources OFF)	■	■
Automatic operation		
Monitoring of the "Normal" source and automatic transfer	■	■
Generator set startup control		■
Delayed shutdown (adjustable) of engine generator set		■
Load shedding and reconnection of non-priority circuits		■
Transfer to the "Replacement" source if one of the phases of the "Normal" phase is absent		■
Test		
By opening the P25M circuit breaker supplying the controller	■	
By pressing the test button on the front of the controller		■
Indications		
Circuit-breaker status indication on the front of the controller: on, off, fault trip	■	■
Automatic mode indication contact	■	■
Other functions		
Selection of type of "Normal" source (single-phase or three-phase) ⁽¹⁾		■
Voluntary transfer to "Replacement" source (e.g. energy-management commands)	■	■
During peak-tariff periods (energy-management commands) forced operation on "Normal" source if "Replacement" source not operational		■
Additional control contact (not in controller). Transfer to "Replacement" source only if contact closed (e.g. used to test the frequency of UR)	■	■
Setting of maximum startup time for the replacement source		■
Options		
Communication option		■
Power supply		
Control voltages ⁽²⁾	110 V	■
	220 to 240 V 50/60 Hz	■
	380 to 415 V 50/60 Hz	■
	440 V 60 Hz	■
Operating thresholds		
Undervoltage	0.35 Un ≤ voltage ≤ 0.7 Un	■
Phase failure	0.5 Un ≤ voltage ≤ 0.7 Un	■
Voltage presence	voltage ≥ 0.85 Un	■
IP degree of protection (EN 60529) and IK degree of protection against external mechanical impacts (EN 50102)		
Front	IP40	■
Side	IP30	■
Connectors	IP20	■
Front	IK07	■
Characteristics of output contacts (dry, volt-free contacts)		
Rated thermal current (A)	8	
Minimum load	10 mA at 12 V	
Output contacts:		
Position of the Auto/Stop switch	■	■
Load shedding and reconnection order		■
Generator set start order		■
	AC	DC
Utilisation category (IEC 60947-5-1)	AC12 AC13 AC14 AC15	DC12 DC13
Operational current (A)	24 V	8 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⁾ For example, 220 V single-phase or 220 V three-phase.

⁽²⁾ The controller is powered by the ACP auxiliaries control plate. The same voltage must be used for the ACP plate, the IVE unit and the circuit-breaker operating mechanisms. If this voltage is the same as the source voltage, then the "Normal" and "Replacement" sources can be used directly for the power supply. If not, an isolation transformer must be used.

Communication with the circuit breaker or switch-disconnector is possible using a number of hardware solutions:

- **Advantys OTB Modbus interface module with built-in inputs/outputs**
- **Power Meter units (PM700, PM800)**
- **Micro Power Server MPS100 TCP IP/Modbus gateway with six digital alarm inputs.**

These solutions are compatible with existing installations equipped with communicating contacts.

The Compact NS range can take advantage of the features of the MPS100, including automatic notification of alarms via e-mail and SMS messages.



Advantys OTB Modbus.



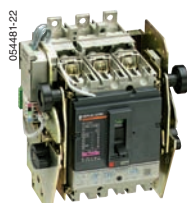
Power Meter.



Micro Power Server MPS100.



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



Withdrawable Compact NS on its chassis equipped with communicating auxiliary contacts.



SC150 indication and control interface.

In addition to existing communication possibilities, new communication solutions are available for the range:

- **Advantys OTB Modbus interface module with 12 inputs/8 outputs built in and expandable by adding optional modules from the Twido range**
- **Power Meter units (PM700, PM800) which can be used to set up four levels of functional units:**
 - local display of currents, voltages, power, power factors, energy, total harmonic distortion (instantaneous and maximum THD values). The Power Meter units must be used in conjunction with a TCU measurement module,
 - remote display of all the above values via a local network or the internet via a Modbus/TCP IP gateway (type MPS100, EGX200, etc.). The Power Meter units must be equipped with a Modbus interface,
 - status indications. The Power Meter units must be equipped with IO22 alarm input/output module and the circuit breaker must be equipped with OF (on/off) and SDE (fault-trip indication) auxiliary contacts,
 - remote opening and closing. A motor-mechanism module must be added to the circuit breaker equipped for status indications
- **MPS100 TCP IP/Modbus gateway with six digital inputs to connect OF and SDE auxiliary contacts (see automatic notification on page A-81).**

The existing solutions remain available:

- **communicating auxiliaries**
- They replace the standard auxiliaries and connect directly to the Digipact bus.

Three equipment levels:

- communicating auxiliary contacts, comprising:
 - OF (on/off), SD (trip indication) and SDE (fault-trip indication) contacts
 - electronic module
 - prefabricated wiring.
 - communicating auxiliary contacts and motor-mechanism module, comprising:
 - OF (on/off), SD (trip indication) and SDE (fault-trip indication) contacts
 - MCH motor-mechanism module (220 V AC) ⁽¹⁾
 - electronic module
 - prefabricated wiring.
 - communicating carriage switches for the chassis, comprising:
 - CE / CD (connected/disconnected position) contacts
 - electronic module
 - wiring connector
 - **SC150 interface**
- Using the SC150 interface, it is possible to integrate a device equipped with non-communicating auxiliaries into a supervision system.
- The SC150 interface is used to connect:
- the auxiliary contacts on the circuit breaker (OF, SD, SDE, SDV, CD, CE)
 - the remote-operation system (on, off, reset)
 - the communication output for the STR53UE and STR43ME electronic trip units equipped with the COM option.

Software

To make use of the information provided by the communicating devices, it is necessary to use software incorporating a Modbus driver. Schneider Electric offers two solutions: the RCU utility and SMS software.

RCU utility

This is a set of Modbus drivers that, in conjunction with a PC, can be used to:

- view device status (on/off and fault trip),
- view variables: currents, voltages, power, power factors, energy, total harmonic distortion (instantaneous and maximum THD values),
- remotely open and close the device.

SMS (System Management Software)

SMS is power-management software to control and monitor LV and MV electrical installations.

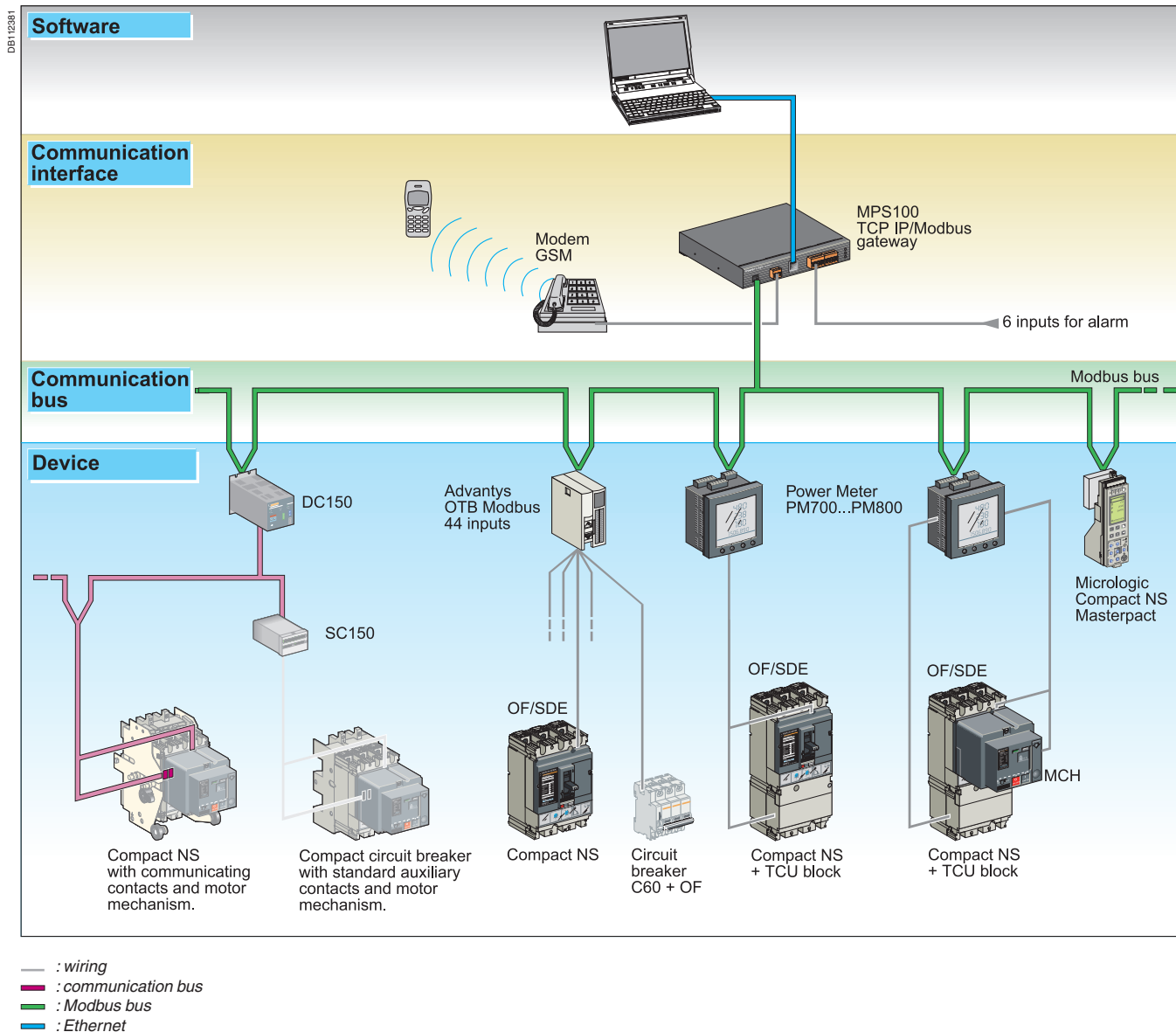
The SMS family includes a number of products offering different features for all types of applications.

SMS can communicate with all intelligent devices in the electrical installation including:

- Power Meter and Circuit Monitor products
- LV circuit breakers and switch-disconnectors
- Sepam units.

⁽¹⁾ For voltages other than 220 V AC, use a standard motor-mechanism module (non-communicating) together with an SC150 indication and control interface.

Overview of functions

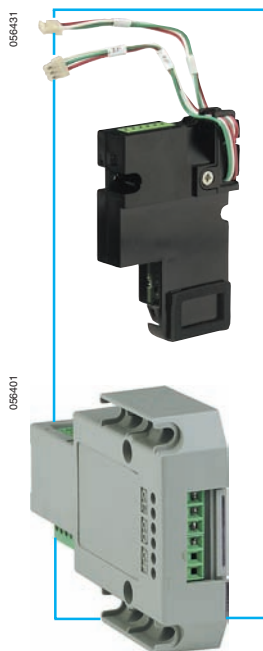


		Compact equipped with:			
		Advantys OTB Modbus	PM700/800 + interfaces	Communicating auxiliaries	SC150
Device identification					
Address		■	■	■	■
Indication of status conditions					
OF (on/off)		■	■	■	■
SD (trip indication)		■	-	■	■
SDE (fault-trip indication)		■	■	■	■
CE/CD (connected/disconnected position)		■	-	■	■
Controls					
ON/OFF		-	■	■	■
LED reset		-	-	■	■
Protection settings					
Reading of the protection settings		-	-	-	■
Operating and maintenance aids					
Measurements	Currents	-	■	-	■
	Voltages, power, power factors, energy, THD	-	■	-	-
		-	■	-	-
Fault readings	Type of fault	-	-	-	■
Indications	Operation counter	-	-	-	■

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

Compact uses the Digipact or Modbus communications protocol for full compatibility with the SMS PowerLogic electrical-installation management systems. An external gateway is available for communication on other networks:

- Profibus
- Ethernet...



Digipact "device" communication module.

Digipact "chassis" communication module



Modbus "device" communication module

Modbus "chassis" communication module

For fixed circuit breakers, the COM option is made up of:

- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SD, SDE micro-contacts for manually operated devices; OF, SDE micro-contacts for electrically operated devices) and its kit for connection to a communicating motor-mechanism module.

For withdrawable circuit breakers, the COM option is made up of:

- a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SD, SDE micro-contacts for manually operated devices; OF, SDE micro-contacts for electrically operated devices) and its kit for connection to a communicating motor-mechanism module
- a "chassis" communication module supplied separately with its set of sensors (CE, CD and CT contacts).

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

Digipact or Modbus "device" communication module

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

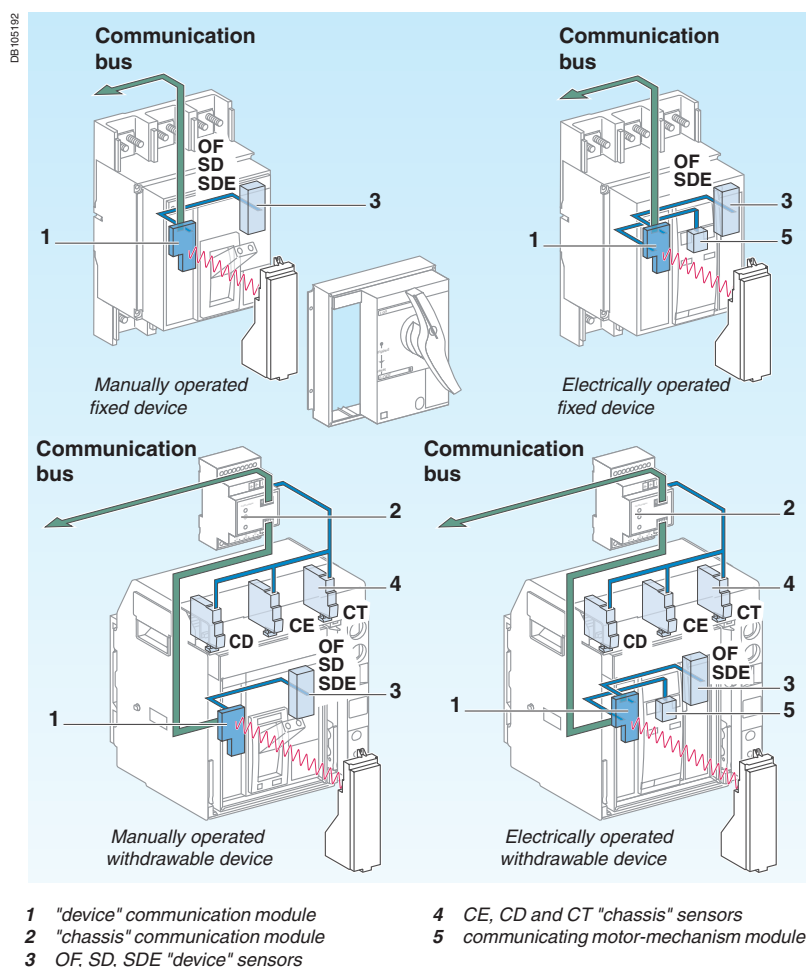
Digipact or Modbus "chassis" communication module

This module is independent of the control unit. The Modbus "chassis" communication module makes it possible to address the chassis and to maintain the address when the circuit breaker is in the disconnected position. Consumption: 30 mA, 24 V.

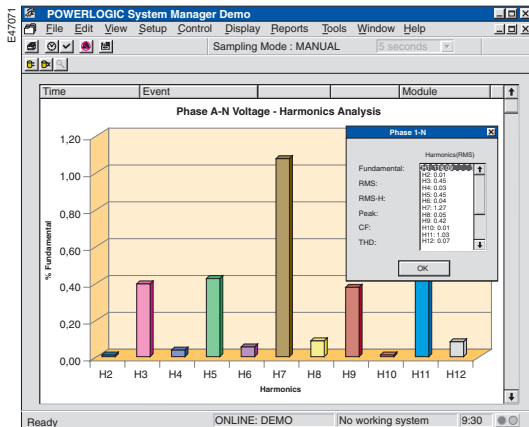
Communicating motor-mechanism module

A bus link is used to transmit remote ON/OFF orders to the circuit breaker. A communicating motor-mechanism module must be used.

The remote-tripping function (MX or MN) is independent of the communication option. It therefore has no connectors for the "device" communication module.



Overview of functions



Compact circuit breakers and switch-disconnectors are compatible with the Digipact or Modbus COM option.

The COM option may be used with all types of control units to:

- identify the device
- indicate status conditions
- control the device.

Depending on the different types of Micrologic (S, A, P) control units, the COM option also offers:

- setting of the protections functions
- analysis of the AC-power parameters for operating-assistance and maintenance purposes

	Switch-disconnector with communication bus		Circuit breaker with communication bus	
	Digipact	Modbus	Digipact	Modbus
Device identification				
Address	■	■	S A P	S A P
Rating	-	-	A P	A P
Type of device	-	-		P
Type of control unit	-	-	A P	A P
Type of long-time rating plug	-	-	A P	A P
Status indications				
ON/OFF OF	■	■	S A P	S A P
SD (trip indication)	■	■	S A P	S A P
SDE (fault-trip indication)	-	-	S A P	S A P
CE/CD (connected/disconnected position)	■	■	S A P	S A P
Protections settings				
Reading of protections settings			A P	A P
Writing of fine settings in the range imposed by the adjustment dials			P	P
Reading/writing of alarms (load shedding and reconnect, etc.)			P	P
Operating and maintenance aids				
Measurements				
current			A P	A P
voltages, frequency, power, etc.			P	P
programming of demand metering				P
Fault readings				
type of fault				A P
interrupted current				P
Histories and logs				
trip history				P
alarm history				P
event logs				P
Indicators				
counter operation			A P	A P
Maintenance register				P

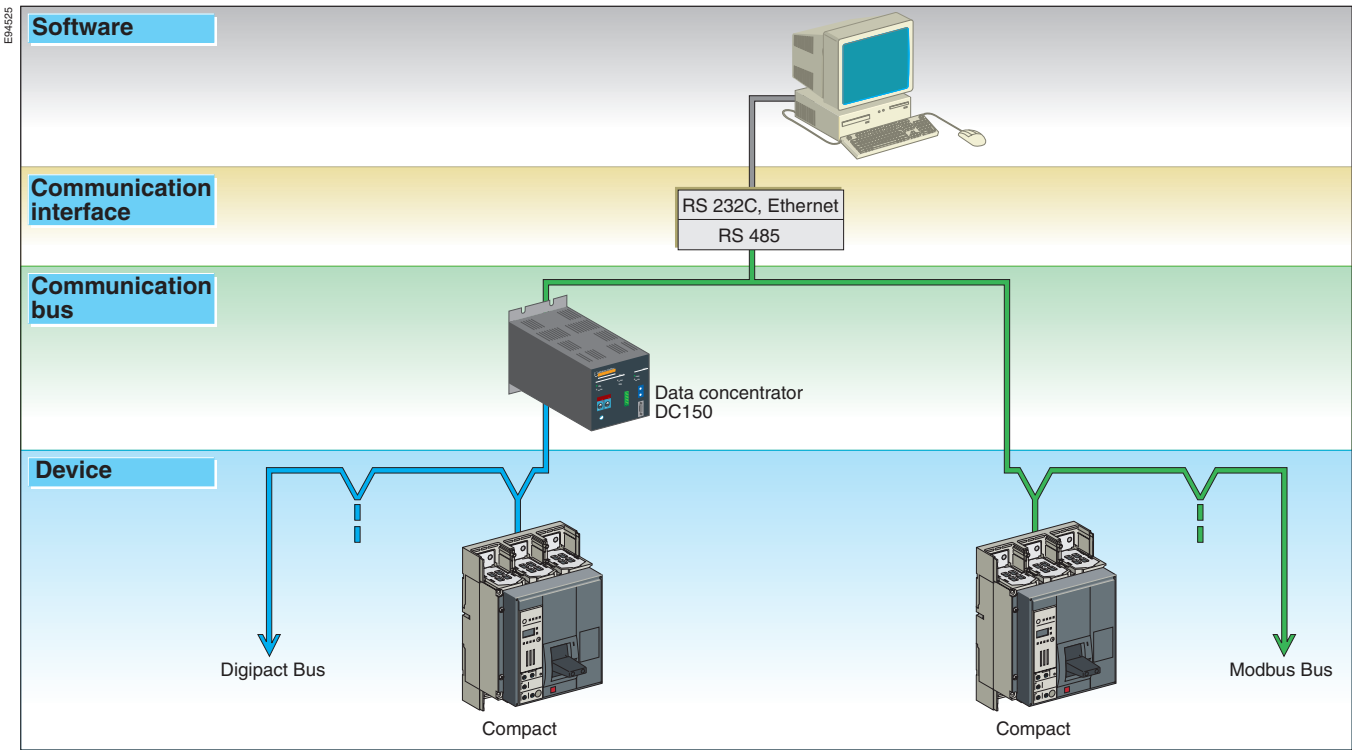
Note:

S = Micrologic 2.0 and 5.0

A = Micrologic with ammeter

P = Micrologic "Power"

See the description of the Micrologic control units for further details on protection.



Devices

Circuit breakers equipped with Micrologic control units may be connected to either a Digipact or Modbus communication bus. The information made available depends on the type of Micrologic control unit (A, P) and on the type of communication bus (Digipact or Modbus). Switch-disconnectors can be connected to the Digipact or Modbus communication bus. The information made available is the status of the switch-disconnector.

Communication bus

Digipact bus

The Digipact bus is the internal bus of the low-voltage switchboard in which the Digipact communicating devices are installed (Compact with Digipact COM, PM150, SC150, UA150, etc.). This bus must be equipped with a DC150 data concentrator (see the Powerlogic System catalogue).

Addresses

Addressing is carried out by the DC150 data concentrator.

Number of devices

The maximum number of devices that may be connected to the Digipact bus is calculated in terms of “communication points”. These points correspond to the amount of traffic the bus can handle. The total number of points for the various devices connected to a single bus must not exceed 100. If the required devices represent more than 100 points, add a second Digipact internal bus.

Communicating device	Number of points
DC150 data concentrator	4
Micrologic + Digipact COM	4
PM150	4
SC150	4
UA150	4

Length of bus

The maximum recommended length for the Digipact internal bus is 200 meters.

Bus power source

Power is supplied by the DC150 data concentrator (24 V).

Modbus bus

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

Addresses

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

The software layer of the Modbus protocol can manage up to 255 addresses (1 to 255).

The "device" communication module comprises three addresses linked to:

- circuit-breaker manager
- measurement manager
- protection manager.

The "chassis" communication module comprises one address linked to:

- the chassis manager.

The division of the system into four managers secures data exchange with the supervision system and the circuit-breaker actuators.

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

logic addresses

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

Number of devices

The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Compact with Modbus COM, PM700, PM800, Sepam, Vigilohm, etc.), the baud rate (19200 is recommended), the volume of data exchanged and the desired response time. The RS 485 physical layer offers up to 32 connection points on the bus (1 master, 31 slaves).

A fixed device requires only one connection point (communication module on the device).

A drawout device uses two connection points (communication modules on the device and on the chassis).

The number must never exceed 31 fixed devices or 15 drawout devices.

Length of bus

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

Bus power source

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

Communication interface

The Modbus bus may be connected to the central processing device in any of three manners:

- direct link to a PLC. The communication interface is not required if the PLC is equipped with a Modbus port;
- direct link to a computer. The Modbus (RS 485) / Serial port (RS 232) communication interface is required;
- connection to a TCP/IP (Ethernet) network. The Modbus (RS 485) / TCP/IP (Ethernet) communication interface is required.

Software

To make use of the information provided by the communicating devices, software with a Modbus driver must be used.

Micrologic utilities

This is a set of Modbus drivers that may be used with a PC to:

- display the variables (I, U, P, E, etc.) with the RDU (Remote Display Utility)
- read/write the settings with the RSU (Remote Setting Utility)
- remotely control (ON / OFF) the device with the RCU (Remote Control Utility).

These utilities are available on request.

System Manager Software (SMS)

SMS is a power management software for the control and monitoring of LV and MV electrical installations.

The SMS family includes a number of products for all types of applications, from standalone systems to networked power management of multiple buildings.

SMS can communicate with all intelligent devices of the electrical installation including:

- Power Meter and Circuit Monitor products
- LV circuit breakers and switch-disconnectors
- Sepam units.

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

Compact uses the Digipact or Modbus communications protocol for full compatibility with the SMS PowerLogic electrical-installation management systems. An external gateway is available for communication on other networks:

- Profibus
- Ethernet...

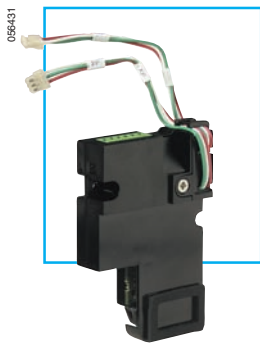
For fixed circuit breakers, the COM option is made up of a "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SD, SDE micro-contacts).

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

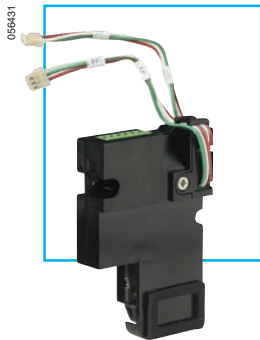
Digipact or Modbus "device" communication module

This module is independent of the control unit. It receives and transmits information on the communication network. An infra-red link transmits data between the control unit and the communication module.

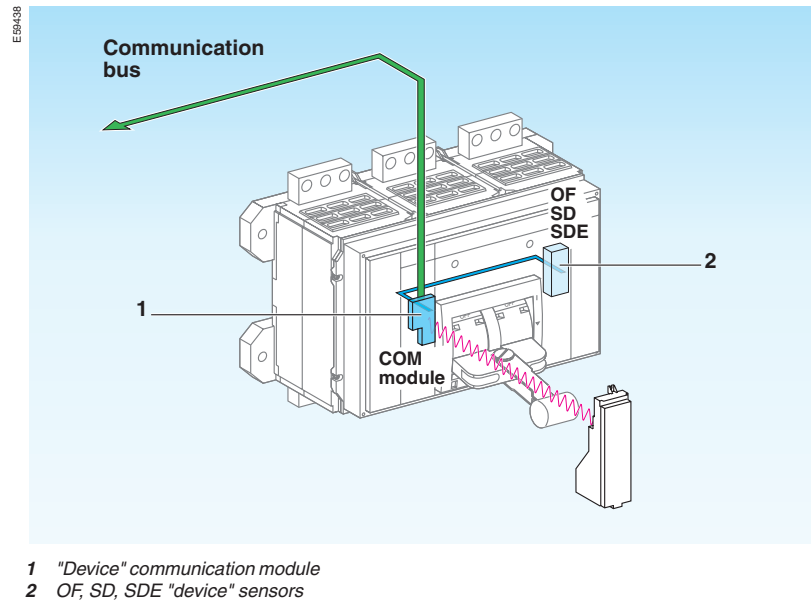
Consumption: 30 mA, 24 V.



Digipact "device" communication module.

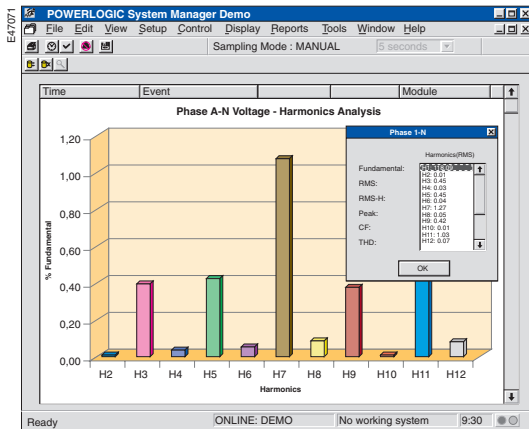


Modbus "device" communication module



- 1 "Device" communication module
- 2 OF, SD, SDE "device" sensors

Overview of functions



Compact circuit breakers and switch-disconnectors are compatible with the Digipact or Modbus COM option.

The COM option may be used with all types of control units to:

- identify the device
- indicate status conditions
- control the device.

Depending on the different types of Micrologic (S, A) control units, the COM option also offers:

- setting of the protections functions
- analysis of the AC-power parameters for operating-assistance and maintenance purposes

	Switch-disconnector with communication bus		Circuit breaker with communication bus	
	Digipact	Modbus	Digipact	Modbus
Device identification				
Address	■	■	S	A
Rating	-	-	A	A
Type of control unit	-	-	A	A
Type of long-time rating plug	-	-	A	A
Status indications				
ON/OFF OF	■	■	S	A
SD (trip indication)	■	■	S	A
SDE (fault-trip indication)	-	-	S	A
Protections settings				
Reading of protections settings			A	A
Operating and maintenance aids				
Measurements				
current			A	A
Fault readings				
type of fault				A
Indicator				
counter operation			A	A

Note:

S = Micrologic 2.0 and 5.0

A = Micrologic with ammeter

See the description of the Micrologic control units for further details on protection.

The MPS100 Micro Power Server:

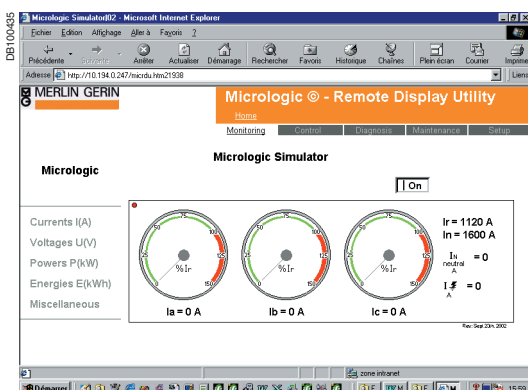
- notifies maintenance staff when any preset alarm or trip is activated by the Micrologic trip unit, automatically sending an e-mail and/or SMS
- data logs are periodically forwarded by e-mail
- the e-mails are sent via an Ethernet local area network (LAN) or remotely via modem.



MPS100 Micro Power Server.



Main LV switchboard.



Monitoring of the main LV switchboard via Web pages embedded in the MPS100 and accessible via a standard Web browser.

Micro Power Server makes data collection easy for monitoring Masterpact / Compact circuit breakers

Now, more than ever, there is a need to monitor electrical distribution systems in industrial and large commercial applications. The key to managing all equipment, maximising efficiencies, reducing costs and increasing up time is having the right tools.

Micro Power Server MPS100 is designed to withstand harsh electrical environments and provide a consistent flow of easy to interpret information.

Micro Power Server is designed for unattended operation within the main LV switchboard

The MPS100 is a self-contained facility information server that serves as a stand-alone device for power system monitoring.

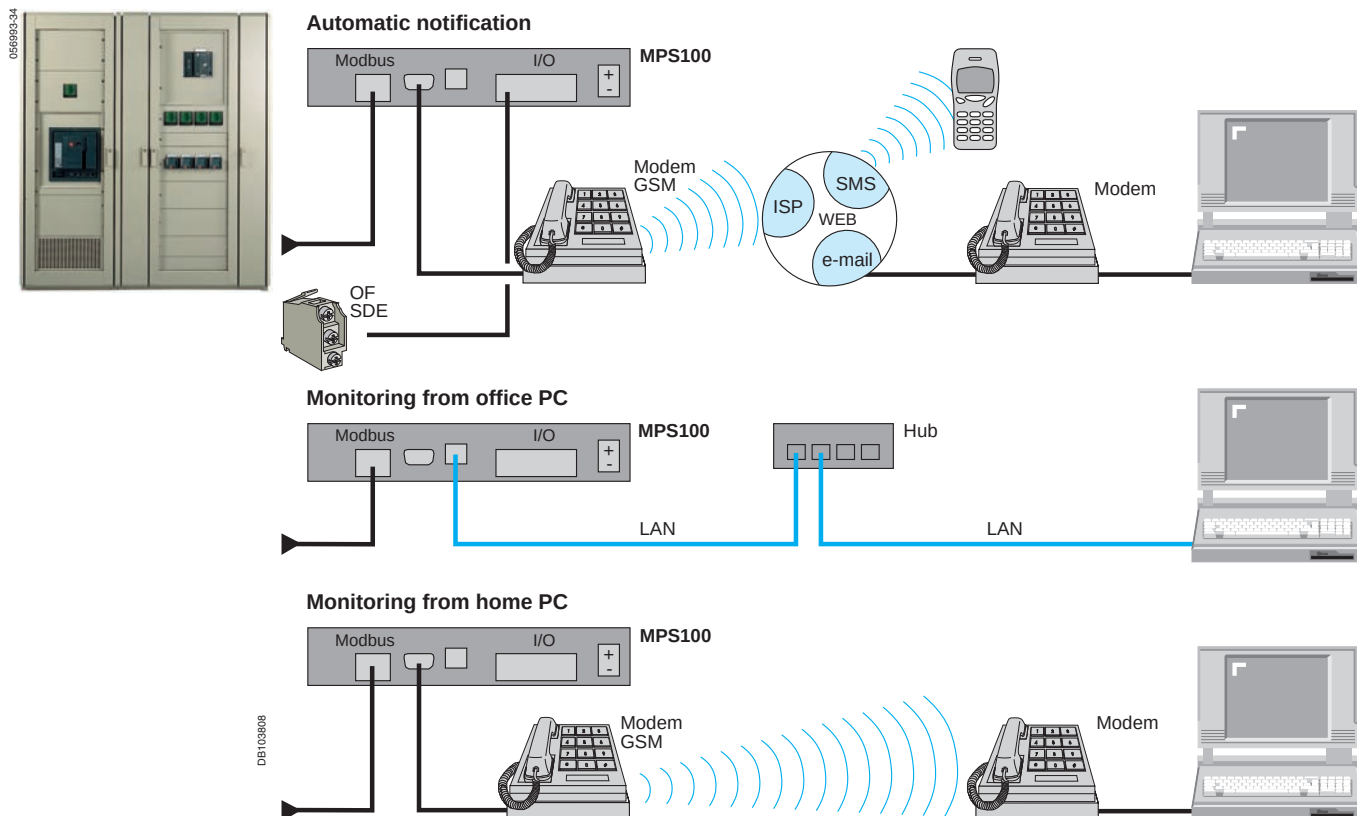
It is used to transfer power system information via a standard web browser over an Ethernet local area network (LAN) or via modem, making it possible to view power system information on a PC with an Ethernet connection.

In either capacity, the Micro Power Server functions as a web server for Micrologic trip unit and Power Meter supervision, automatically notifying (e-mail and/or SMS) maintenance staff when any preset alarm or trip is activated in the Micrologic trip unit.

Benefits

- view your main LV switchboard without installing software on your local PC, eliminating the need for a dedicated PC with specific software
- Micro Power Server allows centralised monitoring, so you no longer waste precious time walking around the facility to collect data
- view your main LV switchboard via a modem connection (GSM or switched network), avoiding the need for a LAN
- maintenance people are automatically notified at any time, wherever they are, so you do not have to stay in front of a monitor all day long
- data logs can be periodically forwarded by sending e-mails to the relevant people (maintenance, accounting, application service provider) automatically
- possibility to monitor/notify six external events (limit switches, auxiliary switches...)
- back-up of Micrologic trip unit settings in the memory of the MPS100, so you know where to retrieve it when necessary.

Typical architecture



It is possible to combine the different types of architecture.



Supported Modbus devices

- Micrologic trip units
 - Power Meters (PM700, PM800).
- Maximum recommended connected devices is 10.

Features

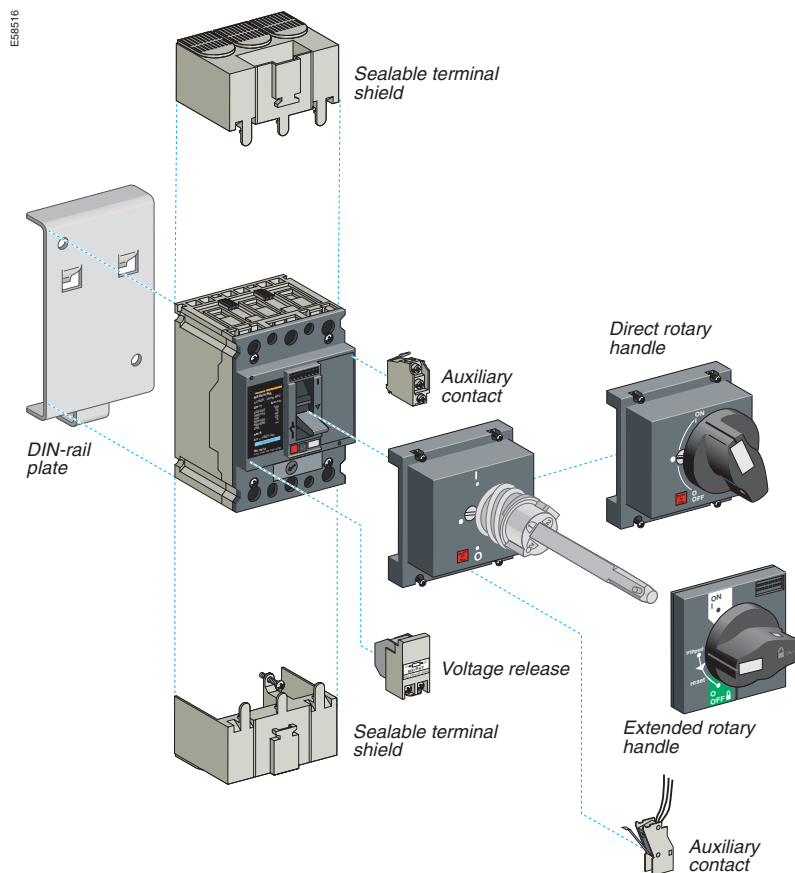
- access to the power system via a standard PC web browser
- real-time data displayed with an intuitive and user friendly interface (dashboard)
- Ethernet Modbus TCP/IP connectivity directly to the LAN or via modem (Point to Point Protocol services)
- SMTP (Simple Mail Transfer Protocol) client (capacity to send e-mail)
- local logging of data such as energy, power, current...
- set-up and system configuration through MPS100 embedded HTML pages
- user interface translatable in any language, factory settings in English and French
- 6 inputs/2 outputs (no-volt contact)
- DHCP (Dynamic Host Configuration Protocol) client.

Technical characteristics

Power supply	24 V DC $\pm 15\%$, consumption = 250 mA
Operating temperature	0 to +50 °C
Rugged compact metal housing	35 x 218 x 115 mm (H x W x D)
Additional information available at: http://194.2.245.4/mkt/microser.nsf	
User name: MPS, Password: MPS100	

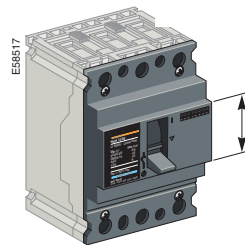
Electrical and mechanical accessories

Compact NS80H-MA

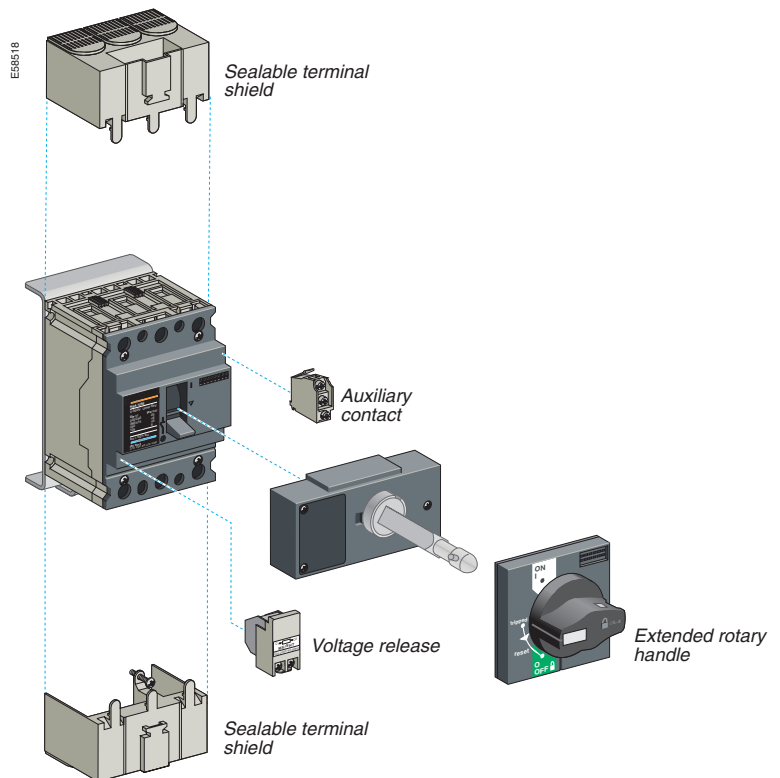


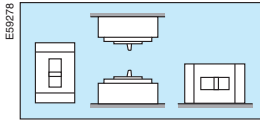
Compact NSC100N, NSA160

Front accessory for NSC100N (45 mm standard door cutout)



45 mm front





Installation positions

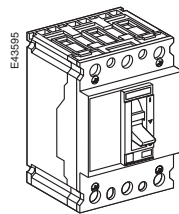
Installation

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.

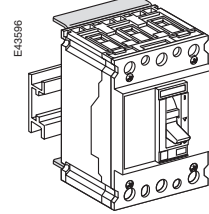
Mounting on a DIN rail is possible using a special adapter.

The NSA160 circuit breaker may be mounted exclusively on a DIN rail.

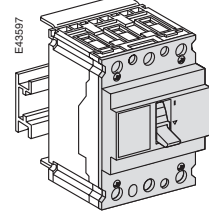
These three circuit breakers are available in the fixed, front-connection version.



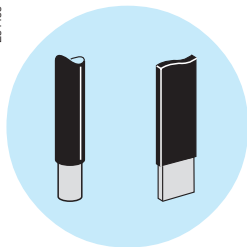
*NS80H-MA and NSC100N:
mounting on backplate or
mounting plate.*



*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.*



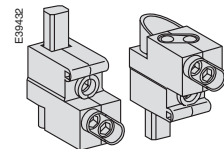
Front connection of bare cables

Compact NS80H-MA, NSC100N and NSA160 circuit breakers are equipped as standard with connectors for bare copper or aluminium cables from 1.5 to 70 mm².

Distribution connector

This connector screws directly to the standard connectors. It is used to connect up to three cables:

- flexible cables from 1 to 10 mm²
- rigid cables from 1.5 to 16 mm²
- with crimped or self-crimping ferrules from 1.5 to 4 mm².



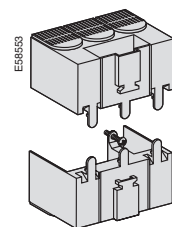
Distribution connector

Insulation of live parts

Terminal shields

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

For voltages ≥ 500 V, terminal shields are mandatory.



Terminal shields



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 where it is inserted in the device.

- OF (ON/OFF) - 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-leakage fault (Compact NSC100N and NSA160)
 - operation of a voltage release.

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

- SDV (earth-leakage fault indication) - inserted in the Vigì 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	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				5			
	6	6	6	1	5	3	5	1
	48 V				5			
	6	6	2.5	0.2	5	3	2.5	0.2
	110 V				5			
	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V				5			
	6	4	-	-	5	2	-	-
	250 V				5			
	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V				5			
	6	2	-	-	5	1.5	-	-
	480 V				5			
	6	1.5	-	-	5	1	-	-
	660/690 V				-			
	6	0.1	-	-	-	-	-	-



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 $0.7 \times U_n$.

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): $< 5 \text{ VA}$
 - seal-in (MN): $< 5 \text{ VA}$
- response time: $< 50 \text{ ms}$.



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, shackle 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, IP54, IK08.

Extended rotary handle

Degree of protection IP55, IK08.

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

It maintains:

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

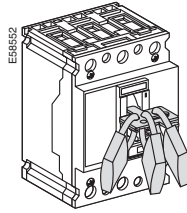
The door cannot be opened if the circuit breaker is ON or locked.

The extended rotary handle is made up of:

- a unit that replaces the front cover of the circuit breaker (secured by screws)
- an assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally
- an extension shaft that must be adjusted to the distance (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 shackle diameters ranging from 5 to 8 mm (padlocks not supplied).

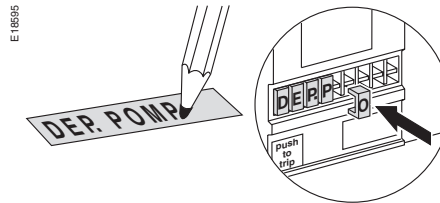


Toggle locking using a removable device

Outgoing-circuit identification

Compact NS80H-MA and NSC100N devices come with clip-in labels for handwritten indications.

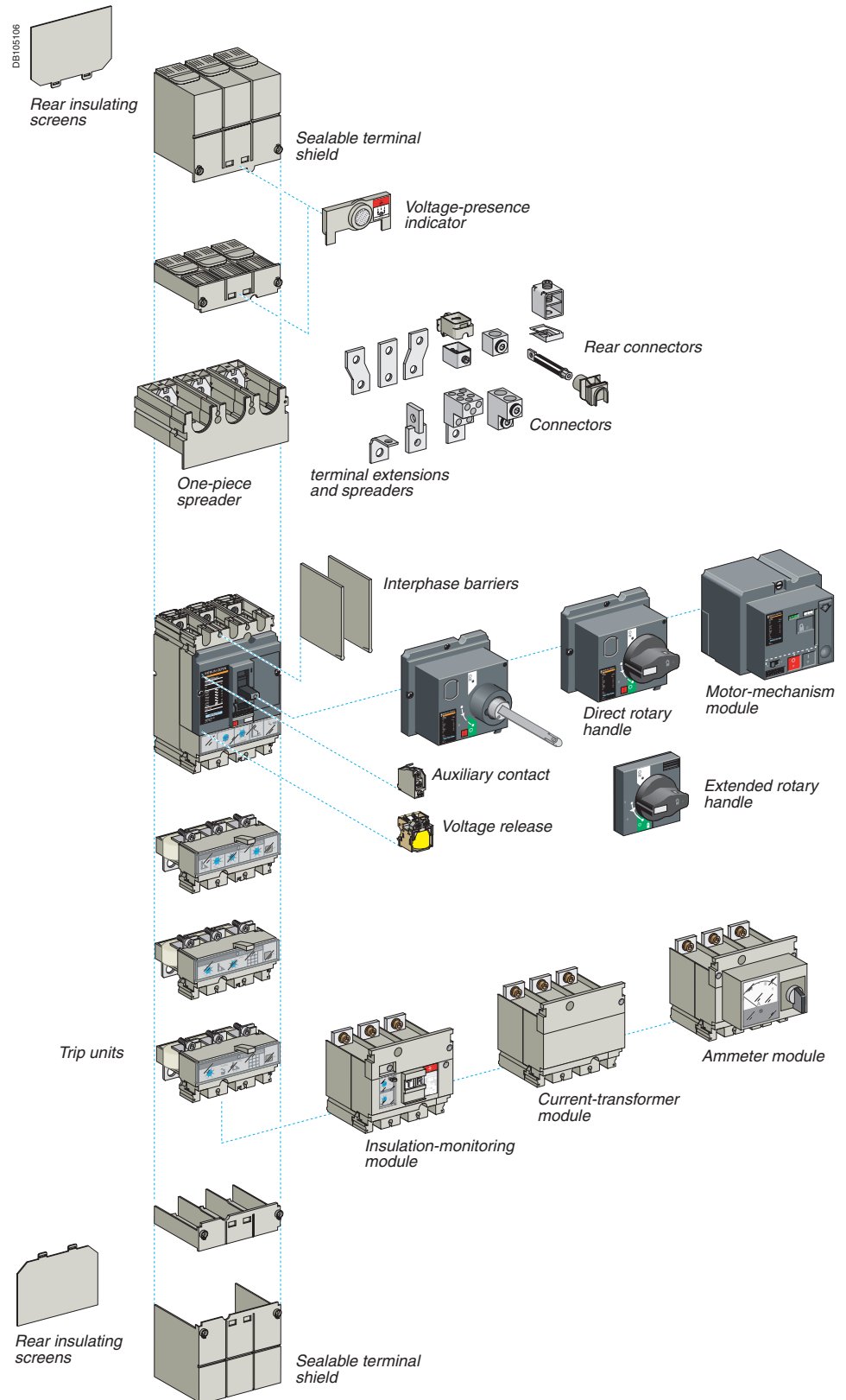
It is also possible to use pre-printed Telemecanique labels (part number AB1-** (8 digits)).



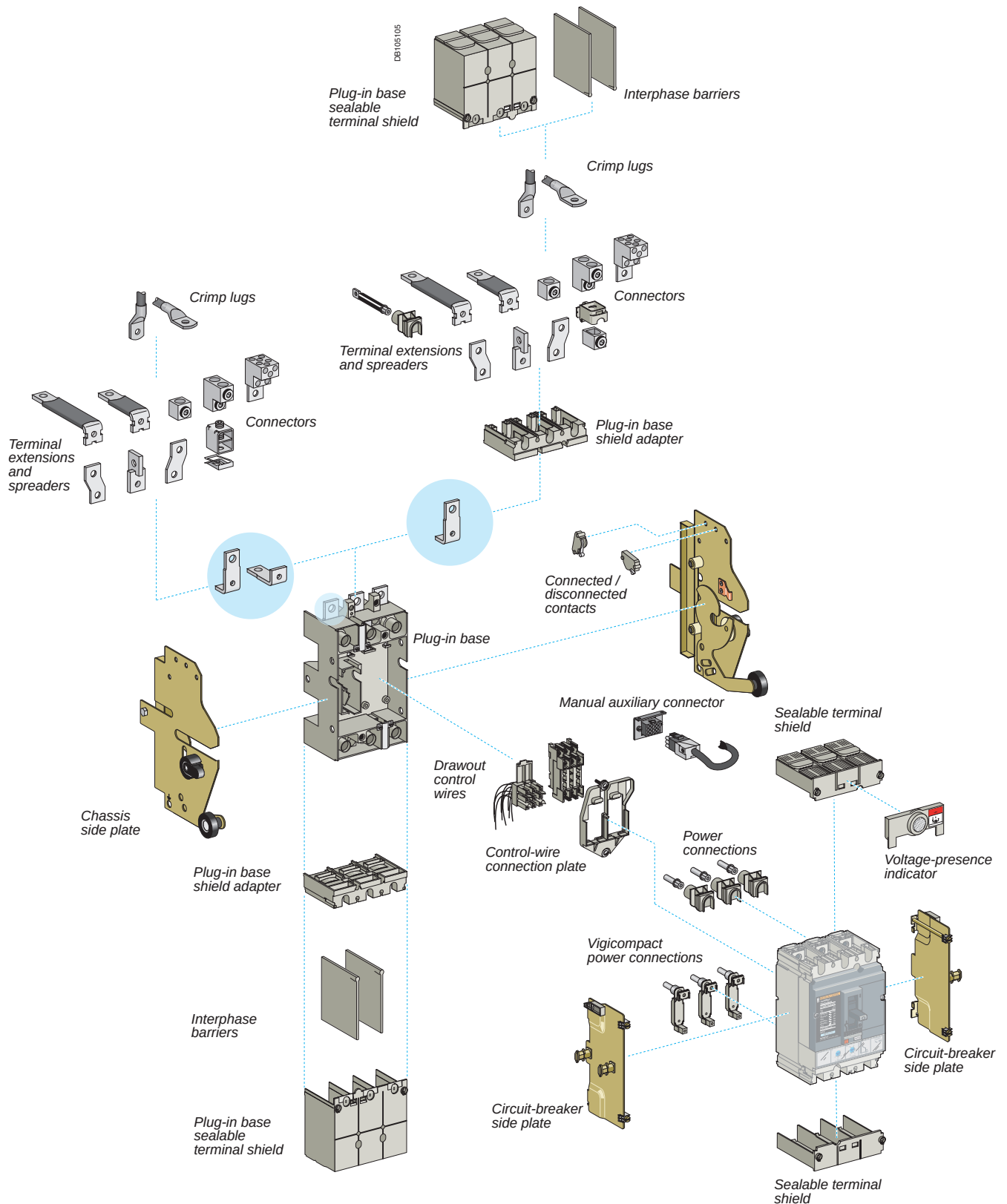
Identification accessories

Electrical and mechanical accessories

Compact NS100 to 630 (fixed version)



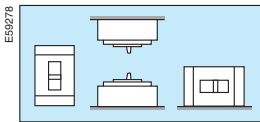
Compact NS100 to 630 (plug-in and withdrawable versions)



These withdrawable circuit breakers can be equipped with the same rotary handles, motor mechanisms and measurement and indication modules as the fixed versions.



Fixed Compact NS250H

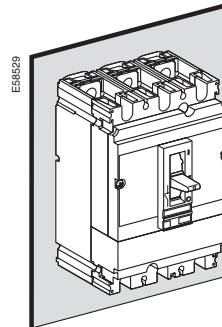


Installation positions

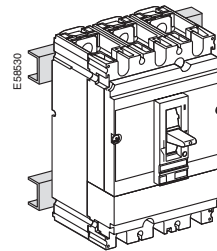
Installation

Fixed circuit breakers

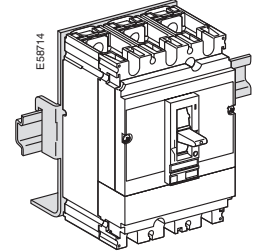
Compact circuit breakers may be mounted vertically, horizontally or flat on their back without any derating of characteristics. They are designed for easy installation in the various types of switchboards of each market and country.



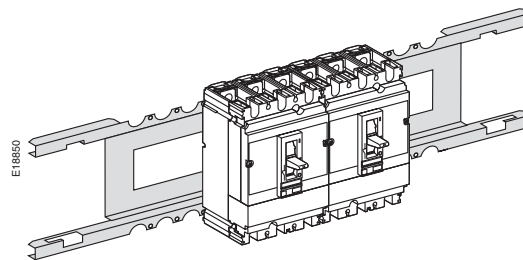
Mounting on a backplate
(solid or slotted)



Mounting on rails



Mounting on DIN rail (with
adapter)



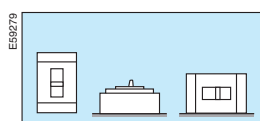
Mounting on a Prisma functional mounting plate.

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.

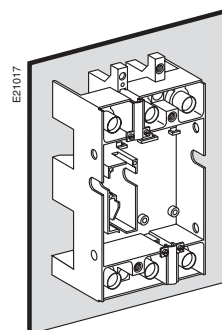


Compact NS250H on a plug-in base

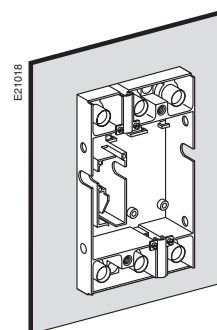


Installation positions

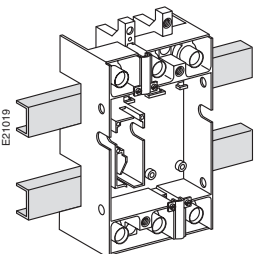
Circuit breaker on a plug-in base



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 it has been removed.
- mandatory short terminal shields.

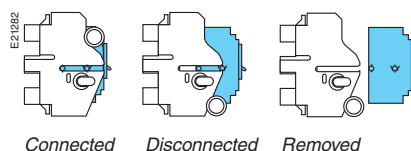
Accessories

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 (shackle diameter 5 to 8 mm), to prevent connection.*
- *the auxiliaries can be tested (with manual auxiliary connector).*

Circuit breaker on a withdrawable chassis



Connected Disconnected Removed

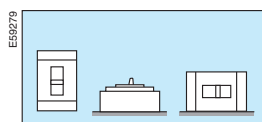
The chassis is made up of two side plates installed on the base and two other plates mounted on the circuit breaker.

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.



Compact NS250H on a withdrawable chassis

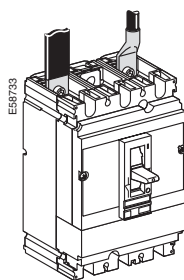


Installation positions

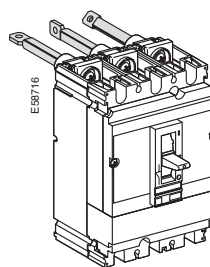
Front and rear connections

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

Fixed device

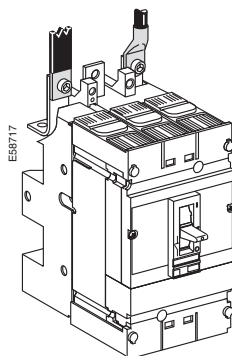


Front connection

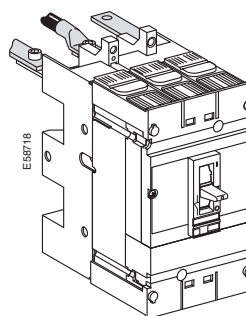


Rear connection

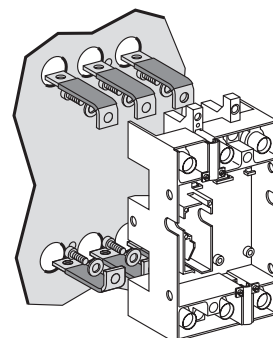
Plug-in and withdrawable devices



Front connection

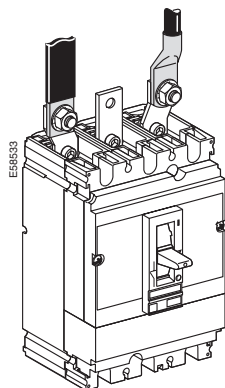
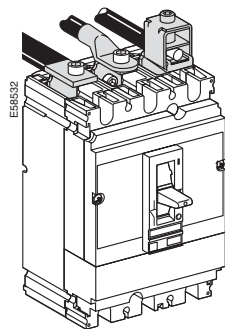
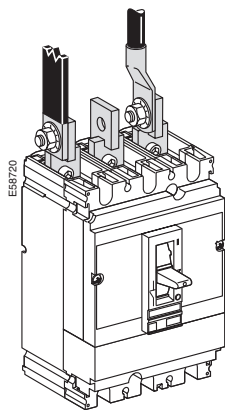
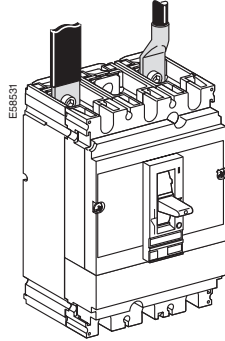
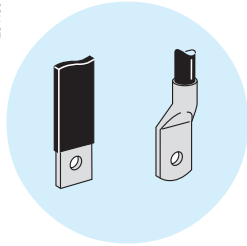


Rear connection



Rear connection through a backplate

E54456



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 interphase 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 mm² (NS100 to 250)

□ 240 or 300 mm² (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 mm² (NS100 to 250)

□ 240 or 300 mm² (NS400 to 630).

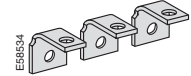
Crimping by hexagonal barrels.

Spreaders

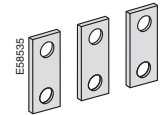
Spreaders increase the pitch of the terminals.

They are not compatible with terminal shields on the Compact NS100 to 250.

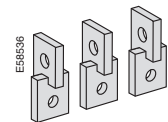
The one-piece spreader increases the pitch, thus making it possible to use the connection accessories of a larger device (e.g. a Compact NS100 to 250 can be fitted with the accessories of a Compact NS400 to 630). The one-piece spreader also provides protection against direct contact (see page A-95).



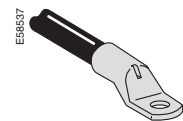
Right-angle terminal
extensions



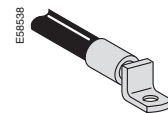
Straight terminal extensions
for NS100 to 250



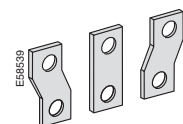
Edgewise terminal
extensions for NS400 to 630



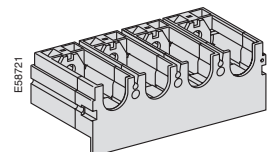
Small lug for copper cables



Small lug for aluminium
cables

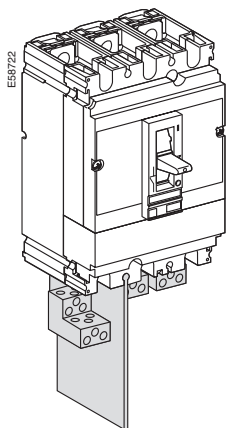
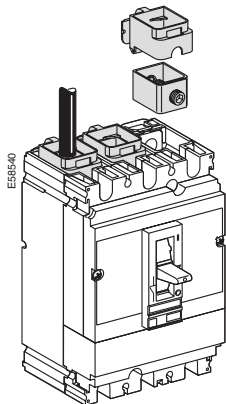
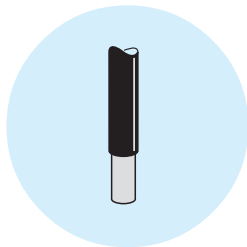


Spreaders



One-piece spreader

E54457



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

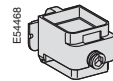
The connectors are screwed to device terminals or right-angle terminal extensions.

Distribution connectors for Compact NS100 to 250

These connectors are screwed directly to device terminals. Interphase 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 mm² each.

Polybloc distribution block for Compact NS100 to 630

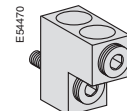
The Polybloc connects directly to the device terminals and is used to connect up to six or nine flexible or rigid cables with cross-sectional areas not exceeding 10 mm², to each pole. Connection is made to spring terminals without screws.



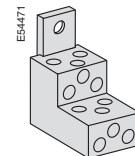
1-cable connector for NS100 to 250



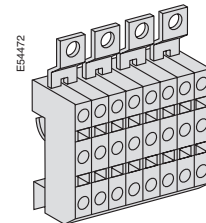
1-cable connector for NS400 to 630



2-cable connector for NS400 to 630

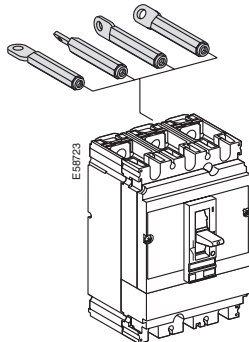
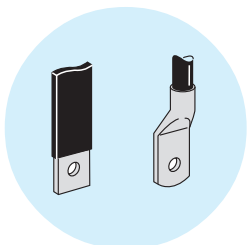


Distribution connector for NS100 to 250



Polybloc distribution block for NS100 to 250

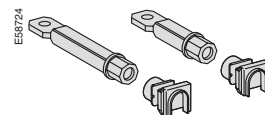
E54456



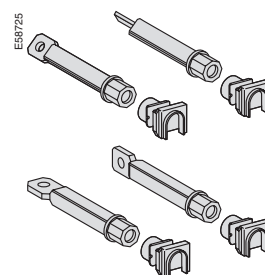
Rear connection

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.

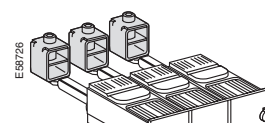
The rear connections are simply fitted to the device connection terminals. All combinations of rear connection lengths and positions are possible on a given device. The device is mounted on a backplate. For the connection of cables without lugs, the 1-cable connectors for Compact NS100 to 250 may be simply clipped onto the rear connections.



Two lengths

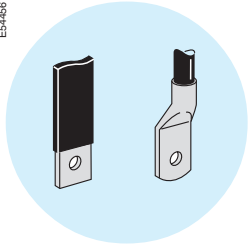


Four positions



Connection of bare cables to NS100 to 250.

E54466



Connection of plug-in devices

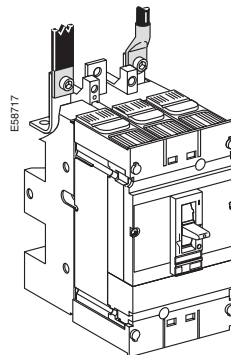
Connection of bars or cables with lugs

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.

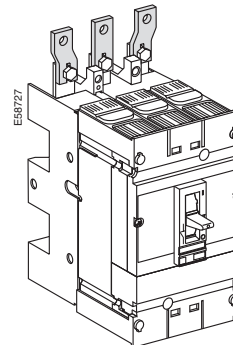
For Compact NS630 devices, connection most often requires the 52.5 or 70 mm pitch spreaders.

Connection accessories

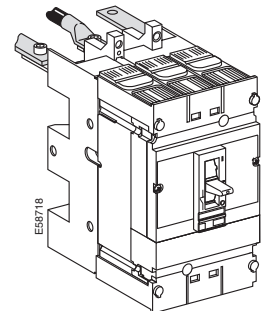
See the "Connection of fixed devices" section.



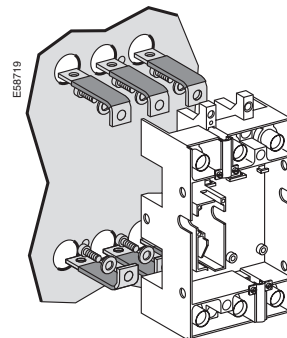
Front connection



Front connection with
spreaders

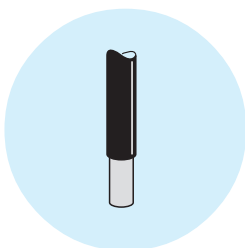


Rear connection



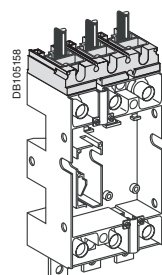
Rear connection of a base
mounted on a backplate

E54467

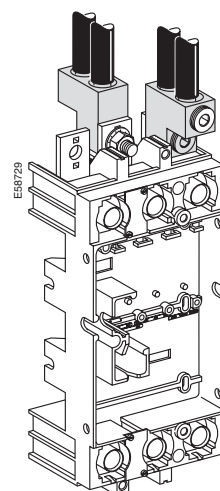


Connection of bare cables

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



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



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

058384



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 next largest frame size
- compatible with all the connection accessories available for the next largest frame size (connectors, terminal extensions, etc.)
- enhances insulation between phases in comparison with standard spreaders.

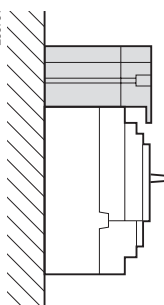
	NS100 to 250	NS400 to 630
Pitch without spreaders (mm)	35	45
Pitch with standard spreaders (mm)	45	52.5 or 70
Pitch with one-piece spreader (mm)	45	-

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.

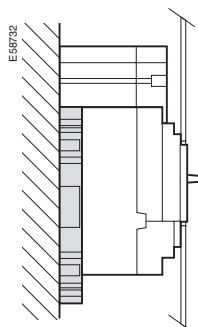
- devices with different frame sizes can thus be aligned in the switchboard
- the same mounting plate can be used for all devices (including Interpact INS switch-disconnectors).

EE8731



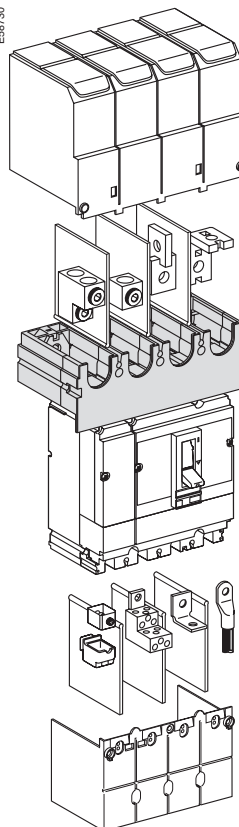
Mounting at the back of a switchboard

EE8732

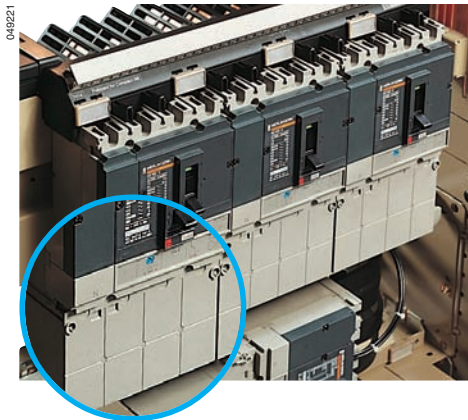


Mounting behind the front panel with a raiser

EE8730



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



Compact NS equipped with terminal shields.

Insulation of live parts

Terminal shields

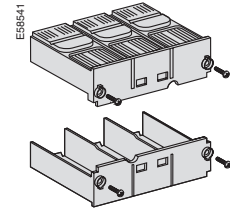
Terminal shields are sealable insulating accessories used for protection against direct contact with power circuits (degree of protection IP40, IK07). They are supplied with sealing accessories.

Terminal-shield selection

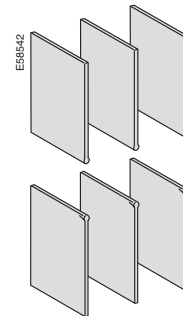
- fixed circuit breaker, front connection - long terminal shields
 - fixed circuit breaker, rear connection - short terminal shields
 - for voltages ≥ 500 V, terminal shields are mandatory
 - for voltages > 600 V, special connection kit with terminal shields and insulating screens
 - for Compact NS400 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



Interphase barriers

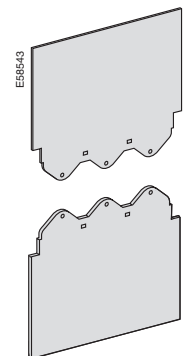
Interphase barriers

Safety accessories for maximum insulation at the power-connection points:

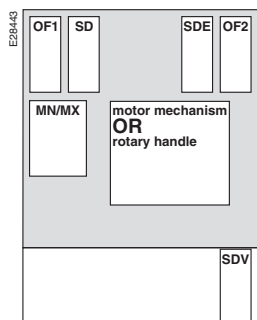
- they clip easily onto the circuit breaker
- not compatible with terminal shields
- special version for plug-in bases.

Rear insulating screens

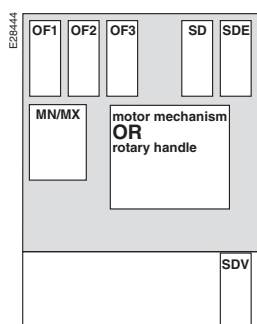
Safety accessories for insulation between connections and the backplate. Compatible with terminal shields or interphase barriers.



Rear insulating screens



Compact NS100/160/250

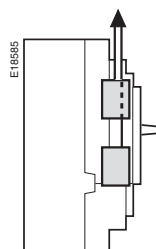


Compact NS400 to 630

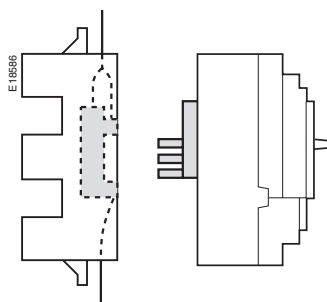
Connection of electrical auxiliaries

Fixed configuration

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



Plug-in and withdrawable configurations



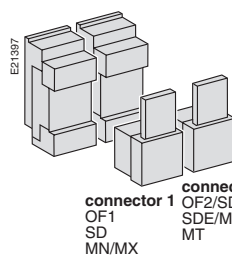
Automatic auxiliary connectors

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

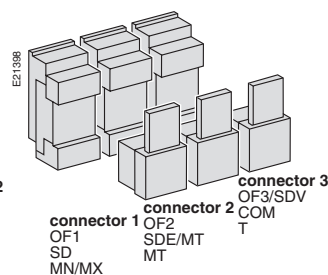
- a moving part, connected to the circuit breaker via a support (one support per circuit breaker)
- a fixed part, mounted on the plug-in base, equipped with connectors for bare cables up to 2.5 mm².

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.



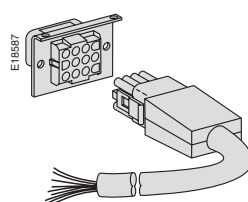
Compact NS100 to 250



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

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

- 1.5 mm² for auxiliary contacts and voltage releases
- 2.5 mm² for the motor-mechanism module.

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 (ON/OFF) - 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-leakage fault
 - operation of a voltage release
 - operation of the "push to trip" button
 - disconnection when the device is ON.

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

- SDE (fault indication) - indicates that the circuit breaker has tripped due to:
 - an overload
 - a short-circuit
 - an earth-leakage fault.

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

- SDV (Earth-leakage 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 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		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	6	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	2	-	-	5	1.5	-	-
	480 V	6	1.5	-	-	5	1	-	-
	660/690 V	6	0.1	-	-	-	-	-	-



Compact NS250L with a direct rotary handle



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, 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 (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 at the back of switchboards, from the switchboard front.

It maintains:

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

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

The extended rotary handle is made up of:

- a unit that replaces the front cover of the circuit breaker (secured by screws)
- an assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally
- an extension shaft that must be adjusted to the distance. The min/max distance between the back of circuit breaker and door is:
 - 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 if the voltage exceeds 0.85 times the rated voltage.

For a lower value, circuit breaker closing cannot be guaranteed.

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 $0.7 \times U_n$.

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 mm², to integrated terminal blocks.

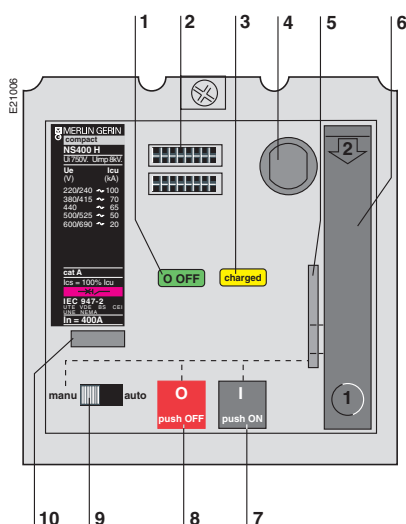
Electrical characteristics

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

047313



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, shackle 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 operations 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 mm².

Accessories

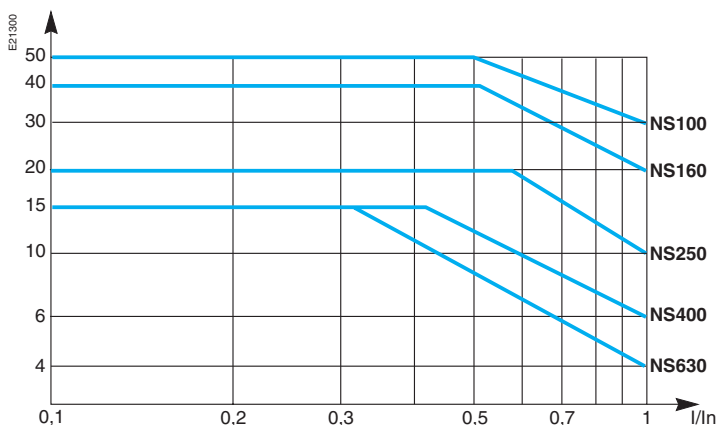
- keylock for locking in OFF position
- operations counter for the Compact NS400 and NS630, indicating the number of ON and OFF cycles. The counter must be installed on the front of the motor-mechanism module.

Characteristics

Motor mechanism			MT100 to MT630
Response time (ms)	opening		< 600
	closing		< 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 ⁽¹⁾	DC (W)	opening	≤ 500
		closing	≤ 500
	AC (VA)	opening	≤ 500
		closing	≤ 500

Electrical endurance

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



⁽¹⁾ For NS100/250, motor "vibratory" type consider inrush current as 2 I_n during 10 ms cycling.



Compact NS630L with voltage-presence indicator



Compact NS630H with current-transformer module



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 Digipact 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 connectors for cables up to 2.5 mm².

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.

Current-transformer module with voltage measurement outputs

For direct connection of a digital power monitoring unit: Power Meter PM700, PM800, etc. (not supplied).

Installation

- mounts directly on the downstream terminals of the circuit breaker
- degree of protection: IP40 and IK04
- class II insulation of front with respect to the power circuits
- built-in connectors for cables from 1.5 to 2.5 mm².

Electrical characteristics

- rated operational voltage U_e: 530 V
- frequencies of measured values: 50...60 Hz
- three CTs with 5 A secondary windings for the rated primary current I_N
 - class 0.5 to 1 for rated power consumption values at the output:
 - 125 A, 150 A and 250 A ratings: class 1 for 1.1 VA
 - 400/600 A rating: class 0.5 for 2 VA
 - use a cable of 2.5 mm² section up to 2.5 m long.
- four voltage measurement outputs including protection with automatic reset.
- voltage measurement output impedance 3500 Ω ±25 %, maximum current 1 mA.

Ammeter and I_{max} ammeter modules

Ammeter module

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

I_{max} ammeter module

Measures and displays (dial-type ammeter) the maximum current flowing in the middle phase. The I_{max} 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 class 4.5
- I_{max} ammeter module: accuracy ±6 %
- maximum currents are displayed only if they last at least 15 minutes.



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.



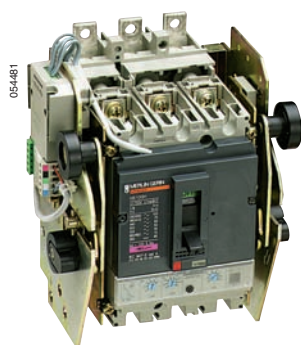
Compact NS equipped with communicating auxiliary contacts and motor-mechanism module

Communicating auxiliaries

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.).

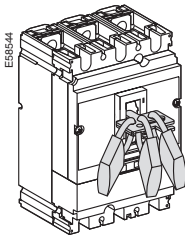


Withdrawable Compact NS equipped with communicating auxiliary contacts

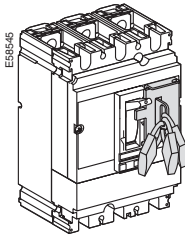
Locking systems

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).

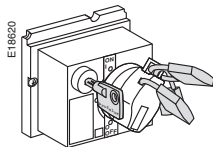
Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	lock in OFF or ON position	padlock	fixed device
Direct rotary handle	lock in OFF position	padlock	locking device + keylock
		keylock	
MCC rotary handle	lock in OFF position	padlock	
Rotary handle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



Locking of the toggle using a removable device



Locking of the toggle using a fixed device



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

048803



Heavy-duty insulating individual enclosure for Compact NS

Individual enclosures

Compact NS 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, IP55, IK08)
- ☐ device mounting plate
- ☐ removable plate (without holes) for cable entry through bottom

■ heavy-duty insulating individual enclosure, with:

- ☐ polyester 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.

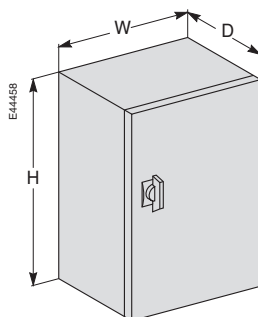
Dimensions (H x W x D in mm)

■ metal enclosures:

- | | |
|--|-----------------|
| ☐ Compact and Vigicompact NS100 to 160: | 450 x 350 x 250 |
| ☐ Compact and Vigicompact NS250: | 650 x 350 x 250 |
| ☐ Compact NS400: | 650 x 350 x 250 |
| ☐ Compact NS630 and Vigicompact NS400 to 630: | 850 x 350 x 250 |

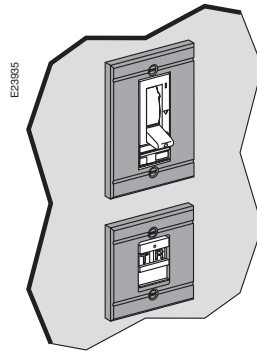
■ insulating enclosures:

- | | |
|--|-----------------|
| ☐ Compact and Vigicompact NS100 to 160: | 360 x 270 x 235 |
| ☐ Compact NS250: | 540 x 270 x 235 |
| ☐ Compact NS400 to 630: | 720 x 360 x 235 |
| ☐ Vigicompact NS250 to 630: | 720 x 360 x 235 |

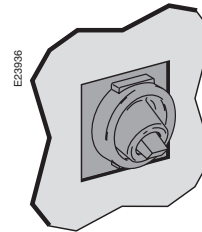


Escutcheons

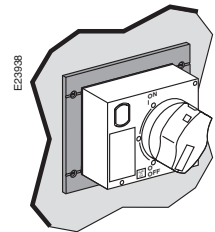
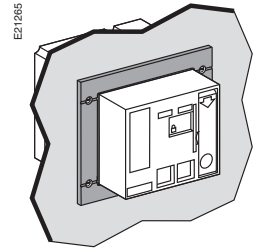
Escutcheons are an optional feature mounted on the switchboard door. They increase the degree of protection to at least IP40, IK07.



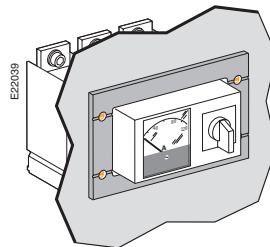
Front-panel escutcheons for toggle and Vigi module (NSA160). Secures to the panel, from the front.



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.
For circuit breaker with motor mechanism and Vigi module, use the protection collar for front panel mounting (see below).



Front-panel escutcheons for ammeter module. Secures to the panel by four screws, from the front.

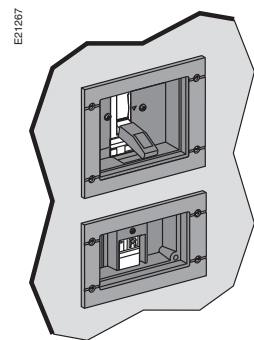
Protection collar for toggle and Vigi module on withdrawable devices

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

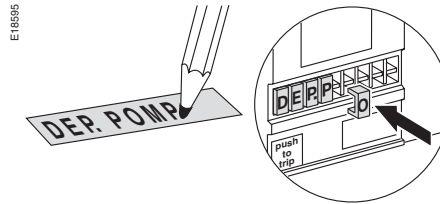
Same as for fixed devices.



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.

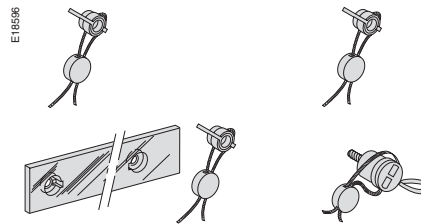


Identification accessories

Sealing accessories

This option includes the elements required to fit lead seals to prevent:

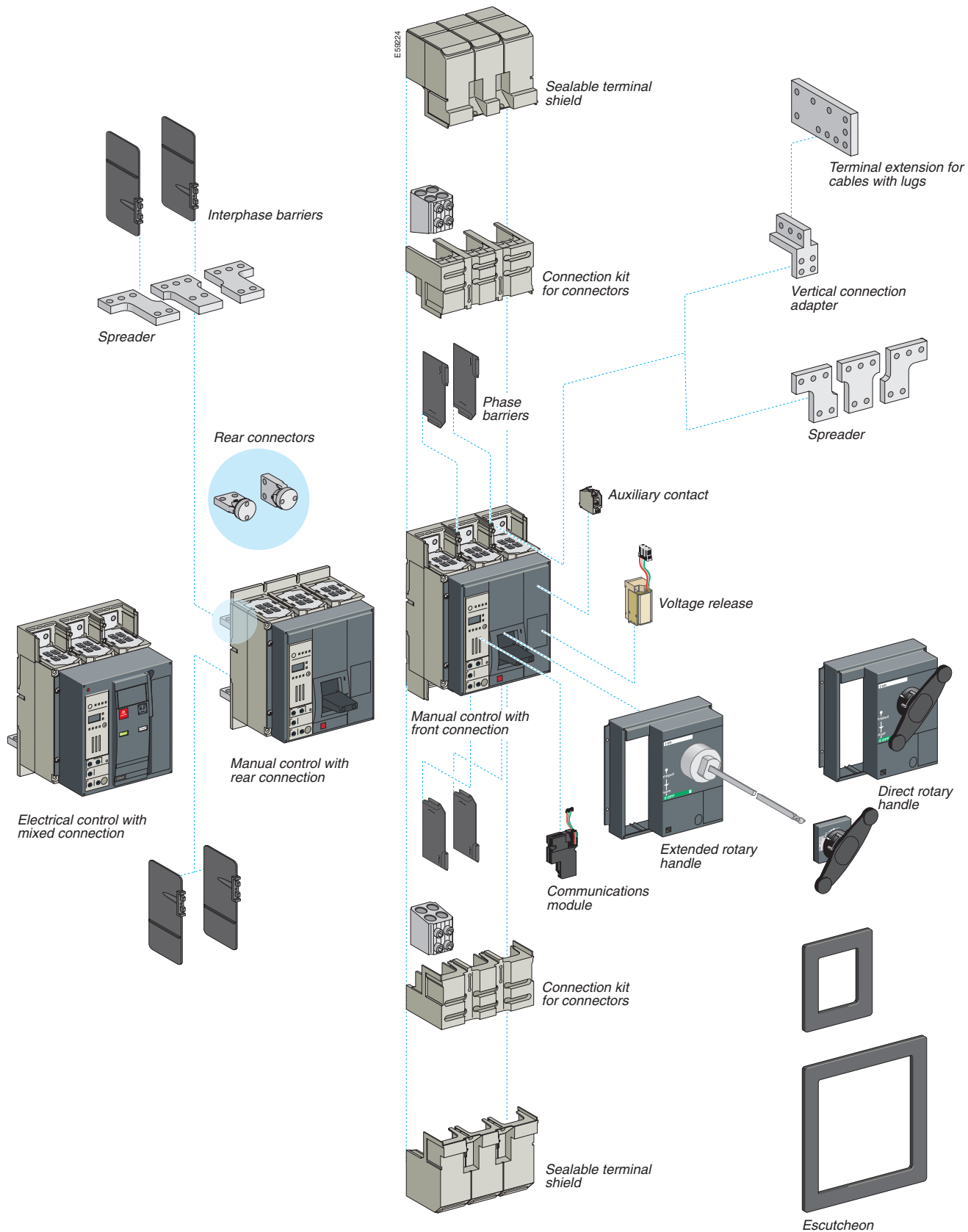
- front removal
- rotary-handle removal
- opening of the motor-mechanism module
- access to auxiliaries
- access to trip-unit settings
- trip-unit removal
- access to earth-leakage protection settings
- terminal-shield removal
- access to power connections.



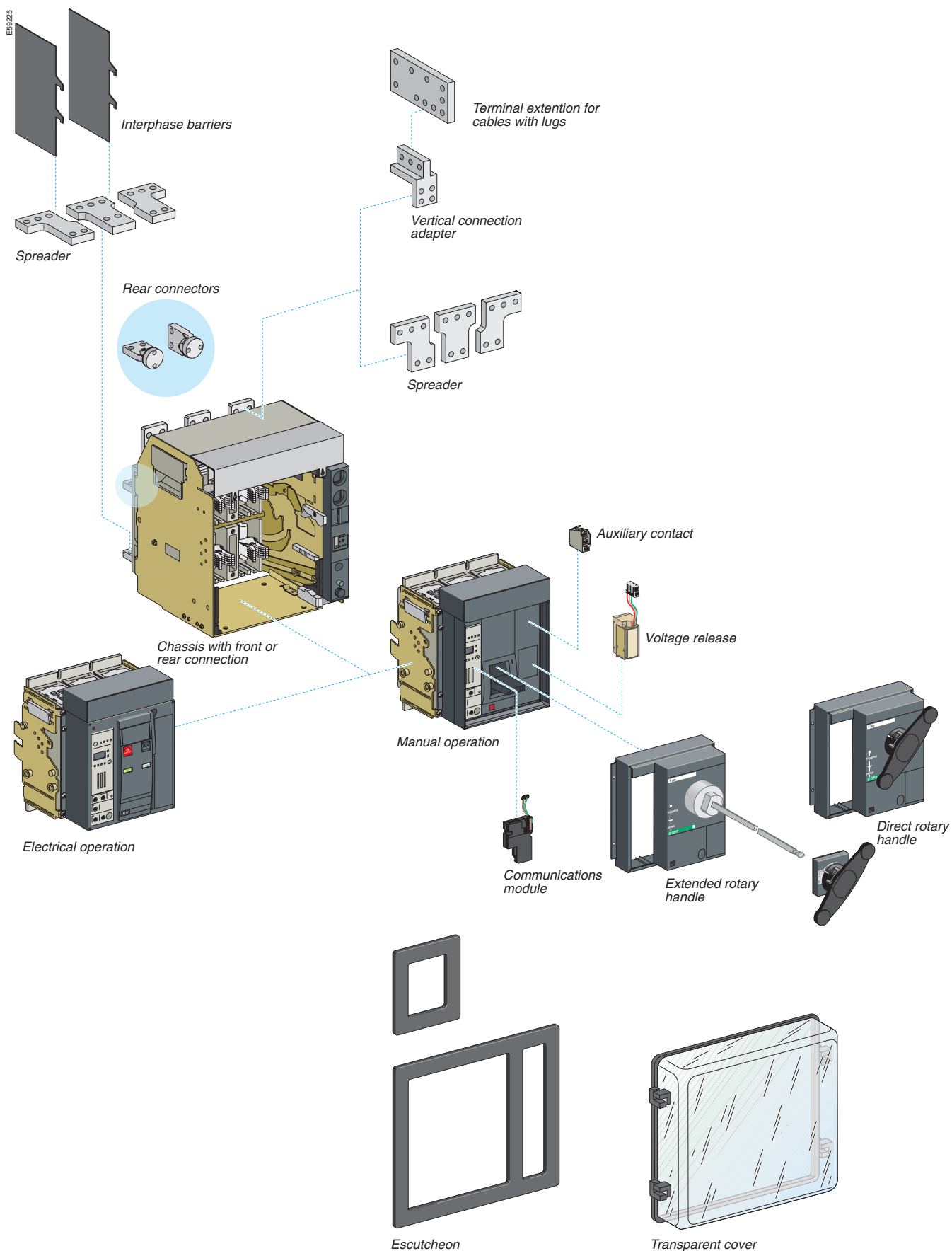
Sealing accessories

Electrical and mechanical accessories

Compact NS630b to 1600
(fixed version)

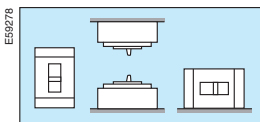


Compact NS630 to 1600 (withdrawable version)





Fixed Compact NS800H

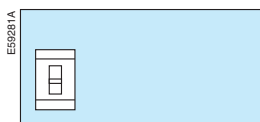


The withdrawable configuration makes it possible to:

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



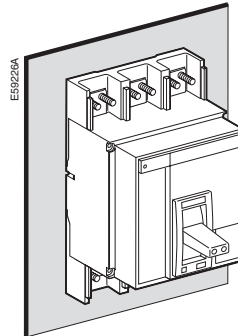
Withdrawable Compact NS800H



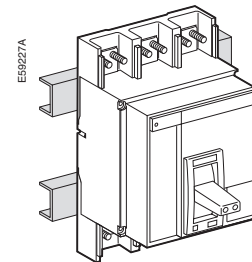
Installation

Fixed configuration

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



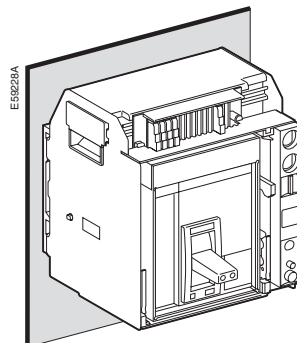
Mounting on a backplate



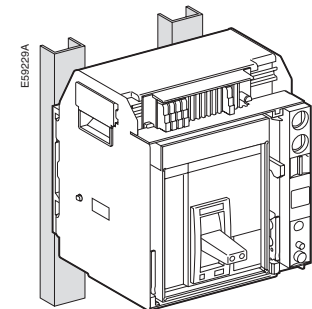
Mounting on rails

Withdrawable configuration

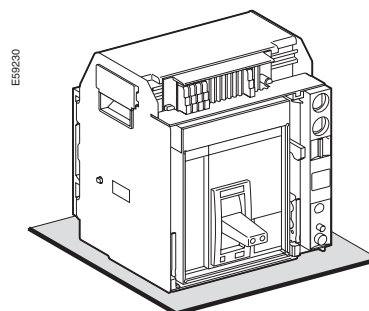
Compact NS630b to 1600 circuit breakers should be installed vertically only.



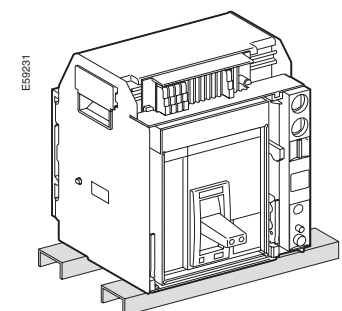
Mounting on a backplate



Rear mounting on rails



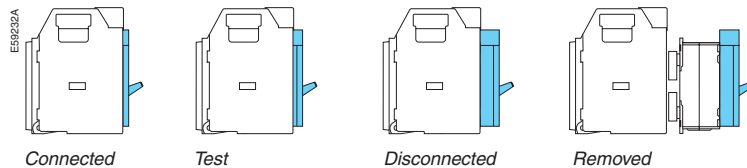
Device on mounting plate



Device on rails

The device may be in one of four positions on the chassis:

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



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.

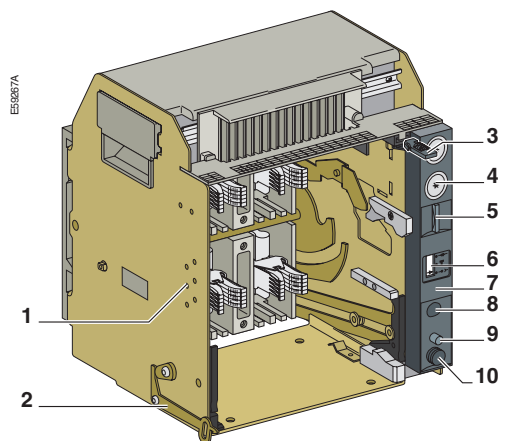
Locking

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

Types of connection

Fixed device

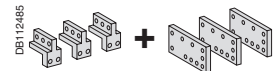
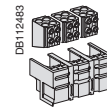
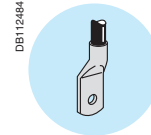
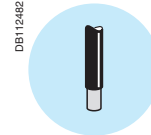
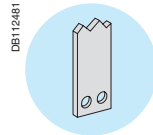
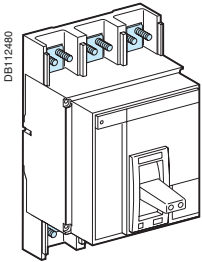
Front connections (N, H, L)

Connection by:

bars

bare cables (except L)

cables with lugs



Rear connections (N, H, L, LB)

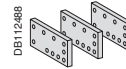
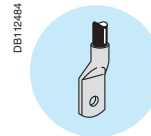
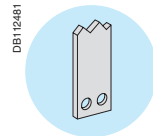
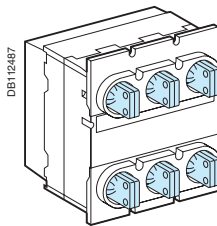
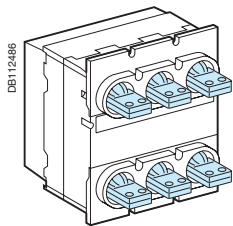
Connection by:

Horizontal:

Vertical:

bars

cables with lugs



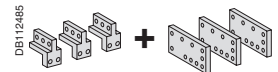
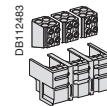
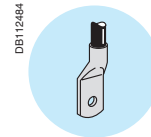
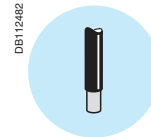
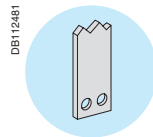
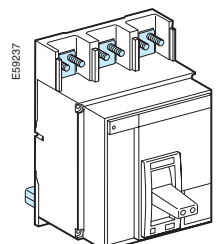
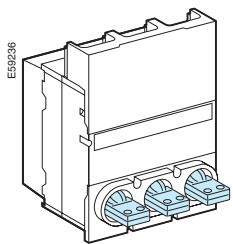
Simply turn a horizontal rear connector 90° to make it a vertical connector.

Combination of front and rear connections (N, H, L) Connection by:

bars

bare cables (except L)

cables with lugs



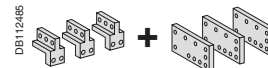
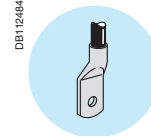
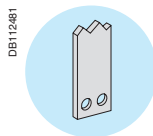
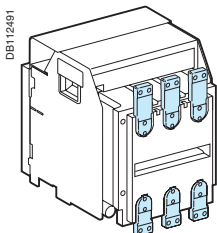
Withdrawable device

Front connections

Connection by:

bars

cables with lugs

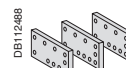
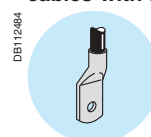
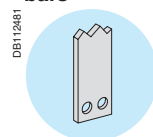
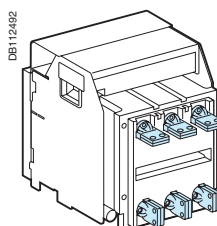


Rear connections

Connection by:

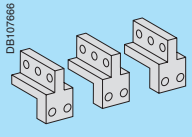
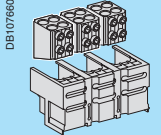
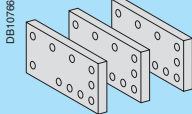
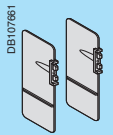
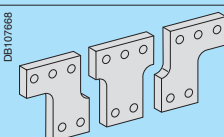
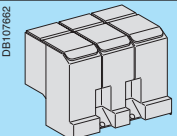
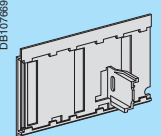
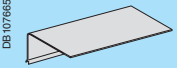
bars

cables with lugs



To ensure performance and isolation, depending on the type of circuit breaker (N, H, L, LB) and type of connection, certain isolation accessories are mandatory.

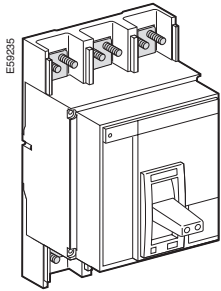
Connections accessories

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

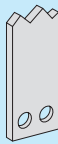
(1) Mandatory for voltages ≥ 500 V unless using the bare-cable connector + terminal shield kit.

(2) Mandatory for fixed devices with L and LB performance levels, whatever the voltage.

Front connection of fixed devices

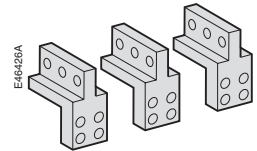


E54540

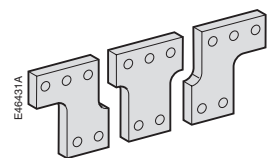
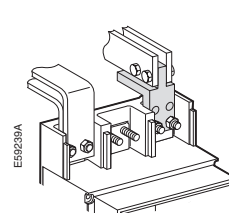
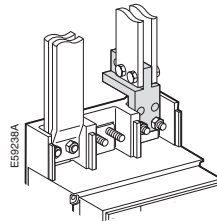


Bars

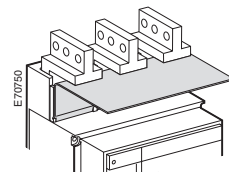
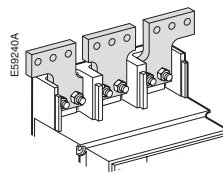
Fixed, front-connection Compact NS630b to 1600 devices are equipped with terminals comprising captive screws for direct connection of bars. Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch to 95 mm. If the vertical connection adapters are front oriented, then it is mandatory to install the arc chute screen in order to comply with the safety clearances.



Vertical-connection adapters



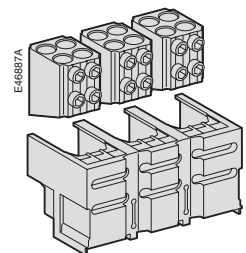
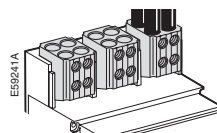
Spreaders.



Bare cables

Special sets of connectors and terminal shields may be used to connect up to four 240 mm² copper or aluminium cables for each phase. Bare cable connection is possible for ratings up to and including 1250 A.

E54457



4-cable connectors

Cables with lugs

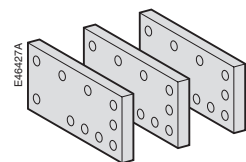
Cable lug adapters are combined with the vertical-connection adapters.

One to four cables with crimped lugs (≤ 300 mm²) may be connected.

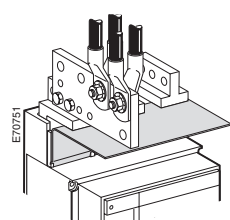
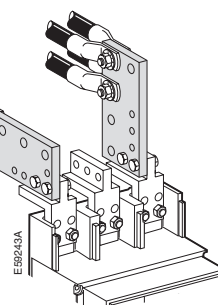
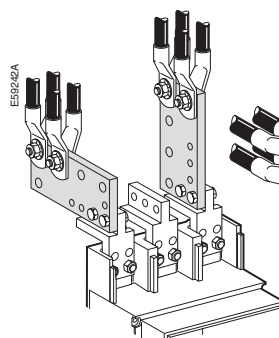
To ensure stability, spacers must be positioned between the terminal extensions.

If the cable lug adapters are installed over the top of the arc chute chambers, then it is mandatory to install the arc chute screen in order to comply with the safety clearances.

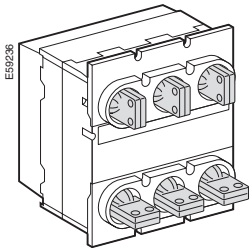
E54456



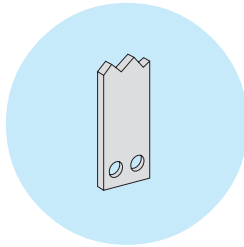
Cable lug adapters



Rear connection of fixed devices

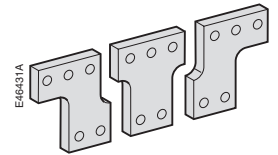
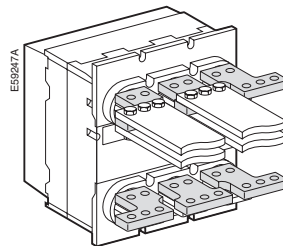
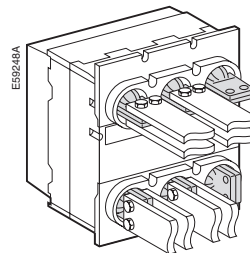
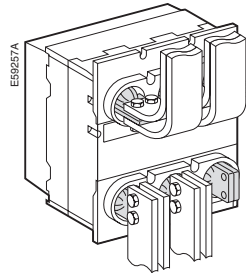


E54540



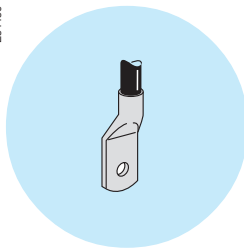
Bars

Fixed, rear-connection Compact NS630b to 1600 devices equipped with horizontal or vertical connectors may be directly connected to flat or edgewise bars, depending on the position of the connectors. Spreaders are available to increase the pole pitch to 95 mm.



Spreaders.

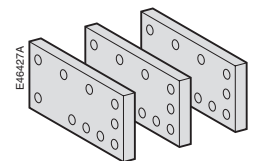
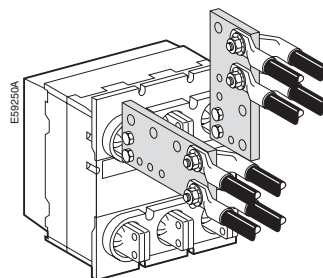
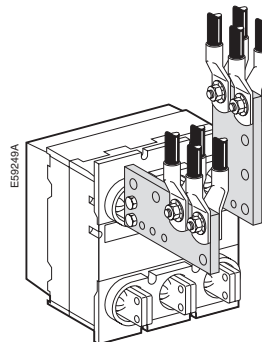
E54456



Cables with lugs

Cable lug adapters enable connection of one to four cables with crimped lugs ($\leq 300 \text{ mm}^2$).

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

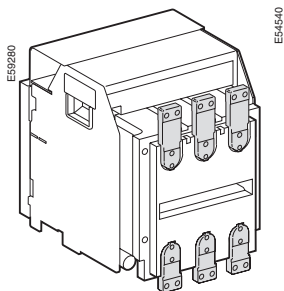


Cable lug adapters

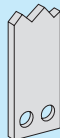
Front connection of withdrawable devices

Bars

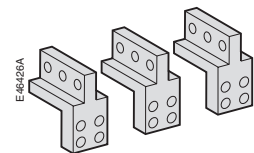
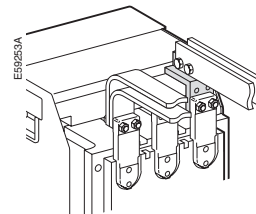
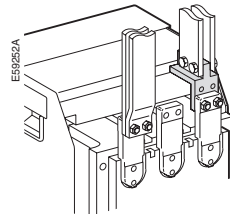
Withdrawable, front-connection Compact NS630b to 1600 devices are suitable for direct connection of bars. Other connection possibilities for bars include vertical-connection adapters for edgewise bars and spreaders to increase the pole pitch to 95 mm.



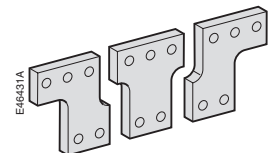
E59280



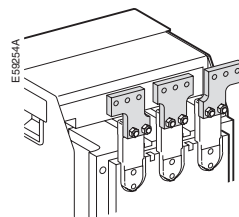
E54456



Vertical-connection adapters



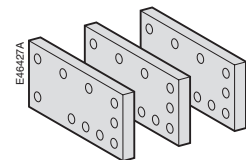
Spreaders



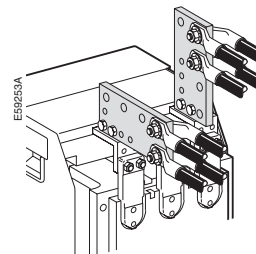
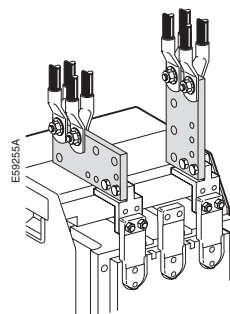
Cables with lugs

Cable lug adapters enable connection of one to four cables with crimped lugs ($\leq 300 \text{ mm}^2$).

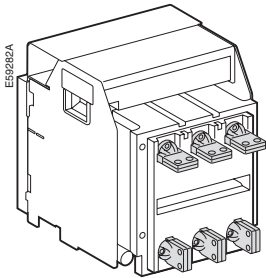
To ensure stability, spacers must be positioned between the terminal extensions.



Cable lug adapters



Rear connection of withdrawable devices



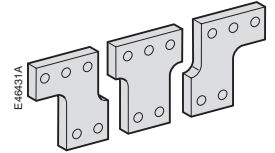
E545-40



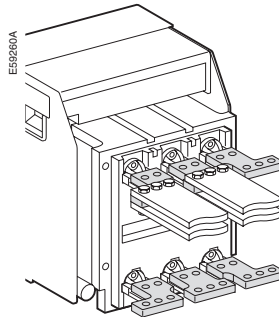
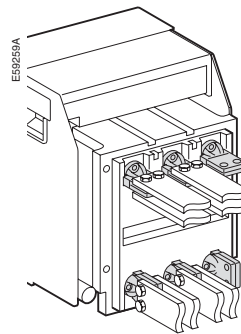
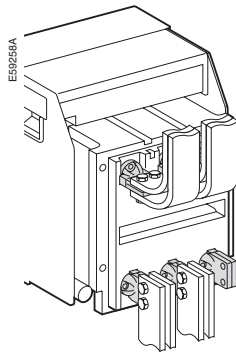
Bars

Withdrawable, rear-connection Compact NS630b to 1600 devices equipped with horizontal or vertical connectors may be directly connected to flat or edge-wise bars, depending on the position of the connectors.

Spreaders are available to increase the pole pitch to 95 mm.



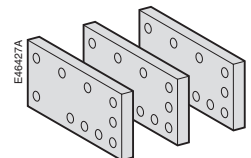
Spreaders



Cables with lugs

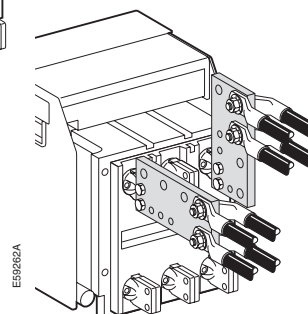
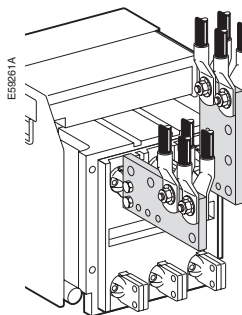
Cable lug adapters enable connection of one to four cables with crimped lugs ($\leq 300 \text{ mm}^2$).

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



Cable lug adapters

E54456



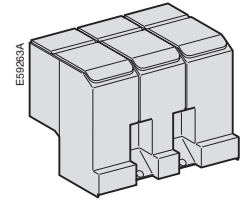


Compact NS equipped with connection shield

Insulation of live parts

Connection shield

Mounted on fixed, front-connection devices, this shield insulates power-connection points, particularly when cables with lugs are used

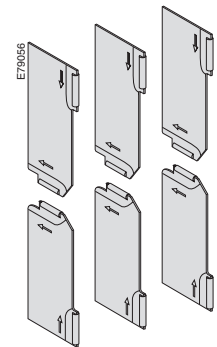


Connection shield

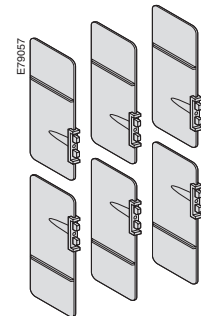
Interphase barriers

These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not. Barriers are installed vertically between front or rear connection terminals.

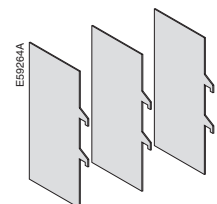
They are mandatory for voltages ≥ 500 V for both fixed and withdrawable products and for L and LB types, whatever the voltage.



Interphase barriers for fixed device, front connection



Interphase barriers for fixed device, rear connection



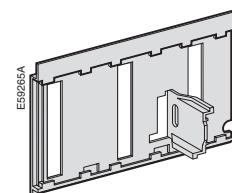
Interphase barriers for withdrawable device, rear connection

Safety shutters (standard)

Mounted on the chassis, the safety shutters automatically block access to the disconnecting contact cluster when the device is in the disconnected or test positions (degree of protection IP20). When the device is removed from its chassis, no live parts are accessible.

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

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

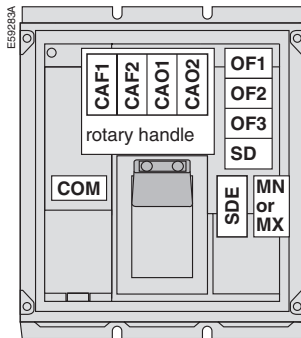


Safety shutters

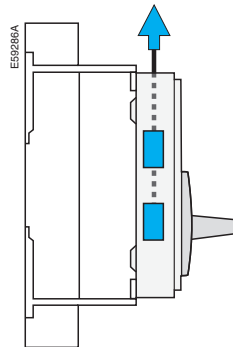
Connection of electrical auxiliaries

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.



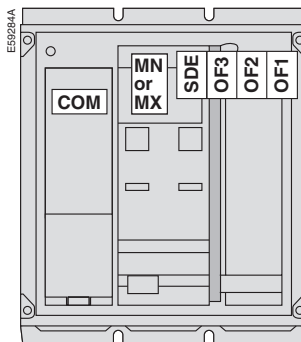
Manually operated device



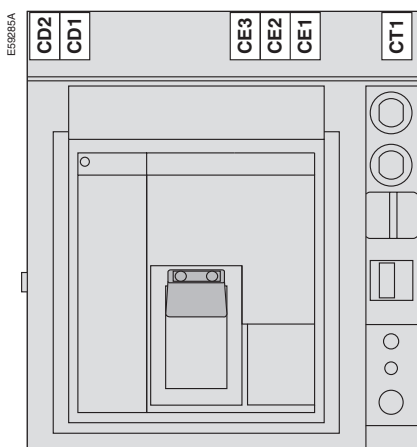
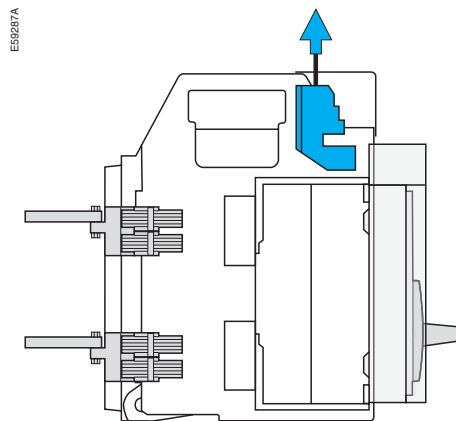
Withdrawable devices

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.



Electrically operated device



Withdrawable device



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 (ON/OFF) - indicates the position of the main circuit breaker contacts

■ SD (trip indication) - indicates that the circuit breaker has tripped due to:

- ☐ an overload
- ☐ a short-circuit
- ☐ an earth-leakage fault.
- ☐ operation of a voltage release
- ☐ operation of the "push to trip" button
- ☐ disconnection when the device is ON.

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

■ SDE (fault indication) - indicates that the circuit breaker has tripped due to:

- ☐ an overload
- ☐ a short-circuit
- ☐ an earth-leakage fault.

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

■ CAF / CAO (early-make or early-break function) - indicates the position of the rotary handle. Used in particular for advanced opening of safety trip devices (early break) or to energise a control device prior to circuit-breaker closing (early make).

Installation

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

■ CAF / CAO function - the contact fits into the rotary-handle unit (direct or extended).

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

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	6	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	2	-	-	5	1.5	-	-
	480 V	6	1.5	-	-	5	1	-	-
660/690 V		6	0.1	-	-	-	-	-	-

Connected, disconnected, test position carriage switches

A single type of changeover contact can be mounted optionally on the chassis to indicate, depending on the slot where it is installed:

■ the connected (CE) position

■ the disconnected (CD) position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached

■ the test (CT) position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Installation

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

Electrical characteristics of the CE/CD/CT auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		8				5			
Minimum load		100 mA at 24 V				2 mA at 15 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	8	6	2.5	1	5	3	5	1
	48 V	8	6	2.5	0.2	5	3	2.5	0.2
	110 V	8	5	0.8	0.05	5	2.5	0.8	0.05
	220/240 V	8	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	8	3	-	-	5	1.5	-	-
	660/690 V	6	0.1	-	-	-	-	-	-



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



M6C programmable contacts:
circuit-breaker external relay with six independent changeover contacts controlled from the circuit breaker via a three-wire connection.

M6C programmable contacts

These contacts, used with the Micrologic P control units, may be programmed via the control unit keypad or via a supervisory station with the COM communication option. They require an external power supply module.

They indicate:

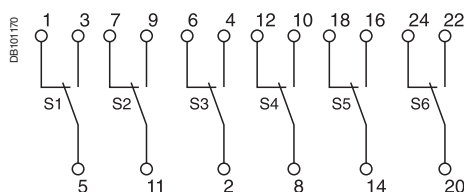
- the type of fault
- instantaneous or delayed threshold overruns.

They may be programmed:

- with instantaneous return to the initial state
- without return to the initial state
- with return to the initial state following a delay.

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

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



Rotary handles

There are two types of rotary handle:

- direct rotary handle
- extended rotary handle.

There are two models:

- standard with a black handle
- VDE with a red handle and yellow front for machine-tool control.

Direct rotary handle

Degree of protection IP40, IK07.

The direct rotary handle maintains:

- visibility of and access to trip unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped
- access to the "push to trip" button
- circuit breaker locking capability in the OFF position by one to three padlocks, shackle diameter 5 to 8 mm (not supplied).

It replaces the circuit-breaker front cover.

Accessories transform the standard direct rotary handle for the following situations:

- a higher degree of protection (IP43, IK07)
- machine-tool control, complying with CNOMO E03.81.501, IP54, IK07.

Extended rotary handle

Degree of protection IP55, IK07.

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

It maintains:

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

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

The extended rotary handle is made up of:

- a unit that replaces the front cover of the circuit breaker (secured by screws)
- an assembly (handle and front plate) on the door that is always secured in the same position, whether the circuit breaker is installed vertically or horizontally
- an extension shaft that must be adjusted to the distance. The min/max distance between the back of circuit breaker and door is 218/605 mm.



Compact NS with a direct rotary handle



Compact NS with an extended rotary handle

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.

059421



MX voltage release

Remote tripping

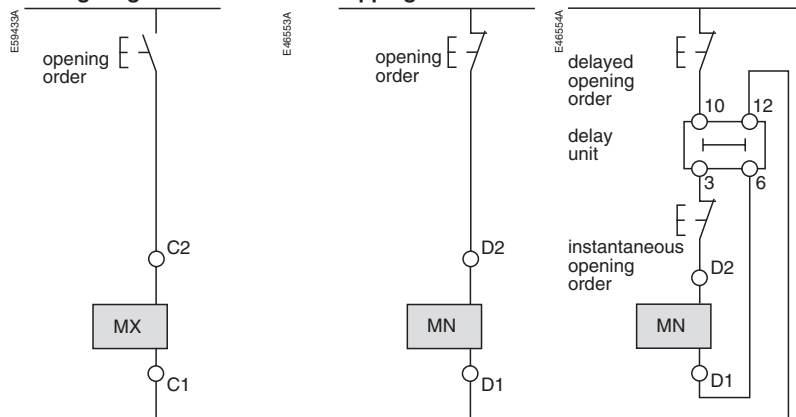
This function opens the circuit breaker via an electrical order. It is made up of:

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

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

The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases (2nd MX)

When energised, the 2nd MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the 2nd MX locks the circuit breaker in the OFF position.

Characteristics		
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250
Operating threshold	0.7 to 1.1 Un	
Permanent locking function	0.85 to 1.1 Un	
Consumption (VA or W)	pick-up: 200 (200 ms)	hold: 4.5
Circuit-breaker response time at Un	50 ms ±10	

Instantaneous voltage releases (MN)

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit-breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

Characteristics			
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480	
	V DC	24/30 - 48/60 - 100/130 - 200/250	
Operating threshold	opening	0.35 to 0.7 Un	
	closing	0.85 Un	
Consumption (VA or W)	pick-up: 200 (200 ms)		hold: 4.5
MN consumption with delay unit (VA or W)	pick-up: 400 (200 ms)		hold: 4.5
Circuit-breaker response time at Un	90 ms ±5		

MN delay units

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

Characteristics			
Power supply	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 of delay unit alone (VA or W)	pick-up: 200 (200 ms)		hold: 4.5
Circuit-breaker response time at Un	non-adjustable	0.25 s	
	adjustable	0.5 s - 0.9 s - 1.5 s - 3 s	

Electrically operated circuit breakers are equipped as standard with a motor mechanism module.

Two solutions are available for electrical operation:

- a point-to-point solution
- a bus solution with the COM communication option.



Electrically operated Compact NS circuit breaker

Electrically operated circuit breaker

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

An electrical operation function is generally combined with:

- device ON/OFF indication (OF)
- "fault-trip" indication (SDE).

Motor mechanism module

Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277 - 380/415
	V DC	24/30 - 48/60 - 100/125 - 200/250

Operating threshold	0.85 to 1.1 Un
Consumption (VA or W)	180
Motor overcurrent	2 to 3 In for 0.1 second
Charging time	maximum 4 seconds
Operating frequency	maximum 3 cycles per minute

Electrical closing order

The release remotely closes the circuit breaker if the spring mechanism is charged.

Release electrical characteristics are identical to those of an MX release (see above), the operating threshold is from 0.85 to 1.1 Un and the circuit-breaker response time at Un is 60 ms $\pm$ 10.

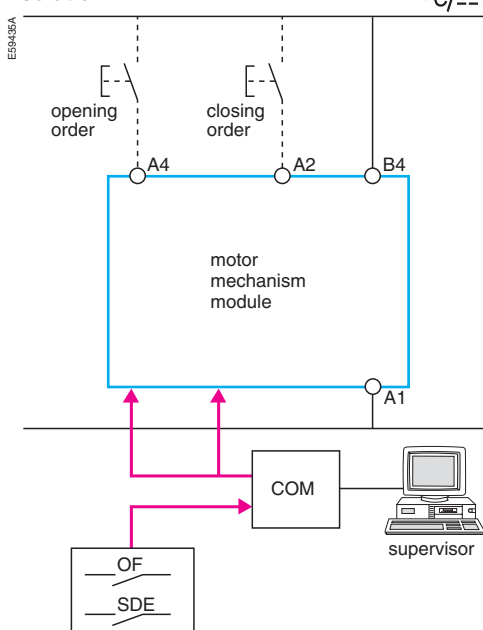
The Compact NS electrical operation function can be used to implement a synchro-coupling system.

Electrical opening order

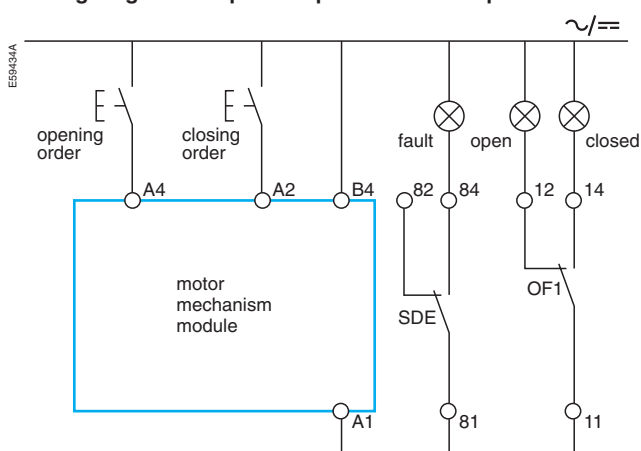
The release instantaneously opens the circuit breaker when energised. The supply can be impulse-type or maintained.

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

Wiring diagram of a bus-type electrical operation solution



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



In the event of simultaneous opening and closing orders, the mechanism discharges without any movement of the main contacts.

In the event of maintained opening and closing orders, the standard electrical operation solution provides an anti-pumping function by blocking the main contacts in open position.



Toggle locked by removable padlocking device



Rotary handle locked by a keylock

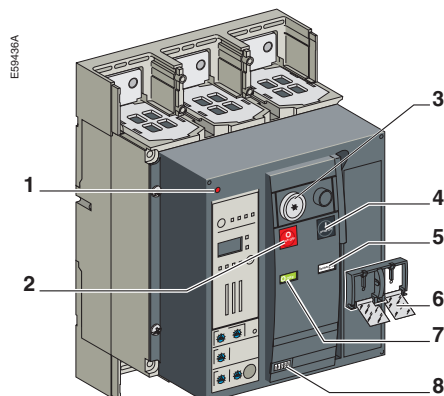
Locking on manually operated devices

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

Control device	Function	Means	Required accessories
Toggle	lock in OFF position	padlock	removable device
	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	lock in OFF position, door opening prevented	padlock	
		keylock	keylock

Locking in ON position does not prevent the device from tripping in the event of a fault or remote tripping order.

Locking on electrically operated devices



- 1 reset of mechanical trip indicator
- 2 OFF pushbutton
- 3 OFF position locking
- 4 ON pushbutton
- 5 springs charged indication
- 6 pushbutton locking
- 7 contact position indication
- 8 operation counter



Access to pushbuttons protected by transparent cover



Pushbutton locking using a padlock

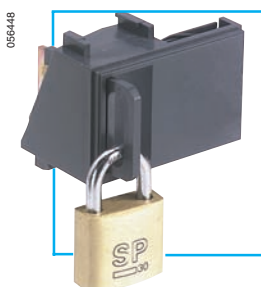
Pushbutton locking

The transparent cover blocks access to the pushbuttons used to open and close the device.

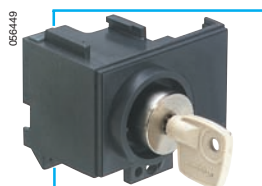
It is possible to independently lock the opening OFF button and the closing ON button.

The pushbuttons may be locked using either:

- three padlocks (not supplied)
- lead seal
- two screws.



OFF position locking using padlocks



OFF position locking using a keylock and padlocks

Device locking in the OFF position

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:

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

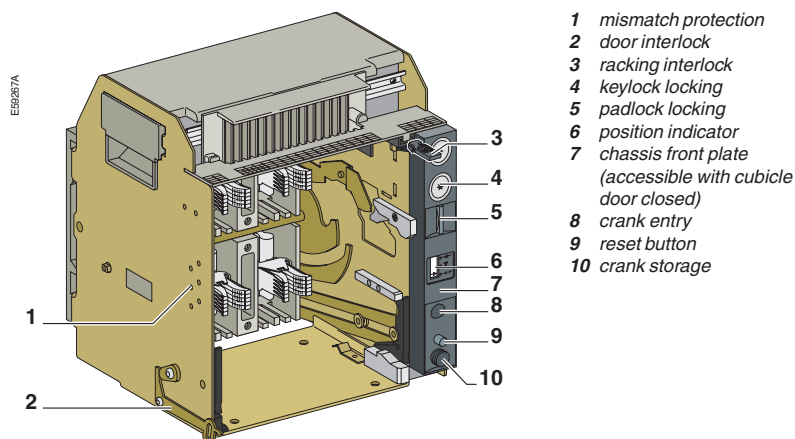
Keys may be removed only when locking is effective (Profalux or Ronis type locks).

The keylocks are available in any of the following configurations:

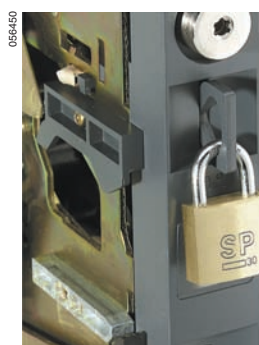
- one keylock
- one keylock mounted on the device + one identical keylock supplied separately for interlocking with another device.

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

Chassis locking



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



Disconnected position locking by padlocks



Disconnected position locking by keylocks

Disconnected position locking

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the disconnected position in two manners:

- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:

- one keylock
- one keylock mounted on the device + one identical keylock supplied separately, using the same key, for interlocking with another device
- one (or two) keylocks mounted on the device + one (or two) identical keylocks supplied separately, for interlocking with another device.

A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Connected, disconnected and test position locking

The connected, disconnected and test positions are shown by an indicator. The racking crank blocks when the exact position is obtained.

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. If the breaker is put in the connected position with the door open, the door may be closed without having to disconnect the circuit breaker.

Racking interlock

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

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.



Door interlock



Racking interlock



Mismatch protection

056463



Auxiliary terminal shield

Other accessories

Auxiliary terminal shield (CB)

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

Operation counter (CDM)

The operation counter sums the number of operating cycles and is visible on the front panel. It is compatible with electrically operated devices.

Escutcheon (CDP)

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

Transparent cover (CCP) for escutcheon

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

Blanking plate (OP) for escutcheon

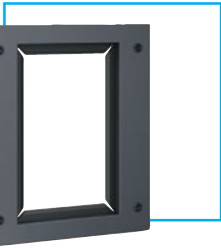
Used with the escutcheon, this option closes off the door cutout of a cubicle not yet equipped with a device. It may be used with the escutcheon for both fixed and withdrawable devices.

056464



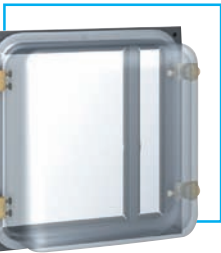
Operation counter

E45184



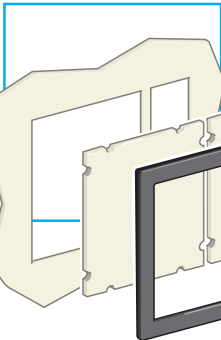
Escutcheon

E45187



Transparent cover

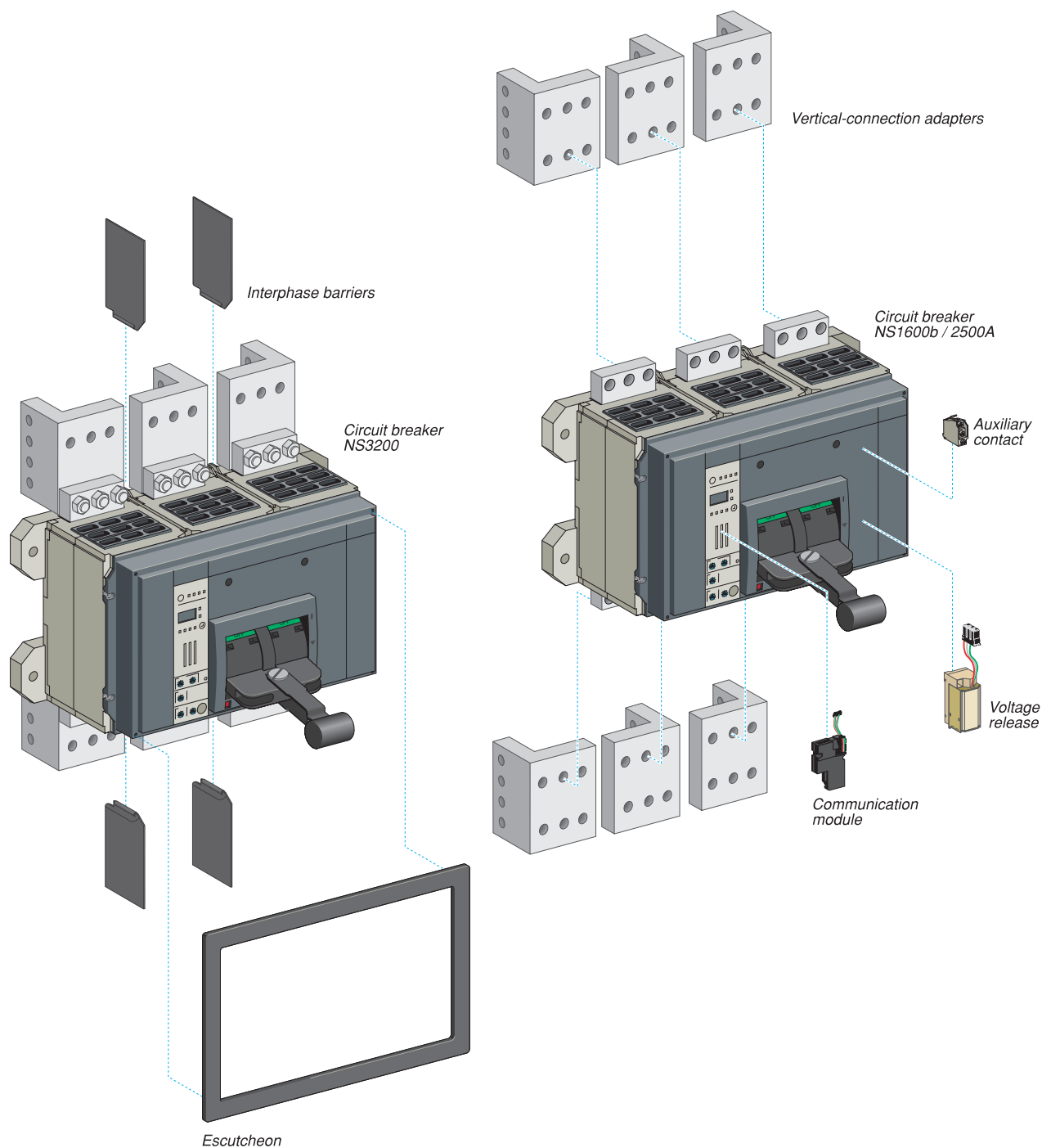
E59987



Blanking plate

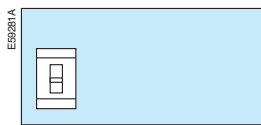
Electrical and mechanical accessories

Compact NS1600b to 3200
(fixed version)





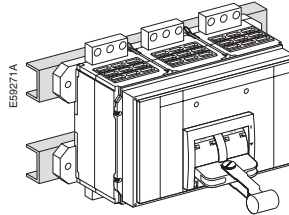
Fixed Compact NS



Installation

Fixed circuit breakers

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

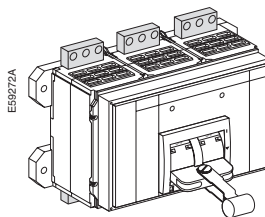


Mounting on rails

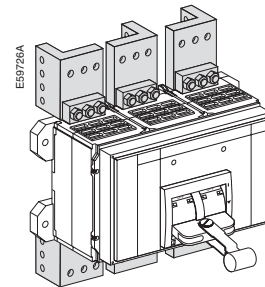
Connection

Front connection

NS1600 to 2500



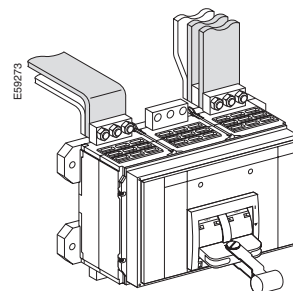
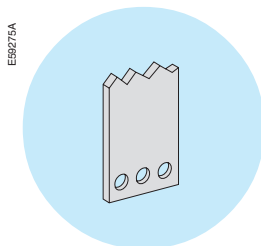
NS3200



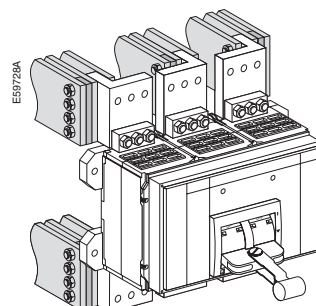
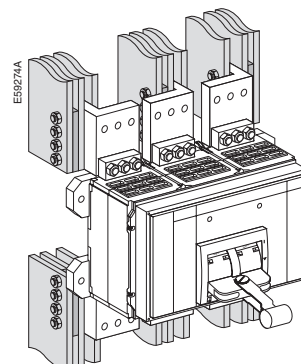
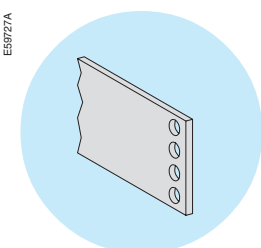
Bars

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

NS1600b to 2500



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





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 (ON/OFF) - indicates the position of the main circuit breaker contacts
- SD (trip indication) - indicates that the circuit breaker has tripped due to:

- ☐ an overload
- ☐ a short-circuit
- ☐ an earth-leakage fault
- ☐ operation of a voltage release
- ☐ operation of the "push to trip" button

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

- SDE (fault indication) - indicates that the circuit breaker has tripped due to:

- ☐ an overload
- ☐ a short-circuit
- ☐ an earth-leakage fault.

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

Installation

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

Electrical characteristics of the OF/SD/SDE auxiliary contacts

Contacts		Standard				Low level			
Rated thermal current (A)		6				5			
Minimum load		100 mA at 24 V				1 mA at 4 V			
Utilisation cat. (IEC 60947-5-1)		AC12	AC15	DC12	DC14	AC12	AC15	DC12	DC14
Operational current (A)	24 V	6	6	6	1	5	3	5	1
	48 V	6	6	2.5	0.2	5	3	2.5	0.2
	110 V	6	5	0.6	0.05	5	2.5	0.6	0.05
	220/240 V	6	4	-	-	5	2	-	-
	250 V	-	-	0.3	0.03	5	-	0.3	0.03
	380/440 V	6	2	-	-	5	1.5	-	-
	480 V	6	1.5	-	-	5	1	-	-
660/690 V		6	0.1	-	-	-	-	-	-

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).

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MX voltage release

Remote tripping

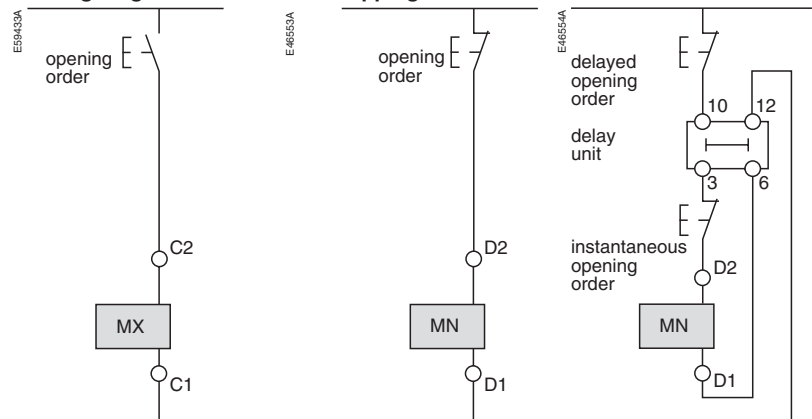
This function opens the circuit breaker via an electrical order. It is made up of:

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

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

The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function



Voltage releases (2nd MX)

When energised, the 2nd MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the 2nd MX locks the circuit breaker in the OFF position.

Characteristics

Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 277 - 380/480
	V DC	12 - 24/30 - 48/60 - 100/130 - 200/250
Operating threshold	0.7 to 1.1 Un	
Permanent locking function	0.85 to 1.1 Un	
Consumption (VA or W)	pick-up: 200 (200 ms) hold: 4.5	
Circuit-breaker response time at Un	50 ms ±10	

Instantaneous voltage releases (MN)

The MN release instantaneously opens the circuit breaker when its supply voltage drops to a value between 35 % and 70 % of its rated voltage. If there is no supply on the release, it is impossible to close the circuit breaker, either manually or electrically. Any attempt to close the circuit breaker has no effect on the main contacts. Circuit-breaker closing is enabled again when the supply voltage of the release returns to 85 % of its rated value.

Characteristics

Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480
	V DC	24/30 - 48/60 - 100/130 - 200/250
Operating threshold	opening	0.35 to 0.7 Un
	closing	0.85 Un
Consumption (VA or W)	pick-up: 200 (200 ms) hold: 4.5	
MN consumption with delay unit (VA or W)	pick-up: 400 (200 ms) hold: 4.5	
Circuit-breaker response time at Un	90 ms ±5	

MN delay units

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

Characteristics

Power supply	non-adjustable	100/130 - 200/250
	adjustable	48/60 - 100/130 - 200/250 - 380/480
Operating threshold	opening	0.35 to 0.7 Un
	closing	0.85 Un
Consumption of delay unit alone (VA or W)	pick-up: 200 (200 ms) hold: 4.5	
Circuit-breaker response time at Un	non-adjustable	0.25 s
	adjustable	0.5 s - 0.9 s - 1.5 s - 3 s

62191



Compact NS with toggle locked using a fixed device and padlocks

62190



Compact NS with toggle locked using a removable device and padlocks

Device locking

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

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

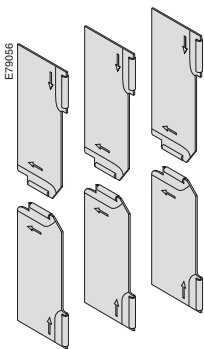
Interphase barriers

These barriers are flexible insulated partitions used to reinforce isolation of connection points in installations with busbars, whether insulated or not.

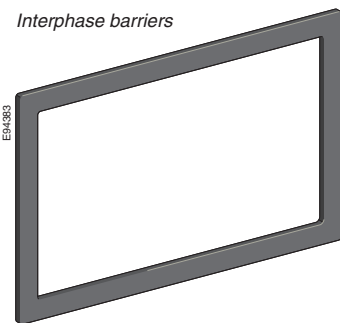
Barriers are installed vertically between front connection terminals.

Escutcheon (CDP)

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP40.



Interphase barriers



Escutcheon

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

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 control units).

Required power source: standard LR6-AA battery.

Portable test kit

The portable test kit is 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.

Note

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

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



Portable test kit

Display modules

Perfectly integrated in the Compact and Masterpact ranges, Display modules are designed for use with Micrologic control units to provide instant and highly intuitive access to all the information provided by the circuit breakers, including device status, current, voltage and power values, etc.



DMB300 display module: basic and harmonic measurements



DMC300 display module: measurements, harmonic analysis, diagnosis

DMB300 and DMC300 display modules use the power and communications capabilities of the Micrologic control units to centralise the display of electrical values, status conditions and alarms of one or more Compact or Compact circuit breakers.

The mounting and cabling system for the display modules ensures fast, easy and reliable installation.

Start-up is immediate with no configuration or programming required.

Display modules are high-performance devices combining:

- simple and easy-to-read dials
- powerful and accurate digital processing.

Their small size and extensive communications capabilities make for easy and flexible installation and operation.

Display modules	DMB300	DMC300
Associated circuit breakers		
Type	Compact or Masterpact equipped with Micrologic control units	
Number	1 to 4	1 to 16
Display		
Screen type	Black and white	Colour, touch screen
Screen size	240 x 64 pixels	5", 320 x 240 pixels
Entry	5 buttons	Touch screen
Information displayed		
Currents (per phase)		
Currents I1, I2, I3, IN	A P	A P
Maximum current	A P	A P
Earth-fault and earth-leakage currents	A P	A P
Demand current	P	P
Maximum demand current	P	P
Voltages		
Phase-to-phase voltages (U1-2, U2-3, U3-1)	P	P
Minimum/maximum phase-to-phase voltages	P	P
Phase-to-neutral voltages (V1-N, V2-N, V3-N)	P	
Minimum/maximum phase-to-neutral voltages	P	
Frequency	P	P
Voltage unbalance (% per phase)	P	
Power		
Active (P), reactive (Q) and apparent (S) power	P	P
Power factor and cos	P	P
Maximum power (P, Q, S)	P	P
Demand power (P, Q, S)	P	P
Maximum demand power (P, Q, S)	P	P
Metering		
Active, reactive and apparent energy	P	P
On-line help		
	On-line help is available for each type of information supplied by the module	
Circuit-breaker diagnostics		
Identification of control units	A P	A P
Reading of protections	A P	A P
Circuit-breaker status	A P	A P
Type of trip	A P	A P
Current alarms	P	P
Maintenance indicator		P
Installation diagnosis		
Indication of faulty devices		A P
Fault log		A P
Installation and start-up		
Mounting	Mounted through door, without tools, using 6 spring-clips supplied with the mod.	
Connection	Prefabricated wiring systems	

Associated Micrologic control unit

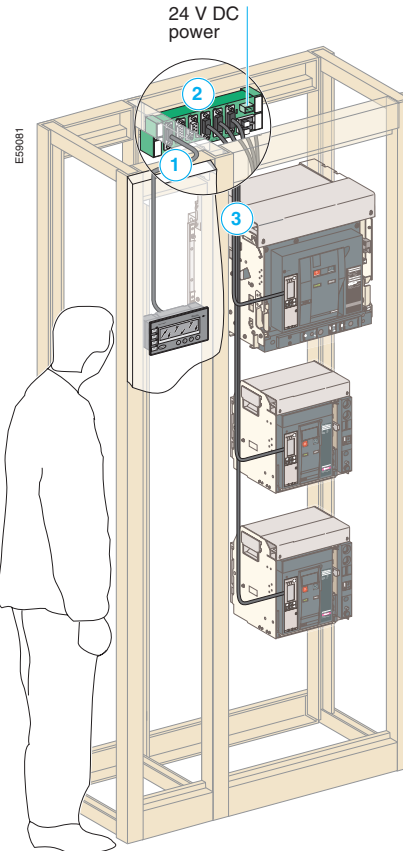
A = Micrologic A
P = Micrologic P

Wiring system

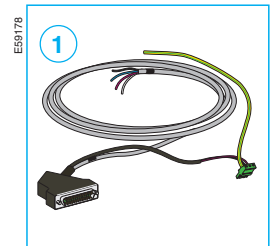
The wiring system is designed for low-voltage power switchboards. Installation requires no tools or special skills.

The prefabricated wiring ensures both data transmission (Modbus protocol) and 24V DC power distribution for the display module and the communications modules on the Micrologic control units.

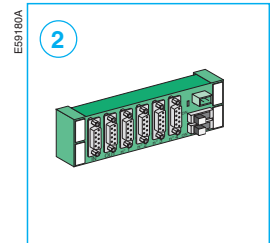
Connection of DMB300 display module



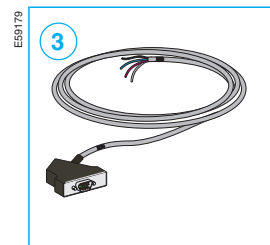
Compact circuit breakers equipped with Micrologic control units and the Modbus eco COM option



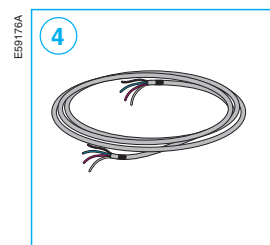
CDM 303:
Connection cable between
display module and junction
block



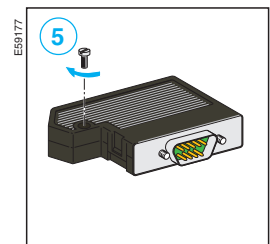
CJB 306 junction block



CCP 303:
Connection cable between
Masterpact or Compact and
junction block



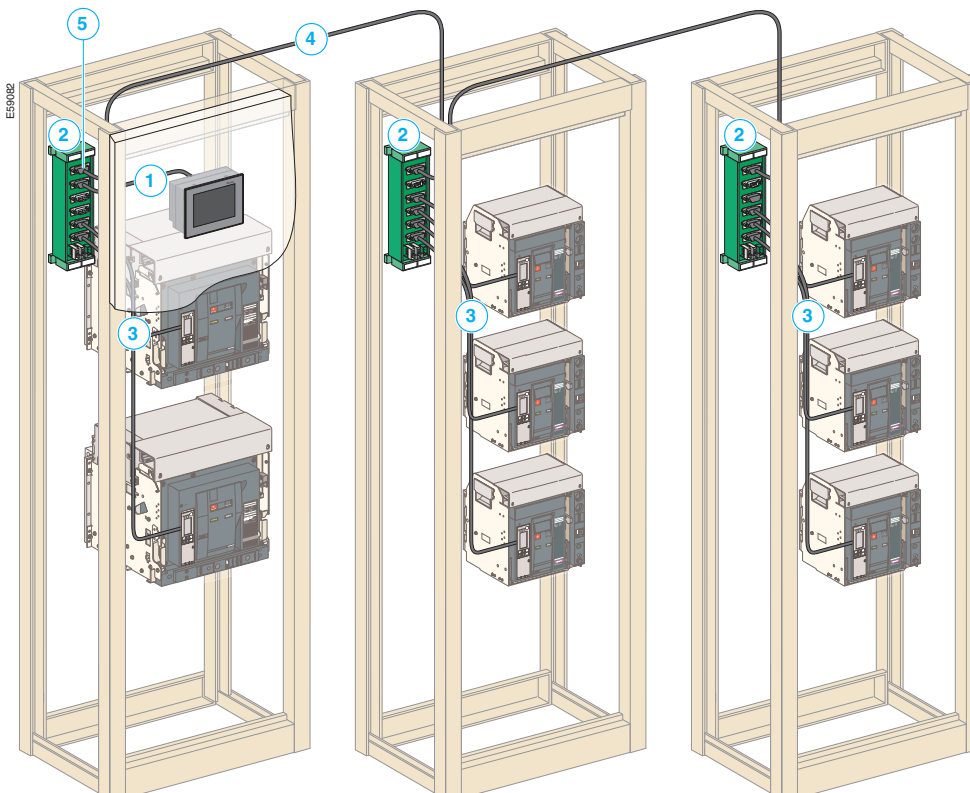
CCR 301:
Roll of RS 485 cable
(2 RS 485 wires + 2 power
supply wires)



CSD 309:
SubD 9-pin connector for
colour-coded connection of
wires to screw terminals

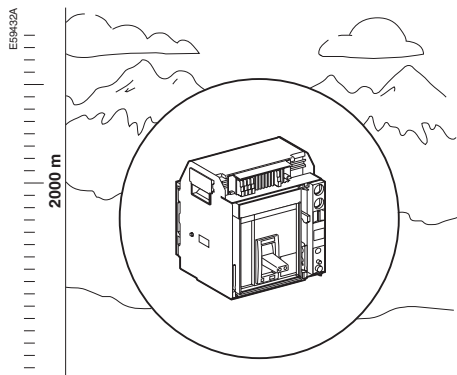
Connection of DMC300 display module

Maximum distance between module and circuit breaker: 1200 m



Compact circuit breakers equipped with Micrologic control units and the Modbus eco COM option

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<i>Additional characteristics</i>	<i>E-1</i>
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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
Rated insulation level (V) U_i	750	700	600	500
Rated operational voltage (V) U_e	690	550	480	420
Average thermal current (A) at 40 °C	$1 \times I_n$	$0.96 \times I_n$	$0.93 \times I_n$	$0.9 \times I_n$

Compact NS630b to 3200

Altitude (m)	2000	3000	4000	5000
Dielectric resistance voltage (V)	3000	2500	2100	1800
Rated insulation level (V) U_i	800	700	600	500
Rated operational voltage (V) U_e	690	590	520	460
Average thermal current (A) at 40 °C	$1 \times I_n$	$0.98 \times I_n$	$0.96 \times I_n$	$0.94 \times I_n$

Vibrations

Compact NS devices resist electromagnetic or mechanical vibrations.

Tests are carried out in compliance with standard IEC 60068-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):

- 2 → 13.2 Hz: amplitude ± 1 mm
- 13.2 → 100 Hz: constant acceleration 0.7 g.

Excessive vibration may cause tripping, breaks in connections or damage to mechanical parts.

Electromagnetic disturbances

Compact NS devices are protected against:

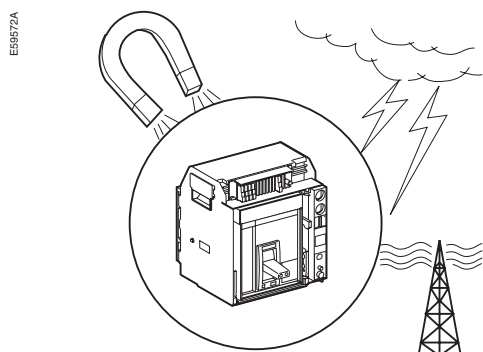
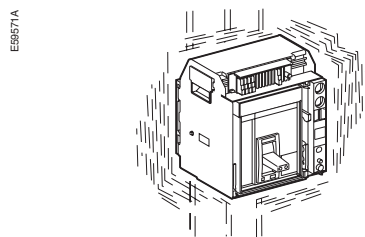
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by an atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system)
- devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced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

Compact NS devices have successfully passed the electromagnetic-compatibility tests (EMC) defined by the following international standards:

- IEC 60947-2, appendix F
- IEC 60947-2, appendix B (trip units with Vigi earth-leakage function).

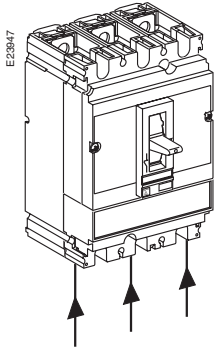
The above tests guarantee that:

- no nuisance tripping occurs
- tripping times are respected.



Installation in switchboards

Power supply and weights



Power supply

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

Weights

		Circuit breaker	Plug-in base	Chassis	Vigi module	Fully visible break block (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	3P	14		14			
manual operation	4P	18		18			
NS630b to 1600	3P	14		16			
electrical operation	4P	18		21			
NS1600b to 3200	3P	24					
	4P	36					
NSA	3P/3D	1.1			1.5		
	4P/4D	1.4			1.7		
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.

Compact NS80 to 630

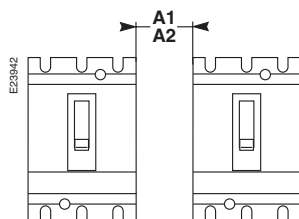
When installing a circuit breaker, minimum distances (safety clearances) must be maintained between the device and panels, bars and other protection devices installed nearby. These distances, which depend on the ultimate breaking capacity, are defined by tests carried out in accordance with standard 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.

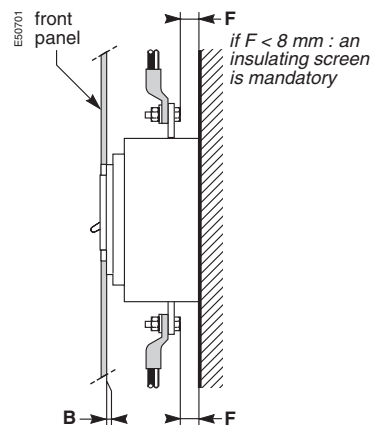
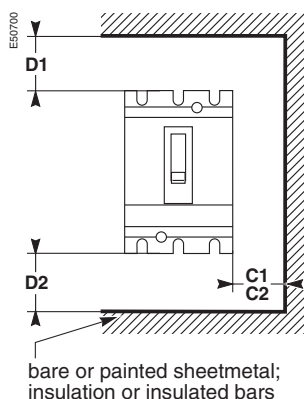
For Compact NS80 to 630 devices, terminal shields, interphase barriers and the insulation kit are recommended and may be mandatory depending on the utilisation voltage and the type of installation (fixed, withdrawable) (see page B-5).

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 sheet metal			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 interphase barriers.

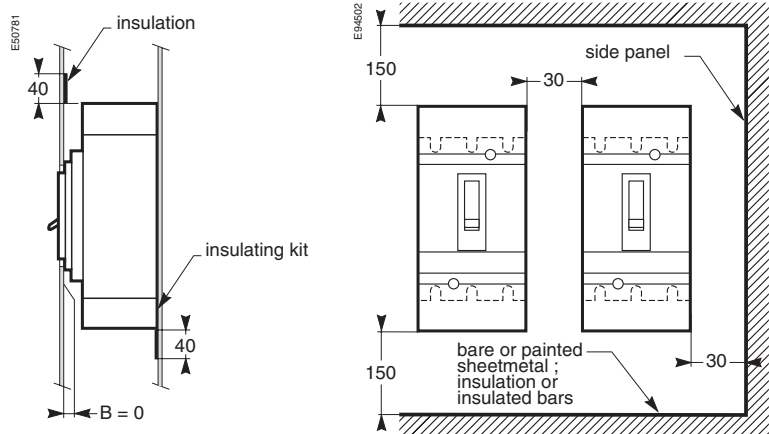
⁽²⁾ For Compact NS with long or short terminal shields.

⁽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 interphase barriers.

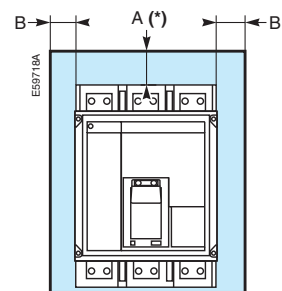
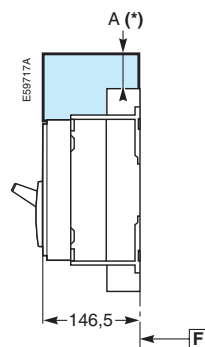
Fixed Compact NS400 1000 V AC, front connection

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



Insulating kit is standard.

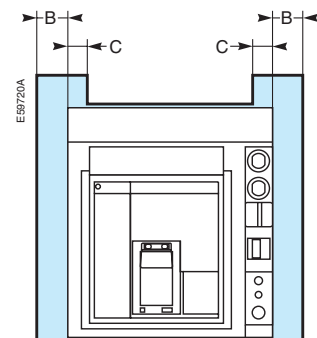
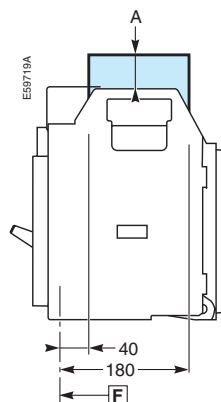
Compact NS630b to 3200 (fixed devices)



(*) An overhead clearance of 50 mm is required to remove the arc chutes.

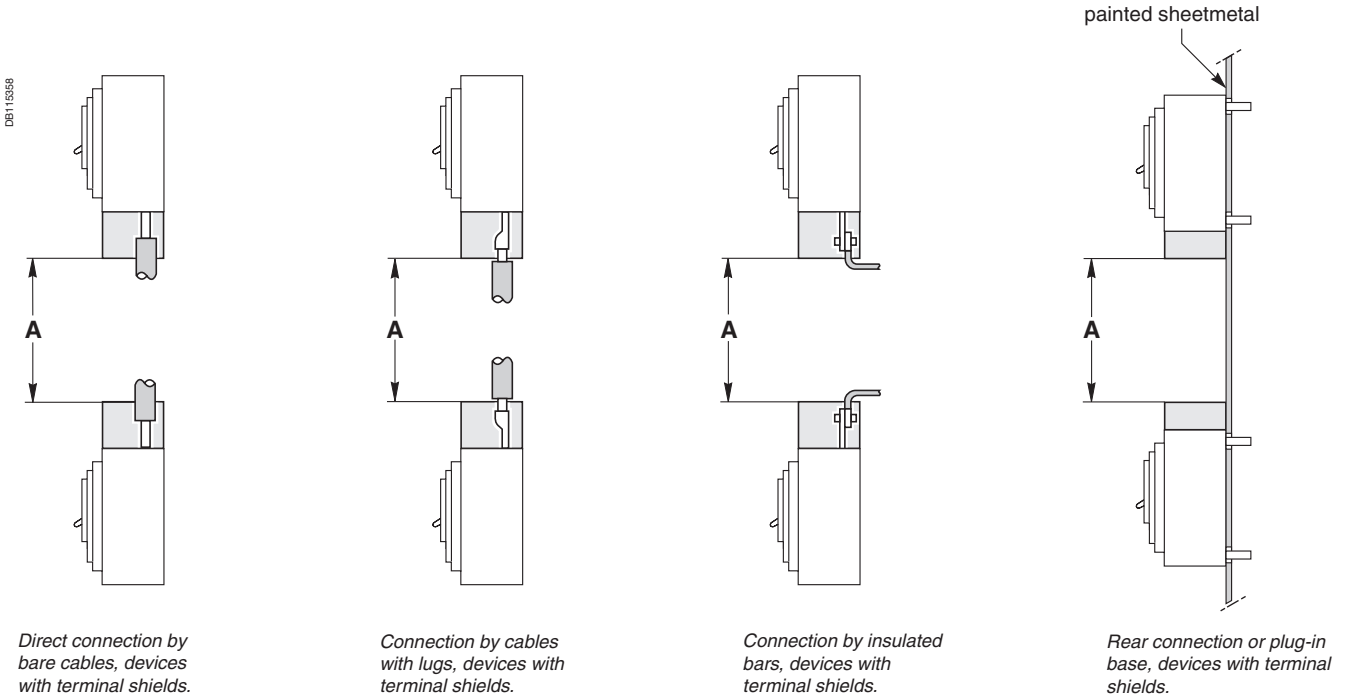
	Insulated parts	Metal parts	Live parts
NS630b to 1600			
A	0	120	180
B	0	10	60
NS1600b to 3200			
A	50	170	230
B	0	10	60

Compact NS630b to 1600 (withdrawable devices)



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

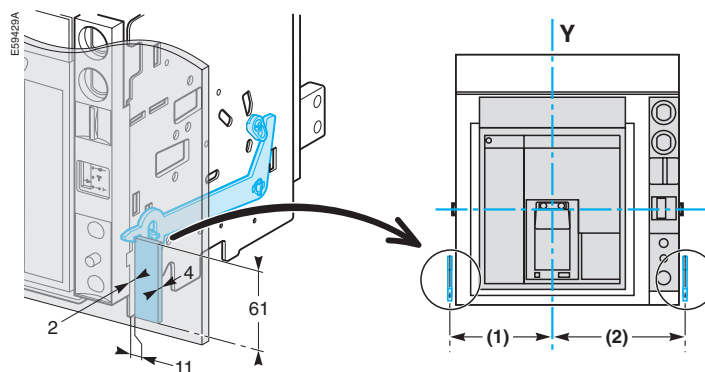
F Datum



Minimum dimensions (mm)	A
Compact circuit breaker	
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.

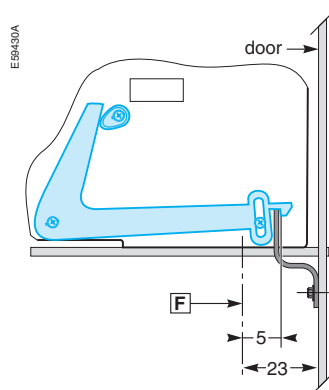


Dimensions (mm)

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

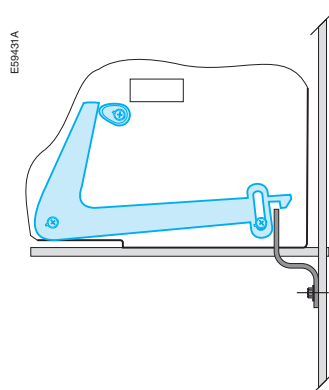
Device in the connected or test positions

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

Wiring of voltage releases

During pick-up, the power consumed is approximately 150 to 200 VA.
For low control voltages (12, 24, 48 V), maximum cable lengths are imposed by the voltage and the cross-sectional area of cables.

Recommended maximum cable lengths (meter).

		12 V		24 V		48 V	
		2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²	2.5 mm ²	1.5 mm ²
MN	U source 100 %	—	—	58	35	280	165
	U source 85 %	—	—	16	10	75	45
MX-XF	U source 100 %	21	12	115	70	550	330
	U source 85 %	10	6	75	44	350	210

Note: the indicated length is that of each of the two wires.

24 V DC power-supply module

External 24 V DC power-supply module for Micrologic (F1-, F2+)

- do not connect the positive terminal (F2+) to earth
- the negative terminal (F1-) can be connected to earth, except in IT systems
- a number of Micrologic control units and M6C modules can be connected to the same 24 V DC power supply (the consumption of a Micrologic control unit or an M6C module is approximately 100 mA)
- do not connect any devices other than a Micrologic control unit or an M6C module
- the maximum length for each conductor is ten metres. For greater distances, it is advised to twist the supply wires together
- the 24 V DC supply wires must cross the power cables perpendicularly. If this is difficult, it is advised to twist the supply wires together
- the technical characteristics of the external 24 V DC power-supply module for Micrologic control units are indicated on page 34.

Communication bus

- do not connect the positive terminal (E1) to earth
- the negative terminal (E2) can be connected to earth
- a number of "device" or "chassis" communication modules can be connected to the same 24 V DC power supply (the consumption of each module is approximately 30 mA)
- the 24 V DC (E1, E2) power supply for the communication bus must be separate from the external 24 V DC power-supply module for Micrologic control units (F1-, F2+).

E1	E2	E3	E4	E5	E6
+	-	A/Tx-	B/Tx+	A/Rx-	B'/Rx+

To create a two-wire Modbus communication bus, simply connect Tx- with Rx- and Tx+ with Rx+.

To connect a Modbus slave (Micrologic) to a Modbus master (PLC), connect:

The slave Tx- to the master Rx- The slave Rx- to the master Tx-
The slave Tx+ to the master Rx+ The slave Rx+ to the master Tx+

RS485 Modbus Junction Block

DB106137

4 Wires 2 Wires

0/V

1

2

3

4

5/OUT

Termination

ON OFF

⏏

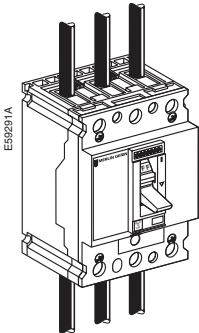
1 2 3 4 5

6 7 8 9

Pins	Signal	Color
1	0 V	Black
2	24 V	Red
3	NC	
4	B' / Rx ⁺	Blue
5	B / Tx ⁺	Yellow
6	0 V	Black
7	24 V	Red
8	A' / Rx ⁻	White
9	A / Tx ⁻	Brown

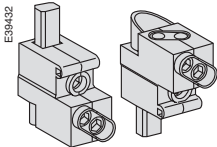
Wiring of ZSI: it is recommended to use twisted shielded cable. The shield must be connected to earth at both ends.

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 1.5 to 10 flexible ⁽¹⁾
Tightening torque (Nm)	5	2

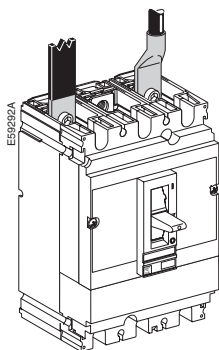
⁽¹⁾ For flexible cables from 1.5 to 4 mm², connection with crimped or self-crimping ferrule.

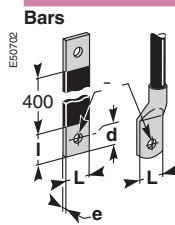


Distribution connector

Power connections for Compact NS100 to 630

Connection of insulated bars or
cables with lugs



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

⁽¹⁾ Tightening torque for lugs or bars on the circuit breaker.

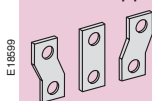
⁽²⁾ Tightening torque for rear connections or terminal extensions on plug-in base.

Connections with accessories - IEC228

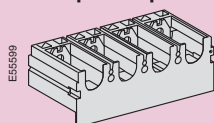
NS100 to 250

Spreader

Separate parts
Tinned copper



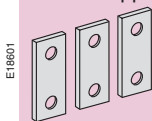
One-piece spreader



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

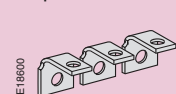
Straight terminal extensions

Tinned copper.



Right-angle terminal extensions

Tinned copper.
Upstream side.

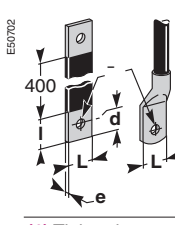


NS100 to 250

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⁾

⁽¹⁾ Tightening torque for spreaders or terminal extensions on the circuit breaker.

⁽²⁾ Tightening torque for spreaders or terminal extensions on plug-in base.

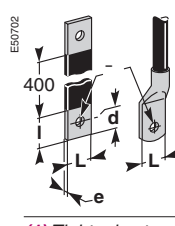
Spreaders, straight and right-angle terminal extensions are supplied with flexible interphase barriers.

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⁾

⁽¹⁾ Tightening torque for spreaders or terminal extensions on the circuit breaker.

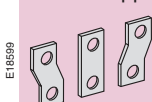
⁽²⁾ Tightening torque for spreaders or terminal extensions on plug-in base.

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

NS400 and 600

Separate spreaders with 52.5 and 70 mm pole pitches

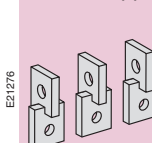
Tinned copper



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

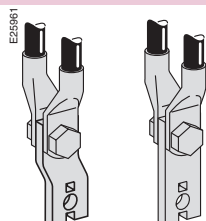
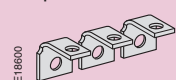
Edgewise terminal extension

Tinned copper



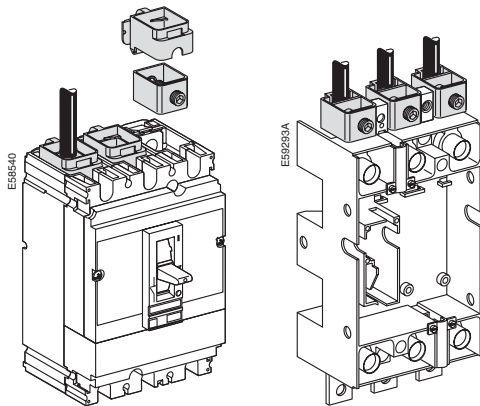
Right-angle terminal extensions

Tinned copper
Upstream side

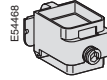


Close-up view of two cables with lugs.

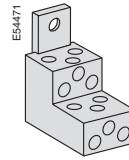
Connection of bare cables



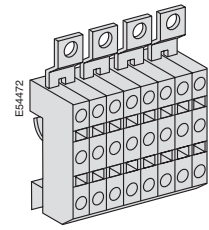
NS100 to 250



1-cable connector



Distribution connector



Polybloc distribution block



S

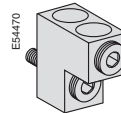
	1-cable connector	Steel ≤ 160A	Aluminium ≤ 250A	
L (mm)		20	20	
S (mm ²) Cu / Al		1.5 to 95 ⁽¹⁾	10...16 25...35	50...185 150 max. flex.
Tightening torque (Nm)		12	15 20	26
6-cable distribution connector (copper or aluminium)				
L (mm)		15 or 30		
S (mm ²) Cu / Al		1.5 to 6 ⁽¹⁾	8 to 35	
Tightening torque (Nm)		4	6	
Polybloc distribution block (6 or 9 cables)				
L (mm)		12		
S (mm ²) 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



S

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

Conductor materials and electrodynamic stresses

See page B-13.

Ties for flexible bars and cables

See page B-13.

Power connections for Compact NS100 to 630 (cont.)

Insulation of live parts

Fixed Compact NS, front connections

	NS100/250	NS400/630N/H	NS400/630L
U < 500 V	Interphase barriers or long terminal shields recommended. Insulated bars are mandatory.		Interphase barriers or long terminal shields recommended. Insulated bars are mandatory.
500 V ≤ U ≤ 600 V	Interphase barriers or long terminal shields are mandatory. Insulated bars are mandatory.	Interphase barriers or long terminal shields are mandatory. Insulated bars are mandatory.	Interphase barriers or long terminal shields are mandatory. Insulated bars are mandatory.
U > 600 V	Insulation kit and insulated bars are mandatory.	Insulation kit and insulated bars are mandatory.	Insulation kit and 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

	NS100/250	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

	NS100/250	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.

Power connections for Compact NS630b to 3200

Conductor materials and electrodynamic stresses

Compact circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors (flexible or rigid bars, cables). In the event of a short-circuit, thermal and electrodynamic stresses will be exerted on the conductors. They must therefore be correctly sized and maintained in place using supports.

Electrical connection points on all types of devices (switch-disconnectors, contactors, circuit breakers, etc.) should not be used for mechanical support.

Any partition between upstream and downstream connections of the device must be made of non-magnetic material.

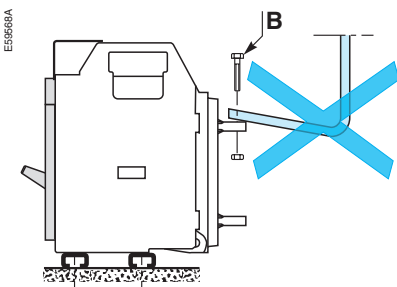
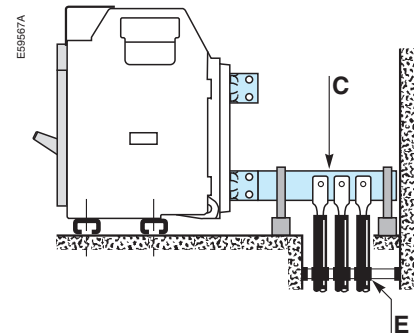
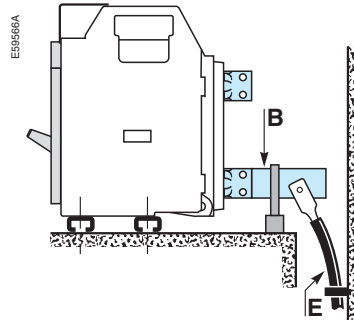
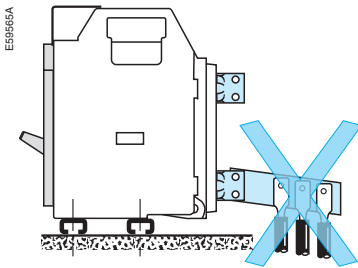
Ties for flexible bars and cables

The table below indicates the maximum distance between ties depending on the prospective short-circuit current.

The maximum distance between ties attached to the switchboard frame is 400 mm.

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

Note. For cables $\geq 50 \text{ mm}^2$, use 9 mm-wide ties.



Connection of bars

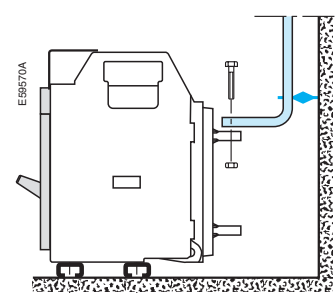
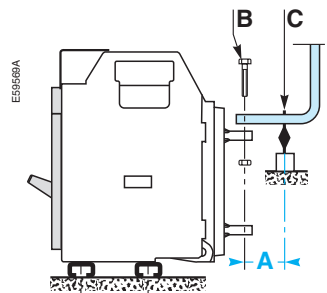
Bars must be adjusted to ensure correct positioning on the terminals before bolting (B).

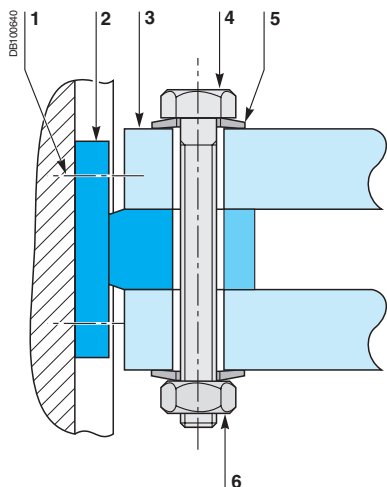
Bars must rest on a support firmly attached to the switchboard frame, such that the circuit-breaker terminals do not bear any weight (C).

Electrodynamic forces

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

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





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

Connections

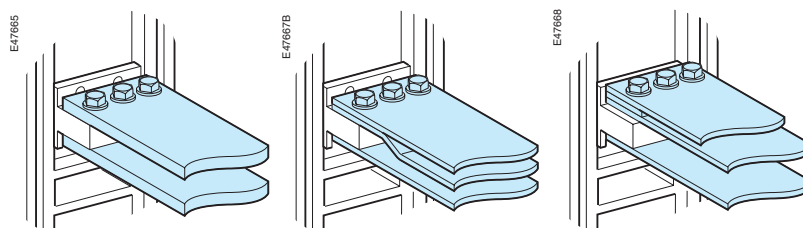
The quality of bar connections depends, among other things, on the tightening torques used for the nuts and bolts. Over-tightening may have the same consequences as under-tightening.

The correct tightening torques for the connection of bars to the circuit-breaker terminals are indicated in the table below.

The values below are for copper bars (Cu ETP-NFA51-100) and steel nuts and bolts (class 8.8).

The same values apply to AGS-T52 quality aluminium bars (French standard NFA 02-104 and American National Standard H-35-1).

Examples of bar connections

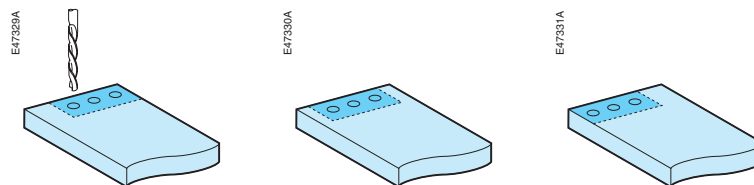


Tightening torque for bars

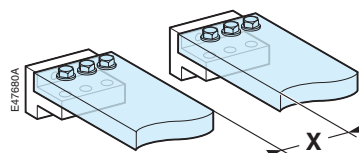
Rated diameter (mm)	Drilling (mm) diameter	Tightening torque (Nm) with flat or grower washers	Tightening torque (Nm) with contact or split washers
10	11	37.5	50

Bar drilling

Examples



Insulation distance

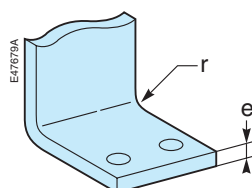


Dimensions (mm)

Utilisation voltage	X minimum
$U_i \leq 600$ V	8 mm
$U_i \leq 1000$ V	14 mm

Bar bending

Bars must be bent according to the table below. A tighter bend may cause cracks.



Dimensions (mm)

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

Sizing of bars

The following tables are based on the following assumptions:

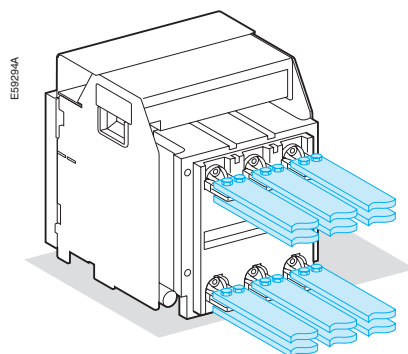
- maximum permissible temperature of bars is 100 °C
- Ti: temperature around the circuit breaker and its connections
- busbars made of copper and not painted.

Note.

The values presented in the tables are the result of trials and theoretical calculations on the basis of the assumptions mentioned above.

These tables are intended as an aid in designing connections, however, the actual values must be confirmed by tests on the installation.

Front or horizontal rear connections



Compact	Maximum service current	Ti: 40 °C		Ti: 50 °C		Ti: 60 °C	
		Number of bars		Number of bars		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	2b.80 x 5	2b.40 x 10	2b.80 x 5	2b.50 x 10	3b.80 x 5	2b.63 x 10
NS1600 / 1600b	1600	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.80 x 5	3b.50 x 10
NS2000	1800	3b.80 x 5	2b.63 x 10	3b.80 x 5	2b.63 x 10	3b.100 x 5	2b.80 x 10
NS2000	2000	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	3b.100 x 5	3b.63 x 10
NS2500	2200	3b.100 x 5	2b.80 x 10	3b.100 x 5	2b.80 x 10	4b.80 x 5	2b.100 x 10
NS2500	2500	4b.100 x 5	2b.100 x 10	4b.100 x 5	2b.100 x 10	4b.100 x 5	3b.80 x 10
NS3200	2800	4b.100 x 5	3b.80 x 10	4b.100 x 5	3b.80 x 10	5b.100 x 5	3b.100 x 10
NS3200	3000	5b.100 x 5	3b.80 x 10	6b.100 x 5	3b.100 x 10	8b.100 x 5	4b.80 x 10
NS3200	3200	6b.100 x 5	3b.100 x 10	8b.100 x 5	3b.100 x 10		4b.100 x 10

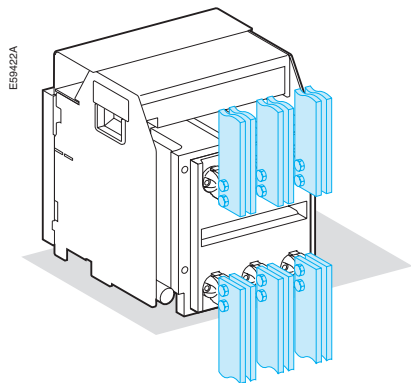
Note.

With Compact NS630b to NS1600, it is recommended to use 50 mm wideness bars (see "Recommended busbars drilling").

Power connections for Compact NS630b to 3200

Sizing of bars

Vertical rear connections

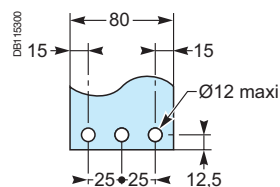
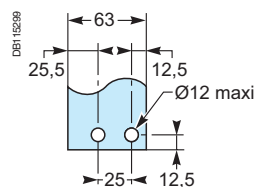
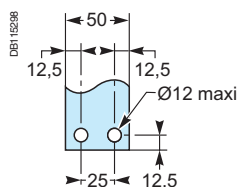
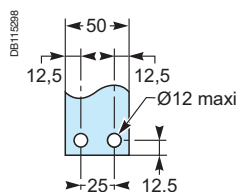


Compact	Maximum service current	Ti: 40 °C Number of bars		Ti: 50 °C Number of bars		Ti: 60 °C Number of bars	
		5 mm thick	10 mm thick	5 mm thick	10 mm thick	5 mm thick	10 mm thick
NS630b	400	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10	2b.30 x 5	1b.30 x 10
NS630b	630	2b.40 x 5	1b.40 x 10	2b.40 x 5	1b.40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

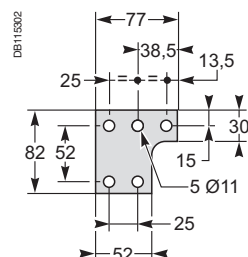
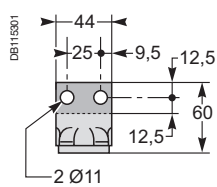
Power connections for Compact NS630b to 1600

Recommended drilling dimensions

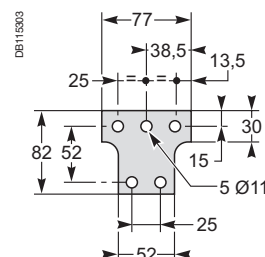
Rear connection



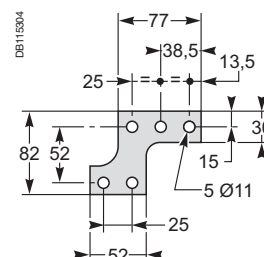
Middle left or middle right spreader for 4P



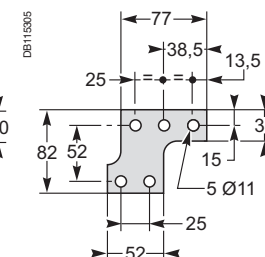
Middle spreader for 3P



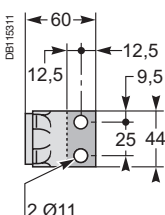
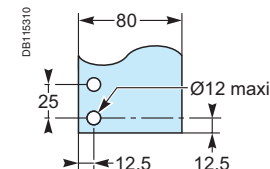
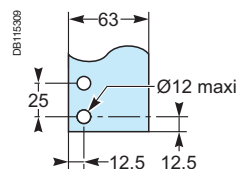
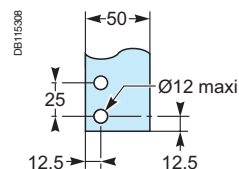
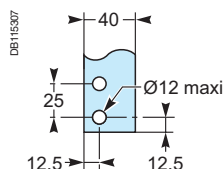
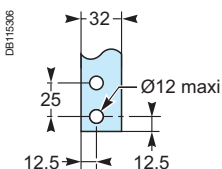
Left or right spreader for 4P



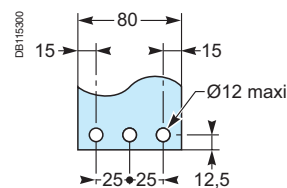
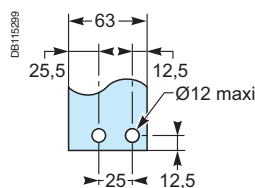
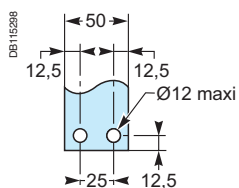
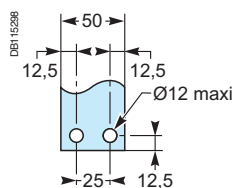
Left or right spreader for 3P



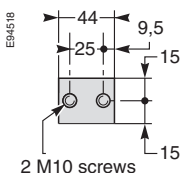
Vertical rear connection



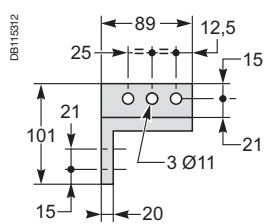
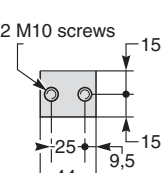
Front connection



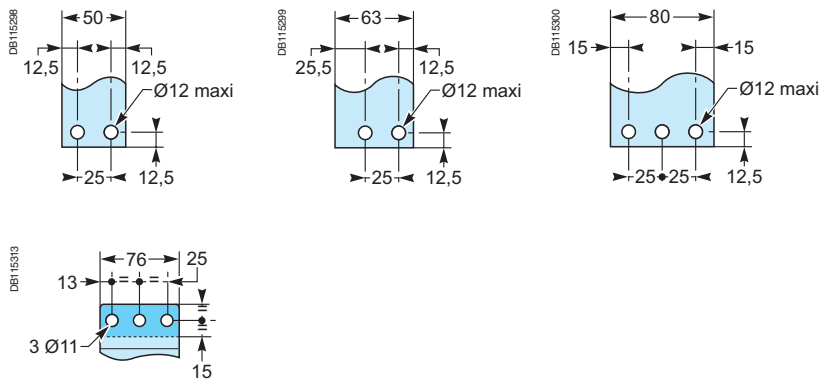
Top terminal



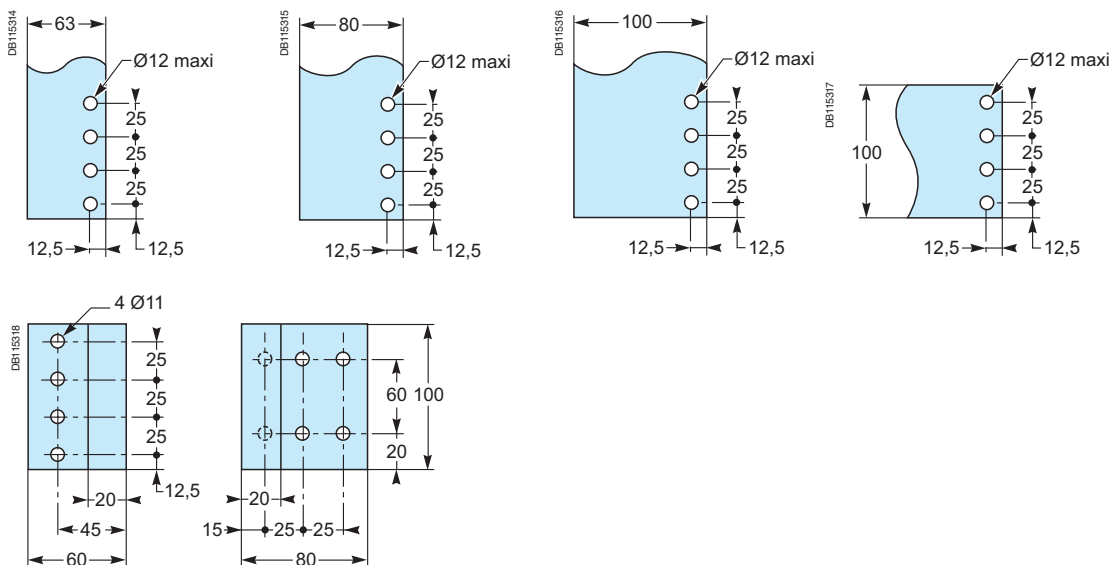
Bottom terminal



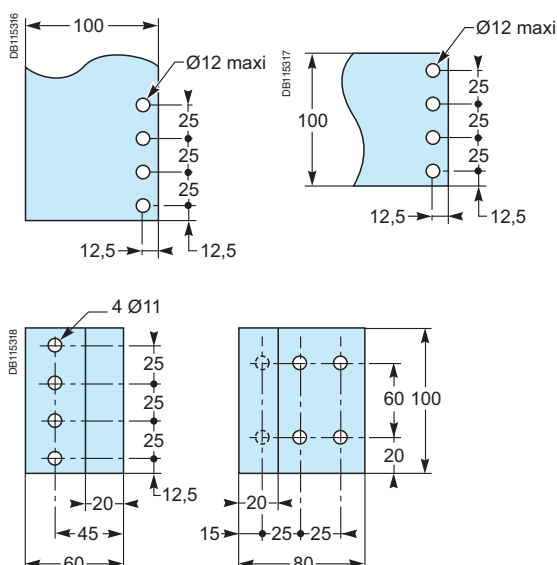
Front connection (NS1600b to 2500)



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 valid 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 I_r values corresponding to the thermal setting on the device, corrected as indicated 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

Temperature derating

Compact NS devices equipped with electronic trip units

The values opposite are valid for **fixed** circuit breakers equipped with one of the following modules:

- Vigü 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 Vigü module or an insulation-monitoring module, the coefficients in the table below must be applied.

Circuit breaker	Trip unit	Coeff.
NS100	STR22SE/GE 40 to 100	1
NS160	STR22SE/GE 40 to 160	1
NS250	STR22SE/GE 100 and 160	1
NS250	STR22SE/GE 250	0.86

The values opposite are valid 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 Vigü 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 Vigü 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.

NS100-160	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
In: 40 to 160 A	no derating						
I _r max	1	1	1	1	1	1	1
NS250	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
In: 100 to 160 A	no derating						
I _r max	1	1	1	1	1	1	1
In: 250 A	250	250	250	237.5	237.5	225	225
I _r 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.

NS400	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
Fixed	In: 400 A	400	400	400	390	380	370
	I _o /I _r max	1/1	1/1	1/1	1/0.98	1/0.95	1/0.93
Plug-in / withdrawable	In: 400	400	390	380	370	360	350
	I _o /I _r max	1/1	1/0.98	1/0.95	1/0.93	1/0.9	1/0.88
NS630	40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
Fixed	In: 630 A	630	615	600	585	570	550
	I _o /I _r max	1/1	1/0.98	1/0.95	1/0.93	1/0.9	1/0.88
Plug-in / withdrawable	In: 570 A	570	550	535	520	505	490
	I _o /I _r max	1/0.9	1/0.88	1/0.85	1/0.83	1/0.8	0.8/0.98

Compact NS630b to NS1600 ⁽¹⁾

The table below indicates the maximum rated-current value for each type of connection, depending on the ambient temperature. For mixed connections, use the same derating values as for horizontal connections.

Version	Fixed device							Vertical rear						
Connection	Front or horizontal rear													
temp. T _i ⁽²⁾	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/H/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/H/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/H/L 1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
NS1250 N/H	1250	1250	1250	1250	1250	1240	1090	1250	1250	1250	1250	1250	1250	1180
NS1600 N/H	1600	1600	1560	1510	1470	1420	1360	1600	1600	1600	1600	1600	1510	1460

Version	Withdrawable device							Vertical rear						
Connection	Front or horizontal rear													
temp. T _i ⁽²⁾	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS630b N/H/L	630	630	630	630	630	630	630	630	630	630	630	630	630	630
NS800 N/H/L	800	800	800	800	800	800	800	800	800	800	800	800	800	800
NS1000 N/H/L 1000	1000	1000	1000	1000	1000	920	1000	1000	1000	1000	1000	1000	990	990
NS1250 N/H	1250	1250	1250	1250	1250	1170	1000	1250	1250	1250	1250	1250	1250	1090
NS1600 N/H	1600	1600	1520	1480	1430	1330	1160	1600	1600	1600	1560	1510	1420	1250

Compact NS1600b to 3200

Version	Fixed device							Vertical rear						
Connection	Front or horizontal rear													
temp. T _i ⁽²⁾	40	45	50	55	60	65	70	40	45	50	55	60	65	70
NS1600b N/H	1600	1600	1600	1600	1500	1450	1400	1600	1600	1600	1600	1600	1550	1500
NS2000 N/H	2000	2000	2000	2000	1900	1800	1700	2000	2000	2000	2000	2000	1900	1800
NS2500 N/H	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
NS3200 N/H	-	-	-	-	-	-	-	3200	3200	3200	3180	3080	2970	2860

⁽¹⁾ For a circuit breaker mounted in horizontal position, the derating to be applied is equivalent to that of a front or horizontal rear connected circuit breaker.

⁽²⁾ T_i: temperature around the circuit breaker and its connections.

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

3/4 poles	Fixed device			Additional modules	
	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

3/4 poles	Fixed device			Additional modules				
	Rat. (A)	R/pole	P/pole	Vigi (N, L3)	Vigi (L1, L2)	With-drawable module	Ammeter module	Transfo. module
NS100	16	11.42	2.92	0	0	0	0	0
	25	6.42	4.01	0	0	0.1	0	0
	32	3.94	4.03	0.06	0.03	0.15	0.1	0.1
	40	3.42	5.47	0.10	0.05	0.2	0.1	0.1
	50	1.64	4.11	0.15	0.08	0.3	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
NS160	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
NS250	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

3 poles	Fixed device			Additional modules				
	Rat. (A)	R/pole	P/pole	Vigi (N, L3)	Vigi (L1, L2)	With-drawable module	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					
NS100	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
NS160	150	0.38	8.55	1.35	0.68	2.6	0.45	0.45
NS250	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

1/2 poles	Fixed device		
	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
	125	0.63	9.84
NS160N/H	125	0.63	9.84
	160	0.48	12.29

The values indicated in the tables opposite are typical values.

Power dissipated per pole (P/pole) in Watts (W)

The value indicated in the table is the power dissipated at I_N , 50/60 Hz, for a three-pole or four-pole circuit breaker (these values can be higher than the power calculated on the basis of the pole resistance). Measurement and calculation of the dissipated power are carried out in compliance with the recommendations of Annex G of standard IEC 60947-2.

Resistance per pole (R/pole) in milliohms (mΩ)

The value of the resistance per pole is provided as a general indication for a new device.

The value of the contact resistance must be determined on the basis of the measured voltage drop, in accordance with the manufacturer's test procedure (expert card ABT no. FE 05e).

Note: this measurement is not sufficient to determine the quality of the contacts, i.e. the capacity of the circuit breaker to carry its rated current.

Compact NS100 to NS630

3/4 poles	Rat. (A)	Fixed device		Additional modules				
		R/pole	P/pole	Vigi (N, L3)	Vigi (L1, L2)	With-drawable module	Ammeter module	Transfo. module
NS100	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
NS160	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
NS250	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
NS400	400	0.12	19.2	3.2	1.6	9.6	2.4	2.4
NS630	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

3/4 poles	Rat. (A)	Fixed device		Additional modules	
		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		
	N/H	L	LB	N/H	L	LB
NS630b N/H/L	30	40	45	0.026	0.039	0.056
NS800 N/H/L	45	50	56	0.026	0.039	0.056
NS1000 N/H/L	65	70	-	0.026	0.039	-
NS1250 N/H	130	-	-	0.026	-	-
NS1600 N/H	220	-	-	0.026	-	-

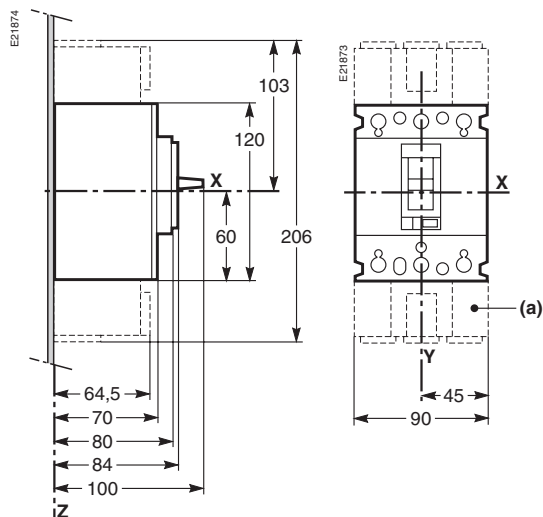
Version	Withdrawable device					
	Dissipated power			Input/output resistance		
	N/H	L	LB	N/H	L	LB
NS630b N/H/L	55	50	60	0.038	0.050	0.065
NS800 N/H/L	90	60	77	0.038	0.050	0.065
NS1000 N/H/L	150	80	-	0.038	0.050	-
NS1250 N/H	250	-	-	0.036	-	-
NS1600 N/H	460	-	-	0.036	-	-

Compact NS1600b to 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	680	0.008

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	Compact NSA160	C-5
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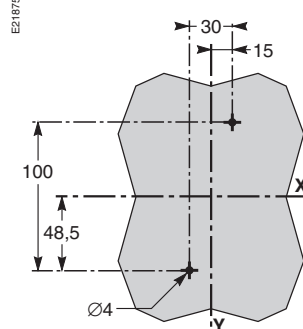
Dimensions



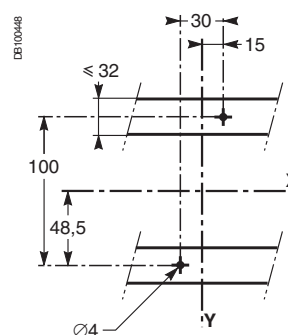
(a) long terminal shields

Mounting

On backplate

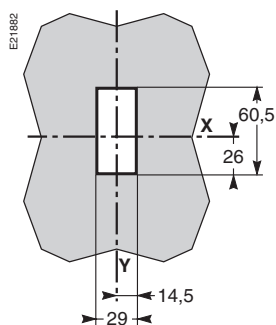
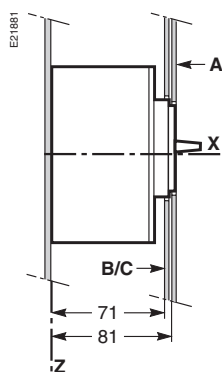


On rails

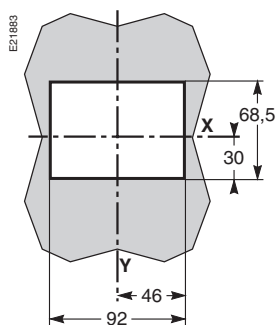


Front-panel cutouts

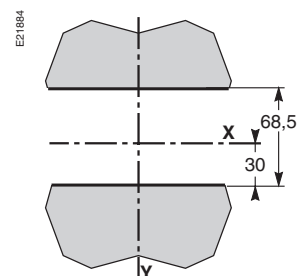
Cutout A



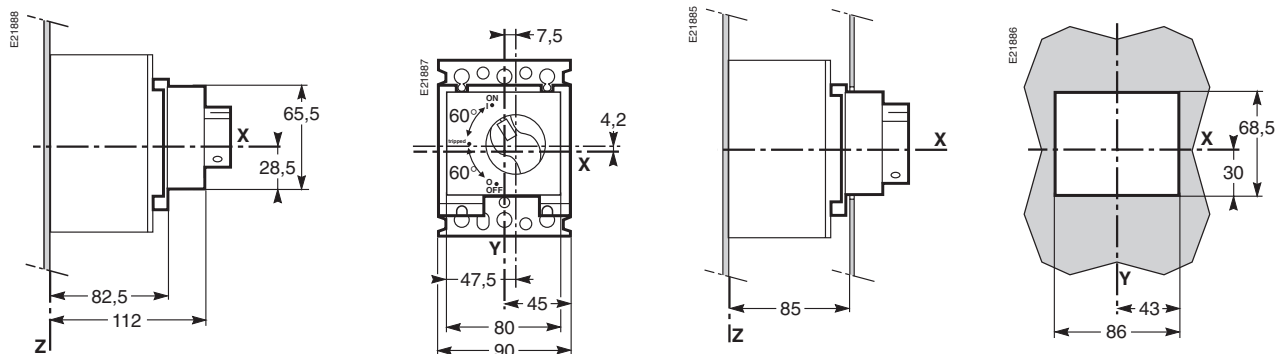
Cutout B



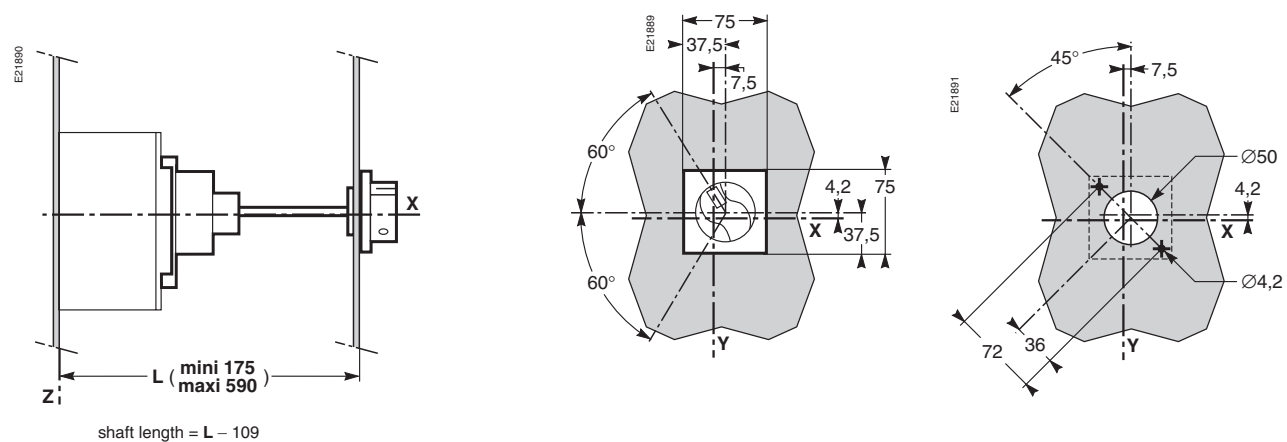
Cutout C



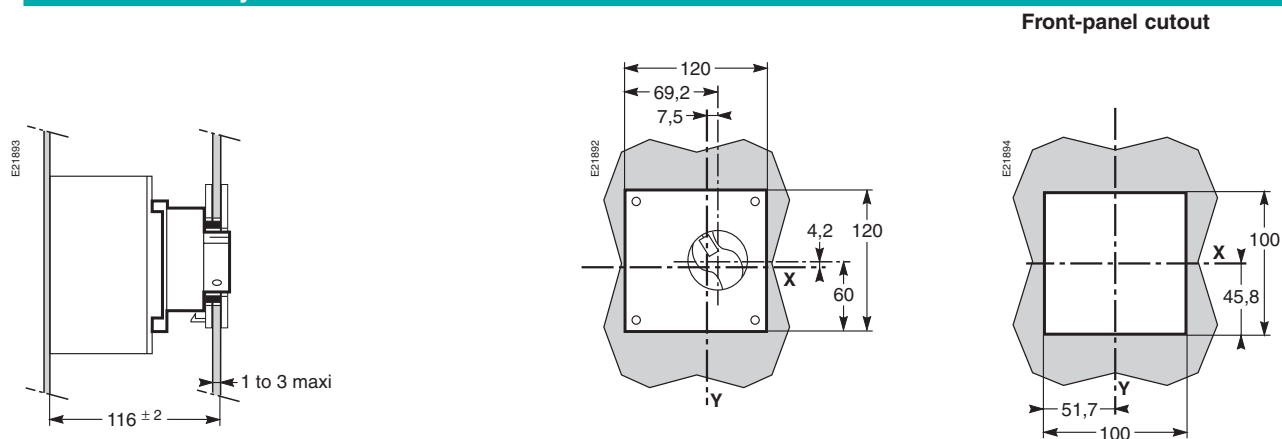
Standard direct rotary handle



Extended rotary handle

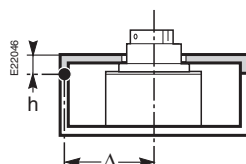


MCC direct rotary handle



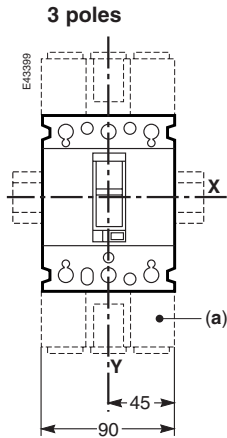
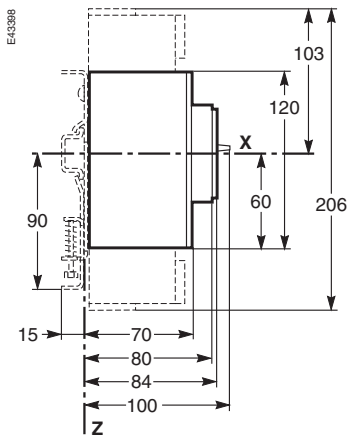
Note.

Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.

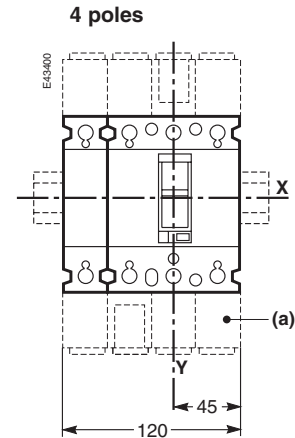


Dimensions

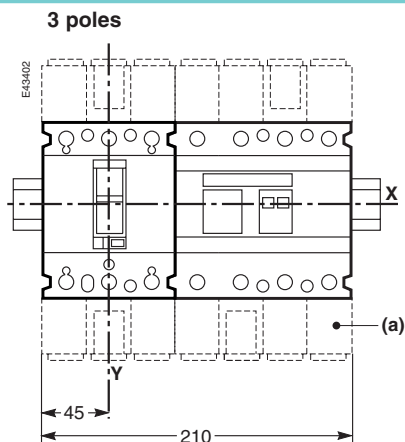
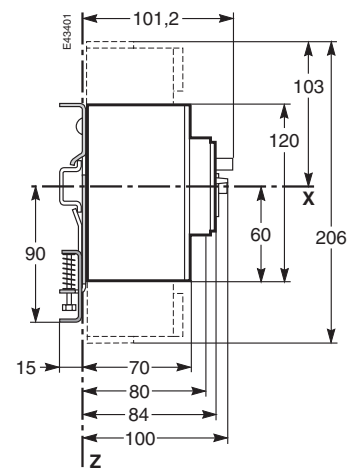
Compact NSC100



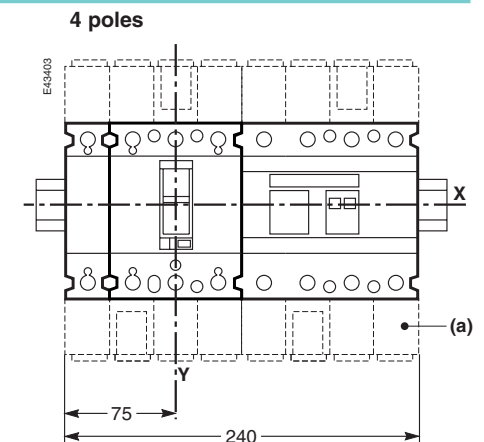
(a) long terminal shields



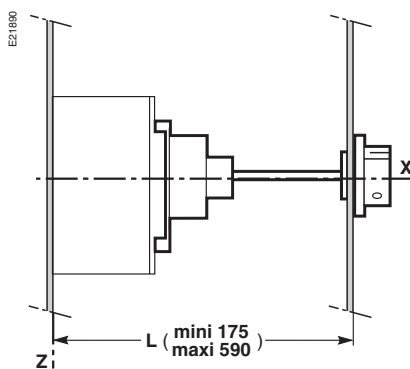
Vigicompact NSC



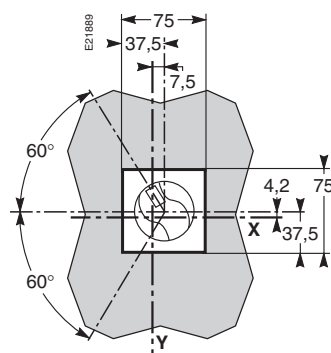
(a) long terminal shields.



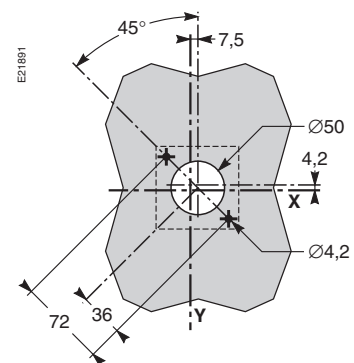
Extended rotary handle



shaft length = $L - 109$



Front-panel cutout

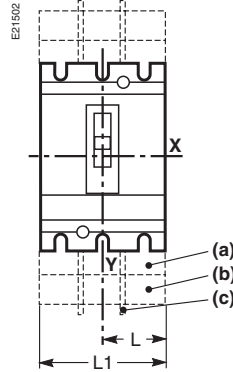
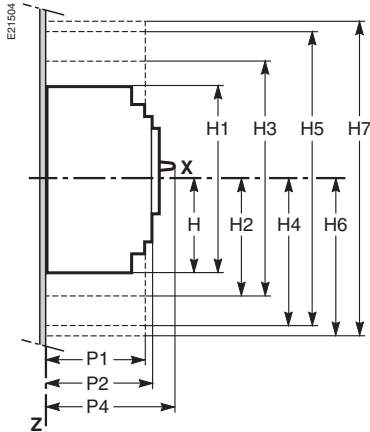


Note.
Centre line X indicates the centre of the mounting rail.

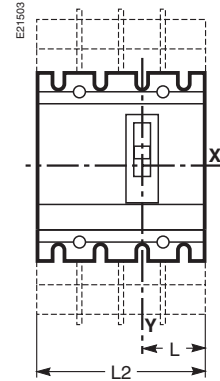
Dimensions

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) interphase barriers.

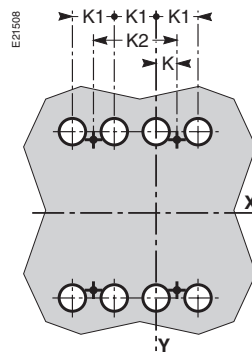
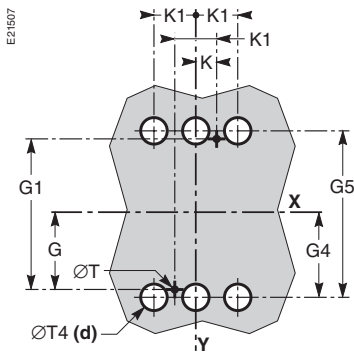


Mounting

On backplate

2 poles or 3 poles

4 poles

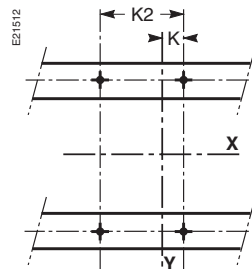
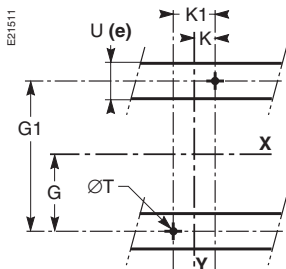


(d) for rear connection only. For two-pole circuit breakers,
the centre hole is not necessary.

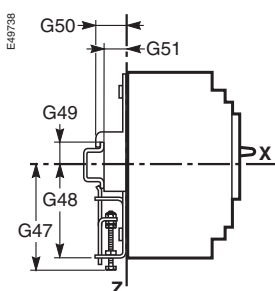
On rails

2 poles or 3 poles

4 poles

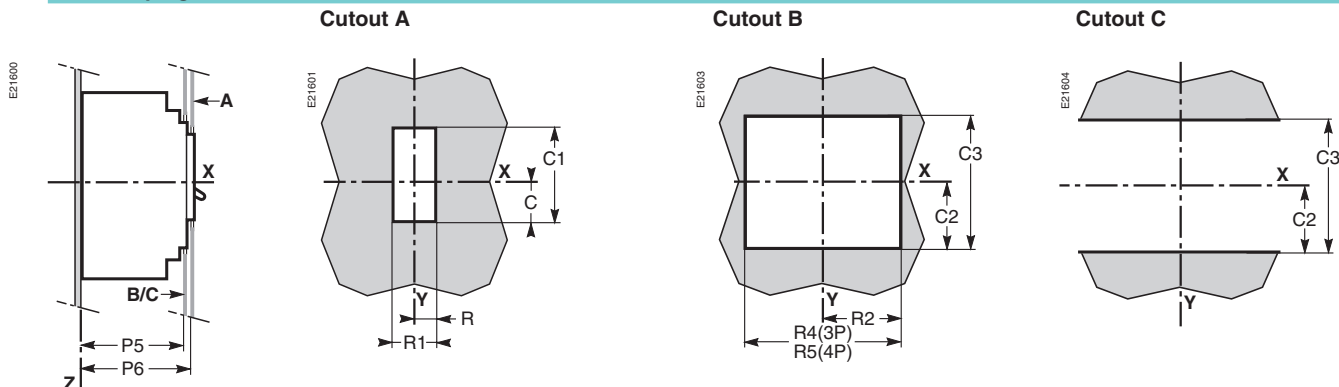


On DIN rail with adapter plate



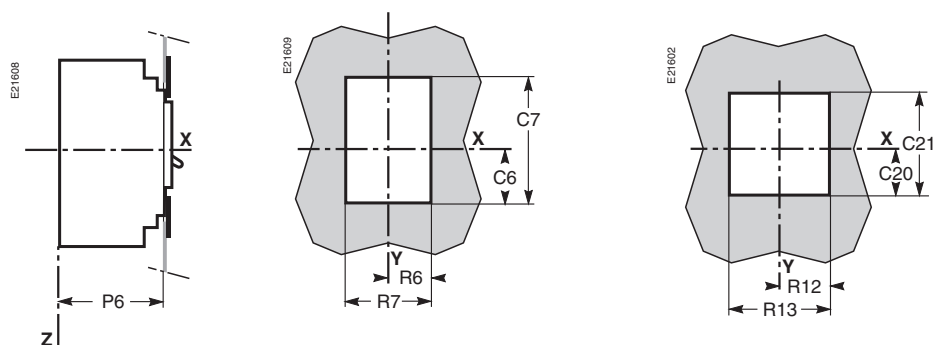
Front-panel cutouts

Fixed or plug-in circuit breaker



With escutcheon

With toggle cover



Dimensions (mm)

Type	C	C1	C2	C3	C6	C7	C20	C21	G	G1	G4
NS100/160/250	29	76	54	108	43	104	34	86	62.5	125	70
NS400/630	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
NS100/160/250	140	95	75	13.5	23	17.5	80.5	161	94	188	160.5
NS400/630	227						127.5	255	142.5	285	240

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

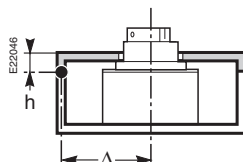
Type	P4	P5	P6	R	R1	R2	R4	R5	R6	R7	R12
NS100/160/250	111 ⁽¹⁾	83	88	14.5	29	54	108	143	29	58	43
NS400/630	168	107	112	31.5	63	71.5	143	188	46.5	93	63

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

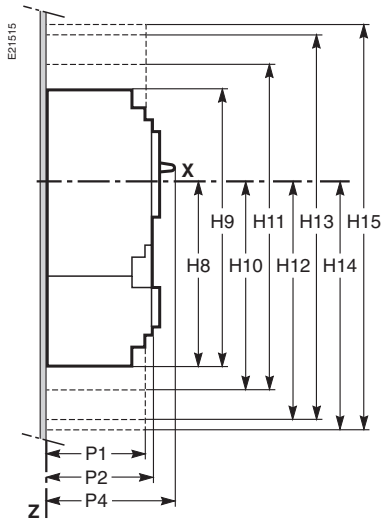
Type	R13	ØT	ØT4	U
NS100/160/250	86	6	22	≤ 32
NS400/630	126	6	32	≤ 32

Note.

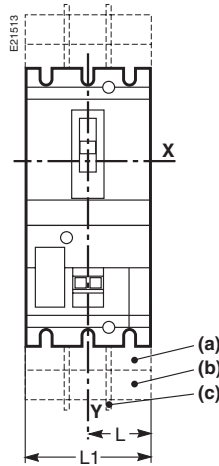
Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.



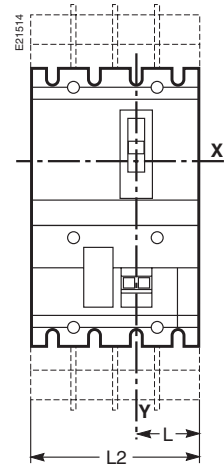
Dimensions



2 poles or 3 poles



4 poles

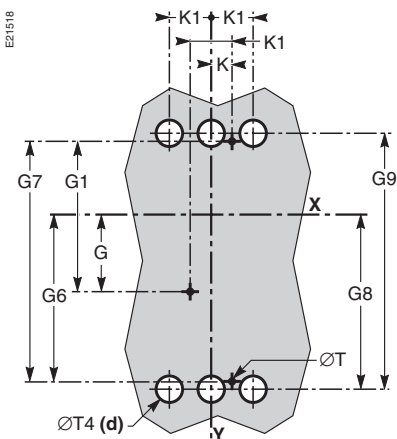


(a) short terminal shields.
(b) long terminal shields.
(c) interphase barriers.

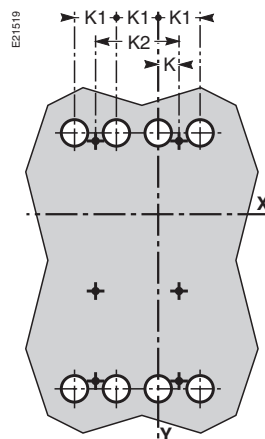
Mounting

On backplate

2 poles or 3 poles



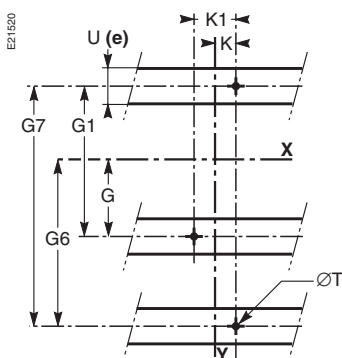
4 poles



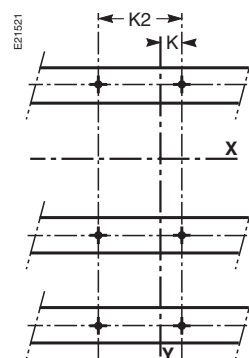
(d) for rear connection only. For two-pole circuit breakers, the centre hole is not necessary.

On rails

2 poles or 3 poles

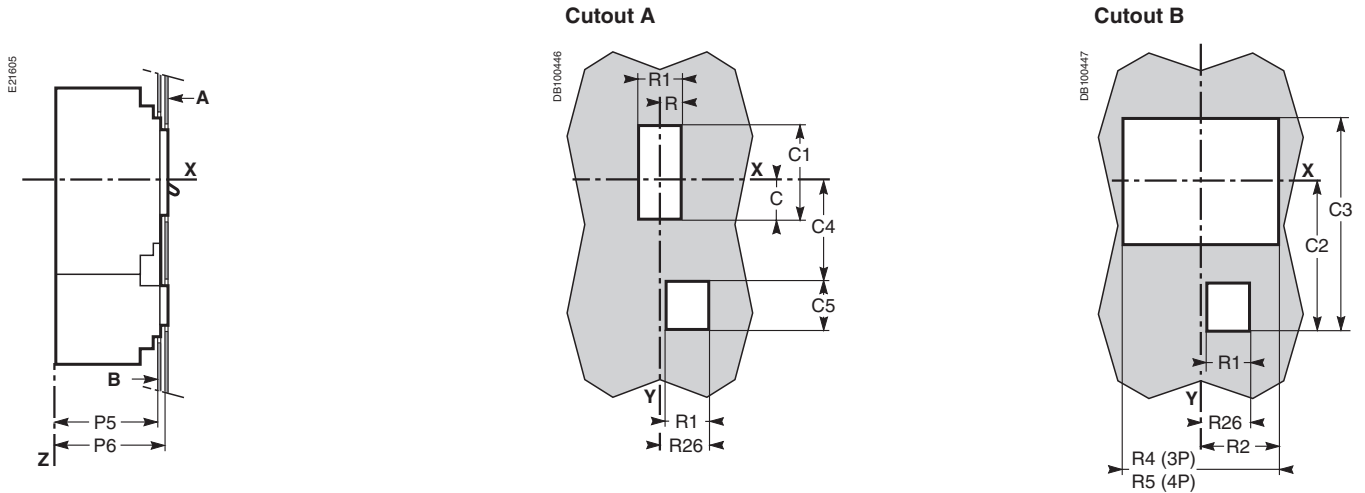


4 poles

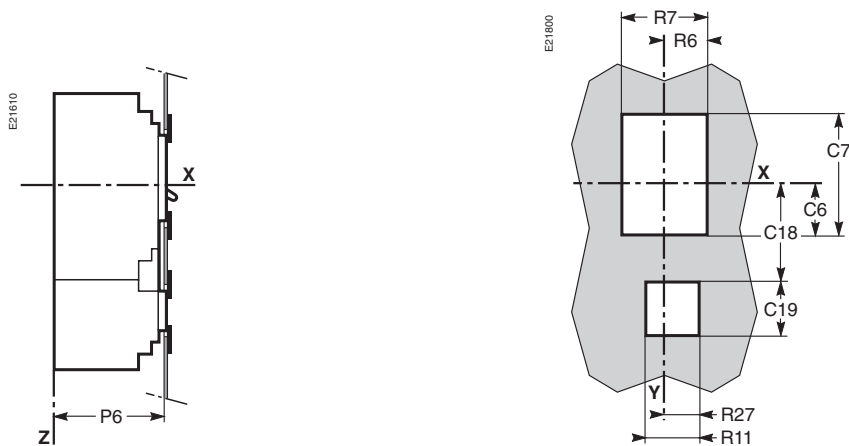


Front-panel cutouts

Fixed or plug-in circuit breaker



With escutcheons



Dimensions (mm)

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

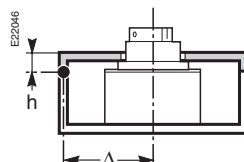
Type	H8	H9	H10	H11	H12	H13	H14	H15	K	K1	K2	L	L1	L2	P1	P2	P4	P5
NS100/160/250	155.5	236	169	263	235.5	396	253.5	432	17.5	35	70	52.5	105	140	81	86	111 ⁽¹⁾	83
NS400/630	227.5	355	242.5	385	340	580	337	574	22.5	45	90	70	140	185	95.5	110	168	107

⁽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
NS100/160/250	88	14.5	29	54	108	143	29	58	58	43	86	14.5	29	6	22	≤ 32
NS400/630	112	31.5	29	71.5	143	188	46.5	93	58	63	126	32	47	6	32	≤ 32

Note.

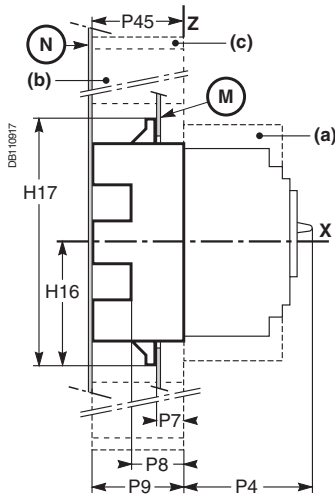
Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.



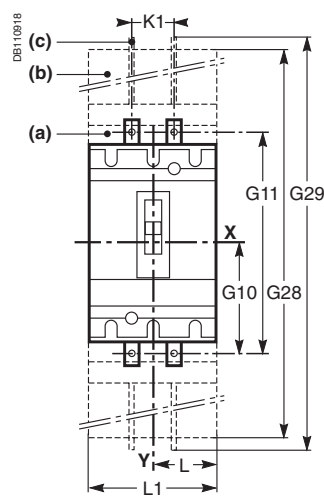
Compact NS100 to 630 (plug-in and withdrawable versions)

Dimensions

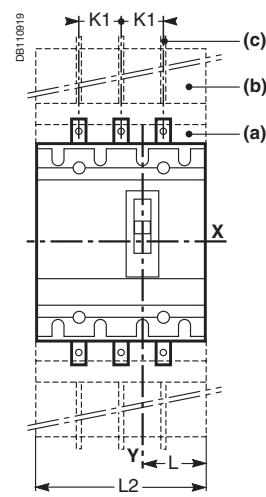
Plug-in base



2 poles or 3 poles

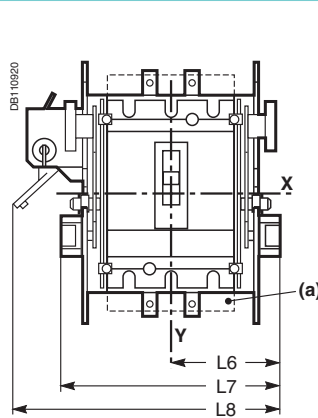
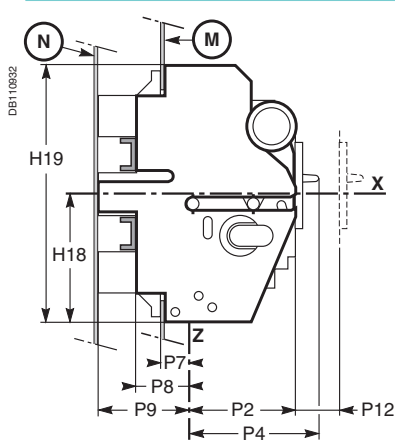


4 poles

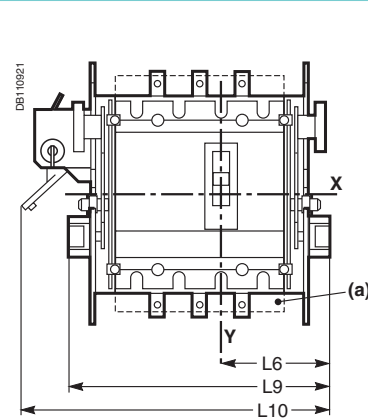


Chassis

2 poles or 3 poles



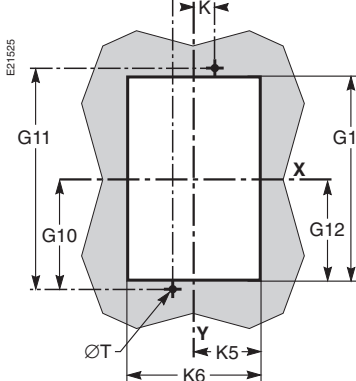
4 poles



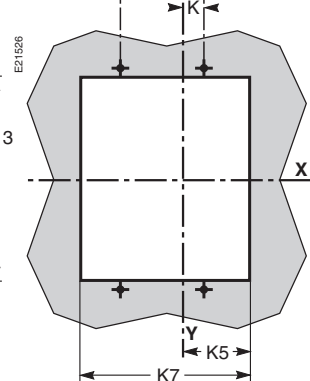
Mounting

Through panel (M) (plug-in base)

2P, 3P

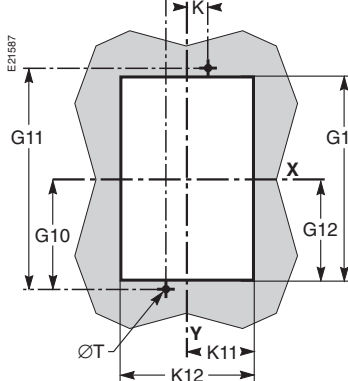


4P

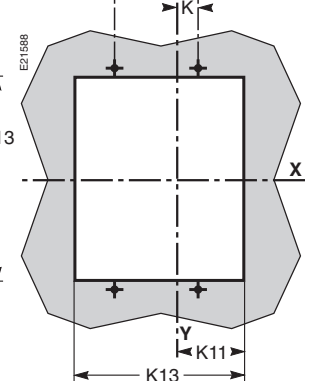


Through panel (M) (chassis)

2P, 3P

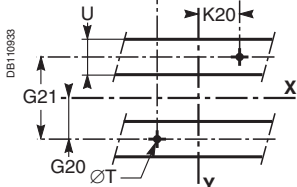


4P

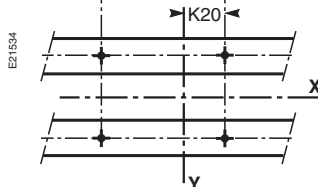


On rails (plug-in base or chassis)

2P, 3P



4P



(a) Short terminal shields for circuit breaker are mandatory.
(b) Long terminal shields for plug-in base.
(c) Interphase barriers.

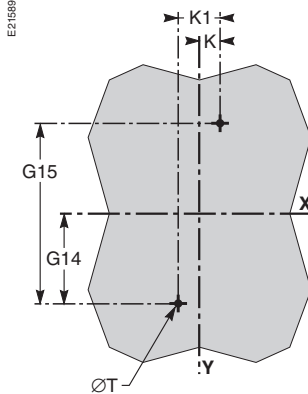
Note.

Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.

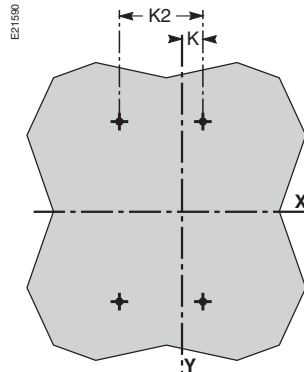
On backplate (N) (plug-in base or chassis)

Front connection (insulating screen is mandatory between the backplate and the base, supplied with the base)

2P, 3P

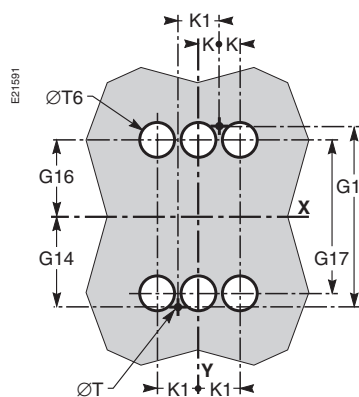


4P

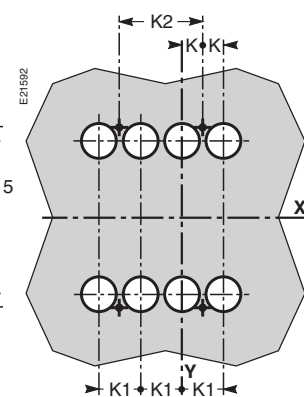


Interior rear connection

2P, 3P

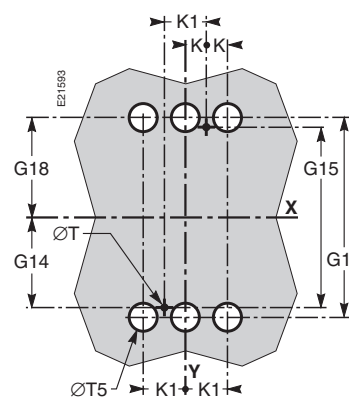


4P

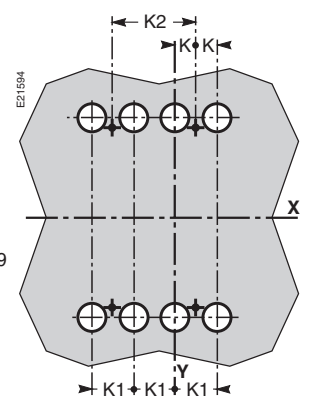


Exterior rear connection

2P, 3P



4P

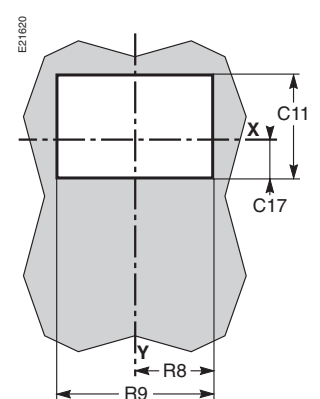
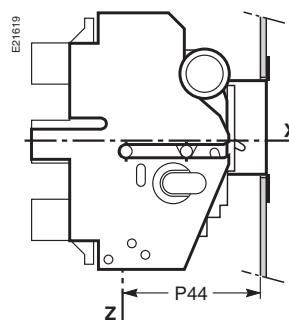


Front-panel cutouts

Plug-in base

Chassis with protection collar and escutcheons

See fixed or plug-in circuit breaker, page C-15.



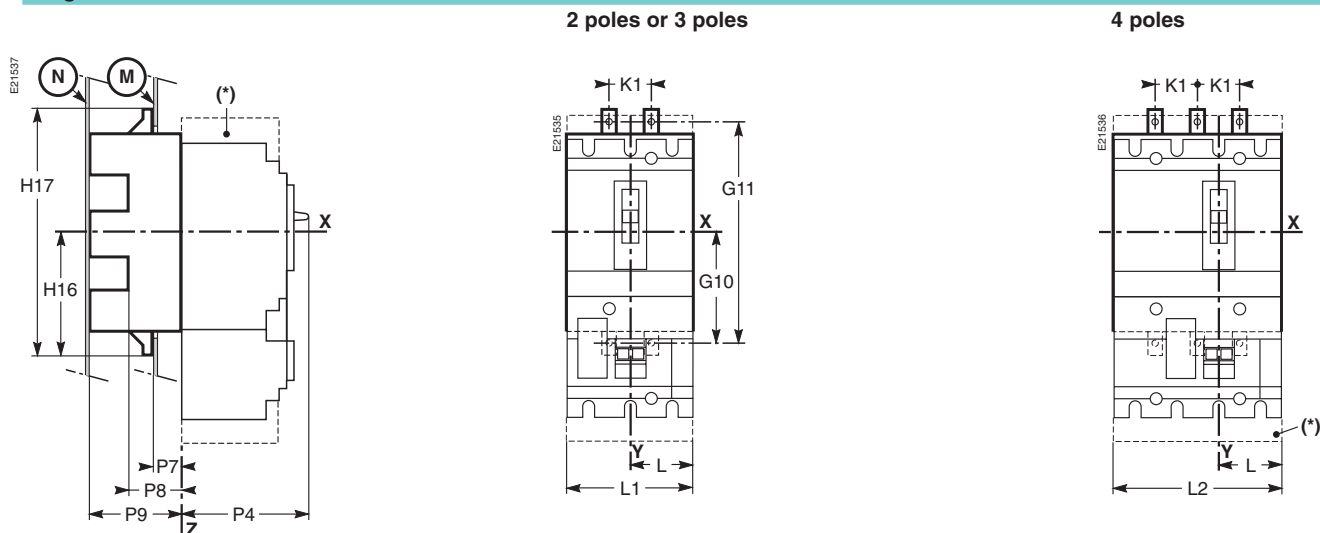
Dimensions (mm)

Type	C11	C17	G10	G11	G12	G13	G14	G15	G16	G17	G18	G19	G20	G21	G22	G23	G24
NS100/160/250	103	42.5	95	190	87	174	77.5	155	66	132	82	164	37.5	75	111	222	190
NS400/630	155	56	150	300	137	274	125	250	101	202	126	252	75	150	170.5	341	283.5
Type	G25	G26	G27	G28	G29	H16	H17	H18	H19	K	K1	K2	K5	K6	K7	K11	K12
NS100/160/250	380	208	416	380.6	416	102.5	205	103.5	210	17.5	35	70	54.5	109	144	74	148
NS400/630	567	318.5	637	566.1	637	157.5	315	140	280	22.5	45	90	71.5	143	188	91.5	183
Type	K13	K20	K21	K22	L	L1	L2	L6	L7	L8	L9	L10	P2	P4	P7	P8	P9
NS100/160/250	183	35	70	105	52.5	105	140	92.5	185	216	220	251	86	111 ⁽¹⁾	27	45	75
NS400/630	228	50	100	145	70	140	185	110	220	250	265	295	110	168	27	45	100
Type	P10	P12	P44	P45	R8	R9	U	ØT	ØT5	ØT6							
NS100/160/250	64	32	123	76.2	74	148	≤ 32	6	24	30							
NS400/630	86	32	147	99.3	90	180	≤ 32	6	33	33							

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

Dimensions

Plug-in base



Chassis

See withdrawable Compact, page C-10.

Mounting

Through panel (M) (plug-in base)

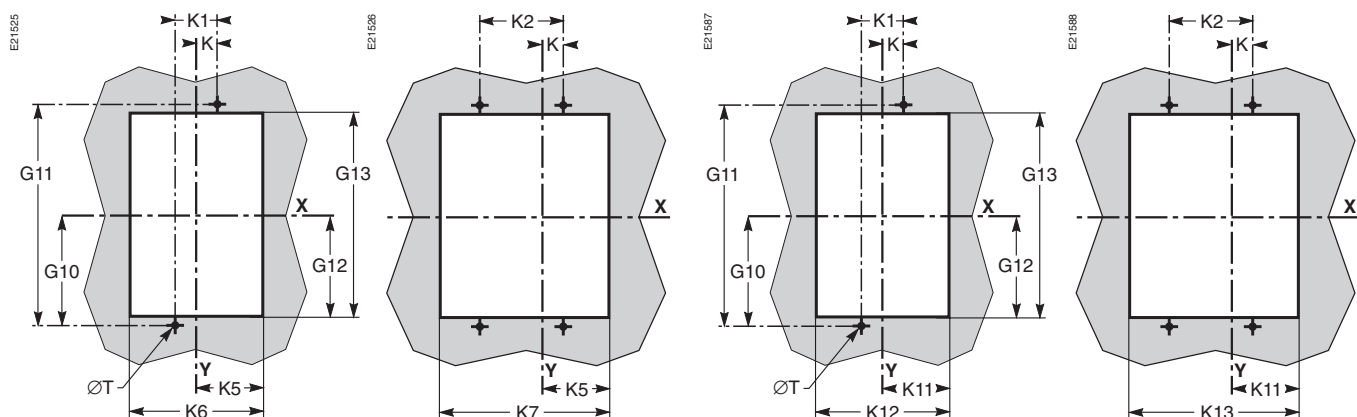
2P, 3P

4P

Through panel (M) (chassis)

2P, 3P

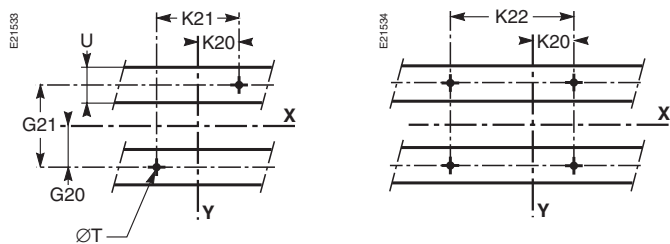
4P



On rails (plug-in base or chassis)

2P, 3P

4P



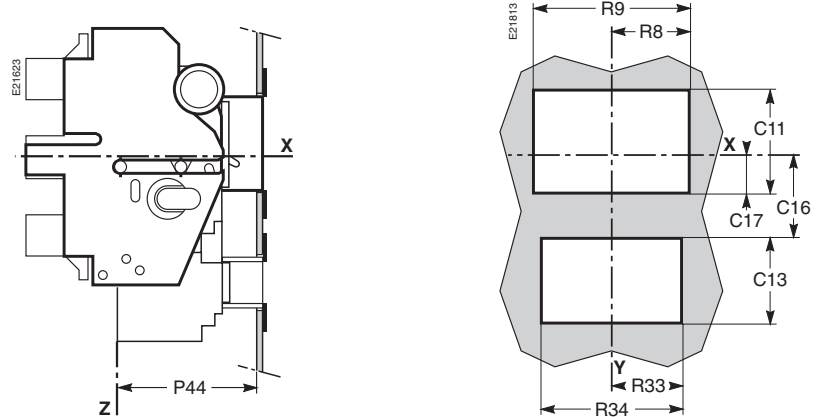
(*) short terminal shields are mandatory

Front-panel cutouts

Plug-in base

Chassis with protection collar and escutcheons

See fixed or plug-in circuit breaker, page C-9.



Dimensions (mm)

Type	C11	C13	C16	C17	G10	G11	G12	G13	G20	G21	H16
NS100/160/250	103	84	55	42.5	95	190	87	174	37.5	75	102.5
NS400/630	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
NS100/160/250	205	17.5	35	70	54.5	109	144	74	148	183	35
NS400/630	315	22.5	45	90	71.5	143	188	91.5	183	228	50

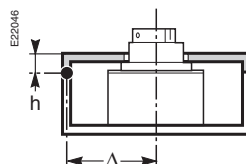
Type	K21	K22	L	L1	L2	P4	P7	P8	P9	P44	R8
NS100/160/250	70	105	52.5	105	140	111 ⁽¹⁾	27	45	75	123	74
NS400/630	100	145	70	140	185	168	27	45	100	147	90

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

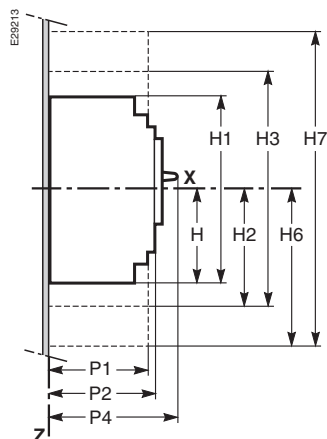
Type	R9	R33	R34	ØT	U
NS100/160/250	148	74	148	6	≤ 32
NS400/630	180	91.5	148	6	≤ 32

Note.

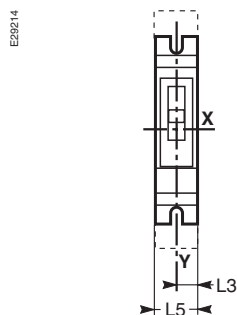
Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.



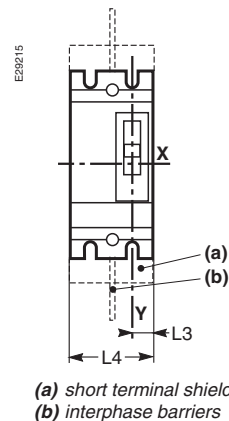
Dimensions



1 pole



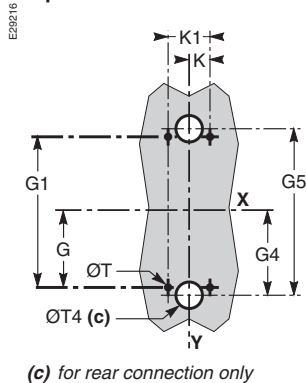
2 poles



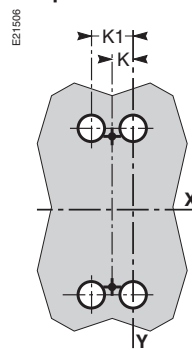
Mounting

On backplate

1 pole

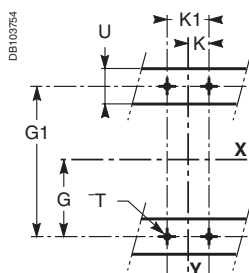


2 poles

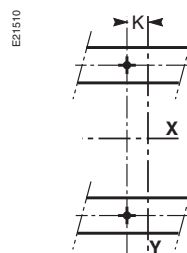


On rails

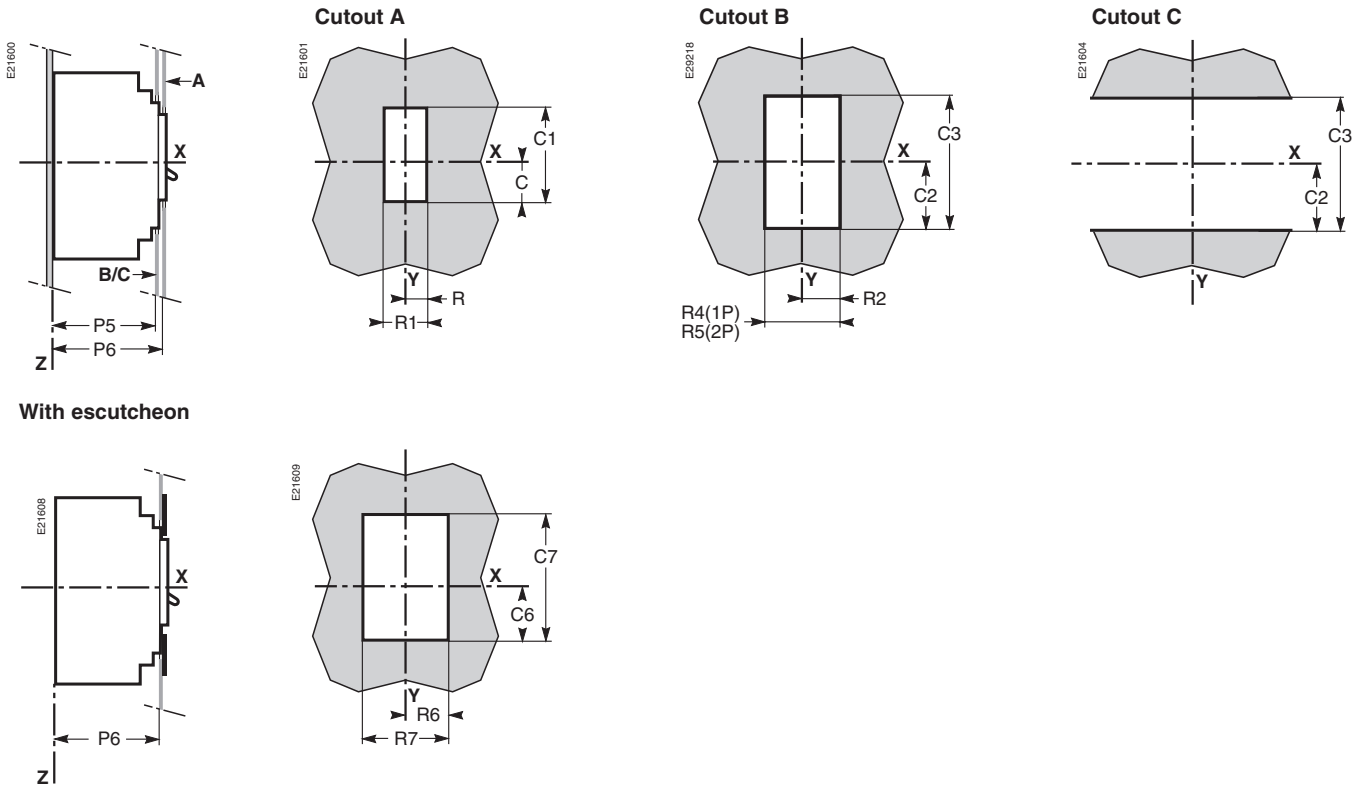
1 pole



2 poles



Front-panel cutout



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

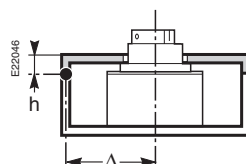
Type	H1	H2	H3	H4	H6	H7	K	K1	L3	L4	L5
NS100/160/250	161	94	188	160.5	178.5	357	17.5	35	17.5	70	35

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
NS100/160/250	58	6	22	≤ 32

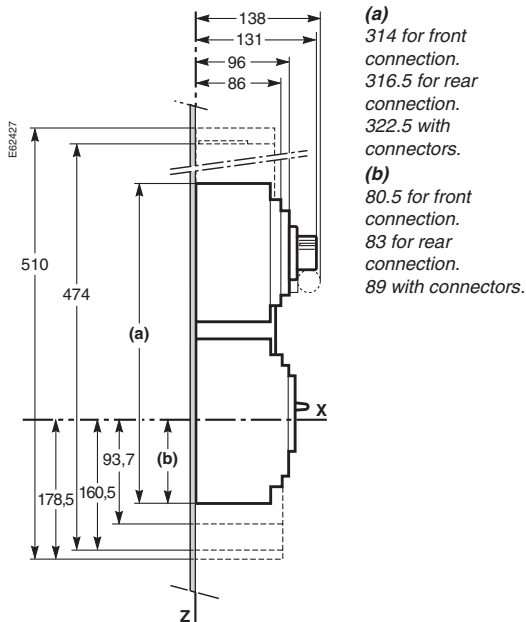
Note.

Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.

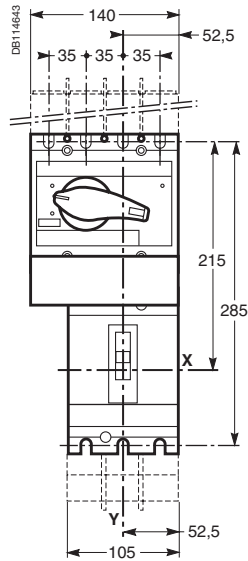


Visu function for Compact NS100 to 630 (combination with Interpact INV)

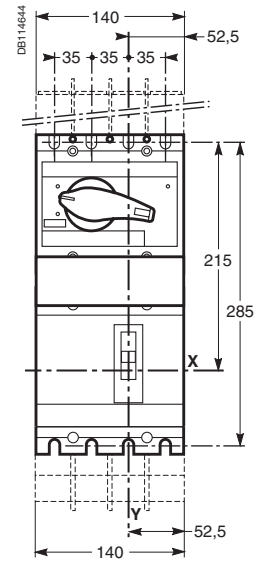
Fixed Compact NS100 to 250 with Visu function Interpact INV100 to 250



3 poles

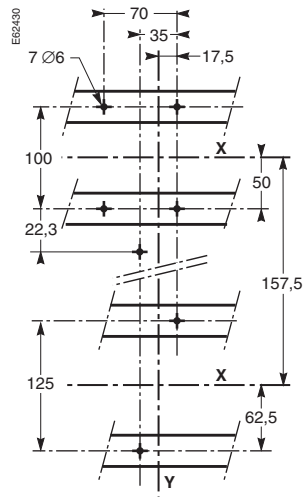


4 poles

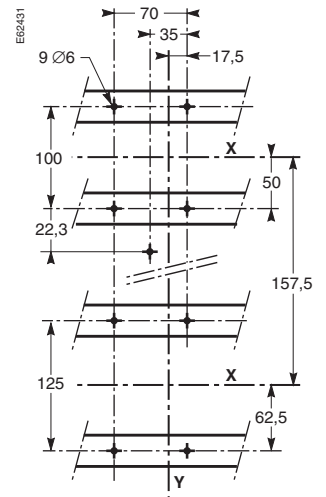


Mounting on rails and backplate

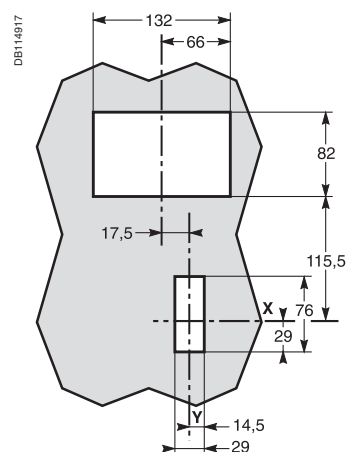
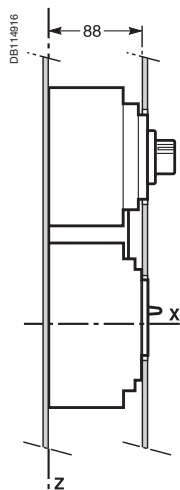
3 poles



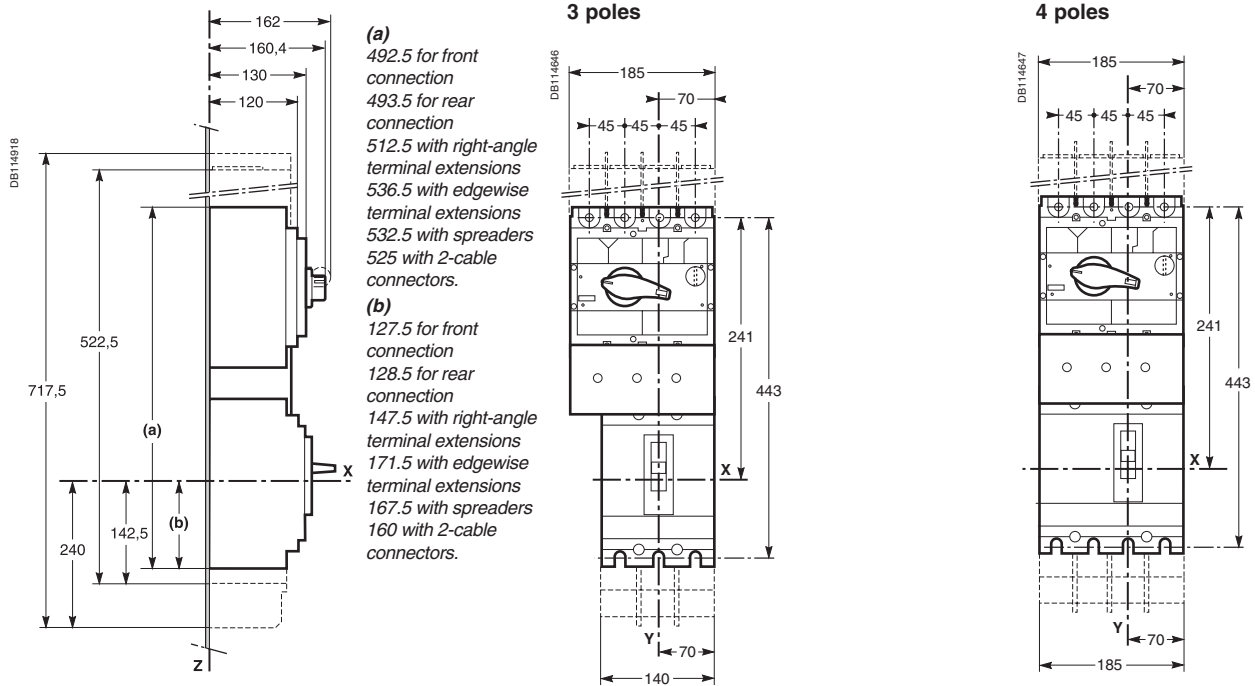
4 poles



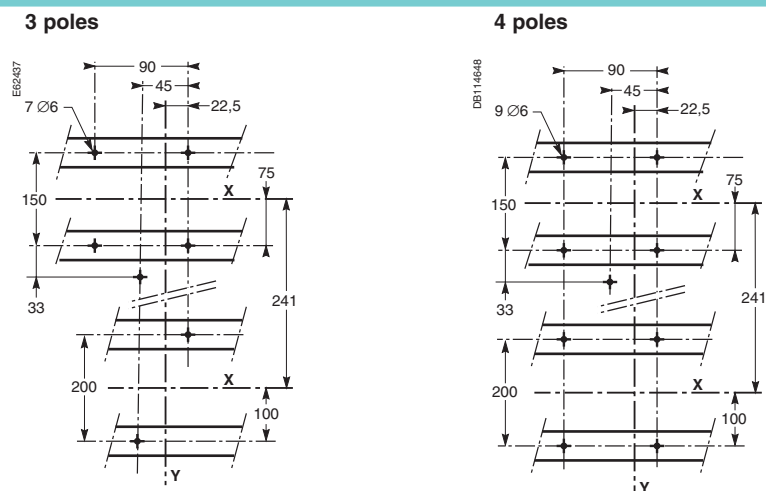
Front-panel cutout



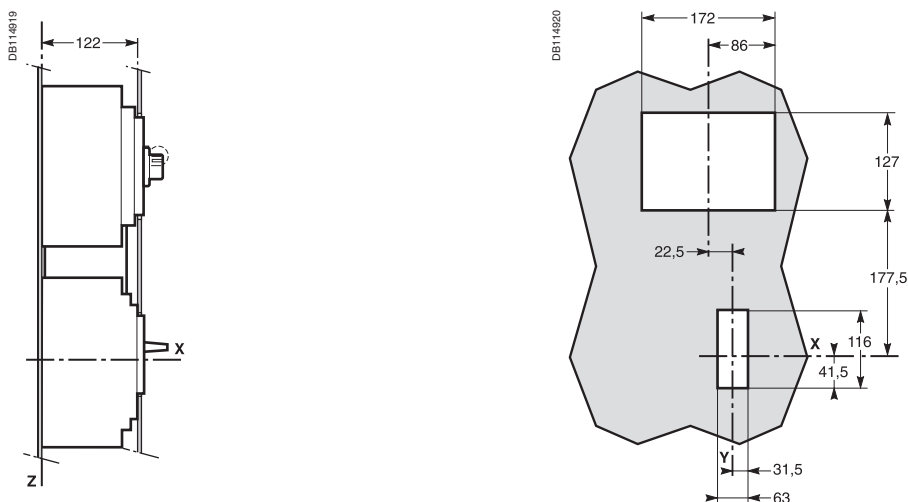
Fixed Compact NS400 to 630 with Visu function Interpact INV400 to 630



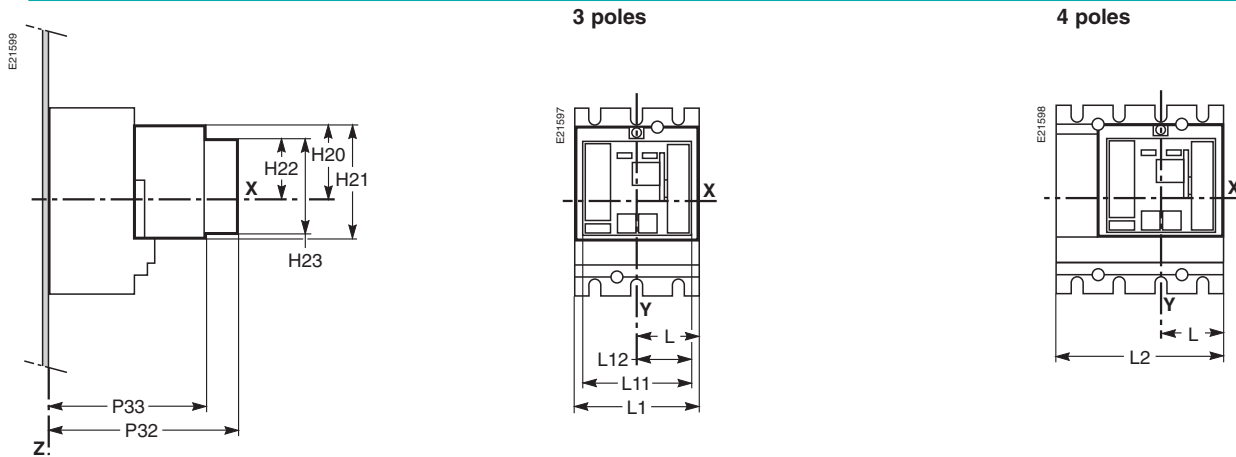
Mounting on rails and backplate



Front-panel cutout

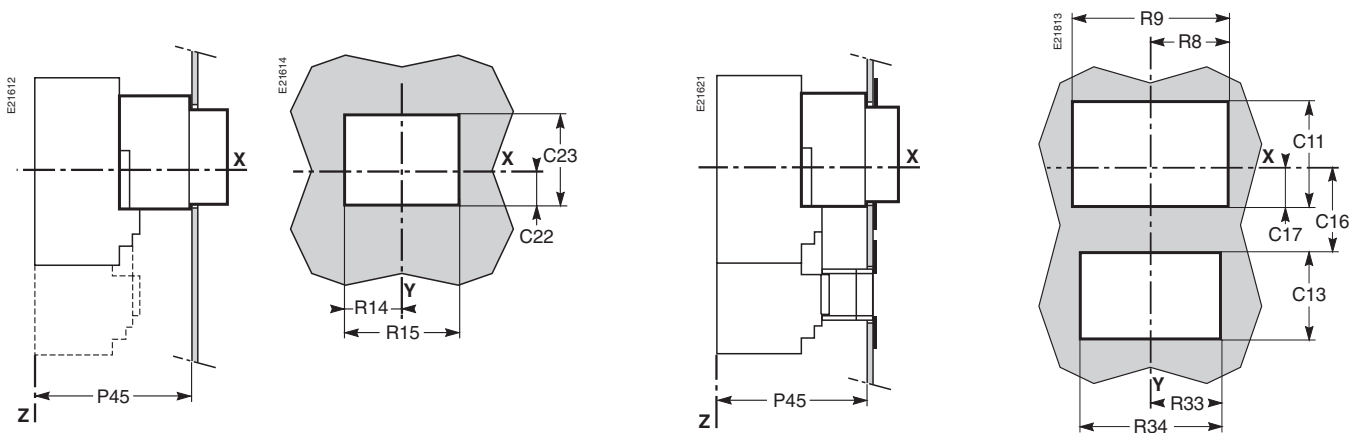


Dimensions



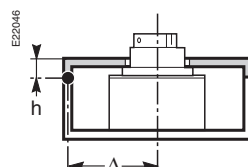
Front-panel cutouts

With IP40, IK07 escutcheons and protection collar
for Vigi module



Note.

Door cutout dimensions are given for a device position in the enclosure where $\Delta \geq 100 + (h \times 5)$ with respect to the door hinge.



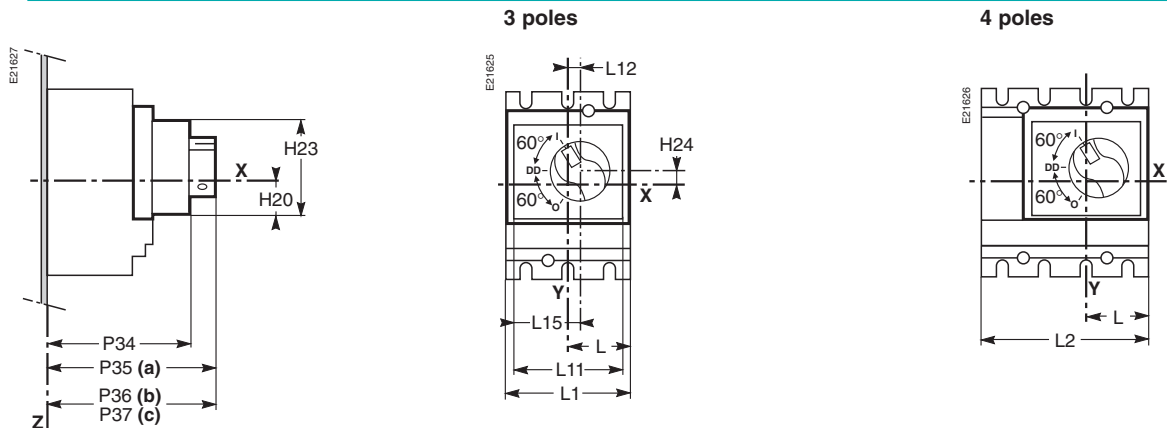
Dimensions (mm)

Type	C11	C13	C16	C17	C22	C23	H20	H21	H22	H23	L	L1
NS100/160/250	103	84	56	42.5	29	76	62.5	97	45.5	73	52.5	105
NS400/630	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
NS100/160/250	140	91	45.5	178	143	145	74	148	48.5	97	74	148
NS400/630	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



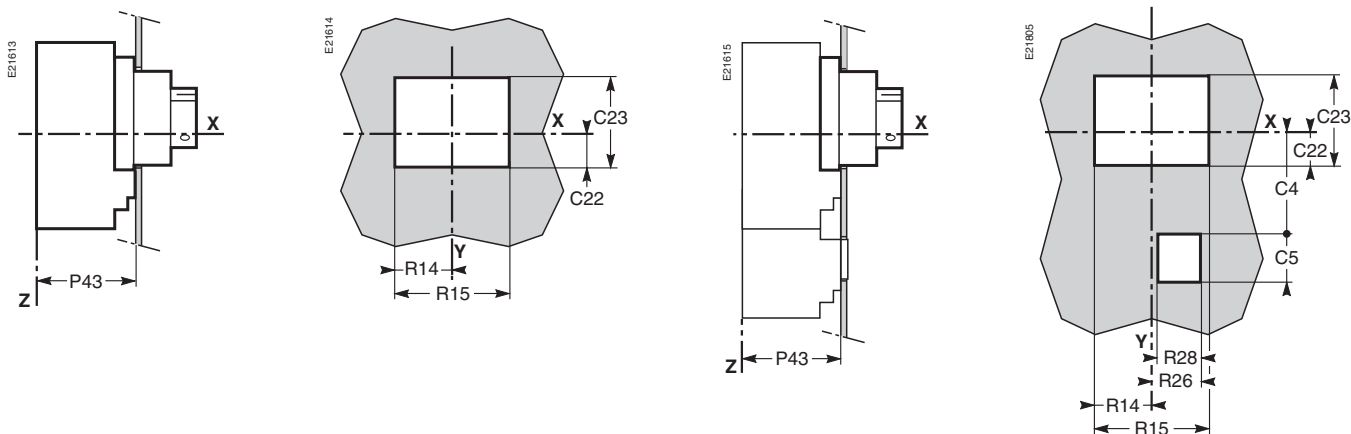
- (a) without keylock
- (b) with Ronis keylock
- (c) with Profalux keylock

Front-panel cutouts

Fixed or plug-in circuit breaker

Compact

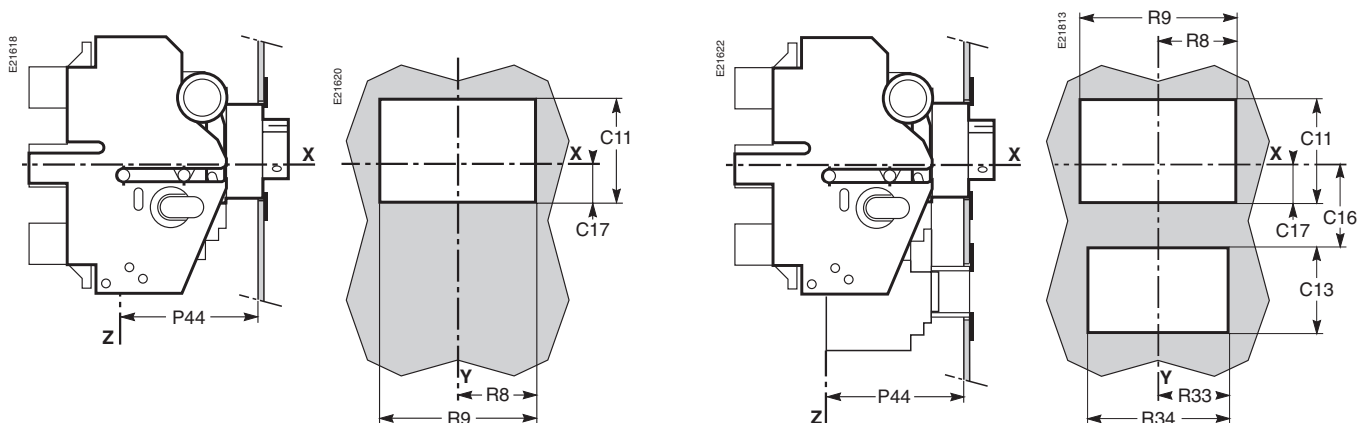
Vigicompact



Withdrawable circuit breaker

Compact

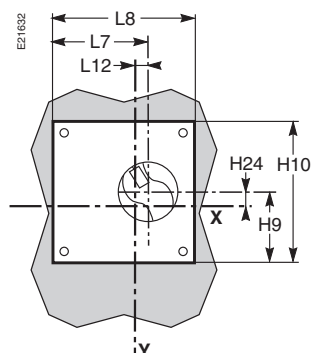
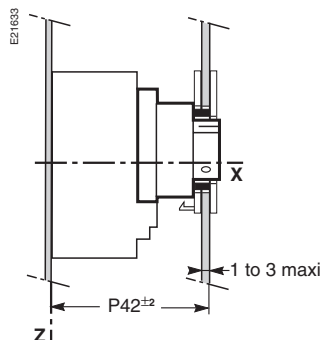
Vigicompact



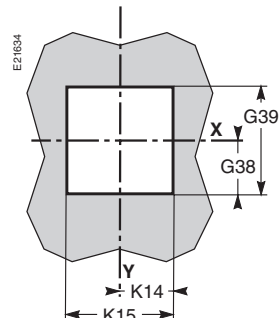
An escutcheon is mandatory

Protection collar for Vigi module is mandatory.
Escutcheons are mandatory for rotary handles and Vigi protection collars.

MCC direct rotary handle



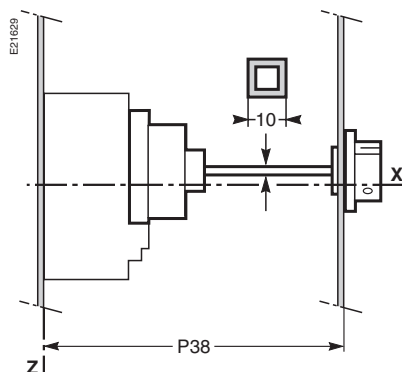
Front-panel cutout



Extended rotary handle

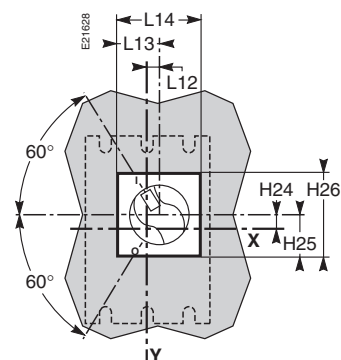
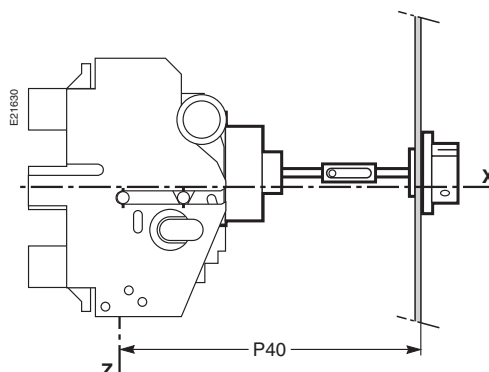
Fixed or plug-in circuit breaker

Cut shaft at length:
P38-126 mm (NS100 to 250)
P38-150 mm (NS400 to 630)

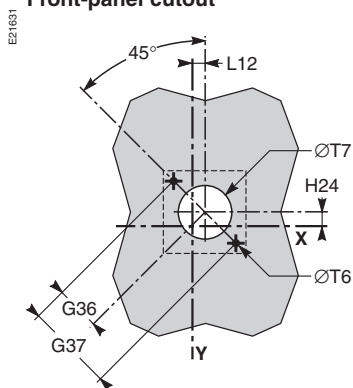


Withdrawable circuit breaker

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
NS100/160/250	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
NS100/160/250	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
NS100/160/250	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

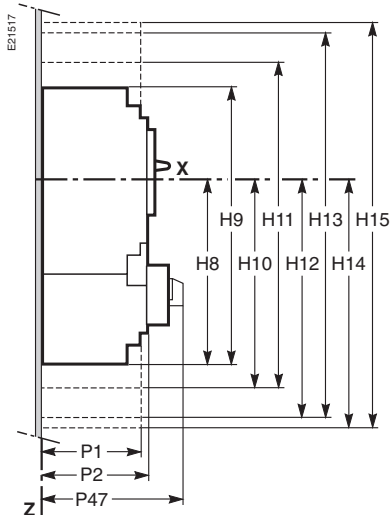
(1) ≤ 600 mm.

Note.

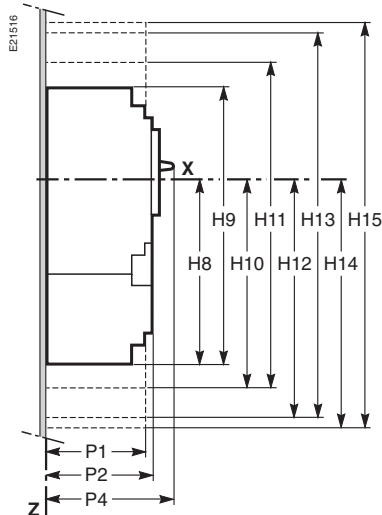
Door cutout dimensions are given for a device position in the enclosure where Δ ≥ 100 + (h x 5) with respect to the door hinge.

Dimensions

Circuit breaker with ammeter module



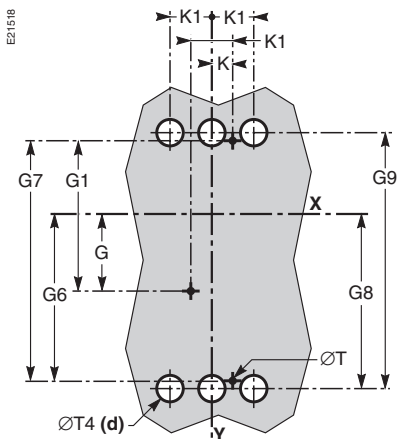
Circuit breaker with current-transformer module



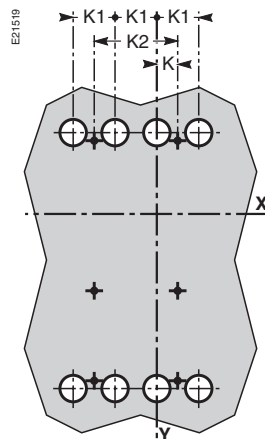
Mounting

On backplate

2 poles or 3 poles



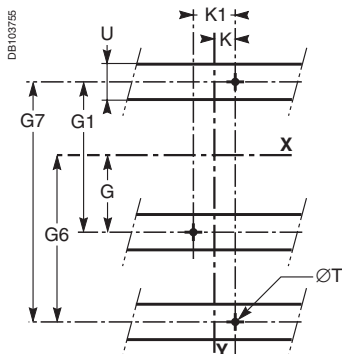
4 poles



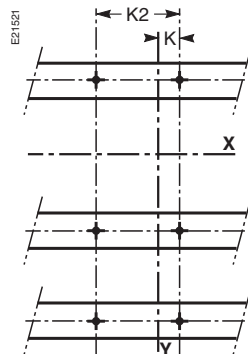
(d) for rear connection only. For two-pole circuit breakers, the centre hole is not necessary.

On rails

2 poles or 3 poles

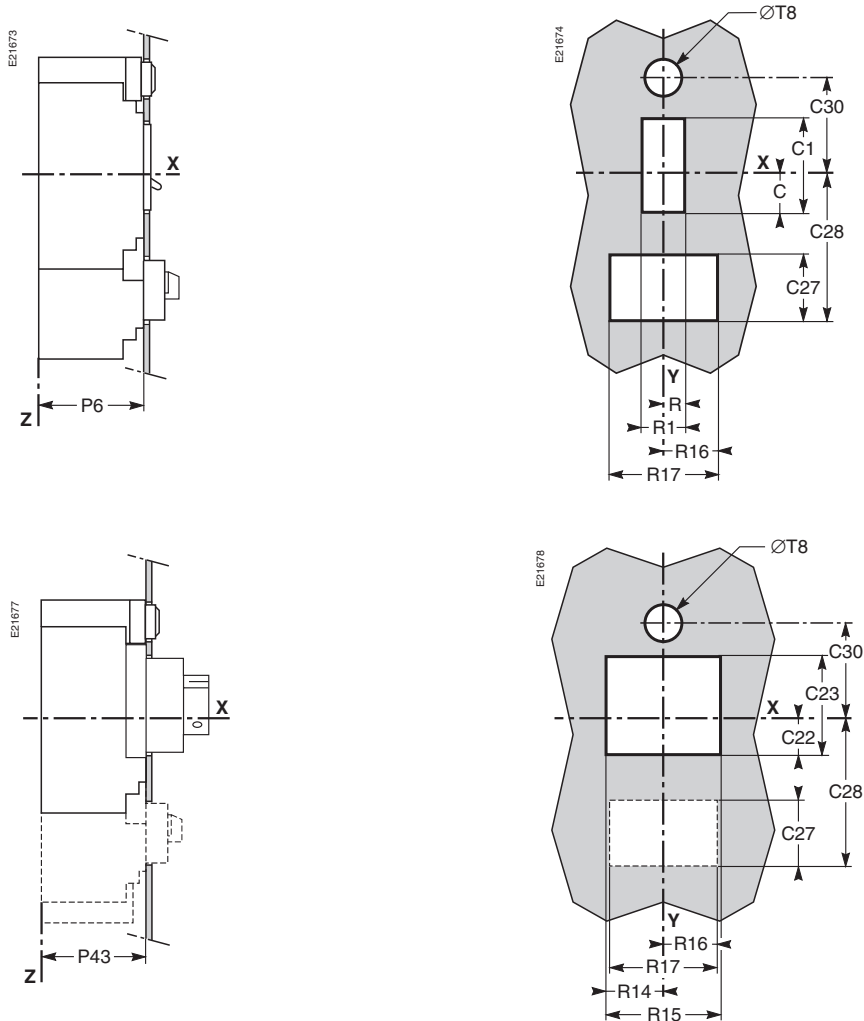


4 poles



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
NS100/160/250	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

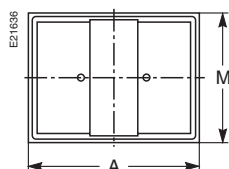
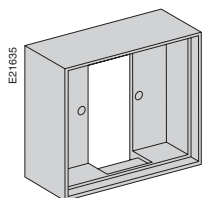
Type	H11	H12	H13	H14	H15	K	K1	K2	P1	P2	P4	P6	P43	P47	P48	R	R1
NS100/160/250	263	235.5	396	253.5	432	17.5	35	70	81	86	111 ⁽¹⁾	88	89	137	128	14.5	29
NS400/630N/H/L	385	340	580	337	574	22.5	45	90	95.5	110	168	112	112	162	154	31.5	63

Type	R14	R15	R16	R17	ØT	ØT4	ØT8	U
NS100/160/250	48.5	97	46.5	93	6	22	31	≤ 32
NS400/630N/H/L	64.5	129	64.5	93	6	32	31	≤ 32

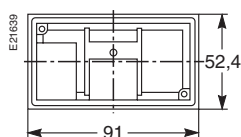
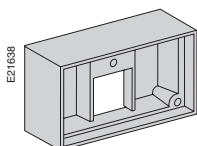
(1) P4 = 126 mm for Compact NS 250N/H/L.

Protection collar

Toggle protection collar



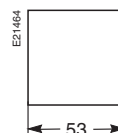
Vigi-module protection collar



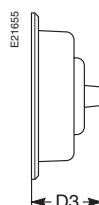
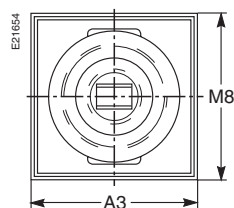
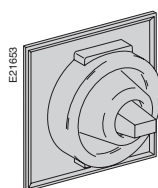
Circuit breaker with
toggle or rotary handle



Circuit breaker with
motor-mechanism
module

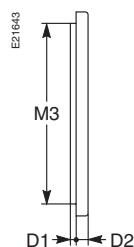
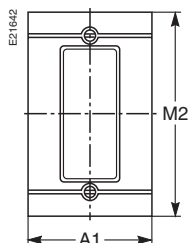
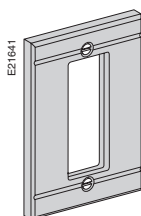


Toggle cover

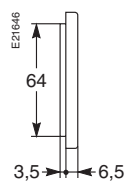
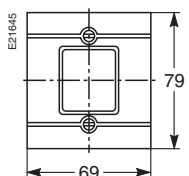
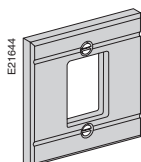


Front-panel escutcheons

For toggle

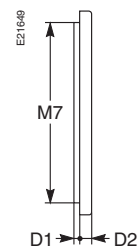
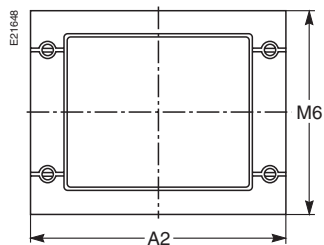
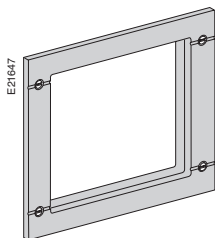


For Vigi module

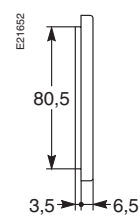
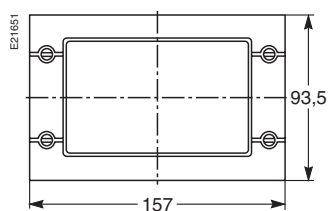
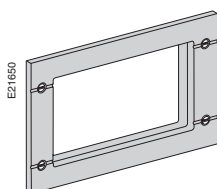


Front-panel escutcheons

For protection collar, motor mechanism or rotary handle



For Vigî module with protection collar or ammeter module

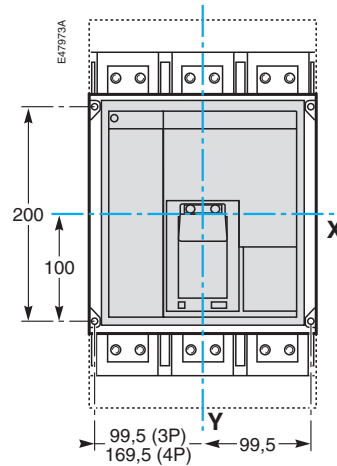
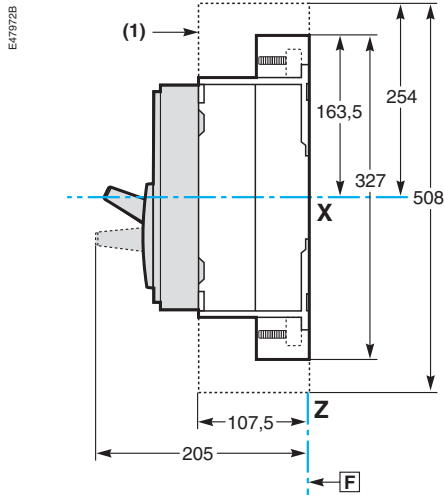


Dimensions (mm)

Type	A	A1	A2	A3	D	D1	D2	D3	M	M2	M3	M6	M7	M8
NS100/160/250	91	69	157	94	35	3.5	6.5	40	73	115	102	114	101	94
NS400/630	123	102	189	35	35	3.5	6.5	60	123	155	142	164	151	134

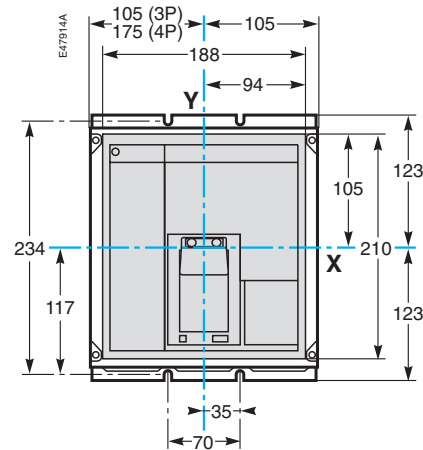
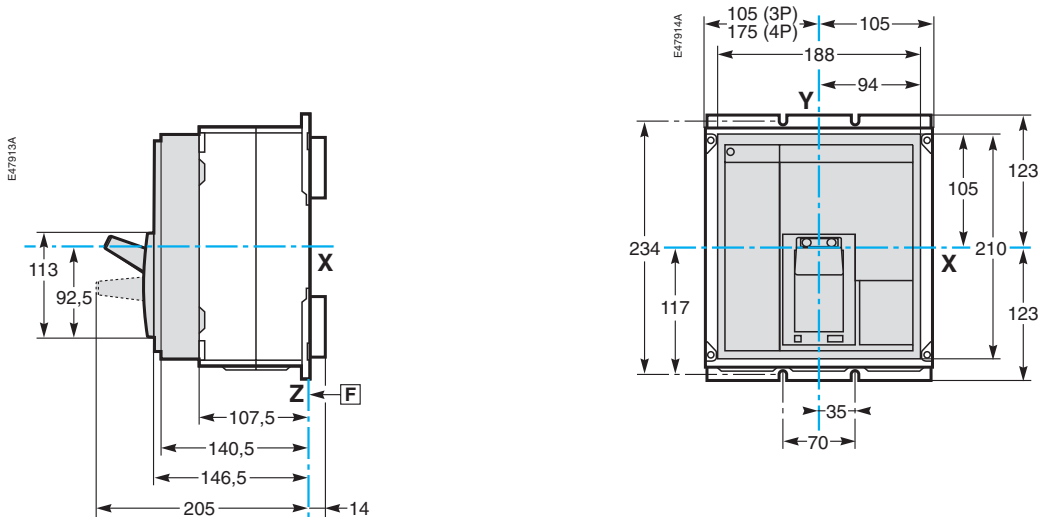
Manual control

Front connection (N, H, L)



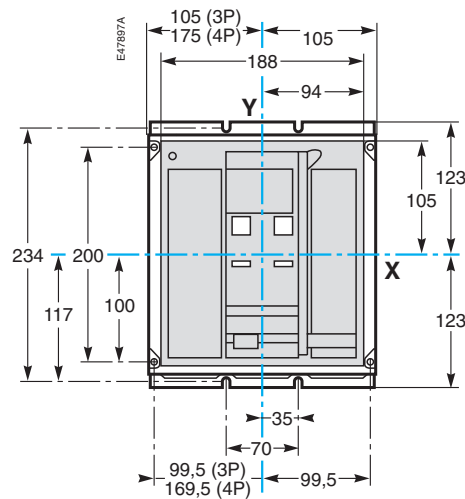
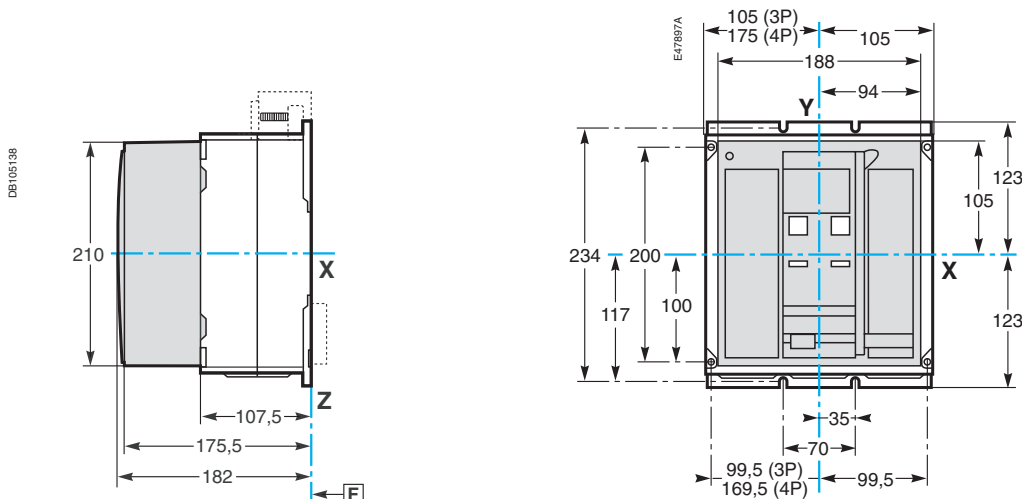
(1) terminal shields are optional

Rear connection (N, H, L, LB)



Electrical control

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



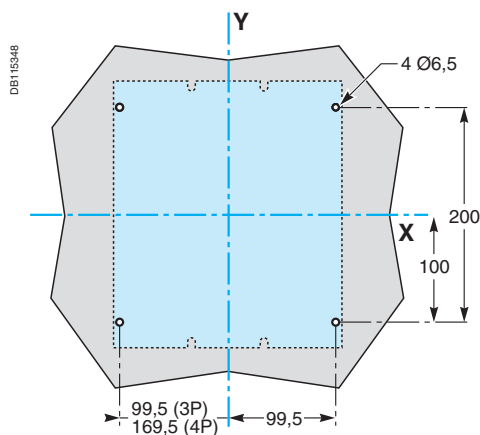
F : Datum

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

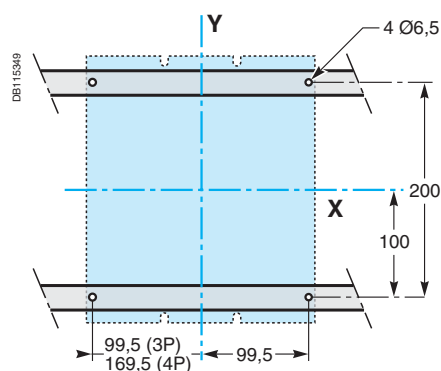
Mounting

Front connection

On backplate



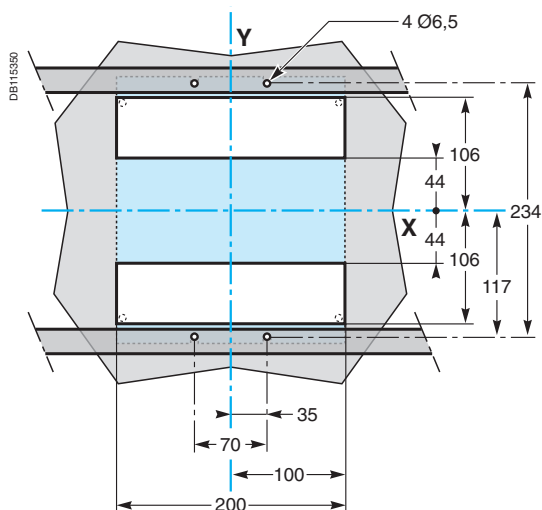
On rails



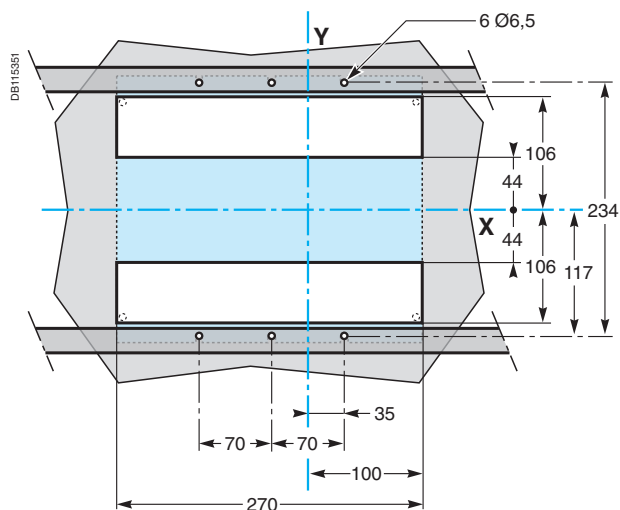
Rear connection

On backplate or rails

3P



4P

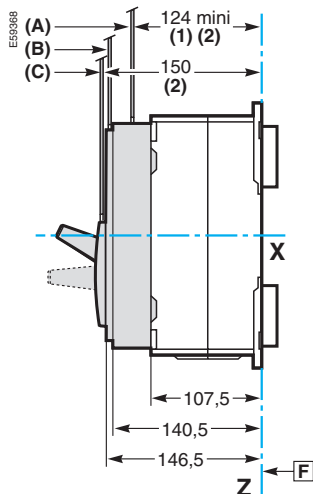


Note.

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

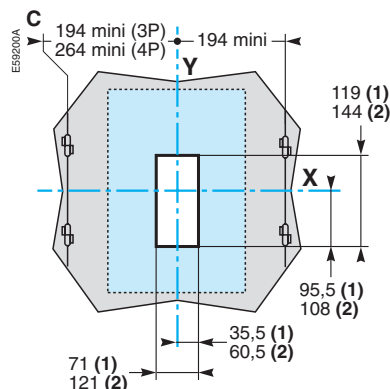
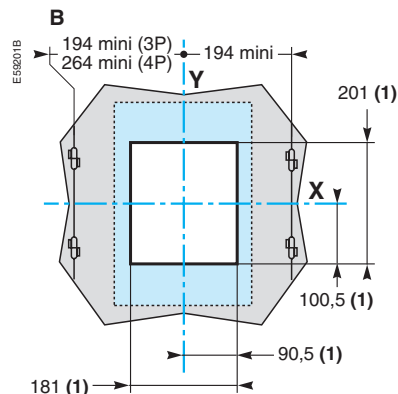
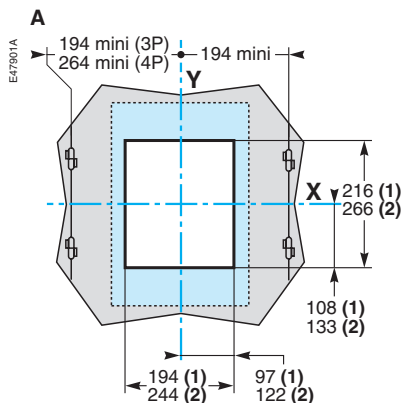
X and **Y** are the symmetry planes for a 3-pole device
Z is the back plane of the device.

Toggle control

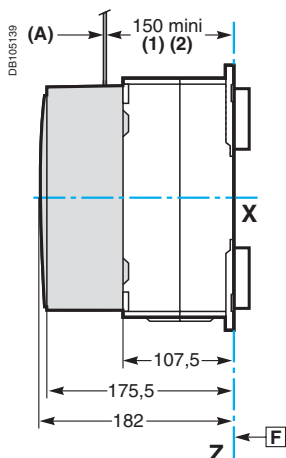


F : Datum.
(1) Without escutcheon.
(2) With escutcheon.

Door cutout

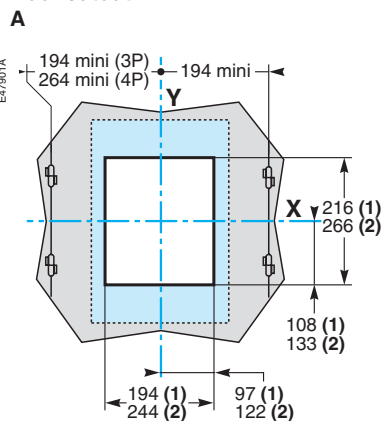


Electrical control



F : Datum.
(1) Without escutcheon.
(2) With escutcheon.

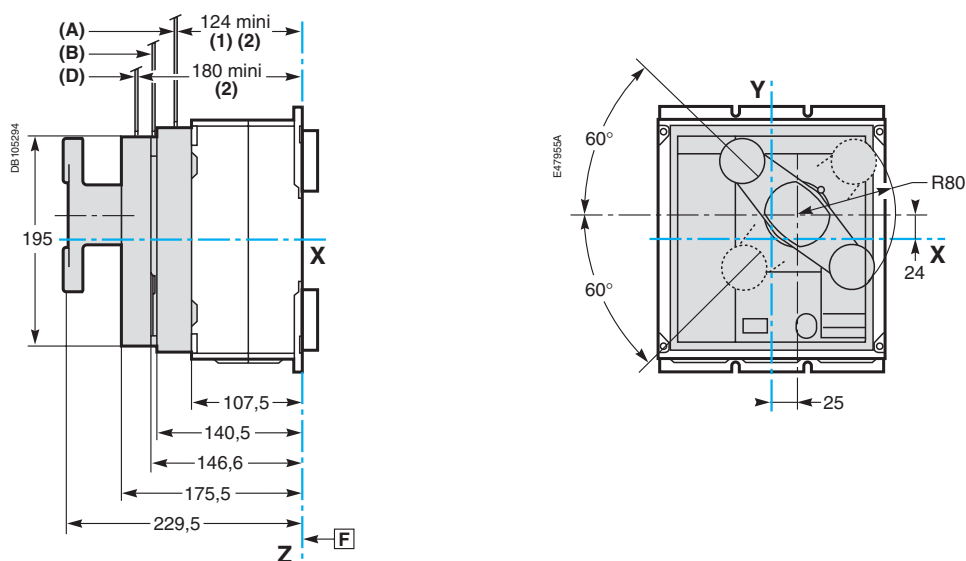
Door cutout



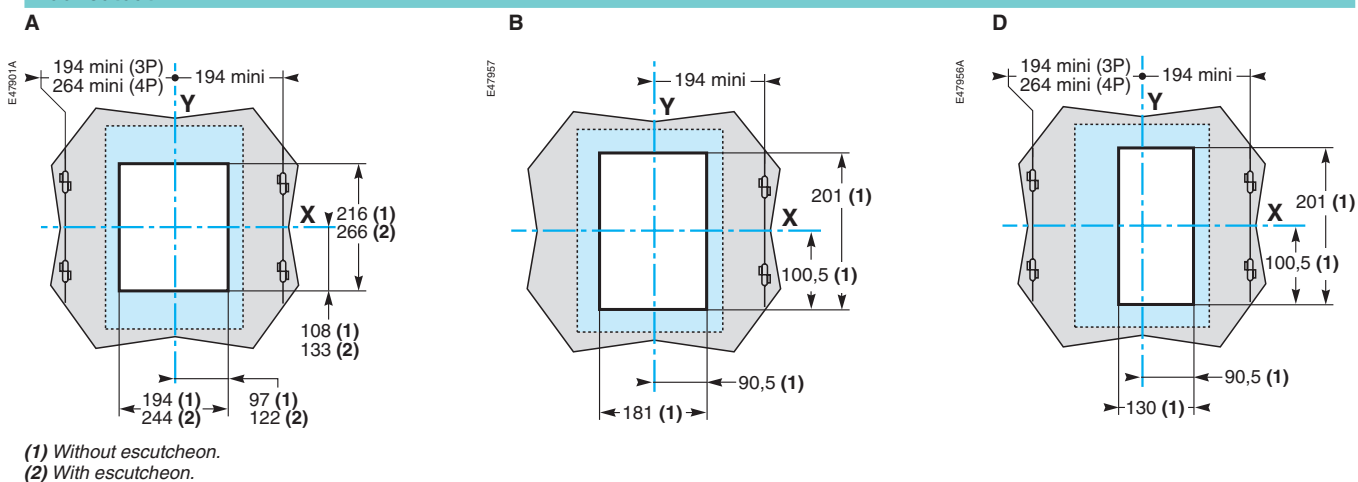
Rotary handle

Direct rotary handle

Dimensions



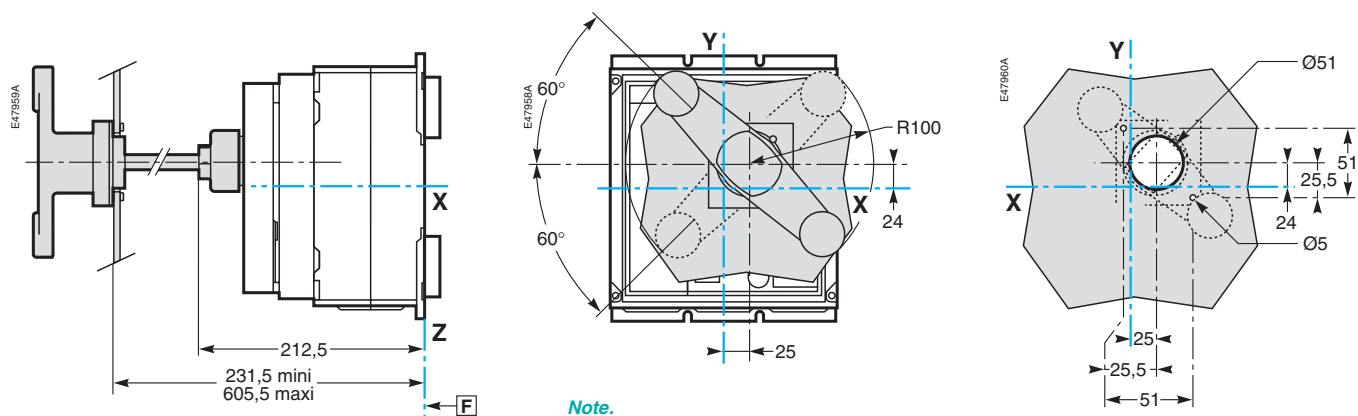
Door cutout



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

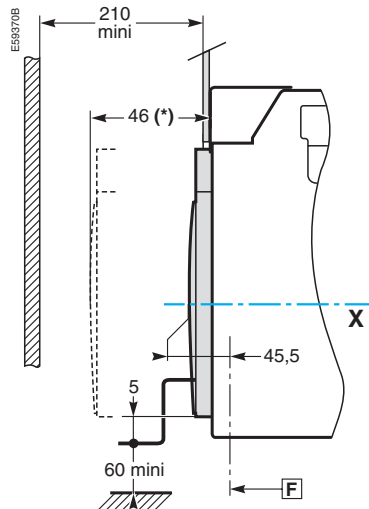
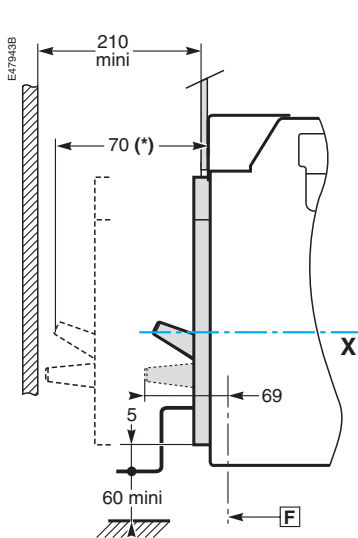
Compact NS630b to 1600 (withdrawable version)

Dimensions, mounting and cutouts

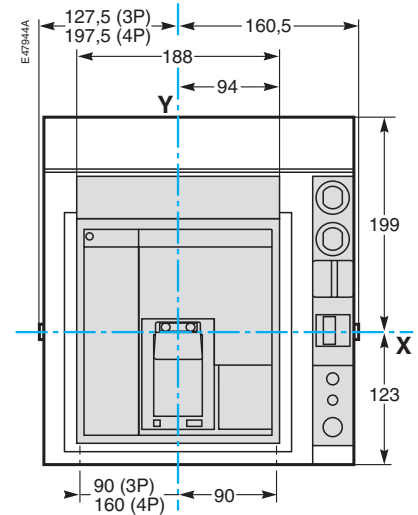
Dimensions

Manual control

Electrical control



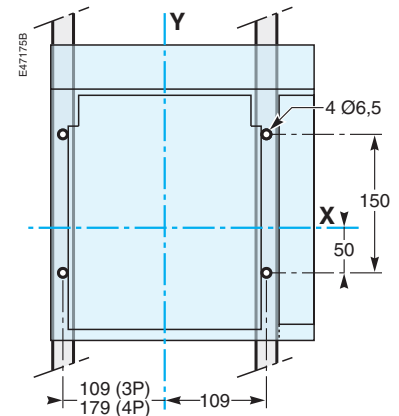
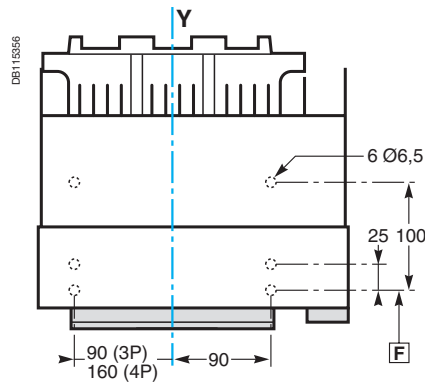
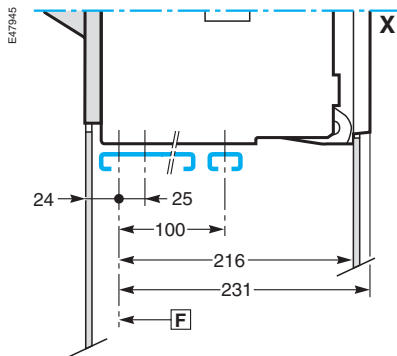
(*) Withdrawable position



Mounting

Bottom mounting on base plate or rails

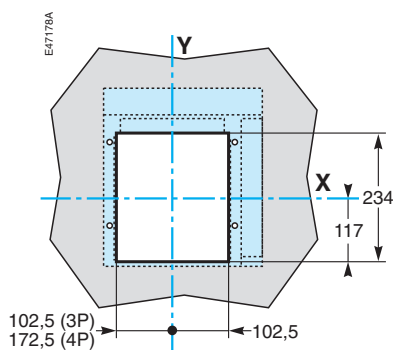
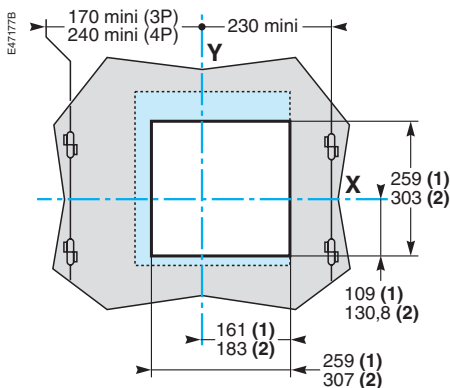
Vertical on uprights or backplate



Cutouts

Door cutout

Rear panel cutout



(1) Without escutcheon.
(2) With escutcheon.

F : Datum

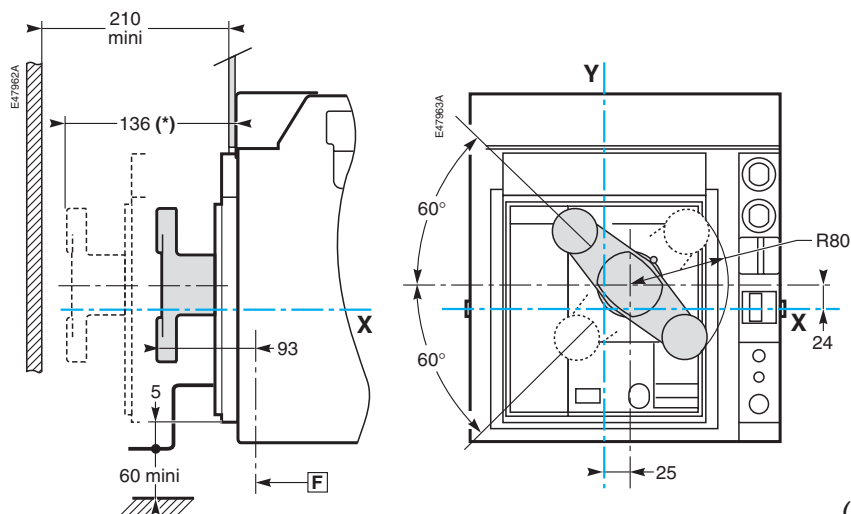
Note.

X and Y are the symmetry planes for a 3-pole device.

Rotary handle

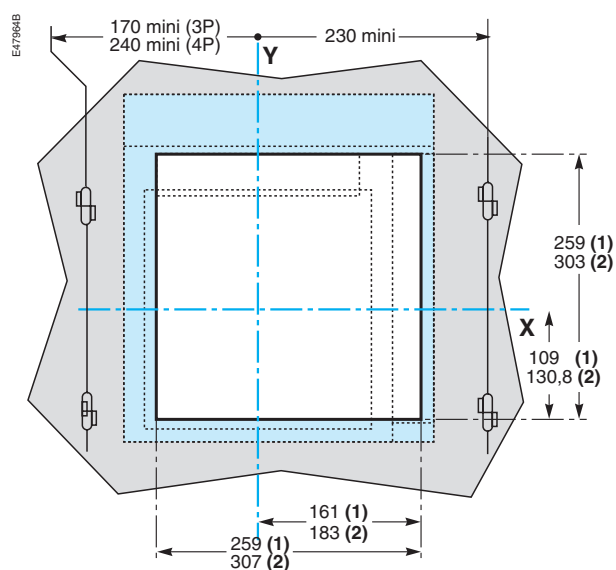
Direct rotary handle

Dimensions



(*) Withdrawable position.

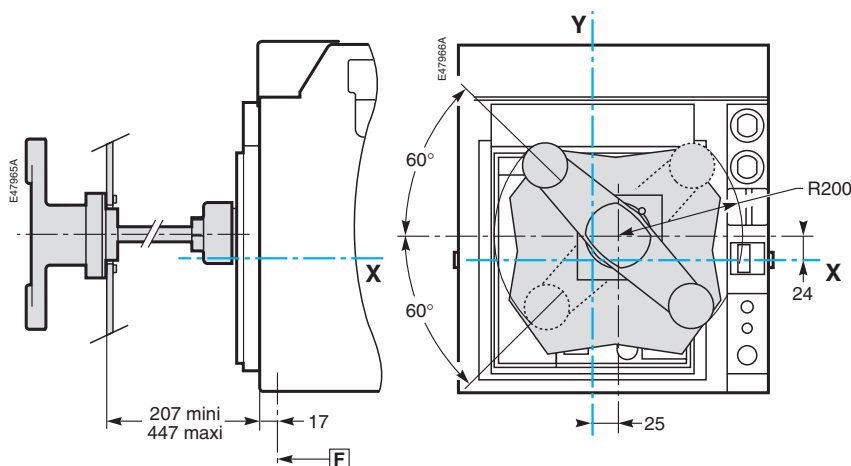
Door cutout



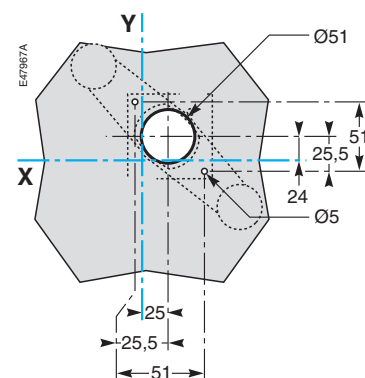
(1) Without escutcheon.
(2) With escutcheon.

Extended rotary handle

Dimensions



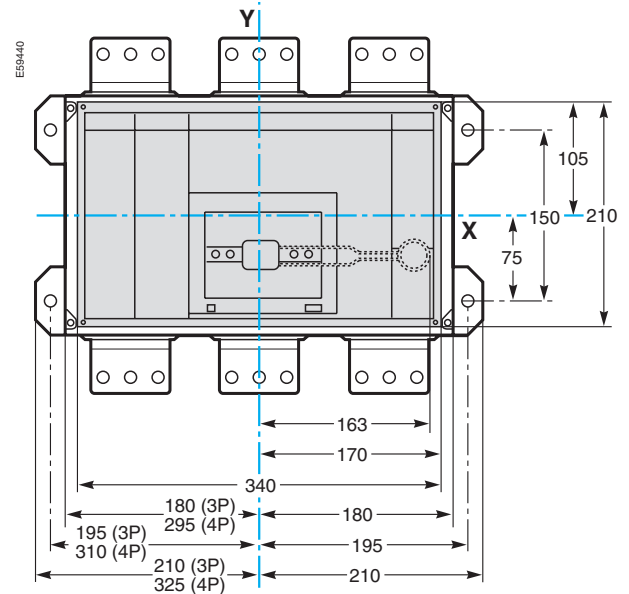
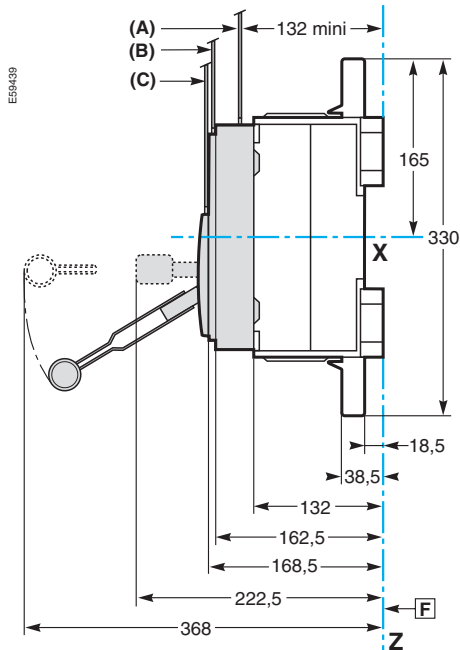
Door cutout



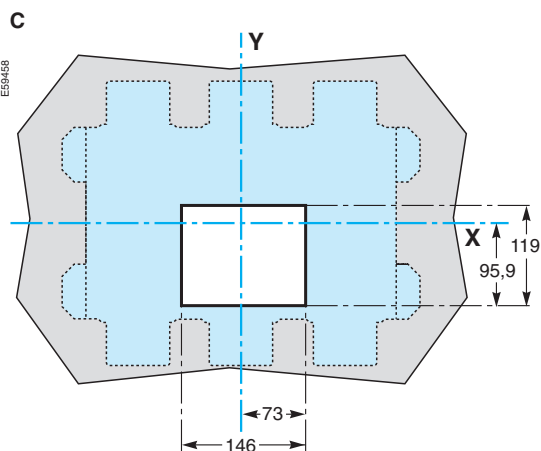
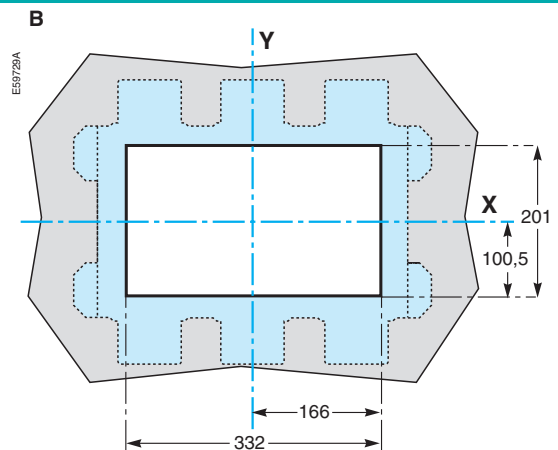
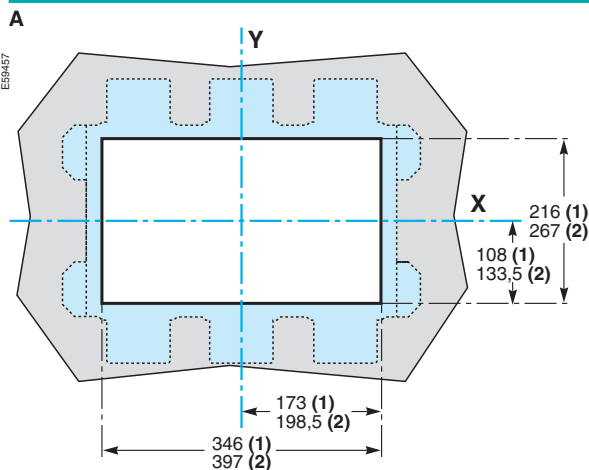
Note.

X and Y are the symmetry planes for a 3-pole device.

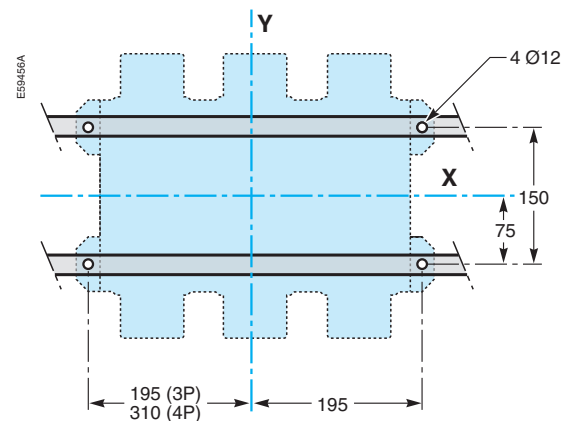
Dimensions



Door cutout (A, B, C)



Mounting on rails



F : datum

(1) Without escutcheon.
(2) With escutcheon.

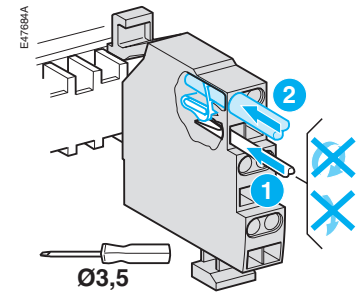
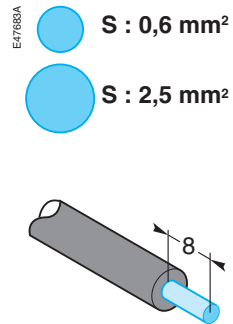
Note.

X and Y are the symmetry planes for a 3-pole device

Compact NS630b to 3200

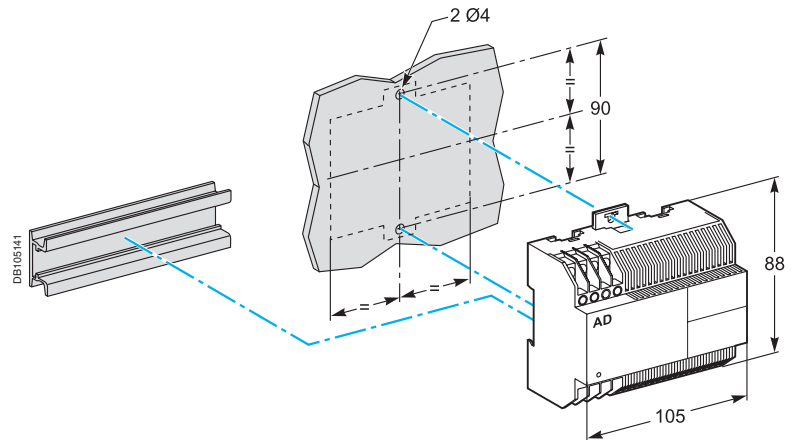
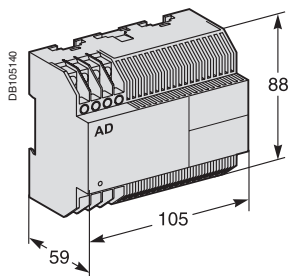
External modules

Control-wire connections to terminal block

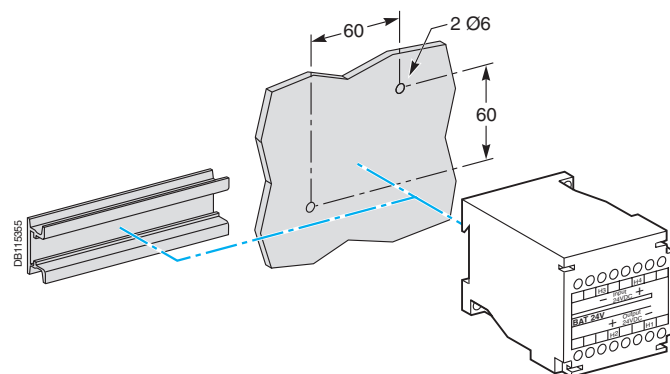
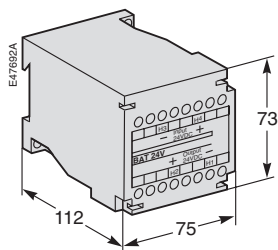


Only one wire per terminal.

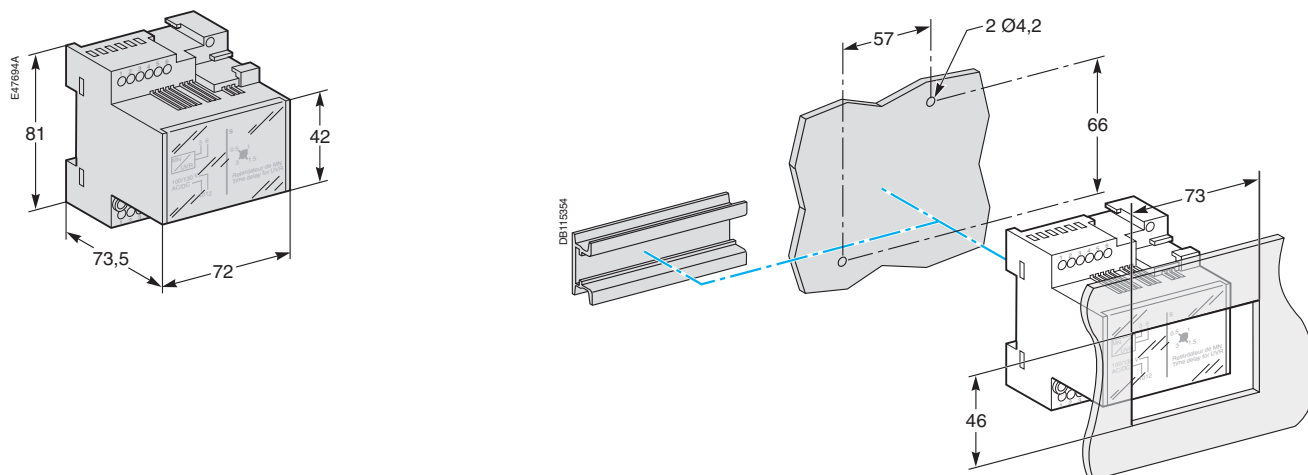
External power-supply module (AD)



Battery module (BAT)

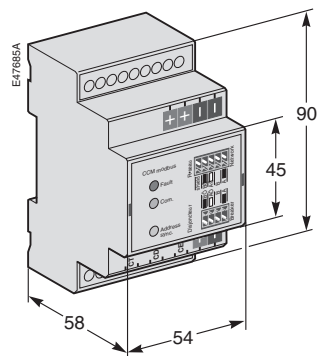


MN delay unit

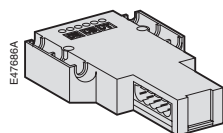


Chassis communication module

Modbus

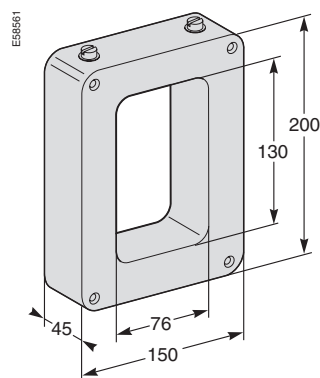


Digipact

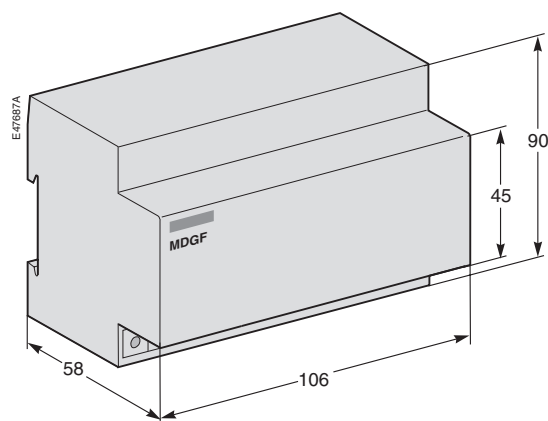


External sensor for source ground return (SGR) protection

External sensor

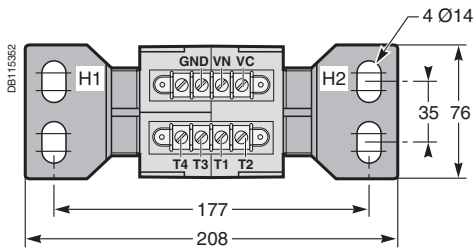


"MDGF" summing module

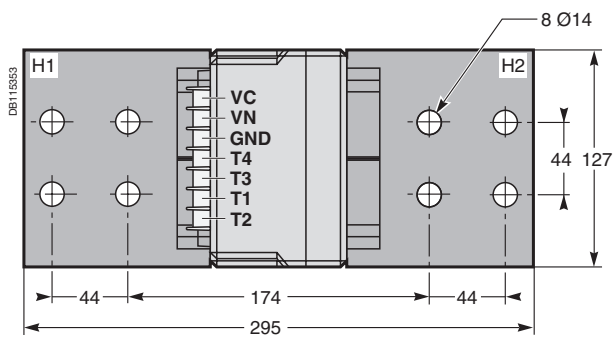


External sensor for neutral

400/1600 A (NS630b to 1600)



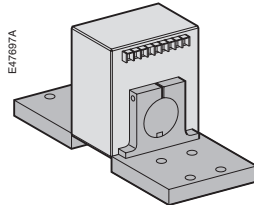
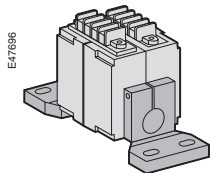
1000/4000 A (NS1600b to 3200)



Installation

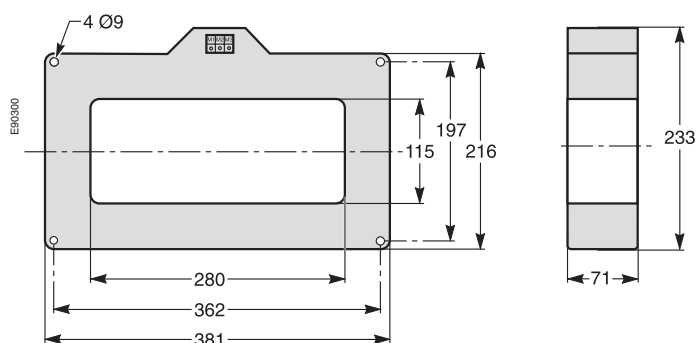
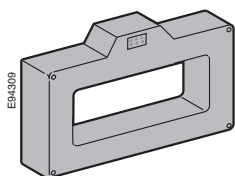
400/1600 (NS630b to NS1600)

1000/4000 A (NS1600b to NS3200)

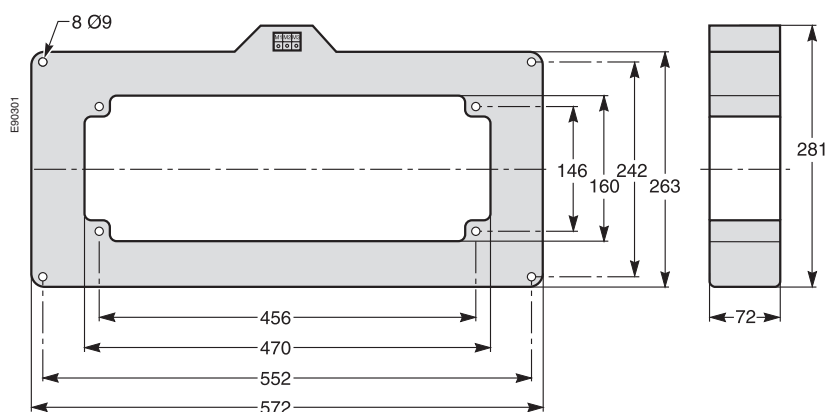
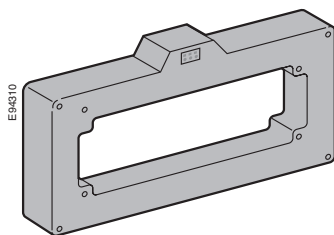


Rectangular sensor for earth leakage protection (Vigi)

280 x 115 mm window



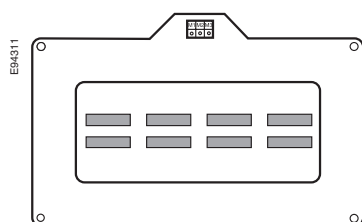
470 x 160 mm window



Busbars	I ≤ 1600 A	I ≤ 3200 A
Window (mm)	280 x 115	470 x 160
Weight (kg)	14	18

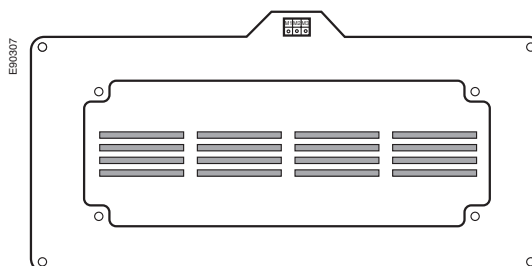
Busbars path

280 x 115 window
Busbars spaced 70 mm centre-to-centre

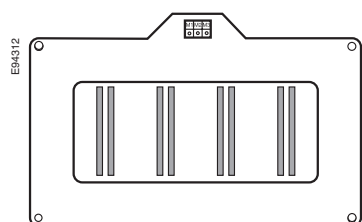


2 bars 50 x 10

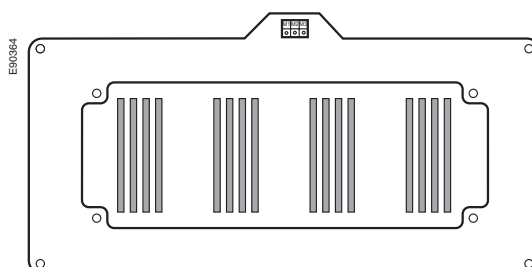
470 x 160 window
Busbars spaced 115 mm centre-to-centre



4 bars 100 x 5



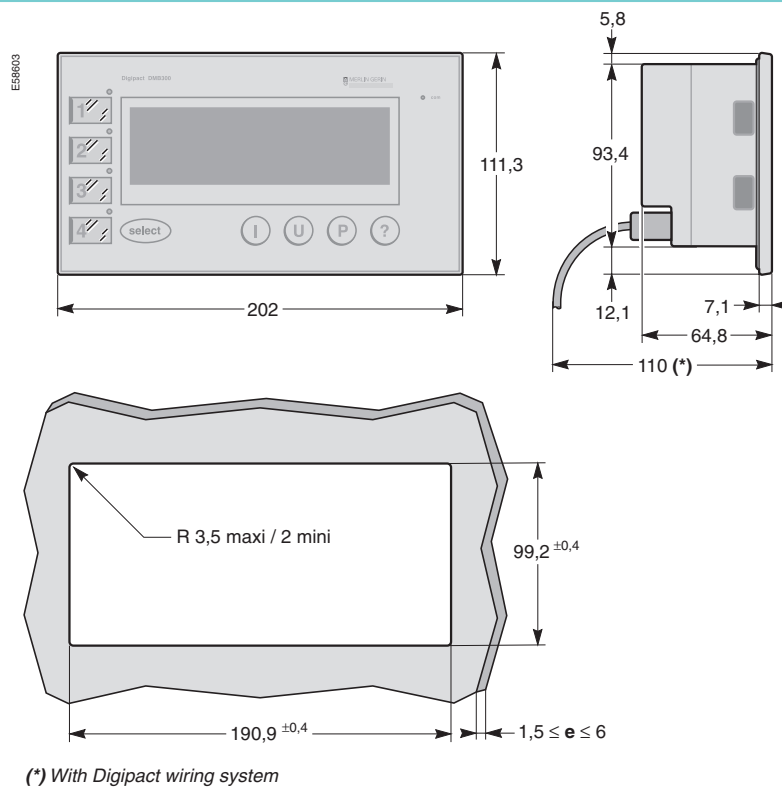
2 bars 100 x 5



4 bars 125 x 5

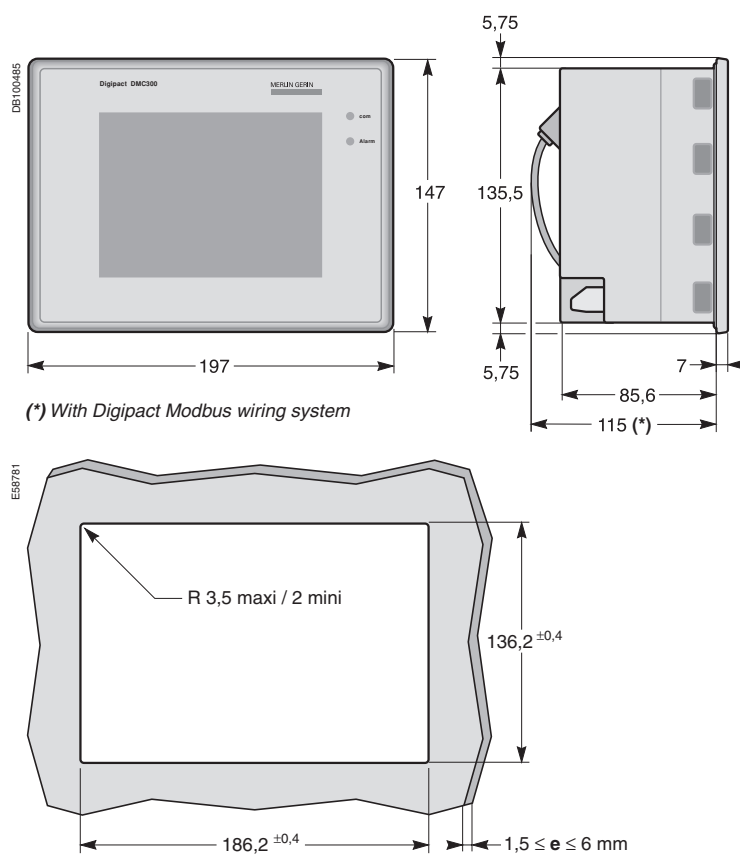
Installation and connection for Digipact DMB300

Dimensions and front-panel cut-out



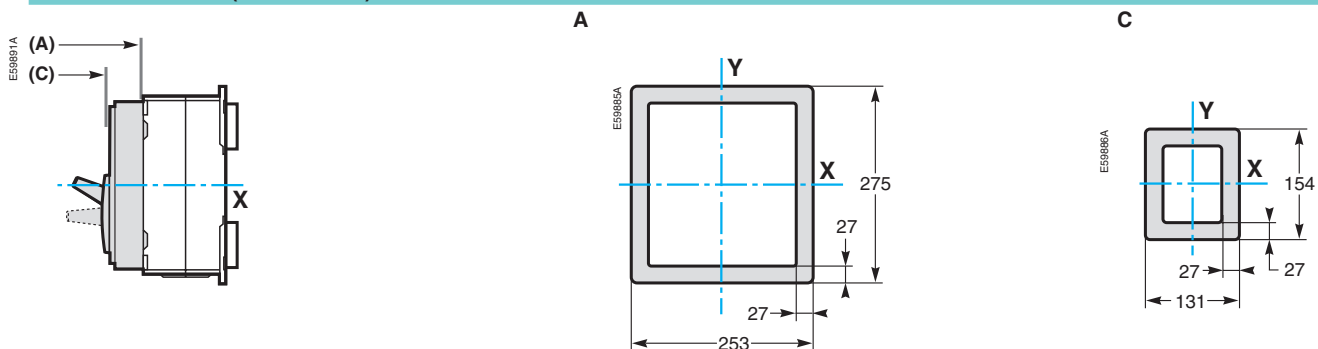
Installation and connection for Digipact DMC300

Dimensions and front-panel cut-out

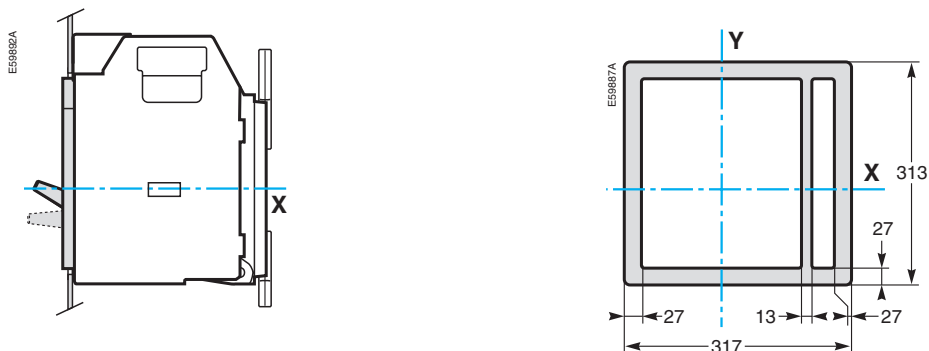


Escutcheon

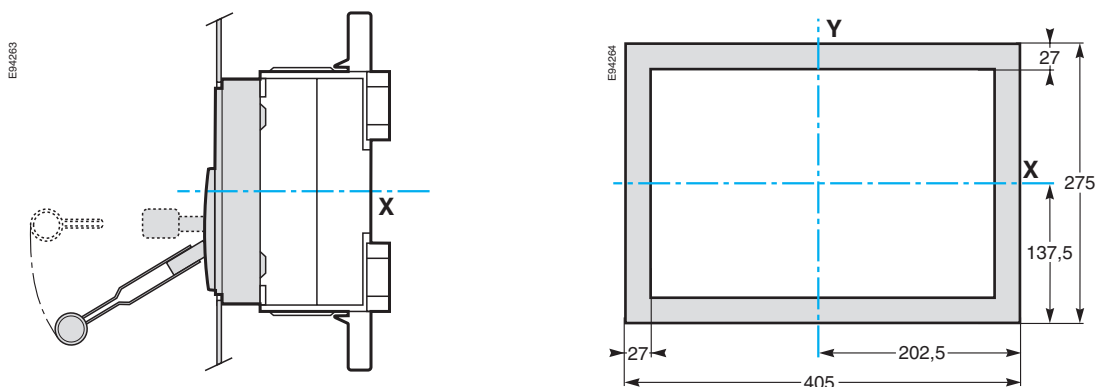
NS630b to NS1600 (fixed control)



NS630b to NS1600 (withdrawable control)

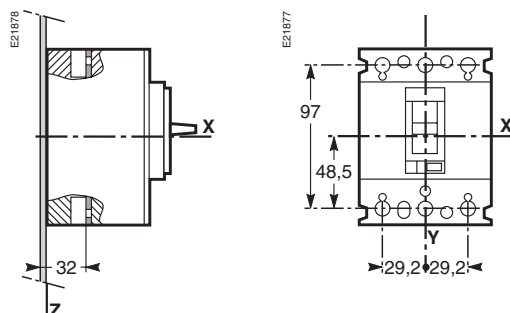


NS1600b to NS3200 (fixed control)

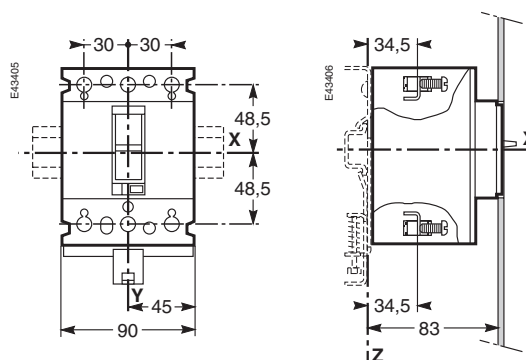


Compact NS80H-MA, NSC100N and NSA160

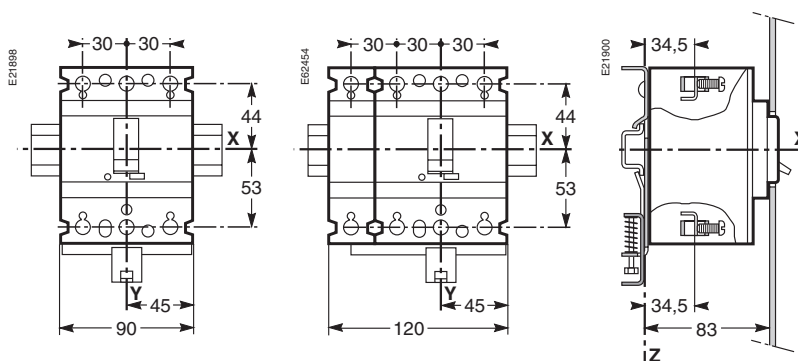
Compact NS80H-MA



Compact NSC100N



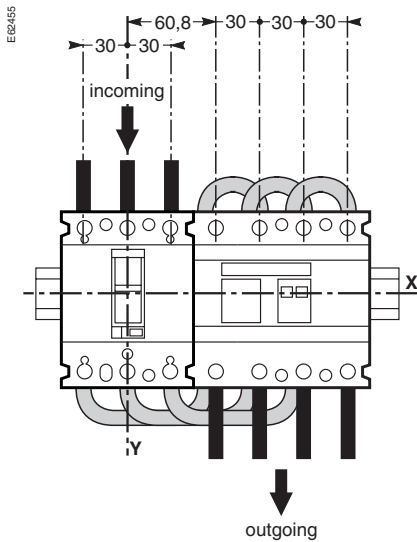
Compact NSA160



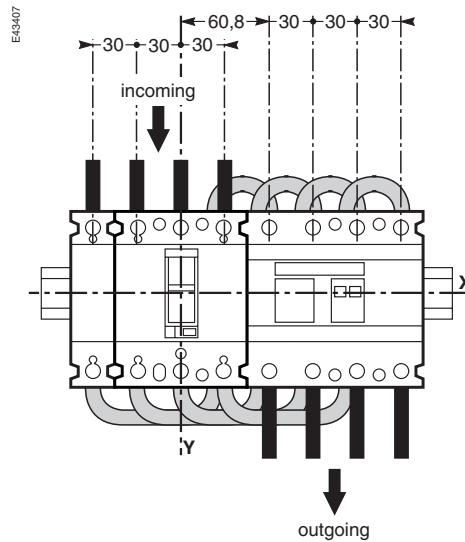
Vigicompact NSC and NSA

Bottom connection

3 poles

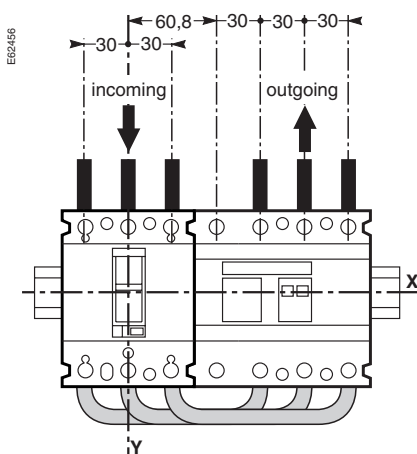


4 poles

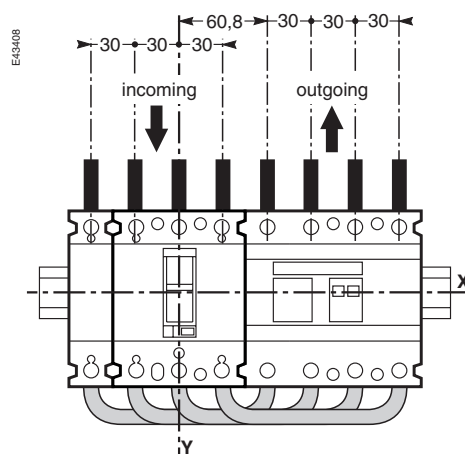


Top connection

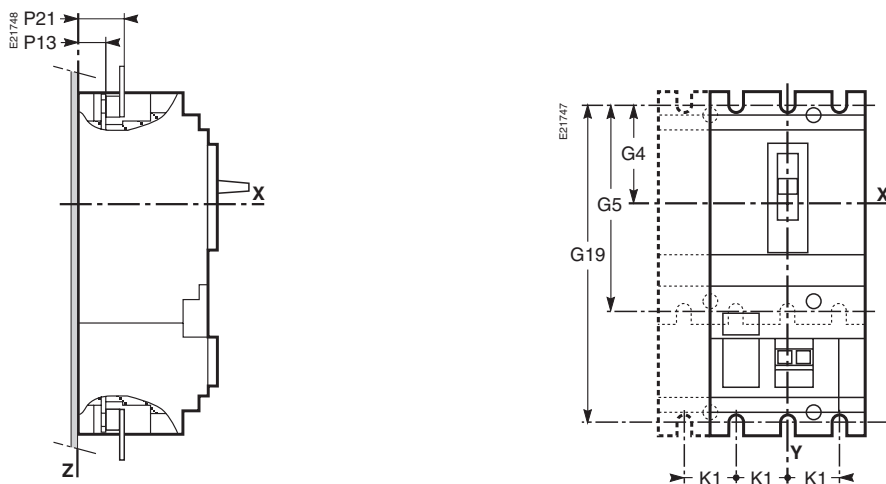
3 poles



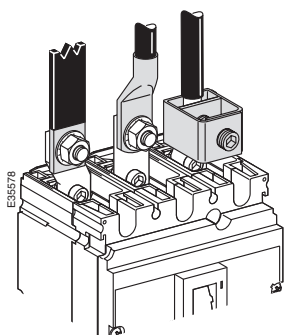
4 poles



Connection dimensions

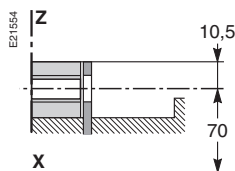


Front connection

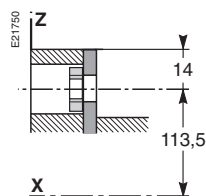


Terminals

NS100/160/250

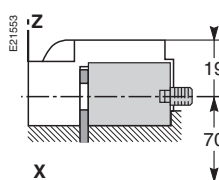


NS400/630

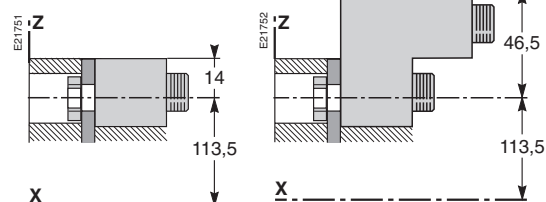


Connectors

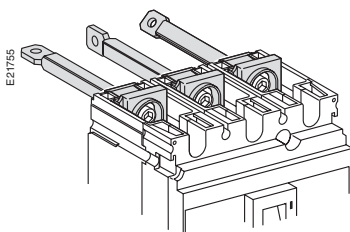
NS100/160/250



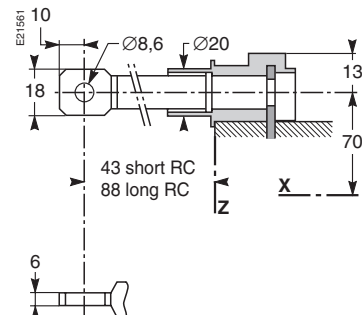
NS400/630



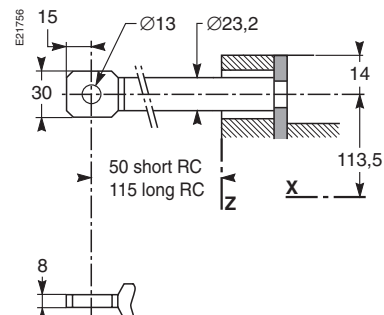
Rear connection



NS100/160/250

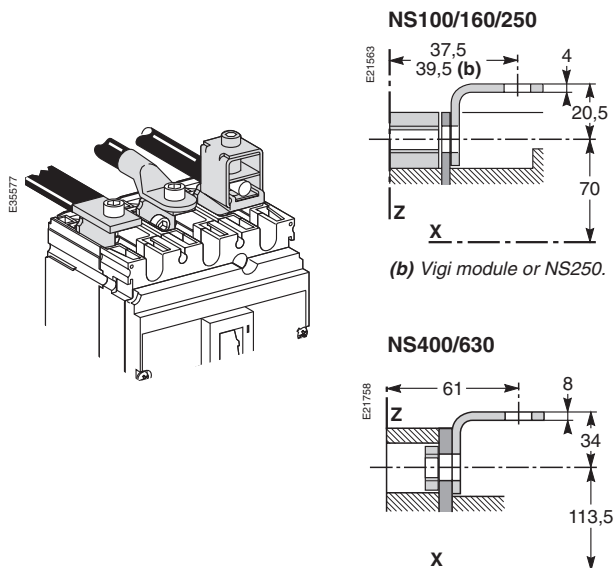


NS400/630

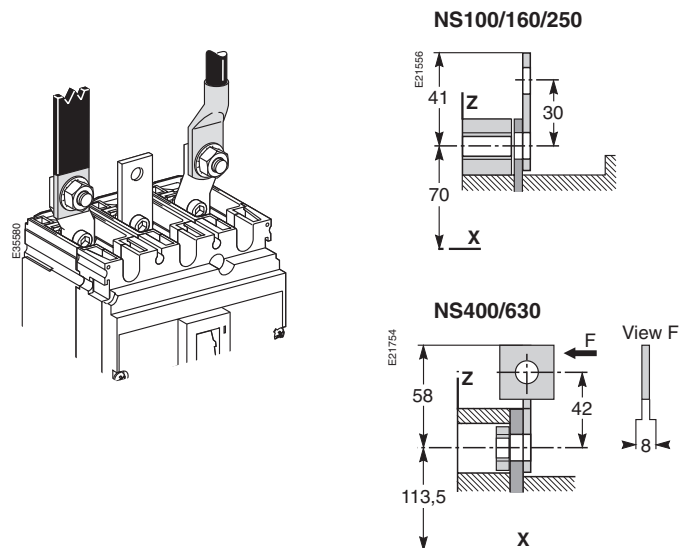


Connection with accessories

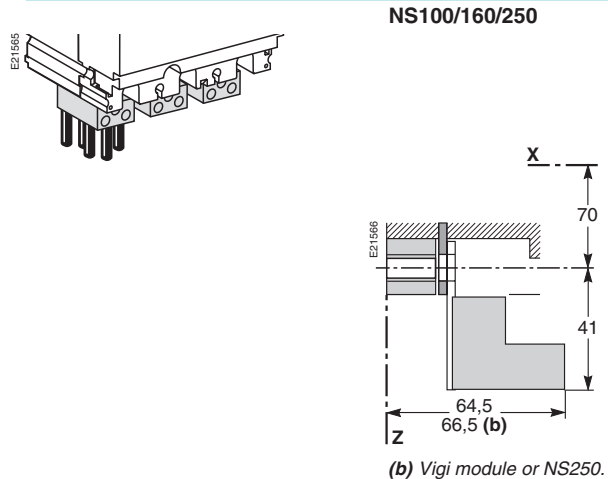
Right-angle terminal extensions (upstream only)



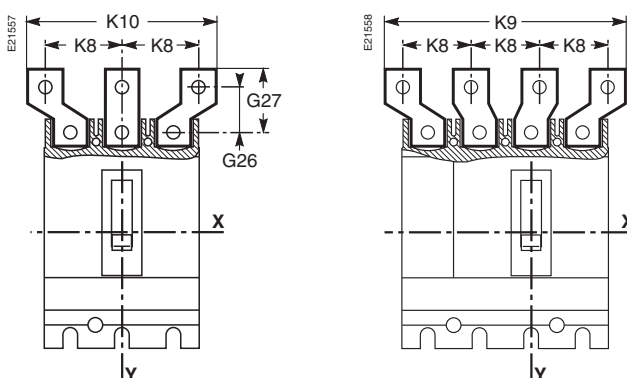
Straight or edgewise terminal extensions



Distribution connectors (interphase barriers mandatory)



Spreader



Dimensions (mm)

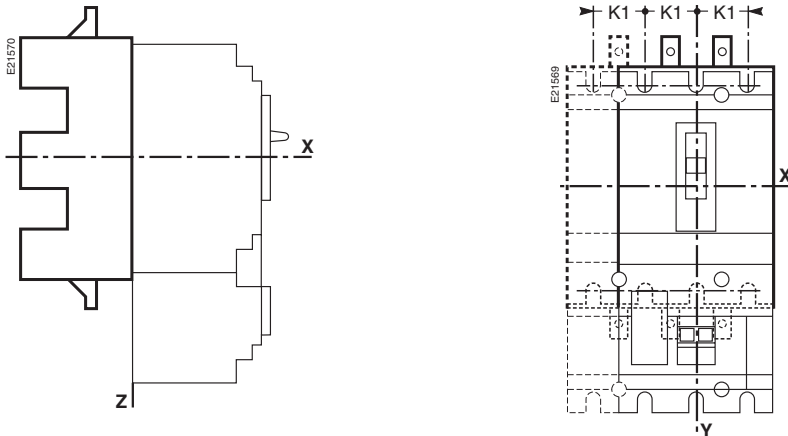
Type	G4	G5	G19	G26	G27	K1	K8	K9	K10	P13	P21
NS100/160/250	70	140	215	30	41	35	45	159	114	19.5 ⁽¹⁾	
NS400/630N/H/L	113.5	227	327	39 52.5	54 67.5	45	52.5 70	187.5 240	135 170	26	44

(1) P13 = 21.5 mm for NS250 and Vigi MH module.

Note.

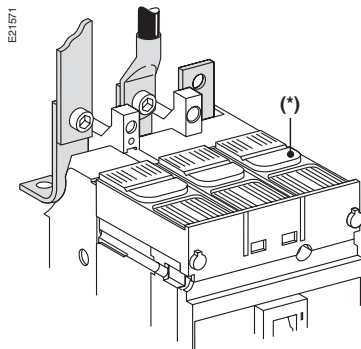
For dimensions of conductors, see pages A-92 and A-93.

Plug-in base or chassis



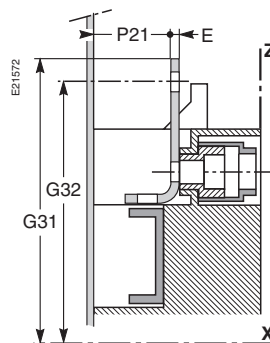
Front connection

Terminals



NS100/160/250

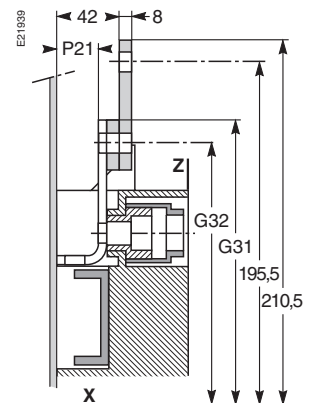
Mounting on backplate or on rails ⁽¹⁾



⁽¹⁾ For backplate mounting, the insulating screen, supplied with the plug-in base, must be installed.

NS400/630

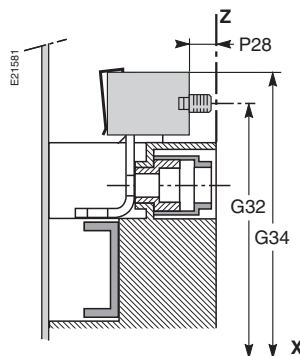
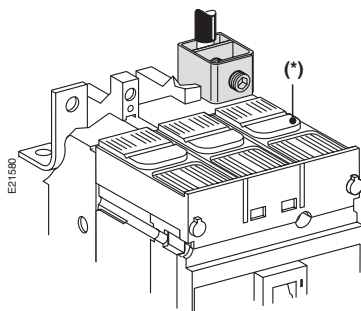
With spreaders



Connectors

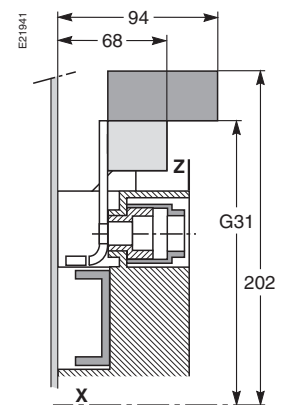
NS100/160/250

Mounting on backplate or on rails ⁽¹⁾



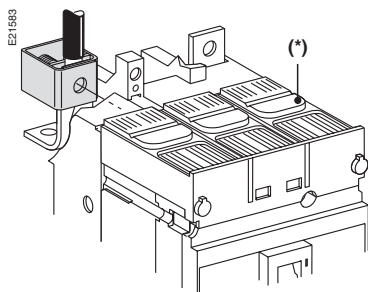
NS400/630

With spreaders

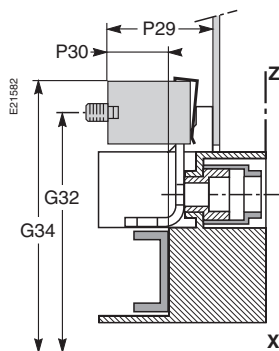


^(*) short terminal shields are mandatory.

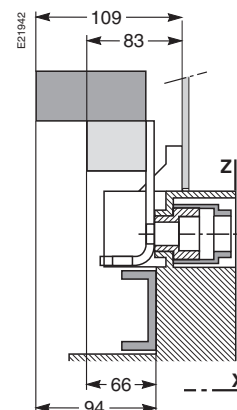
Connectors



NS100/160/250
Mounting through backplate or on rails

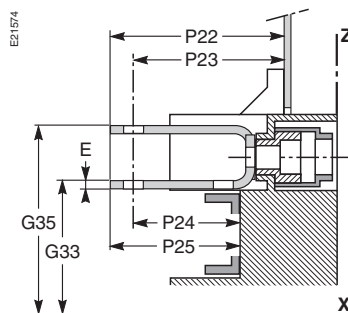
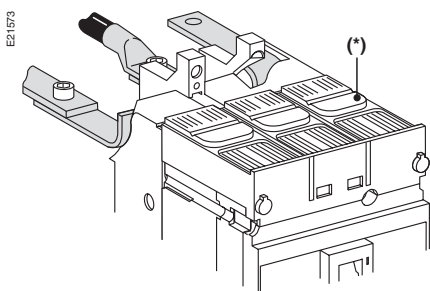


NS400/630



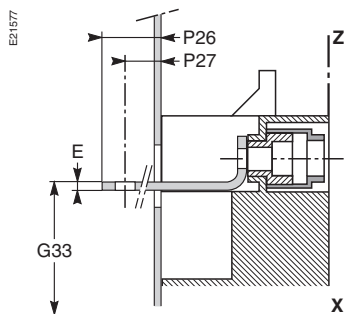
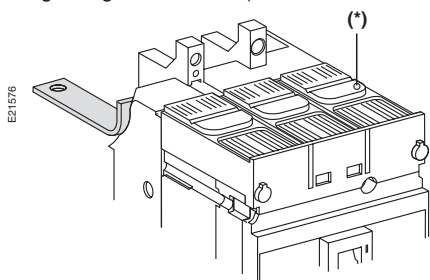
Rear connection

Mounting through backplate or on rails



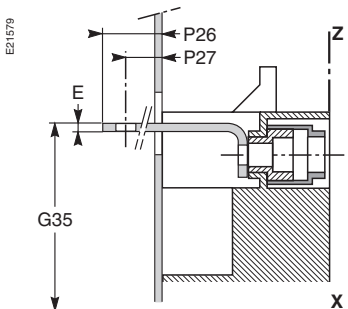
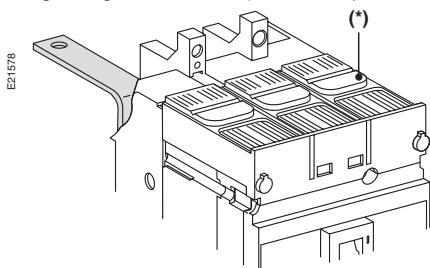
Mounting on backplate

Right-angle extensions (mounted down and out)



Long, insulated right-angle terminal extensions are mandatory.

Right-angle extensions (mounted up and out)

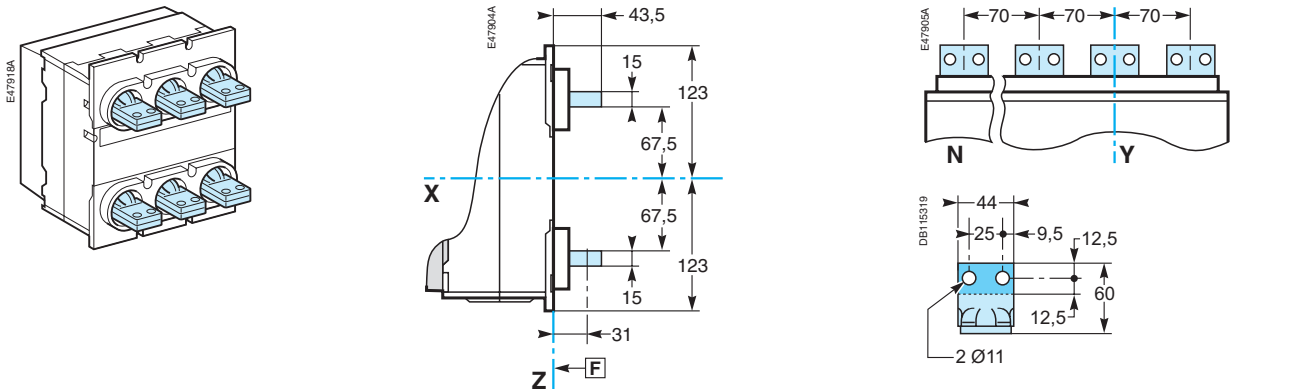


(*) short terminal shields are mandatory.

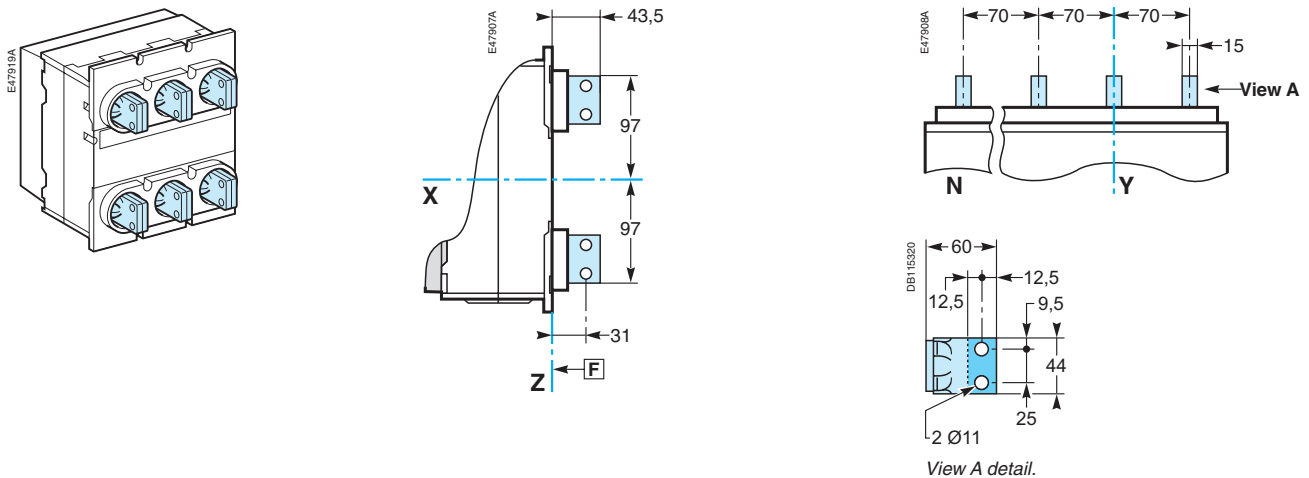
Dimensions (mm)

Type	E	G31	G32	G33	G34	G35	K1	P21	P22	P23	P24	P25	P26	P27	P28	P29	P30
NS100/160/250	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
NS400/630N/H/L	6	171	156.5	104		129	45	26	114.5	100.5	82.5	96.5	108.5	94.5			

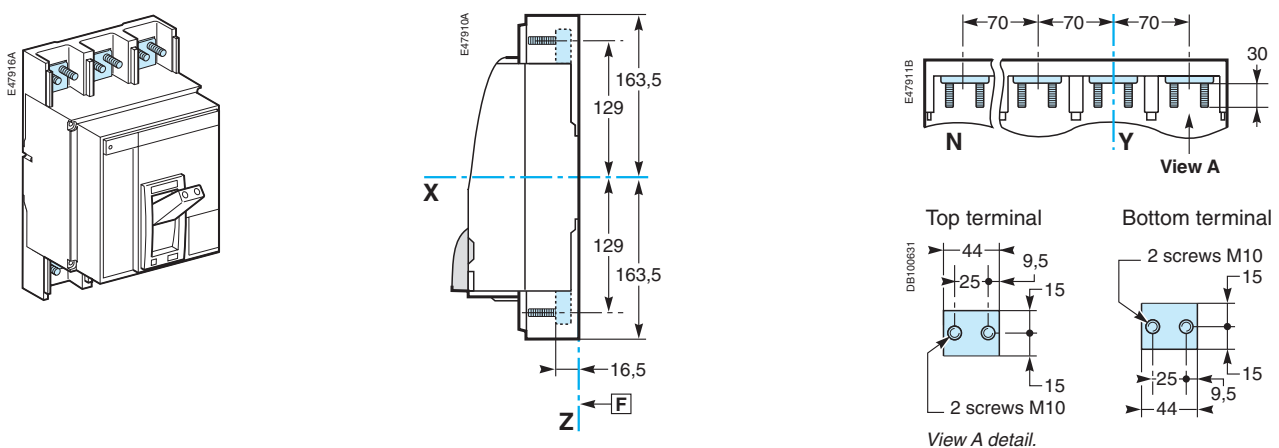
Horizontal rear connection



Vertical rear connection



Front connection

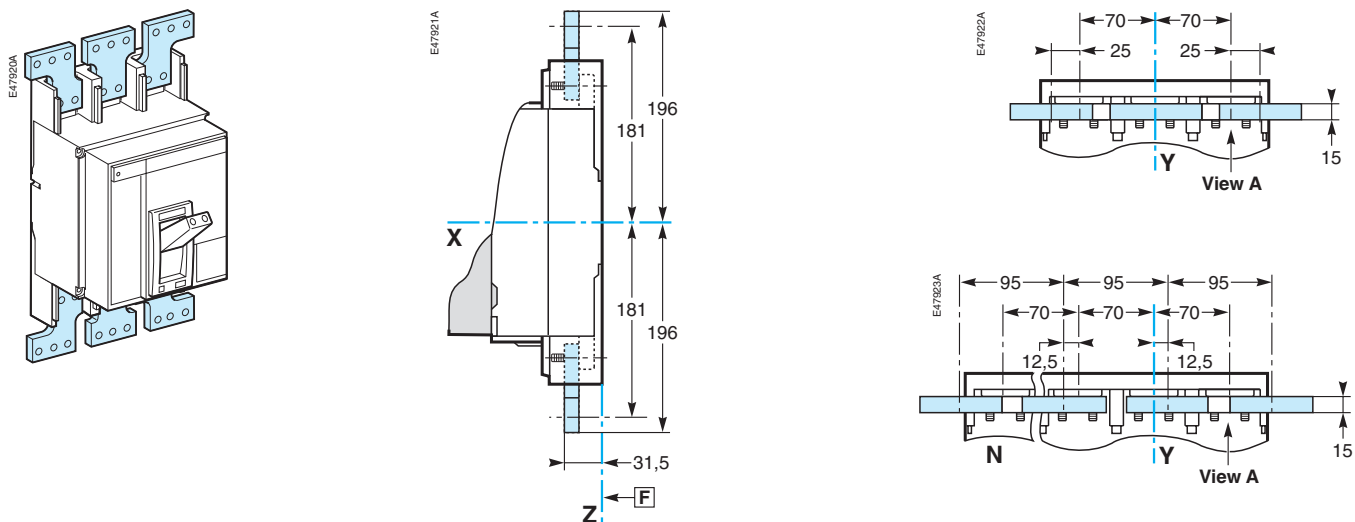


F : Datum.

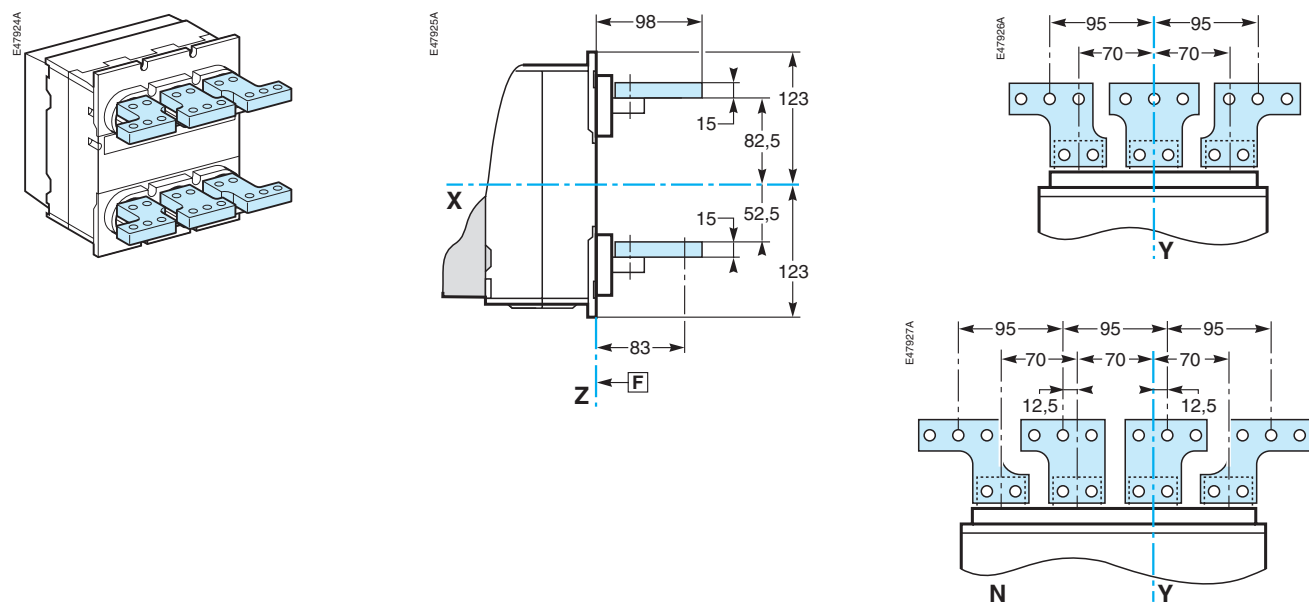
Note.

Recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

Front connection with spreaders

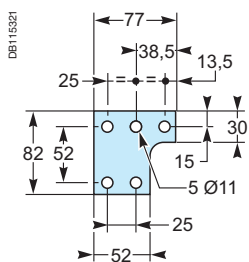


Rear connection with spreaders



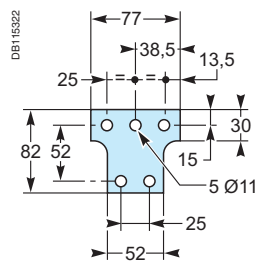
Spreader detail

Middle left or middle right spreader for 4P

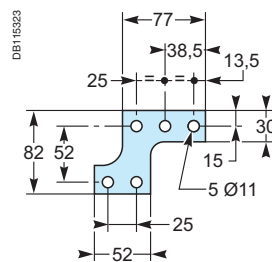


View A detail

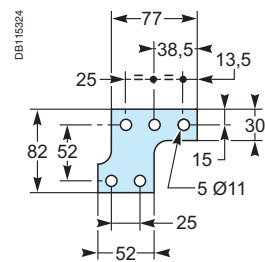
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P

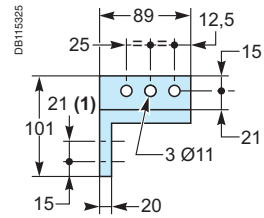
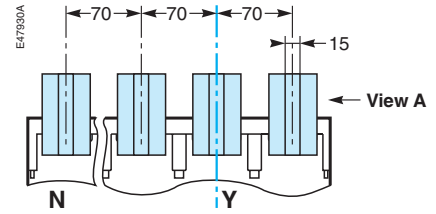
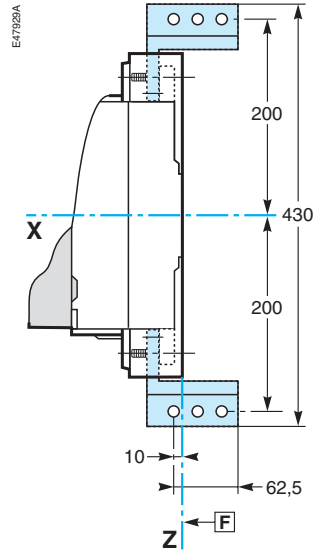
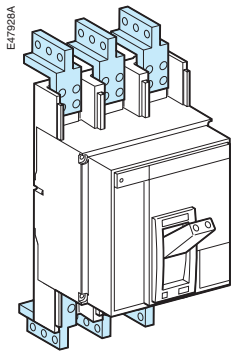


F : Datum.

Note.

X and Y are the symmetry planes for a 3-pole device.

Front connection with vertical-connection adapters



View A detail.

F : Datum.

Note.

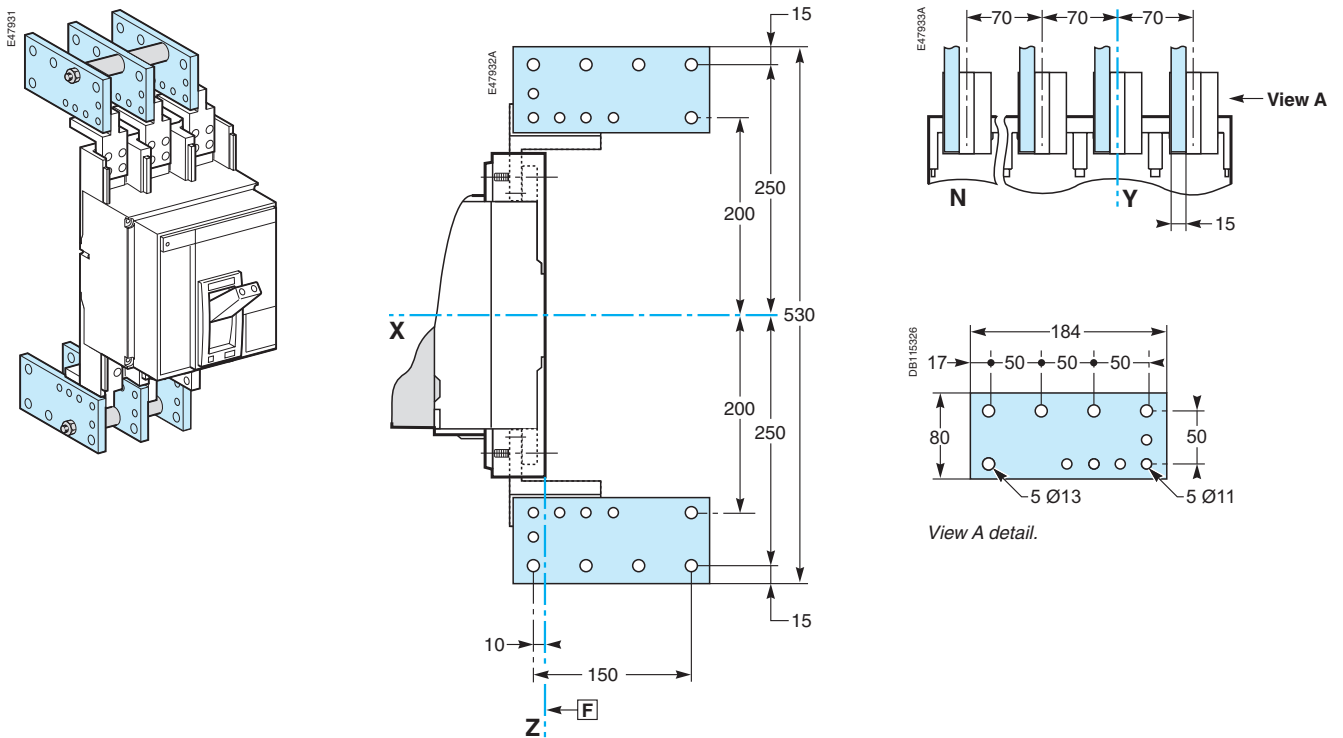
(1) two mounting possibilities for vertical-connection adapters
(pitch 21 mm).

Recommended connection screws: **M10** class 8.8.

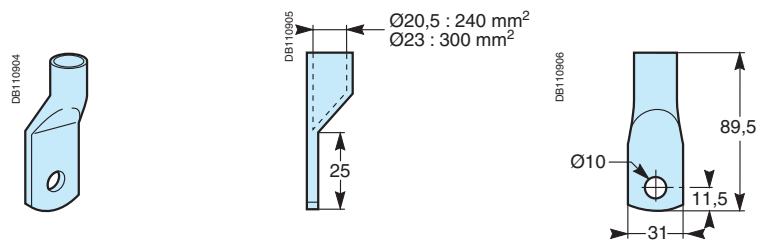
Tightening torque: **50 Nm** with contact washer.

Cables with lugs and bare cables

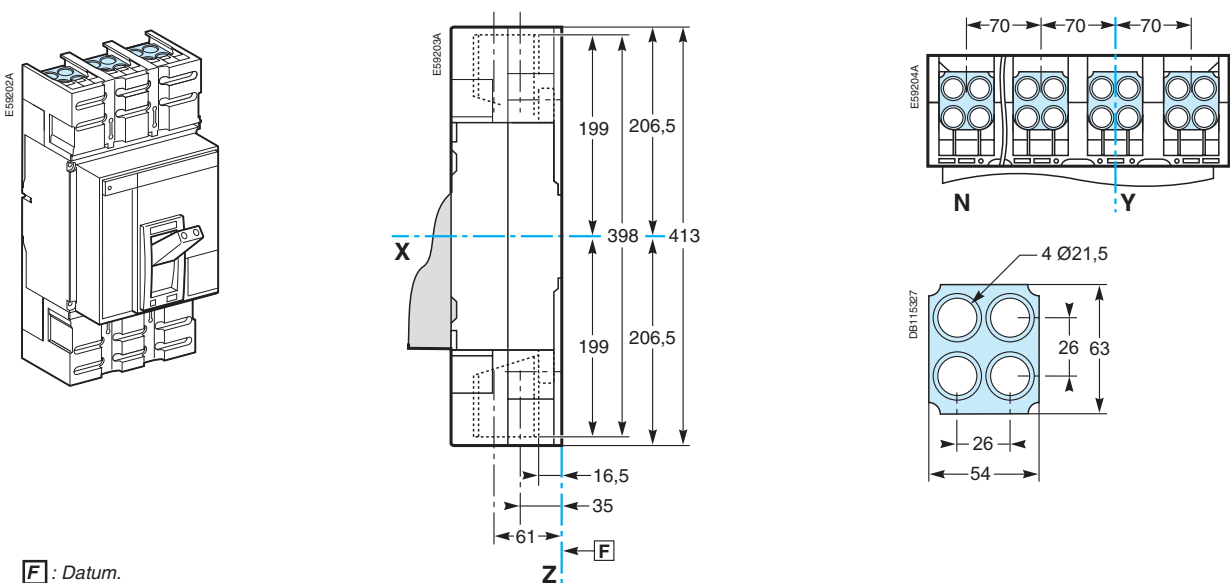
Front connection with vertical-connection adapters and cable-lug adapters



Lugs

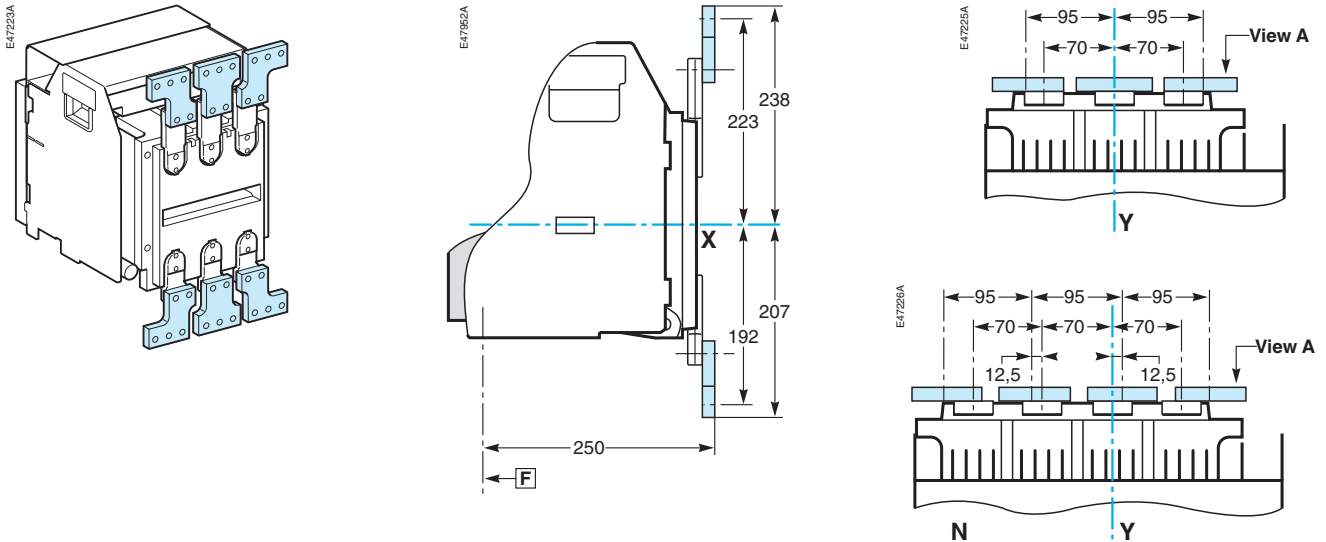


Fixed circuit breaker with 4-cable bare-cable connectors (240 mm²)



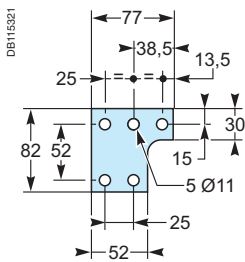
F : Datum.

Front connection with spreaders



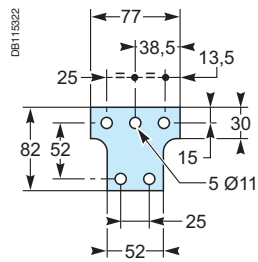
Spreader detail

Middle left or middle right spreader for 4P

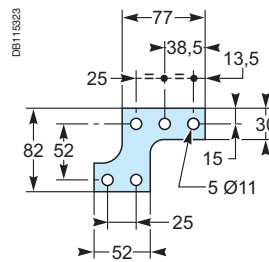


View A detail.

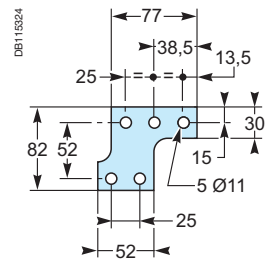
Middle spreader for 3P



Left or right spreader for 4P



Left or right spreader for 3P

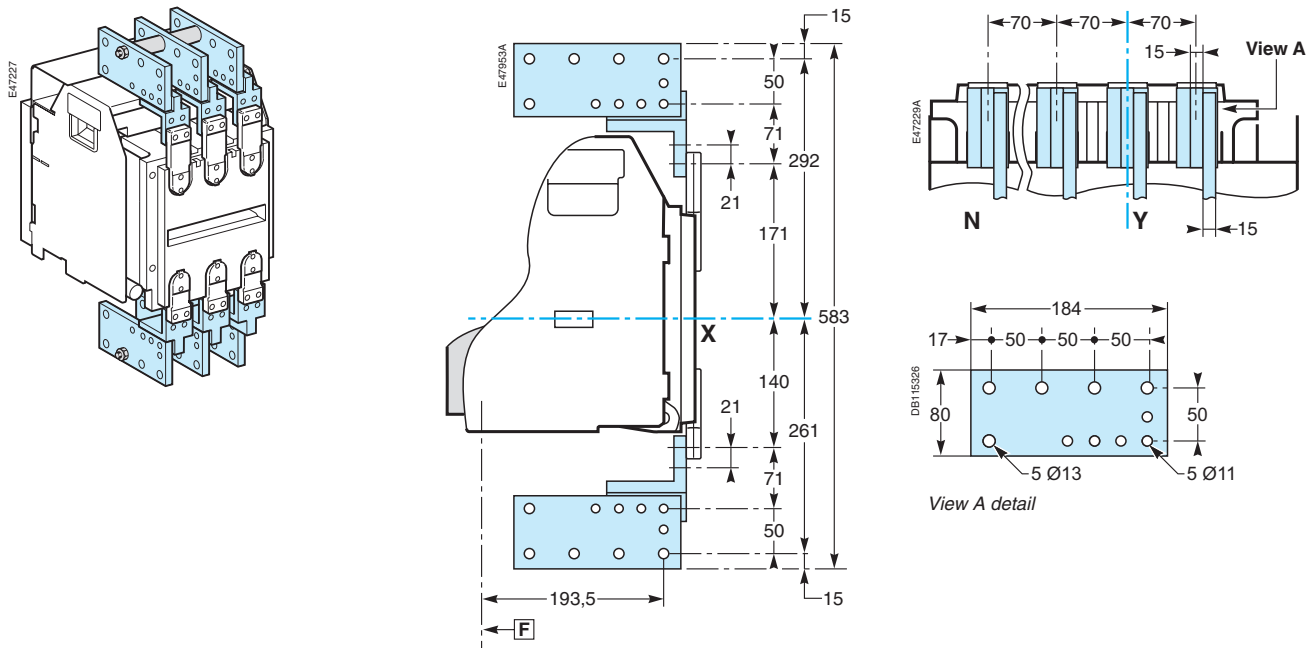


F : Datum.

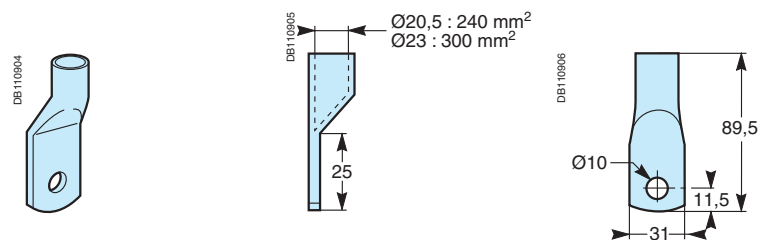
Compact NS630b to 1600 (plug-in and withdrawable versions) (cont.)

Cables with lugs

Front connection with vertical-connection adapters and cable-lug adapters



Lugs

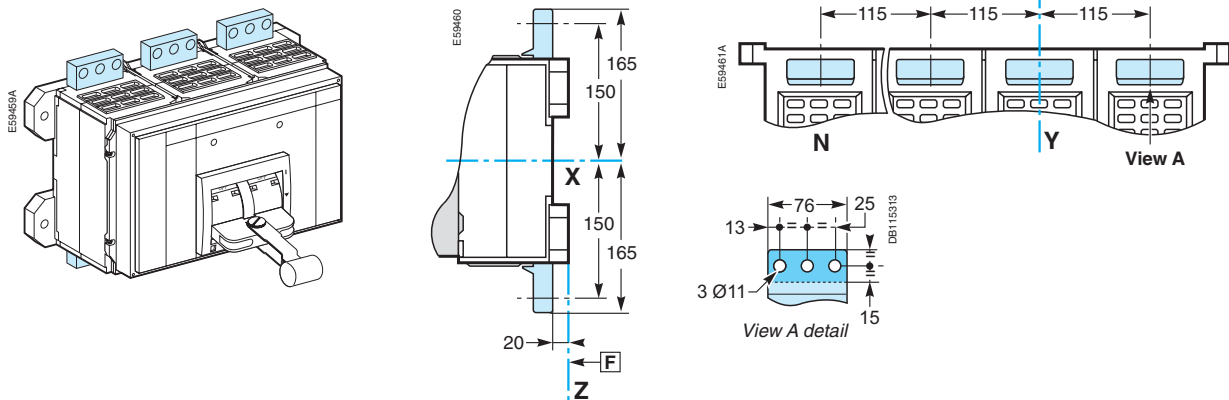


F : Datum.

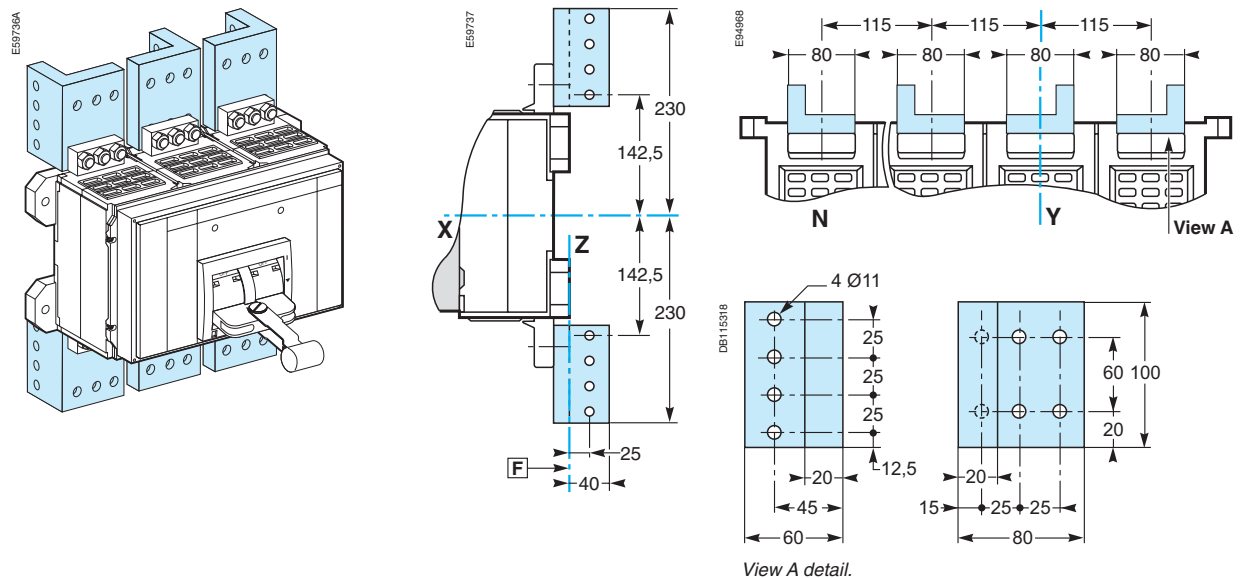
Note.
X and Y are the symmetry planes for a 3-pole device.
Tightening torque: 50 Nm with contact washer.
X and Y are the symmetry planes for a 3-pole device.

Compact NS1600b to 3200 (fixed version)

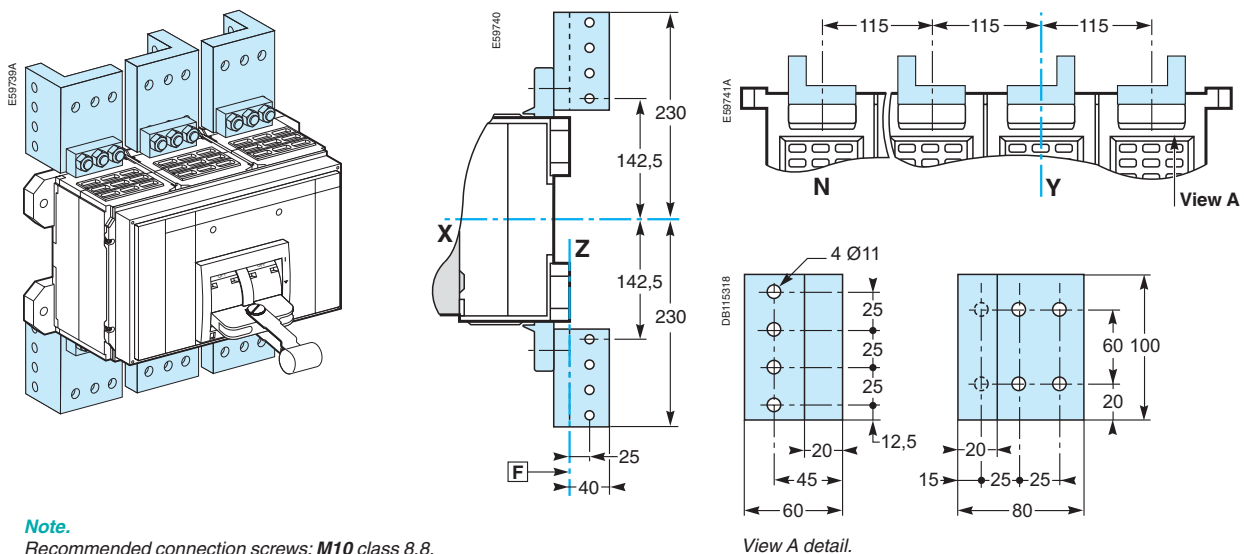
Front connection (NS1600b to 2500)



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



Front connection (NS3200)



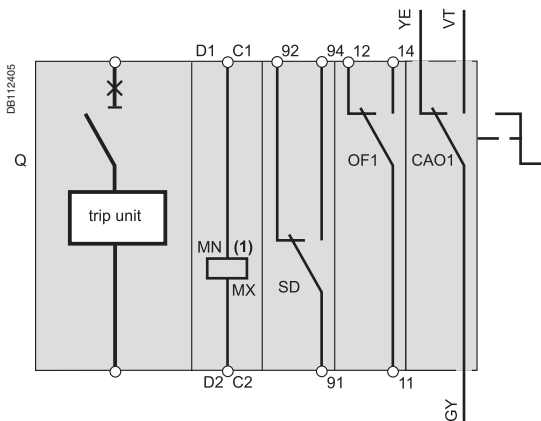
Note.

Recommended connection screws: **M10** class 8.8.
Tightening torque: **50 Nm** with contact washer.

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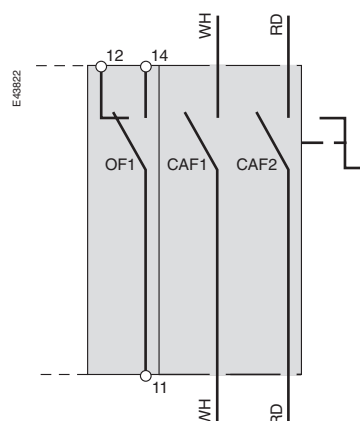
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

With OF1 and CAO1

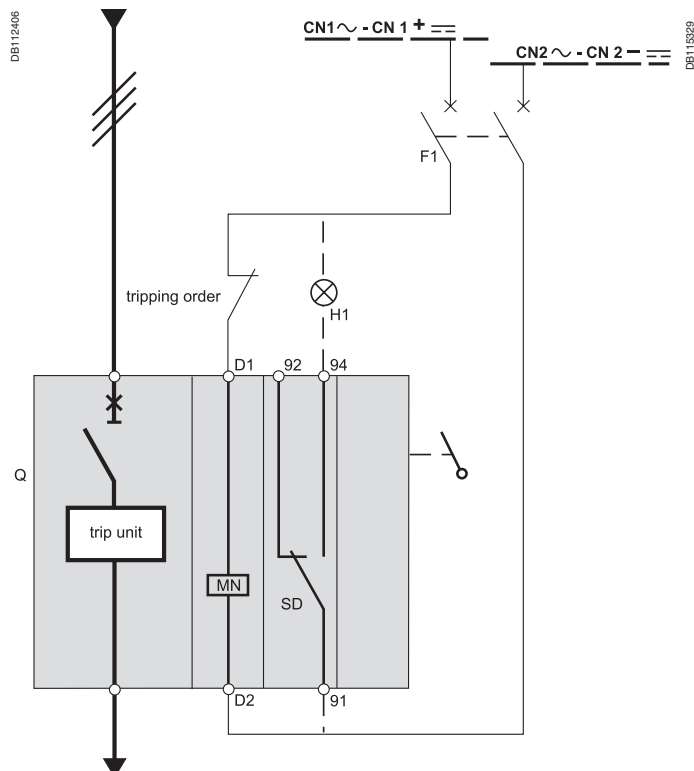


(1) MN or MX (MN: D1, D2; MX: C1, C2)

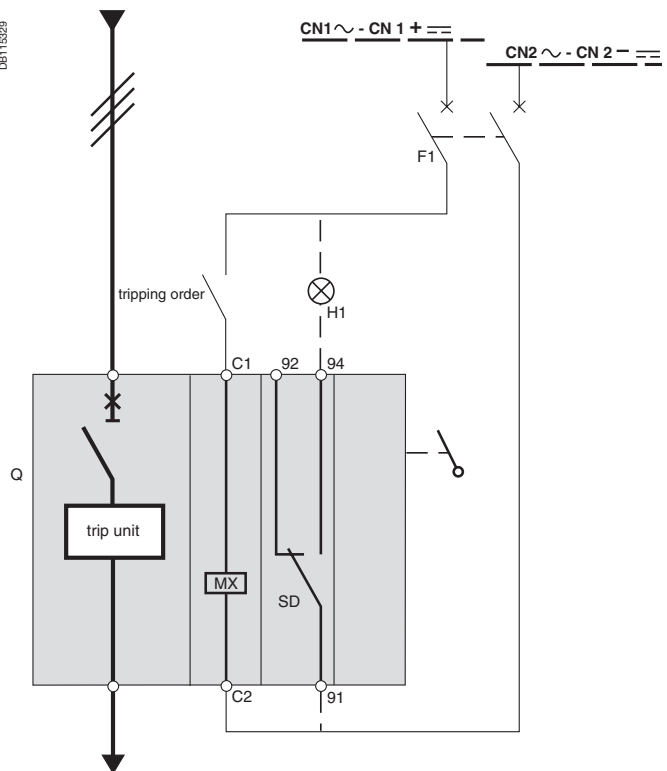
With OF1 and CAF1/CAF2



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

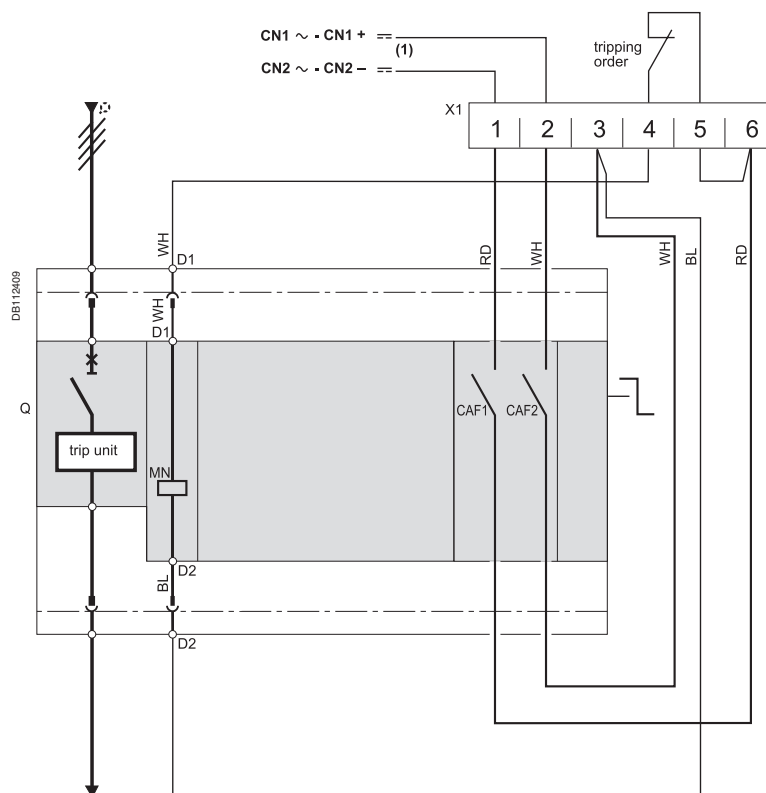
Colour code for auxiliary wiring

- RD** red
- GN** green
- BK** black
- BL** blue
- WH** white

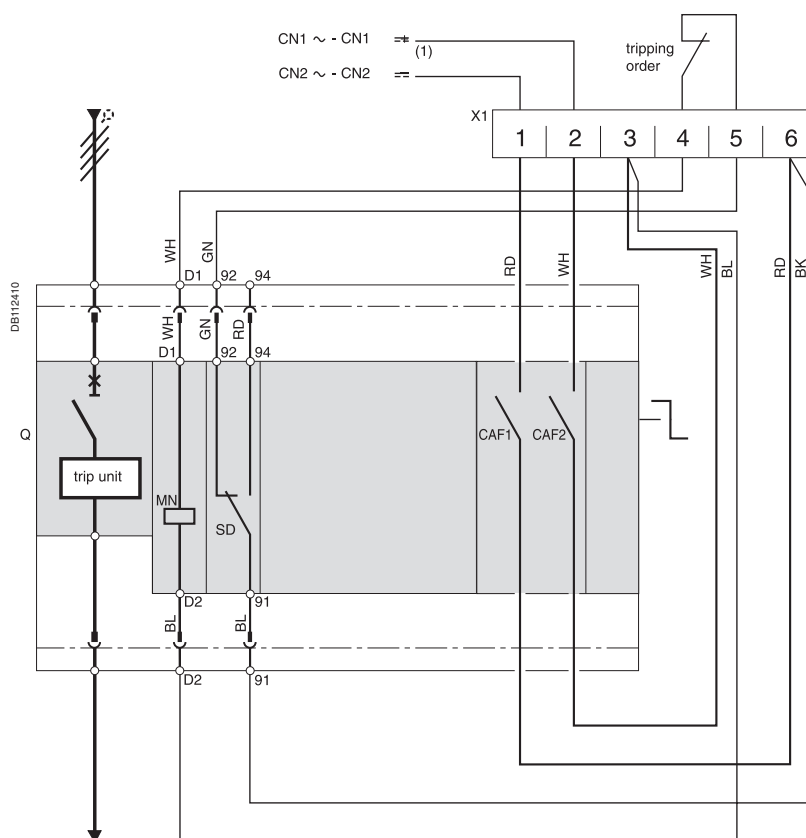
Early-make contacts

Following tripping due to an electrical fault, reset must be carried out locally and manually.

With MN



With MN + SD

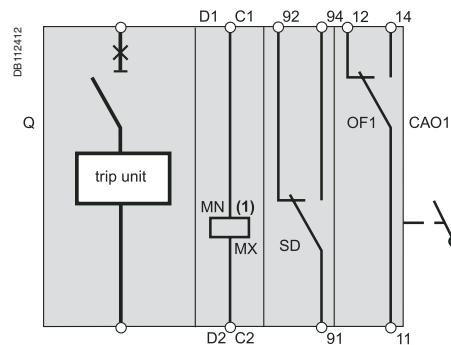


(1) independent auxiliary source.

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.

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, D2; MX: C1, C2)

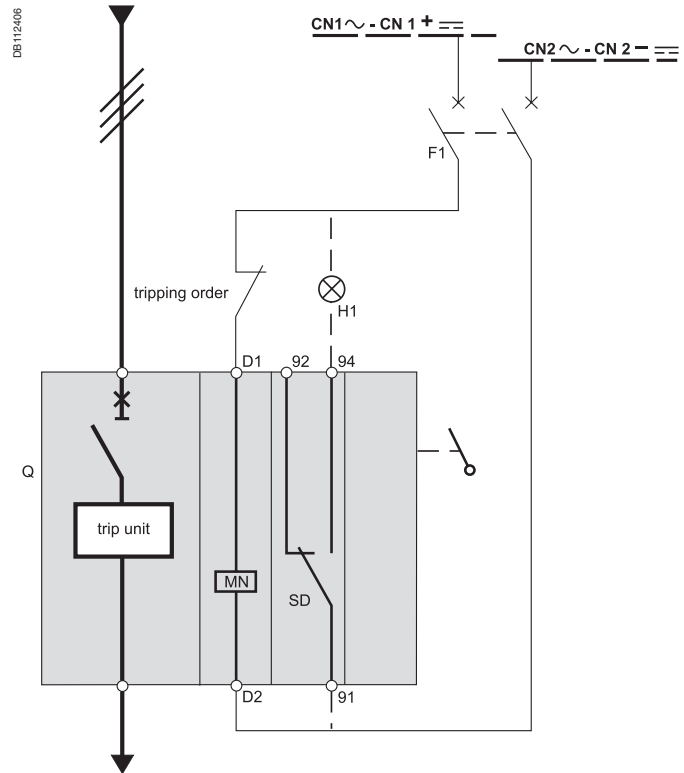
Symbols

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

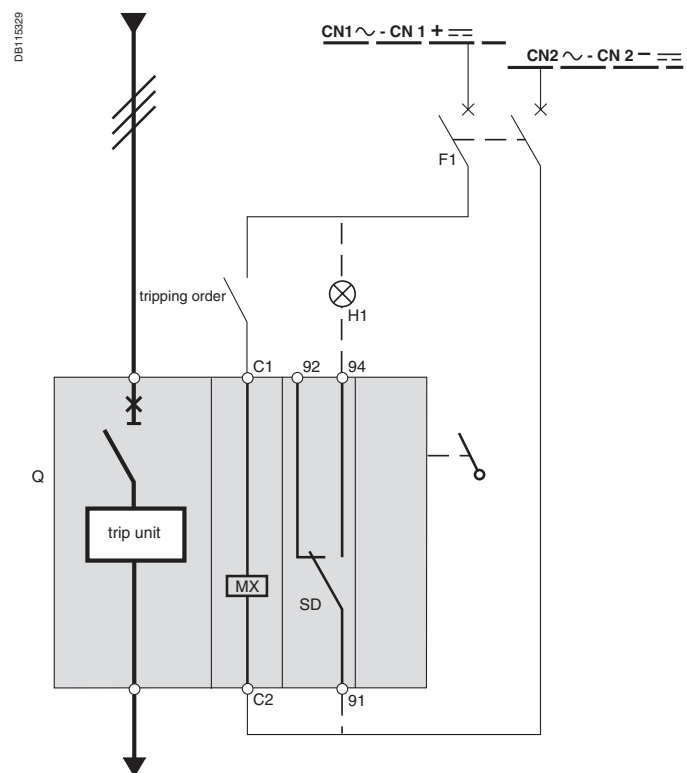
Colour code for auxiliary wiring

RD	red
GN	green
BK	black
BL	blue
WH	white

With MN



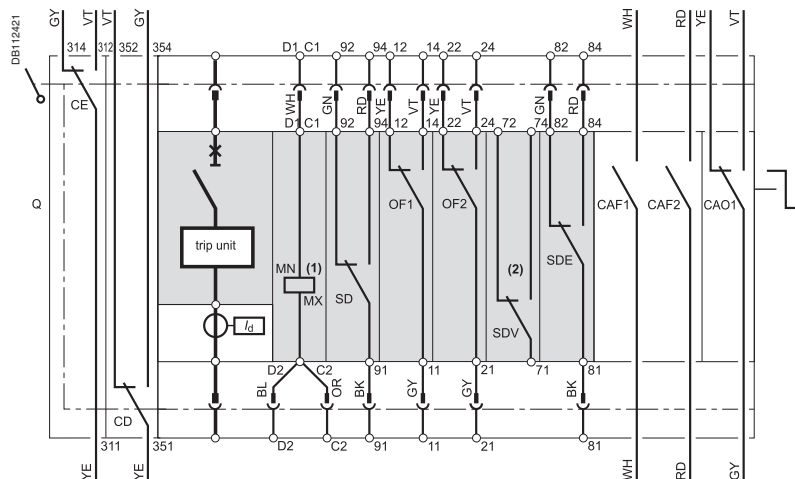
With MX



The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Compact NS100 to 250

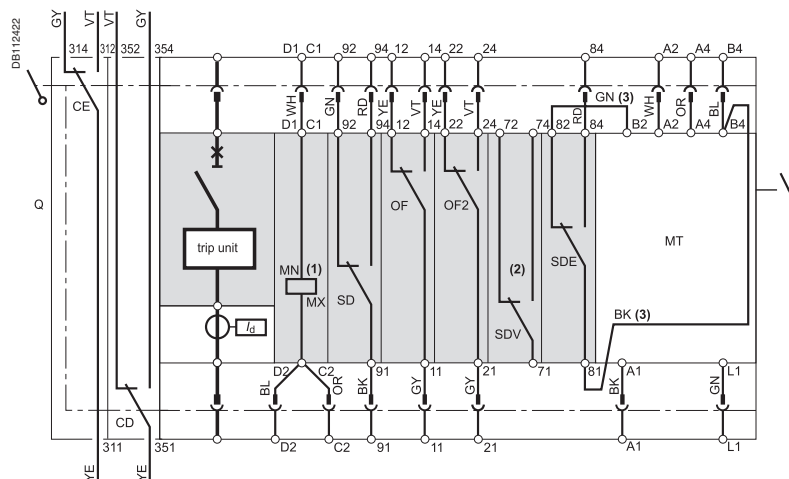
Manually operated circuit breaker



(1) MN or MX (MN: D1, D2; 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, D2; 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.

Symbols

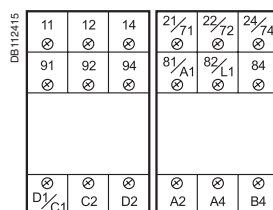
Q	Compact NS100 to 250
SD	trip indication contact
SDE	fault indication contact
SDV	earth-fault indication contact
OF	ON / OFF indication contact
MN	undervoltage release
MX	shunt release
MT	motor-mechanism module
CAO	early-break contact of rotary handle
CAF	early-make contact of rotary handle
CE	connected-position carriage switch
CD	disconnected-position carriage switch

Colour code for auxiliary wiring

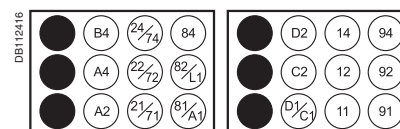
RD	red
GN	green
BK	black
VT	violet
YE	yellow
GY	grey
BL	blue
OR	orange
WH	white

Auxiliary wiring for plug-in / withdrawable circuit breaker

Automatic auxiliary connectors (wires 0.75 to 2.5 mm²) Manual auxiliary connectors (wires 0.75 to 2.5 mm²)



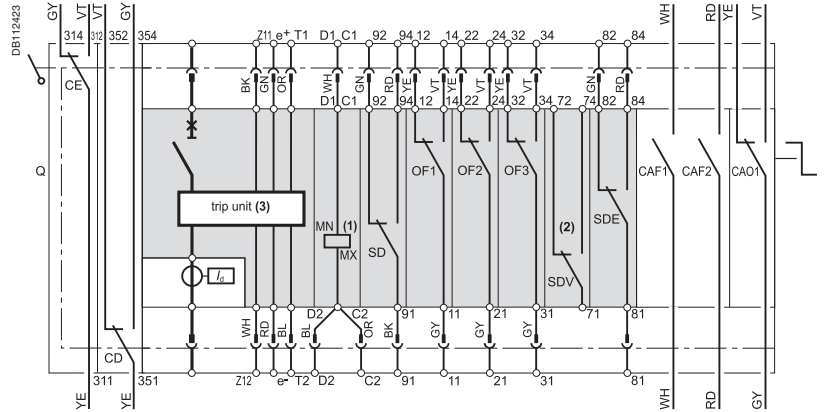
Fixed part
(front view looking into base)



Fixed part (rear view).

Compact NS400 to 630

Manually operated circuit breaker

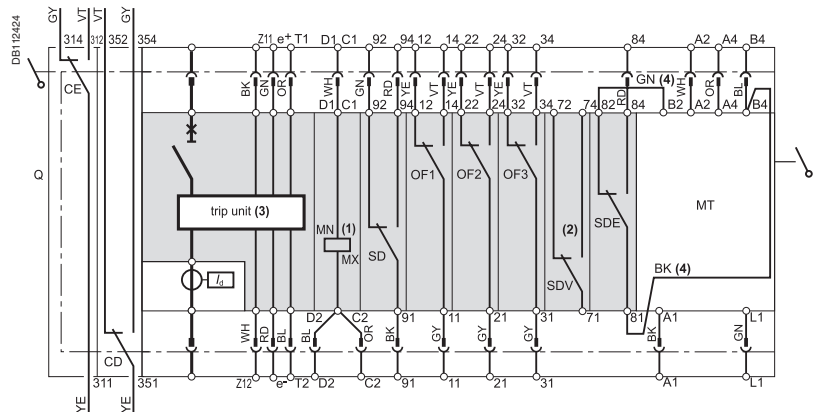


(1) MN or MX (MN: D1, D2; MX: C1, C2).

(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, D2; 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.

Symbols

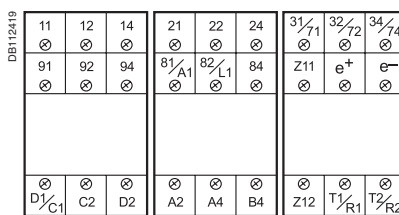
Q	Compact NS100 to 250
SD	trip indication contact
SDE	fault indication contact
SDV	earth-fault indication contact
OF	ON / OFF indication contact
MN	undervoltage release
MX	shunt release
MT	motor-mechanism module
CAO	early-break contact of rotary handle
CAF	early-make contact of rotary handle
CE	connected-position 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

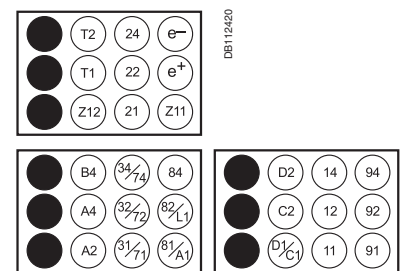
Auxiliary wiring for plug-in / withdrawable circuit breaker

Automatic auxiliary connectors
(wires 0.75 to 2.5 mm²)



Fixed part
(front view looking into base)

Manual auxiliary connectors
(wires 0.75 to 2.5 mm²)

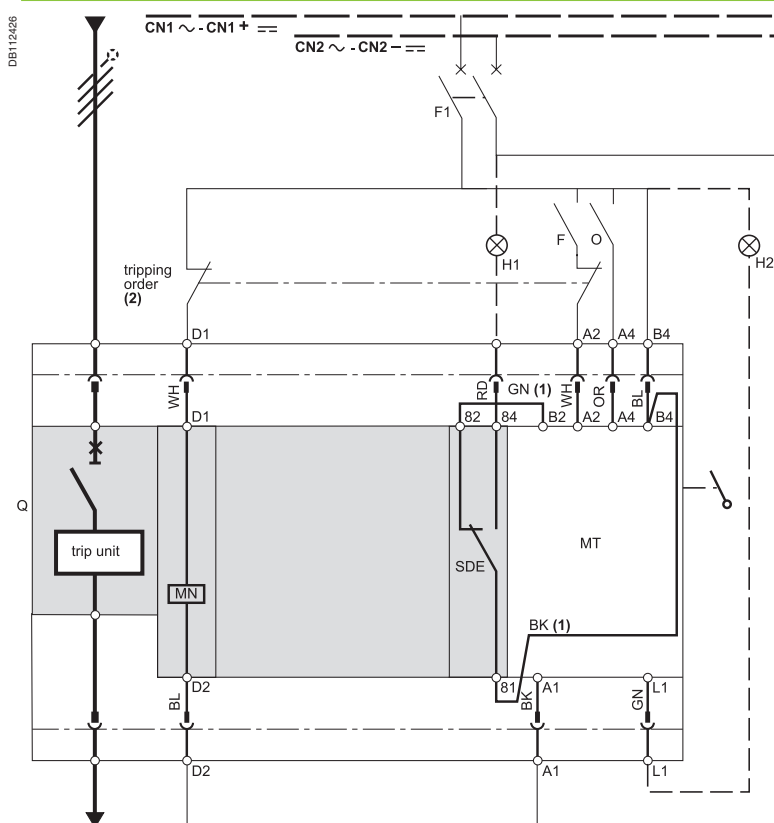


Fixed part (rear view).

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.

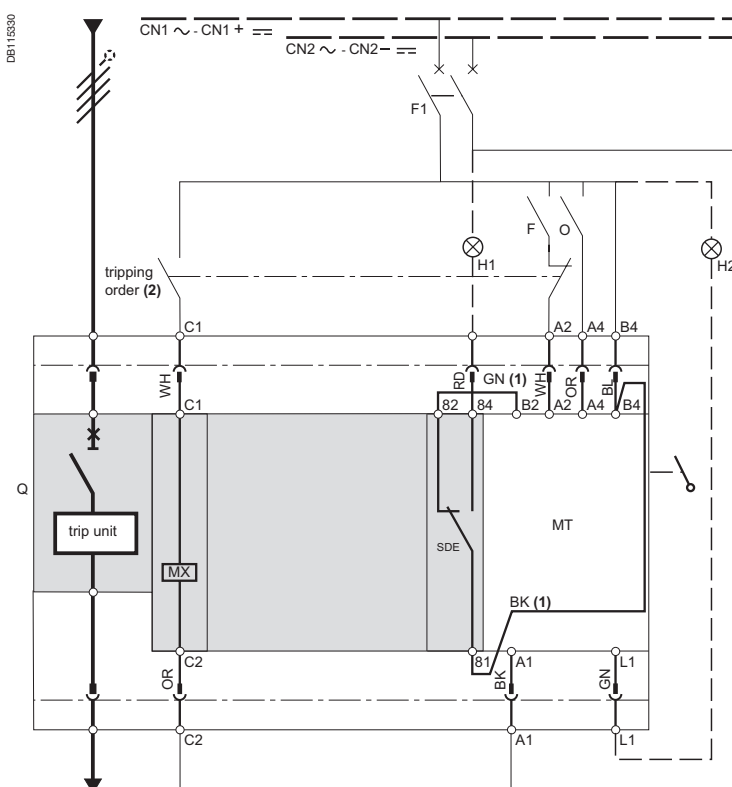
Automatic reset with MN



(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*

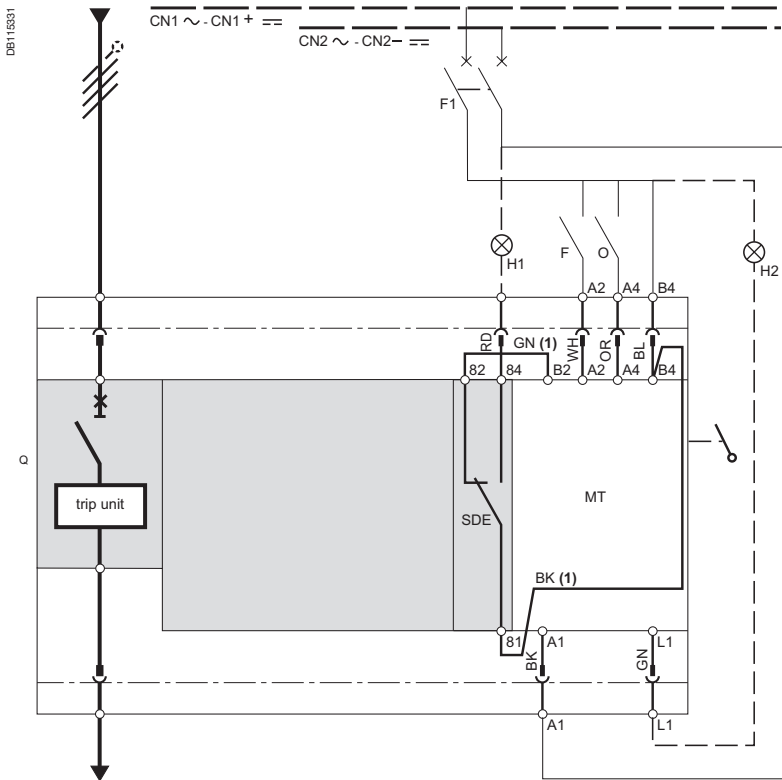
BK *black*

BL *blue*

OR *orange*

WH *white*

Automatic reset without auxiliary

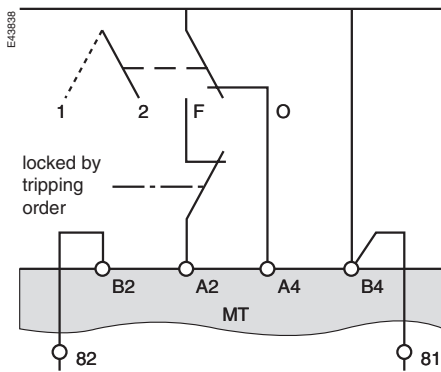


(1) wires supplied, must be connected to ensure correct operation.

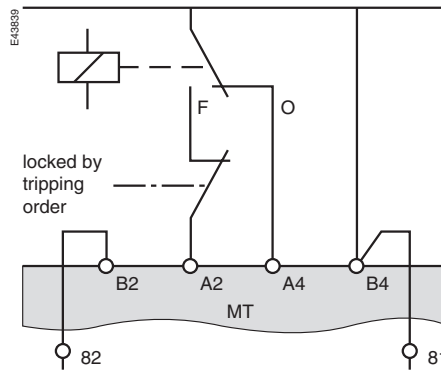
Control via switch or relay

With MN/MX

Controlled by switch

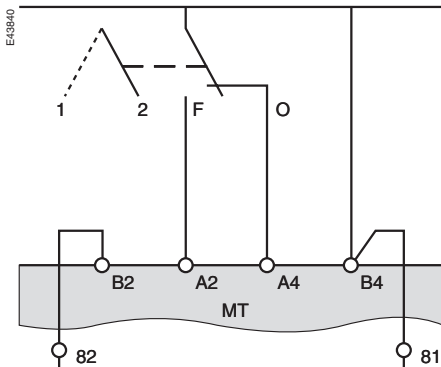


Controlled by relay

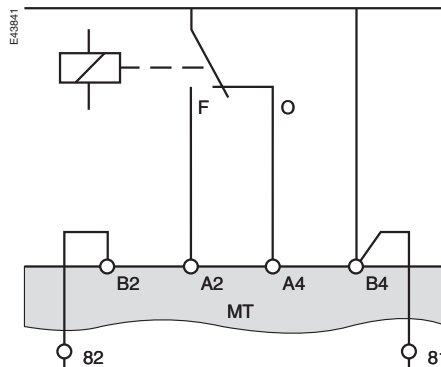


Without auxiliary

Controlled by switch



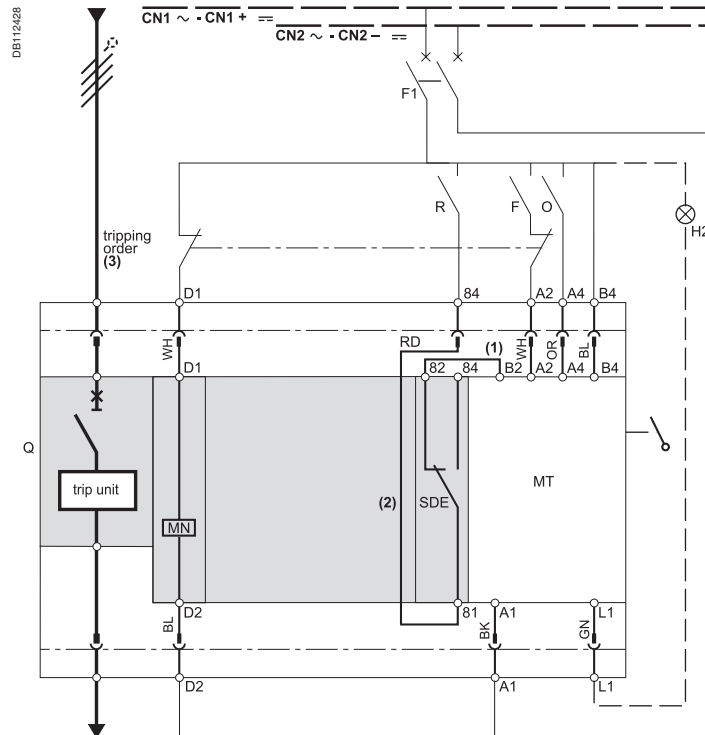
Controlled by relay



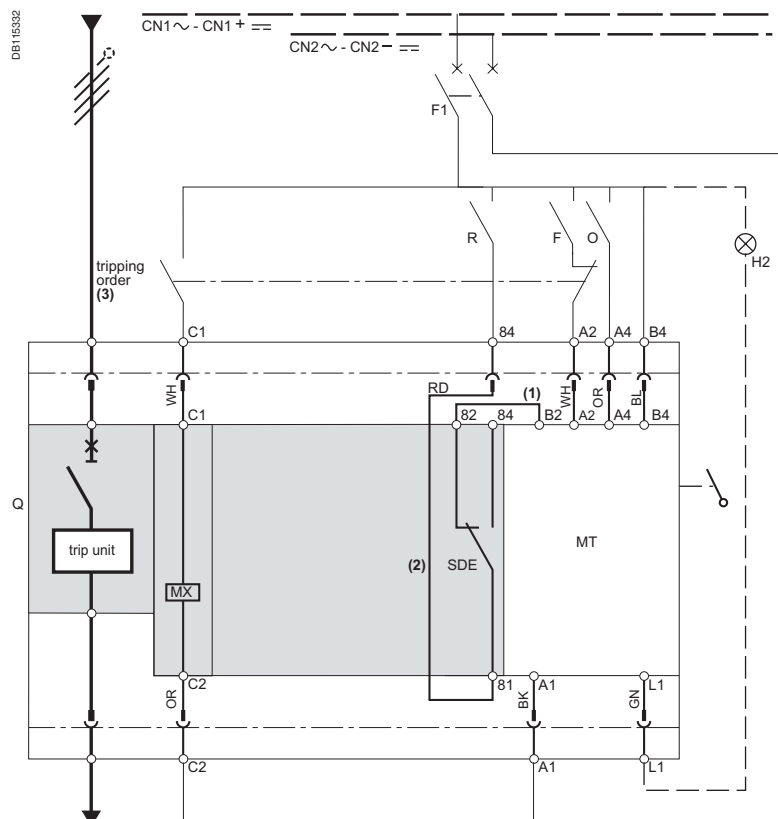
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

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
F closing order
O opening order
 (must be > 150 ms, has priority over F order)

orders must not be simultaneous

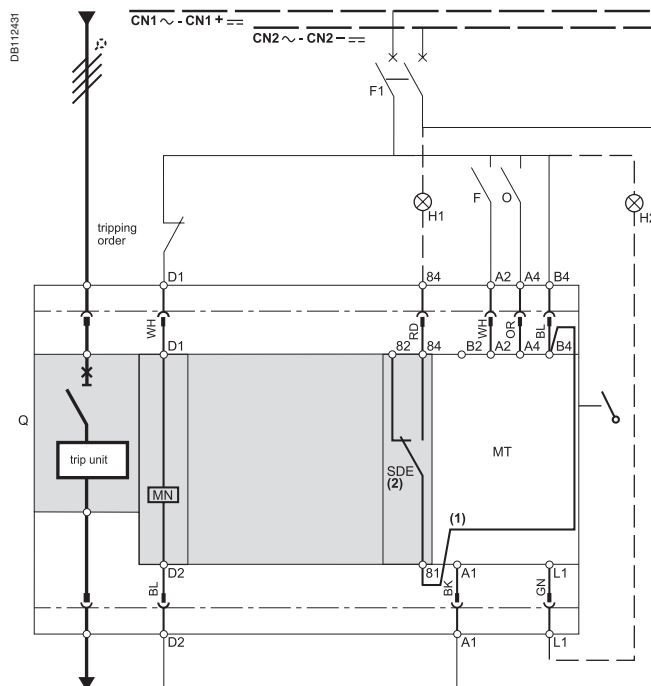
Colour code for auxiliary wiring

- RD** red
GN green
BK black
BL blue
OR orange
WH white

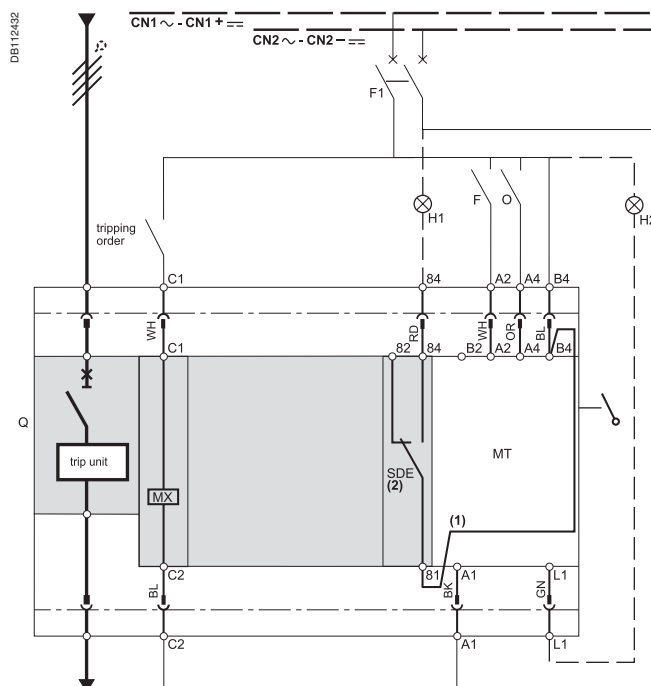
The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

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.

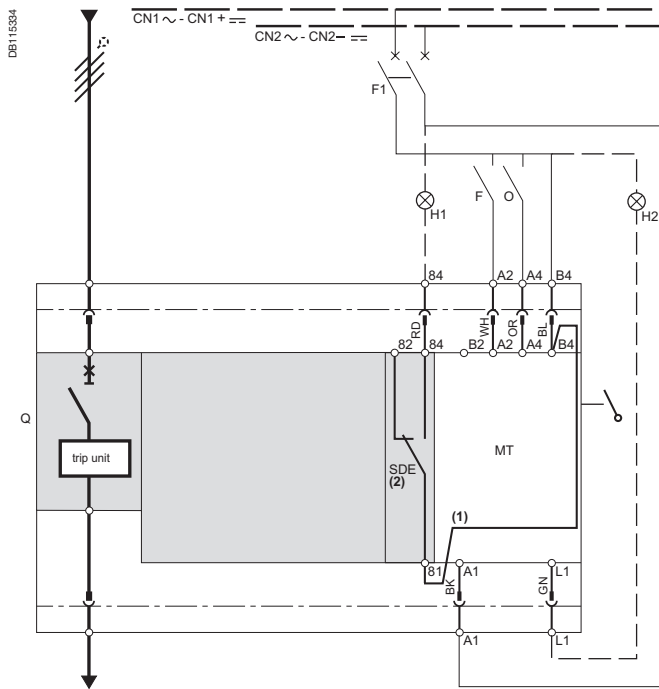
Symbols

- 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

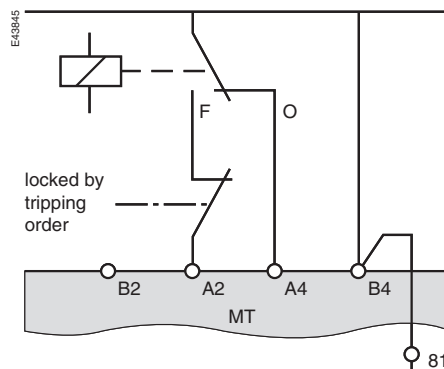
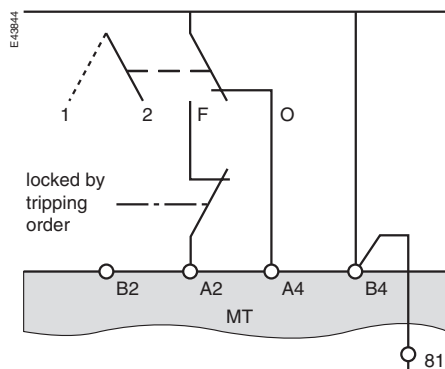
Local reset without auxiliary



(1) (2) required to ensure correct indication of an electrical fault.

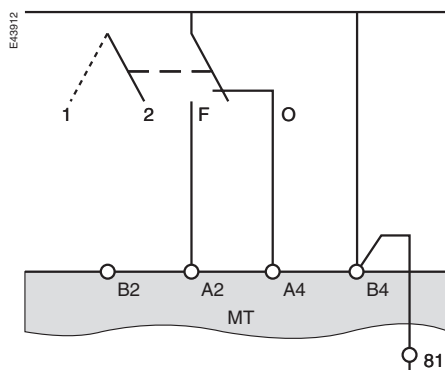
Control via switch or relay

With MN/MX

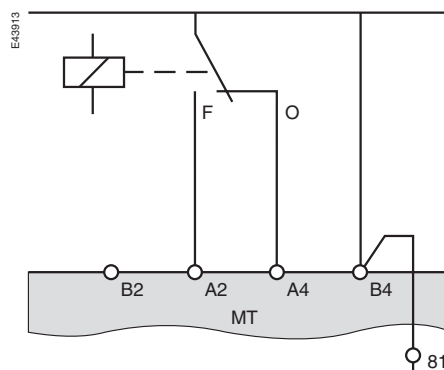


Without auxiliary

Controlled by switch



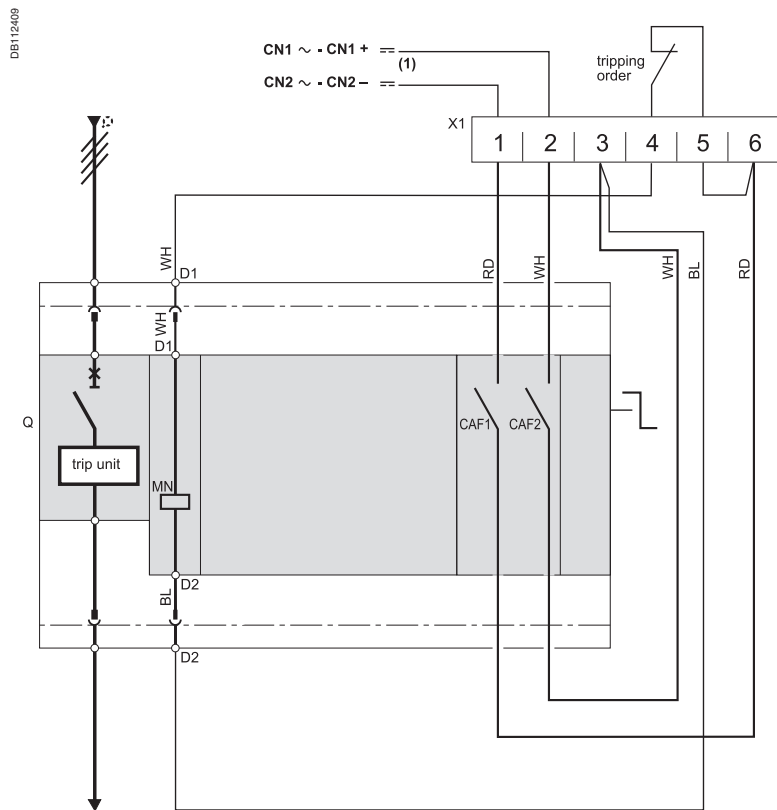
Controlled by relay



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

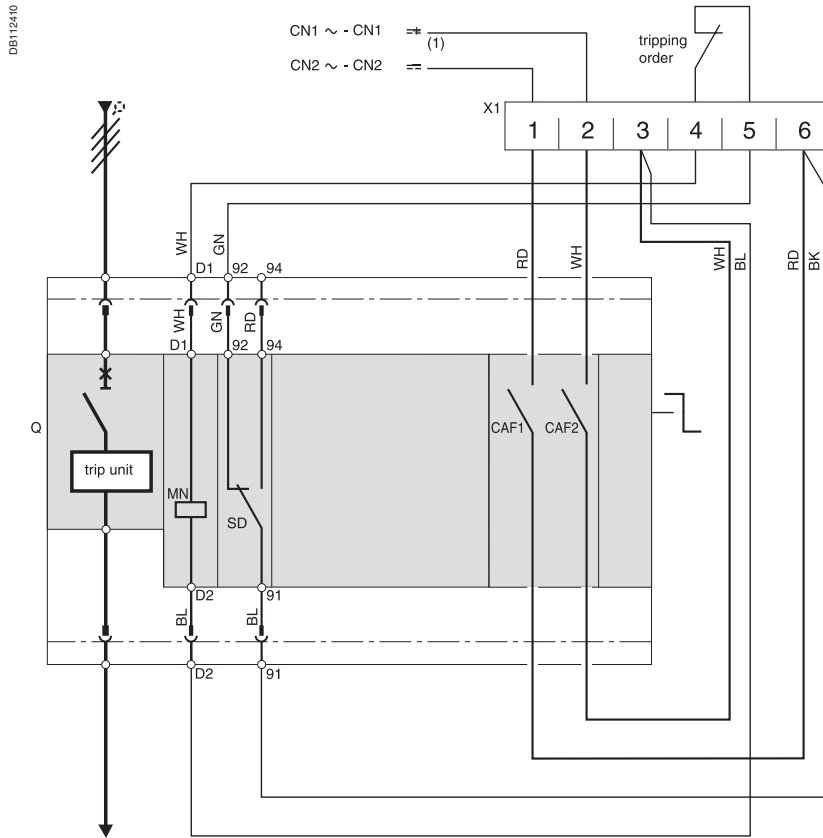
Symbols

- 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

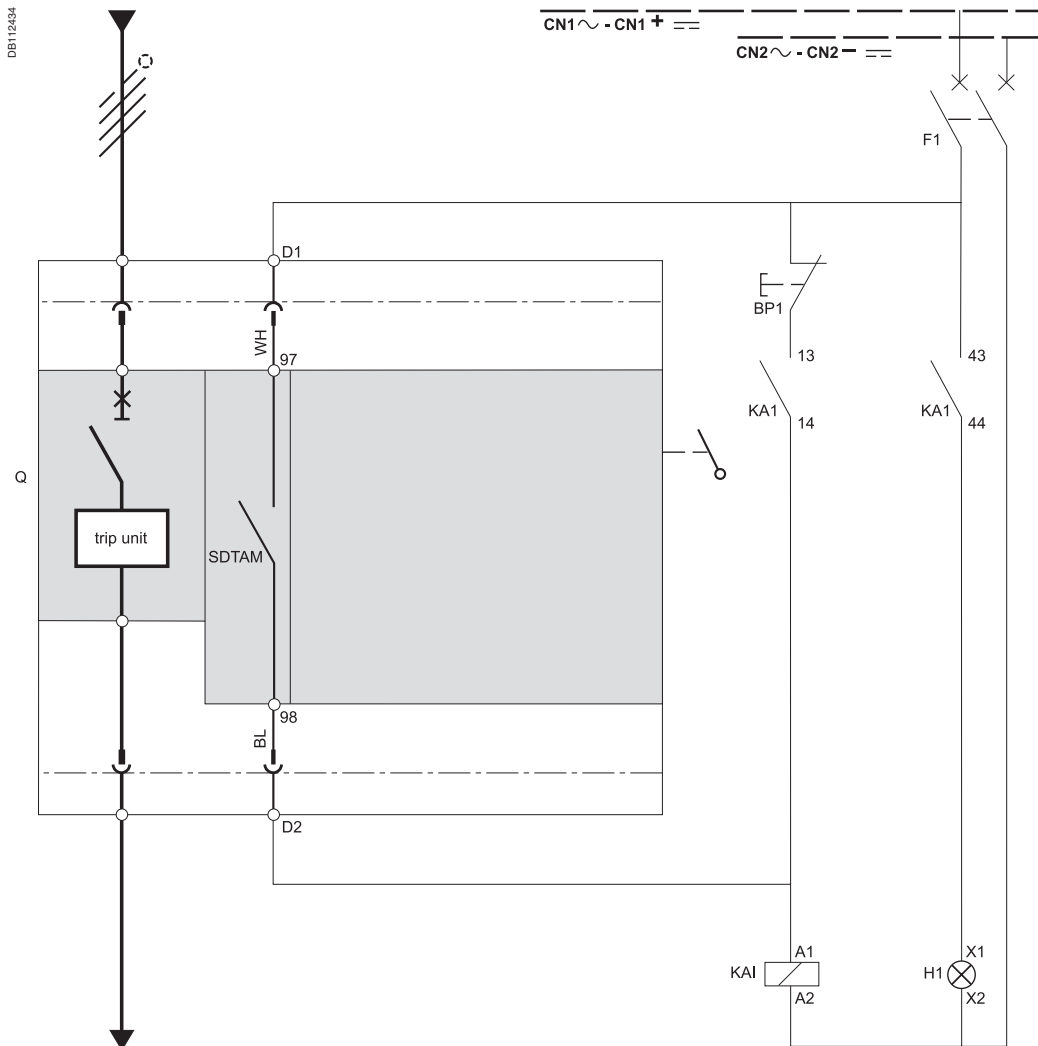
With MN + SD



(1) independent auxiliary source.

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

Thermal-fault indication



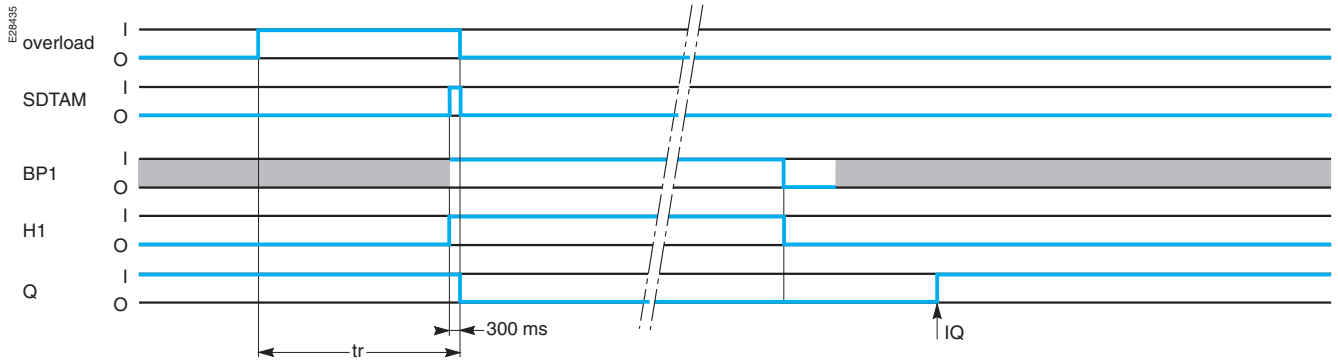
Symbols

- 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 I_r (long-time tripping threshold)
IQ closing order for circuit breaker Q

Note.

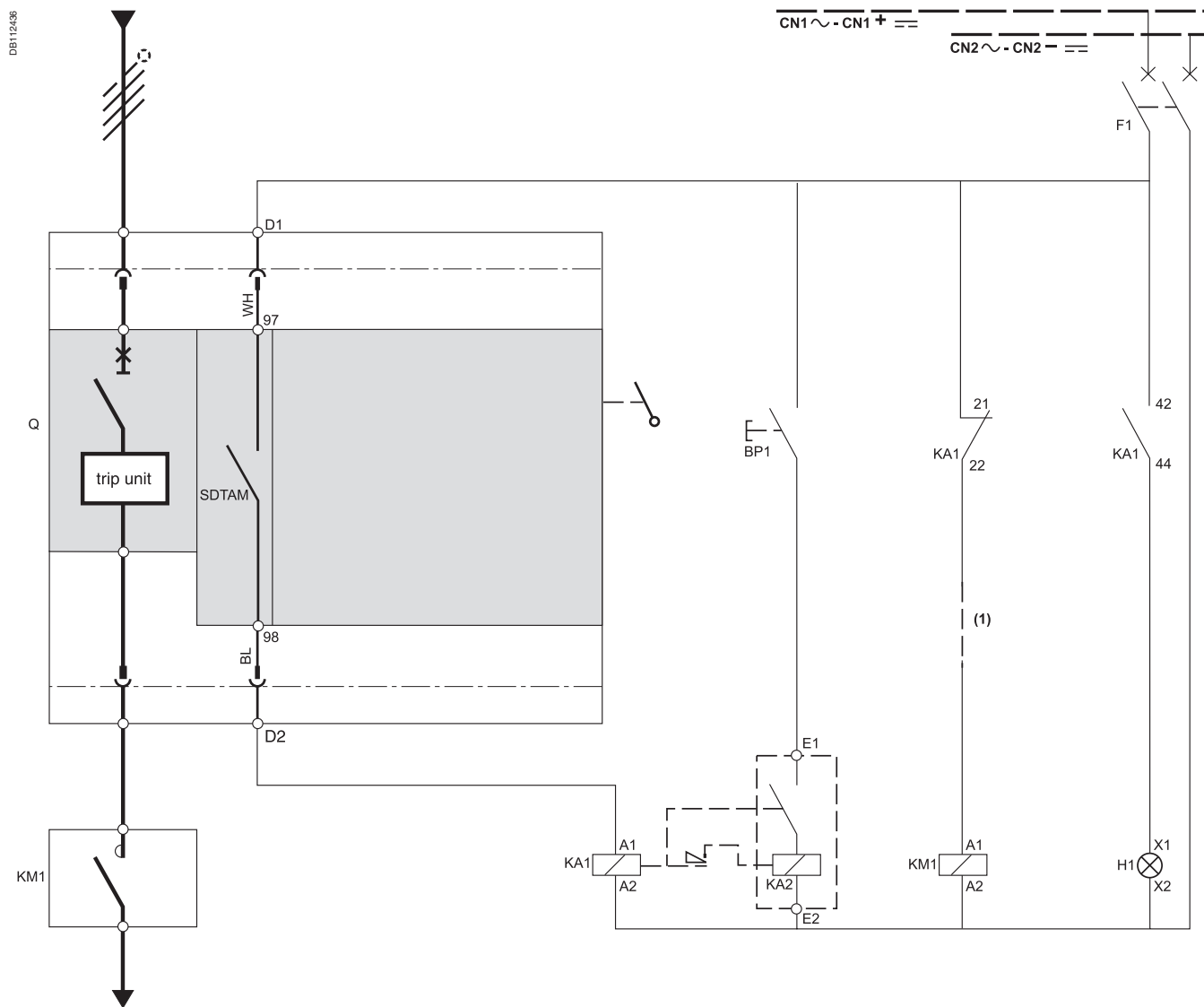
For a short-circuit or earth fault, only circuit breaker Q opens.
 The above automatic control sequence is not run.

Legend

- O: OFF (circuit open)
- I: ON (circuit closed)
- : either ON or OFF

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.*

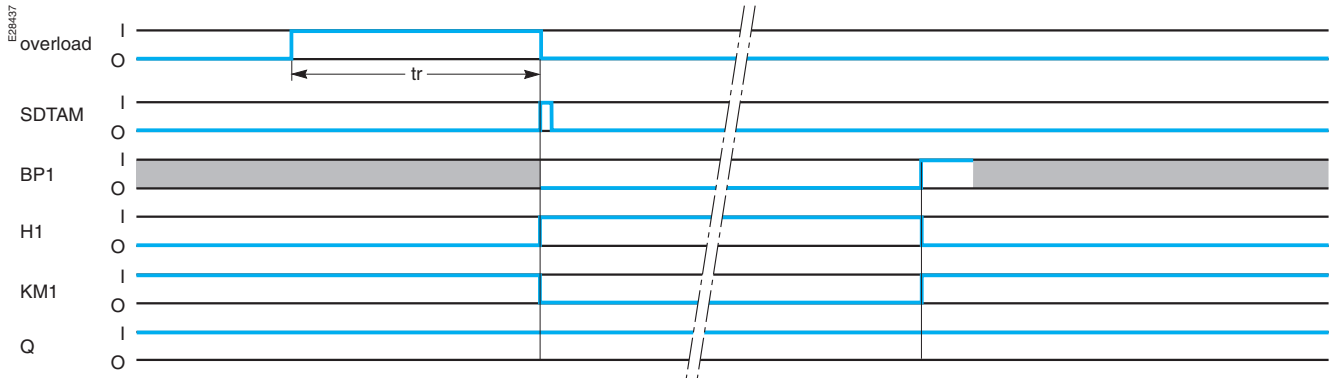
Symbols

Q	<i>Compact NS100 to 630</i>
F1	<i>breaker for protection of the auxiliary circuit</i>
SDTAM	<i>thermal-fault early-break signal</i>
BP1	<i>SDTAM reset button</i>
KA1	<i>auxiliary relay - Telemechanique CA...DN31 or CA...DN22</i>
KA2	<i>mechanical latching unit - Telemechanique LA6 DK1</i>
RHK	<i>bistable relay - Telemechanique RHK-41</i>
H1	<i>lamp signalling SDTAM fault</i>
KM1	<i>power contactor</i>

Colour code for auxiliary wiring

BL blue
WH white

Automatic operation



tr overload (long-time) protection tripping time
overload current greater than I_r (long-time tripping threshold)

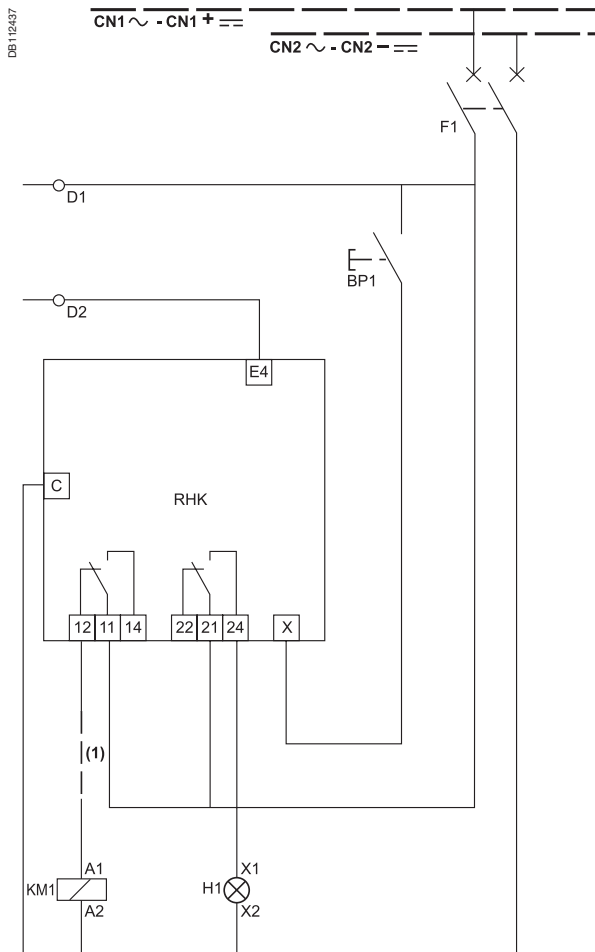
Note.

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



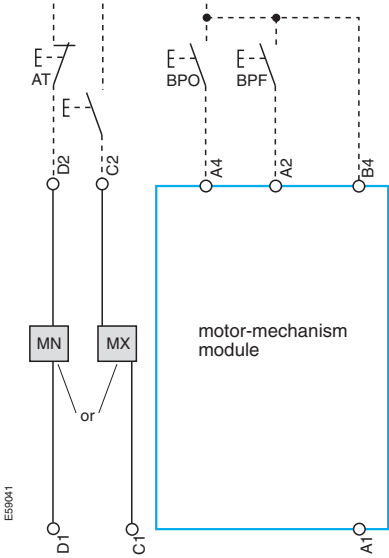
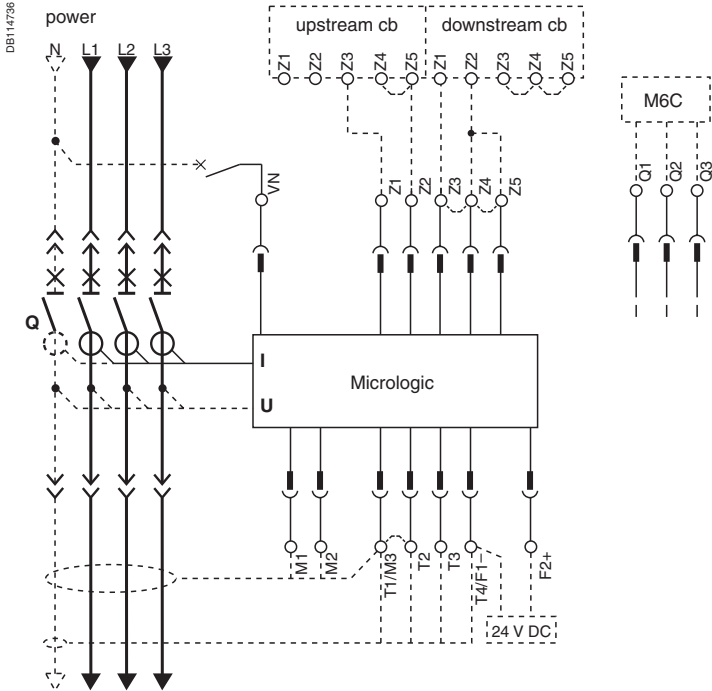
(1) KM1 operating conditions must be inserted between 12 and A1.

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



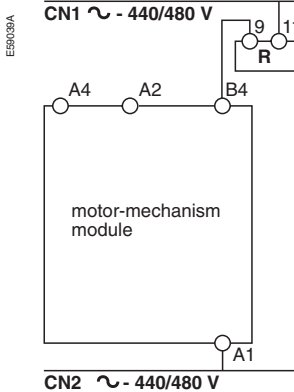
Basic	A	P	Control unit
■	■	■	E1-E6 communication
	■	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault)
	■	■	M1 = Vigi module input (Micrologic 7)
	■	■	T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	■	F2+, F1- external 24 V DC power supply VN external voltage connector (must be connected to the neutral with a 3P circuit breaker)
		■	M6C : 6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required

A : digital ammeter.
P : A + power meter + additional protection.

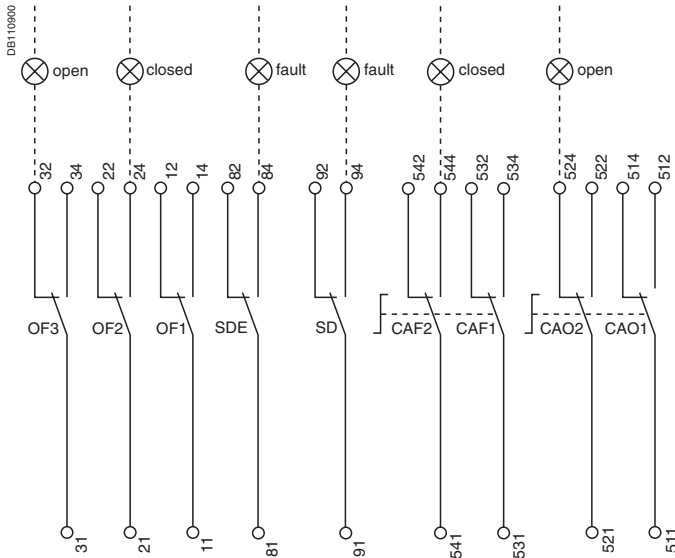
Remote operation

- MN** : undervoltage release
or
MX : shunt release
- Motor-mechanism module (*)**
A4 : electrical opening order
A2 : electrical closing order
B4, A1 : power supply for control devices and gear motor

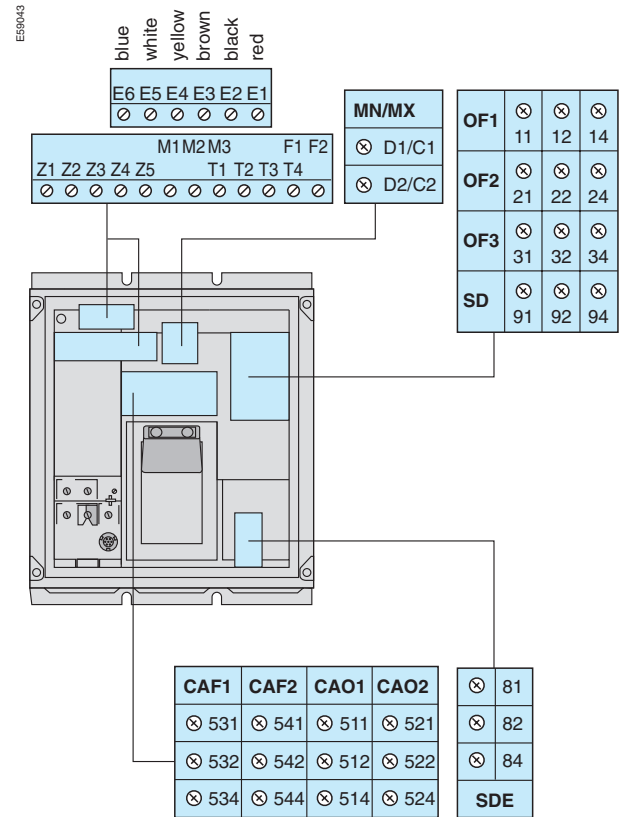
(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)



Indication contacts



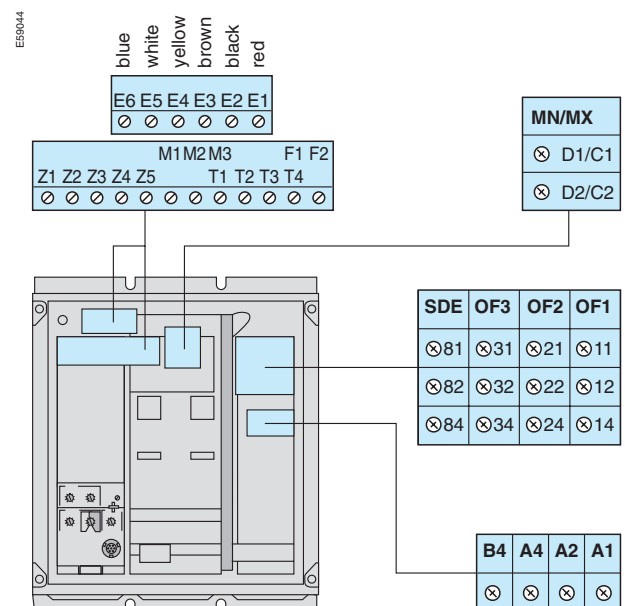
Terminal-block marking (manual operation)



Indication contacts

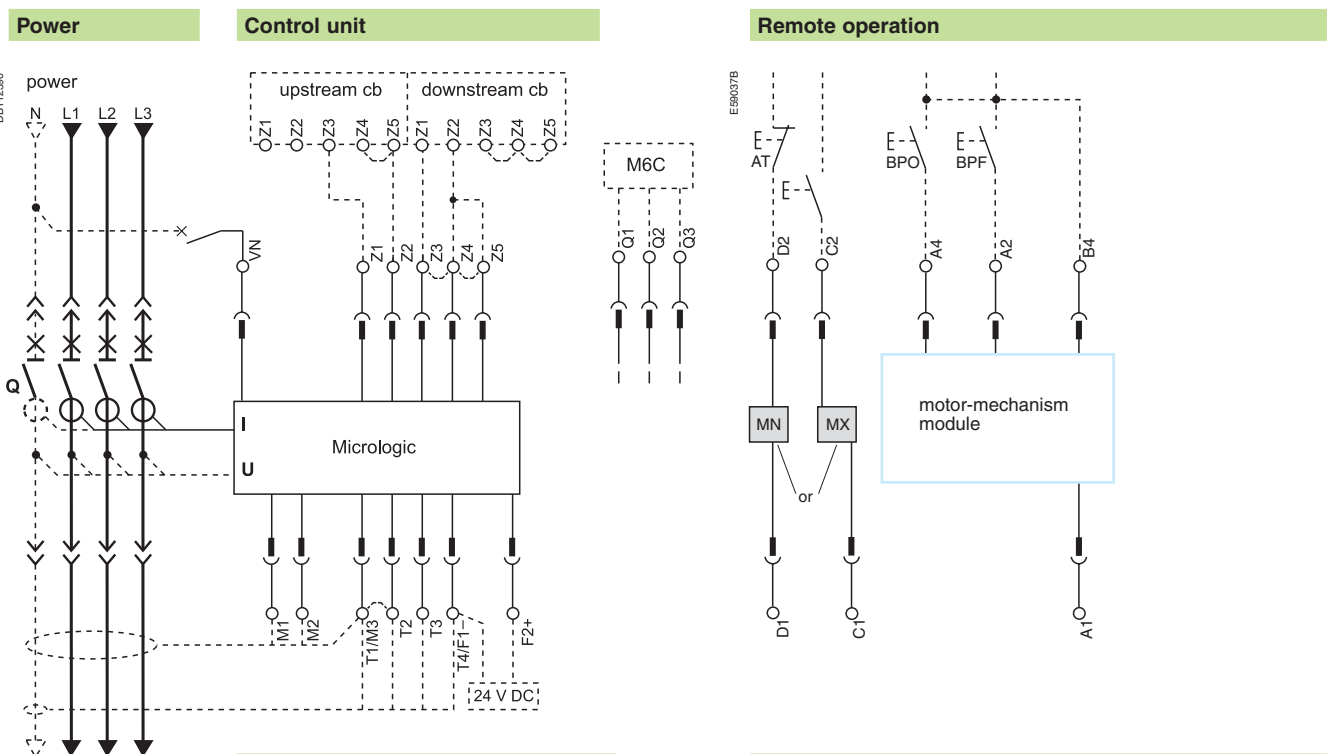
- OF3 / OF2 / OF1** : indication contacts
- SDE** : fault-trip indication contact (short-circuit, overload, earth fault)
- SD** : trip indication contact (manual operation)
- CAF2/CAF1 *** : early-make contact (rotary handle)
- CAO2 / CAO1** : early-break contact (rotary handle)

Terminal-block marking (electrical operation)



* CAF2 option is not compatible with M6C option.

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.



Terminal-block marking	Com	UC1	UC2	UC3	M6C / CAF2
	E5 E6	Z5 M1	M2 M3	F2+	Q3 544
	E3 E4	Z3 Z4	T3 T4	VN	Q2 542
	E1 E2	Z1 Z2	T1 T2	F1 -	Q1 541

Basic	A	P	Control unit
■	■	■	Com: E1-E6 communication
■	■	■	UC1: Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT; Z3 ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7)
■	■	■	UC2: T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
■	■	■	UC3: F2+, F1- external 24 V DC power supply VN external voltage connector (must be connected to the neutral with a 3P circuit breaker)
■	■	■	M6C: 6 programmable contacts (to be connected to the external module M6C) ext. 24 V DC power supply required

A : digital ammeter.

P : A + power meter + additional protection.

Remote operation	MT2	MT1
MN / MX D2 C2	A4	A2
D1 C1	B4	A1

Remote operation

MN : undervoltage release
or
MX : shunt release

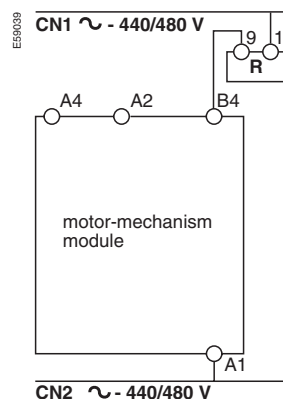
Motor-mechanism module (*)

MT2 : A4 : electrical opening order

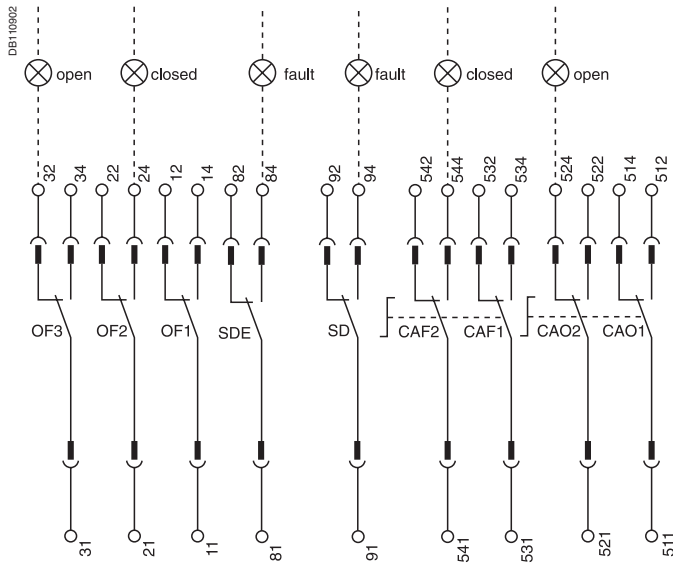
MT1 : A2 : electrical closing order

B4, A1 : power supply for control devices and gear motor (MCH)

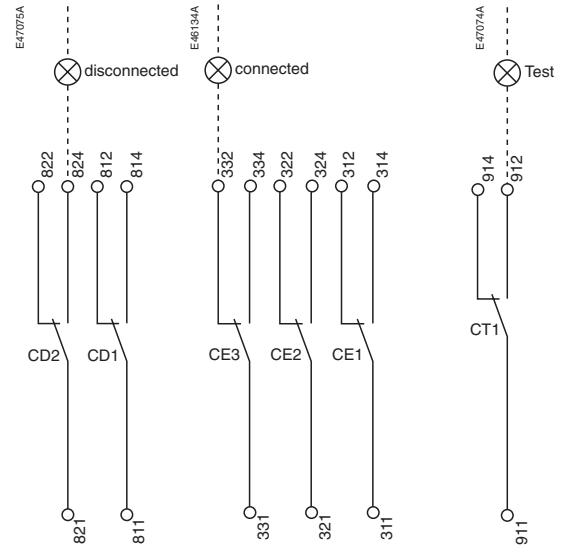
(*) Spring-charging motor 440/480 V AC
(380 V motor + additional resistor)



Indication contacts



Carriage switches



Indication contacts

M6C / CAF2	CAF1	SDE	SD	CAO2	CAO1	OF3	OF2	OF1
Q3	544	534	84	94	524	514	34	24
Q2	542	532	82	92	522	512	32	22
Q1	541	531	81	91	521	511	31	21
								11

Carriage switches

CD2	CD1	CE3	CE2	CE1	CT1
824	814	334	324	314	914
822	812	332	322	312	912
821	811	331	321	311	911

Indication contacts

- OF3 / OF2 / OF1** : indication contacts
- SDE** : fault-trip indication contact (short-circuit, overload, earth fault)
- SD** : trip indication contact (manual operation)
- CAF2/CAF1 *** : early-make contact (rotary handle)
- CAO2 / CAO1** : early-break contact (rotary handle)

Carriage switches

- CD2** : disconnected
CD1 position
- CE3** : connected
CE2 position
CE1
- CT1** : test position

Legend



Connected
(only one wire per connection point).

* CAF2 option is not compatible with M6C option.

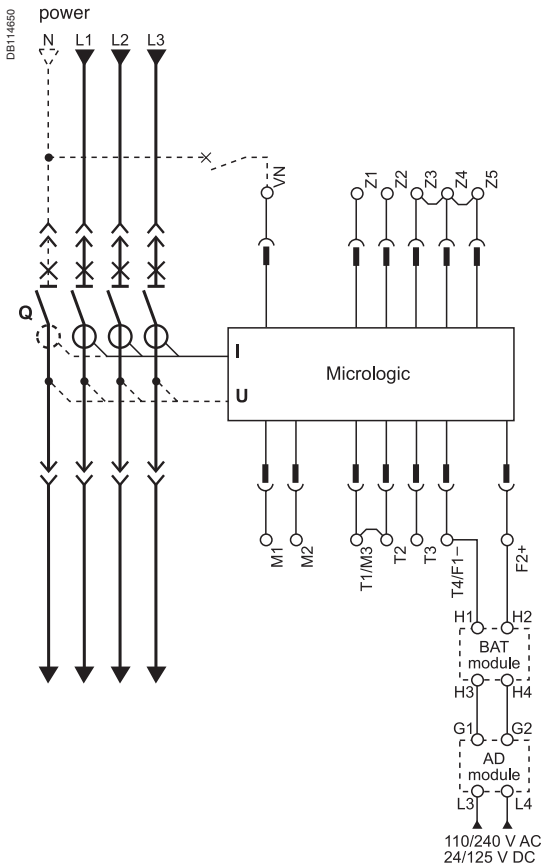
Compact NS630b to 3200

Connection of the 24 V DC External power supply AD module

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.

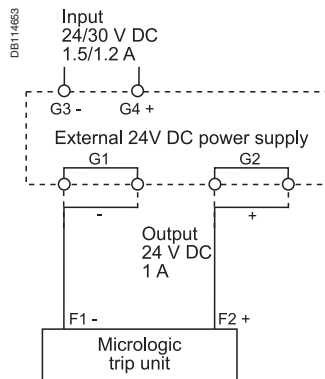
Circuit breaker	Closed	Open
Protection function	No	No
Display function	No ⁽¹⁾	Yes
Circuit breaker status indications and control communications bus	No	No
Identification, settings, operation and maintenance aids via communication bus	No ⁽¹⁾	Yes

⁽¹⁾ Except if current < 20 % I_n.

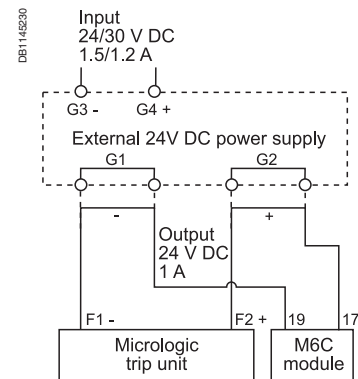


The maximum cable length between 24 V DC external supply (G1, G2) and the Micrologic control unit (F1-, F2+) is 10 m.
The BAT battery module, mounted in series upstream of the AD module, ensures an uninterrupted supply of power if the AD module power supply fails.

Wiring diagrams



Power supply wiring for Micrologic trip unit only.



Power supply wiring for Micrologic trip unit and M6C module.

Connection

The maximum length for each conductor supplying power to the trip unit or M6C module is 10 m.

Do not ground F2+, F1-, or power supply output:

- the positive terminal (F2+) on the trip unit must not be connected to earth ground
- the negative terminal (F1-) on the trip unit must not be connected to earth ground
- the output terminals (- and +) of the 24 V DC power supply must not be grounded.

Reduce electromagnetic interference:

- the input and output wires of the 24 V DC power supply must be physically separated as much as possible
- if the 24 V DC power supply wires cross power cables, they must cross perpendicularly. If this is not physically possible, the power supply conductors must be twisted together
- Power supply conductors must be cut to length. Do not loop excess conductor.

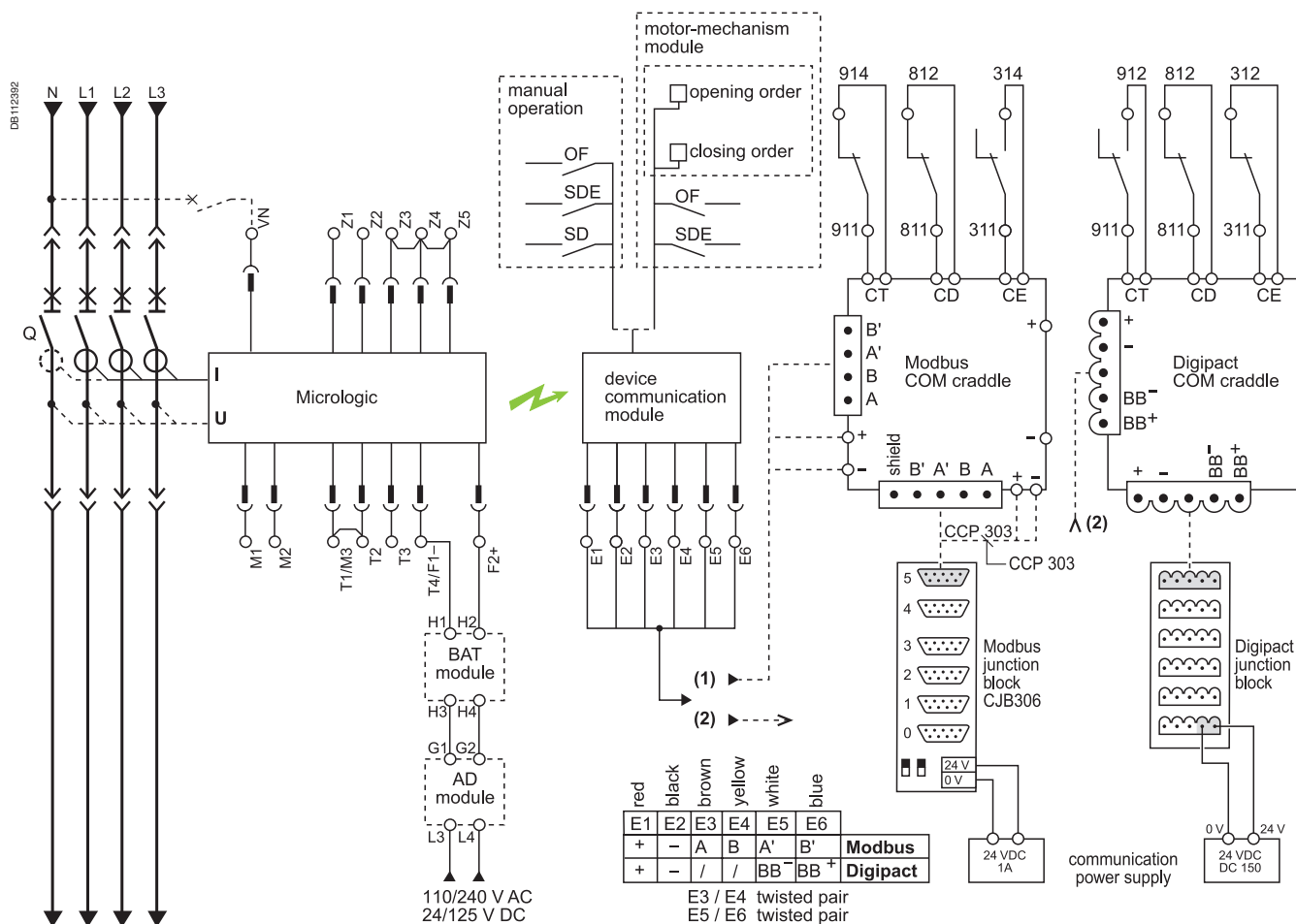
Use only one 24 V DC power supply for each Micrologic trip unit.

Connect external 24 V DC power supply only per the following wiring diagrams.

Examples of connection of the communications device option

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+).



(1) Drawout device equipped with Com chassis modbus.

(2) Fixed device or draw-out device without Com chassis Digipact.

Examples using the COM communications option

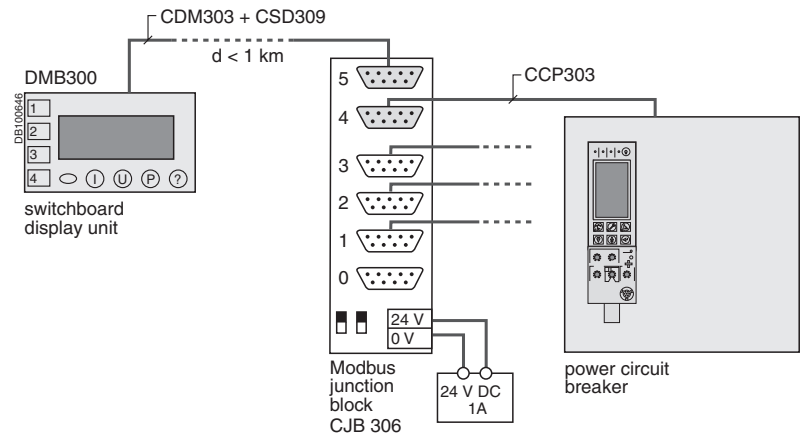
Switchboard display unit

This architecture provides remote display of the variables managed by Micrologic control units equipped with the COM Modbus module.

- I (Micrologic A)
- I, U, P, S (Micrologic P)

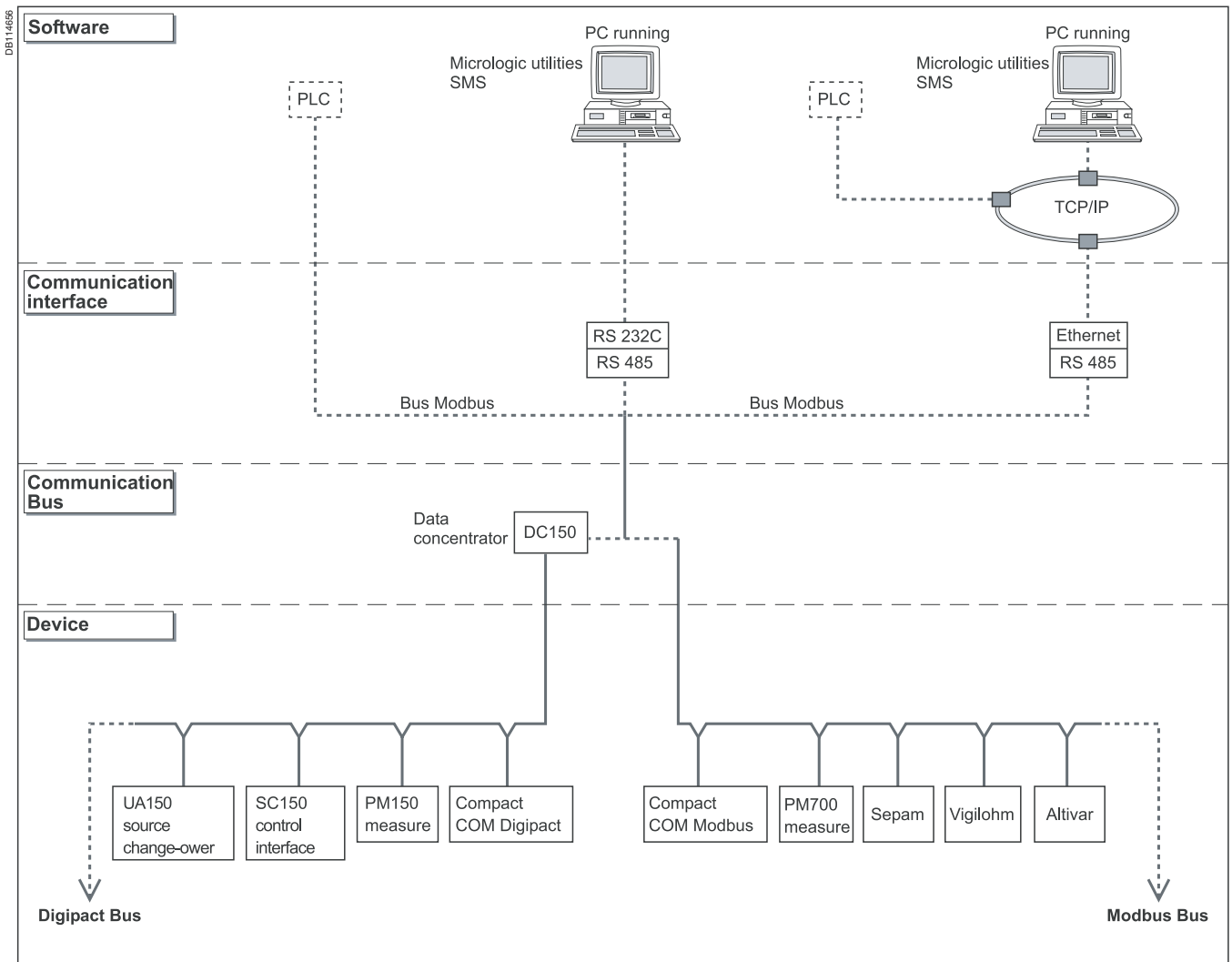
No programming is required.

For Micrologic A control unit (if current < 20 % I_n), it is recommended to use the 24 V DC external power supply (AD module).



Communicating switchboard

This configuration provides remote display and control of Compact equipped with the Modbus or Digipact COM module. The Digipact bus can be combined with the Modbus bus.



External sensor (CT) for residual earth-fault protection

Connection of current-transformer secondary circuit for external neutral

Compact equipped with a Micrologic 6 A:

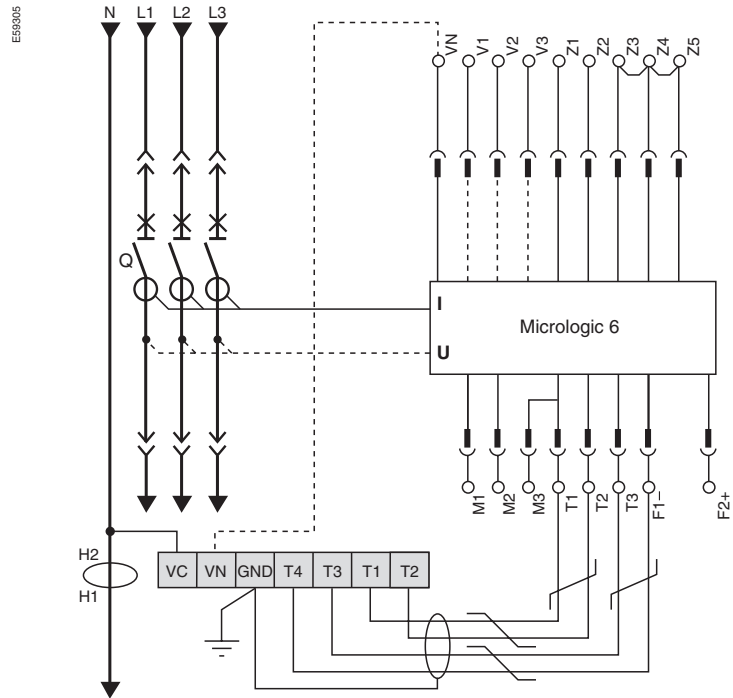
- shielded cable with 2 twisted pairs
- T1 twisted with T2
- T3 twisted with T4
- shielding connected to GND on one end only
- maximum length 10 meters
- cable cross-sectional area 0.4 to 1.5 mm²
- recommended cable: Belden 9552 or equivalent.

If supply is via the top, follow the diagram.

If supply is via the bottom, control wiring is identical; for the power wiring, H1 is connected to the source side, H2 to the load side.

The connection of the VN signal is necessary only for power measurements.

For four-pole versions, for residual earth-fault protection, the current transformer for the external neutral is not necessary.

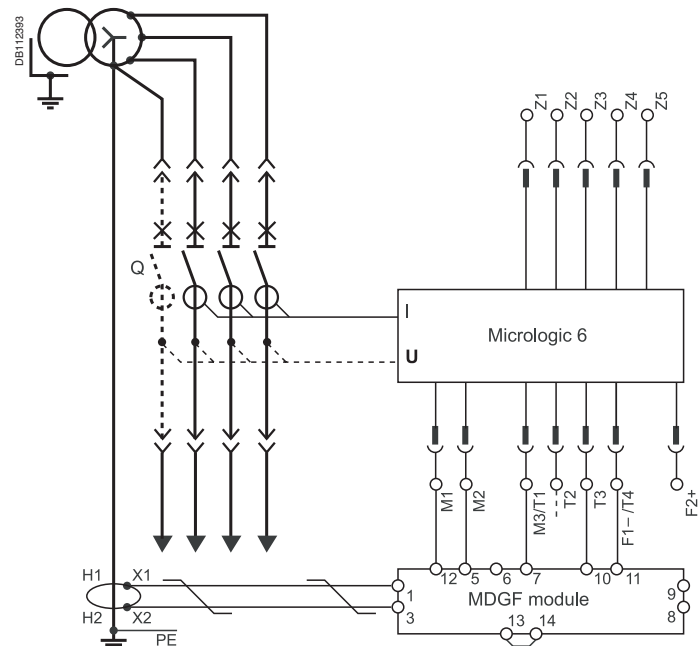


External transformer for source ground return (SGR) earth-fault protection

Connection of the secondary circuit

Compact equipped with a Micrologic 6 A:

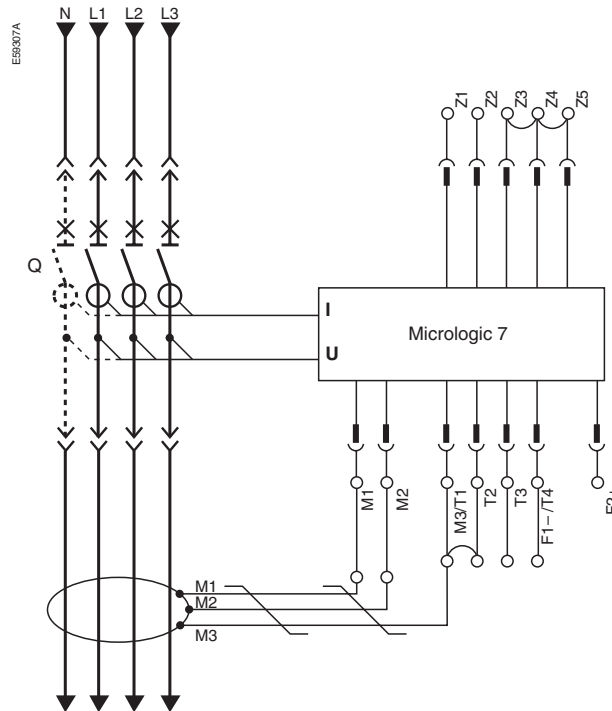
- unshielded cable with 1 twisted pair
- maximum length 150 metres
- cable cross-sectional area 0.4 to 1.5 mm²
- recommended cable: Belden 9409 or equivalent.



Earth-leakage protection

Connection of the rectangular-sensor secondary circuit.

Compact equipped with a Micrologic 7 A/P: use the cable shipped with the rectangular sensor.



Neutral protection

- three pole circuit breaker:
 - neutral protection is impossible with Micrologic A
 - with Micrologic P, an external neutral transformer is necessary; the connection diagram is the same as for residual earth-fault protection.
- four pole circuit breaker:
 - Compact equipped with Micrologic A
 - the current transformer for external neutral is not necessary.

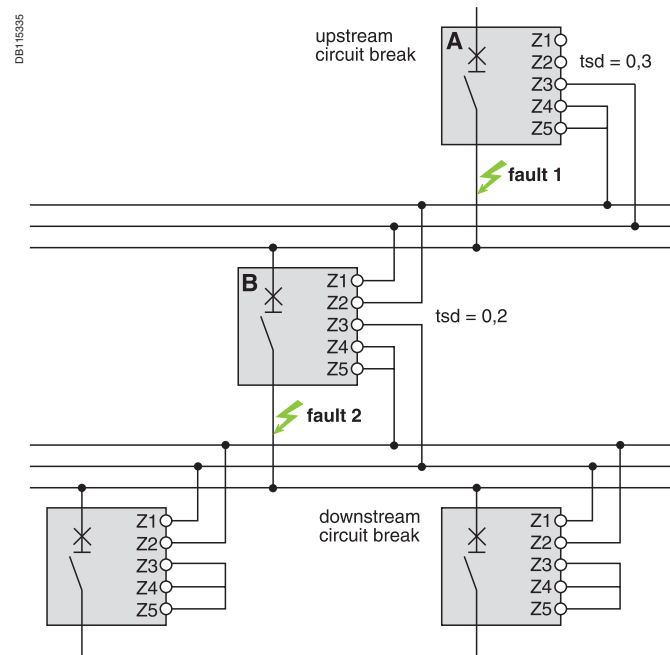
Zone selective interlocking

Zone-selective interlocking is used to reduce the electrodynamic forces exerted on the installation by shortening the time required to clear faults, while maintaining time discrimination between the various devices. A pilot wire interconnects a number of circuit breakers equipped with Micrologic A/P/H control units, as illustrated in the diagram above.

The control unit detecting a fault sends a signal upstream and checks for a signal arriving from downstream. If there is a signal from downstream, the circuit breaker remains closed for the full duration of its tripping delay. If there is no signal from downstream, the circuit breaker opens immediately, regardless of the tripping-delay setting.

Fault 1. Only circuit breaker A detects the fault. Because it receives no signal from downstream, it immediately opens in spite of its tripping delay set to 0.3.

Fault 2. Circuit breakers A and B detect the fault. Circuit breaker A receives a signal from B and remains closed for the full duration of its tripping delay set to 0.3. Circuit breaker B does not receive a signal from downstream and opens immediately, in spite of its tripping delay set to 0.2.



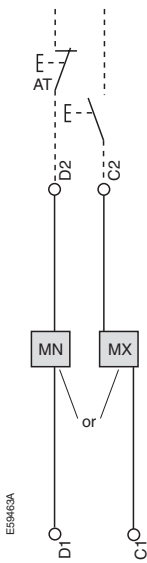
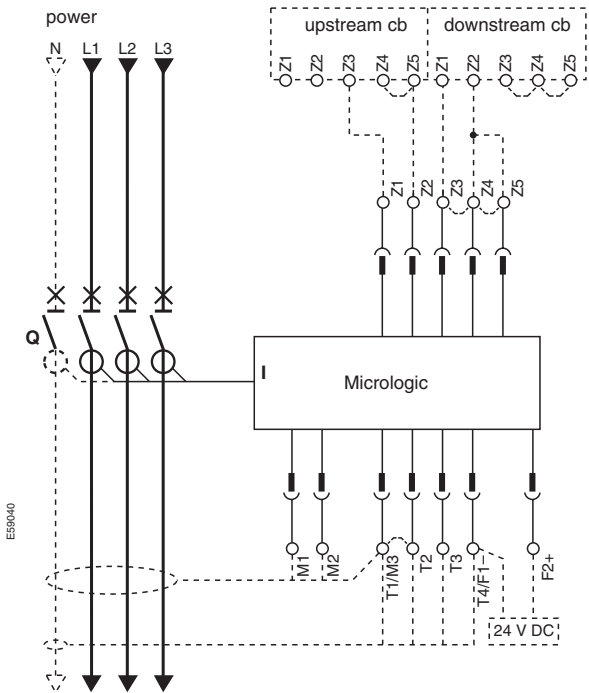
Note. The maximum permissible distance between two devices is 3000 metres and the maximum number of devices is 100.

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



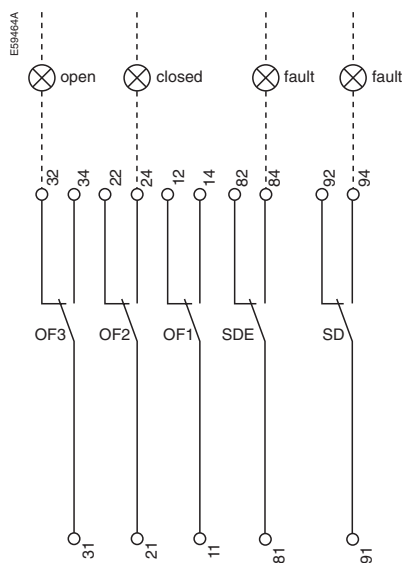
— (basic)	A	Control unit
■	■	E1-E6 communication
	■	Z1-Z5 zone selective interlocking: Z1 = ZSI OUT SOURCE Z2 = ZSI OUT ; Z3 = ZSI IN SOURCE Z4 = ZSI IN ST (short time) Z5 = ZSI IN GF (earth fault) M1 = Vigi module input (Micrologic 7) T1, T2, T3, T4 = external neutral; M2, M3 = Vigi module input (Micrologic 7)
	■	F2+, F1- external 24 V DC power supply

Remote operation

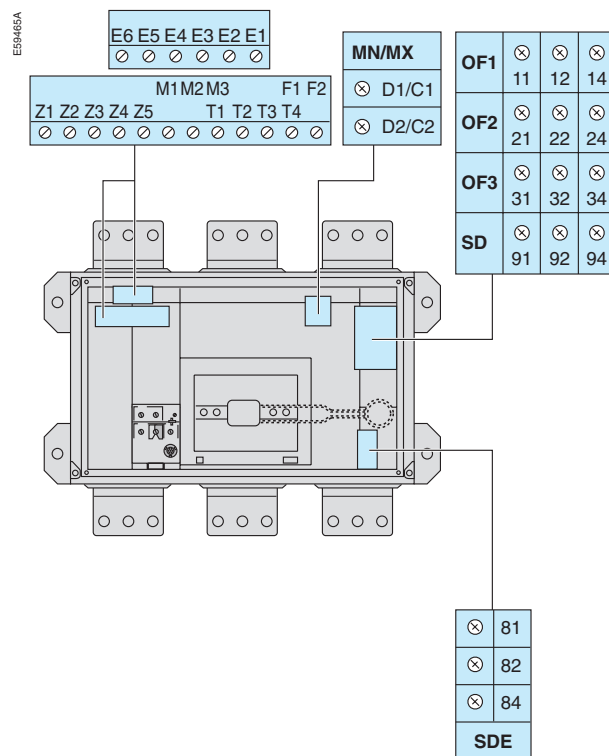
MN : undervoltage release
or
MX : shunt release

—: basic Micrologic control unit.
A: digital ammeter.

Indication contacts



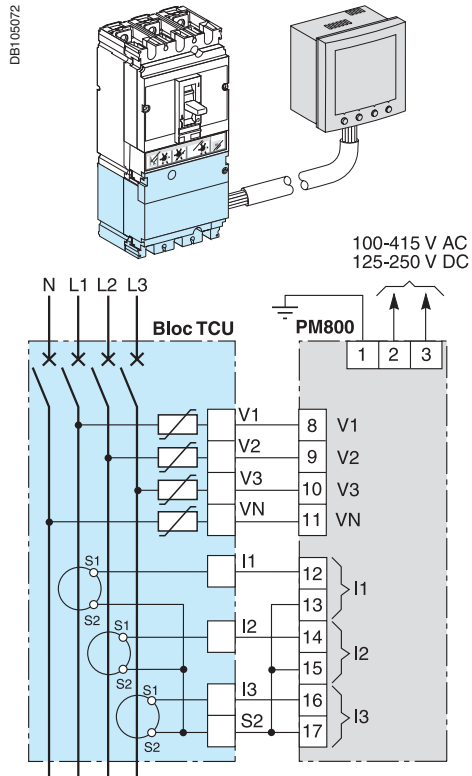
Terminal-block marking



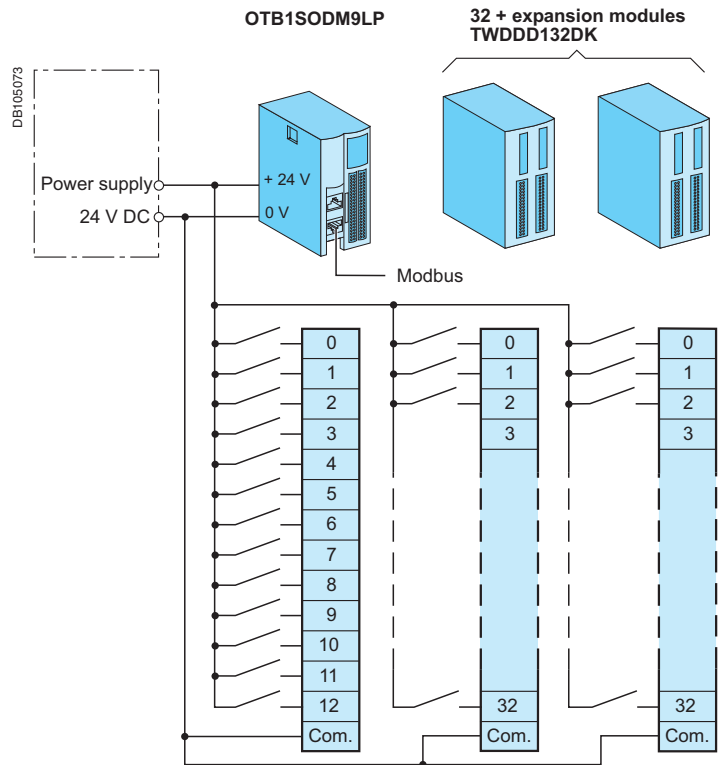
Indication contacts

- OF3 / OF2 / OF1** : ON / OFF indication contacts
- SDE** : fault-trip indication contact
(short-circuit, overload, earth fault)
- SD** : trip indication contact

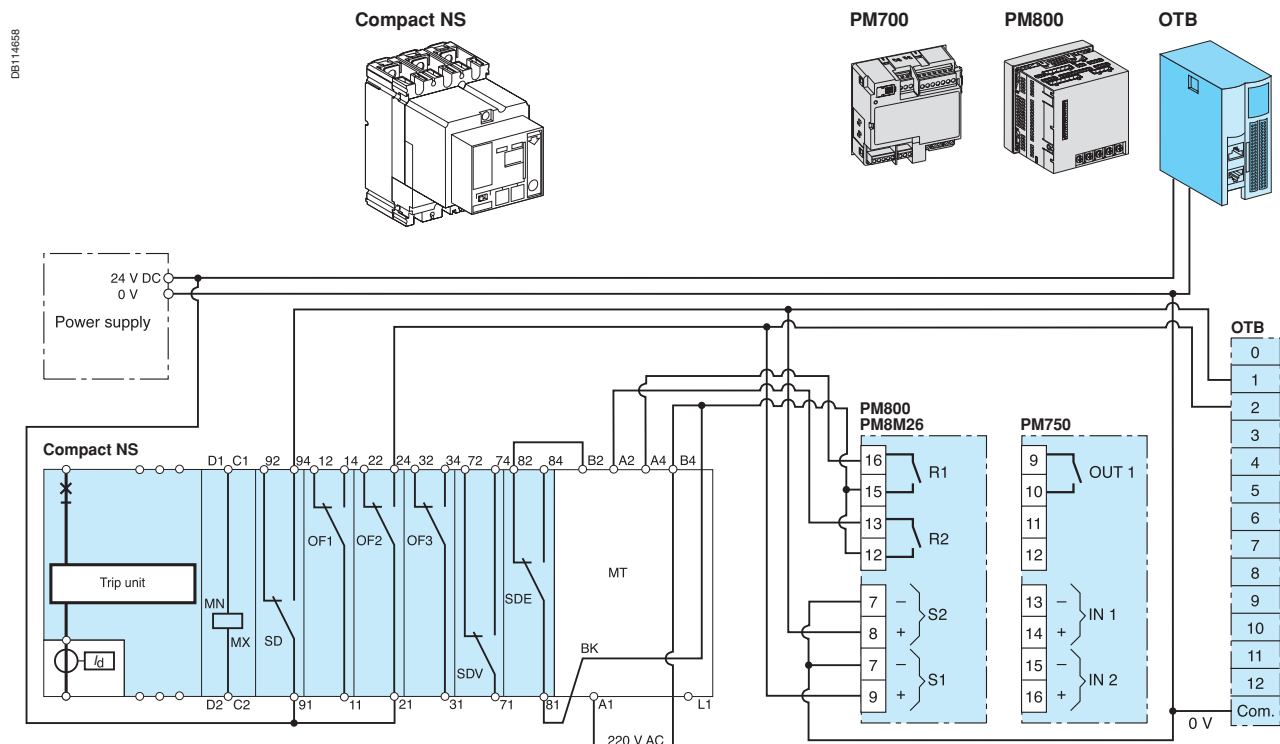
TCU module and Power Meter PM700 or PM800



OF/SDE status indication with Modbus OTB



OF/SDE status aquisition and Compact remote tripping



Technical information: how to read and write data from/to PM750 and PM800 I/O modules.

PM750 input states and output control

Reading S1 and S2 input states

- the state of these contacts is read from Modbus register **4115** and **4116**.
- a register has a value of 0 when a zero volt signal is applied to the input and a value of 1 when a 24 V DC signal is applied to the input.

Controlling outputs:

Output is controlled by writing to Modbus register **4126**

- writing a value to Modbus register **3321** closes the contact
- writing a value to Modbus register **3320** opens the contact.

PM800 with PM8M26 input/output option - input states and output control

Reading IN 1 and IN 2 input states

- the state of input IN 1 is read from Modbus register **4445**
- the state of input IN 2 is read from Modbus register **4475**.

Warning: when preparing the Modbus frame to be sent to the PM800 to read the content of these registers, remember to subtract 1 from the register number: for instance to read the content of register 4445, you must send a Modbus function 3 specifying the starting register $4445 - 1 = 4444$.

Bits have a value of 0 when a zero volt signal is applied to the input and a value of 1 when a 24 V DC volt signal is applied to the input.

Controlling of outputs OUT 1 and OUT 2

- to close the OUT 1 contact:

□ write a value of **3310** to Modbus register **8000** and a value of **3** to Modbus register **8001**, then write to Modbus register **8000** a value of **3321** and to Modbus register **8001** a value of **3**.

- to open the OUT 1 contact:

□ write a value of **3320** to Modbus register **8000** and a value of 3 to Modbus register **8001**.

- to close the OUT 2 contact:

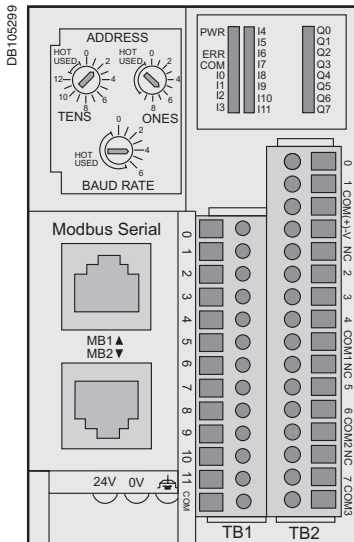
□ write a value of **3310** to Modbus register **8000** and a value of **4** to Modbus register **8001**, then write a value of **3321** to Modbus register **8000** and a value of 4 to Modbus register **8001**.

- to open the OUT 2 contact:

□ write a value of **3320** to Modbus register **8000** and a value of 4 to Modbus register **8001**.

Warning: remember to subtract 1 from the register number when preparing the Modbus frame.

Technical information on how to read and write data from/to Advantys OTB.



Parity is always set to **EVEN**.

Advantys OTB1SODM9LP inputs

Configuring the Advantys OTB

Modbus address ranges from @001 to @0127.

Communication speed:

Position	Baud rate
0	19200
1	1200
2	2400
3	4800
4	9600
5	19200
6	38400

Identifying which expansion modules are connected to the basic

Advantys OTB

In order to avoid reading non-existing inputs, it is necessary to know the configuration of the installed Advantys OTB. To determine if any TWDDDD132DK 32-input expansion modules are connected to the Advantys OTB, it is necessary to read Modbus registers **1103** and **1104**.

Warning: when preparing the Modbus frame to be sent to the Advantys OTB to read the content of the registers, remember to subtract 1 from the register number: for instance to read the content of register 1103, you must send a Modbus function 3 specifying the starting register $1103 - 1 = 1102$.

■ if the content of register **1103** is NOT equal to 0x0200 and that of register **1104** NOT equal to 0x0200, then **no** TWDDDD132DK 32-input expansion module are connected to the Advantys OTB. Thus only 12 inputs are available

■ if the content of register **1103** is equal to 0x0200 and that of register **1104** NOT equal to 0x0200, then **one** TWDDDD132DK 32-input expansion module is connected to the Advantys OTB. Thus 12 + 32 inputs are available

■ if the content of register **1103** is equal to 0x0200 and that of register **1104** equal to 0x0200, then **two** TWDDDD132DK 32-input expansion modules are connected to the Advantys OTB. Thus 12 + 32 + 32 inputs are available.

Reading input states

■ the states of the 12 inputs of the Advantys OTB are read from Modbus register 1 ⁽¹⁾. The result is a bitmap.

- bit 0 gives the state of Input 1
- bit 1 gives the state of Input 2

...

- bit 11 gives the state of Input 12.

■ the states of the 32 inputs of the first TWDDDD132DK 32-input expansion module are read from Modbus registers 2 and 3 ⁽¹⁾.

The result is two 16-bit bitmaps.

- bit 0 of bitmap 1 (Modbus register 2) gives the state of Input 1
- bit 1 of bitmap 1 (Modbus register 2) gives the state of Input 2

...

- bit 15 of bitmap 1 (Modbus register 2) gives the state of Input 16

- bit 0 of bitmap 2 (Modbus register 3) gives the state of Input 17
- bit 1 of bitmap 2 (Modbus register 3) gives the state of Input 18

...

- bit 15 of bitmap 2 (Modbus register 3) gives the state of Input 32.

■ the states of the 32 inputs of the second TWDDDD132DK 32-input expansion module are read from Modbus registers 4 and 5 ⁽¹⁾.

The result is two 16-bit bitmaps.

- bit 0 of bitmap 1 (Modbus register 4) gives the state of Input 1
- bit 1 of bitmap 1 (Modbus register 4) gives the state of Input 2

...

- bit 15 of bitmap 1 (Modbus register 4) gives the state of Input 16

- bit 0 of bitmap 2 (Modbus register 5) gives the state of Input 17
- bit 1 of bitmap 2 (Modbus register 5) gives the state of Input 18

...

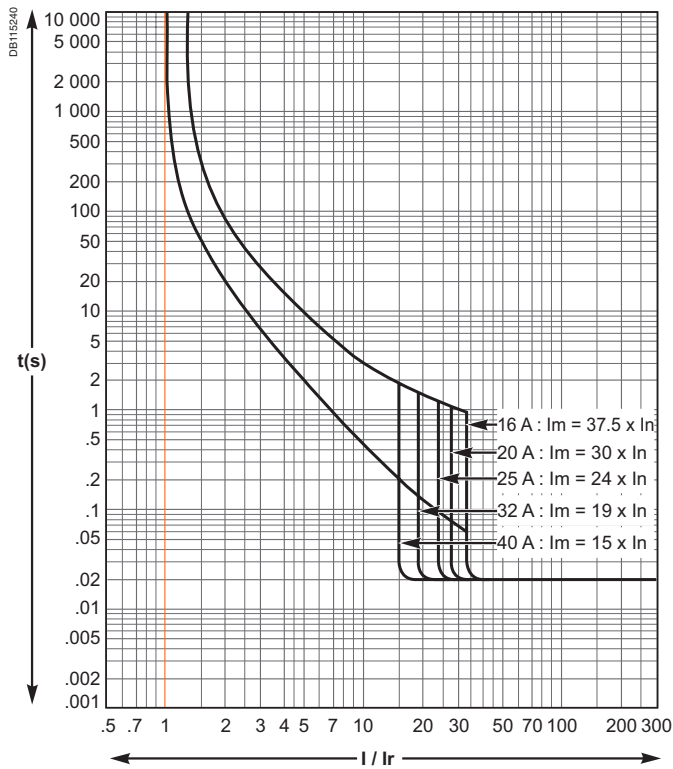
- bit 15 of bitmap 2 (Modbus register 5) gives the state of Input 32.

■ bits have a value of 0 when a zero volt signal is applied to the input and a value of 1 when a 24 DC volt signal is applied to the input.

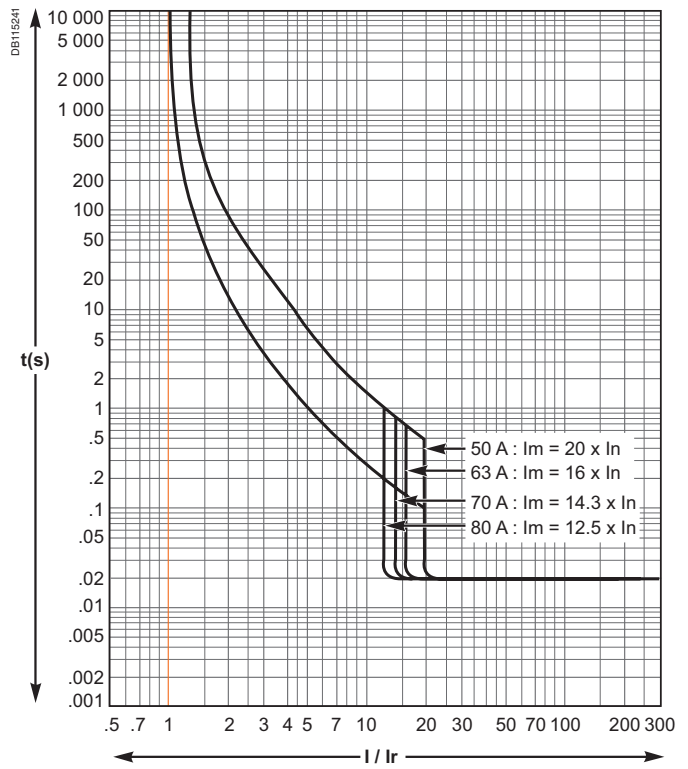
(1) Warning: when preparing the Modbus frame to be sent to the Advantys OTB to read the content of the registers, remember to subtract 1 from the register numbers: for instance to read the content of register 1, you must send a Modbus function 3 specifying the starting register $1 - 1 = 0$.

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Compact NS630b to 3200	E-10
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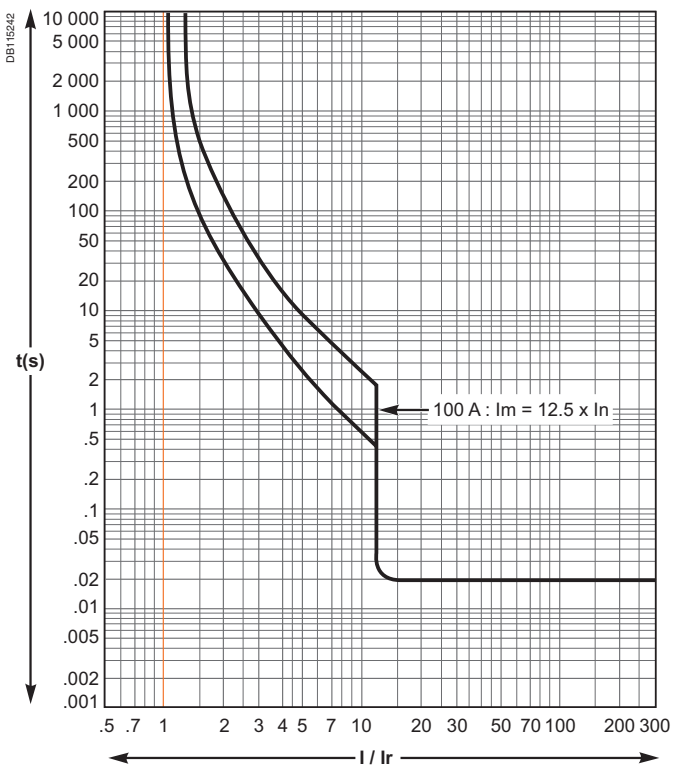
16...40 A



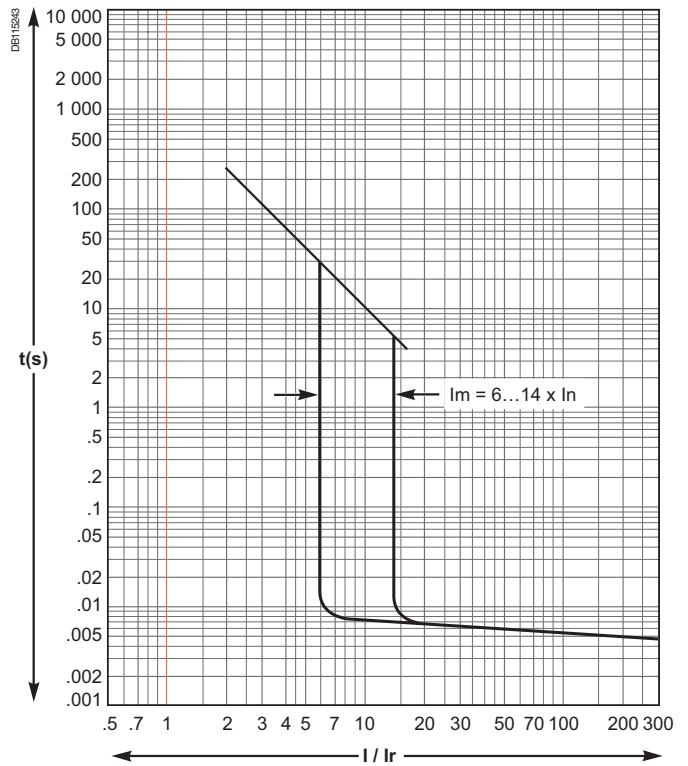
50...80 A



100 A

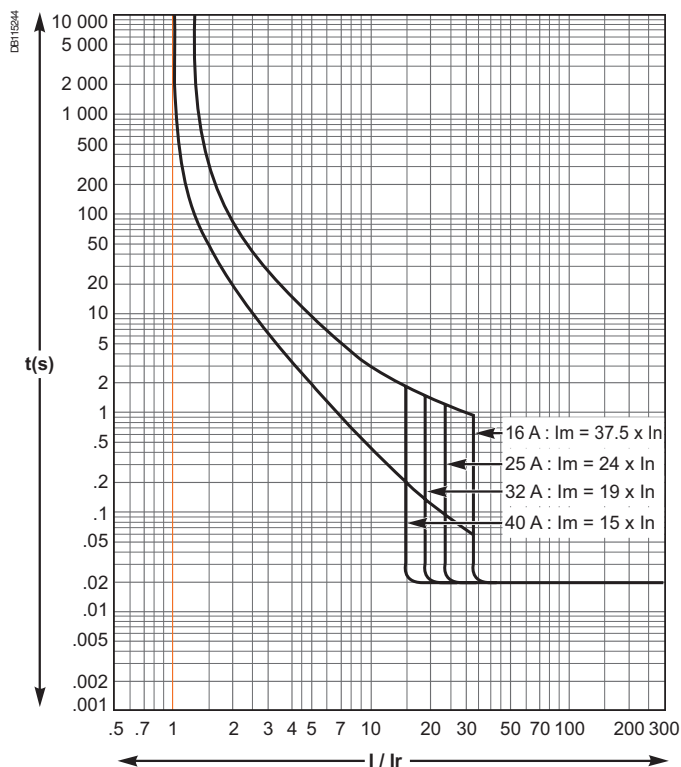


MA1.5...MA80

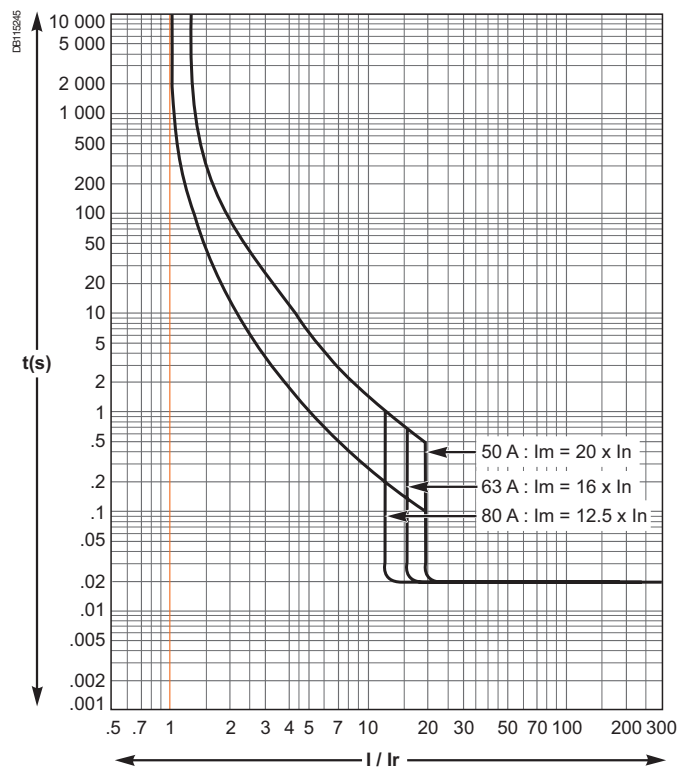


Compact NSA160

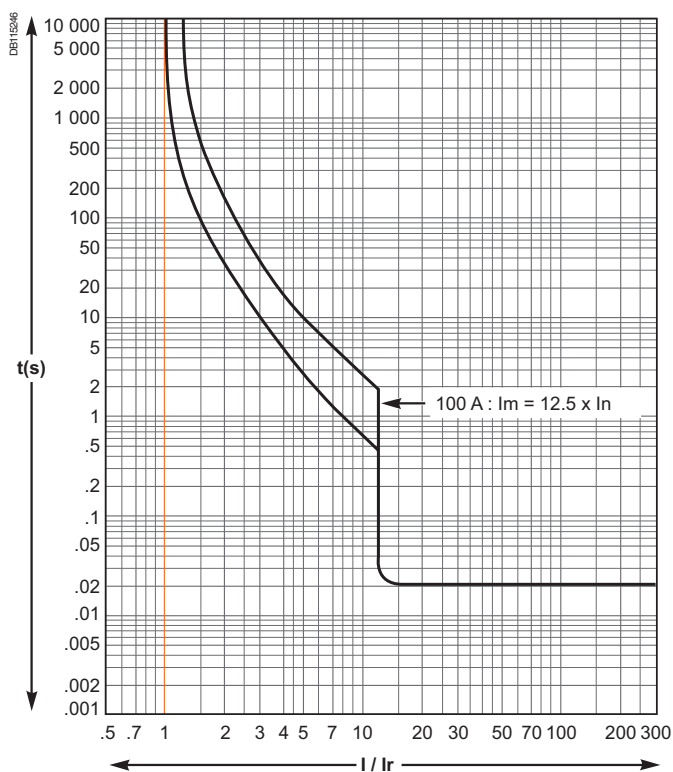
16...40 A



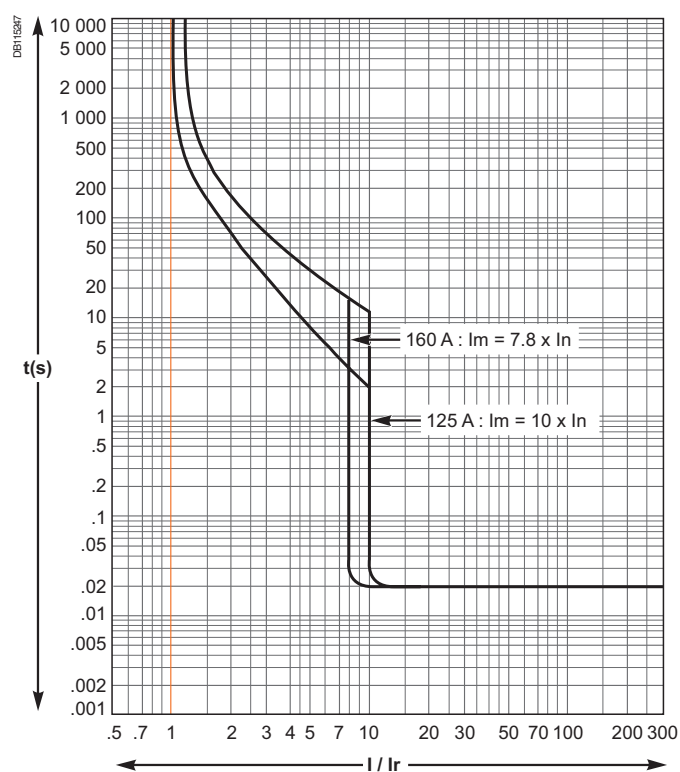
50...80 A



100 A

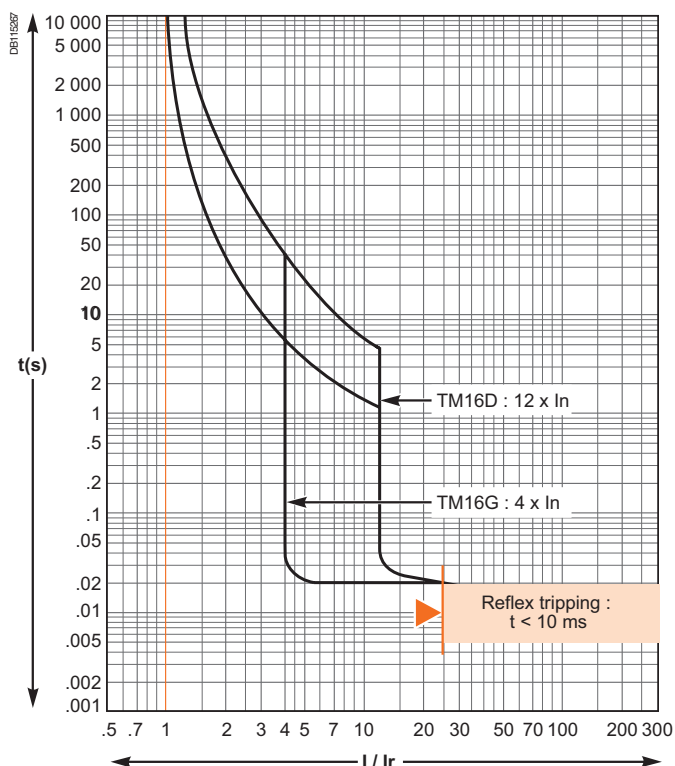


125...160 A

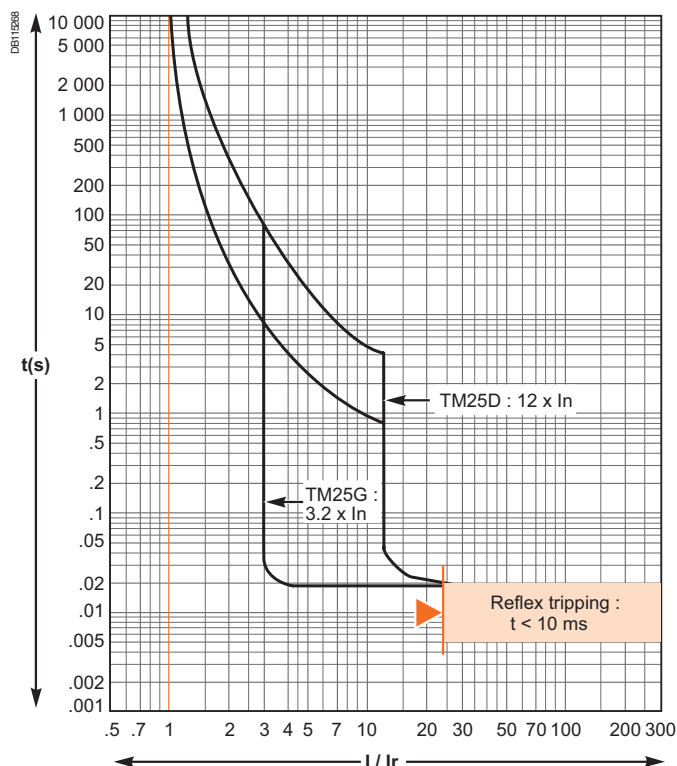


TM magnetic trip units

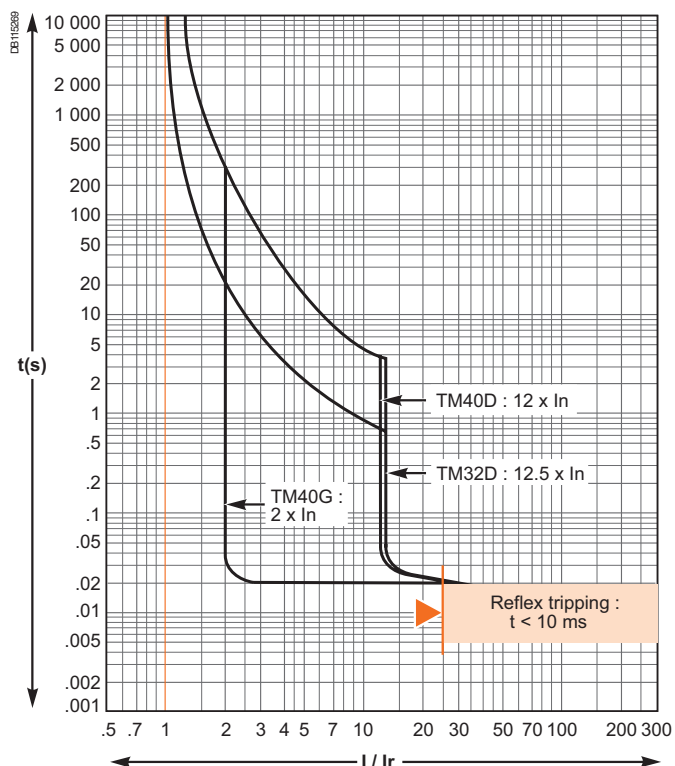
TM16D / TM16G



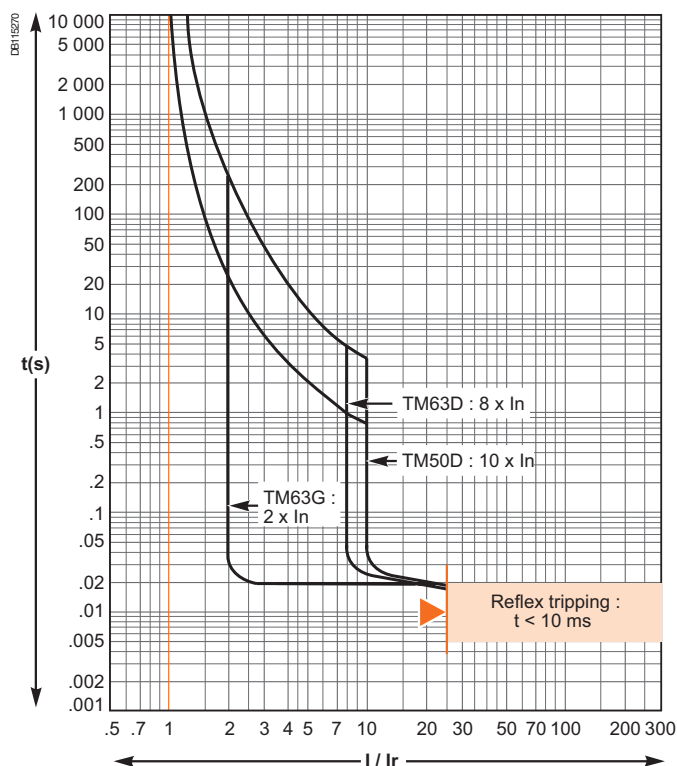
TM25D / TM25G



TM32D / TM40D / TM40G

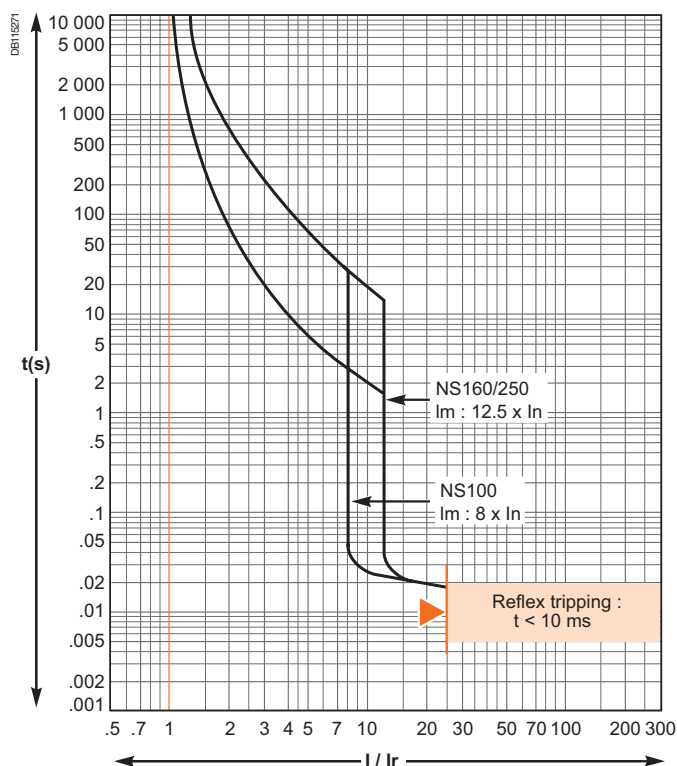


TM50D / TM63D / TM63G

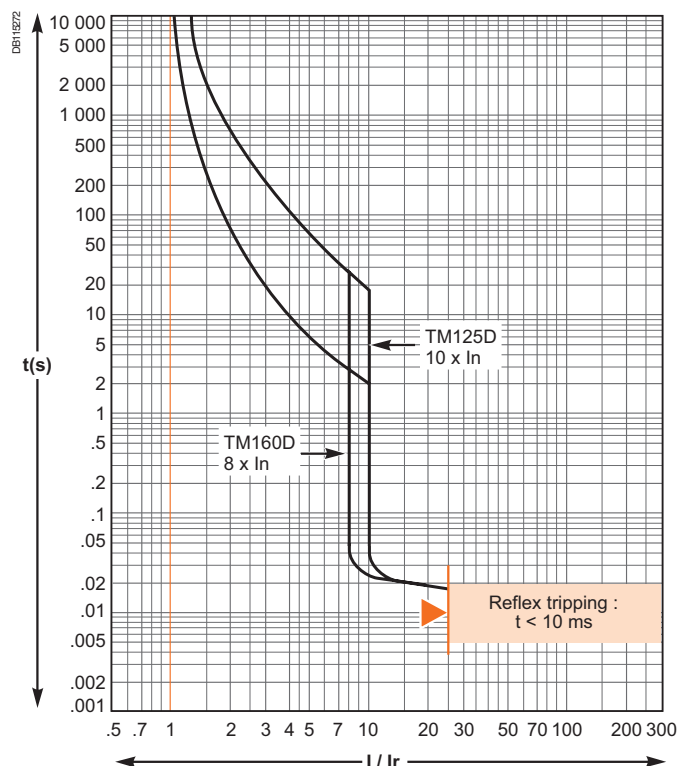


TM magnetic trip units (cont.)

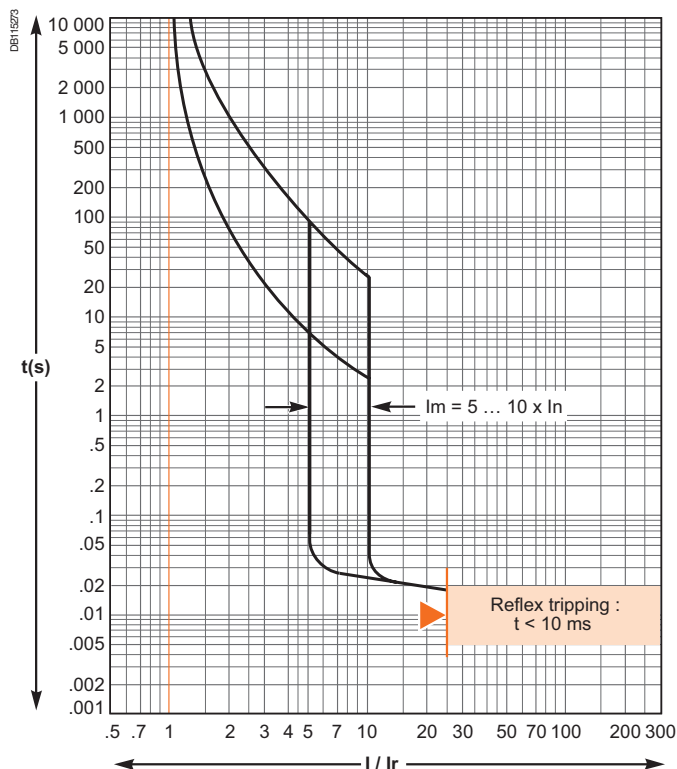
TM80D / TM100D



TM125D / TM160D

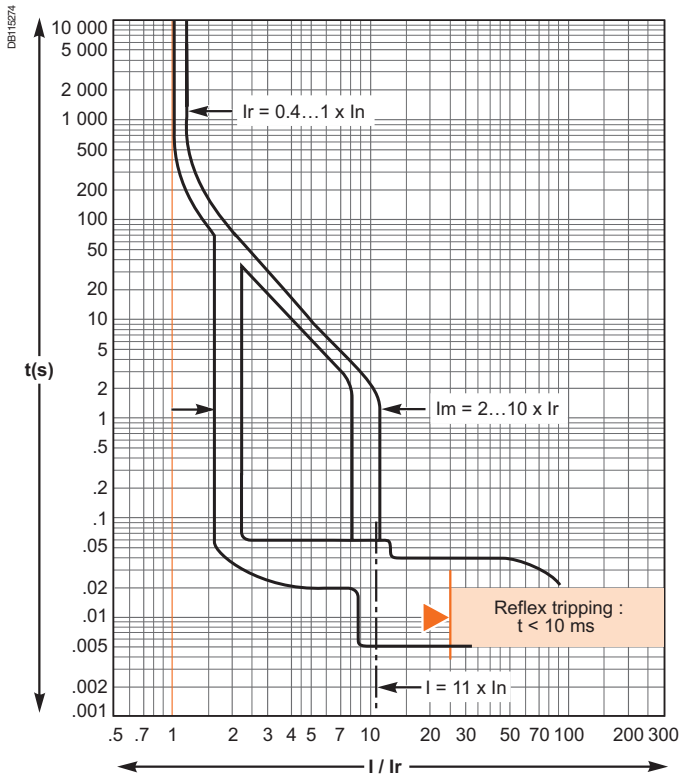


TM200D / TM250D

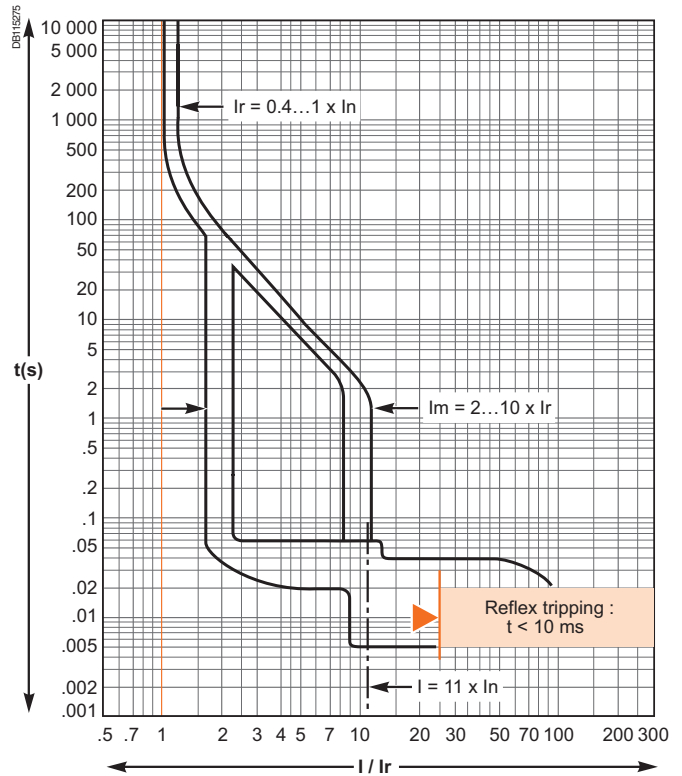


STR22SE and STR22GE electronic trip units

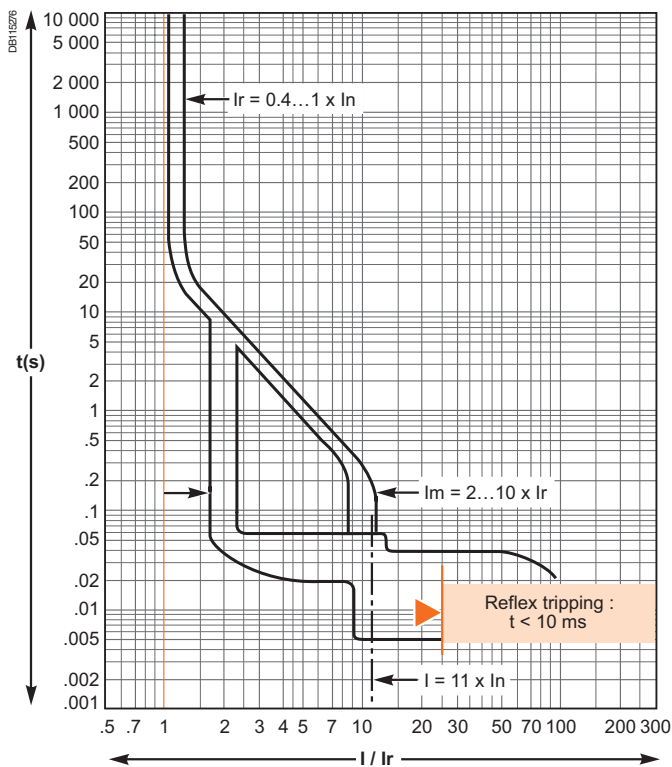
STR22SE - 40...100 A



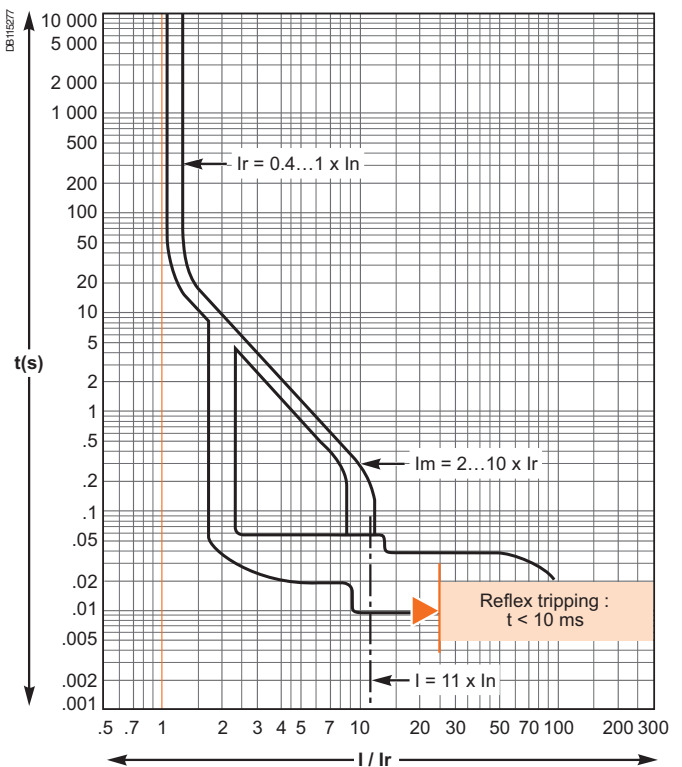
STR22SE - 160...250 A



STR22GE - 40...100 A



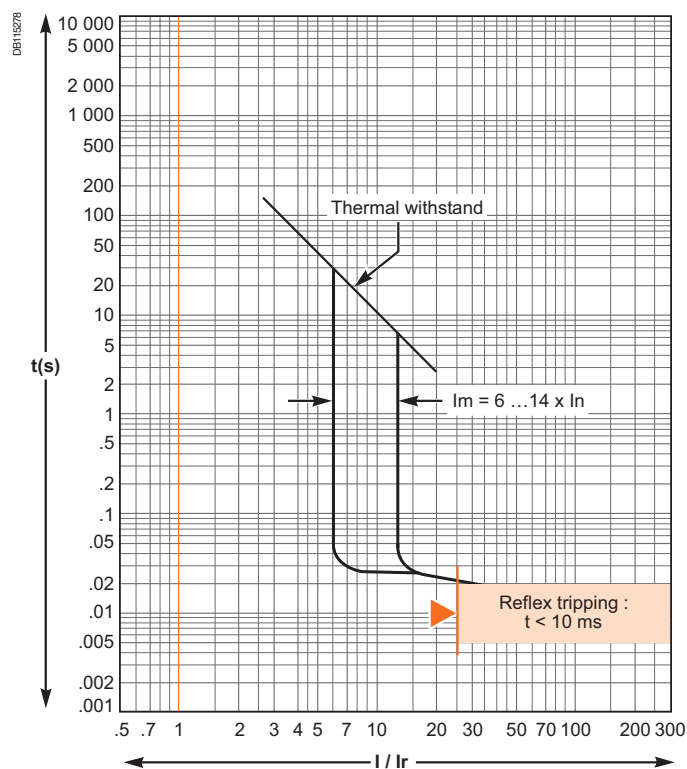
STR22GE - 160...250 A



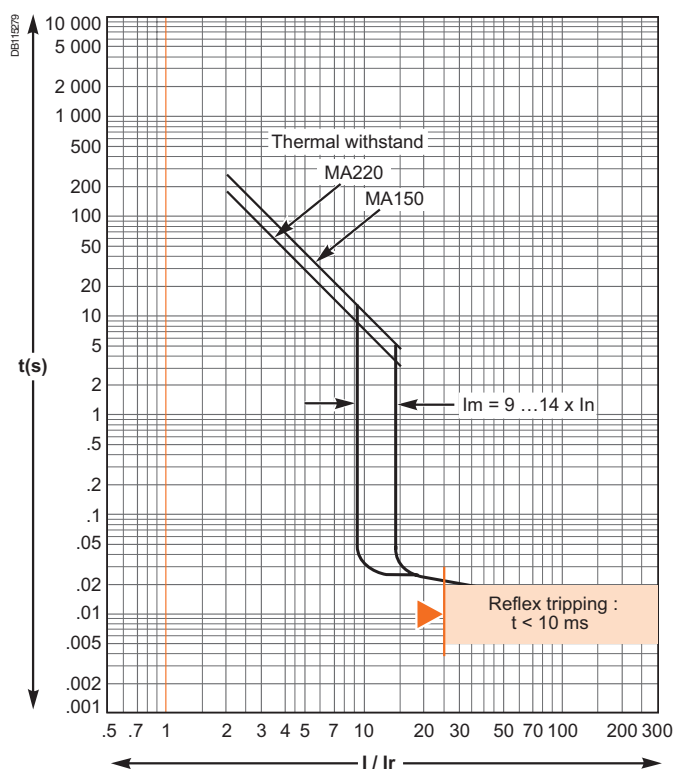
Compact NS100 to 250 Motor-starter protection

MA magnetic trip units

MA2,5...MA100

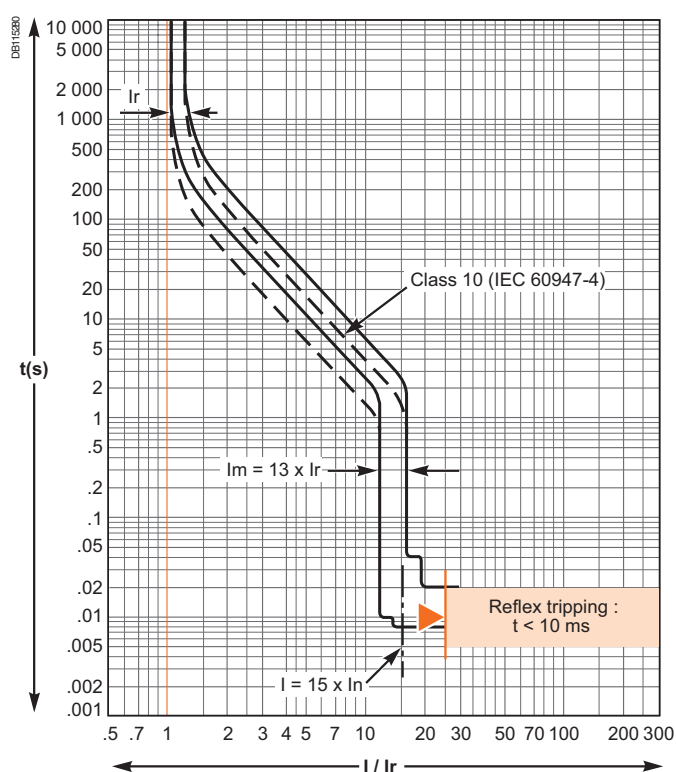


MA150 and MA220



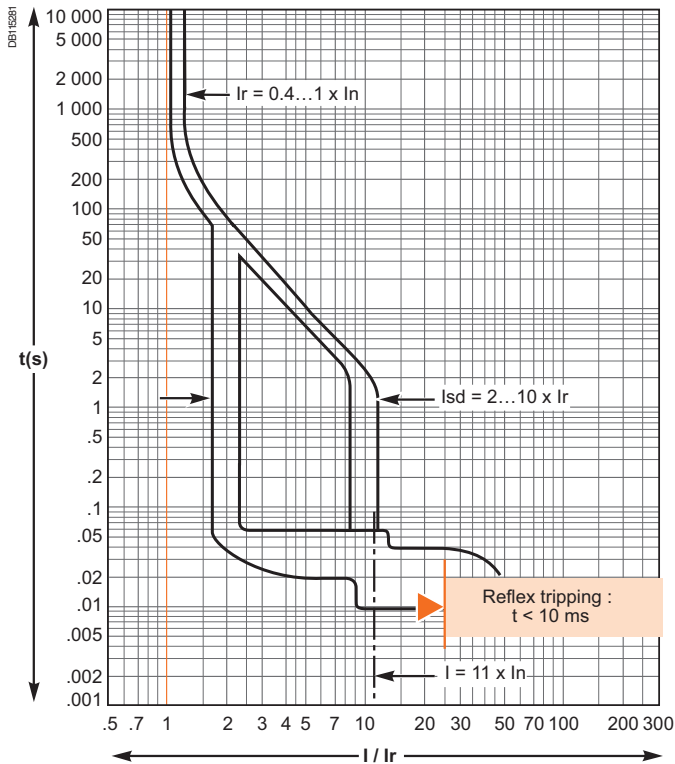
STR22ME electronic trip units

STR22ME - 10...220 A

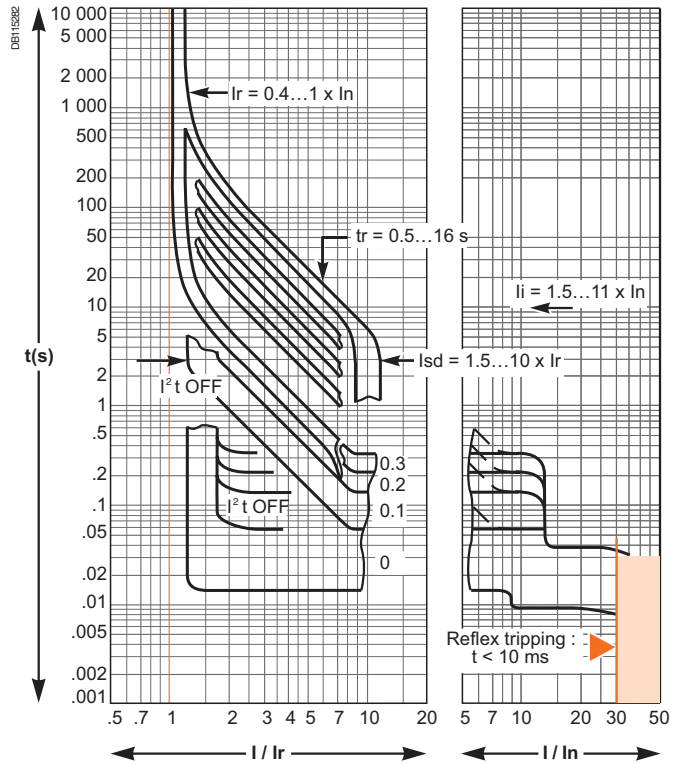


STR23 and STR53 electronic trip units

STR23SE / STR23SV

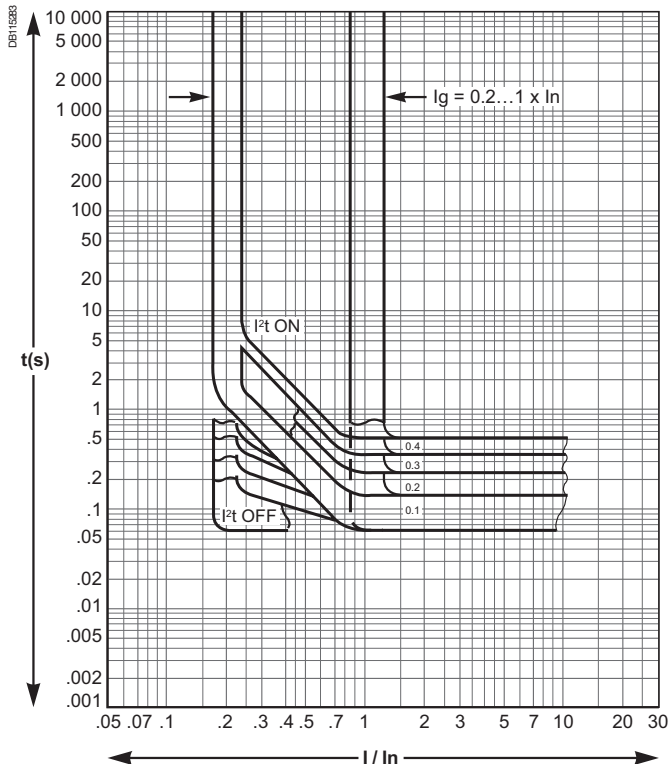


STR53UE / STR53SV



Options for STR53UE

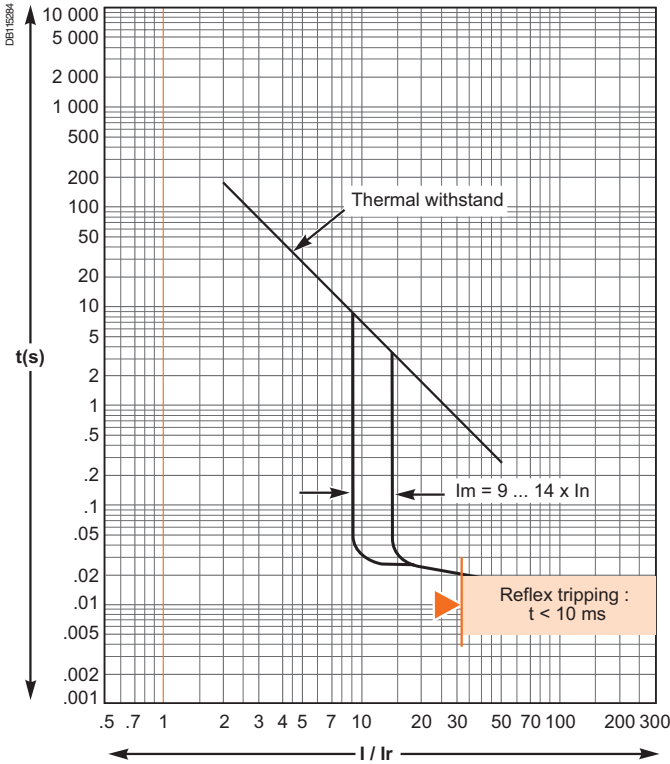
Earth-fault protection



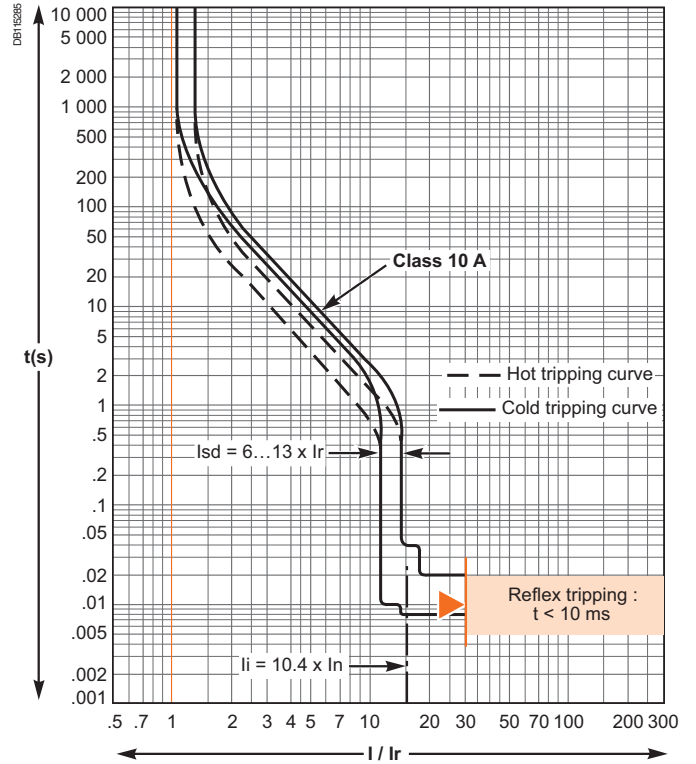
Compact NS400 to 630 Motor-starter protection

MA magnetic and STR43ME electronic trip units

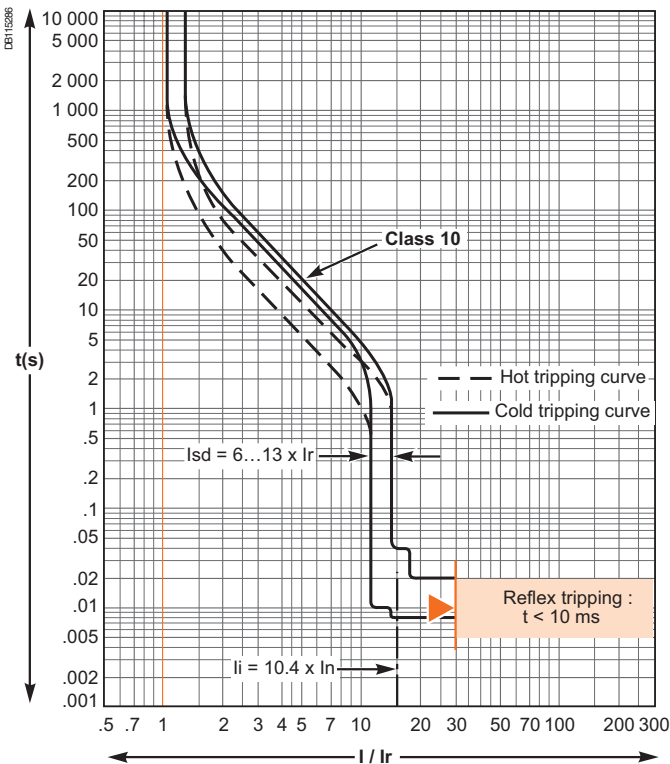
MA320...MA500



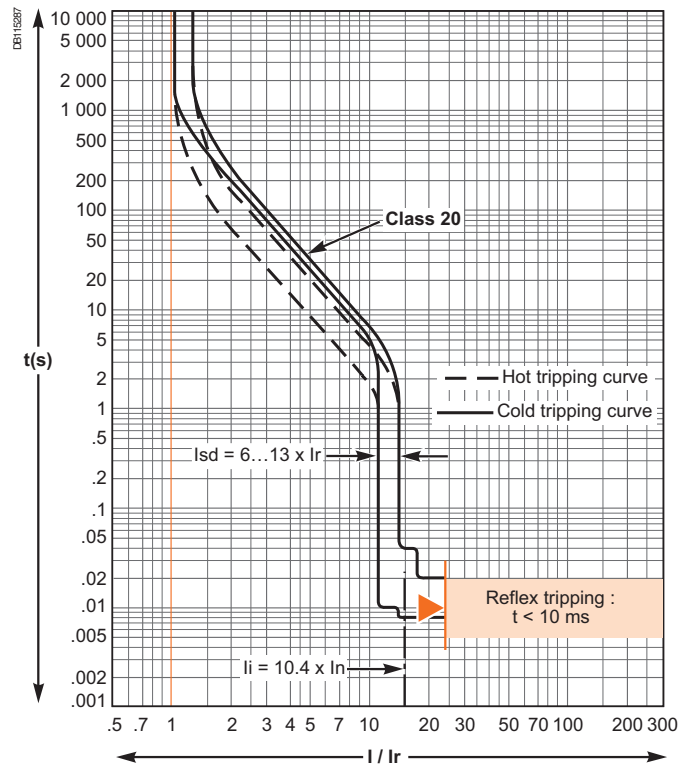
STR43ME - 120 to 500 A - class 10 A



STR43ME - 120 to 500 A - class 10



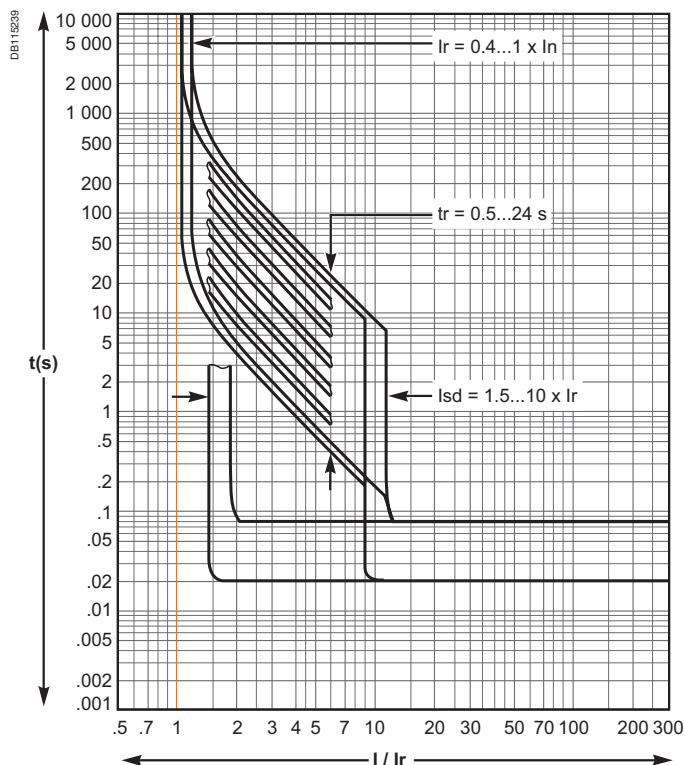
STR43ME - 120 to 500 A - class 20



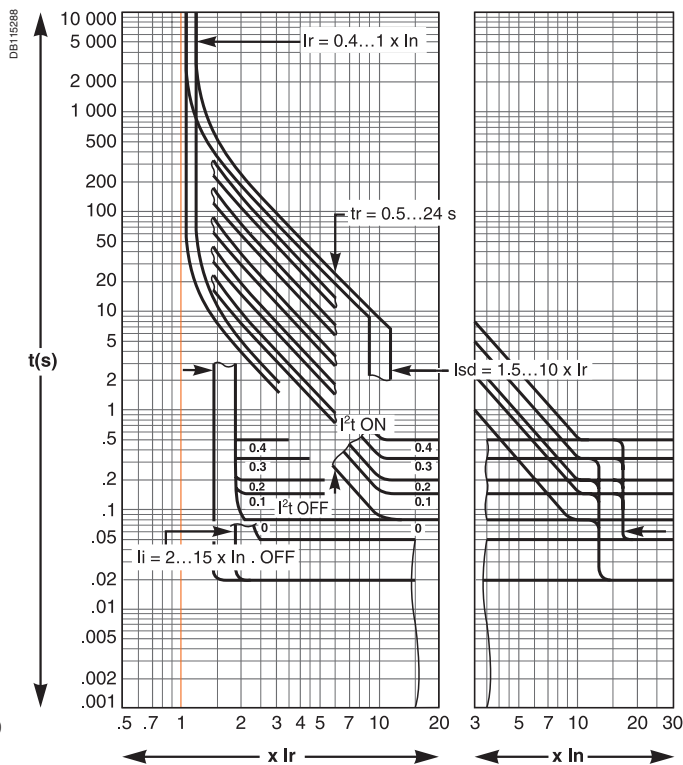
Thermal-withstand capacities are given for circuit breakers operating in an ambient temperature of 65 °C.

Micrologic electronic control units

Micrologic 2.0

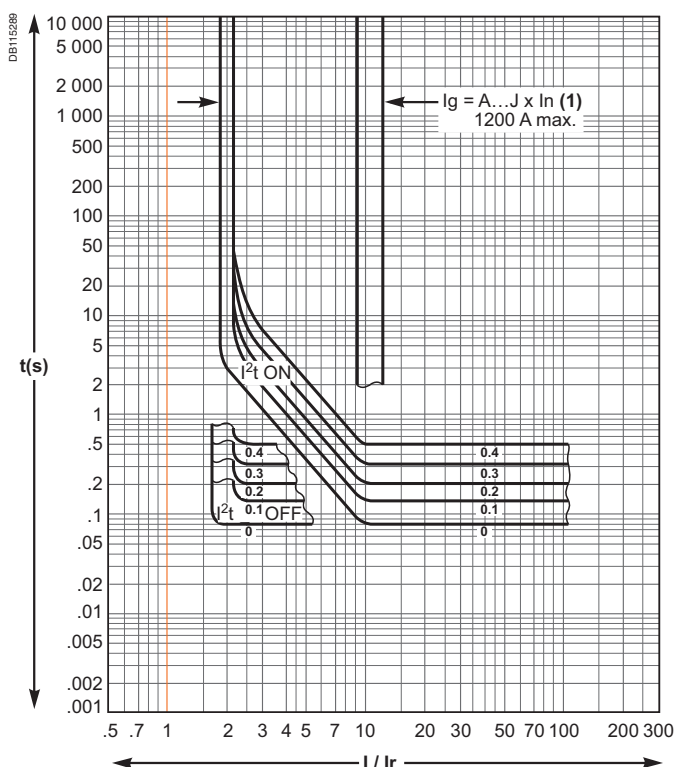


Micrologic 5.0, 6.0, 7.0



Options for Micrologic electronic control units

Earth-fault protection (Micrologic 6.0)



(1)

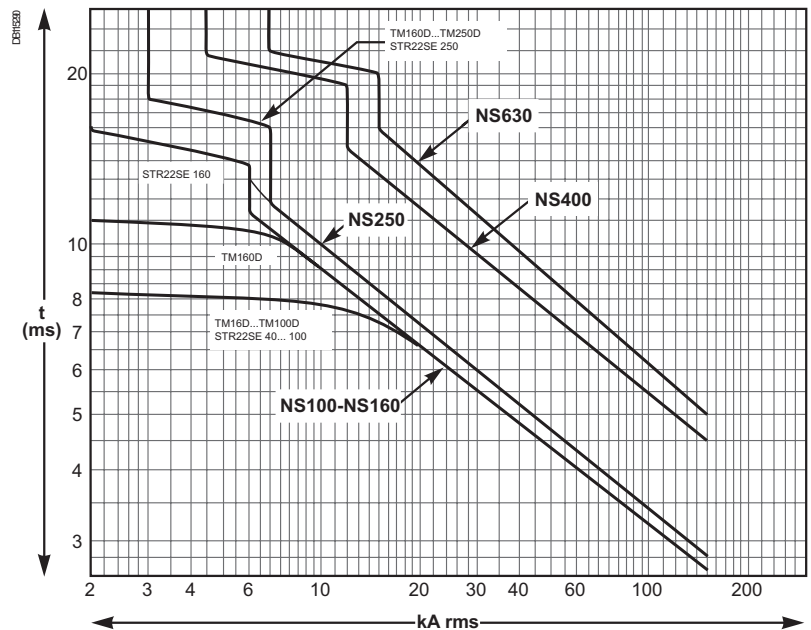
Ig = In x...	A	B	C	D	E	F	G	H	J
Ig < 400 A	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
400 A ≤ Ig ≤ 1200 A	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Ig > 1200 A	500	640	720	800	880	960	1040	1120	1200

Reflex tripping

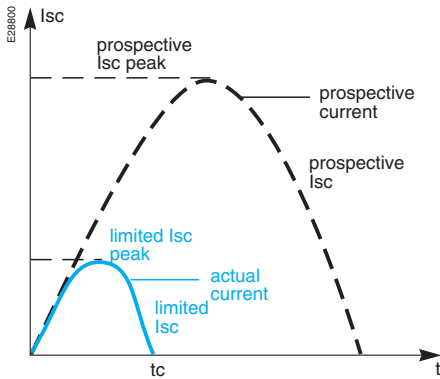
Compact NS100 to 630 devices incorporate the exclusive reflex-tripping system. This system breaks very high fault currents by mechanically tripping the device via a "piston" actuated directly by the pressure produced in the breaking units resulting from a short-circuit.

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.



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 (A²s), 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 mm² and thermal stresses in A²s.

CSA (mm ²)	1.5	2.5	4	6	10
PVC Cu	2.97 x 10 ⁴	8.26 x 10 ⁴	2.12 x 10 ⁵	4.76 x 10 ⁵	1.32 x 10 ⁶
Al					5.41 x 10 ⁵
PRC Cu	4.10 x 10 ⁴	1.39 x 10 ⁵	2.92 x 10 ⁵	6.56 x 10 ⁵	1.82 x 10 ⁶
Al					7.52 x 10 ⁵
CSA (mm ²)	16	25	35	50	
PVC Cu	3.4 x 10 ⁶	8.26 x 10 ⁶	1.62 x 10 ⁷	3.31 x 10 ⁷	
Al	1.39 x 10 ⁶	3.38 x 10 ⁶	6.64 x 10 ⁶	1.35 x 10 ⁷	
PRC Cu	4.69 x 10 ⁶	1.39 x 10 ⁷	2.23 x 10 ⁷	4.56 x 10 ⁷	
Al	1.93 x 10 ⁶	4.70 x 10 ⁶	9.23 x 10 ⁶	1.88 x 10 ⁷	

Example

Is a Cu/PVC cable with a CSA of 10 mm² adequately protected by an NS160N?

The table above indicates that the permissible stress is 1.32x10⁶ A²s.

All short-circuit currents at the point where an NS160N (Icu = 35 kA) is installed are limited with a thermal stress less than 6 x 10⁵ A²s (see next page).

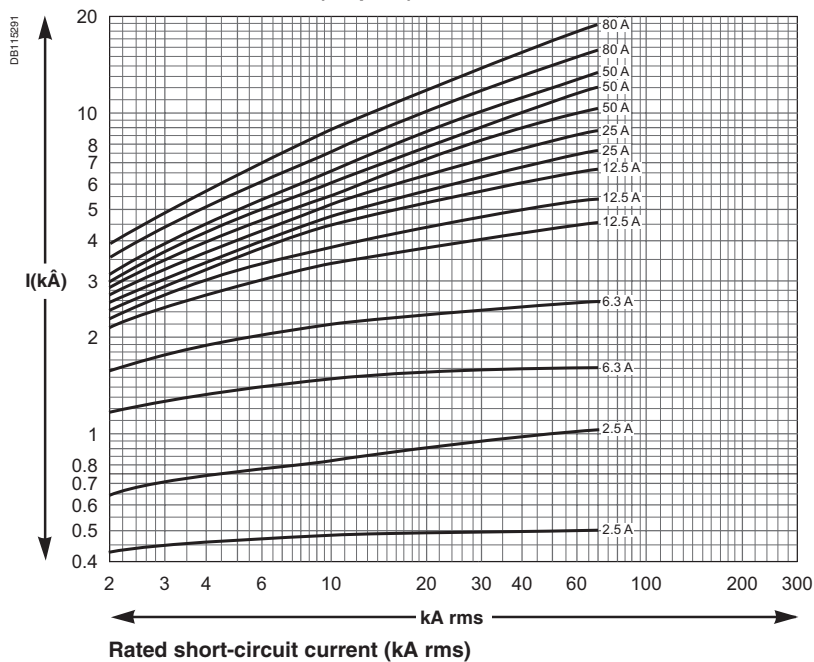
Cable protection is therefore ensured up to the limit of the breaking capacity of the circuit breaker.

Current-limiting curves

Circuit breaker NS80H-MA	Thermal relay	Contactor		
Cal. 80 A	LRD-33	63	63/80	LC1-D80
Cal. 80 A	LRD-33	59	48/65	LC1-D65
Cal. 50 A	LRD-33	57	37/50	LC1-D65
Cal. 50 A	LRD-33	55	30/40	LC1-D65
Cal. 50 A	LRD-33	53	23/32	LC1-D65
Cal. 25 A	LRD-33	22	17/25	LC1-D65
Cal. 25 A	LRD-13	21	12/18	LC1-D65
Cal. 12.5 A	LRD-13	16	09/13	LC1-D65
Cal. 12.5 A	LRD-13	14	07/10	LC1-D65
Cal. 12.5 A	LRD-13	12	5.5/08	LC1-D32
Cal. 6.3 A	LRD-13	10	04/06	LC1-D65
Cal. 6.3 A	LRD-13	08	2.5/04	LC1-D65
Cal. 2.5 A	LRD-13	07	1.6/2.5	LC1-D65
Cal. 2.5 A	LRD-13	06	01/1.6	LC1-D09

Voltage 400/440 V AC ⁽¹⁾

Limited short-circuit current (kA peak)

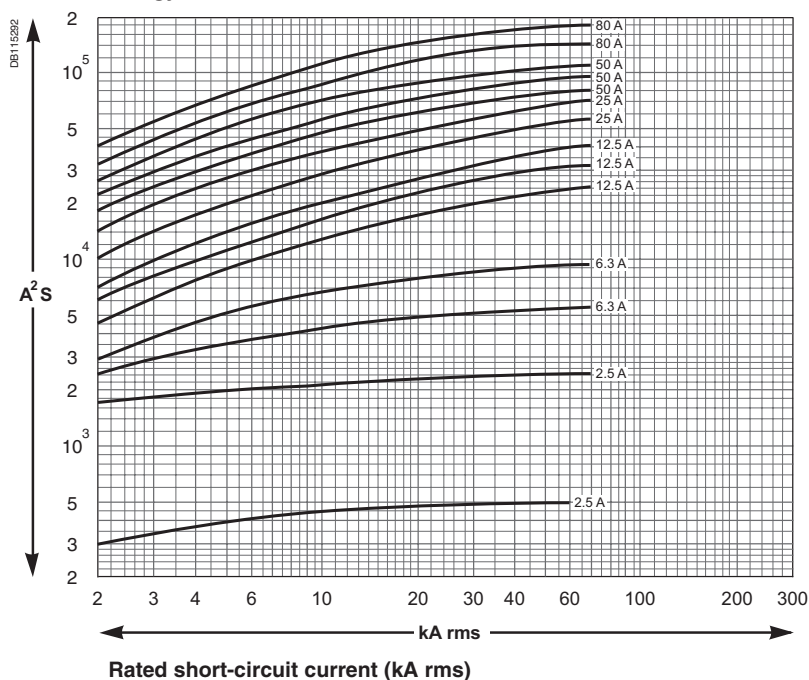


Thermal-stress curves

Circuit breaker NS80H-MA	Thermal relay	Contactor		
Cal. 80 A	LRD-33	63	63/80	LC1-D80
Cal. 80 A	LRD-33	59	48/65	LC1-D65
Cal. 50 A	LRD-33	57	37/50	LC1-D65
Cal. 50 A	LRD-33	55	30/40	LC1-D65
Cal. 50 A	LRD-33	53	23/32	LC1-D65
Cal. 25 A	LRD-33	22	17/25	LC1-D65
Cal. 25 A	LRD-13	21	12/18	LC1-D65
Cal. 12.5 A	LRD-13	16	09/13	LC1-D65
Cal. 12.5 A	LRD-13	14	07/10	LC1-D65
Cal. 12.5 A	LRD-13	12	5.5/08	LC1-D32
Cal. 6.3 A	LRD-13	10	04/06	LC1-D65
Cal. 6.3 A	LRD-13	08	2.5/04	LC1-D65
Cal. 2.5 A	LRD-13	07	1.6/2.5	LC1-D65
Cal. 2.5 A	LRD-13	06	01/1.6	LC1-D09

Voltage 400/440V AC ⁽¹⁾

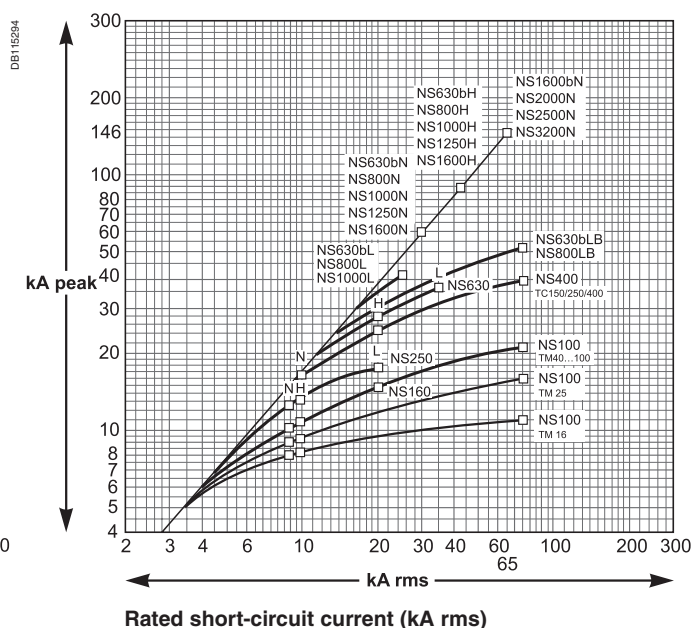
Limited energy



⁽¹⁾ Valid for 480 V Nema.

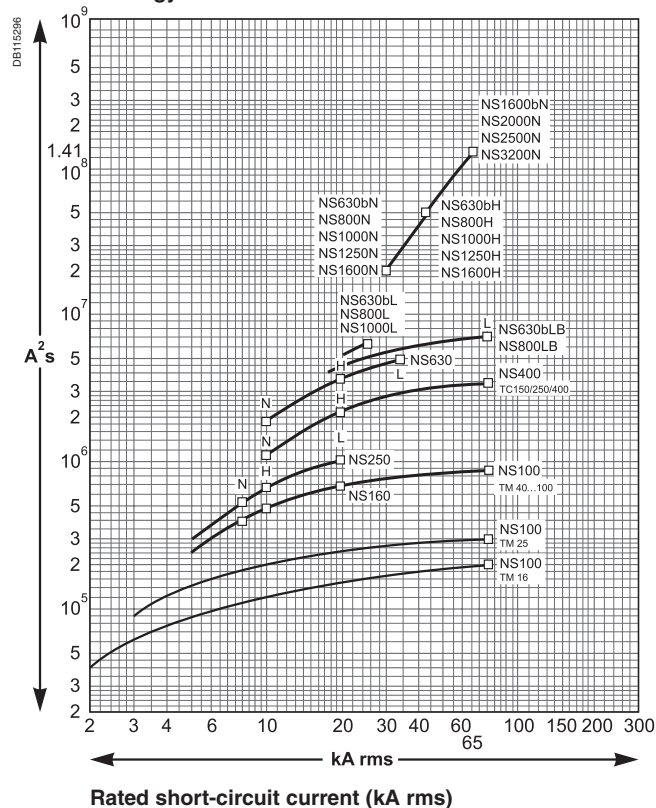
Voltage 660/690 V AC

Limited short-circuit current (kA peak)



Voltage 660/690 V AC

Limited energy



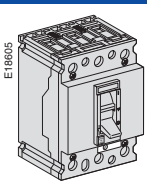
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Catalogue numbers and order forms

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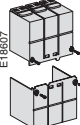
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Compact NS80H-MA with built-in trip unit MA

	Compact NS80H-MA (70 kA at 380-415 V)	
	Rating	3P 3d
	MA1.5	28106
	MA2.5	28105
	MA6.3	28104
	MA12.5	28103
	MA25	28102
	MA50	28101
	MA80	28100

Connection accessories

Long terminal shields (1 pair)

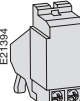
	3P	28034

Electrical auxiliaries

Auxiliary switch (changeover)

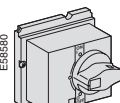
	OF or SD	29450
	OF or SD low level	29452

Voltage releases

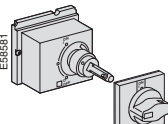
	AC	Voltage	MX	MN
		24 V 50/60 Hz		28079
		42 V 50/60 Hz	28069	
		48 V 50/60 Hz	28070	28080
		110-130 V 50/60 Hz	28071	28081
		208 V 60 Hz	28067	28089
		220-240 V 50/60 Hz	28072	28082
		277 V 60 Hz	28068	28090
		380-415 V 50 Hz	28073	28083
		440-480 V 50/60 Hz	28074	28084
	DC	Voltage	MX	MN
		24 V	28075	28085
		48 V	28076	28086
		110-125 V	28077	28087
		250 V	28078	28088
		MN 220-240 V 50/60 Hz with time delay		29421
		Composed of:	MN 250 V DC	28088
			Delay unit 220-240 V 50/60 Hz	29427

Rotary handles

Direct rotary handle

	Standard black handle	28050
	Red handle on yellow front	28051
	MCC conversion accessory	28054

Extended rotary handle

	Standard extended rotary handle	28052
	Red handle on yellow front	28053

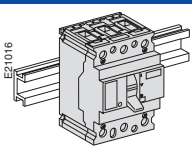
Indication auxiliary

	2 early make contacts	28055
	1 early-break contact	28056
	Wiring accessory for early-make contact (CAF)	29336

Miscellaneous

Removable locking device for 3 padlocks	29370
100 identification labels	29314
DIN rail plate	28040

Compact NSC100N with built-in trip unit

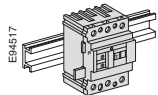
	Compact NSC100N (18 kA at 380-415 V)		
	Rating	3P 3d	4P 4d
	TM16D	28120	28130
	TM20D	28121	28131
	TM25D	28122	28132
	TM32D	28123	28133
	TM40D	28124	28134
	TM50D	28125	28135
	TM63D	28126	28136
	TM70D	28127	28137
	TM80D	28128	28138
	TM100D	28129	28139

Compact NSC100NA switch-disconnector

Compact NSC100NA		
Rating	3P	4P
	28140	28141

Vigi module

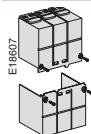
Vigi module 0.03/3A



Bottom connection	3P	28000
	4P	28001
Top connection	3P	28002
	4P	28003

Connection accessories

Long terminal shields (1 pair)



3P	28034
4P	28035

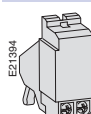
Electrical auxiliaries

Auxiliary switch (changeover)



OF or SD	29450
OF or SD low level	29452

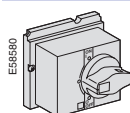
Voltage releases



AC	Voltage	MX	MN
	24 V 50/60 Hz		28079
	42 V 50/60 Hz	28069	
	48 V 50/60 Hz	28070	28080
	110-130 V 50/60 Hz	28071	28081
	208 V 60 Hz	28067	28089
	220-240 V 50/60 Hz	28072	28082
	277 V 60 Hz	28068	28090
	380-415 V 50 Hz	28073	28083
	440-480 V 50/60 Hz	28074	28084
DC	Voltage	MX	MN
	24 V	28075	28085
	48 V	28076	28086
	110-125 V	28077	28087
	250 V	28078	28088
MN 220-240 V 50/60 Hz with time delay			29421
Composed of:		MN 250 V DC	28088
		Delay unit 220-240 V 50/60 Hz	29427

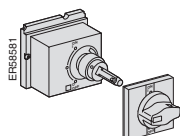
Rotary handles

Direct rotary handles



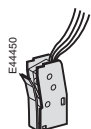
Standard black handle	28050
Red handle on yellow front	28051
MCC conversion accessory	28054

Extended rotary handles



Standard extended rotary handle	28052
Red handle on yellow front	28053

Indication auxiliary



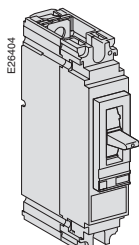
2 early make contacts	28055
1 early-break contact	28056
Wiring accessory for early-make contact (CAF)	29336

Miscellaneous

45 mm standard front face	28039
DIN rail plate	28040
100 labels	29314
Removable locking device for 3 padlocks	29370

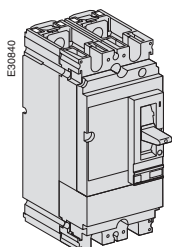
Compact NS100/160N 1P/2P, NS250 1P

With thermal-magnetic trip unit TM-D



Compact NS100N

Rating	1P 1t (Icu = 25 kA at 220/240 V)	2P 2t (Icu = 85 kA at 220/240 V and 25 kA at 380/415 V)
TM16D	29585	29605
TM20D	29588	29608
TM25D	29584	29604
TM30D	29587	29607
TM40D	29583	29603
TM50D	29586	29606
TM63D	29582	29602
TM80D	29581	29601
TM100D	29580	29600



Compact NS160N

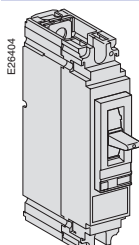
Rating	1P 1t (Icu = 25 kA at 220/240 V)	2P 2t (Icu = 85 kA at 220/240 V and 25 kA at 380/415 V)
TM125D	30581	30601
TM160D	30580	30600

Compact NS250N

Rating	1P 1t (Icu = 25 kA at 220/240 V)
TM160D	31582
TM200D	31581
TM250D	31580

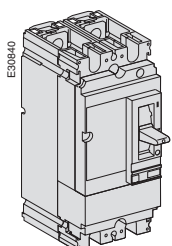
Compact NS100/160H 1P/2P

With thermal-magnetic trip unit TM-D



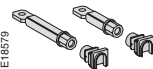
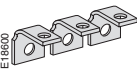
Compact NS100H

Rating	1P 1t (Icu = 40 kA at 220/240 V)	2P 2t (Icu = 100 kA at 220/240 V and 70 kA at 380/415 V)
TM16D	29595	29615
TM20D	29598	29618
TM25D	29594	29614
TM30D	29597	29617
TM40D	29593	29613
TM50D	29596	29616
TM63D	29592	29612
TM80D	29591	29611
TM100D	29590	29610



Compact NS160H

Rating	1P 1t (Icu = 40 kA at 220/240 V)	2P 2t (Icu = 100 kA at 220/240 V and 70 kA at 380/415 V)
TM125D	30590	30611
TM160D	30589	30610

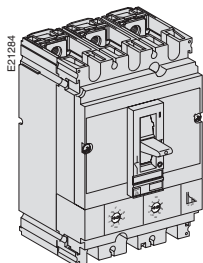
Connection accessories				
Rear connections				
 E18579	2 short			29235
	2 long			29236
Bare cable connectors				
 E18872	Snap-on, for cable:	Steel: 1.5 to 95 mm ² ; ≤ 160 A	Set of 2	29246
		Aluminium: 25 to 95 mm ² ; ≤ 250 A	Set of 2	29255
		Aluminium: 120 to 185 mm ² ; ≤ 250 A	Set of 2	29247
Terminal extensions				
 E18800	Right-angle terminal extensions		Set of 2	29250
 E18801	Straight terminal extensions		Set of 2	29251
Terminal shields				
	Short (1 pair)	1P		29320
	Short (2 pairs)	2P	2x	29320
Locks				
Toggle locking device for 3 padlocks				
	Removable			29370
Installation accessories				
Front-panel escutcheons				
	For toggle operated breaker			29315

NS100/160/250N: complete fixed/FC device

Compact NS100/160/250N and NA

Compact NS100/160/250N

With thermal-magnetic trip unit TM-D



Compact NS100N (36 kA at 380/415 V)

Rating	3P 2t	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	29625	29635	29645	29655	
TM25D	29624	29634	29644	29654	
TM32D	29627	29637	29647	29657	
TM40D	29623	29633	29643	29653	
TM50D	29626	29636	29646	29656	
TM63D	29622	29632	29642	29652	
TM80D	29621	29631	29641	29651	29661
TM100D	29620	29630	29640	29650	29660

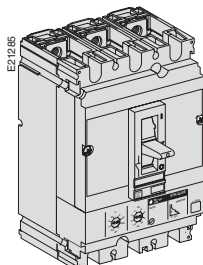
Compact NS160N (36 kA at 380/415 V)

Rating	3P 2t	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM80D	30623	30633	30643	30653	30663
TM100D	30622	30632	30642	30652	30662
TM125D	30621	30631	30641	30651	30661
TM160D	30620	30630	30640	30650	30660

Compact NS250N (36 kA at 380/415 V)

Rating	3P 2t	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM125D	31623	31633	31643	31653	31663
TM160D	31622	31632	31642	31652	31662
TM200D	31621	31631	31641	31651	31661
TM250D	31620	31630	31640	31650	31660

With electronic trip unit STR22SE



Compact NS100N (36 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	29772	29782
100	29770	29780

Compact NS160N (36 kA at 380/415 V)

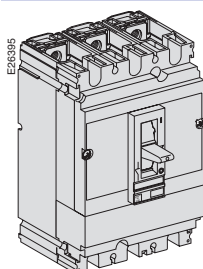
Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	30773	30783
100	30771	30781
160	30770	30780

Compact NS250N (36 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
100	31772	31782
250	31770	31780

Compact NS100/160/250NA switch-disconnector

With NA switch-disconnector unit



Compact NS100NA

Rating	2P	3P	4P
100	29619	29629	29639

Compact NS160NA

Rating	2P	3P	4P
160	30619	30629	30639

Compact NS250NA

Rating	2P	3P	4P
250	31619	31629	31639

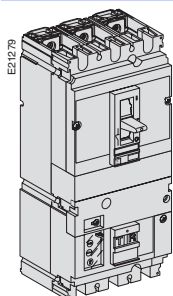
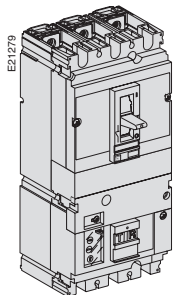
Vigicompact NS100/160/250N

With thermal-magnetic trip unit TM-D

Vigicompact NS100N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	29935	29945	29955	
TM25D	29934	29944	29954	
TM32D	29937	29947	29957	
TM40D	29933	29943	29953	
TM50D	29936	29946	29956	
TM63D	29932	29942	29952	
TM80D	29931	29941	29951	29961
TM100D	29930	29940	29950	29960
Vigicompact NS160N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM80D	30933	30943	30953	30963
TM100D	30932	30942	30952	30962
TM125D	30931	30941	30951	30961
TM160D	30930	30940	30950	30960
Vigicompact NS250N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM125D	31933	31943	31953	31963
TM160D	31932	31942	31952	31962
TM200D	31931	31941	31951	31961
TM250D	31930	31940	31950	31960

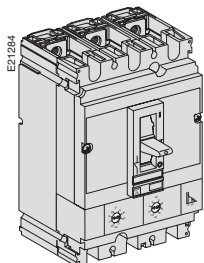
With electronic trip unit STR22SE

Vigicompact NS100N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)		
Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	29972	29982
100	29970	29980
Vigicompact NS160N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)		
Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	30973	30983
100	30971	30981
160	30970	30980
Vigicompact NS250N (36 kA at 380/415 V) equipped of MH Vigi module (220 to 440 V)		
Rating	3P 3t	4P 3t, 4t, 3t + Nr
100	31972	31982
250	31970	31980



Compact NS100/160/250SX

With thermal-magnetic trip unit TM-D



Compact NS100SX (50 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	35857	35867	35877	
TM25D	35856	35866	35876	
TM32D	35855	35865	35875	
TM40D	35854	35864	35874	
TM50D	35853	35863	35873	
TM63D	35852	35862	35872	
TM80D	35851	35861	35871	35881
TM100D	35850	35860	35870	35880

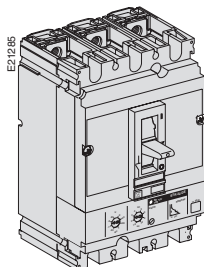
Compact NS160SX (50 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM80D	35893	35903	35913	35923
TM100D	35892	35902	35912	35922
TM125D	35891	35901	35911	35921
TM160D	35890	35900	35910	35920

Compact NS250SX (50 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM125D	35933	35943	35953	35963
TM160D	35932	35942	35952	35962
TM200D	35931	35941	35951	35961
TM250D	35930	35940	35950	35960

With electronic trip unit STR22SE



Compact NS100SX (50 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	35971	35976
100	35970	35975

Compact NS160SX (50 kA at 380/415 V)

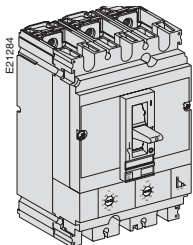
Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	35982	35987
100	35981	35986
160	35980	35985

Compact NS250SX (50 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
100	35991	35996
250	35990	35995

Compact NS100/160/250H

With thermal-magnetic trip unit TM-D



Compact NS100H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	29675	29685	29695	
TM25D	29674	29684	29694	
TM32D	29677	29687	29697	
TM40D	29673	29683	29693	
TM50D	29676	29686	29696	
TM63D	29672	29682	29692	
TM80D	29671	29681	29691	29701
TM100D	29670	29680	29690	29700

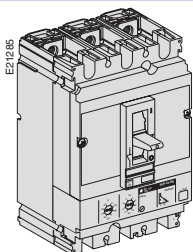
Compact NS160H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM80D	30673	30683	30693	30703
TM100D	30672	30682	30692	30702
TM125D	30671	30681	30691	30701
TM160D	30670	30680	30690	30700

Compact NS250H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM125D	31673	31683	31693	31703
TM160D	31672	31682	31692	31702
TM200D	31671	31681	31691	31701
TM250D	31670	31680	31690	31700

With electronic trip unit STR22SE



Compact NS100H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	29792	29802
100	29790	29800

Compact NS160H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
40	30793	30803
100	30791	30801
160	30790	30800

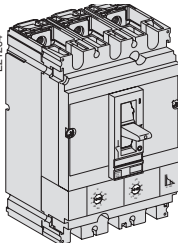
Compact NS250H (70 kA at 380/415 V)

Rating	3P 3t	4P 3t, 4t, 3t + Nr
100	31792	31802
250	31790	31800

Compact NS100/160/250L

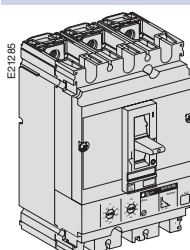
With thermal-magnetic trip unit TM-D

E21284

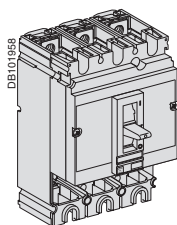


Compact NS100L (150 kA at 380/415 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	29715	29725	29735	
TM25D	29714	29724	29734	
TM32D	29717	29727	29737	
TM40D	29713	29723	29733	
TM50D	29716	29726	29736	
TM63D	29712	29722	29732	
TM80D	29711	29721	29731	29741
TM100D	29710	29720	29730	29740
Compact NS160L (150 kA at 380/415 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM80D	30713	30723	30733	30743
TM100D	30712	30722	30732	30742
TM125D	30711	30721	30731	30741
TM160D	30710	30720	30730	30740
Compact NS250L (150 kA at 380/415 V)				
Rating	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM125D	31713	31723	31733	31743
TM160D	31712	31722	31732	31742
TM200D	31711	31721	31731	31741
TM250D	31710	31720	31730	31740

With electronic trip unit STR22SE

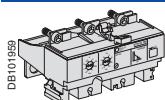
	Compact NS100L (150 kA at 380/415 V)		
	Rating	3P 3t	4P 3t, 4t, 3t + Nr
	40	29812	29822
	100	29810	29820
	Compact NS160L (150 kA at 380/415 V)		
	Rating	3P 3t	4P 3t, 4t, 3t + Nr
	40	30813	30823
	100	30811	30821
	160	30810	30820
	Compact NS250L (150 kA at 380/415 V)		
	Rating	3P 3t	4P 3t, 4t, 3t + Nr
	100	31812	31822
	250	31810	31820

Basic frame



	2P (3P frame)	3P	4P
NS100N	29000	29003	29008
NS100SX		29006	29011
NS100H		29004	29009
NS100L		29005	29010
NS160N	30400	30403	30408
NS160SX		30406	30411
NS160H		30404	30409
NS160L		30405	30410
NS250N	31400	31403	31408
NS250SX		31406	31411
NS250H		31404	31409
NS250L		31405	31410

+ Trip unit



Standard protection: trip unit TM-D

Rating	3P 2t	3P 3t	4P 3t	4P 4t	4P 3t + Nr
TM16D	29025	29035	29045	29055	
TM25D	29024	29034	29044	29054	
TM32D	29027	29037	29047	29057	
TM40D	29023	29033	29043	29053	
TM50D	29026	29036	29046	29056	
TM63D	29022	29032	29042	29052	
TM80D ⁽¹⁾	29021	29031	29041	29051	29061
TM100D ⁽¹⁾	29020	29030	29040	29050	29060
TM80D ⁽²⁾	30423	30433	30443	30453	30463
TM100D ⁽²⁾	30422	30432	30442	30452	30462
TM125D	30421	30431	30441	30451	30461
TM160D ⁽³⁾	30420	30430	30440	30450	30460
TM160D ⁽⁴⁾	31422	31432	31442	31452	31462
TM200D	31421	31431	31441	31451	31461
TM250D	31420	31430	31440	31450	31460

Standard protection: electronic trip unit SE

Rating	3P 3t	4P 3t, 4t, 3t + Nr
STR22SE - 40 A	29072	29082
STR22SE - 80 A ⁽²⁾	30471	30481
STR22SE - 100 A	29070	29080
STR22SE - 160 A	30470	30480
STR22SE - 250 A	31470	31480

Standard protection with oversized neutral: electronic trip unit SE OSN

Rating	4P 3t, 3t + 1.6N
STR22SE OSN 160 A - 3 x ϕ 100 A ⁽²⁾	30466
STR22SE OSN 250 A - 3 x ϕ 160 A ⁽⁴⁾	31481

Type G protection: trip unit TM-G

Rating	3P 2t	3P 3t	4P 4t
TM16G	29145	29155	29165
TM25G	29144	29154	29164
TM40G	29143	29153	29163
TM63G	29142	29152	29162

Type G protection: electronic trip unit GE

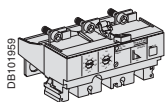
Rating	3P 3t	4P 3t, 4t, 3t + Nr
STR22GE - 40 A	29076	29086
STR22GE - 100 A	29075	29085
STR22GE - 160 A	30475	30485
STR22GE - 250 A	31475	31485

Motor protection: trip unit MA

Rating	3P 3t	4P 3t
MA2.5	29125	
MA6.3	29124	
MA12.5	29123	
MA25	29122	
MA50	29121	
MA100	29120	29130
MA150	30500	30510
MA220	31500	31510

(1) For NS100.
(2) For NS160/250.
(3) For NS160.
(4) For NS250.

+ Trip unit (cont.)



Motor protection: electronic trip unit ME

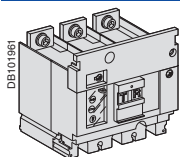
Rating	3P 3t
STR22ME - 20 A	29175
STR22ME - 25 A	29174
STR22ME - 40 A	29173
STR22ME - 50 A	29172
STR22ME - 80 A	29171
STR22ME - 100 A	29170
STR22ME - 150 A	30520
STR22ME - 220 A	31520

Options:	SDTAM 110/240 V AC/DC	29424
	SDTAM 24/48 V AC - 24/72 V DC	29430

Switch-disconnector NA

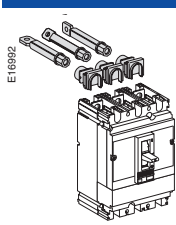
	2P (3P frame)	3P	4P
NA (NS100)	29200	29201	29202
NA (NS160/250)	30456	30456	30457

+ Vigi module

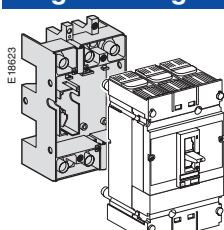


	3P	4P
ME type for NS100/160	29212	29213
MH type for NS100/160 (220 to 440 V)	29210	29211
MH type for NS250 (220 to 440 V)	31535	31536
MH type for NS100/160 (440 to 550 V)	29215	29216
MH type for NS250 (440 to 550 V)	31533	31534
Connection for a 4P Vigi on a 3P breaker		29214

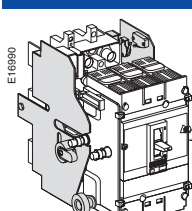
Fixed/RC device = fixed/FC device + rear connection kit

	Short RC kit			
	3P			29237
	4P			29238
	Comprising:	Short RCs	3P	3x 29235
			4P	4x 29235
	Mixed RC kit			
	3P			29239
	4P			29240
	Comprising:	Kit 3P	Short RCs	2x 29235
			Long RCs	1x 29236
		Kit 4P	Short RCs	2x 29235
			Long RCs	2x 29236

Plug-in configuration = fixed/FC device + plug-in kit

	Kit for Compact			
	2P (3P frame)			29288
	3P			29289
	4P			29290
	Comprising:	Base	2P	1x 29265
			3P	1x 29266
			4P	1x 29267
		Safety trip	3P/4P	1x 29270
		Short terminal shields	3P	1x 29321
			4P	1x 29322
		Power connections	2P	2x 29268
			3P	3x 29268
			4P	4x 29268
	Kit for Vigicompact			
	3P			29291
	4P			29292
	Comprising:	Base	3P	1x 29266
			4P	1x 29267
		Safety trip	3P/4P	1x 29270
		Short terminal shields	3P	1x 29321
			4P	1x 29322
		Power connections	3P	3x 29269
			4P	4x 29269

Withdrawable configuration = fixed/FC device + withdrawable kit

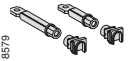
	Kit for Compact			
	2P (3P frame)			29298
	3P			29299
	4P			29300
	Comprising:	Plug-in kit	2P	1x 29288
			3P	1x 29289
			4P	1x 29290
		Fixed part of chassis	2P/3P/4P	1x 29282
		Moving part of chassis	2P/3P/4P	1x 29283
	Kit for Vigicompact			
	3P			29301
	4P			29302
	Comprising:	Plug-in kit	3P	1x 29291
			4P	1x 29292
		Fixed part of chassis	3P/4P	1x 29282
		Moving part of chassis	3P/4P	1x 29283

Insulation accessories for plug-in and withdrawable

Long terminal shields for plug-in base and withdrawable configuration				
3P				29332
4P				29333
Comprising:	Adapter	3P (1 pair)	1x	29306
		4P (1 pair)	1x	29307
	Long terminal shields	3P (1 pair)	1x	29308
		4P (1 pair)	1x	29309
Interphase barriers kit for plug-in base and withdrawable configuration				
3P				29334
4P				29311
Comprising:	Adapter	3P (1 pair)	1x	29306
		4P (1 pair)	1x	29307
	Interphase barriers	Set of 6	1x	29328

Connection accessories (Cu or Al)

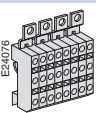
Rear connections

	2 short	29235
	2 long	29236

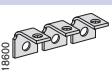
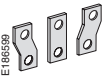
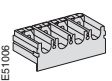
Bare cable connectors

	Snap-on, for cable	Steel: 1.5 to 95 mm ² ; ≤ 160 A	Set of 3	29242
			Set of 4	29243
		Aluminium: 25 to 95 mm ² ; ≤ 250 A	Set of 3	29227
			Set of 4	29228
	Voltage plug for 185 mm ² bare cable connector		Set of 2	29348
			Set of 10	29241
	Clips for bare-cable connector		Set of 3	29248
			Set of 4	29249
	Distribution connectors for six 1.5 to 35 mm ² cables with interphase barriers		Set of 3	29248
			Set of 4	29249

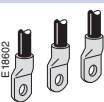
"Polybloc" distribution block (for bare cable)

	160 A (40 °C) 6 cables S ≤ 10 mm ²	07100
	250 A (40 °C) 9 cables S ≤ 10 mm ²	07101

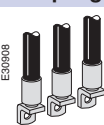
Terminal extensions

	Right-angle terminal extensions	Set of 3	29261
		Set of 4	29262
	Straight terminal extensions	Set of 3	29263
		Set of 4	29264
	Spreaders	3P	31563
		4P	31564
	Supplied with 2 (or 3) interphase barriers		
	One-piece spreader	3P	31060
		4P	31061
	Front alignment base	3P/4P	31064

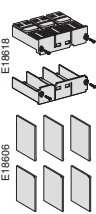
Crimp lugs for copper cable

	For cable 120 mm ²	Set of 3	29252
		Set of 4	29256
	For cable 150 mm ²	Set of 3	29253
		Set of 4	29257
	For cable 185 mm ²	Set of 3	29254
		Set of 4	29258
	Supplied with 2 (or 3) interphase barriers		

Crimp lugs for aluminium cable

	For cable 150 mm ²	Set of 3	29504
		Set of 4	29505
	For cable 185 mm ²	Set of 3	29506
		Set of 4	29507
	Supplied with 2 (or 3) interphase barriers		

Terminal shields

	Short (1 pair)	3 P	29321
		4 P	29322
	Long (1 pair)	3 P	29323
		4 P	29324
	Interphase barriers	Set of 6	29329

Insulation kit U ≥ 600 V

	Long terminal shields + insulating screens	3 P	29326
		4 P	29327
	2 insulating screens (fixed breaker)	3 P	29330
		4 P	29331

Electrical auxiliaries

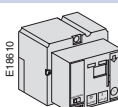
Auxiliary contacts (changeover)

	OF or SD or SDE or SDV	29450
	OF or SD or SDE or SDV low level	29452
	SDE adapter for trip unit TM or MA	29451

Voltage releases

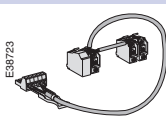
	AC	Voltage	MX	MN
		24 V 50/60 Hz	29384	29404
		48 V 50/60 Hz	29385	29405
		110-130 V 50/60 Hz	29386	29406
		220-240 V 50/60 Hz	29387	29407
		208-277 V 60 Hz		
		380-415 V 50 Hz	29388	29408
		440-480 V 60 Hz		
		525 V 50 Hz - 600 V 60 Hz	29389	29409
	DC	Voltage	MX	MN
		12 V	29382	29402
		24 V	29390	29410
		30 V	29391	29411
		48 V	29392	29412
		60 V	29383	29403
		125 V	29393	29413
		250 V	29394	29414
		MN 48 V 50/60 Hz with time delay		29420
		composed of:		
		MN 48 V DC		29412
		delay unit 48 V 50/60 Hz		29426
		MN 220-240 V 50/60 Hz with time delay		29422
		composed of:		
		MN 250 V DC		29414
		delay unit of 220-240 V 50/60 Hz		29427

Motor mechanism modules with SDE adapter

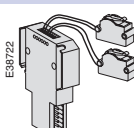
	AC	Voltage	MT100/160	MT250
		48-60 V 50/60 Hz	29440	31548
		110-130 V 50/60 Hz	29433	31540
		220-240 V 50/60 Hz	29434	31541
		208-277 V 60 Hz		
		380-415 V 50/60 Hz	29435	31542
		440-480 V 60 Hz		
	DC	Voltage	MT100/160	MT250
		24-30 V	29436	31543
		48-60 V	29437	31544
		110-130 V	29438	31545
		250 V	29439	31546

LV installation control and monitoring (Digipact)

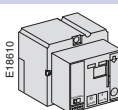
Communicating auxiliary contacts for Compact NS circuit breakers

	OF, SD and SDE communicating auxiliary contacts for Compact NS100/160/250 (the SDE adapter for thermal-magnetic trip units is included)	29453
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Communicating "connected/disconnected" position indication contacts for Compact NS circuit breakers

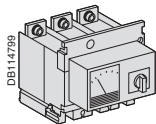
	"connected /disconnected" position indication contacts for Compact NS100/250	29296
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Motor mechanism + communicating auxiliary contacts for Compact NS circuit breakers

	MT100/160	220-240 V 50/60 Hz + communicating OF, SD, SDE for Compact NS100/160	29441
	MT250	220-240 V 50/60 Hz + communicating OF, SD, SDE for Compact NS250	31549

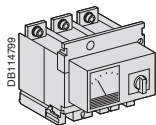
Indication and measurement modules

Ammeter module



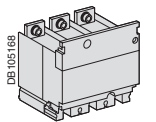
Rating (A)	100	160	250
3P	29455	30555	31565
4P	29456	30556	31566

I max. ammeter module



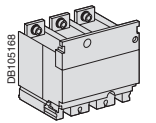
Rating (A)	100	160	250
3P	34849	34850	34851

Current transformer module



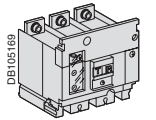
Rating (A)	100	150	250
3P	29457	30557	31567
4P	29458	30558	31568

Current transformer module and voltage output



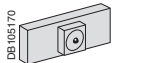
Rating (A)	125	150	250
3P	29461	30561	31569
4P	29462	30562	31570

Insulation monitoring module



3P	29459
4P	29460

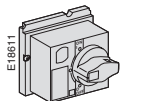
Voltage presence indicator



29325

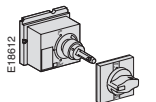
Rotary handles

Direct rotary handles



Standard black handle	29337
Red handle on yellow front	29339
MCC conversion accessory	29341
CNOMO conversion accessory	29342

Standard extended rotary handle



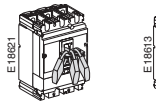
Standard extended rotary handle	29338
Red handle on yellow front	29340
Telescopic handle for withdrawable device	29343

Accessories

Indication auxiliary	1 early-break contact	29345
	2 early-make contacts	29346
Early-make wiring terminal		29336

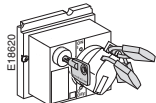
Locks

Toggle locking device for 1 to 3 padlocks



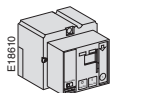
By removable device	29370
By fixed device	29371

Locking of the rotary handle



Keylock adapter (keylock not included)		29344
Keylock (keylock adapter not included)	Ronis 1351B.500	41940
	Profalux KS5 B24 D4Z	42888

Locking of the motor mechanism modules



Keylock adapter + Ronis keylock (special)	29449
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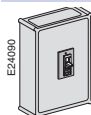
Individual enclosures

Sheet-metal enclosure IP54 for



Compact NS100/160 and Vigi NS100/160 with standard rotary handle	31215
Compact NS100/160 and Vigi NS100/160 with red, yellow rotary handle	31216
Compact NS250 and Vigi NS250 with standard rotary handle	31217
Compact NS250 and Vigi NS250 with red, yellow rotary handle	31218

Insulating enclosure IP55 for



Compact NS100/160	29465
Vigicompact NS100/160	29466
Compact NS250	31573
Vigicompact NS250	31574

Visible break disconnect function

See catalogue dealing with "Interpact INV products (visible break)" and the associated accessories.
Visible break disconnection function associated with fixed front-connected/rear-connected Compact NS (for "tarif vert/tarif jaune" connection).

Test kits

Test kits

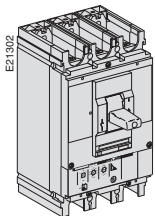


Mini test kit for STR trip units	43362
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Portable test kit for STR trip units	34547
Spare test plug for portable test kit 34547	34503
Wiring kit (spare part)	34546

Compact NS400/630N with electronic trip unit

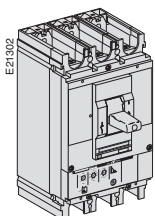
Electronic trip unit STR23SE ($U \leq 525$ V)

Compact NS400N (50 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32719	32720
	400 A	32707	32708
Compact NS630N (50 kA at 380/415 V), 45 mm pitch		32693	32694
		32893	32894

Electronic trip unit STR53UE ($U \leq 525$ V)

Compact NS400N (50 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32725	32726
	400 A	32713	32714
Compact NS630N (50 kA at 380/415 V), 45 mm pitch		32699	32700
		32899	32900

Compact NS400/630H with electronic trip unit

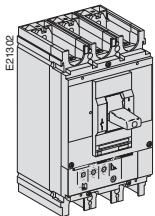
Electronic trip unit STR23SE ($U \leq 525$ V)

Compact NS400H (70 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32721	32722
	400 A	32709	32710
Compact NS630H (70 kA at 380/415 V), 45 mm pitch		32695	32696
		32895	32896

Electronic trip unit STR53UE ($U \leq 525$ V)

Compact NS400H (70 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32727	32728
	400 A	32715	32716
Compact NS630H (70 kA at 380/415 V), 45 mm pitch		32701	32702
		32901	32902

Compact NS400/630L with electronic trip unit

Electronic trip unit STR23SE ($U \leq 525$ V)

Compact NS400L (150 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32723	32724
	400 A	32711	32712
Compact NS630L (150 kA at 380/415 V), 45 mm pitch		32697	32698
		32897	32898

Electronic trip unit STR53UE ($U \leq 525$ V)

Compact NS400L (150 kA at 380/415 V) 45 mm pitch	150 A	3P	4P 3d, 4d, 3d + Nr
	250 A	32729	32730
	400 A	32717	32718
Compact NS630L (150 kA at 380/415 V), 45 mm pitch		32703	32704
		32903	32904

Compact NS400/630H/L with magnetic trip unit MA for motor protection

Trip unit MA320

		3P	
Compact NS400H, 45 mm pitch		32750	
Compact NS400L, 45 mm pitch		32751	

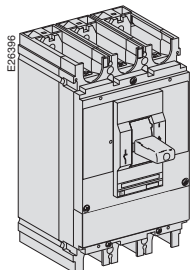
Trip unit MAE500

		3P	
Compact NS630H, 45 mm pitch		32950	
Compact NS630L, 45 mm pitch		32951	

NS400/630: complete fixed/FC device (cont.)

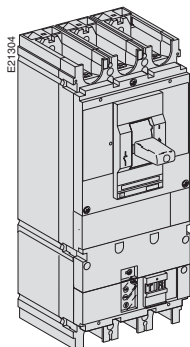
Switch-disconnector, Vigicompact and Compact 1000 V

Compact NS400/630NA switch-disconnector



	3P	4P
Compact NS400NA, 45 mm pitch	32756	32757
Compact NS630NA, 45 mm pitch	32956	32957

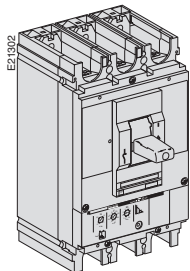
Vigicompact NS400/630N



Trip unit STR23SE ($U \leq 525$ V)

Vigicompact equipped with MB Vigi module (220 to 440 V)	3P	4P 3d, 4d, 3d + Nr
Vigicompact NS400N, 45 mm pitch	32733	32734
Vigicompact NS630N, 45 mm pitch	32933	32934

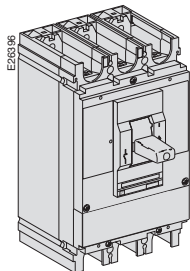
Compact NS400N 1000 V



Trip unit STR23SP

Compact equipped with connection kit	3P	
Compact NS400N 1000 V	150 A low setting 37 A	32673
(10 kA at 1150 V)	150 A	32672
45 mm pitch	250 A	32671
	400 A	32670

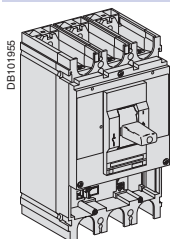
Compact NS400NA 1000 V



Compact equipped with connection kit	3P	
Compact NS400NA 1000 V	400 A	32753
45 mm pitch		

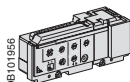
Compact and Vigicompact NS400/630N/H/L

Basic frame



		3P	4P
NS400N	150 A	32382	32387
	250 A	32392	32397
	400 A	32403	32408
NS400H	150 A	32383	32388
	250 A	32393	32398
	400 A	32404	32409
NS400L	150 A	32384	32389
	250 A	32394	32399
	400 A	32405	32410
NS630N		32803	32808
NS630H		32804	32809
NS630L		32805	32810

+ trip unit



Electronic trip units STR23SE or STR23SV

	3P, 4P 3d, 4d, 3d + Nr	
STR23SE (U ≤ 525 V)	32420	
STR23SV (U > 525 V)	32432	

Standard protection with oversized neutral: electronic trip unit STR23SE OSN

Rating	4P 3d, 3d + 1.6N	
STR23SE OSN (U ≤ 525 V)	32443	

Electronic trip units STR53UE (basic offer) or STR53SV

	3P, 4P 3d, 4d, 3d + Nr	
STR53UE F (U ≤ 525 V)	32424	
STR53SV F (U > 525 V)	32433	

Electronic trip unit STR53UE (with options)

	3P, 4P 3d, 4d, 3d + Nr	
STR53UE FTI (U ≤ 525 V)	32425	
STR53UE FI (U ≤ 525 V)	32426	
STR53UE FTI (U ≤ 525 V) for external neutral CT ⁽¹⁾	32429	

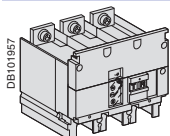
Options:	ZSI wiring	32442
	COM wiring	32441

⁽¹⁾ Allows the connection of an external neutral CT for 3P breakers equipped with «earth fault» protection (T).

Electronic trip unit STR43ME

	3P, 3d	
STR43ME F	32430	
Options:	SDTAM 110/240 V AC/DC	29424
	SDTAM 24/48 V AC / 24/72 V DC	29430
STR43ME FI	32431	
Options:	SDTAM 110/240 V AC/DC	29424
	SDTAM 24/48 V AC / 24/72 V DC	29430
	COM wiring	32441
Spare battery option for STR53UE or STR43ME		32434

+ Vigi module



Type MB		3P	4P
200 to 440 V		32455	32456
440 to 550 V		32453	32454
Connection for a 4P Vigi on a 3P breaker			32457

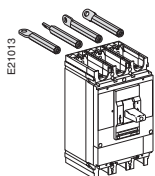
External CT for earth-fault protection



For earth fault protection (T) of STR53UE FT or FTI

Installation on outgoing neutral conductor outside the circuit-breaker		
150 A		36950
250 A		36951
400 A		36952
630 A		32440

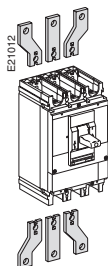
Fixed/RC device = fixed/FC device + RC kit



Mixed RC kit

3P					32477
4P					32478
Comprising:	Kit 3P	Short RCs	2x	32475	
		Long RCs	1x	32476	
	Kit 4P	Short RCs	2x	32475	
		Long RCs	2x	32476	

Fixed/FC device 52.5 mm or 70 mm pitch = fixed FC configuration 45 mm pitch + spreaders

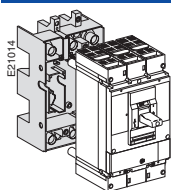


Pitch of all Compact and Vigicompact NS400/630/N/H/L is 45 mm. A set of spreaders is available for connection: fixed front connections or withdrawable with pitch of 52.5 mm or 70 mm.

Upline or downline clearance

52.5 mm	3P	32490
	4P	32491
70 mm	3P	32492
	4P	32493

Plug-in device = fixed/FC device + plug-in kit



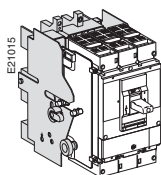
Kit for Compact

3P					32538
4P					32539
Comprising:	Base	3P	1x	32516	
		4P	1x	32517	
	Safety trip	3P/4P	1x	32520	
		3P	1x	32562	
	Short terminal shields	4P	1x	32563	
		3P	3x	32518	
	Power connections	4P	4x	32518	

Kit for Vigicompact

3P					32540
4P					32541
Comprising:	Base	3P	1x	32516	
		4P	1x	32517	
	Safety trip	3P/4P	1x	32520	
		3P	1x	32562	
	Short terminal shields	4P	1x	32563	
		3P	3x	32519	
	Power connections	4P	4x	32519	

Withdrawable device = fixed/FC device + withdrawable kit



Kit for Compact

3P					32542
4P					32543
Comprising:	Plug-in kit	3P	1x	32538	
		4P	1x	32539	
	Fixed part of chassis	3P/4P	1x	32532	
		Moving part of chassis	3P/4P	1x	32533

Kit for Vigicompact

3P					32544
4P					32545
Comprising:	Plug-in kit	3P	1x	32540	
		4P	1x	32541	
	Fixed part of chassis	3P/4P	1x	32532	
		Moving part of chassis	3P/4P	1x	32533

Insulation accessories

Long terminal shields kit for plug-in base and withdrawable configuration

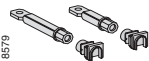
3P					32588
4P					32589
Comprising:	Adapter	3P (1 pair)	1x	32584	
		4P (1 pair)	1x	32585	
	Long terminal shields	3P (1 pair)	1x	32586	
		4P (1 pair)	1x	32587	

Interphase barriers kit for plug-in base and withdrawable configuration

3P					32591
4P					32592
Comprising:	Adapter	3P (1 pair)	1x	32584	
		4P (1 pair)	1x	32585	
	Interphase barriers	Set of 6	1x	32571	

Connection accessories (Cu or Al)

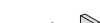
Rear connections

	2 short		32475
	2 long		32476

Bare cable connectors

	For 1 cable from 35 to 300 mm ²	Set of 3	32479
		Set of 4	32480
	For 2 cable from 35 to 240 mm ²	Set of 3	32481
		Set of 4	32482
	Voltage measurement input for bare cable connector	Set of 2	29348

Terminal extensions

	Right-angle terminal extensions		Set of 3	32484
			Set of 4	32485
	Edgewise pads		Set of 3	32486
			Set of 4	32487
	Spreaders	52.5 mm	3P	32490
			4P	32491
		70 mm	3P	32492
			4P	32493
		Supplied with 2 (or 3) interphase barriers		

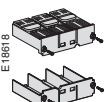
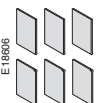
Crimp lugs for copper cable

			
	For cable 240 mm ²	Set of 3	32500
		Set of 4	32501
	For cable 300 mm ²	Set of 3	32502
		Set of 4	32503
	Supplied with 2 (or 3) interphase barriers		

Crimp lugs for aluminium cable

	For cable 240 mm ²	Set of 3	32504
		Set of 4	32505
	For cable 300 mm ²	Set of 3	32506
		Set of 4	32507
	Supplied with 2 (or 3) interphase barriers		

Terminal shields

	Short, 45 mm (1 pair)	3 P	32562
		4 P	32563
	Long, 45 mm (1 pair)	3 P	32564
		4 P	32565
	Long for spreaders, 52.5 mm (supplied with insulating plate)	3 P	32582
		4 P	32583
	Interphase barriers	Set of 6	32570

Insulation Kit U ≥ 600 V

E26033

	45 mm pole distance	3 P	32580	
		4 P	32581	
	For spreaders, 52.5 mm (long terminal shields + insulating plate)	3 P	32582	
		4 P	32583	
	2 insulating screens (fixed breaker)	52.5 mm pitch	3 P	32576
			4 P	32577
		70 mm pitch	3 P	32578
			4 P	32579

Electrical auxiliaries

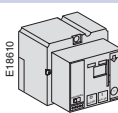
Auxiliary contacts (changeover)

	OF or SD or SDE or SDV	29450
	OF or SD or SDE or SDV low level	29452

Voltage releases

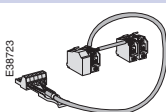
	AC	Voltage	MX	MN
		24 V 50/60 Hz	29384	29404
		48 V 50/60 Hz	29385	29405
		110-130 V 50/60 Hz	29386	29406
		220-240 V 50/60 Hz	29387	29407
		208-277 V 60 Hz		
		380-415 V 50 Hz	29388	29408
		440-480 V 60 Hz		
	DC	525 V 50 Hz-600 V 60 Hz	29389	29409
		Voltage	MX	MN
		12 V	29382	29402
		24 V	29390	29410
		30 V	29391	29411
		48 V	29392	29412
		60 V	29383	29403
		125 V	29393	29413
		250 V	29394	29414
		MN 48 V 50/60 Hz with time delay		29420
		Composed of:	MN 48 V DC	29412
			Delay unit 48 V 50/60 Hz	29426
		MN 220-240 V 50/60 Hz with time delay		29422
		Composed of:	MN 250 V DC	29414
			Delay unit 220/240 V 50/60 Hz	29427

Motor mechanism modules

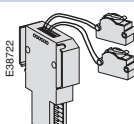
	AC	Voltage	MT400	MT630
		48-60 V 50/60 Hz	32639	32839
		110-130 V 50/60 Hz	32640	32840
		220-240 V 50/60 Hz	32641	32841
		208-277 V 60 Hz		
		380-415 V 50 Hz	32642	32842
		440-480 V 60 Hz	32647	32847
	DC	Voltage	MT400	MT630
		24-30 V	32643	32843
		48-60 V	32644	32844
		110-130 V	32645	32845
		250 V	32646	32846
		Operations counter		32648

LV installation control and monitoring (Digipact)

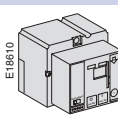
Communicating auxiliary contacts for Compact NS circuit breakers

	OF, SD and SDE communicating auxiliary contacts for Compact NS400/630	32551
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Communicating "connected/disconnected" position indication contacts for Compact NS circuit breakers

	"connected /disconnected" position indication contacts for Compact NS400/630	29296
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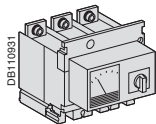
Motor mechanism + communicating auxiliary contacts for Compact NS circuit breakers

	MT400	220-240V 50/60 Hz + communicating OF, SD, SDE for Compact NS400	32652
---	-------	---	-------

	MT630	220-240V 50/60 Hz + communicating OF, SD, SDE for Compact NS630	32848
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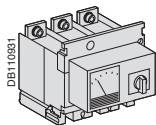
Indication and measurement modules

Ammeter module



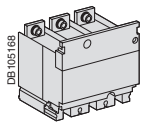
Rating (A)	400	630
3P	32655	32855
4P	32656	32856

I max. ammeter module



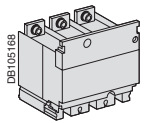
Rating (A)	400	630
3P	34852	34853

Current transformer module



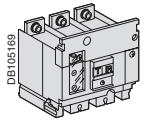
Rating (A)	400	600
3P	32657	32857
4P	32658	32858

Current transformer module and voltage output



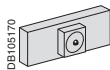
Rating (A)	400	600
3P	32653	32861
4P	32654	32862

Insulation monitoring module



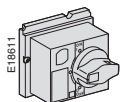
3P	32659
4P	32660

Voltage presence indicator

**32566**

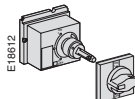
Rotary handles

Direct rotary handle



Standard black handle	32597
Red handle on yellow front	32599
MCC conversion accessory	32606
CNOMO conversion accessory	32602

Extended rotary handle



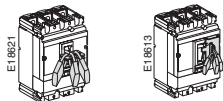
Standard extended rotary handle	32598
Red handle on yellow front	32600
Telescopic handle for withdrawable device	32603

Indication auxiliary

1 early-break contact	32605
2 early-make contacts	29346

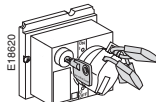
Locks

Toggle locking device for 1 to 3 padlocks



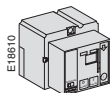
By removable device	29370
By fixed device	32631

Locking of the rotary handle

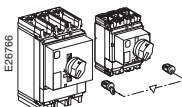
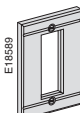
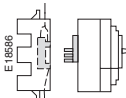
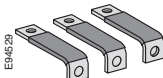
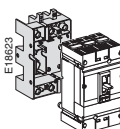
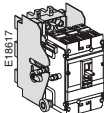


Keylock adapter (keylock not included)	32604
Keylock (keylock adapter not included)	Ronis 1351B.500 41940
	Profalux KS5 B24 D4Z 42888

Locking of the motor mechanism modules



Keylock adapter (keylock not included)	32649
Keylock (keylock adapter not included)	Ronis 1351B.500 41940
	Profalux KS5 B24 D4Z 42888

Interlocking			
Mechanical interlocking for circuit breakers			
	With toggles		32614
	With rotary handles		32621
			
Interlocking with key (2 keylocks / 1 key) for rotary handles			
	Keylock kit (keylock not included)	(1)	32604
	1 set of 2 keylocks (1 key only, Ronis 1351B.500		41950
	keylock kit not included) Profalux KS5 B24 D4Z		42878
	(1) For only 1 device.		
Installation accessories			
Templates for front panel cut-outs			
	Toggle		32556
	Vigi module		29316
	Rotary handle, motor mechanism module or escutcheon collar, IP40		32558
	Vigi module or ammeter IP40		29318
Toggle cover			
			32560
Sealing accessories			
			29375
Plug-in/withdrawable configuration accessories			
Auxiliary connections			
	1 fixed withdrawable part with 9 wires (for base)		29273
	1 moving withdrawable part with 9 wires (for circuit breaker)		32523
	1 support for 3 moving connectors		32525
	9-wire manual auxiliary connector (fixed + moving)		29272
Plug-in base accessories			
	Long insulated right angle terminal extension	Set of 3	32526
		Set of 4	32527
	2 IP4 shutters for base		32521
Chassis accessories			
	Escutcheon collar	Toggle	32534
		Vigi	29285
	Locking kit (keylock not included)		29286
	2 carriage switches (connected/disconnected position indication)		29287
Parts of plug-in kit			
	Plug-in base FC/RC	3P	32516
		4P	32517
	Set of 2 power connections for	Standard	32518
		Vigi	32519
	Safety trip for advanced opening		32520
Parts of withdrawable kit			
	Fixed part (for base)	3P/4P	32532
	Moving part (for circuit breaker)		32533
Spare parts			
	100 identification labels		29314
	Battery for STR43ME or STR53UE		32434
	Toggle extension (replacement)		32553
	Bag of screws		32552

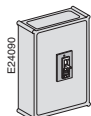
Individual enclosures

Sheet-metal enclosure IP54 for



Compact NS400 with standard rotary handle	31219
Compact NS400 with red, yellow rotary handle	31220
Compact NS630 and Vigi NS400/630 with standard rotary handle	31221
Compact NS630 and Vigi NS400/630 with red, yellow rotary handle	31222

Insulating enclosure IP55 for



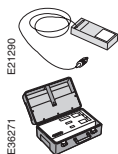
Compact NS400 and NS630	32665
Vigicompact NS400/630	32666

Visible break disconnect function

See chapter "Interpact INV (visible break)" and the associated accessories.
Visible break disconnection function associated with fixed front-connected/rear-connected Compact NS (for «tarif vert/tarif jaune» connection).

Test

Test kits



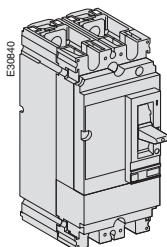
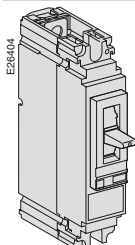
Mini test kit for STR trip units	43362
Portable test kit for STR trip units	34547
Spare test plug for portable test kit 34547	34503
Wiring kit (spare part)	34546

Compact NS100 to NS630 fixed/FC for direct current

Choice of device

Compact NS100/160N/H 1P/2P

With thermal-magnetic trip unit TM-D



Compact NS100N AC/DC

Rating	1P 1d (Icu = 50 kA 250 V DC)	2P 2d (Icu = 85 kA 250 V DC/1P - 500 V DC/2P)
TM16D	29585	29605
TM20D	29588	29608
TM25D	29584	29604
TM30D	29587	29607
TM40D	29583	29603
TM50D	29586	29606
TM63D	29582	29602
TM80D	29581	29601
TM100D	29580	29600

Compact NS160N AC/DC

Rating	1P 1d (Icu = 50 kA 250 V DC)	2P 2d (Icu = 100 kA 250 V DC/1P - 500 V DC/2P)
TM125D	30581	30601
TM160D	30580	30600

Compact NS100H AC/DC

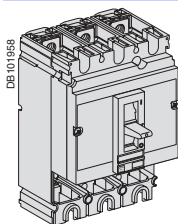
Rating	1P 1d (Icu = 85 kA 250 V DC)	2P 2d (Icu = 100 kA 250 V DC/1P - 500 V DC/2P)
TM16D	29595	29615
TM20D	29598	29618
TM25D	29594	29614
TM30D	29597	29617
TM40D	29593	29613
TM50D	29596	29616
TM63D	29592	29612
TM80D	29591	29611
TM100D	29590	29610

Compact NS160H AC/DC

Rating	1P 1d (Icu = 85 kA 250 V DC)	2P 2d (Icu = 100 kA 250 V DC/1P - 500 V DC/2P)
TM125D	30590	30611
TM160D	30589	30610

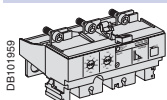
Compact NS100/160/250DC 3P/4P

Basic frame



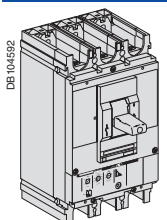
	(Icu = 100 kA 250 V DC/1P - 500 V DC/ 2P - 750 V DC/3P)	
	3P	4P
NS100DC	29016	29017
NS160DC	30416	30417
NS250DC	31416	31417

+ Trip unit



Rating	3P 3d	4P 4d
Standard protection: trip unit TM-D/DC		
TM16D	29035	29055
TM25D	29034	29054
TM32D	29037	29057
TM40D	29033	29053
TM50D	29036	29056
TM63D	29032	29052
TM80DC	29029	29049
TM100DC	29028	29048
TM125DC	30436	30446
TM160DC	30435	30445
TM200DC	31446	31456
TM250DC	31445	31455
Type G protection: trip unit TM-G		
TM16G	29155	29165
TM25G	29154	29164
TM40G	29153	29163
TM63G	29152	29162

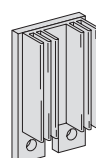
Compact NS400/630DC with trip unit MP



	3P	4P
Trip unit MP1		
Compact NS400DC	32742	32745
Compact NS630DC, 45 mm pitch	32942	32945
Trip unit MP2		
Compact NS400DC	32743	32746
Compact NS630DC, 45 mm pitch	32943	32946
Trip unit MP3		
Compact NS630DC, 45 mm pitch	32944	32947

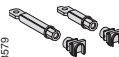
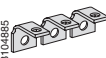
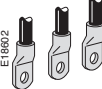
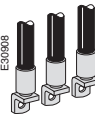
Compact NS100 to NS630 fixed/FC for direct current

Parallel or series connection accessories

Special connection accessories for parallel or series connection			NS100-250	NS400-630
  	Connection accessories for parallel or series connection of 2 poles ⁽¹⁾	1 connection plate equipped with heat sink + 1 interphase barrier ⁽²⁾	29498	32868
	(1) Series connection: 2 poles = 1 connection plate. 3 poles = 2 connection plates. 4 poles = 3 connection plates. Parallel connection: 2 poles = 2 connection plates. 3 poles = 1 set of 2 connection plates (29499). 2 x 2 poles = 4 connection plates. (2) These connection accessories come with an interphase barrier.			
	Connection plates for parallel connection of 3 poles	1 set of 2 connection plates	29499	(3)
	Connection plates for parallel connection of 4 poles		(3)	(3)
	1P short terminal shields	1 pair	29320	
	2P short terminal shields	2 pairs 2 x	29320	
	3P terminal shields for series connection of poles	1 set	29495	32865
	4P terminal shields for series connection of poles	1 set	29496	32866
	4P terminal shields for parallel connection of poles (2P/4P)	1 set	29497	32867
	(3) To be made by the customer.			

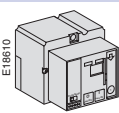
Compact NS100 to NS630 fixed/FC for direct current

Connection accessories

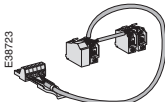
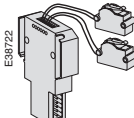
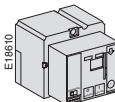
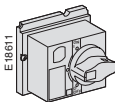
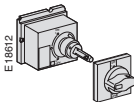
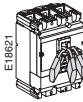
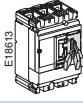
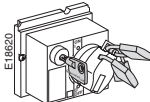
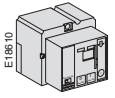
Connection accessories (Cu or Al)				NS100-250	NS400-630
Rear connections					
	2 short			29235	32475
	2 long			29236	32476
Bare cable connectors					
	Snap-on, for cable:	Steel: 1.5 to 95 mm ² ; ≤ 160 A	Set of 2	29246	
			Set of 3	29242	
			Set of 4	29243	
		Aluminium: 25 to 95 mm ² ; ≤ 250 A	Set of 2	29255	
			Set of 3	29227	
			Set of 4	29228	
		Aluminium: 120 to 185 mm ² ; ≤ 250 A	Set of 2	29247	
			Set of 3	29259	
			Set of 4	29260	
		For 1 cable from 35 to 300 mm ²	Set of 3		32479
For 2 cables from 35 to 240 mm ²		Set of 4		32480	
		Set of 3		32481	
	For 2 cables from 35 to 240 mm ²	Set of 4		32482	
		Set of 2	29348	29348	
	Voltage measurement input for bare cable connector 185 mm ² or 1 x 300 mm ² or 2 x 240 mm ²				
Terminal extensions					
	Right-angle terminal extensions	Set of 2	29250		
		Set of 3	29261	32484	
		Set of 4	29262	32485	
	Straight terminal extensions	Set of 2	29251		
		Set of 3	29263		
		Set of 4	29264		
	Edgewise pads	Set of 3		32486	
		Set of 4		32487	
Crimp lugs for copper cable (supplied with 2 or 3 interphase barriers)					
	For cable 120 mm ²	Set of 3	29252		
		Set of 4	29256		
	For cable 150 mm ²	Set of 3	29253		
		Set of 4	29257		
	For cable 185 mm ²	Set of 3	29254		
		Set of 4	29258		
	For cable 240 mm ²	Set of 3		32500	
		Set of 4		32501	
	For cable 300 mm ²	Set of 3		32502	
		Set of 4		32503	
Crimp lugs for aluminium cable (supplied with 2 or 3 interphase barriers)					
	For cable 150 mm ²	Set of 3	29504		
		Set of 4	29505		
	For cable 185 mm ²	Set of 3	29506		
		Set of 4	29507		
	For cable 240 mm ²	Set of 3		32504	
		Set of 4		32505	
	For cable 300 mm ²	Set of 3		32506	
		Set of 4		32507	
Barriers					
	Interphase barriers	Set of 6	29329	32570	

Compact NS100 to NS630 fixed/FC for direct current

Electrical auxiliaries

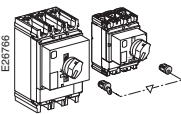
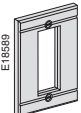
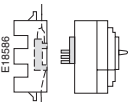
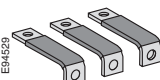
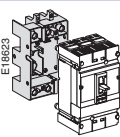
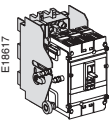
Electrical auxiliaries			NS100-630	
Auxiliary contacts (changeover)				
	OF or SD or SDE or SDV			29450
	OF or SD or SDE or SDV low level			29452
	SDE adapter for trip unit TM or MA			29451
Voltage releases				
	AC	Voltage	MX	MN
		24 V 50/60 Hz	29384	29404
		48 V 50/60 Hz	29385	29405
		110-130 V 50/60 Hz	29386	29406
		220-240 V 50/60 Hz	29387	29407
		208-277 V 60 Hz		
		380-415 V 50 Hz	29388	29408
		440-480 V 60 Hz		
		525 V 50 Hz - 600 V 60 Hz	29389	29409
	DC	Voltage	MX	MN
		12 V	29382	29402
		24 V	29390	29410
		30 V	29391	29411
		48 V	29392	29412
		60 V	29383	29403
		125 V	29393	29413
		250 V	29394	29414
		MN 48 V 50/60 Hz with time delay composed of:		29420
				29412
	MN 220-240 V 50/60 Hz with time delay composed of:		29426	
			29422	
			29414	
			29427	
Motor mechanism modules with SDE adapter			NS100-250	NS400-630
	AC	Voltage	MT100/160	MT400
		48-60 V 50/60 Hz	29440	32639
		110-130 V 50/60 Hz	29433	32640
		220-240 V 50/60 Hz	29434	32641
		208-277 V 60 Hz		
		380-415 V 50/60 Hz	29435	32642
		440-480 V 60 Hz		32647
		Voltage	MT250	MT630
		48-60 V 50/60 Hz	31548	32839
		110-130 V 50/60 Hz	31540	32840
	DC	220-240 V 50/60 Hz	31541	32841
		208-277 V 60 Hz		
		380-415 V 50/60 Hz	31542	32842
		440-480 V 60 Hz		32847
		Voltage	MT100/160	MT400
		24-30 V	29436	32643
		48-60 V	29437	32644
		110-130 V	29438	32645
		250 V	29439	32646
		Voltage	MT250	MT630
	Operations counter	24-30 V	31543	32843
		48-60 V	31544	32844
		110-130 V	31545	32845
250 V		31546	32846	
			32648	

Compact NS100 to NS630 fixed/FC for direct current Monitoring and locking

LV installation control and monitoring (Digipact)			NS100-250	NS400-630
Communicating auxiliary contacts for Compact NS circuit breakers 3P/4P				
	OF, SD and SDE communicating auxiliary contacts ⁽¹⁾		29453	32551
	(1) For NS100-250, the SDE adapter for thermal-magnetic trip units is included.			
Communicating "connected/disconnected" position indication contacts for Compact NS circuit breakers				
	"Connected /disconnected" position indication contacts		29296	29296
Motor mechanism + communicating auxiliary contacts for Compact NS circuit breakers				
	MT100/160	220-240 V 50/60 Hz + communicating OF, SD, SDE	29441	
	MT250	220-240 V 50/60 Hz + communicating OF, SD, SDE	31549	
	MT400	220-240 V 50/60 Hz + communicating OF, SD, SDE		32652
	MT630	220-240 V 50/60 Hz + communicating OF, SD, SDE		32848
				
Rotary handles			NS100-250	NS400-630
Direct rotary handles				
	Standard black handle		29337	32597
	Red handle on yellow front		29339	32599
	MCC conversion accessory		29341	32606
	CNOMO conversion accessory		29342	32602
Standard extended rotary handle				
	Standard extended rotary handle		29338	32598
	Red handle on yellow front		29340	32600
	Telescopic handle for withdrawable device		29343	32603
Accessories				
Indication auxiliary		1 early-break contact	29345	32605
		2 early-break contacts	29346	29346
Early-make wiring terminal		29336		
Locking			NS100-250	NS400-630
Toggle locking device for 1 to 3 padlocks				
	By removable device		29370	29370
	By fixed device (3P/4P)		29371	32631
Locking of the rotary handle				
	Keylock adapter (keylock not included)		29344	32604
	Keylock (keylock adapter not included)	Ronis 1351B.500	41940	41940
		Profalux KS5 B24 D4Z	42888	42888
Locking of the motor mechanism modules				
	Keylock adapter + Ronis keylock (special)		29449	
	Keylock adapter (keylock not included)			32649
	Keylock (keylock adapter not included)	Ronis 1351B.500		41940
		Profalux KS5 B24 D4Z		42888

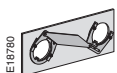
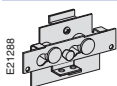
Compact NS100 to NS630 fixed/FC for direct current

Interlocking, installation, plug-in/withdrawable accessories

Interlocking			NS100-250	NS400-630
Mechanical interlocking for circuit breakers 3P/4P				
 	With toggles		29354	32614
	With rotary handles		29369	32621
Interlocking with key (2 keylocks / 1 key) for rotary handles 3P/4P				
	Keylock kit (keylock not included) ⁽¹⁾		29344	32604
	1 set of 2 keylocks	Ronis 1351B.500	41950	41950
	(1 key only, keylock kit not included)	Profalux KS5 B24 D4Z	42878	42878
	<i>(1) For only 1 device.</i>			
Installation accessories			NS100-250	NS400-630
Front-panel escutcheons				
	Toggle 1 to 4P		29315	32556
	Rotary handle, motor mechanism module or escutcheon collar, IP405 3P/4P		29317	32558
Toggle cover			29319	32560
Sealing accessories 1 to 4P			29375	29375
DIN rail adapter 3P/4P			29305	
Plug-in/withdrawable configuration accessories			NS100-250	NS400-630
Auxiliary connections				
	1 9-wire fixed connector (for base)		29273	32556
	1 9-wire moving connector (for circuit breaker)		29274	29316
	1 support for 2 moving connectors		29275	32558
	9-wire manual auxiliary connector (fixed + moving)		29272	29318
Plug-in base accessories				
	Long insulated right angle terminal extension	Set of 3	29276	32526
		Set of 4	29277	32527
	2 IP4 shutters for base		29271	32521
Chassis accessories				
	Escutcheon collar for toggle		29284	32534
	Locking kit (keylock not included)		29286	29286
	2 carriage switches (connected/disconnected position indication)		29287	29287
Parts of plug-in kit				
	Plug-in base FC/RC	3P	29266	32516
		4P	29267	32517
	Set of 2 power connections for standard device		29268	32518
	Safety trip for advanced opening		29270	32520
Parts of withdrawable kit				
	Fixed part (for base)	3P/4P	29282	32532
	Moving part (for circuit breaker)		29283	32533
Spare parts			NS100-250	NS400-630
	Toggle extension			32553
	10 toggle extensions		29313	
	Bag of screws		29312	32552
	12 snap-in nuts (fixed/FC)	M6 for NS100N/H/L	29234	
		M8 for NS160/250N/H/L	30554	
	100 identification labels		29314	29314

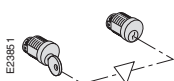
Manual source changeover

Mechanical interlocking



For toggle controlled circuit-breakers	NS100...250	29354
	NS400...630	32614
For rotary handled circuit-breakers	NS100...250	29369
	NS400...630	32621

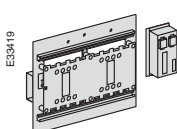
Key lock interlocking



For rotary handled or remote controlled circuit breakers 2 locks, 1 key	Ronis 1351B.500	41950
	Profalux KS5 B24 D4Z	42878

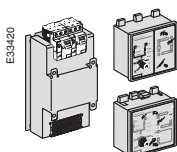
Remote controlled source changeover

Plate + IVE



Source "normal"/source "replacement" (identical voltages)		24 to 250 V DC	48 to 415 V AC 50/60 Hz 480 V 60 Hz
NS100...250/NS100...250			
Plate + IVE ⁽¹⁾		29351	29350
Plate		29349	29349
IVE		29356	29352
Auxiliary switches 2 OF + 2 SDE	4 x	29450	4 x 29450
Spare wiring system (device/IVE)		29365	29365
Back sockets option add: Only long RC		(2)	(2)
Plug in base option add: Plug in kit		(2)	(2)
NS400...630/NS100...630			
Plate + IVE ⁽¹⁾		32611	32610
Plate		32609	32609
IVE		29356	29352
Auxiliary switches 2 OF + 2 SDE	4 x	29450	4 x 29450
Spare wiring system (device/IVE)		29365	29365
Back sockets option add: Only long RC		(2)	(2)
Plug in base option add: Plug in kit		(2)	(2)
Adaptator kit for NS100...250	1 x	32618	1 x 32618

Control unit option



	110/127 V AC 50/60 Hz	220/240 V AC 50/60 Hz	380/415 V AC 50/60 Hz 480 V 60 Hz
ACP + control unit BA ⁽¹⁾		29470	29471
Plate ACP		29363	29364
Control unit BA		29376	29377
ACP + control unit UA ⁽¹⁾	29448	29472	29473
Plate ACP	29447	29363	29364
Control unit UA	29446	29378	29380
ACP + control unit UA150 ⁽¹⁾ (communication option)		29474	29475
Plate ACP		29363	29364
Control unit UA150		29379	29381

Wiring cable between BA/UA and ACP/IVE

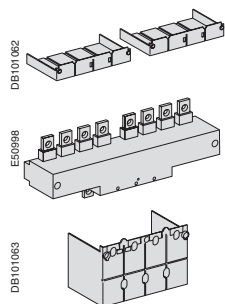
29368	29368
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⁽¹⁾ The supply voltages BA/UA control unit, ACP plate, IVE and the remote control must be identical whatever the source changeover type.

⁽²⁾ See products pages.

Connection accessories

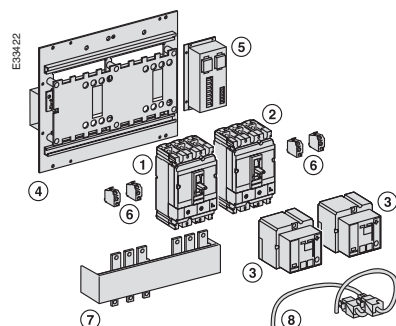
Downstream coupling accessories



		3P	4P
Short terminal shields (1 pair)	NS100...250/NS100...250	29321	29322
	NS400...630/NS400...630	32562	32563
Source "normal"/source "replacement"	NS100...250/ 250 A	29358	29359
	NS100...250		
	NS400...630/ 630 A	32619	32620
	NS400...630		
Long terminal shields (1 pair)	NS100...250/NS100...250		29324
	NS400...630/NS400...630		32565

Typical composition of remote controlled source changeover

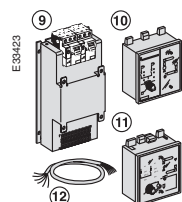
Remote controlled source changeover



- 1 normal device N (1)
- + 1 replacement device R (2)
- + 2 remote controls (3)
- + 1 plate with interlocking (4) with IVE (5) and its wiring (8)
- + 2 plug-in kits (if plug-in version)
- + 1 adaptor kit for NS100...250 plug-in (if NS400...630 with NS100...250)
- + auxiliary switches (6)
- 2 x (1 OF + 1 SDE) for Compact NS100...630
- + 1 downstream coupling accessory (7) for Compact NS100...630 (option)
- + long RC (if back connection)

IVE voltages and remote controls are identical.

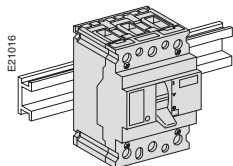
Associated control unit



- 1 source changeover without associated control unit
- + 1 ACP (9) with BA control unit (10)
- Or + 1 ACP (9) with UA control unit (11)
- Or + 1 ACP (9) with UA150 control unit (11)

IVE voltages + remote control + ACP + BA or UA are identical.

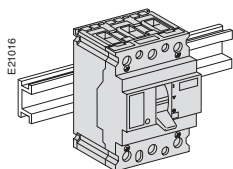
Compact NSA160N with built-in trip unit



Compact NSA160N (36 kA at 380/415 V)

Rating	3P 3d	4P 4d
TM16D	28239	28259
TM25D	28238	28258
TM32D	28237	28257
TM40D	28236	28256
TM50D	28235	28255
TM63D	28234	28254
TM80D	28233	28253
TM100D	28232	28252
TM125D	28231	28251
TM160D	28230	28250

Compact NSA160E with built-in trip unit



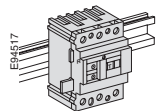
Compact NSA160E (16 kA at 380/415 V)

Rating	3P 3d	4P 4d
TM16D	28209	28229
TM25D	28208	28228
TM32D	28207	28227
TM40D	28206	28226
TM50D	28205	28225
TM63D	28204	28224
TM80D	28203	28223
TM100D	28202	28222
TM125D	28201	28221
TM160D	28200	28220

Compact NSA125/160NA switch

Rating	3P	4P
Compact NSA125NA	28263	28264
Compact NSA160NA	28261	28262

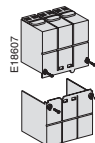
Vigi module 0.03/3A



Bottom connectors	3P	28000
	4P	28001
Top connectors	3P	28002
	4P	28003

Connection accessories

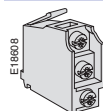
Long terminal shields (1 pair)



3P	28034
4P	28035

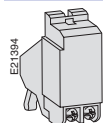
Electrical auxiliaries

Auxiliary contacts (changeover)



OF or SD	29450
OF or SD low level	29452

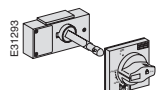
Voltage releases



AC 50/60 Hz	Voltage (V)	MX	MN
	48	28070	28080
	110/130	28071	28081
	220/240	28072	28082
	380/415	28073	28083
	440/480	28074	28084
DC	Voltage (V)	MX	MN
	24	28075	28085
	48	28076	28086
	125	28077	28087
	250	28078	28088

Rotary handles

Door-mounted rotary control



Extended black handle	28059
Red handle on yellow front	28058

Miscellaneous

DIN rail and riser for Multi 9 devices	28041
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Customer name:

Address for delivery:

Requested delivery date:

Customer order no.:

Check the applicable ☐ and enter the appropriate ☐
square boxes information in the rectangles

Circuit breaker	Quantity
Compact type	NS100/160/250
	NS400/630
Rating	A
Circuit breaker	N, H
Number of poles	1 or 2
Circuit breaker	DC
Number of poles	3 or 4
Number of poles tripped	3d or 4d
Fixed device	Front conn. ☐ Long rear conn. ☐
	Short rear conn. ☐
Plug-in/withdr.	Plug-in ☐ Withdrawable ☐

Thermal-magnetic trip unit	
Thermal-magnetic	TMD rating (16...63 A)
NS100 to 250	TMG rating (16...63 A)
	TMDC rating (80...250 A)
Magnetic only	MP1 (NS400/630)
NS400/630	MP2 (NS400/630)
	MP3 (NS630)

Special connection accessories for parallel or series connection	
Series connection	2 poles (1 connection plate)
	3 poles (2 connection plates)
	4 poles (3 connection plates)
Parallel connection	2 poles (2 connection plates)
	3 poles (NS100 to 250, 1 set of 2 connection plates)
	2 x 2 poles (4 connection plates)

Special terminal shields for parallel or series connection	
1P short	1 pair
2P short	2 x 1 pair (1P)
3P short for series connection of poles	1 set
4P short for series connection of poles	1 set
4P short for parallel connection of poles (2P/4P)	1 set

Connection	
NS100/250 connectors	Snap-on 1.5 ² to 95 ² (< 160 A)
	Snap-on 25 ² to 95 ² (< 250 A)
	Snap-on 120 ² to 185 ² (< 250 A)
NS400/630 connectors	1 cable 35 ² to 300 ²
	2 cables 35 ² to 240 ²
Voltage measurement input	For bare cable NS100/250 ≤ 185 ² connector
	For bare cable NS400/630 connector

Right-angle terminal extensions	
Straight extensions	NS100/250
Edgewise extensions	NS400/630
Cu cable lugs	NS100/250 120 ² ☐ 150 ² ☐ 185 ² ☐
	NS400/630 240 ² ☐ 300 ² ☐
Al cable lugs	NS100/250 150 ² ☐ 185 ² ☐
	NS400/630 240 ² ☐ 300 ² ☐
Interface barriers	Set of 6

Communication

Communicating Of, SD, SDE or SDV auxiliary contacts	6A-240 V AC	☐	Low level	☐
Connected/disconnected position indication contacts				
Motor mechanism + communicating Of, SD, SDE contacts	220-240 V 50/60 Hz			

Indication and measurements

Auxiliary contact Of, SD or SDE	Standard	☐	Low level	☐
SDE adapter (TM trip unit)				

Remote operation

Electrical operation	Motor mechanism	CA	☐	CC	☐	V	☐
Voltage releases	Instantaneous	MX	CA	☐	CC	☐	V
		MN	CA	☐	CC	☐	V
	Delayed	MN	CA	☐	CC	☐	V

Rotary handles

Direct	Black	☐	Red on yellow front	☐
	MCC conversion access.	☐	CNOMO conversion access.	☐
Extended	Black	☐	Red on yellow front	☐
	Telescopic handle for withdrawable device			
Indication auxiliary	1 early-break switch	☐	2 early-break switches	☐
	Wiring accessory for early-make switches			

Locking

Toggle (1 to 3 padlocks)	Removable	☐	Fixed	☐
Rotary handle	Keylock adapter (keylock not included)			
	Keylock Ronis 1351B.500	☐	Profalux KS5 B24 D4Z	☐
Motor mechanism	Keylock adapter + Keylock Ronis (special)		NS100/250	
	Keylock adapter (keylock not included)		NS400/630	
	Keylock Ronis 1351B.500	☐	Profalux KS5 B24 D4Z	☐

Interlocking

Mechanical	Toggle	☐	Rotary handle	☐
By key (2 Keylocks, 1 key)	Keylock adapter (keylock not included)			
For rotary handle	Keylock Ronis 1351B.500	☐	Profalux KS5 B24 D4Z	☐

Installation accessories

Front-panel escutcheon	Toggle	☐	
	Rotary handle, motor mechanism, escutcheon collar; IP405		
Toggle cover			
Sealing accessories			
DIN rail adapter	NS100/250		

Plug-in / Drawout configuration accessories

Auxiliary connections	1 automatic connector fixed part with 9 wires (for base)	
	1 auto. conn. moving part with 9 wires (for circuit breaker)	
	1 support for 3 automatic connector moving parts	
	9-wire manual auxiliary connector (fixed + moving)	
Plug-in base accessories	Long insulated terminals	Set of 3 ☐ Set of 4 ☐
	2 IP4 shutters for base	
Chassis accessories	Escutcheon collar	Toggle ☐ Vigi ☐
	Locking kit (keylock not included)	
	2 carriage switches (conn./disconnected position indication)	
Parts of plug-in	Plug-in base FC/RC	2P ☐ 3P ☐ 4P ☐
	Set of 2 power connections	Standard ☐ Vigi ☐
	Safety trip for advanced opening	
	For 3P/4P chassis	Moving part ☐ Fixed part ☐

Compact NS100 to NS630

Circuit breakers and switch-disconnectors

To indicate your choices, check the applicable square boxes
and enter the appropriate information in the rectangles

Circuit breaker or switch-disconnector

Compact type	NS100/160/250 NS400/630		
Rating	A		
Circuit breaker	N, H, L		
Switch-disconnector	NA		
Number of poles	2, 3 or 4		
Number of poles tripped	2d, 3d, 3dN/2 or 4d		
Fixed device	Front connections	Long rear conn.	
	Short rear conn.	Mixed rear conn.	
Plug-in/withdr.	Plug-in	Withdrawable	
Earth-leakage protection	ME, MH, MB, MHM		
	Voltage	V	
	4P MB option on 3P NS		

Thermal-magnetic or electronic trip unit

Thermal-mag.	TMD rating (16 ... 250 A)		
	TMG rating (16 ... 63 A)		
	MA rating (2.5 ... 220 A)		
Electronic	STR22	SE	GE
	STR23	SE	SV
	STR53 (basic)	UE F	SV F
	STR53UE	FT	FI
	ZSI wiring		FTI
	Option T (rating 150...630 A)	A	
	STR43ME	F	FI
	Option STDAM	110/240 V AC/DC	
		24/48 V AC/24/72 V DC	
	COM wiring		
	Spare battery for STR43 and STR53		

Connection

Rear-connection kit	Short		Mixed
Plug-in kit	Compact		Vigicompact
Withdrawable kit	Compact		Vigicompact
Long terminal-shield kit for plug-in or withdr. NS400/630			
Interphase-barrier kit for plug-in or withdr. NS400/630			
NS100/250 connectors	Snap-on 1.5 [□] to 95 [□] (< 160 A)		
	Snap-on 10 [□] to 185 [□] (< 250 A)		
	Distribution 6 x 1.5 [□] to 35 [□]		
NS400/630 connectors	1 cable 35 [□] to 300 [□]		
	2 cables 35 [□] to 240 [□]		
Right-angle terminal extensions			
Straight extensions		NS100/250	
Edgewise extensions		NS400/630	
Spreader	NS100/250 (one piece)		(45 mm)
	NS400/630 (52.5 mm)		(70 mm)
Cu cable lugs	NS100/250	120 [□]	150 [□] 185 [□]
	NS400/630		240 [□] 300 [□]
Al cable lugs	NS100/250		150 [□] 185 [□]
	NS400/630		240 [□] 300 [□]
Voltage measurement input for connector		for lugs NS100/250 ≤ 185 [□] for lugs NS400/630	
Terminal shields	NS100/250	Short	Long
	NS400/630	Short	Long
Long for 52.5 mm spreaders			
Interphase barriers		Set of 6	
Insulation kit > 600V		Without spreaders	
NS400/630		With 52.5 mm spreaders	
2 insulating screens:	NS100/250		
	NS400/630	52.5 pitch	70 pitch

Communication

Communicating OF, SD, SDE or SDV auxiliary contacts	
Connected/disconnected position indication contacts	
Motor mechanism + communicating OF, SD, SDE contacts	220/240 V 50/60 Hz

Indication and measurement

Ammeter module	standard	3P		4P
	I max	3P		
Current-transformer module		3P		4P
Insulation-monitoring module		3P		4P
Voltage-presence indicator				
Auxiliary contact	OF, SD, SDE or SDV	Standard		Low level
SDE adapter (TM or MA trip units)				

Remote operation

Electrical operation	Motor mechanism	AC		DC		V
Voltage releases	Instantaneous	MX	AC		DC	V
		MN	AC		DC	V
	Delayed	MN	AC		DC	V
					DC	V

Rotary handles

Direct	Black		Red on yellow front	
	MCC conversion access.		CNOMO conversion access.	
Extended	Black		Red on yellow front	
	Telescopic handle for withdrawable device			
Indication auxiliary	1 early-break switch		2 early-make switches	
	Wiring accessory for early-make switches			

Locking

Toggle (1 to 3 padlocks)	Removable		Fixed	
Rotary handle	Keylock adapter (keylock not included)			
	Keylocks Ronis 1351B.500		Profalux KS5 B24 D4Z	
Motor mechanism	Keylock adapter + Keylocks Ronis (special)			NS100/250
	Keylock adapter (keylock not included)			NS400/630
	Keylocks Ronis 1351B.500		Profalux KS5 B24 D4Z	

Interlocking

mechanical	Toggle operated		Rotary handle	
by key (2 keylocks,	Locking kit without locks			
1 key) for rotary handle	Keylocks Ronis 1351B.500		Profalux KS5 B24 D4Z	

Installation accessories

Front-panel escutcheon	Toggle			
	Rotary handle, motor mechanism, escutcheon collar; IP40			
	Vigi module or ammeter IP40		Vigi module	
Toggle cover				
Sealing accessories				
DIN rail adapter	NS100/250			

Plug-in / withdrawable configuration accessories

Auxiliary connections	1 automatic connector fixed part with 9 wires (for base)			
	1 auto. conn. moving part with 9 wires (for circuit breaker)			
	1 support for 3 automatic connector moving parts			
	9-wire manual auxiliary connector (fixed + moving)			
Plug-in base accessories	Long insulated terminals	Set of 3		Set of 4
	2 IP4 shutters for base			
Chassis accessories	Escutcheon collar	Toggle		Vigi
	Locking kit (keylock not included)			
	2 carriage switches (conn./disconnected position indication)			
Parts of plug-in withdrawable kits	Plug-in base FC/RC	2P		3P
	Set of two power connections		Standard	
	Safety trip for advanced opening			
	For 3P/4P chassis			Moving part
				Fixed part

Name of customer:

Address for delivery:

Requested delivery date:

Customer order no.:

To indicate your choices, check the applicable square boxes
and enter the appropriate information in the rectangles

Circuit breaker or switch-disconnector	
Compact type	NS630b to NS1600 NS1600b to NS3200
Rating	A
Circuit breaker	N, H, L, LB
Switch-disconnector	NA
Number of poles	3 or 4
Device	NS630b/3200 Fixed NS630b/1600 Withdr. with chassis Withdr. without chassis (moving part only)
Chassis alone without connections	

Micrologic control unit

Basic protection 2.0 5.0

A - ammeter 2.0 5.0 6.0 7.0

P - Power 5.0 6.0 7.0

AD - external power-supply module V

ENV T - External Neutral Voltage Temp. (3P + N and Micrologic P)

TCE - external sensor (CT) for neutral protection

Rectangular sensor NS630b/1600 280 x 115 mm

for earth-leakage protection NS1600b/3200 470 x 160 mm

TCW - external sensor for SGR protection

LR - long-time rating plug Standard 0.4 to 1 Ir

Low setting 0.4 to 0.8 Ir

High setting 0.8 to 1 Ir

LT OFF

Communication

COM module Jbus/Modbus Manual operation

Electrical operation

Digipact Manual operation

Electrical operation

Device Chassis

Eco COM module Modbus

(for switchboard display units)

NS630b/1600 connection

Horizontal rear connections Top Bottom

Vertical rear connections Top Bottom

Front connections Top Bottom

4x240[□] bare cable connectors+shields NS - FC fixed

Long connection shields NS - FC fixed

Vertical-connection adapters NS - FC fixed, withdr.

Cable-lug adapters NS - FC fixed, withdr.

Arc chute screen NS - FC fixed

Interphase barriers NS - fixed, withdrawable

Spreaders NS - fixed, withdrawable

NS1600b/3200 connection

Front connections NS - FC fixed

Vertical connection adaptor optional for NS1600b/2500

(standard for NS3200)

Micrologic control unit functions:

2.0 : basic protection (long time + inst.)

5.0 : selective protection (long time + short time + inst.)

6.0 : selective + earth-fault protection

(long time + short time + inst. + earth-fault)

7.0 : selective + earth-leakage protection

(long time + short time + inst. + earth-leakage)

Indication contacts

NS630b/3200 SD trip indication (maximum 1) (only for manually operated devices)

6 A-240 V AC qty Low level qty

SDE fault-trip indication (maximum 1)

(SDE integrated in electrically operated devices)

6 A-240 V AC qty Low level qty

OF ON/OFF indication contacts (maximum 3)

6 A-240 V AC qty Low level qty

NS630b/1600 Carriage switches

(possible combinations: 3 CE, 2 CD, 1 CT)

CE - "connected" position 6 A-240 V AC qty Low level qty

CD - "disconnected" position 6 A-240 V AC qty Low level qty

CT - "test" position 6 A-240 V AC qty Low level qty

Programmable contacts (630b - 1600)

M6C kit for manually Compact

Auxiliary terminals for chassis alone Jumpers (set of 10)

3-wire terminal (30 parts) 6-wire terminal (10 parts)

Remote operation

Electrical operation (NS630b/1600) Standard Communicating

Power supply AC DC V

Voltage releases MX AC DC V

MN AC DC V

MN delay unit Adjustable Non-adjustable

Rotary handles for NS630b/1600 fixed and withdrawable device

Direct Black Red on yellow front

Extended Black Red on yellow front

Telescopic handle for withdrawable device

Indication auxiliary 6 A-240 V AC 2 early-make switches

2 early-break switches

Locking

Toggle (1 to 3 padlocks) Removable system Fixed system

Rotary handle OFF position ON and OFF positions

using a keylock Ronis 1351B,500 Profalux KS5 B24 D4Z

(NS630b/1600) Keylock kit (without keylock)

For electrically VBP - ON/OFF pushbutton locking

operated devices (by transparent cover + padlocks)

(NS630b/1600) OFF position locking:

VCPO - by padlocks

VSPD - by keylocks:

Keylock kit (w/o keylock) Profalux Ronis

1 keylock Profalux Ronis

2 identical keylocks, 1 key Profalux Ronis

Chassis locking in "disconnected" position:

VSPD - by keylocks Keylock kit (w/o keylock) Profalux Ronis

1 keylock Profalux Ronis

2 identical keylocks, 1 key Profalux Ronis

2 keylocks, different keys Profalux Ronis

Optional connected/disconnected/test position locking

VPEC - door interlock On right-hand side of chassis

On left-hand side of chassis

VPOC - racking interlock

VDC - mismatch protection

Accessories

VO - safety shutters on chassis NS - withdrawable as standard

CDM - mechanical operation counter

CDP - escutcheon

CP - transparent cover for escutcheon

OP - blanking plate for escutcheon

Mounting brackets for fixed NS for mounting on horizontal plane

Test kits Mini test kit Portable test kit

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