Low voltage
Direct Current Network

Compact NSX DC
Masterpact NW DC

Power circuit breakers and switch-disconnectors
direct current from 16 to 4000 A

Catalogue
2012

Schneider Electric

Compact NSX and Masterpact NW direct current

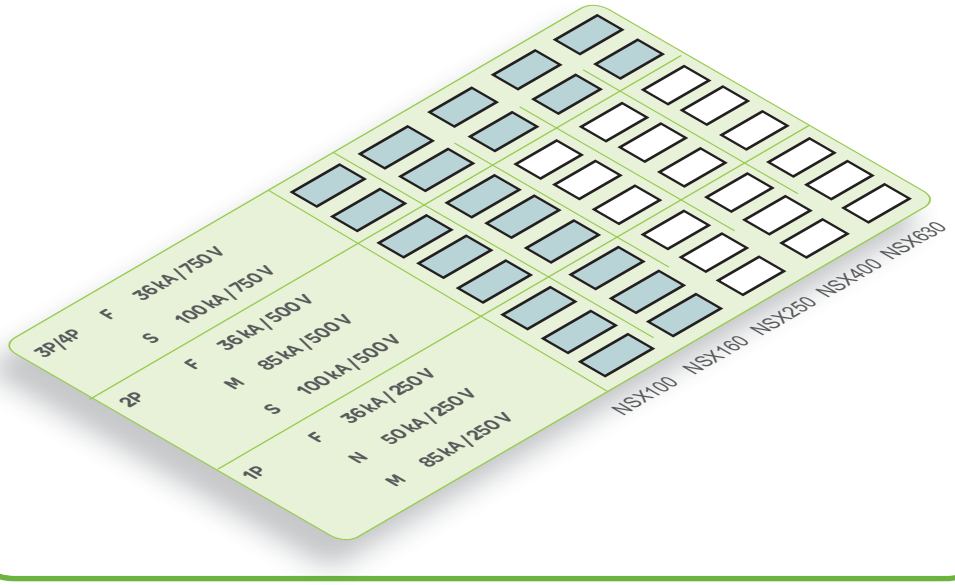
A complete DC offer from 16 to 4000 A

Compact NSX and Masterpact NW 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.

A complete DC offer

Compact NSX 16 to 630 A DC



The Compact NSX range is designed for DC voltages from 24 to 750 V and offers:
■ a wide selection of models suited to 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 four performance levels F, N, M and S:
□ F
- 36 kA in a 1 pole version, for systems ⩽ 250 V
- 36 kA in a 2 poles version, for systems ⩽ 500 V
- 36 kA in a 3 or 4 poles version, for systems ⩽ 750 V

□ N
- 50 kA in a 1 pole version, for systems ⩽ 250 V

□ M
- 85 kA in a 1 pole version, for systems ⩽ 250 V
- 85 kA in a 2 poles version, for systems ⩽ 500 V

□ S
- 100 kA in a 2 poles version, for systems ⩽ 500 V
- 100 kA in a 3 or 4 poles version, for systems ⩽ 750 V

■ fewer frame sizes: just two poles 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)

(1) L/R = time constant of the distribution system (see page A-60).


NSX250 DC -1P.

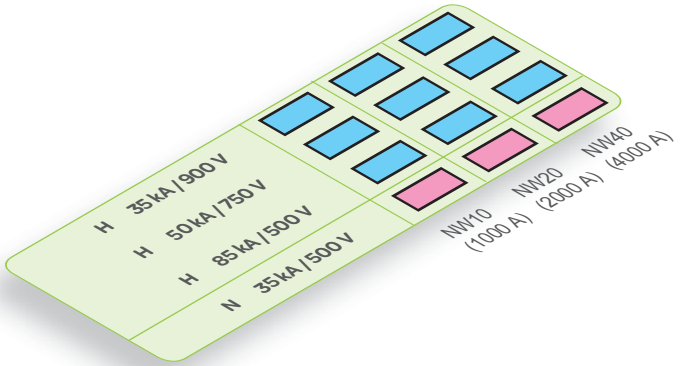

NSX160 DC - 2P.


NSX250 DC - 3P.


NSX630 DC - 3P.

from 16 to 4000 A

Masterpact NW 1000 to 4000 A DC



The Masterpact NW range is designed for DC voltages from 24 to 900 V and offers:

- 2 versions : C/D (3 poles)
  E (4 poles)
- three current ratings: 1000, 2000 and 4000 A
- two high breaking-capacity levels N and H.

Breaking capacity Icu for L/R = 15 ms (1) for 500, 750 or 900 V system voltages:

- N
  - 35 kA for systems ≤ 500 V
- H
  - 85 kA for systems ≤ 500 V
  - 50 kA for systems ≤ 750 V
  - 35 kA for systems ≤ 900 V
- two models:
  - circuit breaker for the protection of power circuits and loads
  - switch-disconnector for circuit control and disconnection
- fixed and drawout versions for the entire range.

(1) L/R = time constant of the distribution system (see page A-60).

NW10 DC - C/D Version.

NW10 DC - E Version.

General contents

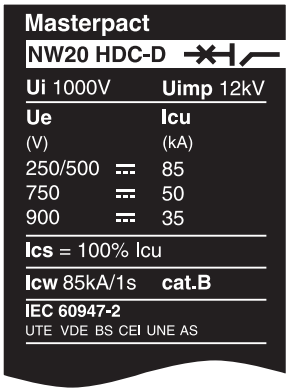
The advantages of comprehensive and optimised range design...

Compact NSX and Masterpact NW DC circuit breakers constitute a flexible and cost-effective means to meet the various needs of DC systems.

DB403581.eps

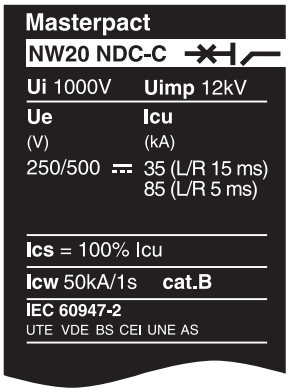
NSX250 DC rating plate.

DB104462.eps



NW20 HDC-D rating plate.

DB104463.eps



NW20 NDC-C rating plate.

A wide, complete and high-performance range

Schneider Electric DC circuit breakers provide a comprehensive solution for the many applications found in DC systems.
The Compact NSX and Masterpact NW ranges offer, for the common voltages and pole versions, a wide selection of current ratings (16 to 4000 A) and breaking capacities (up to 100 kA).

Flexible and optimised design

The Compact NSX and Masterpact NW DC ranges use all the standard accessories and auxiliaries of the AC ranges.
The modular design and many possibilities offered by these systems provide a high degree of flexibility in personalising products, while benefiting from dependable and optimised industrial design.

Safe and simple operation

Even though they use the accessories of the corresponding AC ranges, the Compact NSX and Masterpact NW DC ranges have been specially designed for DC systems.
Specific accessories have been developed to meet the needs of series or parallel connection of poles by users in a simple and dependable manner (see page opposite).
Compact NSX and Masterpact NW DC devices can be installed in class II switchboards with a degree of protection up to IP54.

Compliance with standards

Schneider Electric DC circuit-breaker ranges comply with :
- the main international standards and in particular IEC 60947-1/2/3/4/5,
- European (EN 60947-1 and EN 60947-2) and the corresponding national standards: France NF, Germany VDE, UK 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 United States UL, Canadian CSA, Mexican NOM and Japanese JIS standards, please consult us.

Open communication

Compact NSX and Masterpact NW DC devices can be equipped with communication options for integration in a supervision system via Modbus/JBus bus.

Pollution degree

Compact NSX and Masterpact NW DC circuit breakers are certified for operation under pollution conditions in industrial environments, as per standard IEC 60947, corresponding to:
- pollution degree 3 (Compact NSX)
- pollution degree 4 (Masterpact NW).

Tropicalisation

Compact NSX and Masterpact NW DC 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 60068-2-1 - dry heat (+85 °C)
- IEC 60068-2-30 - damp heat (95 % relative humidity at +55 °C)
- IEC 68-2-52 (level 2) - salt mist.

Environmental protection

Schneider Electric circuit-breaker ranges benefit from Eco-design:
- use of materials not representing a danger to the environment
- non-polluting production units complying with ISO 14001 standards
- filtered breaking for high current ratings to avoid pollution in the switchboard
- low dissipated energy per pole, making energy losses insignificant
- marking of products in view of sorting recyclable materials at the end of the service life.

... specifically for DC applications

Compact NSX and Masterpact NW DC circuit breakers offer optimised pole-connection possibilities.

Designed for direct current

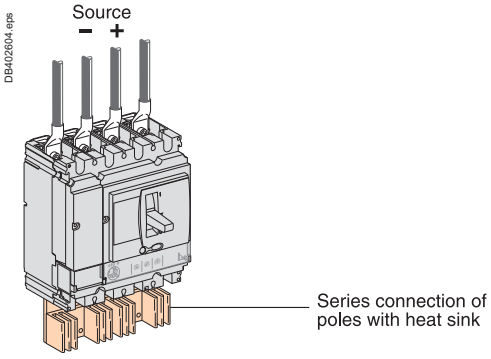
Performance levels and quality signed Schneider Electric

The creation of a dependable and high-performance DC range requires a large amount of specific design and development work in addition to that invested in the original AC range.
Schneider Electric called on its proven industrial experience in the AC field and its recognised know-how in current interruption to develop a high-performance DC range.
Schneider Electric decided to use the cases and accessories of its Compact NSX and Masterpact NW ranges with:
- a high-performance design for the breaking chambers or the poles intended specifically for DC applications (e.g. 100 kA at 250 V per pole for Compact NSX and 85 kA at 900 V for two poles for Masterpact NW)
- fast trip units developed for DC applications
- optimised pole-connection and isolation possibilities that are both simple and dependable.

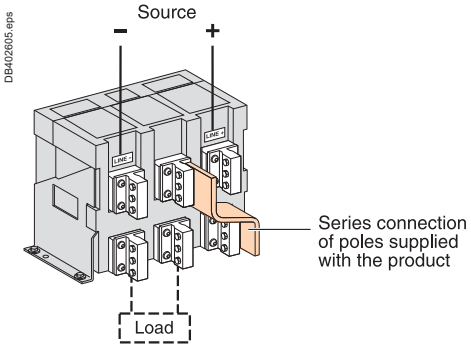
Optimised solutions for the many types of DC systems

The many types of DC systems make it necessary, for cost and technical-optimisation reasons, to connect the poles of two, three or four-pole circuit breakers in series or in parallel.
- The Compact NSX and Masterpact NW ranges enable series connection of poles, thereby optimising breaking capacity for high voltages.

Series connection reduces the voltage across the terminals of each pole (the total voltage is divided by two, three or four depending on the circuit breaker) and the operation of all poles provides the breaking capacity of the overall device.
This makes it possible to break short-circuit currents at high voltages while optimising solutions (e.g. a Compact NSX 100 kA 250 V per pole can be used on a 750 V system with three poles connected in series, thus reducing the cost compared to a 750 V solution.
- The Compact NSX range enables parallel connection of the poles, thereby optimising the use of the rated currents.



Compact NSX DC - safety and flexibility.



Masterpact NW DC - supplied ready for installation (here with vertical rear connections).

Optimised and dependable series or parallel connection of poles

Series connection - controlled temperature rise and guaranteed performance

Schneider Electric DC circuit breakers comply with product standards IEC 60947-1 and 2.
To that end, series connection of poles meets:
- temperature-rise conditions. Connections specifically designed to dissipate heat mean the thermal model is equivalent to that for AC applications. The devices dissipate the temperature rise produced by relatively short series connections
- optimum safety conditions. Connections are designed for extreme operating conditions (insulation and safety clearances, ultimate breaking capacity, high pollution levels, etc.).

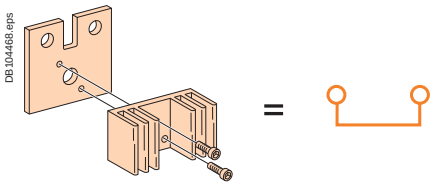
Parallel connection - optimisation

Certain DC systems require high power levels (hundreds to thousands of amperes) at reduced voltages, most often ⩽ 250 V.
The configurations of DC systems and the exceptional performance levels of Compact NSX circuit breakers mean the poles can be parallel connected. This technique virtually doubles, triples or quadruples the current rating depending on the type of circuit breaker and thus reduces the cost of solutions.

Great flexibility in adapting to DC applications

Overview of series connection of poles for Compact NSX DC

With Compact NSX DC circuit breakers, it is easy to create a large number of series pole arrangements using prefabricated connections mounted on site during equipment installation.

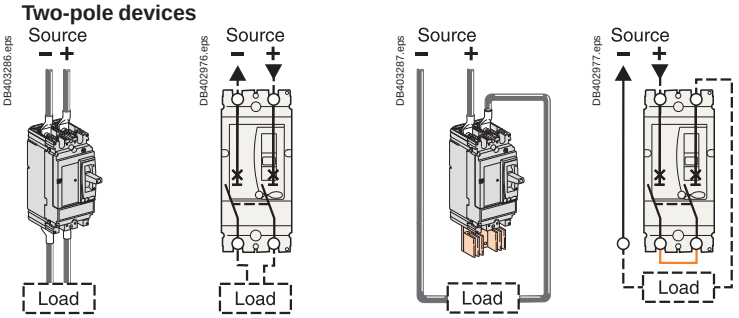


One type of connection per framesize, two catalogue numbers for all series connections.

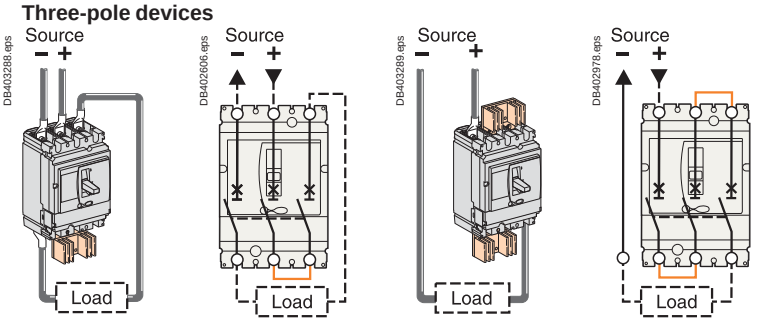
Compact NSX DC

Examples of series connection

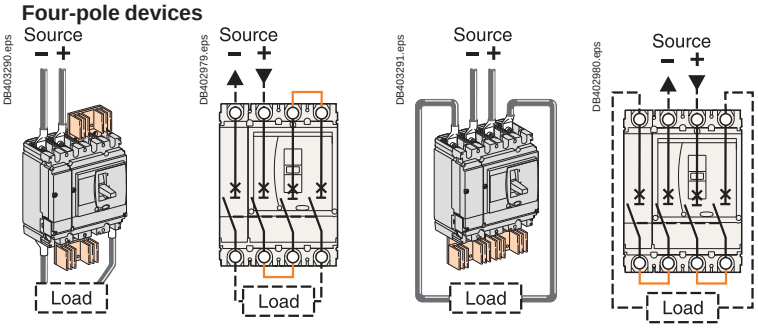
Two-pole devices



Three-pole devices

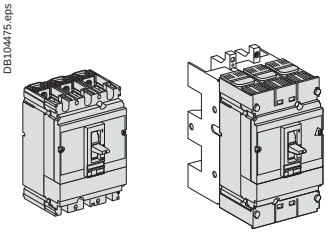


Four-pole devices

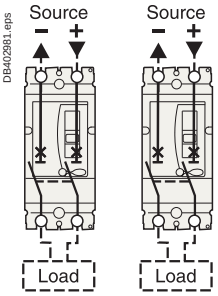


Great flexibility for connections

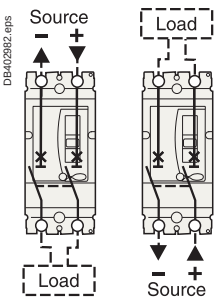
- All connections are possible for the fixed and withdrawable versions.
- Indifferent connection of polarities, from left to right or right to left.
- Indifferent connection of upstream and downstream cables to top or bottom terminals.
- Series connection of poles is possible by upstream/downstream connections. Creation of the connections is the responsibility of the panel builder or the installer.



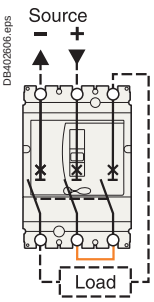
All connections are possible for the fixed and withdrawable versions.



Indifferent connection of polarities.



Upstream/downstream connections to top or bottom connectors.



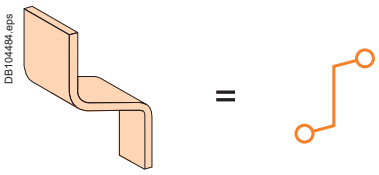
Series connection of poles is possible by upstream/downstream connections (user made).

Great flexibility in adapting to DC applications

Overview of series connection of poles for Masterpact NW DC

Masterpact NW DC circuit breakers, with high ratings and installed as incoming devices, offer three coupling versions C, D and E ready for connection.
The polarities “Line -”, “Line +” indicated on the rear connections of the Masterpact NW DC circuit breakers have to be respected in order to ensure the magnetic threshold tolerances.

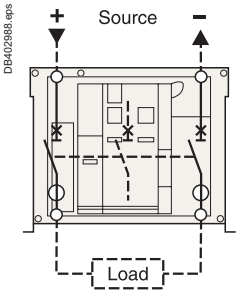
The safe prefabricated series connections are factory made due to the power ratings. They also dissipate heat.



Masterpact NW DC

Three versions supplied ready for connection

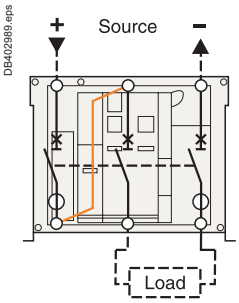
Version C



Front view: three-pole case - two poles in series.

Rear view.

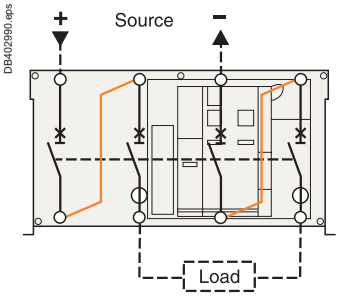
Version D



Front view: three-pole case - three poles in series.

Rear view with connections.

Version E



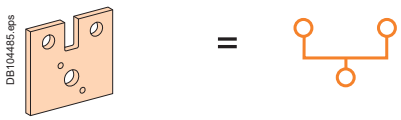
Front view: four-pole case - four poles in series.

Rear view with connections.

Great flexibility in adapting to DC applications

Parallel connection of poles

The exceptional performance levels of Compact NSX DC circuit breakers mean the poles can be parallel connected. This technique virtually doubles, triples or quadruples the current rating depending on the type of circuit breaker and thus reduces the cost of solutions.

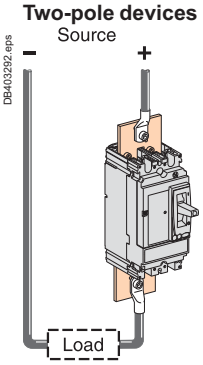


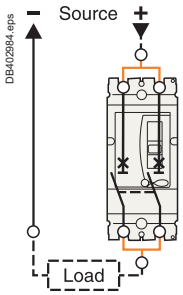
Parallel pole connection accessories are identical to those for series connections. The are equipped with heat sinks.
Customer connections are made directly to the connection plates after removing the heat sinks.

Specific connections are required for parallel connection of three poles.

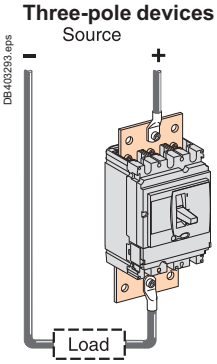
Examples of parallel connection

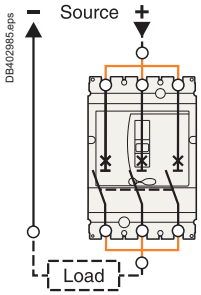
Two-pole devices



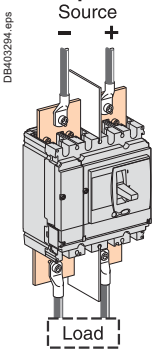


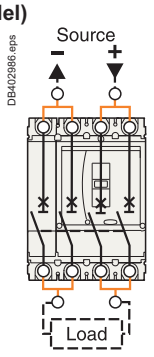
Three-pole devices



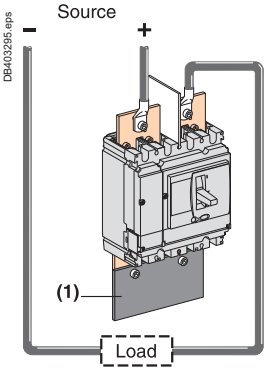


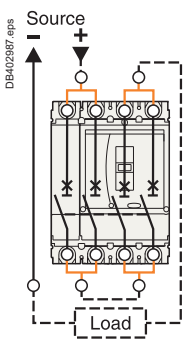
Four-pole devices (2 x 2 poles in parallel)





It is possible to mix series and parallel connections

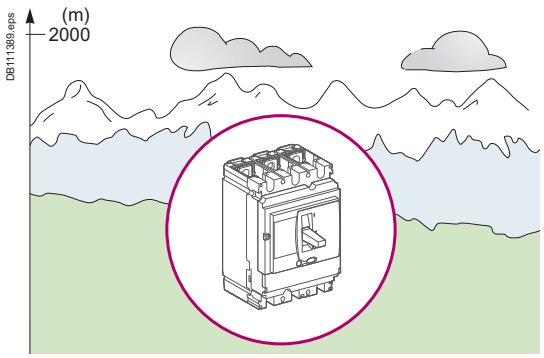




Note: *creation of the additional connection* (1) *is the responsibility of the panel builder or the installer.*

Functions and characteristics

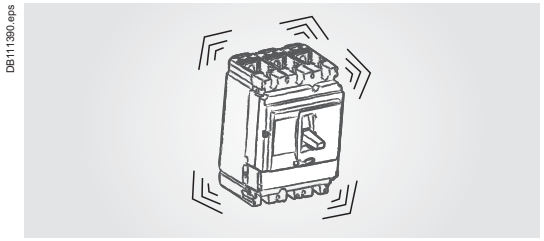
General characteristics of Compact NSX DC
Operating condition



Altitude

Compact NSX DC circuit breakers are designed to operate at their rated values at altitudes under 2000 metres.
Above 2000 metres, the changes in the characteristics of the ambient air (electrical resistance, cooling capacity) result in a reduction of the characteristics below.

Altitude (m)	2000	3000	4000	5000
Dielectric resistance voltage (V)	3500	3150	2500	2100
Compact NSX DC				
Rated insulation voltage (V)	750	700	600	500
Maximum utilisation voltage (V)	690	550	480	420
Rated current (A) at 40 °C	1 x In	0.96 In	0.93 In	0.9 In



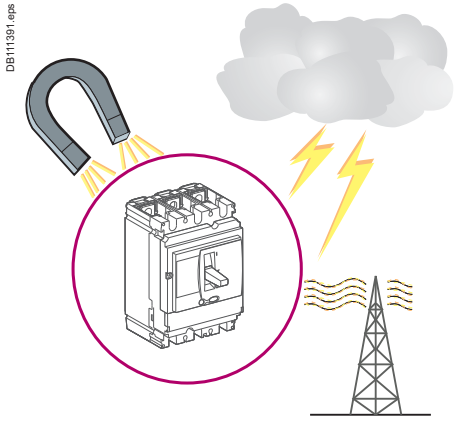
Vibrations

Compact NSX DC circuit breakers are guaranteed against electromagnetic or mechanical vibrations.
Tests are carried out in compliance with standard IEC 68-2-6 for the levels required by merchant-marine inspection organisations (Veritas, Lloyd's, etc.):
- 2 to 13.2 Hz: amplitude ±1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

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

Installation in class II switchboards

All Compact NSX DC circuit breakers are class II front-face devices. They may be installed through the door of class II switchboards (as per standard IEC 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.



Electromagnetic compatibility

Compact NSX DC ircuit breakers are protected against:
- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by atmospheric disturbances or by a distribution-system outage (e.g. failure of a lighting system) and devices emitting radio waves (radios, walkie-talkies, radar, etc.)
- electrostatic discharges produced by users. The circuit breakers have successfully passed the electromagnetic-compatibility tests (EMC) defined by international standard IEC 60947-2, appendix F.

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

Compact NSX DC circuit breakers comply with the following electromagnetic-compatibility standards:
- IEC/EN 61000-4-2 - electrostatic immunity discharge test, part 2 (circuit breakers)
- IEC/EN 61000-4-3 - electromagnetic-field immunity test
- IEC/EN 61000-4-4 - electrical fast transient/burst immunity test
- IEC/EN 61000-4-5 - surge immunity test
- IEC/EN 61000-4-6 - immunity to conducted disturbances, induced by radiofrequency fields
- CISPR 11 - radio-frequency conducted and radiated emission tests required for CE marking
- ◻ EN 61000-6-2 - immunity standard for industrial environments
- ◻ EN 50081-1-2 - emissions in commercial and industrial environments.

Ambient temperature

Operating-temperature range

- Compact NSX DC circuit breakers may be used between -25 °C and +70 °C
- Circuit breakers should be put into service under the normal, ambient operating temperatures indicated above. Exceptionally, they may be put into service when the ambient temperature is between -35 °C and -25 °C.

Derating

Above 40 °C, it is necessary to take into account the derating values (Compact NSX DC).

Storage-temperature range

- Compact NSX DC circuit breakers may be stored in their original packing between -50 °C and +85 °C.

Degree of protection

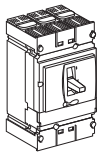
Compact NSX DC circuit breakers offer the following protection characteristics depending on the installation conditions:

- IP: degree of protection (standard IEC 60529)
- IK: protection against external mechanical impacts (standard EN 50102).

Compact NSX DC

Bare circuit breaker with terminal shields

DB402607.eps



With toggle	IP40	IK07

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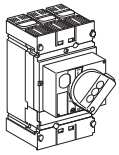
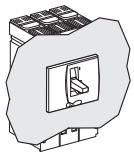


With direct rotary handle, standard or VDE	IP40	IK07

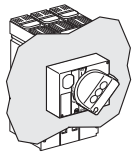
Circuit breaker installed in a switchboard

DB402609.eps



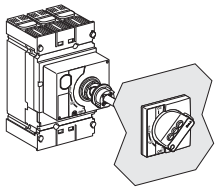
With toggle	IP40	IK07

DB402610.eps



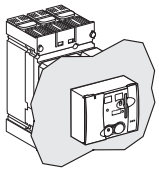
With direct rotary handle, standard or VDE	IP40	IK07
CCM	IP43	IK07
CNOMO	IP54	IK07

DB402611.eps



With extended rotary handle	IP55	IK08

DB402612.eps



With motor mechanism	IP40	IK07

Positive contact indication

Compact NSX DC circuit breakers are suitable for isolation as defined by IEC 60947-1 and 60947-2:

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

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.

For Compact NSX DC, installation of a rotary handle or a motor mechanism does not alter the reliability of the position-indication system.

DB403582.eps

DB116888.eps

Circuit breaker characteristics
Compact NSX100 DC to NSX630 DC

pb107518_13_r.eps

pb107524-19_r.eps

PB107547_32.eps

PB105035_31r.eps

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-7)				
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
Control	Manual	with toggle		
		with direct or extended rotary handle		
	Electrical	with remote control		
Dimensions and weight				
Dimensions H x W x D (mm) connected in series	Fixed			1P
				2P
				3P
				4P
Weight (kg) connected in series	Fixed			1P
				2P
				3P
				4P

(1) Number of poles taking part in current interruption.
Example. The NSX100N DC 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.

	NSX100 DC								NSX160 DC								NSX250 DC		NSX400 DC		NSX630 DC	
	1			2			3/4		1			2			3/4		3/4		3/4		3/4	
	100								160								250		400		550	
	750								750								750		750		750	
	8								8								8		8		8	
	250			500			750		250			500			750		750		750		750	
	F	N	M	F	M	S	F	S	F	N	M	F	M	S	F	S	F	S	F	S	F	S
	36	50	85	36	85	100	36	100	36	50	85	36	85	100	36	100	36	100	36	100	36	100
	36	50	85	36	85	100	36	100	36	50	85	36	85	100	36	100	36	100	36	100	36	100
	-	-	-	36	85	100	36	100	-	-	-	-	85	100	36	100	36	100	36	100	36	100
	-	-	-	-	-	-	36	100	-	-	-	-	-	-	36	100	36	100	36	100	36	100
	100 %																					
	100 %																					
	A																					
	< 10 ms																					
	■																					
	3																					
	■	■	■	■	■	■	-		■	■	■	■	■	■	-		-		■		■	
	-	-	-	-	-	-	■		-	-	-	-	-	-	■		■		-		-	
	■	■	■	■	■	■	■		■	■	■	■	■	■	■		-		-		-	
	■	■	■	■	■	■	■		■	■	■	■	■	■	■		■		■		■	
	10000																		5000			
	5000																		1000			
	10000																		2000			
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	5000																		1000			
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	-	-	-	-	-	-	■		-	-	-	-	-	-	■		■		■		■	
	-	-	-	-	-	-	■		-	-	-	-	-	-	■		■		■		■	
	-	-	-	-	-	-	■		-	-	-	-	-	-	■		■		■		■	
	-	-	-	-	-	-	■		-	-	-	-	-	-	■		■		■		■	
	■																					
	■																					
	■																					
	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			

Trip-unit characteristics
Types of trip units
Trip units for Compact NSX DC


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Depending on the version, Compact NSX DC circuit breakers are equipped with:
■ 1P/2P: TM-D built-in thermal-magnetic trip units.

Trip units for Compact NSX100 DC - NSX160 DC - NSX250 DC
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	NSX100N/H DC		■	■	■	■	■	■	■	■	■	-	-
	NSX160N/H DC		-	-	-	-	-	-	-	-	-	■	■
Overload protection (thermal)													
Tripping threshold		Ir (A) at 40 °C	Fixed										
			16	20	25	32	40	50	63	80	100	125	160
Protection against short-circuits (magnetic)													
Pick-up		Im (A)	Fixed										
Compact circuit breaker	NSX100/ 160N/H DC	Marked AC value (1)	190	190	300	300	500	500	500	640	800	1000	1250
		True DC value	260	260	400	400	700	700	700	800	1000	1200	1250


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Depending on the version, Compact NSX DC circuit breakers are equipped with:
■ 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.

Trip units for Compact NSX100 DC - NSX160 DC - NSX250 DC
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	NSX100 DC		■	■	■	■	■	■	■	■	-	-	-	-	■	■	■	■
	NSX160 DC		■	■	■	■	■	■	■	■	■	■	-	-	■	■	■	■
	NSX250 DC		-	-	-	-	-	-	■	■	■	■	■	■	-	-	-	-
Overload protection (thermal)																		
Tripping threshold (A)		Ir (at 40 °C)	Adjustable															
			0.7 to 1 x In															
Protection against short-circuits (magnetic)																		
Pick-up (A)		Im	Fixed										Adjustable		Fixed			
Compact circuit breaker	NSX100/160/ NSX250 DC	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


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(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.

Compact NSX400 DC - NSX630 DC 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 NSX400 DC	■	■	-
		Compact NSX630 DC	■	■	■
Protection against short-circuits (magnetic)					
Pick-up (A)		Im	Adjustable	-	-
			800…1600	1250…2500	2000…4000


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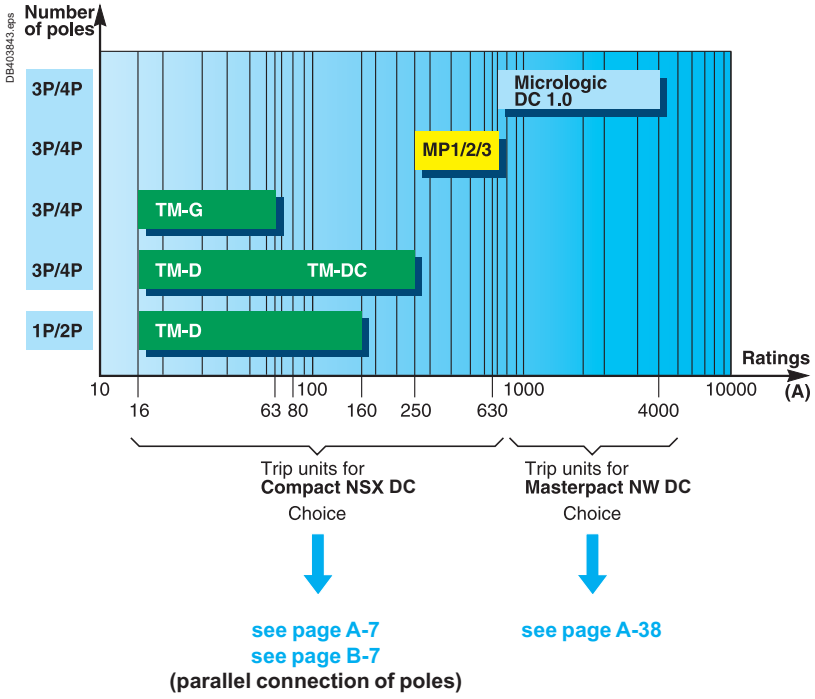
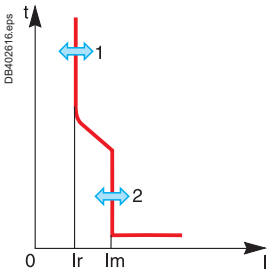
Above 250 A, the protection of Compact NSX400 DC and 630 DC circuit breakers is ensured by built-in magnetic trip units supplied mounted on the circuit breaker and offering one of three protection levels MP1, MP2 and MP3.

Types of trip units

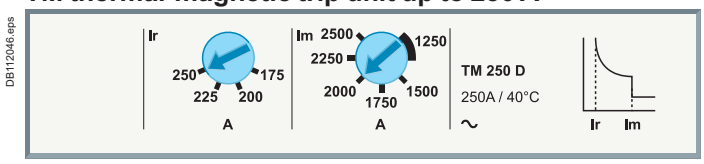




1 *overload protection threshold.*
2 *short-circuit protection pick-up.*

Trip units for Compact NSX DC

TM thermal-magnetic trip unit up to 250 A

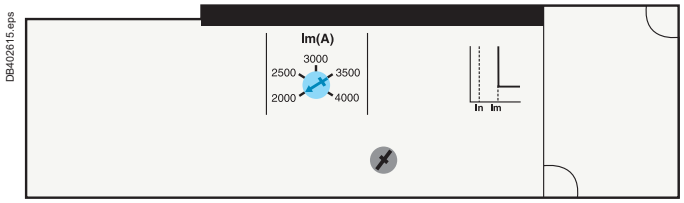


Up to 250 A for Compact NSX DC, protection is provided by thermal-magnetic trip units.

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

MP magnetic trip unit for 400 and 630 A



Above 250 A, the protection of Compact NSX400 DC and 630 DC circuit breaker is ensured by built-in magnetic trip unit, offering one of three protection levels MP1, MP2 or MP3.

Accessories and auxiliaries
Overview of Compact NSX100 to 630 DC fixed version

Insulation accessories

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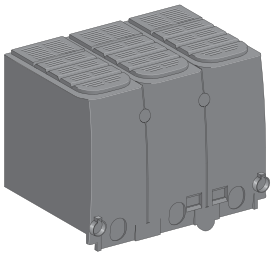
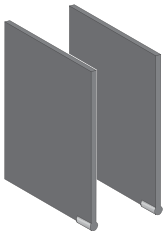
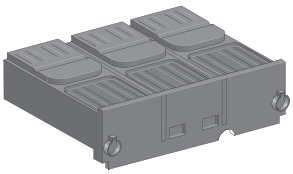




Interphase barriers



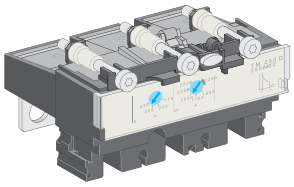
Sealable terminal shields

Electrical auxiliaries ▶ A-21

Indication contact

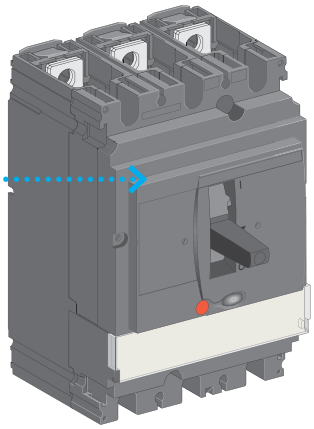
Voltage release

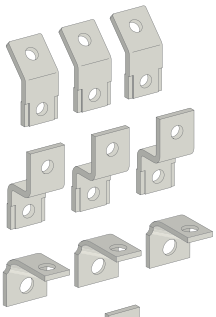
Protection and measurements



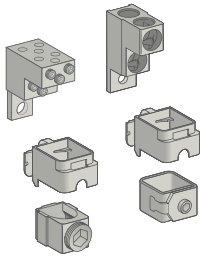
TM-D, TM-G trip unit

Connection ▶ A-14

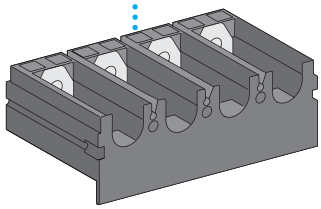




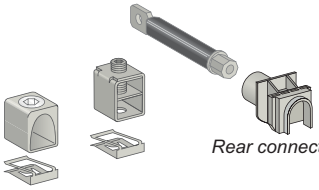
Terminal extensions



Cable connectors



One-piece spreader



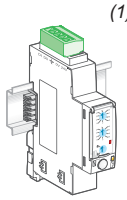
Cable connectors

Rear connectors

Communication

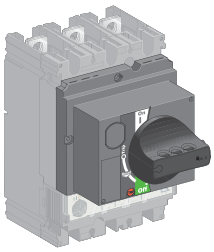
(1) NSX cord

(1) BSCM module

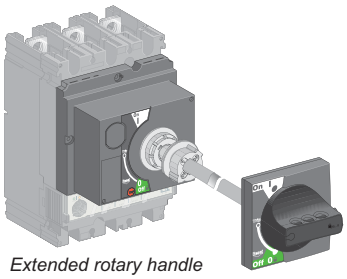


(1) o bus interface

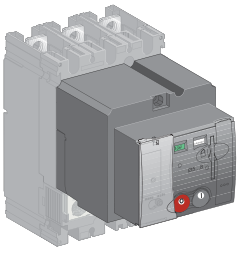
Control accessories ▶ A-24



Direct rotary handle



Extended rotary handle



Motor mechanism

(1) Compact NSX100-250 only.

Accessories and auxiliaries

Overview of Compact NSX100 to 630 DC plug-in and withdrawable versions

Insulation accessories

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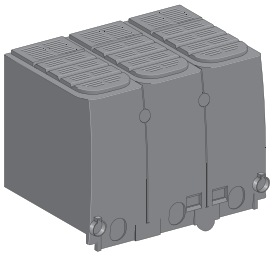
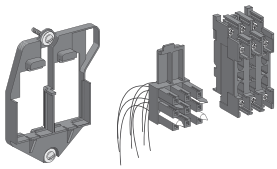
Interphase barriers

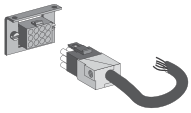


Sealable long terminal shields for plug-in base

Electrical accessories ▶ A-16

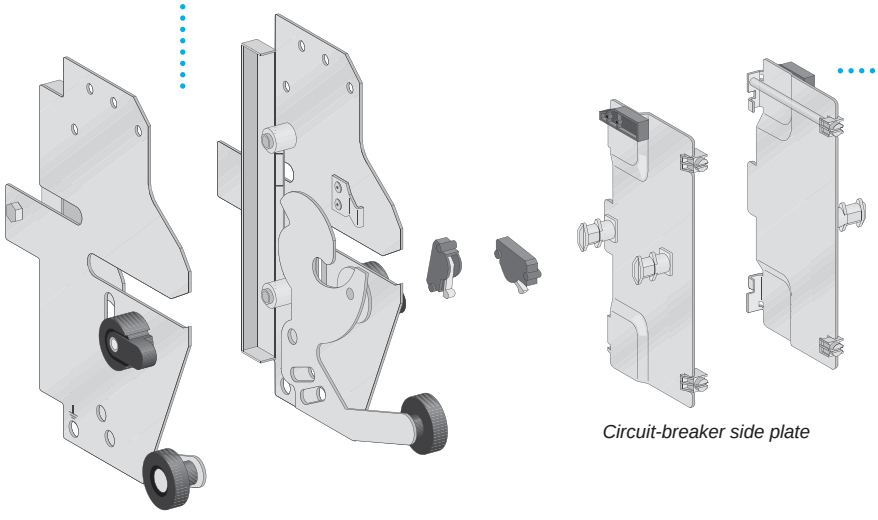


Automatic withdrawable auxiliary connector



Manual auxiliary connector

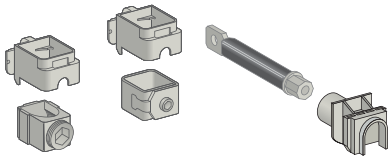
Mechanical accessories ▶ A-13



Chassis side plate

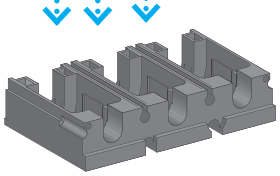
Circuit-breaker side plate

Connection ▶ A-14 and A-16

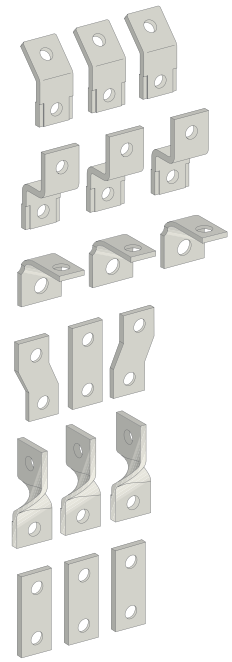


Cable connectors

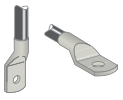
Rear connectors



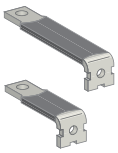
Adapter



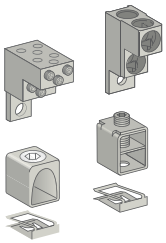
Terminal extensions



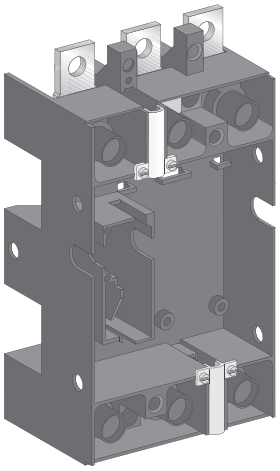
Lugs



Rear connectors

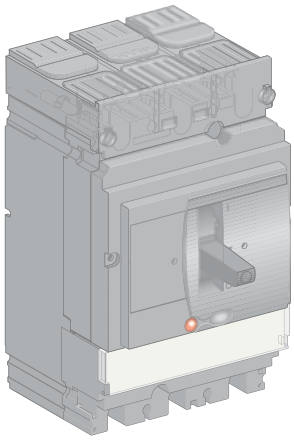


Cable connectors

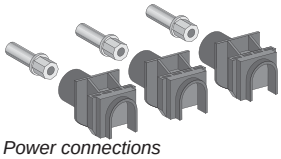


Plug-in base

Circuit breaker



Power connection accessories



Power connections

Electrical and mechanical accessories
Compact NSX100 to 630 DC

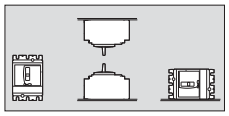
Compact NSX DC circuit breakers may be installed horizontally, vertically or flat on their back, without derating performance levels.
There are three installation versions:
- fixed
- plug-in (on a base)
- withdrawable (on a chassis).

For the last two, components must be added (base, chassis) to the fixed version.
Many connection components are shared by the three versions.

PB107547_32.eps

Fixed Compact NSX250 DC.

DB112208.eps

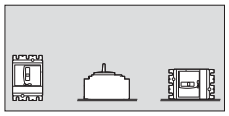


Installation positions.

PB104934.eps

Plug-in
Compact NSX250 DC.

DB112209.eps

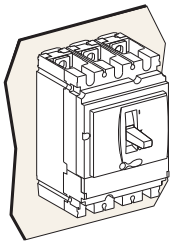


Installation positions.

Fixed circuit breakers

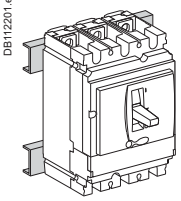
Fixed circuit breakers are designed for standard connection using bars or cables with lugs. Bare-cable connectors are available for connection to bare copper or aluminium cables.
For connection of large cables, a number of solutions with spreaders may be used for both cables with lugs or bare cables.

DB112200.eps



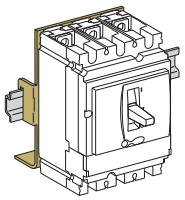
Mounting on a backplate.

DB112201.eps



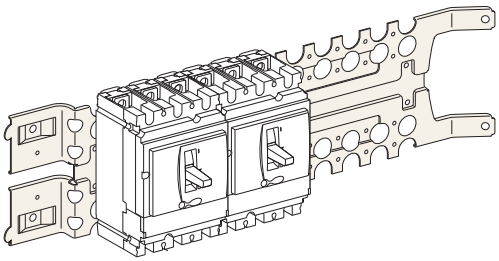
Mounting on rails.

DB112202.eps



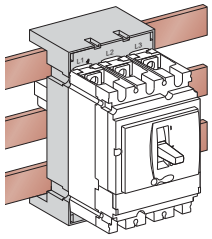
Mounting on DIN rail (with adapter).

DB112203.eps



Mounting on a Prisma mounting plate.

DB112204.eps



Mounting on busbars with an adapter.

Plug-in base circuit breakers

The plug-in version makes it possible to:
- extract and/or rapidly replace the circuit breaker without having to touch the connections on the base
- allow for the addition of future circuits by installing bases that will be equipped with a circuit breaker at a later date
- isolate the power circuits when the device is mounted on or through a panel. It acts as a barrier for the connections of the plug-in base. Insulation is made complete by the mandatory short terminal shields on the device. The degrees of protection are:
  - circuit breaker plugged in = IP4
  - circuit breaker removed = IP2
  - circuit breaker removed, base equipped with shutters = IP4.

Parts of a plug-in configuration

A plug-in configuration is made by adding a "plug-in kit" to a fixed device.
To avoid connecting or disconnecting the power circuits under load conditions, a safety trip causes automatic tripping if the device is ON, before engaging or withdrawing it. The safety trip, supplied with the kit, must be installed on the device. If the device is disconnected, the safety trip does not operate. The device can be operated outside the switchboard.

Accessories

Optional insulation accessories are available.
- Terminal shields to protect against direct contact.
- Interphase barriers to reinforce insulation between phases and protect against direct contact.

Mounting

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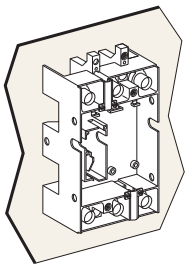
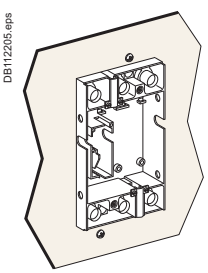


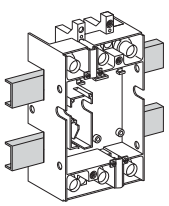
Mounting on a backplate.

DB112205.eps



Mounting through a front panel.

DB112207.eps



Mounting on rails.

■ 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).

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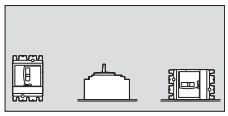
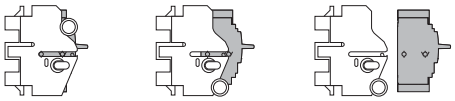
Withdrawable Compact NSX250 DC.

DB112209.eps



Installation positions.

DB112210.eps



Connected. *Disconnected.* *Removed.*

Withdrawable circuit breakers

In addition to the advantages provided by the base, installation on a chassis facilitates handling. It offers three positions, with transfer from one to the other after mechanical unlocking:
■ connected: the power circuits are connected
■ disconnected: the power circuits are disconnected, the device can be operated to check auxiliary operation
■ removed: the device is free and can be removed from the chassis.

Parts of a withdrawable configuration

A withdrawable configuration requires two side plates installed on the base and two sides plates mounted on the circuit breaker. Similar to the plug-in version, a safety trip causes automatic tripping if the device is ON, before engaging or withdrawing it, and enables device operation in the disconnected position.

Accessories

Accessories are the same as for the base, with in addition:
■ auxiliary contacts for installation on the fixed part, indicating the “connected” and “disconnected” positions
■ locking by 1 to 3 padlocks (shackle diameter 5 to 8 mm), to:
□ prevent insertion for connection
□ lock the circuit breaker in connected or disconnected position
■ 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)
■ telescopic shaft for extended rotary handles. The door can then be closed with the device in the connected and disconnected positions.

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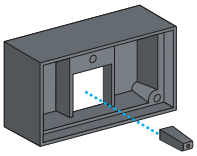

Protection collar for toggle and toggle extension to provide IP4 in the connected and disconnected positions.

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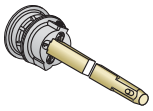

Telescopic shaft.

Mounting

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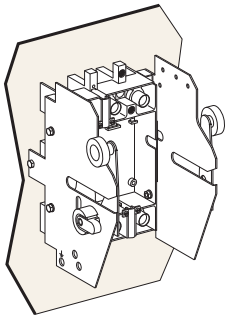
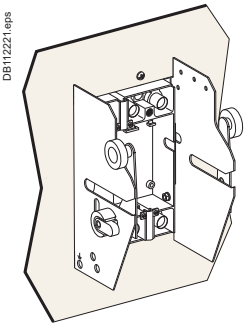


Mounting on a backplate.

DB112221.eps



Mounting through a front panel.

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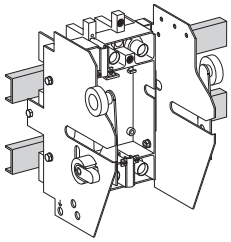
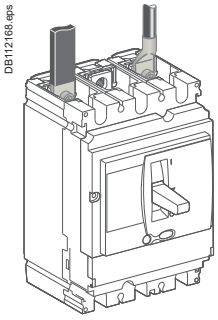


Mounting on rails.

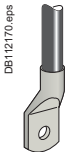
Electrical and mechanical accessories

Connection of fixed devices

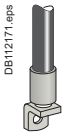
Fixed circuit breakers are designed for standard front connection using bars or cables with lugs.
Cable connectors are available for bare cables. Rear connection is also possible.



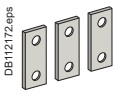
Insulated bar.



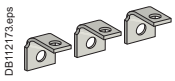
Small lug for copper cables.



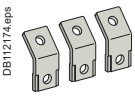
Small lug for Al cables.



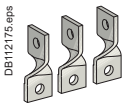
Straight terminal extensions.



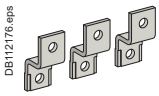
Right-angle terminal extensions.



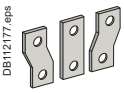
45° terminal extensions.



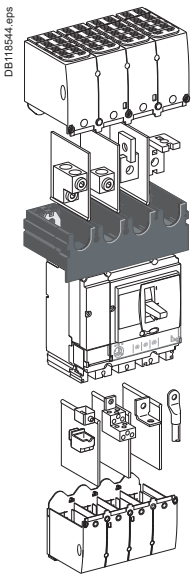
Edgewise terminal extensions.

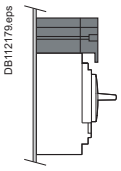


Double-L terminal extensions.

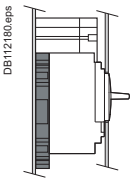


Spreaders.





Mounting at the back of a switchboard.



Mounting behind the front panel with a raiser.

Front connection

Bars or cables with lugs

Standard terminals

Compact NSX100 to 630 DC come with terminals comprising snap-in nuts with screws:

- Compact NSX100 DC: M6 nuts and screws. Compact NSX160/250 DC: M8 nuts and screws
- Compact NSX400/630 DC: M10 nuts and screws.

These terminals may be used for:

- direct connection of insulated bars or cables with lugs
- terminal extensions offering a wide range of connection possibilities.

Interphase barriers or terminal shields are recommended. They are mandatory for certain connection accessories (in which case the interphase barriers are provided).

Bars

When the switchboard configuration has not been tested, insulated bars are mandatory.

Maximum size of bars

Compact NSX DC circuit breaker		100/160/250 DC	400/630 DC
Without spreaders	pitch (mm)	35	45
	maximum bar size (mm)	20 x 2	32 x 6
With spreaders	pitch (mm)	45	52.5
	maximum bar size (mm)	32 x 2	40 x 6

Crimp lugs

There are two models, for aluminium and copper cables.
It is necessary to use narrow lugs, compatible with device connections. They must be used with interphase barriers or long terminal shields. The lugs are supplied with interphase barriers and may be used for the types of cables listed below.

Cable sizes for connection using lugs

Compact NSX DC circuit breaker		100/160/250 DC	400/630 DC
Copper cables	size (mm²)	120, 150, 185	240, 300
	crimping	hexagonal barrels or punching	
Aluminium cables	size (mm²)	120, 150, 185	240, 300
	crimping	hexagonal barrels	

Terminal extensions

Extensions with anti-rotation ribs can be attached to the standard terminals to provide numerous connection possibilities in little space:

- straight terminal extensions
- right-angle terminal extensions
- edgewise terminal extensions
- double-L extensions
- 45° extensions.

Spreaders

Spreaders may be used to increase the pitch:

- NSX100 to 250 DC: the 35 mm pitch can be increased to 45 mm
- NSX400/630 DC: the 45 mm pitch can be increased to 52 or 70 mm.

Bars, cable lugs or cable connectors can be attached to the ends.

One-piece spreader for NSX100 to 250 DC

Connection of large cables may require an increase in the distance between the device terminals.
The one-piece spreader is the means to:

- increase the 35 mm pitch of the NSX100 to 250 DC circuit-breaker terminals to the 45 mm pitch of a NSX400/630 DC device
- use all the connection and insulation accessories available for the next largest frame size (lugs, connectors, spreaders, right-angle and edgewise terminal extensions, terminal shields and interphase barriers).

It may also be used for Interpact INS switch-disconnectors.
Equipped with a single-piece spreader, Compact NSX DC devices can be mounted:

- at the back of a switchboard
- behind the front panel with a raiser.

The one-piece spreader is also the means to:

- align devices with different frame sizes in the switchboard
- use the same mounting plate, whatever the device.

Pitch (mm) depending on the type of spreader

Compact NSX DC circuit breaker	NSX100 to 250 DC	NSX100 to 630 DC
Without spreaders	35	45
With spreaders	45	52.5 or 70
With one-piece spreader	45	-

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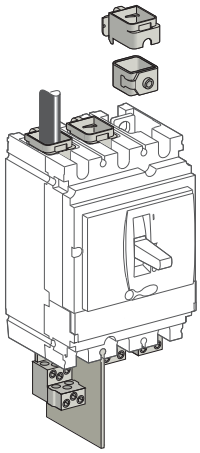

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Bare cable.

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1-cable connector for NSX100 to 250 DC.

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NSX400/ 630 DC.

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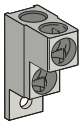

2-cable connector for NSX100 to 250 DC.

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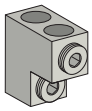

NSX400/ 630 DC.

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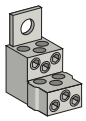

Distribution connector for NSX100 to 250 DC.

Bare cables

For bare cables (without lugs), the prefabricated bare-cable connectors may be used for both copper and aluminium cables.

Cable connectors for Compact NSX100 to 250 DC
The connectors snap directly on to the device terminals or are secured by clips to right-angle and straight terminal extensions as well as spreaders.

Cable connectors for Compact NSX400 to 630 DC
The connectors are screwed directly to the device terminals.

Cable connectors for Compact NSX100 to 250 and 400/630 DC
The connectors are screwed to device terminals or right-angle terminal extensions.

Distribution connectors for Compact NSX100 to 250 DC
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.

Maximum size of cables depending on the type of connector

Compact NSX DC circuit breaker		100/160 DC	250 DC	400 DC	630 DC
Steel connectors	1.5 to 95 mm²	■			
Aluminium connectors	25 to 95 mm²	■	■		
	120 to 185 mm²	■	■		
	2 cables 50 to 120 mm²	■	■		
	2 cables 35 to 240 mm²			■	■
	35 to 300 mm²			■	■
Distribution connectors	6 cables 35 mm²	■	■		

Four positions.

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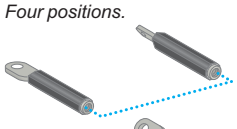

Two lengths.

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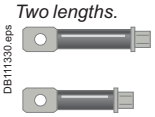

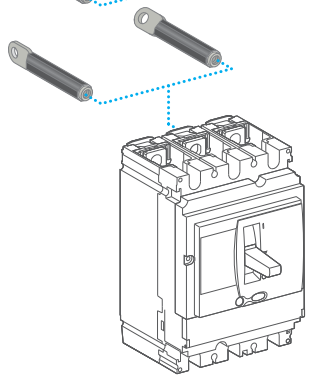

Rear connection.

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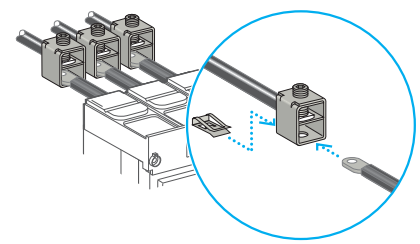


Connection of bare cables to NSX100 to 250 DC.

Rear connection

Device mounting on a backplate with suitable holes enables rear connection.

Bars or cables with lugs

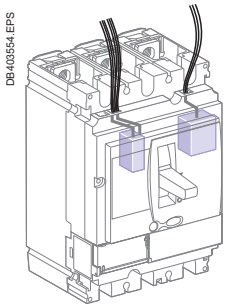
Rear connections for bars or cables with lugs are available in two lengths. Bars may be positioned flat, on edge or at 45° angles depending on how the rear connections are positioned.
The rear connections are simply fitted to the device connection terminals. All combinations of rear connection lengths and positions are possible on a given device.

Bare cables

For the connection of bare cables, the 1-cable connectors for Compact NSX100 to 250 DC may be secured to the rear connections using clips.

Electrical and mechanical accessories

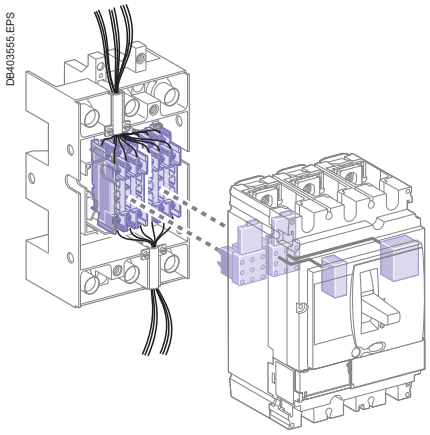
Connection of electrical auxiliaries



Fixed Compact NSX DC.

Fixed Compact NSX100-250 DC

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



Plug-in/withdrawable Compact NSX DC.

Withdrawable or plug-in Compact NSX DC

Automatic auxiliary connectors

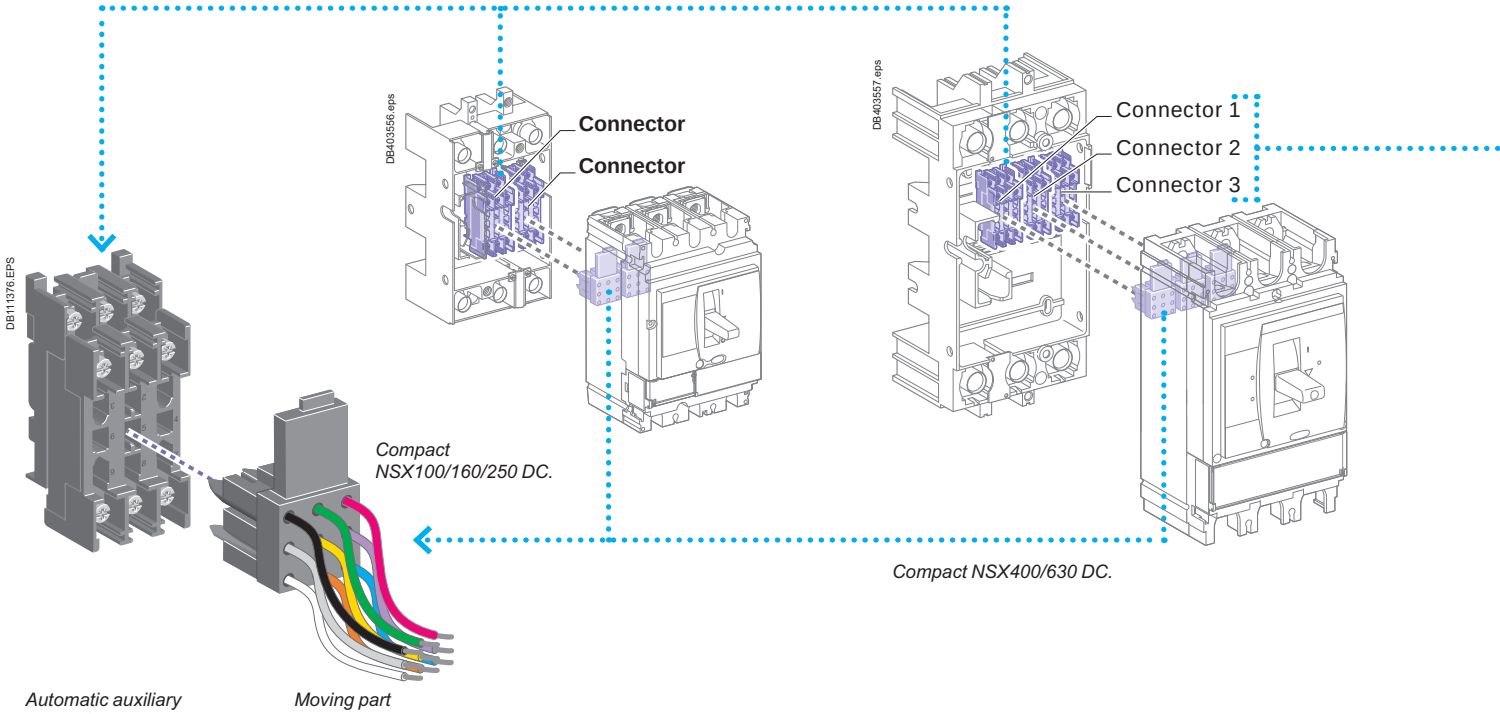
Auxiliary circuits exit the circuit breaker via one to three automatic auxiliary connectors (nine wires each). These are made up of:

- 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.

Micrologic trip unit options are also wired via the automatic auxiliary connectors.

Selection of automatic auxiliary connectors

Depending on the functions installed, one to three automatic auxiliary connectors are required.



Compact NSX100/160/250 DC.

Compact NSX400/630 DC.

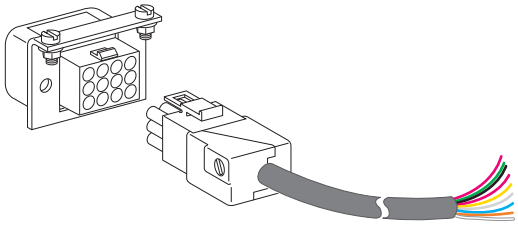
Automatic auxiliary connector: Fixed part

Moving part

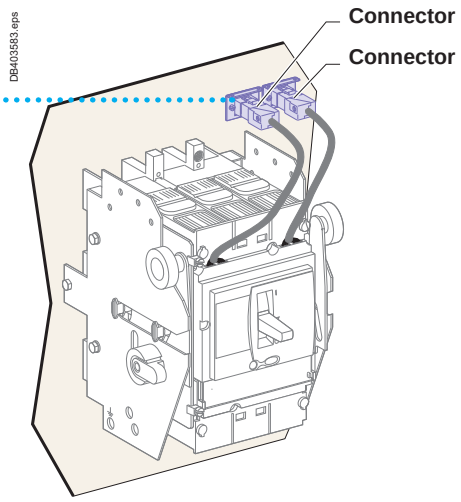
Withdrawable Compact NSX DC

Manual auxiliary connectors

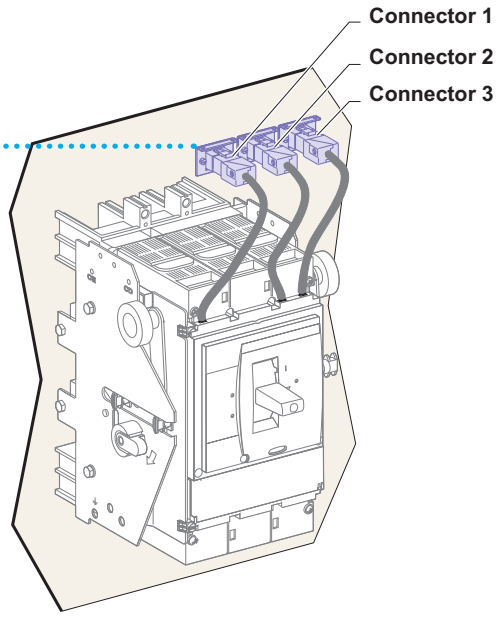
As an option to the automatic auxiliary connectors, withdrawable circuit breakers may be equipped with one to three plugs with nine wires each. In "disconnected" position, the auxiliaries remain connected.
They can then be tested by operating the device.



Nine-wire manual auxiliary connector.



Compact NSX100/160/250 DC.



Compact NSX400/630 DC.

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.

Circuit breaker	Connector 1	Connector 2	Connector 3
	OF1 MN/ MX SD	OF2 SDE NSX cord MT 24 V DC	OF3
NSX100/160/250 DC	■	■	-
NSX400/630 DC	■	■	■

***MT**: motor mechanism.*

Electrical and mechanical accessories

Selection of auxiliaries for Compact NSX100/160/250 DC

044313_30_SE.eps

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

Operation

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

Mechanical characteristics

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

Electrical characteristics

- consumption:
  - pick-up (MX): < 30 VA
  - seal-in (MN and MNR): < 5 VA.
- response time: < 50 ms.

NA, TMD, TMG, MA

Standard

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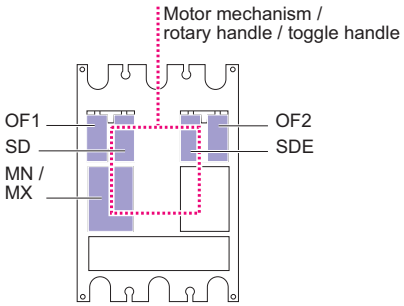

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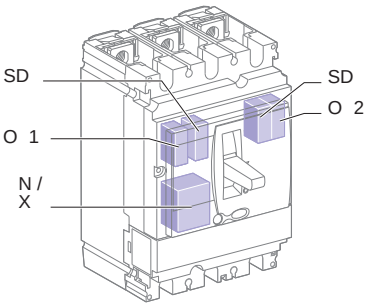


Communication

Communication requires specific auxiliaries (see page A-24).

Communication of status indications (1)

- 1 BSCM module.
- 1 NSX cord (internal terminal block) for both communication and 24 V DC supply to the BSCM.

Communication of status conditions is compatible with a toggle handle and a rotary handle.

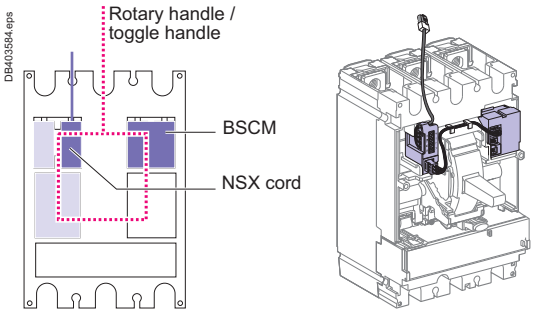
Communication of status indications and controls

This requires, in addition to the previous auxiliaries:

- 1 IFM connected to the BSCM.

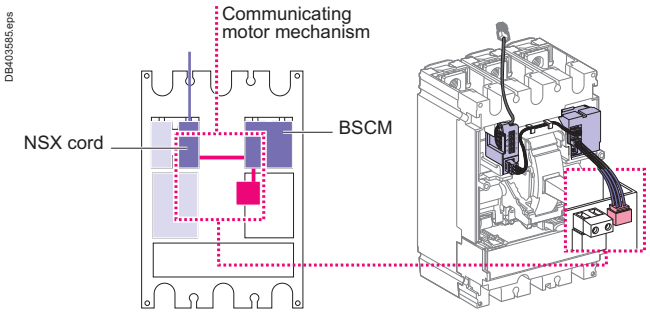
TMD, TMG

Communication of status indications (1)



or

Communication of status indications (1)



(1) Compact NSX100-250 DC only.

Electrical and mechanical accessories

Selection of auxiliaries for Compact NSX400/630 DC

Standard

All Compact NSX400/630 DC circuit breakers and switch-disconnectors have slots for the electrical auxiliaries listed below.

5 indication contacts (see page A-21)
- 3 ON/OFF (OF1, OF2, OF3)
- 1 trip indication (SD)
- 1 fault-trip indication (SDE).

1 remote-tripping release (see page A-25)
- either 1 MN undervoltage release
- or 1 MX shunt release.

All these auxiliaries may be installed with a motor mechanism or a rotary handle or toggle handle.

NA, MP1, MP2, MP3

Standard

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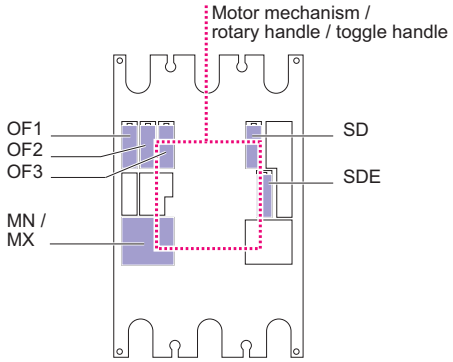

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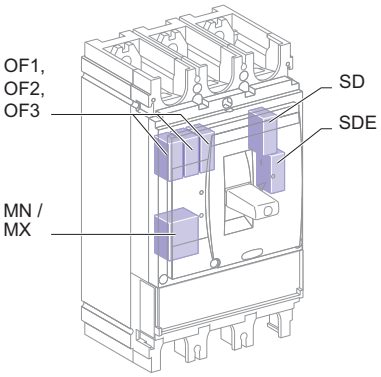

Indication contacts for Compact NSX DC

One contact model provides circuit-breaker status indications (OF - SD - SDE).
An early-make or early-break contact, in conjunction with a rotary handle, can be used to anticipate device opening or closing.
A CE / CD contact indicates that the chassis is connected / disconnected.

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Indication contacts.

PB103706-68.eps

CE/CD carriage switches.

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

Functions

Breaker-status indications, during normal operation or after a fault
A single type of contact provides all the different indication 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
□ operation of a voltage release
□ operation of the "push to trip" button
□ disconnection when the device is ON.
The SD contact returns to de-energised state when the circuit breaker is reset.
■ SDE (fault-trip indication) indicates that the circuit breaker has tripped due to:
□ an overload
□ a short-circuit.
The SD contact returns to de-energised state when the circuit breaker is reset.

Rotary-handle position contact for early-make or early-break functions
■ CAM (early-make or early-break function) contacts indicate the position of the rotary handle.
They are 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).

Chassis-position contacts
■ CE/CD (connected/disconnected) contacts are microswitch-type carriage switches for withdrawable circuit breakers.

Installation

■ OF, SD, 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.
The SDE function on a Compact NSX100 - 250 DC 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 function: the contacts clip into the fixed part of the chassis.

Electrical characteristics of auxiliary contacts

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

Electrical and mechanical accessories

Rotary handles

For Compact NSX DC

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

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

PB104936.eps

Compact NSX DC with a rotary handle.

PB103607-50.eps

Compact NSX DC with an MCC rotary handle.

PB103608-50.eps

Compact NSX DC with a CNOMO machine-tool rotary handle.

Direct rotary handle

Standard 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.

Device locking
The rotary handle facilitates circuit-breaker locking.
- Padlocking:
  - standard situation, in the OFF position, using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied
  - with a simple modification, in the ON and OFF positions. Locking in the ON position does not prevent free circuit-breaker tripping if a fault occurs. In this case, the handle remains the ON position after the circuit breaker tripping. Unlocking is required to go to the tripped then the OFF position.
- Keylock (and padlock)

It is possible to install a Ronis or Profalux keylock (optional) on the base of the handle to obtain the same functions as with a padlock.

Early-make or early-break contacts (optional)
Early-make and/or early-break contacts may be used with the rotary handle. It is thus possible to:
- supply an MN undervoltage release before the circuit breaker closes
- open the contactor control circuit before the circuit breaker opens.

MCC switchboard control

Control of an MCC switchboard is achieved by adding a kit to the standard handle. In addition to the standard functions, the kit offers the characteristics listed below.

Higher degree of protection IP
Degree of protection IP43, IK07.
The IP is increased by a built-in gasket.

Door locking depending on device position
- The door cannot be opened if the circuit breaker is ON or in the tripped position.

For exceptional situations, door locking can be temporarily disabled with a tool to open the door when the circuit breaker is closed. This operation is not possible if the handle is locked by a padlock.
- Circuit-breaker closing is disabled if the door is open. This function can be deactivated.

Machine-tool control in compliance with CNOMO

Control of a machine-tool is achieved by adding a kit to the standard handle. In addition to the standard functions, the kit offers the characteristics listed below.

Enhanced waterproofness and mechanical protection
- Degree of protection IP54, IK08.
- Compliance with CNOMO E03.81.501N.

PB104939.eps

Compact NSX DC with an extended rotary handle installed at the back of a switchboard, with the keylock option and key.

PB104940.eps

Extended rotary handle

Degree of protection IP55, IK08.
The extended rotary handle makes it possible to operate circuit breakers installed at the back of switchboards, from the switchboard front.
It maintains:
- visibility of and access to trip-unit settings
- suitability for isolation
- indication of the three positions O (OFF), I (ON) and tripped.

Mechanical door locking when device closed
A standard feature of the extended rotary handle is a locking function, built into the shaft, that disables door opening when the circuit breaker is in the ON or tripped positions.
Door locking can be temporarily disabled with a tool to open the door without opening the circuit breaker. This operation is not possible if the handle is locked by a padlock.

Voluntary disabling of mechanical door locking
A modification to the handle, that can be carried out on site, completely disables door locking, including when a padlock is installed on the handle. The modification is reversible.

When a number of extended rotary handles are installed on a door, this disabling function is the means to ensure door locking by a single device.

Device and door padlocking
Padlocking locks the circuit-breaker handle and disables door opening:
- standard situation, in the OFF position, using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied
- with a simple modification, in the ON and OFF positions. Locking in the ON position does not prevent free circuit-breaker tripping if a fault occurs.

In this case, the handle remains in the ON position after the circuit breaker tripping. Unlocking is required to go to the tripped then the OFF position.
If the door controls were modified to voluntarily disable door locking, padlocking does not lock the door, but does disable handle operation of the device.

Device locking using a keylock inside the switchboard
It is possible to install a Ronis or Profalux keylock (optional) on the base of the rotary handle to lock the device in the OFF position or in either the ON or OFF positions.

Accessory for device operation with the door open
When the device is equipped with an extended rotary handle, a control accessory mounted on the shaft makes it possible to operate the device with the door open.
- The device can be padlocked in the OFF position.
- The accessory complies with UL508.

Early-make or early-break contacts (optional)
The extended rotary handle offers the same possibilities with early-make and/or early-break contacts as the standard rotary handle.

Parts of the extended rotary handles
- 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…600 mm for Compact NSX100 to 250 DC
  - 209…600 mm for Compact NSX400/630 DC.

For withdrawable devices, the extended rotary handle is also available with a telescopic shaft to compensate for device disconnection. In this case, the min/max distances are:
- 248…600 mm for Compact NSX100 to 250 DC
- 272...600 mm for Compact NSX400/630 DC.

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Manual source-changeover systems

An additional accessory interlocks two devices with rotary handles to create a source-changeover system. Closing of one device is possible only if the second is open.
This function is compatible with direct or extended rotary handles.
Up to three padlocks can be used to lock in the OFF or ON position.

Electrical and mechanical accessories

Motor mechanism

For Compact NSX DC

PB103372-30.eps

Compact NSX250 DC with motor mechanism.

When equipped with a **motor-mechanism** module, Compact NSX DC 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.

A specific motor mechanism is required for operation via the communication function (1). This **communicating motor mechanism** must be connected to the BSCM module to receive the opening and closing orders. Operation is identical to that of a standard motor mechanism.

Applications

- Local motor-driven operation, centralised operation, automatic distribution control.
- Normal/standby source changeover or switching to a replacement source to ensure availability or optimise energy costs.
- Load shedding and reconnection.
- Synchrocoupling.

Operation

The type of operation is selected using the manual/auto mode selection switch (**7**). A transparent, lead-seal cover controls access to the switch.

Automatic

When the switch is in the "auto" position, the ON/OFF (I/O) buttons and the charging lever on the mechanism are locked.
- Circuit-breaker ON and OFF controlled by two impulse-type or maintained 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

When the switch is in the "manual" position, the ON/OFF (I/O) buttons may be used. A microswitch linked to the manual position can remote the information.
- Circuit-breaker ON and OFF controlled by 2 pushbuttons I/O.
- Recharging of stored-energy system by pumping the lever 8 times.
- Padlocking in OFF position.

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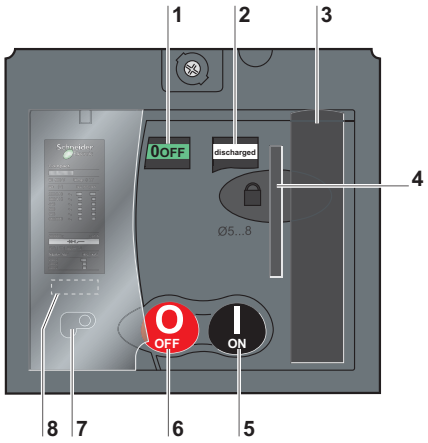

1 *Position indicator (positive contact indication)*
2 *Spring status indicator (charged, discharged)*
3 *Manual spring-charging lever*
4 *Keylock device (optional) Locking device (OFF position), using 1 to 3 padlocks, shackle diameter 5 to 8 mm, not supplied*
5 *I (ON) pushbutton*
6 *O (OFF) pushbutton*
7 *Manual/auto mode selection switch. The position of this switch can be indicated remotely.*
8 *Operation counter (Compact NSX400/630 DC).*

Installation and connections

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.

Optional accessories

- Keylock for locking in OFF position.
- Operations counter for the Compact NSX400/630 DC, indicating the number of ON/OFF cycles. Must be installed on the front of the motor-mechanism module.

Characteristics

Motor mechanism			MT100 to MT630
Response time (ms)	opening		< 600
	closing		< 80
Operating frequency	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 (2)	DC (W)	opening	≤ 500
		closing	≤ 500
	AC (VA)	opening	≤ 500
		closing	≤ 500

(2) For NSX100 DC to NSX250 DC, the inrush current is 2 In for 10 ms.

Electrical endurance

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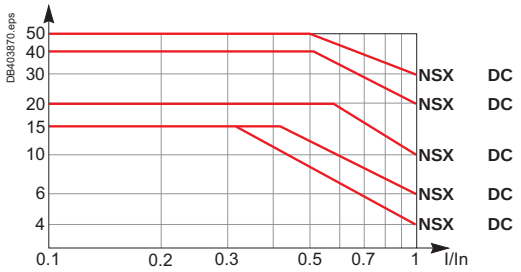
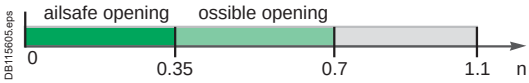


Circuit breaker + motor-mechanism module, in thousands of operations (IEC 60947 2), at 440 V.

(1) NSX100-250 DC only.

Remote tripping
For Compact NSX DC

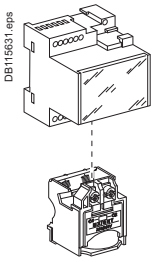
MX or MN voltage release.



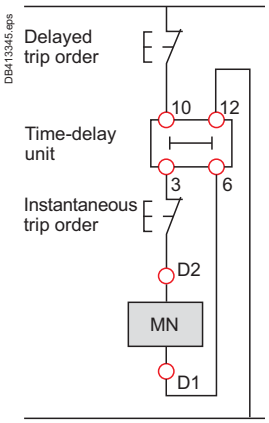
Opening conditions of the MN release.

Closing conditions of the MN release.

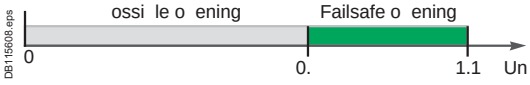
MN voltage release.



MN release with a time-delay unit.



Wiring diagram for emergency-off function with MN + time-delay unit.



Opening conditions of the MX release.

***Note**: circuit breaker opening using an MN or MX release must be reserved for safety functions. This type of tripping increases wear on the opening mechanism. Repeated use reduces the mechanical endurance of the circuit breaker by 50 %.*

MX or MN voltage releases are used to trip the circuit breaker. They serve primarily for remote, emergency-off commands.
It is advised to test the system every six months.

MN undervoltage release

The MN release opens the circuit breaker when its supply voltage drops to a value below 35 % of its rated voltage Un.
Undervoltage tripping, combined with an emergency-off button, provides fail-safe tripping. The MN release is continuously supplied, i.e. if supply is interrupted:
- either voluntarily, by the emergency-off button,
- or accidentally, through loss of power or faulty wiring,

the release provokes opening of the circuit breaker.

Opening conditions

Circuit-breaker tripping by an MN release meets the requirements of standard IEC 60947-2.
- Automatic opening of the circuit breaker is ensured when the continuous voltage supply to the release U ⩽ 0.35 x Un.
- If the supply voltage is between 0.35 and 0.7 Un, opening is possible, but not guaranteed. Above 0.7 Un, opening does not take place.

Closing conditions

If there is no supply to the MN release, it is impossible to close the circuit breaker, either manually or electrically. Closing is ensured when the voltage supply to the release U ⩾ 0.85 x Un. Below this threshold, closing is not guaranteed.

Characteristics

Power supply	V AC	50/60 Hz: 24 - 48 - 100/130 - 200/240
		50 Hz: 380/415 60 Hz: 208/277
	V DC	12 - 24 - 30 - 48 - 60 - 125 -250
Operating threshold	Opening	0.35 to 0.7 Un
	Closing	0.85 Un
Operating range		0.85 to 1.1 Un
Consumption (VA or W)		Pick-up: 10 - Hold: 5
Response time (ms)		50

Time-delay unit for an MN release

A time delay unit for the MN release eliminates the risk of nuisance tripping due to a transient voltage dip lasting ⩽ 200 ms. For shorter micro-outages, a system of capacitors provides temporary supply to the MN at U > 0.7 to ensure non tripping.
The correspondence between MN releases and time-delay units is shown below.

Power supply	Corresponding MN release
Unit with fixed delay 200 ms	
48 V AC	48 V DC
220 / 240 V AC	250 V DC
Unit with adjustable delay ⩽ 200 ms	
48 - 60 V AC/DC	48 V DC
100 - 130 V AC/DC	125 V DC
220 - 250 V AC/DC	250 V DC

MX shunt release

The MX release opens the circuit breaker via an impulse-type (⩾ 20 ms) or maintained order.

Opening conditions

When the MX release is supplied, it automatically opens the circuit breaker. Opening is ensured for a voltage U ⩾ 0.7 x Un.

Characteristics

Power supply	V AC	50/60 Hz: 24 - 48 - 100/130 - 200/240
		50 Hz: 380/415 60 Hz: 208/277
	V DC	12 - 24 - 30 - 48 - 60 - 125 -250
Operating range		0.7 to 1.1 Un
Consumption (VA or W)		Pick-up: 10
Response time (ms)		50

Circuit breaker control by MN or MX

When the circuit breaker has been tripped by an MN or MX release, it must be reset before it can be reclosed.
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.
Connection using wires up to 1.5 mm² to integrated terminal blocks.

Electrical and mechanical accessories

Locks

For Compact NSX DC

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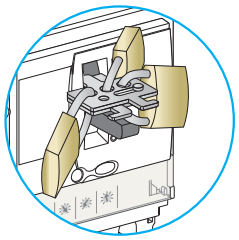

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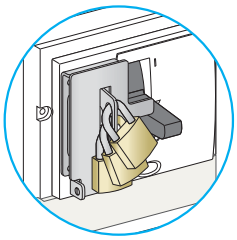
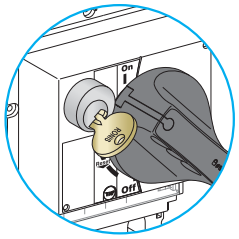


Toggle locking using padlocks and an accessory:
Removable device *Fixed device attached to the case.*

DB111363.eps



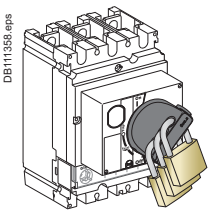
Rotary-handle locking using a keylock.

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). Certain locking systems require an additional accessory.

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	Standard	Lock in ■ OFF position ■ OFF or ON position (1)	Padlock	-
			Keylock	Locking device + keylock
	MCC	Lock in ■ OFF position ■ OFF or ON position (1)	Padlock	-
	CNOMO	Lock in ■ OFF position ■ OFF or ON position (1)	Padlock	-
Extended rotary handle		Lock in ■ OFF position ■ OFF or ON position (1) with door opening prevented (2)	Padlock	-
		Lock in OFF position	Padlock	UL508 control accessory
		■ OFF or ON position (1) inside the switchboard	Keylock	Locking device + keylock
Motor mechanism		Lock in OFF position remote operation disabled	Padlock	-
			Keylock	Locking device + keylock
Withdrawable circuit breaker		Lock in ■ disconnected position	Padlock	-
			Keylock	Locking device + keylock
		■ connected position	Keylock	Locking device + keylock

(1) Following a simple modification of the mechanism.
(2) Unless door locking has been voluntarily disabled.

DB111358.eps



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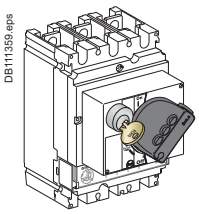
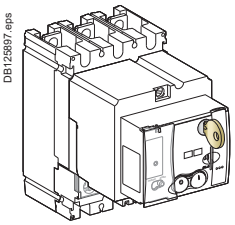


Rotary-handle locking using a padlock or a keylock.

DB125897.eps



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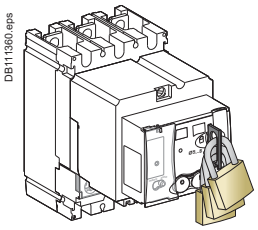
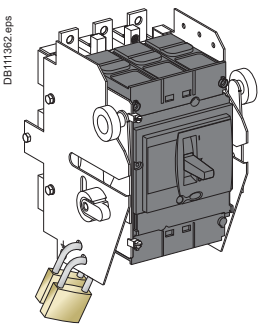


Motor-mechanism locking using a padlock or a keylock.

DB111362.eps



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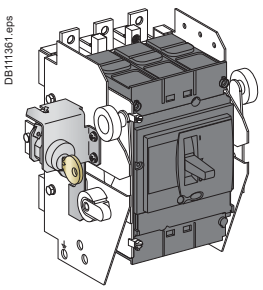
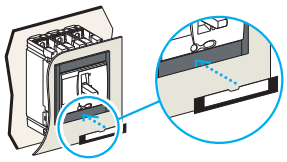
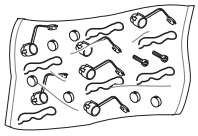


Chassis locking in the connected position.

Sealing accessories
For Compact NSX DC



Identification accessories.



Sealing accessories.

Outgoing-circuit identification

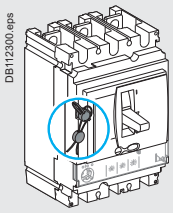
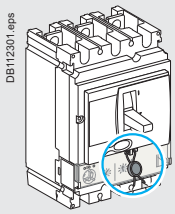
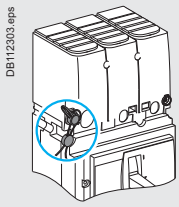
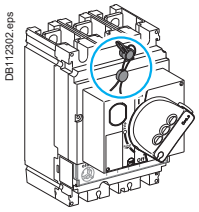
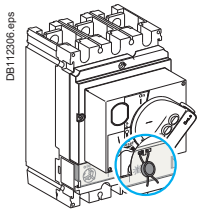
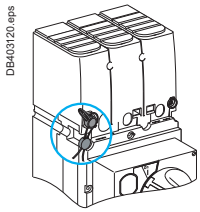
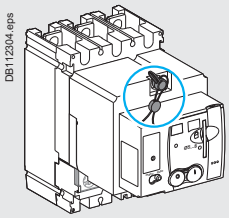
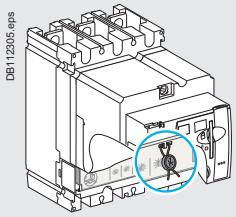
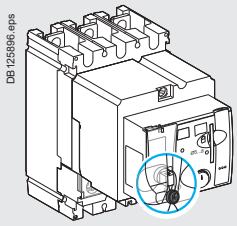
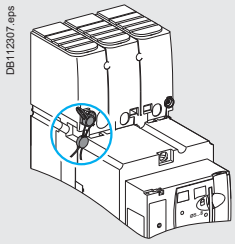
Compact NSX100 to 630 DC can be equipped with label holders supplied in sets of ten (cat. no. LV429226).
They are compatible with escutcheons.

Sealing accessories

Sealing accessories are available. Each bag of accessories contains all the parts required for the types of sealing indicated below.
A bag contains:

- 6 sealing accessories
- 6 lead seals
- 0.5 m of wire
- 2 screws.

Types of seals and corresponding functions

Toggle control				
Rotary handle				
Motor mechanism				
Types of seals	**Front-cover fixing screw**	**Trip-unit transparent cover**	**Motor-mechanism transparent cover**	**Terminal-shield fixing screw**
Protected operations	■ front removal ■ access to auxiliaries ■ trip-unit removal.	■ modification of settings ■ access to test connector.	■ access to manual/auto mode selection switch: depending on its position, manual (1) or automatic operation is not possible. *(1) In this case, local operation is not possible.*	■ access to power connections (protection against direct contact).

Electrical and mechanical accessories

Escutcheons and protection collars

For Compact NSX DC

Escutcheons are an optional feature mounted on the switchboard door. They increase the degree of protection to IP40, IK07. Protection collars maintain the degree of protection, whatever the position of the device (connected, disconnected).

PB104942.eps

IP30 escutcheon.

PB104938.eps

IP30 escutcheon with access to the trip unit.

IP30 or IP40 escutcheons for fixed devices

IP30

The three types are glued to the cut-out in the front door of the switchboard:

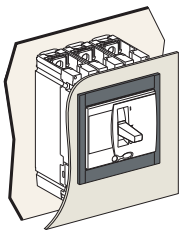
- ■ escutcheon for all control types (toggle, rotary handle or motor mechanism)
- □ without access to the trip unit
- □ with access to the trip unit.

IP40

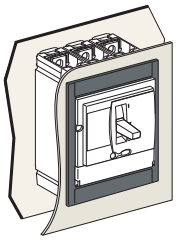
The four types, with a gasket, are screwed to the door cut-out:

- ■ three escutcheons identical to the previous, but IP40
- ■ a wide model for Vigi and ammeter modules that can be combined with the above.

DB112290.eps



DB402617.eps



Escutcheon for toggle without and with access to the trip unit.

IP40 escutcheons for withdrawable devices

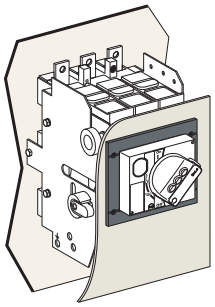
IP40 for withdrawable devices

The two types, with a gasket, are screwed to the door cut-out:
- for rotary handle or motor mechanism: standard IP40 escutcheon
- for toggle with extension: standard escutcheon + collar for withdrawal.

PB103777-36.eps

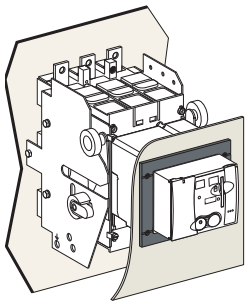
Escutcheon with collar for toggle.

DB112294.eps



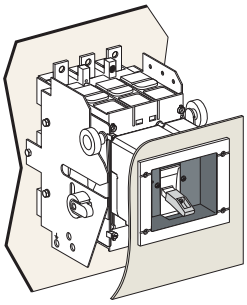
Standard escutcheon with rotary handle.

DB112295.eps



Standard escutcheon for motor mechanism.

DB112296.eps



Standard escutcheon with collar for withdrawal, for toggle.

PB103775-40.eps

Toggle cover.

IP43 toggle cover

Available only for devices with toggles. Fits over toggle and front cover of the device.
- Mounted on the front of the circuit breaker.
- Degree of protection IP43, IK07.

DB112218.eps

Toggle cover.

PB103820_35.eps

NSX retrofit front cover.

Retrofit front covers

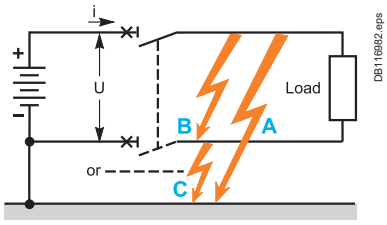
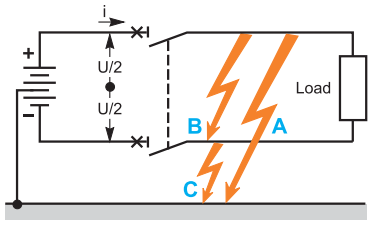
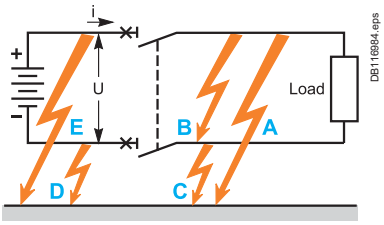
These replacement front covers make it possible to install NSX DC devices in existing switchboards containing NSX devices by installing the NSX-type retrofit covers on the NSX DC devices.
- NSX100 to 250 DC cover.
- NSX400/630 DC cover.

Selection guide for DC circuit breakers

Types of DC distribution systems

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.

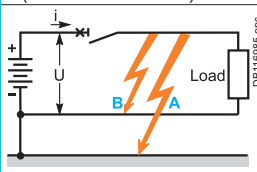
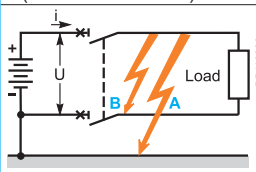
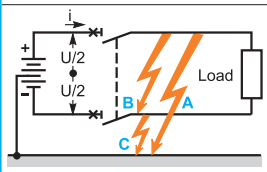
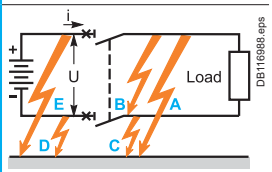
Selection of a circuit breaker depends essentially on the distribution-system parameters presented below which are used to determine the corresponding characteristics:
- type of system - determines the type of product and the number of poles connected in series for each polarity
- rated voltage - determines 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 Isc at U ■ only protected polarity concerned ■ all poles of protected polarity must have breaking capacity ≥ Isc max. at U	■ maximum Isc at U/2 ■ only positive polarity concerned ■ all poles of positive polarity must have breaking capacity ≥ Isc 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 Isc at U ■ if only one polarity (the positive here) is protected, all poles of protected polarity must have breaking capacity ≥ Isc max. at U ■ if both polarities are protected, to enable disconnection, all poles of the two polarities must have breaking capacity ≥ Isc max. at U	■ maximum Isc at U ■ both polarities are concerned ■ all poles of the two polarities must have breaking capacity ≥ Isc max. at U	■ maximum Isc at U ■ both polarities are concerned ■ all poles of the two polarities must have breaking capacity ≥ Isc max. at U
Fault C	No consequences	■ same as fault A ■ all poles of the negative polarity must have breaking capacity ≥ Isc 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 Isc at U ■ only positive polarity (cases A and D) or negative (C and E) concerned ■ all poles of each polarity must have breaking capacity ≥ Isc 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 ≥ Isc max. at U	■ all poles of both polarities ≥ Isc max. at U ■ all poles of each polarity ≥ Isc max. at U/2	■ all poles of each polarity ≥ Isc max. at U
Disconnection of both polarities (3)			
	Possible by adding a pole to the non-protected polarity	■ ensured	■ ensured
Implementation			
	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) Disconnection made possible by multi-pole breaking.

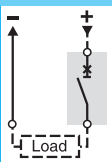
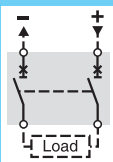
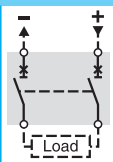
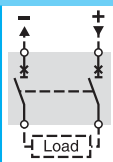
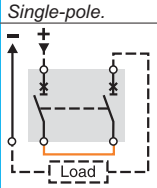
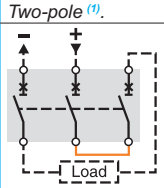
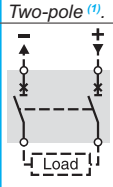
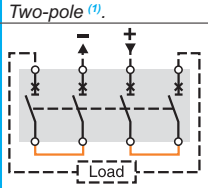
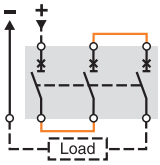
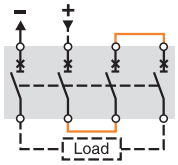
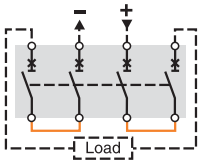
Series connection of poles

Type of distribution system

Type	Earthed			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)				

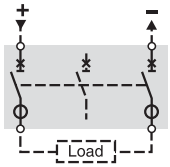
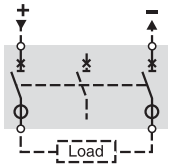
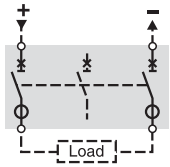
Selection of circuit breaker and pole connection

Compact NSX DC

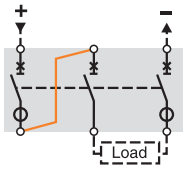
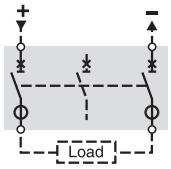
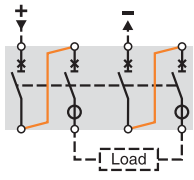
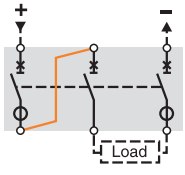
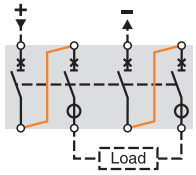
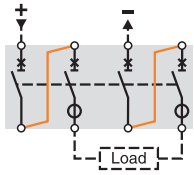
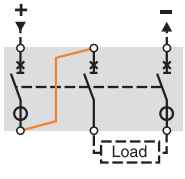
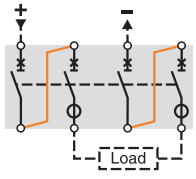
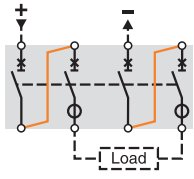
24 V ≤ Un ≤ 250 V	 *Single-pole.*	 *Two-pole (1).*	 *Two-pole (1).*	 *Two-pole (1).*
250 V < Un ≤ 500 V	 *Two-pole (1).*	 *Three-pole.*	 *Two-pole (1).*	 *Four-pole.*
500 V < Un ≤ 750 V	 *Three-pole.*	 *Four-pole.*	 *Four-pole.*	

Masterpact NW DC

Type N

24 V ≤ Un ≤ 500 V		 *Version C.*	 *Version C.*	 *Version C.*

Type H

24 V ≤ Un ≤ 500 V		 *Version D.*	 *Version C.*	 *Version E.*
500 V < Un ≤ 750 V		 *Version D.*	 *Version E.*	 *Version E.*
750 V < Un ≤ 900 V		 *Version D.*	 *Version E.*	 *Version E.*

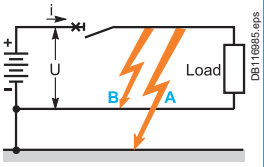
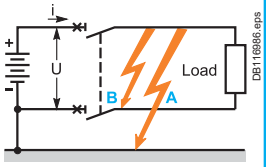
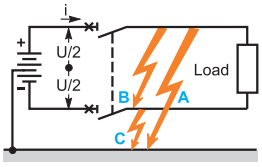
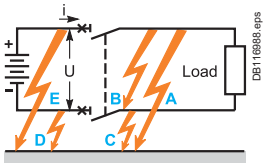
(1) A 3P circuit breaker can be used if a 2P version does not exist. In this case, the central pole is not connected.

Selection guide for DC circuit breakers

Solutions depending on the distribution system and the voltage

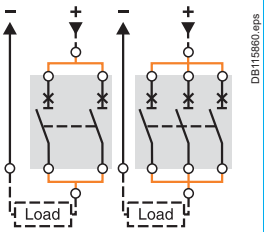
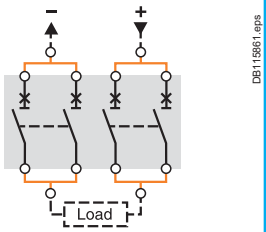
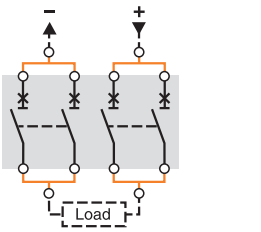
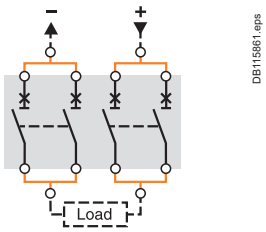
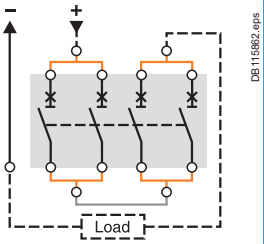
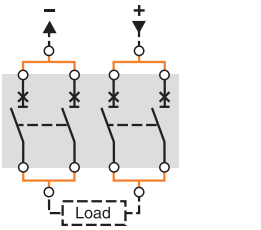
Parallel connection of poles

Type of distribution system

Type	Earthed			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)	 DB116885.eps	 DB116886.eps	 DB116887.eps	 DB116988.eps

Selection of circuit breaker and pole connection

Compact NSX DC

Un ≤ 250 V	 DB115860.eps *Two, three-pole, 2, 3P in parallel, four-pole, 4P in parallel.*	 DB115861.eps *Four-pole, 2 x 2P in parallel.*	 DB115861.eps *Four-pole, 2 x 2P in parallel.*	 DB115861.eps *Four-pole, 2 x 2P in parallel.*
250 V < Un ≤ 500 V	 DB115862.eps *Four-pole, 2 x 2P in parallel, connected in series.*		 DB115861.eps *Four-pole, 2 x 2P in parallel.*	

Breaking capacity of parallel solutions

		Un ≤ 250 V			250 V < Un ≤ 500 V		
		N	H	DC	N	H	DC
Two-pole	2 poles in parallel	85	100	-	-	-	-
Three-pole	3 poles in parallel	-	-	100	-	-	-
Four-pole	4 poles in parallel	-	-	100	-	-	-
	2 x 2 poles in parallel, connected in series	-	-	100	-	-	100

Comparison of series and parallel connection in terms of performance

Series connection of poles divides the voltage per pole and optimises breaking capacity for high-voltage systems.

Series connection of poles on a DC circuit breaker is the means to:
- divide the system voltage by the number of poles
- use the rated current for each pole
- use the breaking capacity of the circuit breaker for all the poles.

For example, a Compact NSX630, 3P DC type, with the three poles connected in series, provides:
- a maximum voltage of 750 V (250 V per pole)
- a rated current of 630 A
- a breaking capacity of 100 kA / 750 V.

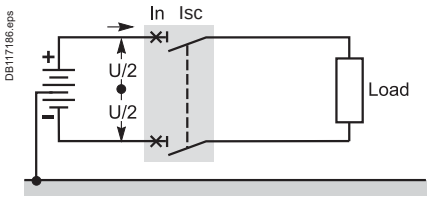
Consequently, a 630 A / 250 V device can be used in a 750 V system.

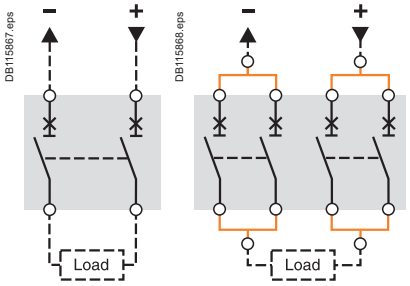
Parallel connection of poles divides the current per pole and optimises the rated current for systems that do not exceed the withstand voltage of each pole. The maximum useable rating and the value of the magnetic setting are indicated (see page B-7).

Parallel connection of poles, on the contrary, imposes the system voltage on each pole, but is the means to:
- divide the current flowing through each pole by the number of poles
- increase the rated current.

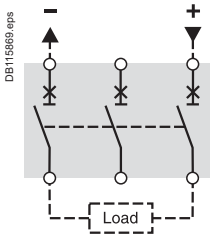
For example, the same Compact NSX630 DC 3P circuit breaker with three poles in parallel provides:
- a maximum voltage of 250 V (250 V per pole)
- a rated current of 1500 A (see table page B-7)
- a breaking capacity of 100 kA / 250 V.

Consequently, a 630 A device used in a 250 V system can handle 1500 A.

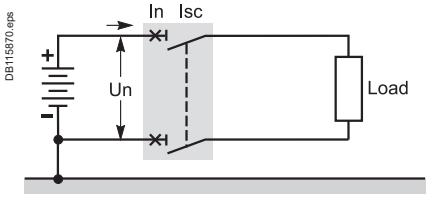


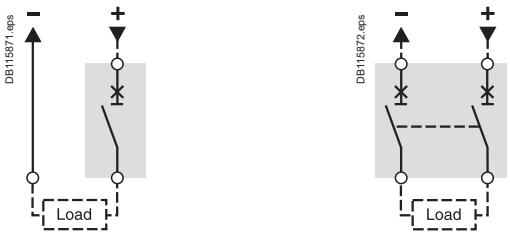


Selection 1. *Selection 2: Compact NSX160 DC 4P 2 x 2P parallel mounted in series.*

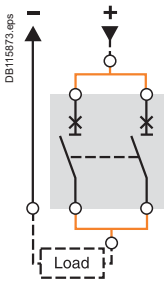


Selection 3: Compact NSX250 DC 3P with 2P connected.





Selection 1: Compact NSX160N DC 1P. *Selection 2.*



Selection 3: Compact NSX100N 2P DC in parallel.

Selection of a Compact NSX DC

Example 1

- type of system - mid-point connected to earth
- system voltage - Un = 500 V DC with time constant L/R = 5 ms
- rated current required at point of installation In = 250 A
- short-circuit current at the point of installation Isc = 60 kA

Selection constraints - (see page A-30)
The system with the mid-point connected to earth requires (see conclusion page A-30):
- identical protection-pole layout for each polarity
- an equal number of poles for each polarity, i.e. a total of two or four
- all poles of the two polarities must have breaking capacity ⩾ Isc max. at Un, i.e. 60 kA/500 V in this case
- all poles of the each polarity must have breaking capacity ⩾ Isc max. at Un/2, i.e. 60 kA/250 V in this case.

Selection possibilities - (see page A-31) and (see page A-32)
The tables indicate for 250 V < Un ⩽ 500 V and for this system:
- poles connected in series: two-pole 2P in series ➡ **selection 1**
- poles connected in parallel: four-pole 2 x 2P parallel connected in series ➡ **selection 2**.

Circuit-breaker selection - (see page A-4) and (see page B-7)
- **selection 1**: the 250 A rated current does not exist in 2P. It is possible to use a 250 A 3P DC type circuit breaker with the central pole not connected ➡ **selection 3**
- **selection 2**: the 160 A rated current (DC version) is suitable with a 2 x 2P assembly connected in parallel because (see table page B-7):
  - ◻ the rated current of the 2 x 2P assembly connected in parallel is In = 288 A > 250 A
  - ◻ and for L/R = 5 ms:
  - breaking capacity of all poles = 100 kA/750 V > 60 kA/500 V
  - breaking capacity of poles of each polarity = 100 kA/250 V > 60 kA/250 V.

The options are:
- **selection 1**: Compact S250DC, 3P, 2 poles connected
- **selection 3**: Compact NSX160 DC, 4P, 2 x 2P parallel connected in series.

Both solutions exist in fixed and withdrawable configurations.

Trip-unit selection
- Compact NSX250 DC 3P: the selection table (see page A-6) indicates 3 TM250DC trip units, which are interchangeable
- Compact NSX160 DC, 4P (2 x 2P) 160 A: the selection table (see page B-7) indicates, for the 2 x 2P parallel configuration mounted in series and for 250 A, a TM125DC trip unit with the magnetic-protection threshold set to 2500 A.

Example 2

- type of system - one polarity earthed
- system voltage - Un = 250 V DC with time constant L/R = 5 ms
- rated current required at point of installation In = 160 A
- short-circuit current at the point of installation Isc = 45 kA.

Selection constraints - (see page A-30)
The system with one polarity connected to earth requires (see conclusion page A-30):
- protection poles on the protected polarity
- all poles contribute to breaking for the polarity:
  - ◻ 1, 2 or 3P without disconnection of the two polarities
  - ◻ 2, 3 or 4P with disconnection of the two polarities
- all poles of the protected polarity must have breaking capacity ⩾ Isc max. at Un, i.e. 45 kA/250 V in this case.

Selection possibilities - (see page A-31) and (see page A-32)
The tables indicate for 250 V < Un ⩽ 250 V and for this system:
- poles connected in series: single-pole ➡ **selection 1** (or two-pole with disconnection ➡ **selection 2**)
- poles connected in parallel: two-pole ➡ **selection 3**
- other selections (parallel connection) are possible, but are of no particular interest.

Circuit-breaker selection - (see page A-4) and (see page B-7)
- **selection 1**: Compact NSX160N DC, 1P, 50 kA, available in fixed version (or **selection 2**: Compact NSX160N DC, 2P, 85 kA, if disconnection of the two polarities is desired)
- **selection 3**: Compact NSX100N DC, 2P in parallel, 50 kA, providing a rated current of 200 A (see table page B-7), available in fixed version.

Trip-unit selection
- Compact NSX160N DC, 1P: the selection table (see page A-6) indicates a built-in TM160DC trip unit with the magnetic-protection threshold set to 1250 A
- Compact NSX100N DC, 2P in parallel: the selection table (see page B-7) indicates, for the 2P parallel configuration and for 160 A, a TM80D trip unit with the magnetic-protection threshold set to 1600 A.

General characteristics of Masterpact DC
Operating conditions

Masterpact circuit breakers have been tested for operation in industrial atmospheres. It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust.

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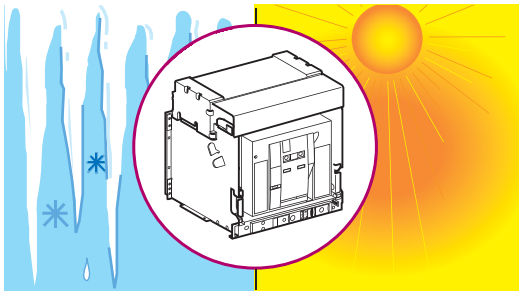

Ambient temperature

Masterpact DC devices can operate under the following temperature conditions:
- the electrical and mechanical characteristics are stipulated for an ambient temperature of -5 °C to +70 °C
- circuit-breaker closing is guaranteed down to -35 °C by manual operation (push button).

Storage conditions are as follows:
- -40 to +85 °C for a Masterpact device without its control unit
- -25 °C to +85 °C for the control unit.

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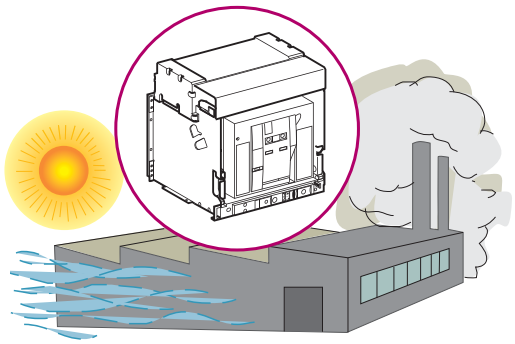

Extreme atmospheric conditions

Masterpact DC devices have successfully passed the tests defined by the following standards for extreme atmospheric conditions:
- IEC 60068-2-1: dry cold at -55 °C
- IEC 60068-2-2: dry heat at +85 °C
- IEC 60068-2-30: damp heat (temperature +55 °C, relative humidity 95 %)
- IEC 60068-2-52 level 2: salt mist.

Masterpact DC devices can operate in the industrial environments defined by standard IEC 60947 (pollution degree up to 4).
It is nonetheless advised to check that the devices are installed in suitably cooled switchboards without excessive dust.

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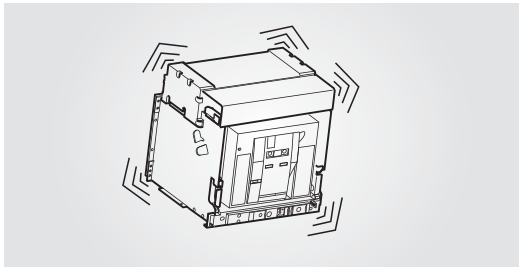
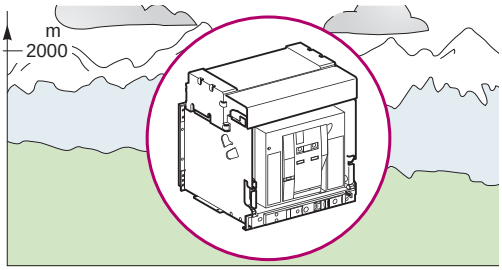


Vibrations

Masterpact DC devices have successfully passed testing in compliance with IEC 60068-2-6 for the following vibration levels:
- 2 to 13.2 Hz: amplitude ± 1 mm
- 13.2 to 100 Hz: constant acceleration 0.7 g.

Vibration testing to these levels is required by merchant marine inspection organisations (Veritas, Lloyd's, etc). Some applications have vibration profiles outside of this standard and require special attention during application design, installation, and use. Excessive vibration may cause unexpected tripping, damage to connections or to other mechanical parts. Please refer to the Masterpact DC maintenance guide (causes of accelerated ageing / operating conditions / vibrations) for additional information.
Examples of applications with high vibration profiles could include:
- wind turbines
- power frequency converters that are installed in the same switchboard or close proximity to the Masterpact DC circuit breaker
- emergency generators
- high vibration marine applications such as thrusters, anchor positioning systems, etc.

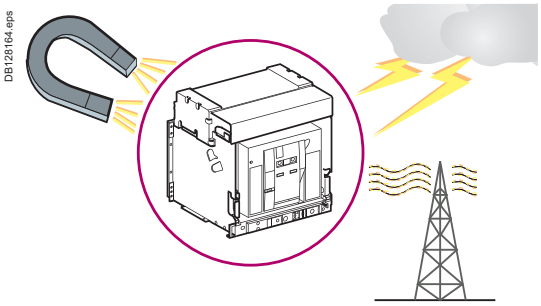


Altitude

At altitudes higher than 2000 metres, the modifications in the ambient air (electrical resistance, cooling capacity) lower the following characteristics as follows:

Altitude (m)		2000	3000	4000	5000
Impulse withstand voltage Uimp (kV)		12	11	10	8
Rated insulation voltage (Ui)		1000	900	780	700
Maximum rated operationnal voltage 50/60 Hz Ue (V)	NT, NW except H10	690	690	630	560
	NW H10	1000	890	795	700
Rated current 40 °C		1 x In	0.99 x In	0.96 x In	0.94 x In

Intermediate values may be obtained by interpolation.



Electromagnetic disturbances

Masterpact DC devices are protected against:

- overvoltages caused by devices that generate electromagnetic disturbances
- overvoltages caused by 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.

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

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

The above tests guarantee that:

- no nuisance tripping occurs
- tripping times are respected.

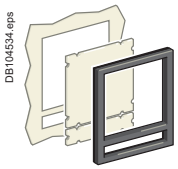
Degree of protection

Masterpact NW DC circuit breakers offer the following protection characteristics depending on the installation conditions:

- IP: degree of protection (standard IEC 60529)
- IK: protection against external mechanical impacts (standard EN 50102).

Masterpact NW DC

Circuit breaker installed in a switchboard



Bare circuit breaker	IP30	
Escutcheon (CDP) for fixed and drawout versions, with blanking plate	IP40	IK07

Transparent cover (CCP) for escutcheon for fixed and drawout versions	IP54	IK10

General characteristics of Masterpact DC

Masterpact NW10 to NW40 DC

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NW10DC 3P.

PB105024_42.eps

NW10DC 4P.

Masterpact DC circuit breaker					
Poles coupling version					C or D (3 poles)
					E (4 poles)
Electrical characteristics as per IEC 60947-1/ 60947-2 and EN 60947-1 / 60947-2					
Rated current at 40 °C / 50 °C (1)		**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	**Icu**	(kA)	V DC	500
					750
					900
	L/R = 15 ms	**Icu**			500
					750
					900
	L/R = 30 ms	**Icu**			500
					750
					900
Service breaking capacity		**Ics**	% Icu		
Rated making capacity		**Icm**	% Icu		
Short-time withstand current		**Icw**	1 s		
Utilisation category					
Breaking time			(ms)		
Making 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
Protection					Overloads
					Short-circuits
Durability					
(O/C cycles)	Mechanical	With maintenance			
		Without maintenance			
	Electrical	Without maintenance			500 V DC
					900 V DC
Indication and control auxiliaries					
Auxiliary contacts					
Voltage release		MX shunt release			
		MN undervoltage release			
Characteristics of switch-disconnectors as per IEC 60947-3 and EN 60947-3					
Type of switch-disconnector					
Rated making capacity		**Icm**	(kA)		
Rated short-time withstand current		**Icw**	(kA)		1 s
Installation and connections					
Connection	Drawout	3P	RC		Horizontal
		4P			Vertical
	Fixed	3P	RC		Horizontal
		4P			Vertical
Dimensions and weight					
Dimensions H x W x D (mm) connected in series	Drawout	3P			
		4P			
	Fixed	3P			
		4P			
Weight (kg) connected in series (approximate values)	Drawout	3P			
		4P			
	Fixed	3P			
		4P			

(1) 50 °C - see the derating table for the NW40 DC.

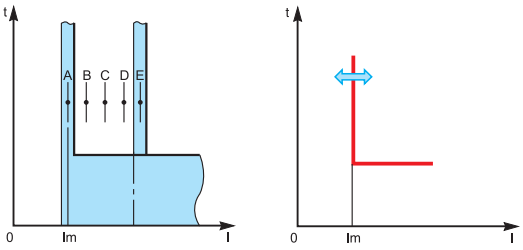
	NW10 DC		NW20 DC		NW40 DC	
	■		■		■	
	■		■		■	
	1000		2000		4000	
	1000		1000		1000	
	12		12		12	
	500/900		500/900		500/900	
	N	**H**	**N**	**H**	**N**	**H**
	85	100	85	100	85	100
	-	85	-	85	-	85
	-	85	-	85	-	85
	35	85	35	85	35	85
	-	50	-	50	-	50
	-	35	-	35	-	35
	25	50	25	50	25	50
	-	50	-	50	-	50
	-	25	-	25	-	25
	100 %					
	100 %					
	50	85	50	85	50	85
	B					
	30 to 75					
	< 70					
	■	■	■	■	■	■
	4					
	■	■	■	■	■	■
	-	-	-	-	-	-
	■	■	■	■	■	■
	20000					
	10000					
	8500		5000		2000	
	-	2000	-	2000	-	1000
	■	■	■	■	■	■
	■	■	■	■	■	■
	■	■	■	■	■	■
		HA		**HA**		**HA**
	-	85	-	85	-	85
	-	85	-	85	-	85
	■	■	■	■	-	-
	■	■	■	■	■	■
	■	■	■	■	-	-
	■	■	■	■	■	■
	439 x 441 x 494				439 x 441 x 594	
	439 x 556 x 494				439 x 556 x 594	
	352 x 422 x 427				352 x 422 x 527	
	352 x 537 x 427				352 x 537 x 527	
	90 to 116					
	125 to 146					
	60 to 86					
	85 to 106					

Trip-unit characteristics
Trip units for Masterpact NW DC

All Masterpact NW DC devices
are equipped with a Micrologic 1.0 DC control unit.

PB101139-32R.eps

DB402618.eps



Magnetic pick-up value.

Protection using the Micrologic 1.0 DC control unit

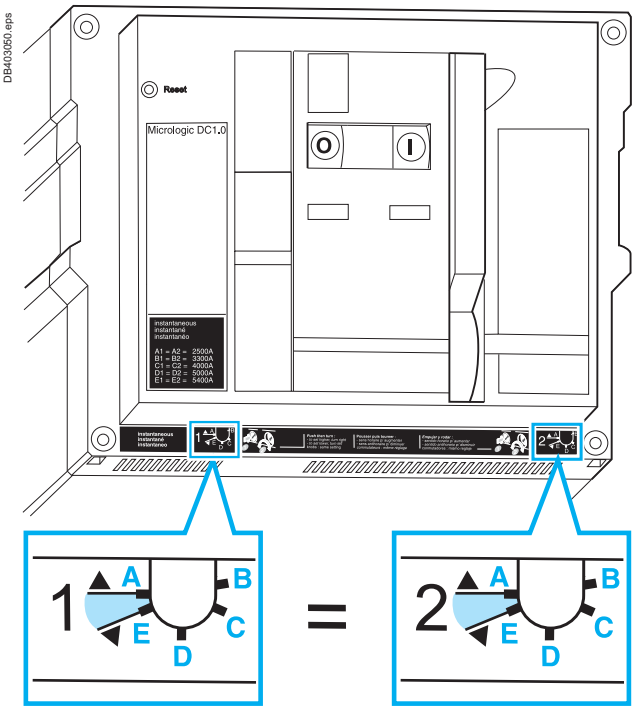
Masterpact NW DC circuit breakers use Micrologic 1.0 DC control units. These interchangeable units with instantaneous thresholds, operating with electromagnetic sensors, can be adjusted on site.
The circuit breakers can be used with the three versions of sensors, defined by their setting range.

Type of sensor	1250/2500 A	2500/5400 A	5000/11000 A
Masterpact NW10 DC	■	■	■
Masterpact NW20 DC	-	■	■
Masterpact NW40 DC	-	-	■

Adjustments

Settings for Masterpact NW DC circuit breakers may be accessed from the front, with the switchboard door open.
- ■ Settings are made for the input (+ pole) and the output (- pole).
- ■ The setting range comprises eleven positions, plus five preferential settings marked **A**, **B**, **C**, **D** and **E**.
- ■ The setting values for the two corresponding sensors must be identical.

DB403050.eps



Two identical settings.

DB104542.eps

instantaneous
instantané
instantaneo :

$A_1 = A_2 =$ 2500A
$B_1 = B_2 =$ 3300A
$C_1 = C_2 =$ 4000A
$D_1 = D_2 =$ 5000A
$E_1 = E_2 =$ 5400A

Setting values for magnetic pick-up Im

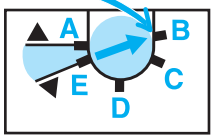
Settings marked A, B, C, D and E

	Minimum				Maximum
Sensor versions	Settings A1 and A2	Settings B1 and B2	Settings C1 and C2	Settings D1 and D2	Settings E1 and E2
1250/2500	1250 A	1500 A	1600 A	2000 A	2500 A
2500/5400	2500 A	3300 A	4000 A	5000 A	5400 A
5000/11000	5000 A	8000 A	10000 A	11000 A	11000 A
Tolerances	±8 %	±10 %	±10 %	±10 %	±10 %

DB403114.eps

instantaneous
instantané
instantaneo :

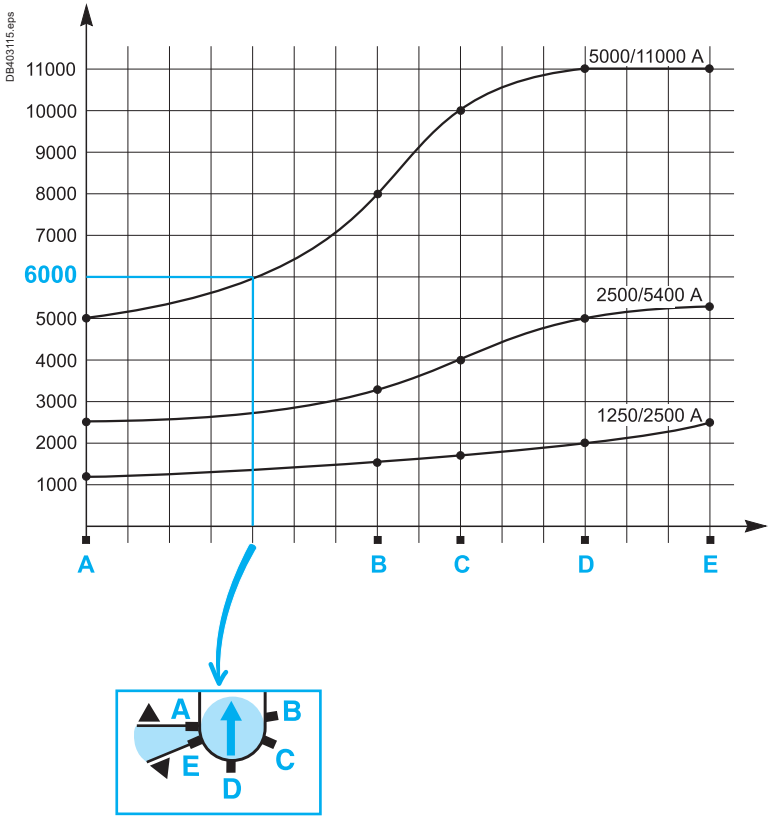
$A_1 = A_2 =$ 5000A
$B_1 = B_2 =$ 8000A
$C_1 = C_2 =$ 10000A
$D_1 = D_2 =$ 11000A
$E_1 = E_2 =$



Intermediate settings

It is possible to set eleven other (unmarked) intermediate values.

DB403115.eps



Communication
COM option in Masterpact NW DC

The COM option is required for integration of the circuit breraker or switch disconnector in a supervision system.
Masterpact uses the Modbus communications protocol for full compatibility with the ION enterprise. An external gateway is available for communication on other networks:
- Profibus
- Ethernet.

PB106674-20.eps

Modbus BCM ULP "device" communication module.

PB100802B-27.eps

Modbus CCM "chassis" communication module.

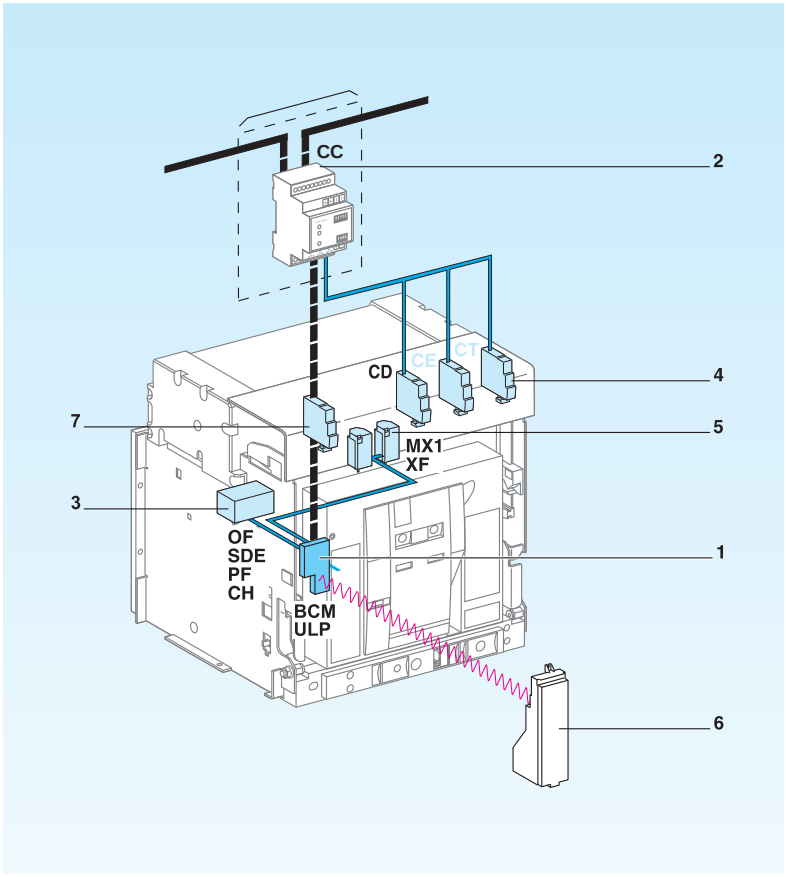
For fixed devices, the COM option is made up of:
■ a Modbus BCM ULP "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE ,PF and CH micro switches) its kit for connection to XF and MX1 communicating voltage releases and its COM terminal block (inputs E1 to E6).
For drawout devices, the COM option is made up of:
■ a Modbus BCM ULP "device" communication module, installed behind the Micrologic control unit and supplied with its set of sensors (OF, SDE, PF and CH micro switches) its kit for connection to XF and MX1 communicating voltage releases and its COM terminal block (inputs E1 to E6).
■ a "chassis" communication module supplied separately with its set of sensors (CE, CD and CT contacts) Modbus CCM.
Status indication by the COM option is independent of the device indication contacts. These contacts remain available for conventional uses.

Modbus BCM ULP "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.

Modbus CCM "chassis" communication module
This module is independent of the control unit. With Modbus "chassis" communication module, this 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.

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

DB402049.eps



1 Modbus BCM ULP "Device" communication module.
2 Modbus CCM "Chassis" communication module (option).
3 OF, SDE, PF and CH micro switches.
4 CE, CD and CT contacts.
5 XF and MX1 communicating voltage releases.
6 Micrologic control unit.
7 COM terminal block (E1 to E6).

: Hard wire.
: Modbus.

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

Communication functions

	Switch-disconnector and circuit breaker with communication Modbus
Device identification	
Address	■
Rating	-
Type of device	-
Type of control unit	-
Status indications	
ON/OFF (OF)	■
Spring charged (CH)	■
Ready to close (PF)	(1)
Fault-trip (SDE)	■
Connected/disconnected/test position (CE/CD/CT)	■
Controls	
ON/OFF (MX/XF)	■
Spring charging	-
Reset of the mechanical indicator	-

Communication Modbus

The Modbus RS 485 (RTU protocol) system is an open bus on which communicating Modbus devices (Compact NSX DC 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 communication parameters (address, baud rate, parity) are entered using the RSU (Remote Setting Utility) Micrologic utility.

Modbus addresses		
@xx	Circuit breaker manager	(1 to 47)
@xx + 50	Chassis manager	(51 to 97)

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

Number of devices
The maximum number of devices that may be connected to the Modbus bus depends on the type of device (Compact with Modbus COM, PM700, PM800, Sepam, Vigilohm, Compact NSX DC, 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.

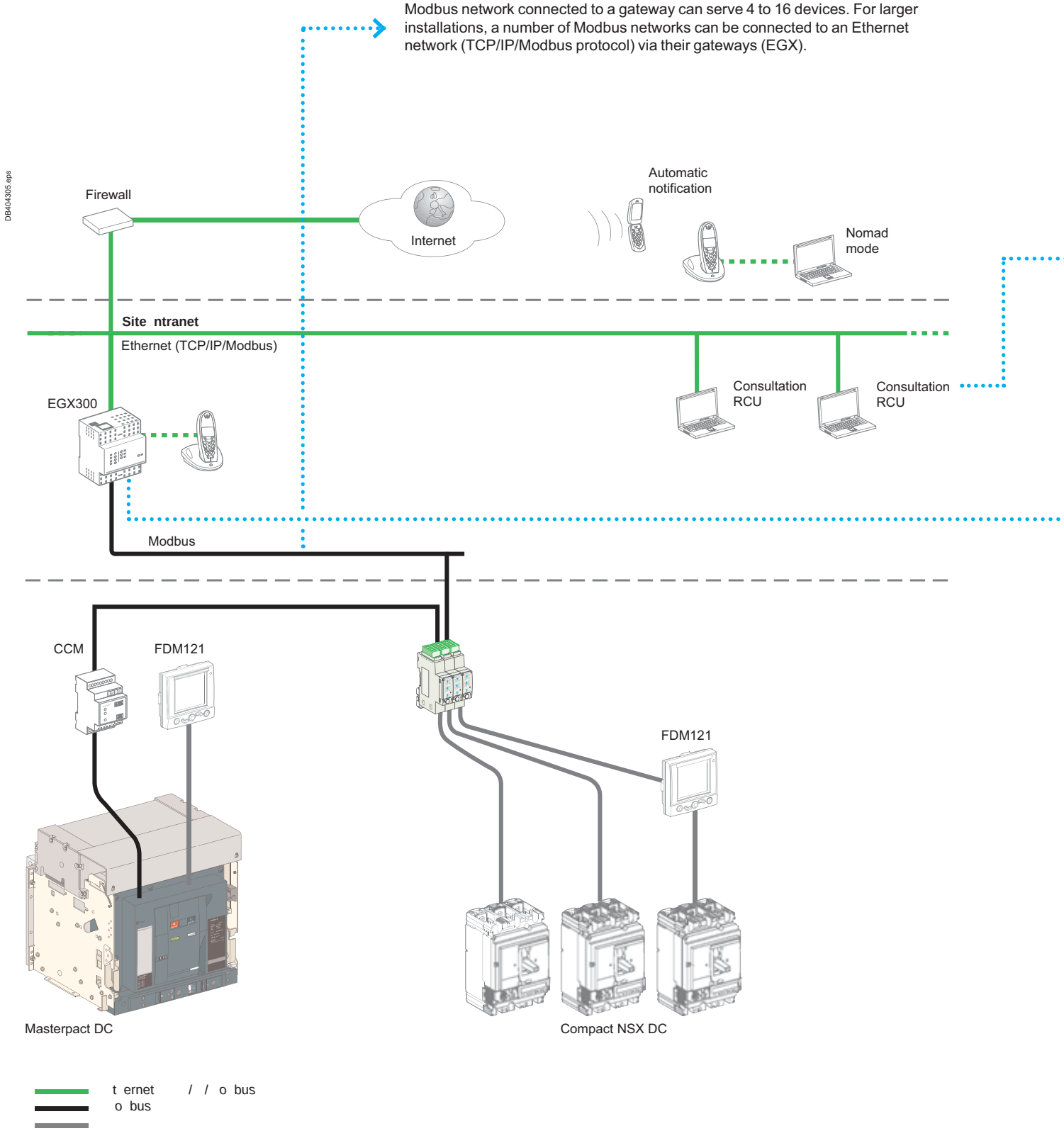
Bus power source
A 24 V DC power supply is required (less than 20 % ripple, insulation class II).

Masterpact communication
Networks and sofware

Masterpact uses the Modbus communication protocol, compatible with ION-E electrical engineering expert system software.
Two downloadable sofware (RSU, RCU) from schneider-electric.com facilitate implementation of communication functions.

Modbus

Modbus is the most widely used communication protocol in industrial networks. It operates in master-slave mode. The devices (slaves) communicate one after the other with a gateway (master).
Masterpact DC, Compact NSX DC, PowerLogic and Sepam products all operate with this protocol. A Modbus network is generally implemented on an LV or MV switchboard scale. Depending on the data monitored and the desired refresh rate, a Modbus network connected to a gateway can serve 4 to 16 devices. For larger installations, a number of Modbus networks can be connected to an Ethernet network (TCP/IP/Modbus protocol) via their gateways (EGX).



RCU (Remote Control Utility)

PB104929.eps

RCU

Gateway

The gateway has two functions:

- access to the company intranet (Ethernet) by converting Modbus frames to the TCP/IP/Modbus protocol
- optional web-page server for the information from the devices.

Examples include EGX100 and EGX300.

PE86181r-251.eps

EGX 300.

Masterpact DC communication
RCU utilities

RCU, are available to assist in starting up a communicating installation.
They can be downloaded from the Schneider Electric internet site and include a “Live update” function that enables immediate updating.Schneider Electric electrical installation supervision, management and expert system software integrates Masterpact DC, Compact DC and Compact NSX DC identification modules.

RCU (Remote Control Utility)

The RCU utility can be used to test communication for all the devices connected to the Modbus network. It is designed for use with Masterpact, Compact NSX DC, Advantys OTB and Power Meter devices. It offers a number of functions.

Mini supervisor

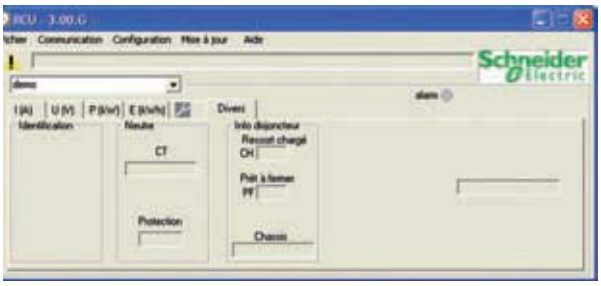
■ Display of ON/OFF status.

Open and close commands for each device

A common or individual password must first be entered.

When all functions have been tested, this utility is replaced by the supervision software selected for the installation.

PB104929_R.eps



RCU: Remote Control Utility for communication tests.

PE86181-25.eps

EGX300.

PB104859.eps

iRIO RTU.

PB104807_68.eps

ION-E.

Types of software

Masterpact and Compact NSX DC communication functions are designed to interface with software dedicated to electrical installations:

- switchboard supervision
- electrical installation supervision
- process control
- SCADA (Supervisory Control & Data Acquisition), EMS (Enterprise Management System) or BMS (Building Management System) type software.

Schneider Electric solutions

Electrical switchboard supervision via EGX300 Web servers

A simple solution for customers who want to consult the main electrical parameters of switchboard devices without dedicated software.

Up to 16 switchboard devices are connected via Modbus interfaces to an EGX300 Ethernet gateway integrating the functions of a web page server. The embedded Web pages can be easily configured with just a few mouse clicks. The information they provide is updated in real time.

The Web pages can be consulted using a standard Web browser on a PC connected via Ethernet to the company Intranet or remotely via a modem. Automatic notification of alarms and threshold overruns is possible via e-mail or SMS (Short Message Service).

Electrical installation supervision via iRIO RTU

The iRIO RTU (remote terminal unit) can be used as Ethernet coupler for the PowerLogic System devices and for any other communicating devices operating under Modbus RS485 protocol. Data is viewable via a standard web browser.

ION-E electrical engineering expert system software

ION-E is a family of web-enabled software products for high-end power-monitoring applications. It is designed for large power systems.

Other software

Masterpact, Compact NSX DC devices can forward their operating information to special software integrating the electrical installation and other technical facilities:

- SCADA process control software: Vijeo CITECT
- BMS Building Management System software: Vista.

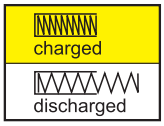
Panorama of electrical and mechanical accessories
Masterpact NW10 to NW40 DC

All Masterpact NW DC devices exist in circuit-breaker (equipped with Micrologic DC 1.0 control unit) and switch-disconnector versions. All auxiliaries are common from 1000 to 4000 A.

PB104736.eps

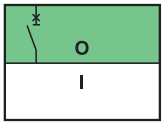
1 *OFF pushbutton.*
2 *ON pushbutton.*
3 *Closing mechanism charging handle.*
4 *Operation counter.*
5 *Operating mechanism charged and "ready to close" indication:*
- *spring charged*
- *spring discharged.*

DB104522.eps



6 *Main contact position indication:*
- *ON*
- *OFF.*

DB104523.eps

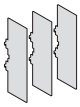


7 *Fault trip indication and reset button.*
8 *Micrologic 1.0 DC control unit.*
9 *Racking interlock.*
10 *Racking-handle storage.*
11 *Shutter position indication and locking.*
12 *"Connected / test / disconnected" position indication.*
13 *Racking-handle port.*
14 *Reset pushbutton.*
15 *Padlock locking.*
16 *Keylock locking.*

PB104432-48R.eps

Vertical rear connection.

DB101149.eps



Circuit breakers and switch-disconnectors
Masterpact NW DC exists in fixed and withdrawable versions:
- circuit breaker equipped with Micrologic 1.0 DC control unit
- switch-disconnector without the control unit.

Common auxiliaries from 1000 to 4000 A
All accessories are:
- accessible from the front in a compartment isolated from the power circuits
- secured by a single screw
- no adjustments
- adaptable on site.

Communication
Circuit-breaker or switch-disconnector integration in a supervision system requires the COM option.
Masterpact uses the Modbus communication protocol compatible with ION-E electrical engineering expert system software.
An external gateway is available for communication with other networks (Profibus, Ethernet, etc.).

Connections
- Rear vertical connection in standard.
- Possibility of conversion to horizontal connection by turning the connectors on the site by the customer (except for the NW40).
- Prefabricated series connections.
- Safety shutters, shutter locking blocks.
- Optional accessories:
  - ☐ interphase barriers
  - ☐ shutter position indication and locking.

Locking

■ pushbutton locking by padlockable transparent cover
■ OFF-position locking by padlock or keylock
■ chassis locking:
□ in disconnected position by keylock
□ in connected, disconnected and test positions
■ door interlock (inhibits door opening with breaker in connected position)
■ racking interlock (inhibits racking with door open)
■ racking interlock between crank and OFF pushbutton
■ automatic spring discharge before breaker removal
■ mismatch protection.

PB104367A32.eps

PB104366A32.eps

Locking in disconnected position by keylock or padlock.

PB100780-32R_SE.eps

Door interlock (inhibits door opening with breaker in connected position).

Indication contacts

■ standard or low-level contacts:
□ ON/OFF indication (OF)
□ "fault-trip" indication (SDE)
□ carriage switches for connected (CE), disconnected (CD) and test (CT) positions.

PB100806-19R.eps

OF contact (microswitch).

PB100807-12R.eps

OF contact (rotary).

PB100820-19R.eps

SDE contact.

PB100816-19R.eps

Combined contact (connected/closed).

Remote operation

■ remote ON/OFF:
□ gear motor
□ XF closing or MX opening voltage releases
□ PF ready-to-close contact
□ options:
- RAR automatic or Res electrical remote reset
- BPFE electrical closing pushbutton
■ remote tripping function:
□ MN voltage release:
- standard
- adjustable or non-adjustable delay
□ or 2nd MX voltage release.

PB104349A55.eps

Remote ON/OFF.

PB100808-22R.eps

Gear motor.

PB100809-11R.eps

Voltage releases (MX and XF).

PB100818-11R.eps

PF ready-to-close contact.

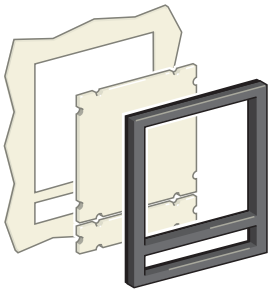
Accessories

■ auxiliary terminal shield
■ operation counter
■ escutcheon
■ transparent cover for escutcheon
■ escutcheon blanking plate.

PB104382-27R.eps

Operation counter.

DB104524.eps



Escutcheon with blanking plate.

PB100776-29R.eps

Transparent cover.

Connection
Overview of solutions

Two types of connection are available: vertical connection is standard however the connectors can be rotated for on-site conversion to horizontal connection (except for NW40).

Rear connection fixed device

Masterpact DC

Vertical rear connection

PB105026.eps

Horizontal rear connection

PB105025.eps

Rear connection withdrawable device

Masterpact DC

Horizontal rear connection

DB402291_59.eps

DB402303_59.eps

Masterpact DC

Vertical rear connection

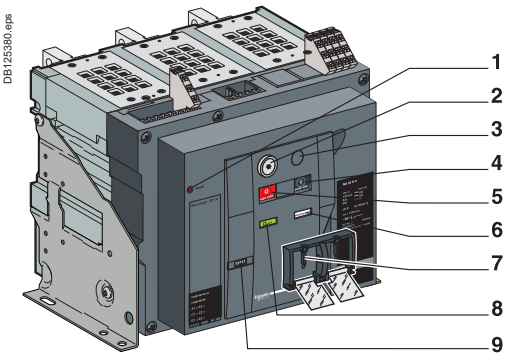
PB104920_59.eps

DB402323_59.eps

Electrical and mechanical accessories

Masterpact NW10 to NW40 DC

Locking on the device



1 *Fault trip indication and reset button.*
2 *OFF position locking.*
3 *Electrical closing pushbutton.*
4 *ON pushbutton.*
5 *OFF pushbuton.*
6 *Operating mechanism charged and "ready to close" indication.*
7 *Pushbutton locking.*
8 *Main contact position indication.*
9 *Operation counter.*

Access to pushbuttons protected by transparent cover.

Pushbutton locking VBP

The transparent cover blocks access to the pushbuttons used to open and close the device.
It is possible to independently lock the opening button and the closing button. The locking device is often combined with a remote operating mechanism.
The pushbuttons may be locked using either:
- three padlocks (not supplied)
- lead seal
- two screws.

Pushbutton locking using a padlock.

Device locking in the OFF position
VCPO - by padlocks - VSPO - by keylocks

The circuit breaker is locked in the OFF position by physically maintaining the opening pushbutton pressed down:
- using padlocks (one to three padlocks, not supplied)
- using keylocks (one or two different keylocks, 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
- two different key locks for double locking.

Profalux and Ronis keylocks are compatible with each other.
A locking kit (without locks) is available for installation of one or two keylocks (Ronis, Profalux, Kirk or Castell).

Accessory-compatibility
3 padlocks and/or 2 keylocks.

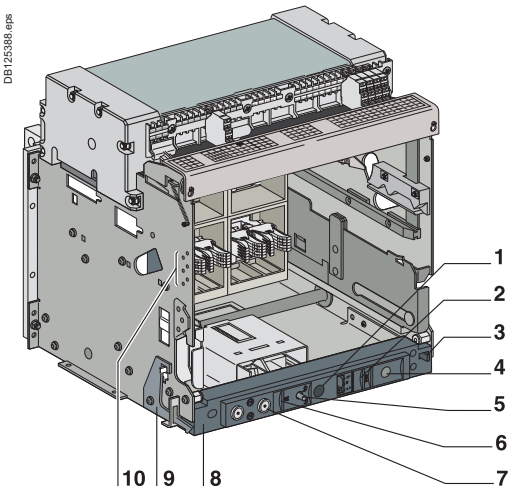
OFF position locking using a padlock.

Cable-type door interlock IPA

This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.
For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.
With this interlock installed, the source changeover function cannot be implemented.

OFF position locking using a keylock.

Locking on the chassis



1 *Racking-handle port.*
2 *"Connected/test/ disconnected" position indication.*
3 *Racking interlock.*
4 *Racking-handle storage.*
5 *Reset pushbutton.*
6 *Padlock locking.*
7 *Keylock locking.*
8 *Chassis front plate (accessible with cubicle door closed).*
9 *"Disconnected" position door interlock.*
10 *Mismatch protection.*

"Disconnected" position locking
By padlocks (standard) or keylocks (VSPD option)

Mounted on the chassis and accessible with the door closed, these devices lock the circuit breaker in the "disconnected" position in two manners:
- using padlocks (standard), up to three padlocks (not supplied)
- using keylocks (optional), one or two different keylocks are available.

Profalux and Ronis keylocks are available in different options:
- one keylock
- two different keylocks for double locking
- one (or two) keylocks mounted on the chassis + one (or two) identical keylocks supplied separately for interlocking with another device.

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

Connected", "disconnected" and "test" position locking

The "connected", "disconnected" and "test" positions are shown by an indicator and are mechanically indexed. The exact position is obtained when the racking handle blocks. A release button is used to free it.
As standard, the circuit breaker can be locked only in "disconnected" position. On request, the locking system may be modified to lock the circuit breaker in any of the three positions "connected", "disconnected" or "test".

Door interlock catch VPEC

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

Racking interlock.

Racking interlock VPOC

This device prevents insertion of the racking handle when the cubicle door is open.

Cable-type door interlock IPA

This option is identical for fixed and drawout versions.

Racking interlock between crank and OFF pushbutton IBPO for NW DC

This option makes it necessary to press the OFF pushbutton in order to insert the racking handle and holds the device open until the handle is removed.

Mismatch protection.

Automatic spring discharge before breaker removal DAE for NW DC

This option discharges the springs before the breaker is removed from the chassis.

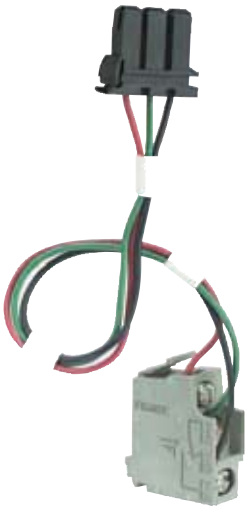
Mismatch protection VDC

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

Electrical and mechanical accessories
Masterpact NW10 to NW40 DC

Indication contacts are available:
- in the standard version for relay applications
- in a low-level version for control of PLCs and electronic circuits.

PB100806-32R.eps

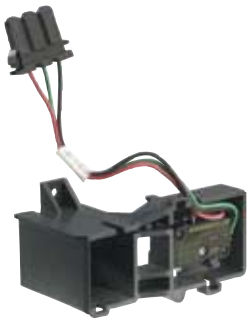


ON/OFF indication contacts OF (microswitch type).

PB100807-20R.eps

ON/OFF indication contacts OF (rotary type).

PB100820-32R.eps



Additional "fault-trip" indication contacts SDE.

PB100816-32R.eps

Combined contacts.

Indication contacts

ON/OFF indication contacts OF

Rotary type changeover contacts directly driven by the mechanism. These contacts trip when the minimum isolation distance between the main circuit-breaker contacts is reached.

OF				
Supplied as standard				4
Maximum number				12
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			minimum load: 100 mA/24 V
		V AC	240/380	10/6 (1)
			480	10/6 (1)
			690	6
		V DC	24/48	10/6 (1)
			125	10/6 (1)
			250	3
	Low-level			minimum load: 2 mA/15 V
		V AC	24/48	6
			240	6
			380	3
		V DC	24/48	6
			125	6
			250	3

(1) Standard contacts: 10 A; optional contacts: 6 A.

"Fault-trip" indication contacts SDE

Circuit-breaker tripping due to a fault is signalled by:
- a red mechanical fault indicator (reset)
- one changeover contact SDE.

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed. One SDE is supplied as standard. An optimal SDE may be added. This latter is incompatible with the electrical reset after fault-trip option (Res).

SDE				
Supplied as standard				1
Maximum number				2
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			minimum load: 2 mA/15 V
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
			250	0.15

Combined "connected/closed" contacts EF

The contact combines the "device connected" and the "device closed" information to produce the "circuit closed" information. Supplied as an option for Masterpact NW DC, it is mounted in place of the connector of an additional OF contact.

EF				
Maximum number				8
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			minimum load: 100 mA/24 V
		V AC	240/380	6
			480	6
			690	6
		V DC	24/48	2.5
			125	0.8
			250	0.3
	Low-level			minimum load: 2 mA/15 V
		V AC	24/48	5
			240	5
			380	5
		V DC	24/48	2.5
			125	0.8
			250	0.3

PB100817-32R.eps

CE, CD and CT "connected/disconnected/test" position carriage switches.

"Connected", "disconnected" and "test" position carriage switches

Three series of optional auxiliary contacts are available for the chassis:

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

Additional actuators

A set of additional actuators may be installed on the chassis to change the functions of the carriage switches.

Contacts				CE	CD	CT
Maximum number	Standard with additional actuators			3 9 6 6 3	3 0 3 0 6	3 0 0 3 0
Breaking capacity (A) p.f.: 0.3 AC12/DC12	Standard			minimum load: 100 mA/24 V		
		V AC	240	8		
			380	8		
			480	8		
			690	6		
		V DC	24/48	2.5		
			125	0.8		
			250	0.3		
	Low-level			minimum load: 2 mA/15 V		
		V AC	24/48	5		
			240	5		
			380	5		
		V DC	24/48	2.5		
			125	0.8		
			250	0.3		

Electrical and mechanical accessories
Masterpact NW10 to NW40 DC

Two solutions are available for remote operation of Masterpact devices:
- a point-to-point solution
- a bus solution with the COM communication option.

PB104349A-68R.eps

Remote operation: remote ON / OFF

The remote ON / OFF function is used to remotely open and close the circuit breaker.
It is made up of:
- an electric motor MCH equipped with a “springs charged” limit switch contact CH
- two voltage releases:
  - a closing release XF
  - an opening release MX.

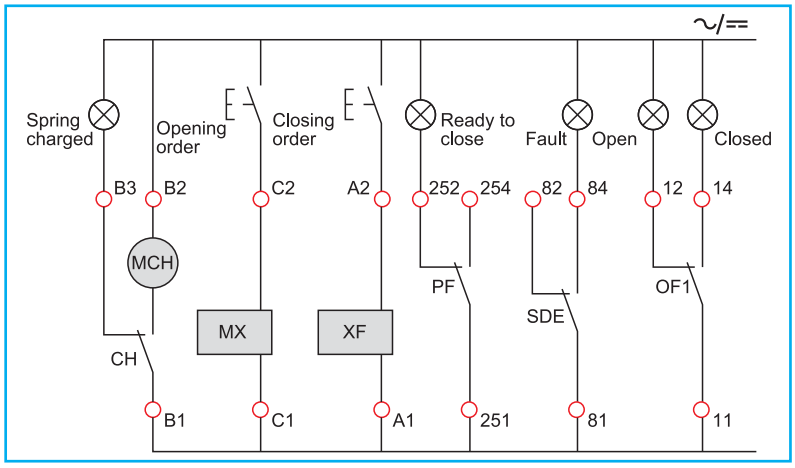
Optionally, other functions may be added:
- a “ready to close” contact PF
- an electrical closing pushbutton BPFE
- remote RES following a fault.

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

Note
An opening order always takes priority over a closing order. If opening and closing orders occur simultaneously, the mechanism discharges without any movement of the main contacts. The circuit breaker remains in the open position (OFF).
In the event of maintained opening and closing orders, the standard mechanism provides an anti-pumping function by blocking the main contacts in open position.
Anti-pumping function. After fault tripping or intentional opening using the manual or electrical controls, the closing order must first be discontinued, then reactivated to close the circuit breaker.
When the automatic reset after fault trip (RAR) option is installed, to avoid pumping following a fault trip, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or blocking the circuit breaker in the open position. (information on type of fault: overload, short time delay, earth-leakage fault, fault vigi or short-circuit, etc.)

Wiring diagram of a point-to-point remote ON / OFF function

DB402619.eps

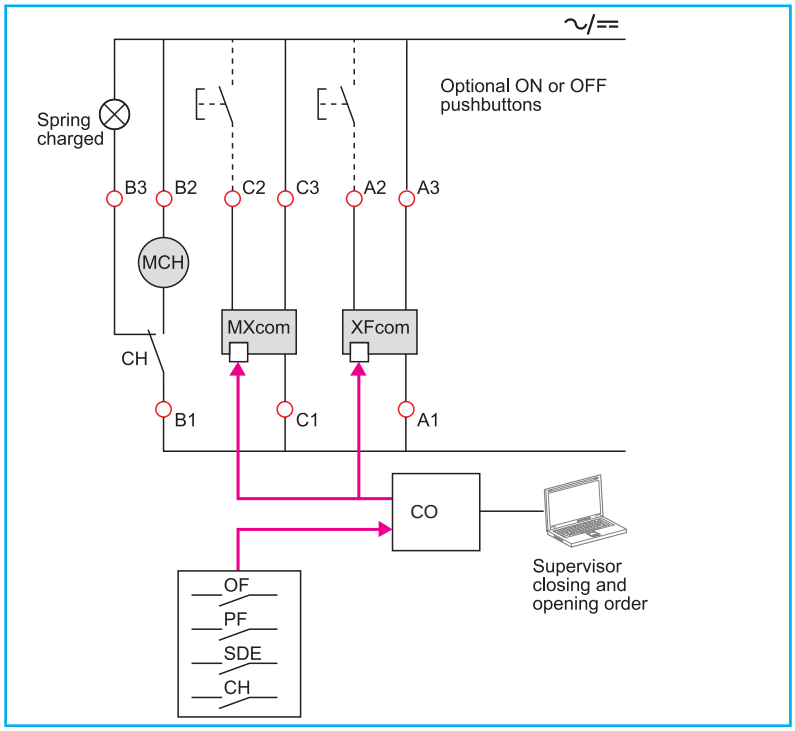


Note
MX communicating releases are of the impulse type only and cannot be used to lock a circuit breaker in OFF position. For locking in OFF position, use the remote tripping function (2nd MX or MN).

When Mx or XF communicating releases are used, the third wire (C3, A3) must be connected even if the communication module is not installed. When the control voltage (C3-C1 or A3-A1) is applied to the MX or XF releases, it is necessary to wait 1.5 seconds before issuing an order. consequently, it is advised to use standrad MX or XF releases for applications such as source-changeover systems.

Wiring diagram of a bus-type remote ON / OFF function

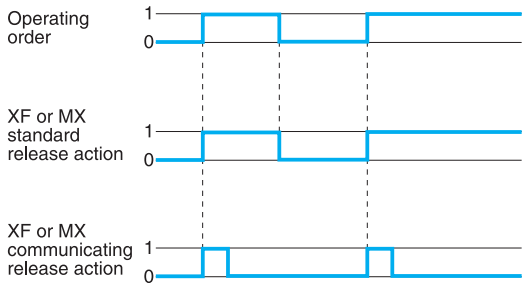
DB402620.eps



PB100808-32R.eps

Electric motor MCH for Masterpact NW DC.

DB402621.eps



PB100809-16R.eps

XF and MX voltage releases.

PB100818-16R.eps

"Ready to close" contacts PF.

Electric motor MCH

The electric motor automatically charges and recharges the spring mechanism when the circuit breaker is closed. Instantaneous reclosing of the breaker is thus possible following opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.
The electric motor (MCH) is equipped as standard with a limit switch contact (CH) that signals the "charged" position of the mechanism (springs charged).

Characteristics		
Power supply	V AC 50/60 Hz	48/60 - 100/130 - 200/240 - 277 - 380/415 - 400/440 - 480
	V DC	24/30 - 48/60 - 100/125 - 200/250
Operating threshold		0.85 to 1.1 Un
Consumption (VA or W)		180
Motor overcurrent		2 to 3 In for 0.1 s
Charging time		maximum 4 seconds
Operating frequency		maximum 3 cycles per minute
CH contact		10 A at 240 V

Voltage releases XF and MX

Their supply can be maintained or automatically disconnected.

Closing release XF

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

Opening release MX

The MX release instantaneously opens the circuit breaker when energised. It locks the circuit breaker in OFF position if the order is maintained (except for MX "communicating" releases).

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

Characteristics		XF	MX
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		0.85 to 1.1 Un	0.7 to 1.1 Un
Consumption (VA or W)		pick-up: 200 (during 200 ms) hold: 4.5	pick-up: 200 (during 200 ms) hold: 4.5
Circuit-breaker response time at Un		70 ms ±10 (NW DC ⩽ 4000 A) 80 ms ±10 (NW DC > 4000 A)	50 ms ±10 (NW DC)

"Ready to close" contact PF

The "ready to close" position of the circuit breaker is indicated by a mechanical indicator and a PF changeover contact. This signal indicates that all the following are valid:

- ■ the circuit breaker is in the OFF position
- ■ the spring mechanism is charged
- ■ a maintained opening order is not present:
- □ MX energised
- □ fault trip
- □ remote tripping second MX or MN
- □ device not completely racked in
- □ device locked in OFF position
- □ device interlocked with a second device.

Characteristics				
Supplied as standard				-
Maximum number				1
Breaking capacity p.f.: 0.3 AC12/DC12	Standard			minimum load: 100 mA/24 V
		V AC	240/380	5
			480	5
			690	3
		V DC	24/48	3
			125	0.3
			250	0.15
	Low-level			minimum load: 2 mA/15 V
		V AC	24/48	3
			240	3
			380	3
		V DC	24/48	3
			125	0.3
			250	0.15

Electrical and mechanical accessories
Masterpact NW10 to NW40 DC

Electrical closing pushbutton BPFE
Located on the front panel, this pushbutton carries out electrical closing of the circuit breaker. It is generally associated with the transparent cover that protects access to the closing pushbutton.
Electrical closing via the BPFE pushbutton takes into account all the safety functions that are part of the control/monitoring system of the installation.
The BPFE connects to the closing release XF in place of the COM module.
The COM module is incompatible with this option.
Different types of voltage exist and the XF electromagnet is compulsary if the BPFE option is selected.

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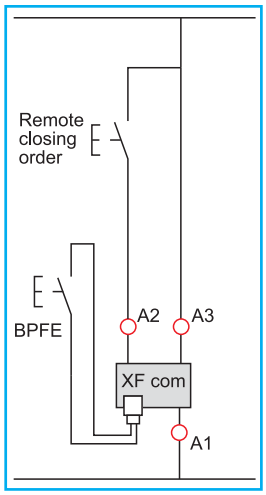
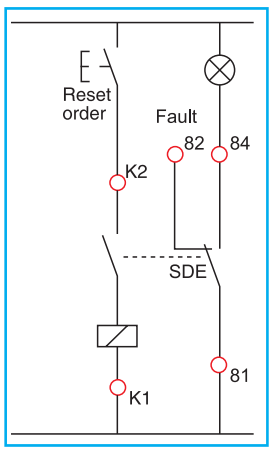


Remote reset after fault trip
Electrical reset after fault trip RES
Following tripping, this function resets the “fault trip” indication contacts SDE and the mechanical indicator and enables circuit breaker closing.
Power supply: 110 / 130 V AC and 200 / 240 V AC.
The use of XF closing release is compulsory with this option.

DB402623.eps



Automatic reset after fault trip RAR
Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit-breaker closing. The mechanical (reset button) and electrical SDE indications remain in fault position until the reset button is pressed.
The use of XF closing release is compulsory with this option.

Remote operation: remote tripping

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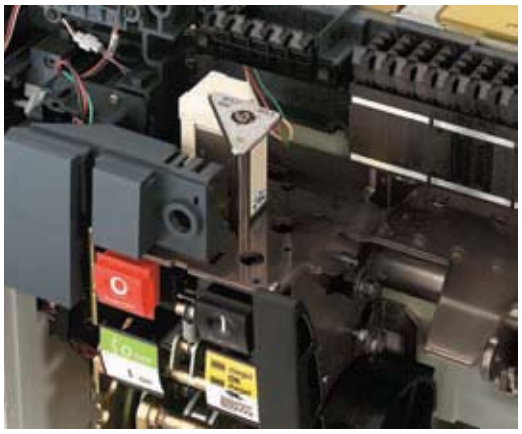
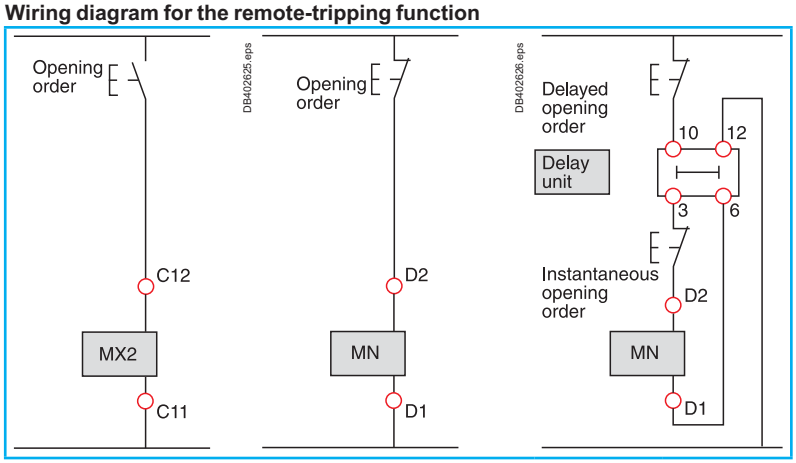


This function opens the circuit breaker via an electrical order. It is made up of:
- a shunt release second MX
- or an undervoltage release MN
- or a delayed undervoltage release MNR: (MN + delay unit).

These releases (2nd MX or MN) cannot be operated by the communication bus. The delay unit, installed outside the circuit breaker, may be disabled by an emergency OFF button to obtain instantaneous opening of the circuit breaker.

Wiring diagram for the remote-tripping function

DB402624.eps



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MX or MN voltage release.

Voltage releases second MX

When energised, the MX voltage release instantaneously opens the circuit breaker. A continuous supply of power to the second 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	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 (during 80 ms)	hold: 4.5
Circuit-breaker response time at Un		50 ms ±10	

Instantaneous voltage releases MN

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

Characteristics			
Power supply	V AC 50/60 Hz	24 - 48 - 100/130 - 200/250 - 380/480	
	V DC	12 - 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 (during 200 ms)	hold: 4.5
MN consumption with delay unit		pick-up: 200 (during 200 ms)	hold: 4.5
Circuit-breaker response time at Un		90 ms ±5	

MN delay units

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

Characteristics			
Power supply	non-adjustable	100/130 - 200/250	
VAC 50-60 Hz/DC	adjustable	48/60 - 100/130 - 200/250 - 380/480	
Operating threshold	opening	0.35 to 0.7 Un	
	closing	0.85 Un	
Consumption of delay unit alone (VA or W)		pick-up: 200 (during 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	

Electrical and mechanical accessories

Masterpact NW10 to NW40 DC

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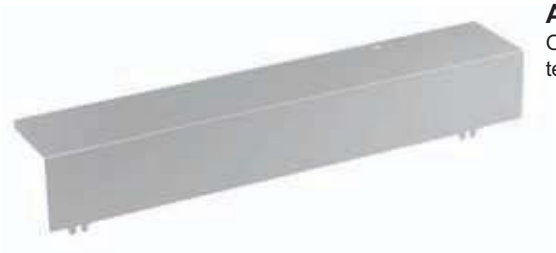

Shields, blanking plates, counters

Auxiliary terminal shield CB

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

PB104382-32R.eps

Operation counter CDM

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

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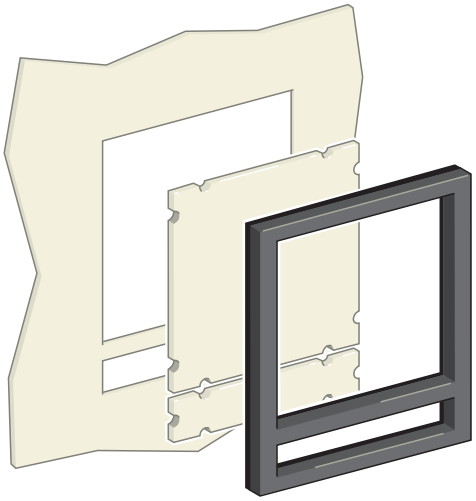


Escutcheon CDP

Optional equipment mounted on the door of the cubicle, the escutcheon increases the degree of protection to IP 40 (circuit breaker installed free standing: IP30) .
It is available in fixed and drawout versions.

Blanking plate OP for escutcheon

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

Transparent cover CCP for escutcheon

Optional equipment mounted on the escutcheon, the cover is hinged and secured by a screw. It increases the degree of protection to IP 54, IK10. It adapts to drawout devices.

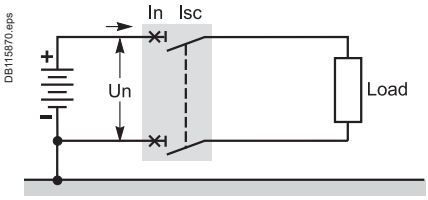
Escutcheon CDP with blanking plate.

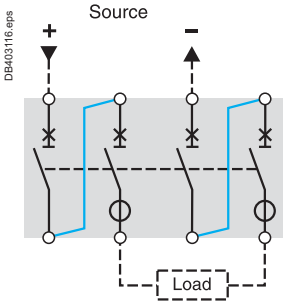
PB100776-42R.eps

Transparent cover CCP for escutcheon.

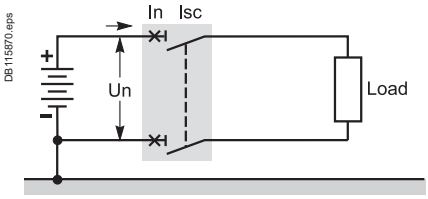
Selection guide for DC circuit breakers

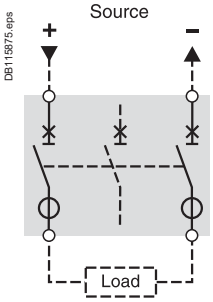
Examples of circuit-breaker selection





Masterpact NW20H DC version E.





Masterpact NW10N DC version C.

Selection of a Masterpact NW DC

Example 1

- type of system - isolated polarities
- system voltage - Un = 750 V DC with time constant L/R = 30 ms
- rated current required at point of installation In = 2000 A
- short-circuit current at the point of installation Isc = 40 kA

Selection constraints - (see page A-30)
The system with isolated polarities requires (see conclusion page A-30):
- identical protection for each polarity
- an equal number of poles for each polarity, i.e. a total of two or four
- all poles of each polarity must have breaking capacity ⩾ Isc max. at Un, i.e. 40 kA/750 V in this case.

Selection possibilities - (see page A-31)
The table for series poles indicates for a voltage 24 V < Un ⩽ 750 V and the type of system, use of a four-pole, version E circuit breaker.

Circuit-breaker selection - (see page A-36)
The Masterpact NW DC characteristics table indicates more specifically with a 2000 A a NW20 DC type H circuit breaker with a breaking capacity of 50 kA/750 V (L/R = 30 ms).
The correct selection is a Masterpact NW20 DC type H version E, 2000 A, 50 kA, available in fixed and drawout versions.

Example 2

- type of system - one polarity earthed
- system voltage - Un = 500 V DC with time constant L/R = 15 ms
- rated current required at point of installation In = 1000 A
- short-circuit current at the point of installation Isc = 30 kA

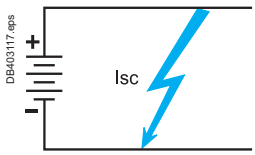
Selection constraints - (see page A-30)
The system with one polarity connected to earth requires (see conclusion page A-30):
- protection poles on the protected polarity
- all poles contribute to breaking for the polarity:
  - 1, 2 or 3P without disconnection of the two polarities
  - 2, 3 or 4P with disconnection of the two polarities
- all poles of the protected polarity must have breaking capacity ⩾ Isc max. at Un, i.e. 30 kA/500 V in this case.

Selection possibilities - (see page A-31)
The table for series poles indicates for a voltage 24 V < Un ⩽ 500 V and the type of system, use of a three-pole, version C circuit breaker.

Circuit-breaker selection - (see page A-36)
The Masterpact NW DC characteristics table indicates more specifically with a 1000 A a NW10 DC type N circuit breaker with a breaking capacity of 35 kA/500 V (L/R = 15 ms). The correct selection is a Masterpact NW10 DC type N version C, 1000 A, 35 kA, available in fixed and drawout versions.

Calculation of DC distribution-system characteristics

Short-circuit currents L/R time constant



Short-circuit currents

Calculation of the short-circuit current across the terminals of a battery

During a short-circuit, the battery discharges a current equal to

$$Isc = \frac{Vb}{Ri}$$

- Vb = maximum discharge voltage (battery 100 % charged)
- Ri = internal resistance equivalent to all cells (a function of the capacity in ampere-hours).

Example

- consider a set of four 500 Ah batteries connected in parallel
- discharge voltage of one battery: 240 V (110 cells 2.2 V each)
- discharge current of one battery: 300 A with a run-time of 30 minutes
- discharge current of all four batteries: 1200 A with a run-time of 30 minutes
- internal resistance 0.5 mΩ per cell, i.e. for one battery:

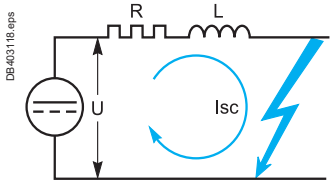
$Ri = 110 \times 0.5 \times 10^{-3} = 55 \times 10^{-3}\ \Omega$

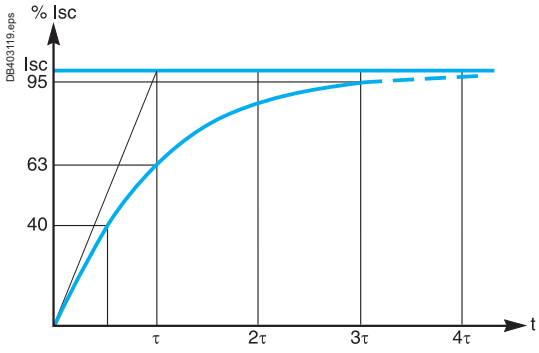
- short-circuit current of one battery: $Isc = 240\ V / 55 \times 10^{-3}\ \Omega = 4.37\ kA$
- neglecting the resistance of the connections, for all four batteries discharging the short-circuit current in parallel, the total short-circuit current is four times that of one battery, i.e. Isc = 4 x 4.37 kA = 17.5 kA.

Note: *if the internal resistance is not known, it is possible to use the following rough approximation: Isc = kc where c is the capacity of the battery in ampere-hours and k is a coefficient close to 10 and always less than 20.*

Other typical examples

- PABXs: Isc from 5 to 25 kA at 240 V DC with L/R = 5 ms
- submarine: Isc from 40 to 60 kA at 400 V DC with L/R = 5 ms.





L/R time constant

When a short-circuit occurs across the terminals of a DC circuit, the current rises from the load current (≤ In) to the short-circuit current Isc over a period of time that depends on the value of the resistance R and inductance L of the short-circuited loop.
The equation determining the current in the loop is:

$u = Ri + L\ di/dt$

The curve of I versus time is defined (neglecting In) by the equation:

$i = Isc\ (1 - \exp(t/\tau))$

where $\tau = L/R$ is the time constant for the rise to Isc.
Practically speaking, after a time $t = 3\tau$, the short-circuit is considered to be established, because the value of exp(-3) = 0.05 is negligible compared to 1 (see the curve opposite).
The lower the time constant (e.g. battery circuit), the shorter the time required for the current to rise to Isc.

To express breaking capacity, the interrupted short-circuit current with the following time constants is used:

- L/R = 5 ms, fast short-circuit
- L/R = 15 ms, standardised value used in standard IEC 60947-2
- L/R = 30 ms, slow short-circuit.

In general, the value of the system time constant is calculated under worst-case conditions, across the terminals of the generator.

Breaking-capacity values for:

- Compact NSX DC (table page A-5) are the same for 5 ms and 15 ms
- Masterpact NW DC (table page A-37) are indicated for 3 values, 5 ms, 15 ms and 30 ms.

Installation recommendations

Compact NSX100 to NSX630 DC
Installation in switchboards

Possible mounting positions
For fixed or withdrawable circuit breakers

Fig. A

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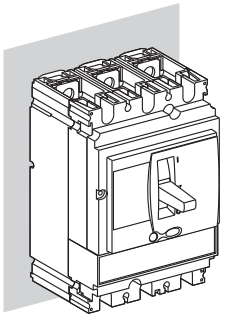


Fig. B

DB413250.eps

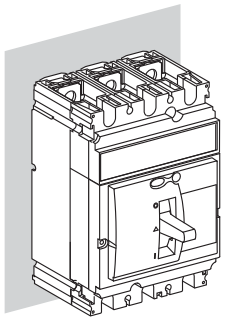


Fig. C

DB413251.eps

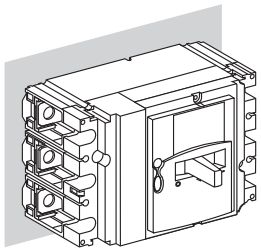


Fig. D

DB413252.eps

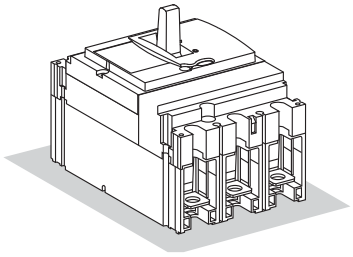
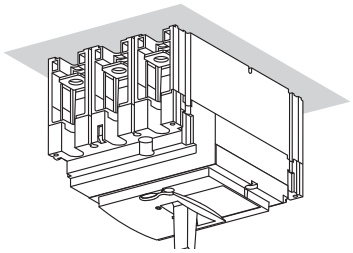


Fig. E

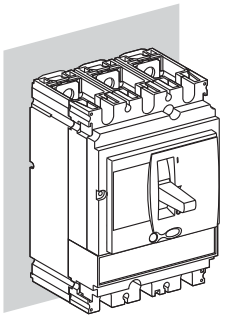
DB413253.eps



Possible supports
For fixed or withdrawable circuit breakers

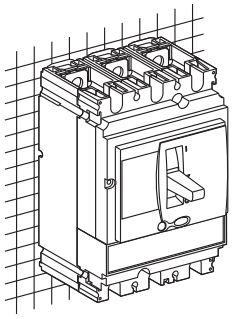
On a plain mounting plate

DB413249.eps



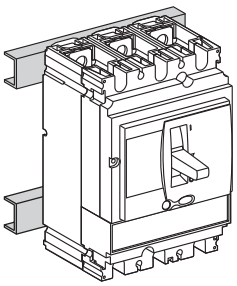
On a slotted mounting plate

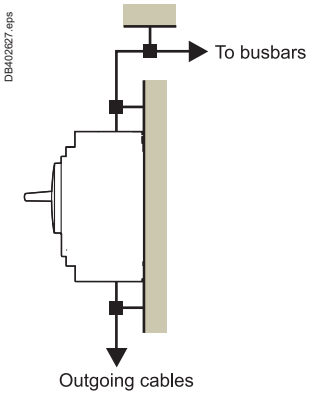
DB413254.eps



On rails

DB413255.eps





Electrodynamic forces on the conductors

The circuit breakers can be connected with copper, tinned copper or tinned aluminum conductors (rigid or flexible bars, cables).
In the event of a short-circuit, electrodynamic forces 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 (contactors, circuit breakers, etc.) should not be used for mechanical support.

Ties for flexible bars and cables

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

Type of tie	Maximum distance between ties (mm)	Short-circuit current (kA rms)
"PANDUIT" type ties Width: 4.5 mm Max. load: 22 kg White	200	10
	100	14
	50	19
"SAREL" type ties Width: 9 mm Max. load: 90 kg Black Double ties	350	21
	200	27
	100	36
	70	45
	50	100

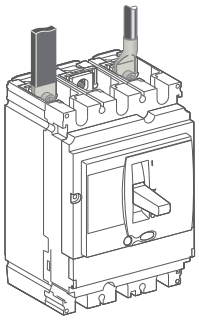
Note: *for 50 mm² cables, use the 9 mm wide ties.*

Weights

Type		Circuit breaker	Plug-in base	Chassis	Motor mechanism
NSX100N/H DC	1P/1D	0.5	-	-	-
	2P/2D	1.45	-	-	-
NSX100 DC	3P/3D	1.79	0.8	2.2	1.2
	4P/4D	2.57	1.05	2.2	1.2
NSX160N/H DC	1P/1D	0.5	-	-	-
	2P/2D	1.45	-	-	-
NSX160N / DC	3P/3D	1.85	0.8	2.2	1.2
	4P/4D	2.58	1.05	2.2	1.2
NSX250 DC	3P/3D	2.2	0.8	2.2	1.2
	4P/4D	2.78	1.05	2.2	1.2
NSX400/630 DC	3P/3D	6.19	2.4	2.2	2.8
	4P/4D	8.13	2.8	2.2	2.8

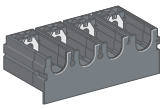
Compact NSX100 to NSX630 DC
Power connections

DB112168.eps



Connection of insulated bars or cables with lugs

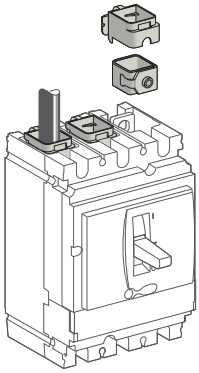
DB115655.eps



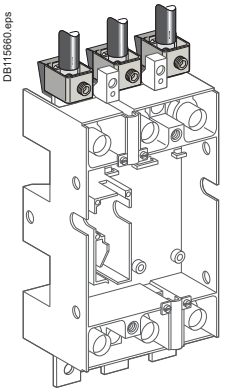
		NSX100 DC	NSX160/250 DC	NSX400/630 DC
Bars	L (mm)	≤ 25	≤ 25	≤ 32
	l (mm)	d + 10	d + 10	d + 15
	d (mm)	≤ 10	≤ 10	≤ 15
	e (mm)	≤ 6	≤ 6	3 ≤ e ≤ 10
	Ø (mm)	6.5	8.5	10.5
Lugs	L (mm)	≤ 25	≤ 25	≤ 32
	Ø (mm)	6.5	8.5	10.5
Tightening torque (Nm) (1)		10	15	50
Tightening torque (Nm) (2)		5	5	20

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

DB115659.eps



DB115660.eps



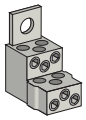
Connection of bare cables

NSX100 to 250 DC

DB112315.eps

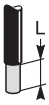
Cable connector.

DB111327.eps



Distribution connector.

DB104660.eps



	Cable connector	Steel ≤ 160 A	Aluminium ≤ 250 A		
	L (mm)	20	20		
	S (mm²) Cu/Al	1.5... 95 (1)	10... 16	25... 35	50...185 150 max. flexible
	Tightening torque (Nm)	12	15	20	26
6-cable distribution connector (copper or aluminium)					
	L (mm)	15 or 30			
	S (mm²) Cu/Al	1.5... 6 (1)	8... 35		
	Tightening torque (Nm)	4	6		

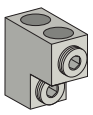
(1) For flexible cables from 1.5 to 4 mm², connection with crimped or self-crimping ferrule.

NSX400 to 630 DC

DB112316.eps

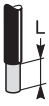
Cable connector.

DB111326.eps



Distribution connector.

DB104660.eps

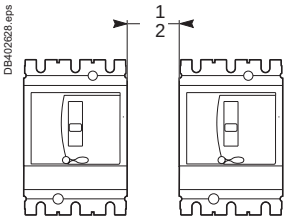


	Cable connector	2-cable connector
L (mm)	20	30 or 60
S (mm²) Cu/Al	35 to 300 rigid 240 max. flexible	2 x 85 to 2 x 240 rigid 240 max. flexible
Tightening torque (Nm)	31	31

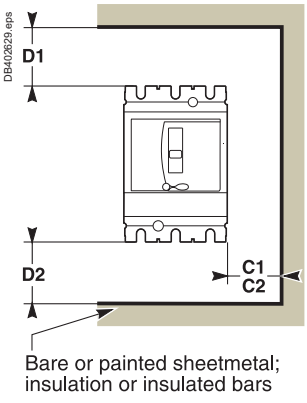
When installing a Compact NSX100 to NSX630 Direct Current circuit breaker, minimum distances (safety clearances) must be maintained between the device and panels, bars and other protection devices installed nearby. These distances, which depend on the ultimate breaking capacity, are defined by tests 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.

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).

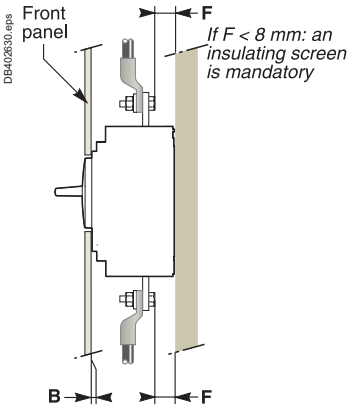
Minimal distance between two adjacent circuit breakers



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
NSX100-250 DC	U ⩽ 250 V	0	30	30	5	35	35	0	10	0
	U ⩽ 500 V	0	30	30	10 (1)	35	35	0	20	0
	U ⩽ 750 V	0	30	30	20 (1)	35	35	0	40	0
NSX400-630 DC	U ⩽ 250 V	0	30	30	5	60	60	0	10	0
	U ⩽ 500 V	0	30	30	10 (1)	60	60	0	20	0
	U ⩽ 750 V	0	30	30	20 (1)	100	100	0	40	0

(1) Distance must be doubled with interphase barriers.
(2) For Compact NSX DC with long or short terminal shields.
(3) For Compact NSX DC without terminal shields.

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

Compact NSX100 to NSX630 DC
Temperature derating

These values are valid for fixed and withdrawable circuit breakers with or without terminal shields.

When the ambient temperature is greater than 40 °C, overload-protection characteristics are slightly modified.
To determine tripping times using time/current curves, use the values of the current indicated in the table below, corrected to take into account the ambient temperature.

Compact NSX DC temperature derating

NSX DC configuration	Type of trip unit	Rating In (A) for a given temperature						
		Ambient temp. 40 °C	Ambient temp. 45 °C	Ambient temp. 50 °C	Ambient temp. 55 °C	Ambient temp. 60 °C	Ambient temp. 65 °C	Ambient temp. 70 °C
NSX100 DC 1/2P 1P 250 V - 2P 500 V	TM16D	16	15.6	15.2	14.8	14.5	14	13.8
	TM25D	25	24.5	24	23.5	23	22	21
	TM32D	32	31.3	30.5	30	29.5	29	28.5
	TM40D	40	39	38	37	36	35	34
	TM50D	50	49	48	47	46	45	44
	TM63D	63	61.5	60	58	57	55	54
	TM80D	80	78	76	74	72	70	68
	TM100D	100	97.5	95	92.5	90	87.5	85
NSX160 DC 1/2P 1P 250 V - 2P 500 V	TM125D	125	122	119	116	113	109	106
	TM160D	160	156	152	147	144	140	136
NSX100 DC 3/4P ⩽ 500 V	TM16D	16.8	16.4	16	15.5	15.2	14.7	14.5
	TM25D	26.3	25.7	25.2	24.7	24.2	23.1	22.1
	TM32D	33.6	33	32	31.5	31	30.5	30
	TM40D	42	41	40	39	38	37	36
	TM50D	53	51	50	49	48	47	46
	TM63D	66	65	63	61	60	58	57
	TM80DC	84	82	80	78	76	74	71
	TM100DC	105	102	100	97	95	92	89
NSX160 DC 3/4P ⩽ 500 V	TM125DC	131	128	125	122	119	114	111
	TM160DC	168	164	160	154	151	147	143
NSX250 DC 3/4P ⩽ 500 V	TM200DC	210	205	200	194	189	184	179
	TM250DC	250	240	235	230	220	210	200
NSX100 DC 3/4P > 500 V	TM16D	16	15.6	15.2	14.8	14.5	14	13.8
	TM25D	25	24.5	24	23.5	23	22	21
	TM32D	32	31.3	30.5	30	29.5	29	28.5
	TM40D	40	39	38	37	36	35	34
	TM50D	50	49	48	47	46	45	44
	TM63D	63	61.5	60	58	57	55	54
	TM80DC	80	78	76	74	72	70	68
	TM100DC	100	97.5	95	92.5	90	87.5	85
NSX160 DC 3/4P > 500 V	TM125DC	125	122	119	116	113	109	106
	TM160DC	160	156	152	147	144	140	136
NSX250 DC > 500 V	TM200DC	200	195	190	185	180	175	170
	TM250DC	230	225	220	210	200	190	180
NSX400 DC ⩽ 500 V	P1-P2	400	400	400	400	400	400	400
NSX400 DC > 500 V	P1-P2	400	400	400	400	400	400	380
NSX630 DC ⩽ 500 V	P1-P2-P3	550	530	510	490	470	440	420
NSX630 DC > 500 V	P1-P2-P3	500	480	460	440	420	400	380

Example: a Compact NSX100 DC equipped with a TM80DC trip unit has a rating of:
- 84 A at 40 °C
- 78 A at 55 °C.

Compact NSX100 to NSX630 DC

Characteristics of circuit breakers with parallel connection of poles

When poles are connected in parallel,the trip unit corresponding to the maximum circuit breaker rating is never used, for safety reasons related to temperature rise.The heating conditions are modified.The table opposite indicates the new thermal ratings that should be used for 2P, 3P and 4P circuit breakers.

Type of circuit breaker	Pole connections	Type of trip unit	Equivalent rated current (1) In (A) at 40 °C	Magnetic threshold Im (A) ±20 %
NSX100 DC				
NSX100 DC 2-pole	2P in parallel	TM16D	40	520
		TM25D	63	800
		TM32D	80	800
		TM40D	100	1400
		TM50D	125	1400
		TM63D	158	1400
See example 2 (see page A-33)		TM80D	200	1600
NSX100 DC 3-pole	3P in parallel	TM16D	58	780
		TM25D	90	1200
		TM32D	115	1650
		TM40D	144	2100
		TM50D	180	2100
		TM63D	227	2100
		TM80DC	288	2400
		TM16G	58	240
		TM25G	90	300
		TM40G	144	300
		TM63G	227	450
NSX100 DC 4-pole	4P in parallel	TM16D	74	1040
		TM25D	115	1600
		TM32D	147	2200
		TM40D	184	2800
		TM50D	230	2800
		TM63D	290	2800
		TM80DC	368	3200
		TM16G	74	320
		TM25G	115	400
		TM40G	184	400
		TM63G	290	600
	2 x 2P (in parallel) in series	TM16D	37	520
		TM25D	58	800
		TM32D	74	1100
		TM40D	46	1400
		TM50D	115	1400
		TM63D	145	1400
		TM80DC	184	1600
		TM16G	37	160
		TM25G	58	200
		TM40G	46	200
		TM63G	145	300

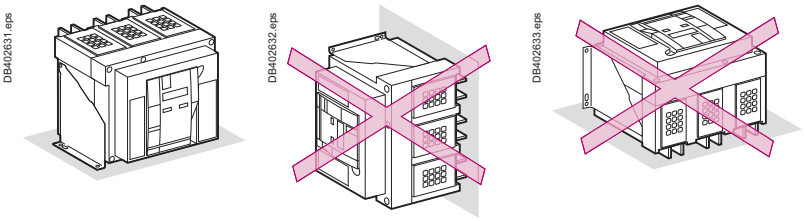
Type of circuit breaker	Pole connections	Type of trip unit	Equivalent rated current (1) In (A) at 40 °C	Magnetic threshold Im (A) ±20 %
NSX160 DC				
NSX160 DC 2-pole	2P in parallel	TM125D	313	2400
NSX160 DC 3-pole	3P in parallel	TM100DC	360	2400
		TM125DC	450	3750
NSX160 DC 4-pole	4P in parallel	TM100DC	460	3200
		TM125DC	575	5000
	2x2P (in parallel) in series	TM100DC	230	1600
See example 1 (see page A-33)		TM125DC	288	2500
NSX250 DC				
NSX250 DC 3-pole	2P in parallel	TM160DC	400	2500
		TM200DC	500	2000 to 4000
NSX250 DC 3-pole	3P in parallel	TM160DC	576	3750
		TM200DC	720	3000 to 6000
NSX250 DC 4-pole	4P in parallel	TM160DC	736	5000
		TM200DC	920	4000 to 8000
	2x2P (in parallel) in series	TM160DC	368	2500
		TM200DC	460	2000 to 4000
NSX400 DC				
NSX400 DC 3-pole	2P in parallel	MP1	640	1600 to 3200
		MP2	640	2500 to 5000
NSX400 DC 3-pole	3P in parallel	MP1	960	2400 to 4800
		MP2	960	3750 to 7500
NSX400 DC 4-pole	4P in parallel	MP1	1280	3200 to 6400
		MP2	1280	5000 to 10000
	2x2P (in parallel) in series	MP1	640	1600 to 3200
		MP2	640	2500 to 5000
NSX630 DC				
NSX630 DC 2-pole	2P in parallel	MP1	1000	1600 to 3200
		MP2	1000	2500 to 5000
		MP3	1000	4000 to 8000
NSX630 DC 3-pole	3P in parallel	MP1	1500	2400 to 4800
		MP2	1500	3750 to 7500
		MP3	1500	6000 to 12000
NSX630 DC 4-pole	4P in parallel	MP1	2000	3200 to 6400
		MP2	2000	5000 to 10000
		MP3	2000	8000 to 16000
	2x2P (in parallel) in series	MP1	1000	1600 to 3200
		MP2	1000	2500 to 50000
		MP3	1000	4000 to 8000

(1) Rated current of the assembly with the indicated pole connections.

Example : a Compact NSX100 DC 4-pole circuit breaker with 4 poles in parallel, equipped with a TM63D trip unit:
- an equivalent rated current of 290 A
- a fixed magnetic threshold of 2800 A.

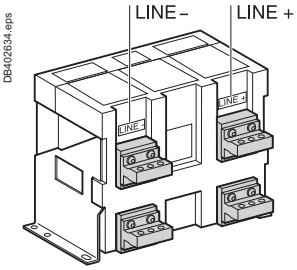
Masterpact NW10 to NW40 DC
Installation in switchboard

Possible positions



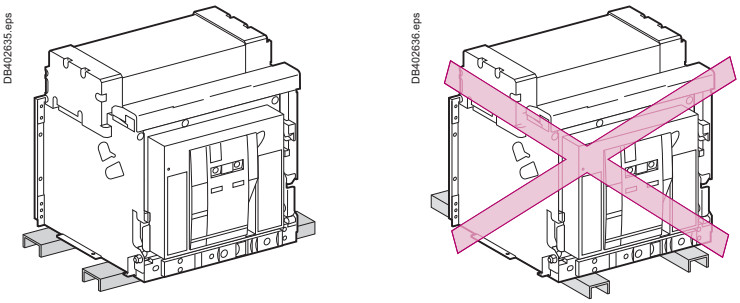
Power supply

The plus and minus polarities **(LINE + and LINE -)** of the power supply must be connected as indicated in the “Dimensions and connection” chapter.

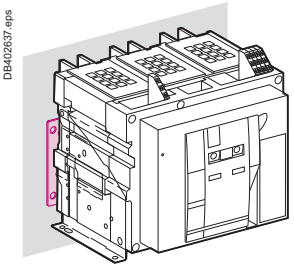


Mounting the circuit-breaker

It is important to distribute the weight of the device uniformily over a rigid mounting surface such as rails or a base plate.
This mounting plane should be perfectly flat (tolerance on support flatness: 2 mm). This eliminates any risk of deformation which could interfere with correct operation of the circuit breaker.
Masterpact devices can also be mounted on a vertical plane using the special brackets.



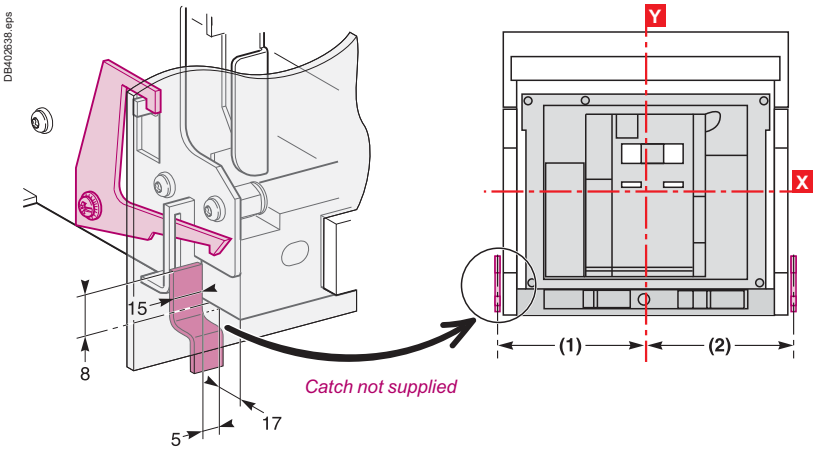
Mounting on rails.



Mounting with vertical brackets.

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

Door interlock catch VPEC

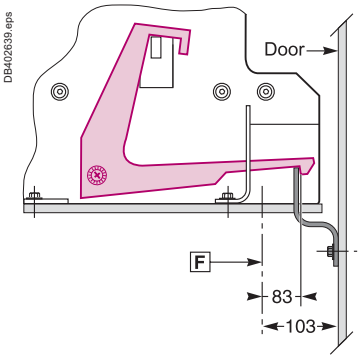


Dimensions (mm)

Type	(1)	(2)
NW10-40 DC (versions C-D)	215	215
NW10-40 DC (version E)	330	215

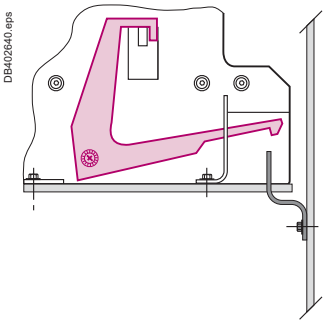
Breaker in “connected” or “test” position

Door cannot be opened



Breaker in “disconnected” position

Door can be opened



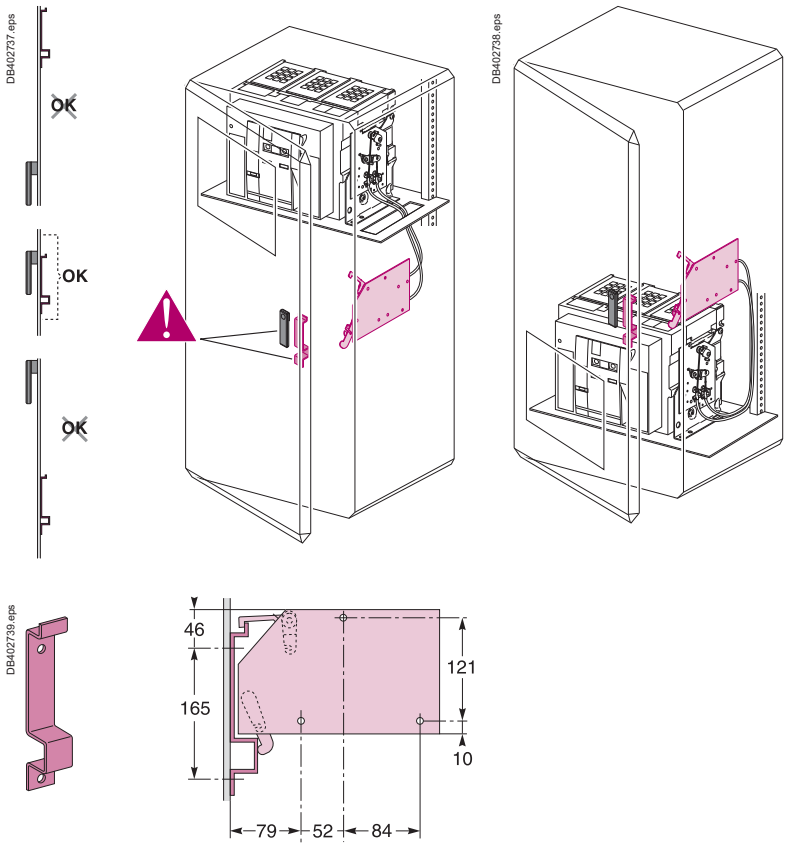
Note:
The door interlock can either be mounted on the right side or the left side of the breaker.

F: *Datum.*

Masterpact NW10 to NW40 DC
Cable-type door interlock
Connection of MN, MX and XF voltage releases

Cable-type door interlock IPA

This option prevents door opening when the circuit breaker is closed and prevents circuit breaker closing when the door is open.
For this, a special plate associated with a lock and a cable is mounted on the right side of the circuit breaker.
With this interlock installed, the source changeover function cannot be implemented.



Wiring of voltage releases

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

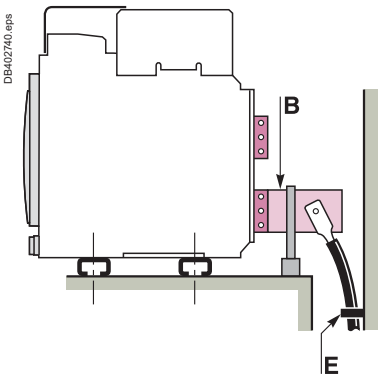
Recommended maximum cable lengths (meter)

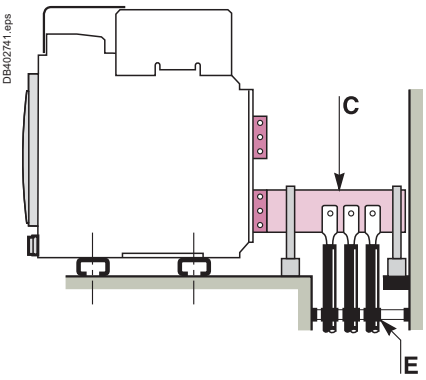
		12 V		24 V		48 V	
		2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²	2.5 mm²	1.5 mm²
MN	U source 100 %	-	-	58	35	280	165
	U source 85 %	-	-	16	10	75	45
MX-XF	U source 100 %	21	12	115	70	550	330
	U source 85 %	10	6	75	44	350	210

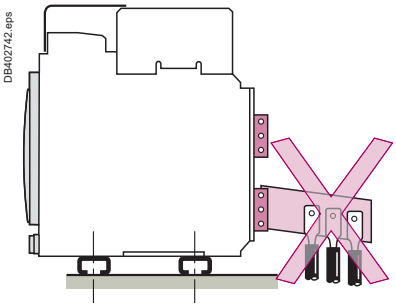
Note: *the indicated length is that of each of the two wires.*

Cable connections

If cables are used for the power connections, make sure that they do not apply excessive mechanical forces to the circuit breaker terminals.
For this, make the connections as follows:
■ extend the circuit breaker terminals using short bars designed and installed according to the recommendations for bar-type power connections:
□ for a single cable, use solution **B** opposite
□ for multiple cables, use solution **C** opposite.
■ in all cases, follow the general rules for connections to busbars:
□ position the cable lugs before inserting the bolts
□ the cables should firmly secured to the framework of the switchboard **E**.

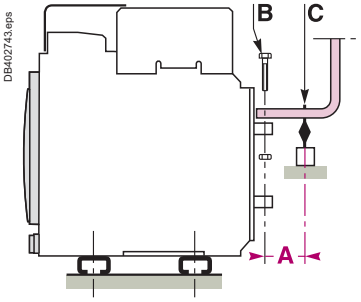


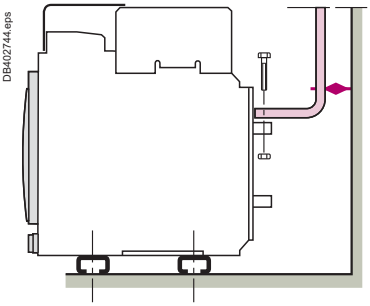


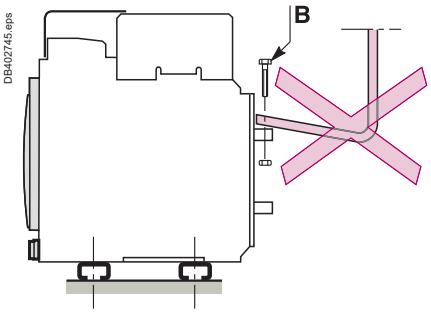


Busbar connections

The busbars should be suitably adjusted to ensure that the connection points are positioned on the terminals before the bolts are inserted **B**
The connections are held by the support which is solidly fixed to the framework of the switchboard, such that the circuit breaker terminals do not have to support its weight **C**. (This support should be placed close to the terminals).





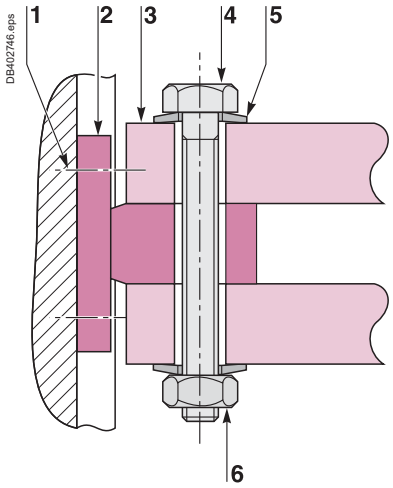


Electrodynamic stresses

The first busbar support or spacer shall be situated within a maximum distance from the connection point of the breaker (see table below). This distance must be respected so that the connection can withstand the electrodynamic stresses between phases in the event of a short circuit.

Maximum distance A between busbar to circuit breaker connection and the first busbar support or spacer with respect to the value of the prospective short-circuit current.					
Isc (kA)	30	50	65	80	100
distance A (mm)	350	300	250	150	150

Masterpact NW10 to NW40 DC
Power connection

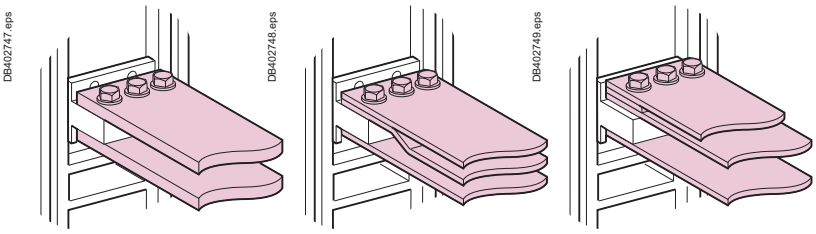


1 *Terminal screw factory-tightened to 16 Nm.*
2 *Breaker terminal.*
3 *Busbar.*
4 *Bolt.*
5 *Washer.*
6 *Nut.*

Clamping

Correct clamping of busbars depends amongst other things, on the tightening torques used for the nuts and bolts. Over-tightening may have the same consequences as under-tightening.
For connecting busbars (Cu ETP-NFA51-100) to the circuit breaker, the tightening torques to be used are shown in the table below.
These values are for use with copper busbars and steel nuts and bolts, class 8.8. The same torques can be used with AGS-T52 quality aluminium bars (French standard NFA 02-104 or American National Standard H-35-1).

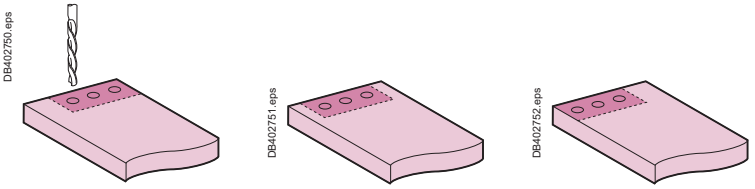
Examples



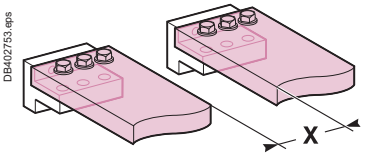
Tightening torques			
Ø Nominal (mm)	Ø Drilling (mm)	Tightening torque (Nm) with flat washers or split lockwashers	Tightening torque (Nm) with contact or serrated washers
10	11	37.5	50

Busbar drilling

Examples



Isolation distance

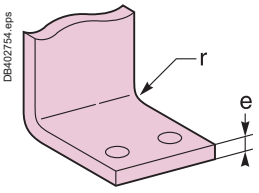


Dimensions (mm)

Ui	X mini
500 V DC	8 mm
900 V DC	14 mm

Busbar bending

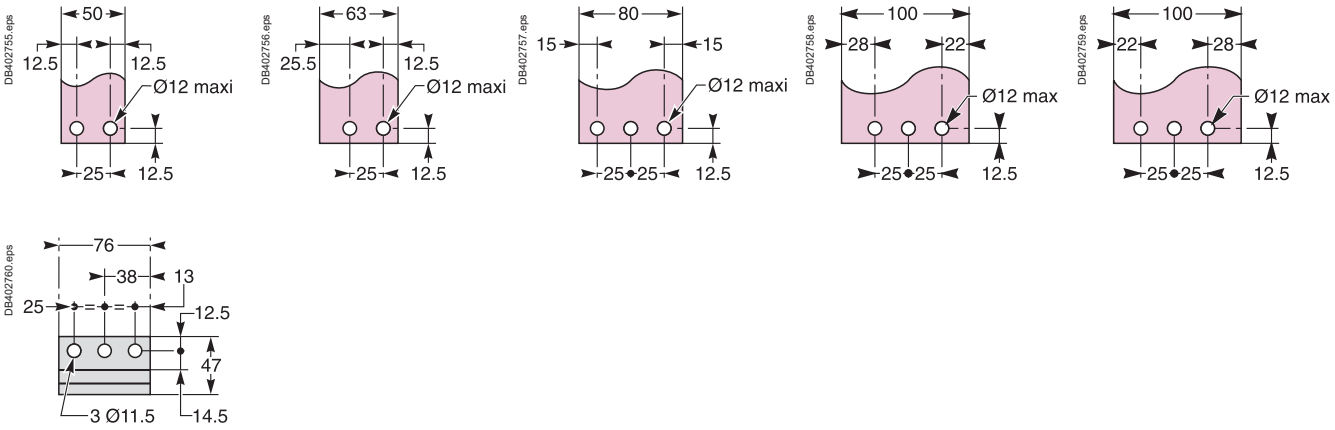
When bending busbars maintain the radius indicated below (a smaller radius would cause cracks).



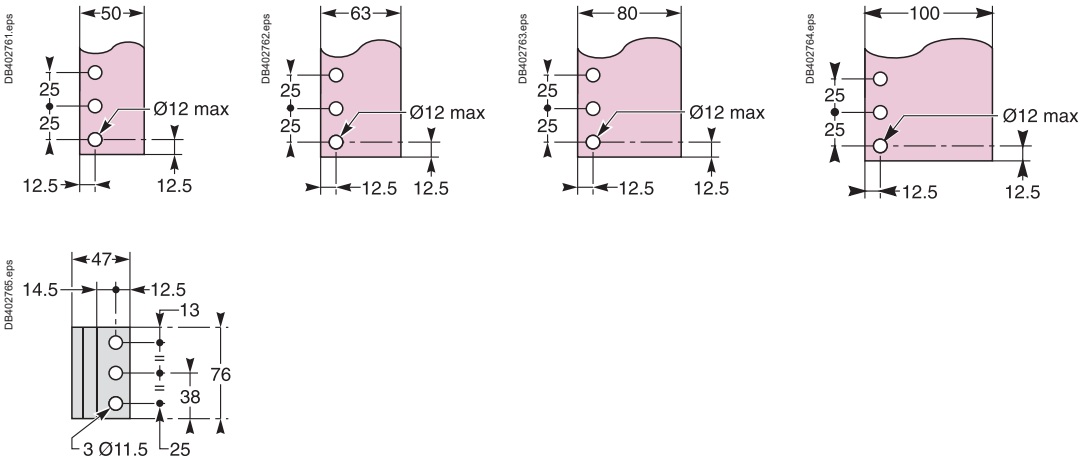
Dimensions (mm)

e	Radius of curvature r Min.	Recommended
5	5	7.5
10	15	18 to 20

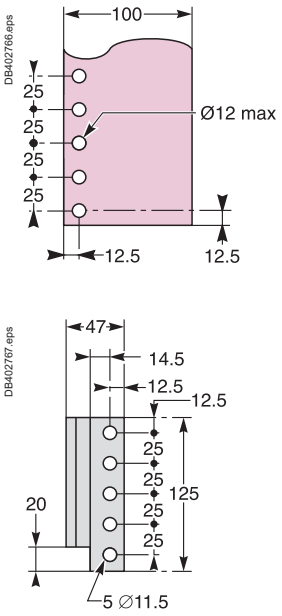
Horizontal rear connection NW10 to NW20 DC



Vertical rear connection NW10 to NW20 DC



Vertical rear connection NW40 DC



Masterpact NW10 to NW40 DC
Busbar sizing

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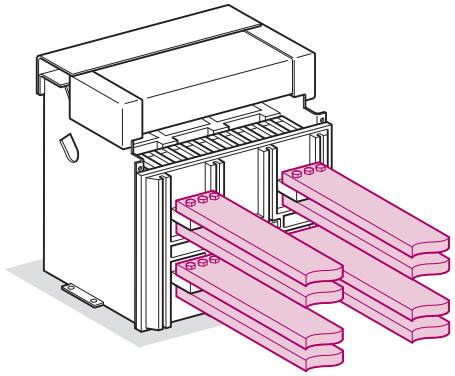

Rear horizontal connection

Basis of tables

- maximum permissible busbar temperature: 100 °C
- Ti: temperature around the circuit breaker and its connections
- busbar material is unpainted copper.

Example

Conditions:

- drawout version
- horizontal busbars
- Ti: 50 °C
- service current: 2000 A.

Solution

For Ti = 50 °C, use an NW20 DC which can be connected with three 100 x 5 mm bars or two 80 x 10 mm bars.

Masterpact	Maximum service current	Ti: 40 °C no. of bars		Ti: 50 °C no. of bars		Ti: 60 °C no. of bars	
		5 mm thick bars	10 mm thick bars	5 mm thick bars	10 mm thick bars	5 mm thick bars	10 mm thick bars
NW10 DC	**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
NW20 DC	**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

Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

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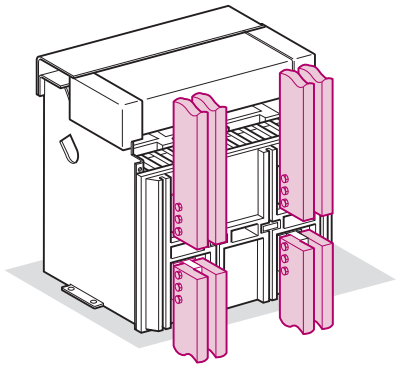


Rear vertical connection

Basis of tables

- maximum permissible busbar temperature: 100 °C
- Ti: temperature around the circuit breaker and its connections
- busbar material is unpainted copper.

Example

Conditions:

- fixed version
- vertical busbars
- Ti: 40 °C
- service current: 1000 A.

Solution

For Ti = 40 °C, use an NW10 DC which can be connected with two 50 x 5 mm bars or one 50 x 10 mm bar.

Masterpact	Maximum service current	Ti: 40 °C no. of bars		Ti: 50 °C no. of bars		Ti: 60 °C no. of bars	
		5 mm thick bars	10 mm thick bars	5 mm thick bars	10 mm thick bars	5 mm thick bars	10 mm thick bars
NW10 DC	**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
NW20 DC	**2000**	3b.100 x 5	2b.63 x 10	3b.100 x 5	2b.63 x 10	3b.100 x 5	3b.80 x 10
NW40 DC	**4000**	-	4b.100 x 10	-	4b.100 x 10	-	4b.100 x 10

Note: *the values indicated in these tables have been extrapolated from test data and theoretical calculations. These tables are only intended as a guide and cannot replace industrial experience or a temperature rise test.*

Temperature derating
Power dissipation and input / output resistance

Temperature derating

The table below indicates the maximum current rating, for each connection type, as a function of the ambient temperature around the circuit breaker and the busbars.
For ambient temperatures greater than 60 °C, consult us.
Ti: temperature around the circuit breaker and its connections.

Version		Drawout device										Fixed device									
Connection		Rear horizontal					Rear vertical					Rear horizontal					Rear vertical				
temp. Ti		40	45	50	55	60	40	45	50	55	60	40	45	50	55	60	40	45	50	55	60
NW10 DC	Version C	1000					1000					1000					1000				
	Version D	1000					1000					1000					1000				
	Version E	1000					1000					1000					1000				
NW20 DC	Version C	2000					2000					2000					2000				
	Version D	2000					2000					2000					2000				
	Version E	2000					2000					2000					2000				
NW40 DC	Version C	-					4000					-					4000				
	Version D	-					4000		3900	3750	3600	-					4000				
	Version E	-					4000		3800	3650	3500	-					4000				

Power dissipation and input/output resistance

Total power dissipation is the value measured at I_N, for a 3 pole (version C, D) or 4 pole (version E) breaker.

Version	Drawout device			Fixed device		
	Power dissipation (Watt)			Power dissipation (Watt)		
version	C	D	E	C	D	E
NW10 DC	45	75	105	25	40	60
NW20 DC	135	230	330	90	160	235
NW40 DC	460	800	1150	360	580	850

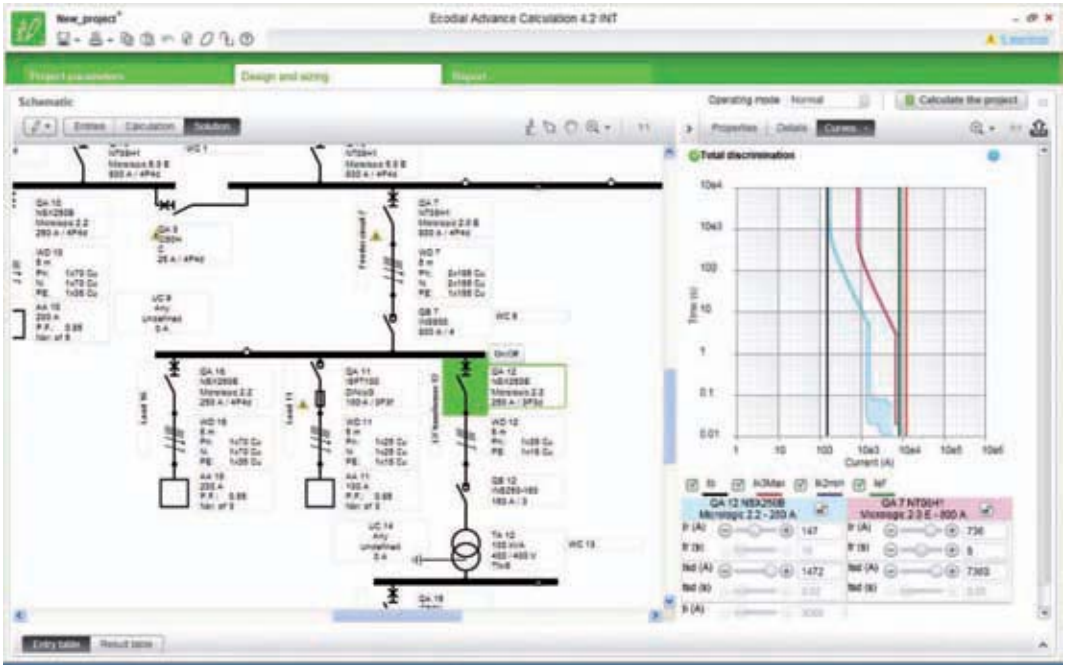
TOOLS

Ecodial

Ecodial software is dedicated to LV electrical installation calculation in accordance with the IEC60364 international standard or national standards.

This 4th generation, "Ecodial Advance Calculation 4", offers a new ergonomic and new features:

- operating mode that allows easy calculation in case of installation with different type of sources (parallel transformers, back-up generators...)
- discrimination analysis associating curves checking and discrimination tables
- direct access to protection settings including residual current protections
- easy selection of alternate solutions or manual selection of a product.



Dimensions and connection

Compact (fixed version) 1P-2P NSX100-NSX160 N/H DC

Dimensions, mounting, cutout

Dimensions

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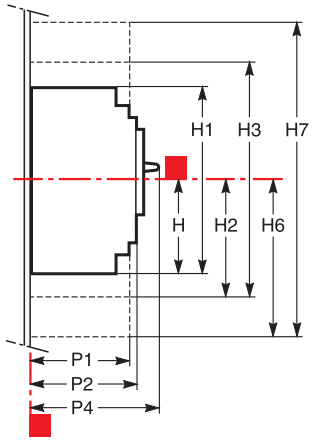

1 pole

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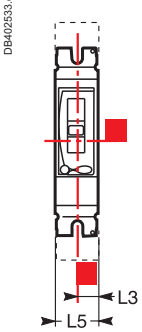
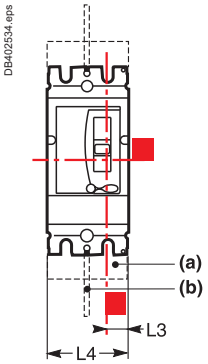


2 poles

DB402534.eps



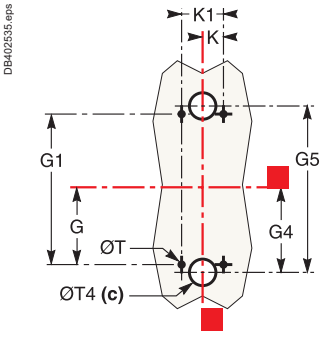
(a) Short terminal shields.
(b) Interphase barriers.

Mounting

On backplate

1 pole

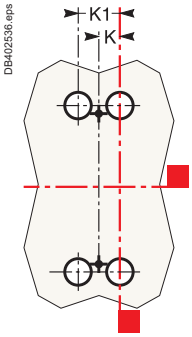
DB402535.eps



(c) For rear connection only.

2 poles

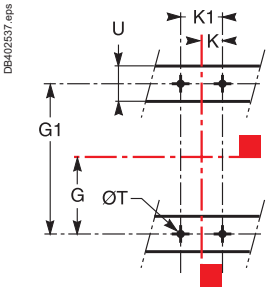
DB402536.eps



On rails

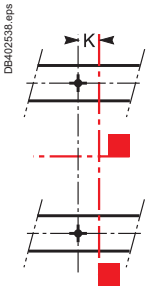
1 pole

DB402537.eps



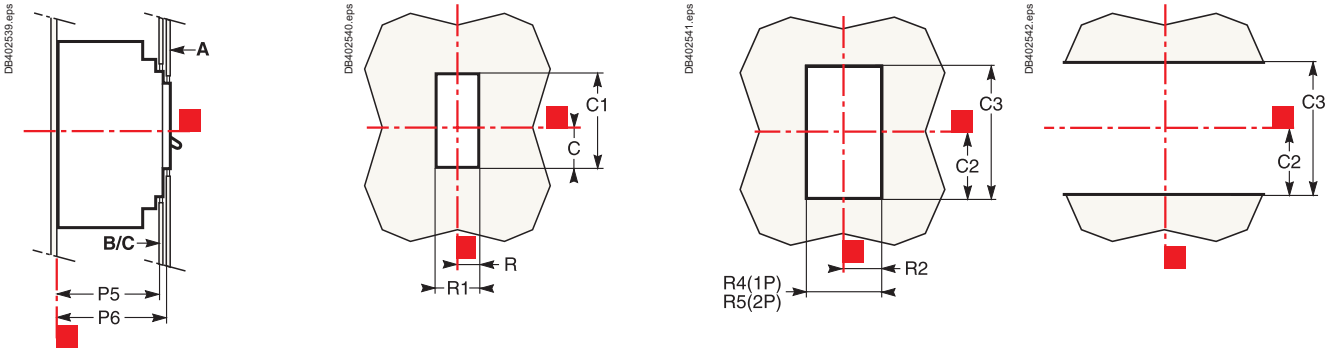
2 poles

DB402538.eps

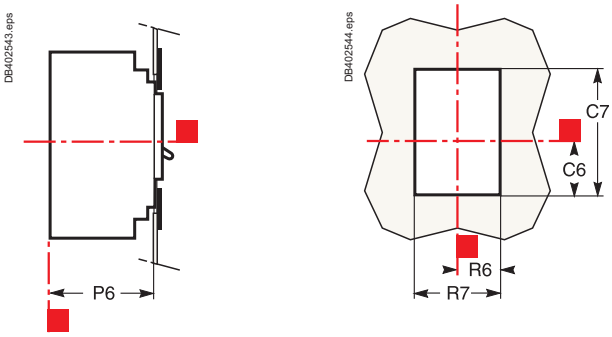


Front-panel cutout

On backplate



With escutcheon



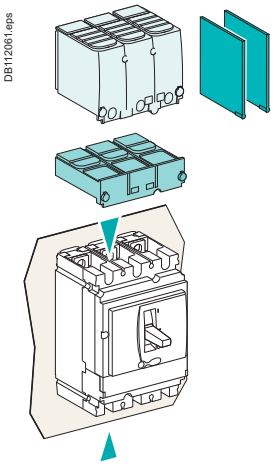
Dimensions (mm)

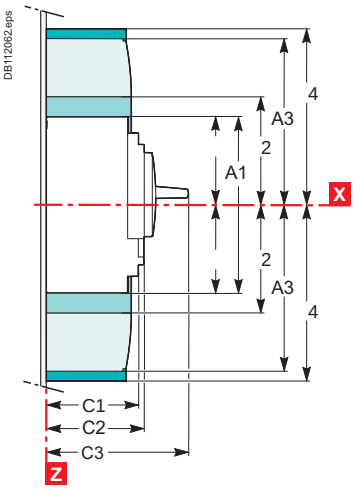
Type	C	C1	C2	C3	C6	C7	G	G1	G4	G5	H
NSX100/160N/H DC	29	76	54	108	43	104	62.5	125	70	140	80.5
Type	**H1**	**H2**	**H3**	**H4**	**H6**	**H7**	**K**	**K1**	**L3**	**L4**	**L5**
NSX100/160N/H DC	161	94	188	160.5	178.5	357	17.5	35	17.5	70	35
Type	**P1**	**P2**	**P4**	**P5**	**P6**	**R**	**R1**	**R2**	**R4**	**R5**	**R6**
NSX100/160N/H DC	81	86	111	83	88	14.5	29	19	38	73	29
Type	**R7**	**ØT**	**ØT4**	**U**							
NSX100/160N/H DC	58	6	22	⩽ 32							

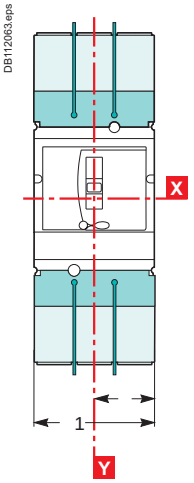
Dimensions and mounting
Compact NSX100 to 630 DC fixed version

Dimensions

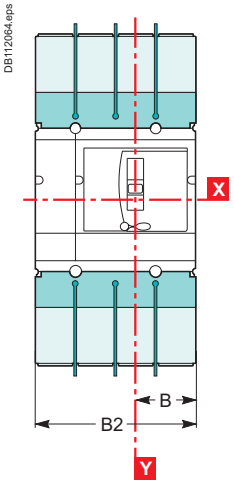
3P







4P

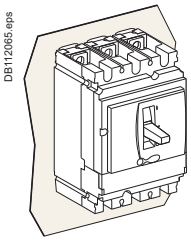


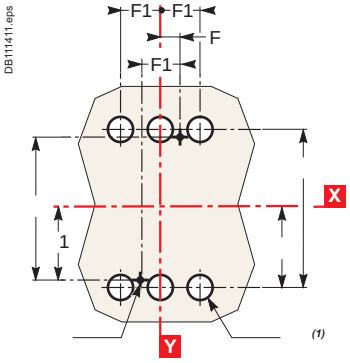
Interphase barriers.
Short terminal shields.

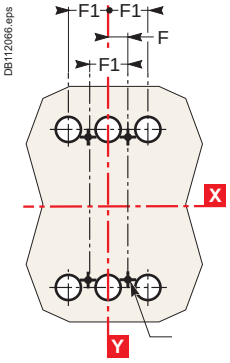
Long terminal shields (also available for NSX400/630 DC spreaders with 52.5 mm pitch: B1 = 157.5 mm, B2 = 210 mm).

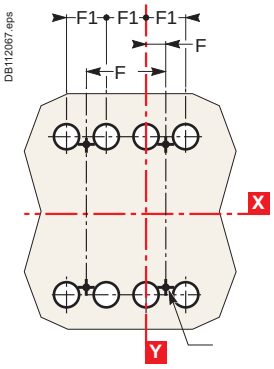
Mounting

	NSX100 to 250 DC	NSX400/630 DC	NSX100 to 630 DC
On backplate	3P	3P	4P



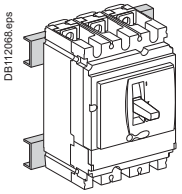


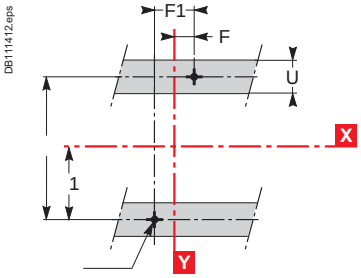


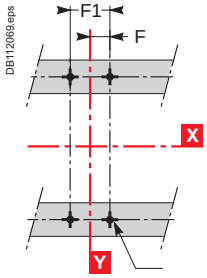


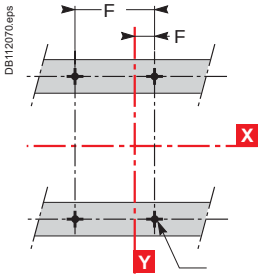
(1) The ØT holes are required for rear connection only.

On rails	3P	3P	4P



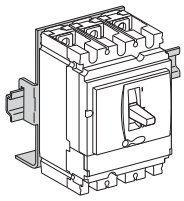




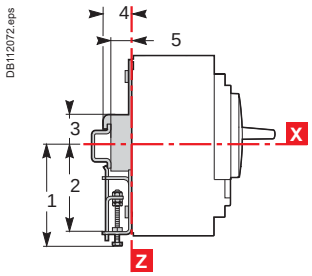


On DIN rail with adapter plate (NSX100 to 250 DC)

DB112071.eps

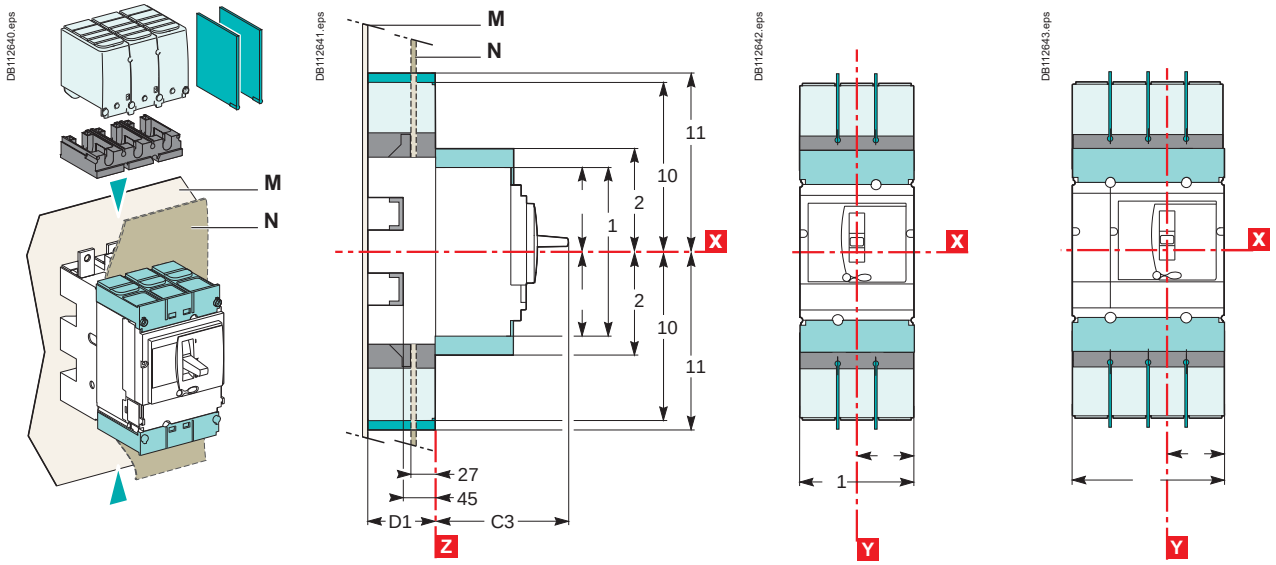


DB112072.eps



Dimensions and mounting
Compact NSX100 to 630 DC plug-in version

Dimensions



Interphase barriers for base.

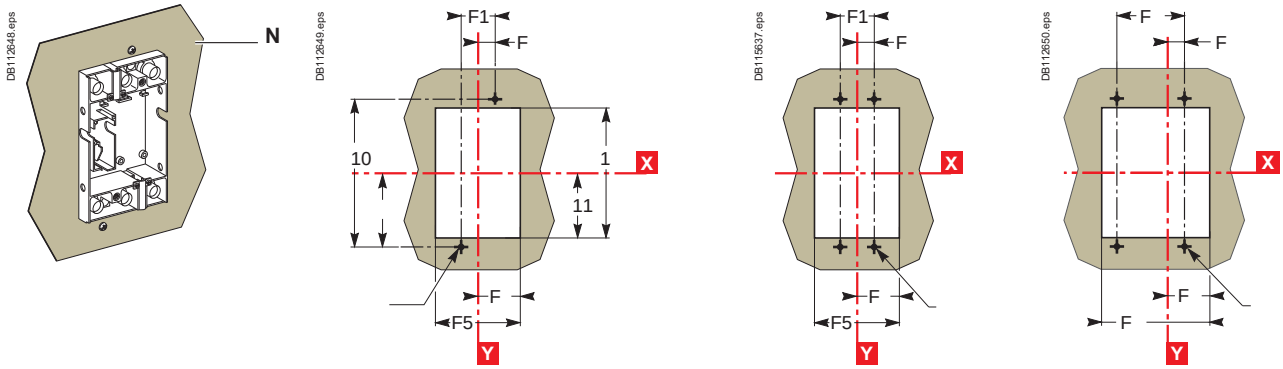
Short terminal shields on circuit breaker.

Long terminal shields (also available for NSX400/630 DC spreaders with 52.5 mm pitch: B1 = 157.5 mm, B2 = 210 mm)

Adapter for base, required to mount long terminal shields or interphase barriers.

Mounting

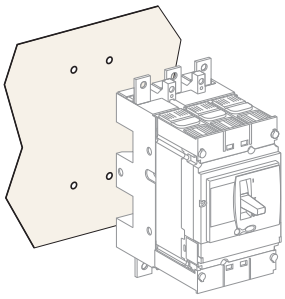
Through front panel (N)



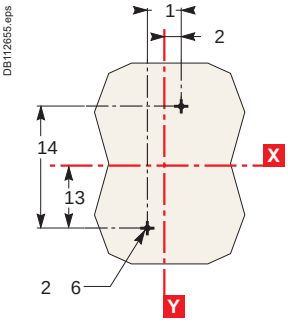
On backplate (M) 3P 4P

Front connection (an insulating screen is supplied with the base and must be fitted between the base and the backplate)

DB112654.eps



DB112655.eps



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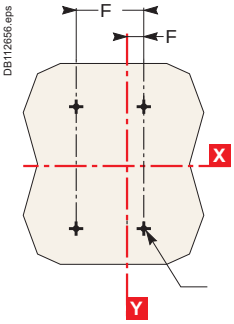
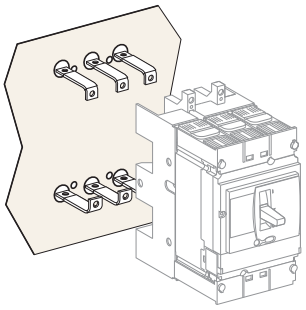
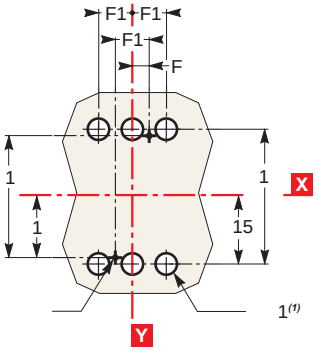


Connection by exterior-mounted rear connectors

DB112657.eps



DB112658.eps



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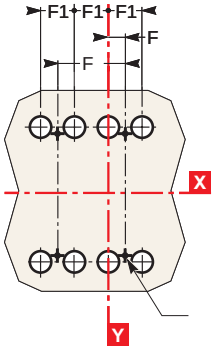
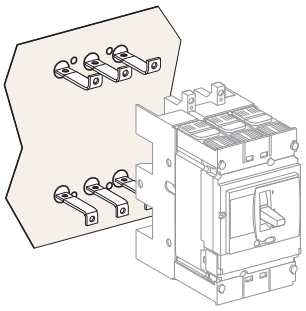


(1) The ØT1 holes are required for rear connection only.

Connection by interior-mounted rear connectors

DB112660.eps



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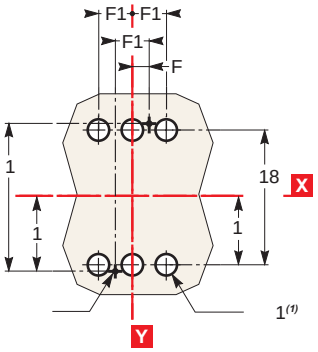

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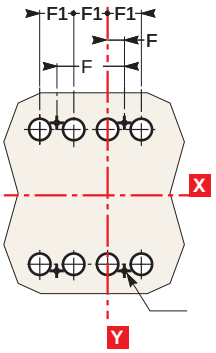
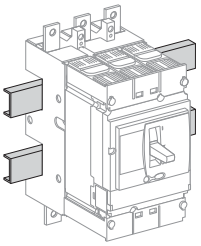


(1) The ØT1 holes are required for rear connection only.

On rails 3P 4P

DB112663.eps



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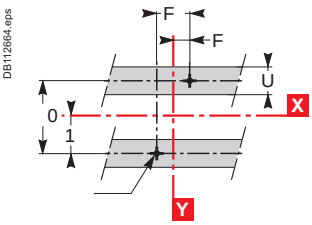

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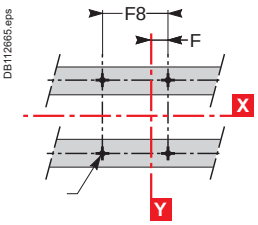


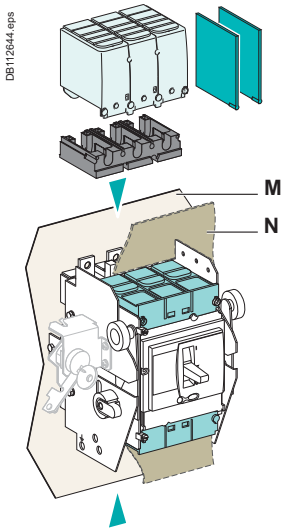
Type	A	A1	A2	A10	A11	B	B1	B2	C3	D1	E9	E10	E11	E12	E13	E14	E15
NSX100/160/250 DC	80.5	161	94	175	210	52.5	105	140	126	75	95	190	87	174	77.5	155	79
NSX400/630 DC	127.5	255	142.5	244	281	70	140	185	168	100	150	300	137	274	125	250	126

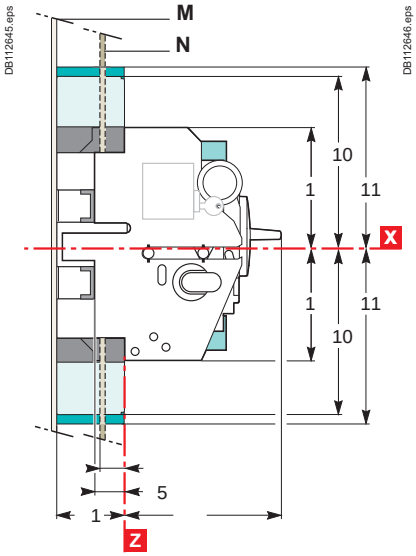
Type	E16	E17	E18	E19	E20	F1	F2	F3	F4	F5	F6	F7	F8	F9	ØT1	U
NSX100/160/250 DC	158	61	122	37.5	75	35	17.5	70	54.5	109	144	70	105	35	24	⩽ 32
NSX400/630 DC	252	101	202	75	150	45	22.5	90	71.5	143	188	100	145	50	33	⩽ 35

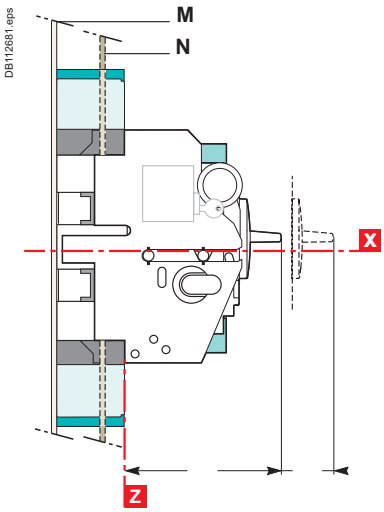
Dimensions and mounting
Compact NSX100 to 630 DC withdrawable version

Dimensions

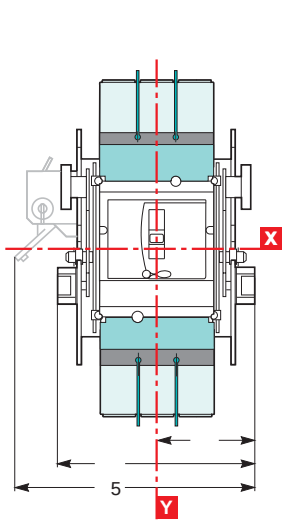
3P

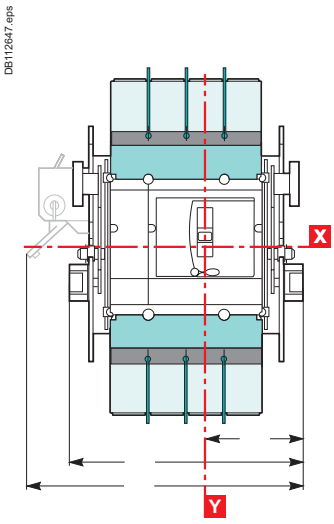






4P



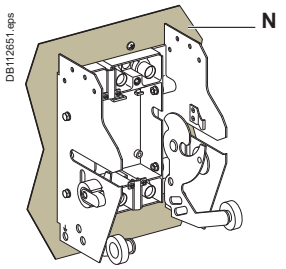


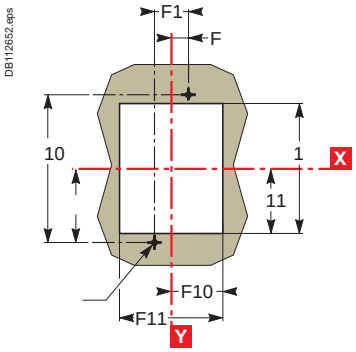
Interphase barriers for base.
Short terminal shields on circuit breaker.
Long terminal shields.
Adapter for base, required to mount long terminal shields or interphase barriers.

Mounting

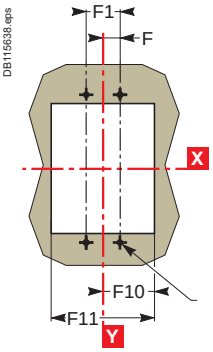
Through front panel (N)

3P NSX100 to 250 DC

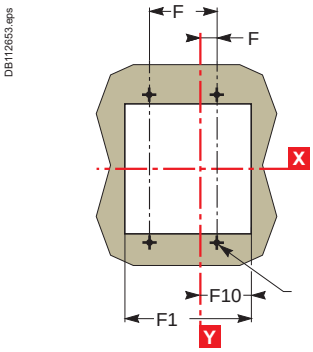




3P NSX400/630 DC

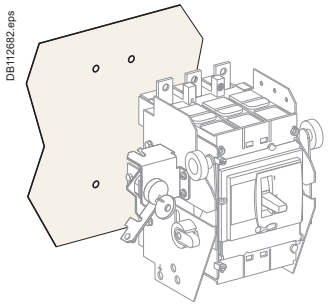


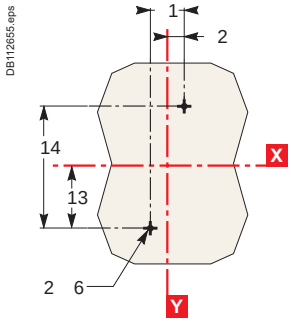
4P NSX100 to 630 DC

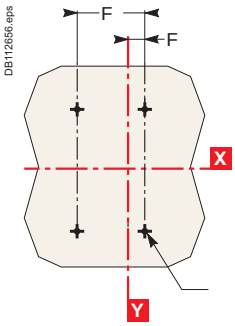


On backplate (M) 3P 4P

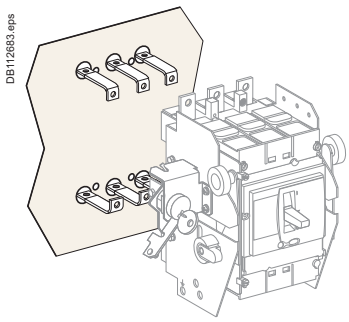
Front connection (an insulating screen is supplied with the base and must be fitted between the base and the backplate)

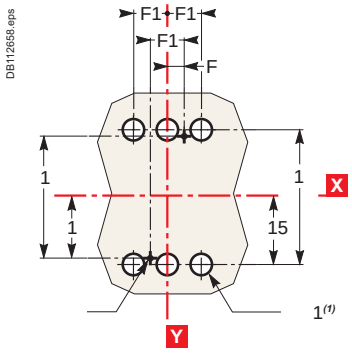


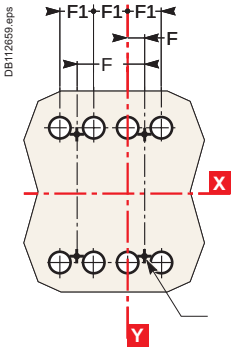




Connection by exterior-mounted rear connectors

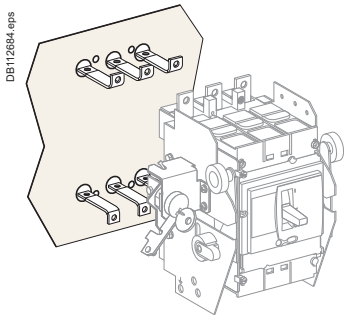


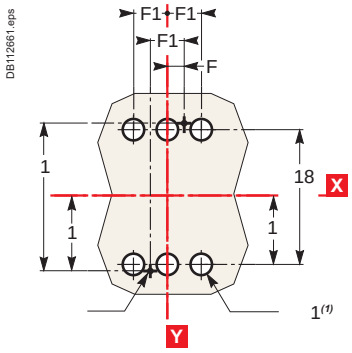


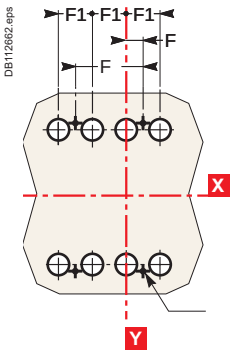


(1) The ØT1 holes are required for rear connection only.

Connection by interior-mounted rear connectors

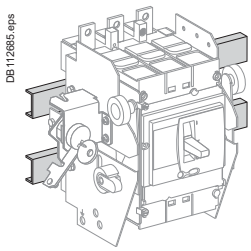


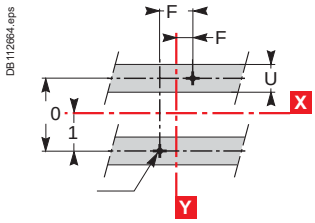


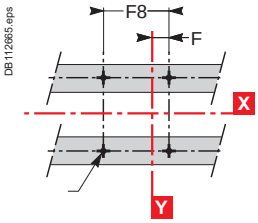


(1) The ØT1 holes are required for rear connection only.

On rails 3P 4P







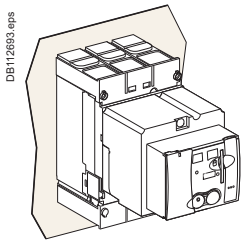
Type	A10	A11	A12	A13	B3	B4	B5	B6	B7	C3	D1	E9	E10	E11	E12	E13	E14
NSX100/160/250 DC	175	210	106.5	103.5	92.5	185	216	220	251	126	75	95	190	87	174	77.5	155
NSX400/630 DC	244	281	140	140	110	220	250	265	295	168	100	150	300	137	274	125	250
Type	**E15**	**E16**	**E17**	**E18**	**E19**	**E20**	**F1**	**F2**	**F3**	**F7**	**F8**	**F9**	**F10**	**F11**	**F12**	**ØT1**	**U**
NSX100/160/250 DC	79	158	61	122	37.5	75	35	17.5	70	70	105	35	74	148	183	24	⩽ 32
NSX400/630 DC	126	252	101	202	75	150	45	22.5	90	100	145	50	91.5	183	228	33	⩽ 35

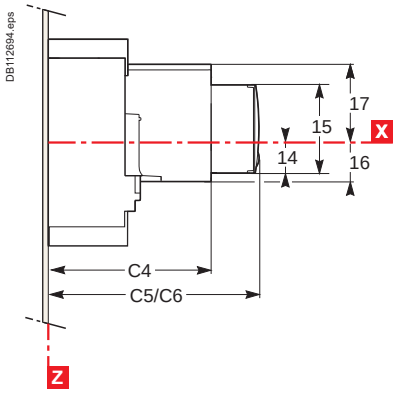
Dimensions and mounting

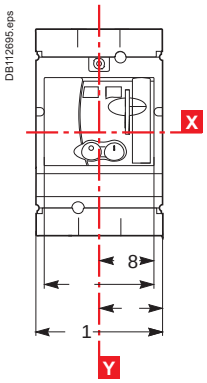
Motor mechanism module for Compact NSX100 to 630 DC

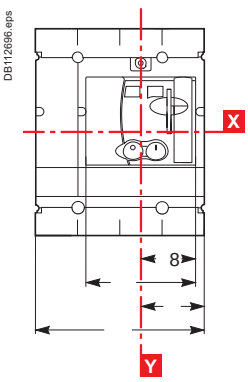
Dimensions — 3P — 4P

Fixed circuit breaker



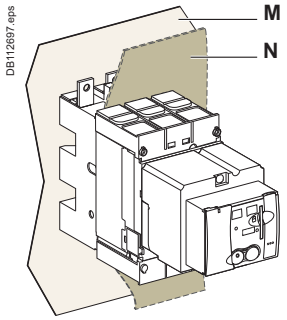


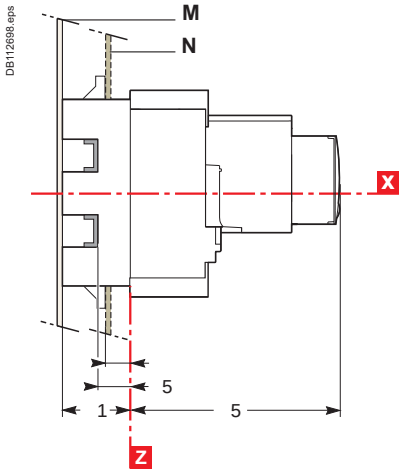




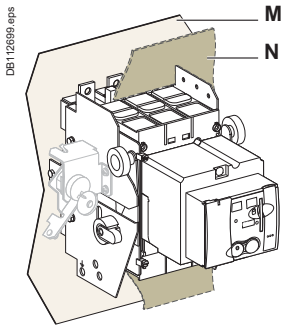
C5: without keylock
C6: with keylock

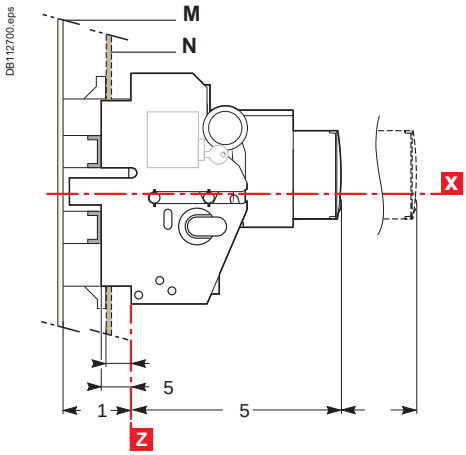
Plug-in circuit breaker





Withdrawable circuit breaker





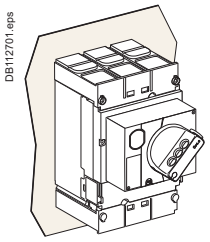
Type	A14	A15	A16	A17	B	B1	B2	B8	B9	C4	C5	C6	D1
NSX100/160/250 DC	27.5	73	34.5	62.5	52.5	105	140	45.5	91	143	182	209.5	75
NSX400/630 DC	40	123	52	100	70	140	185	61.5	123	215	256	258	100

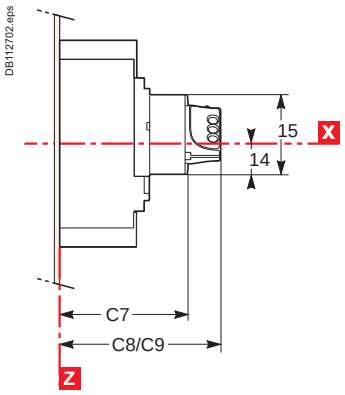
Direct rotary handle
for Compact NSX100 to 630 DC

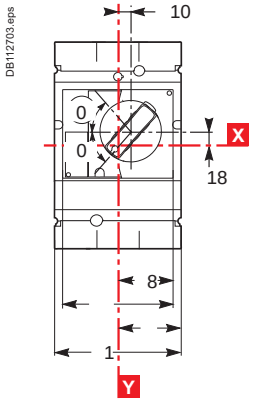
Dimensions

Fixed circuit breaker

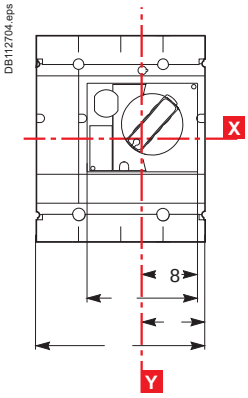
3P





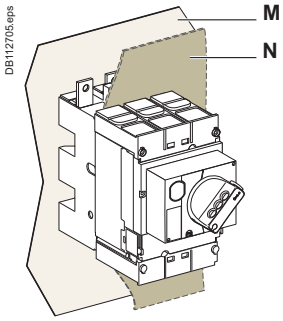


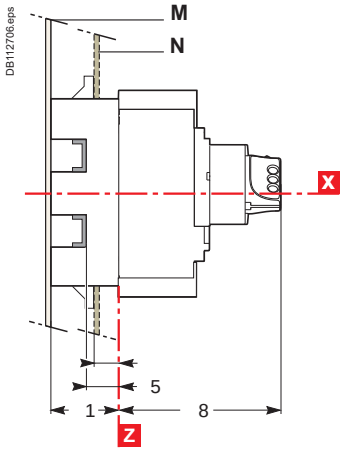
4P



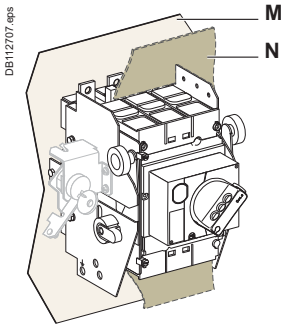
C8: without keylock
C9: with keylock

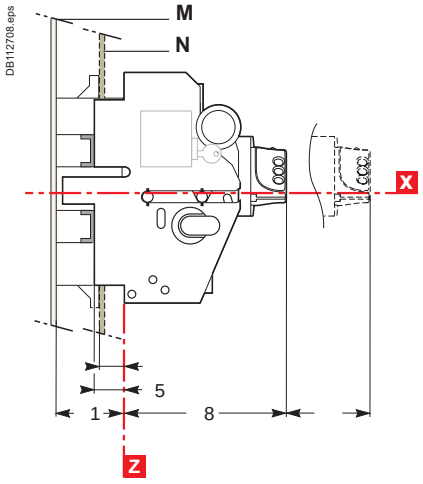
Plug-in circuit breaker





Withdrawable circuit breaker





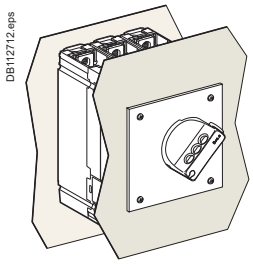
Type	A14	A15	A18	B	B1	B2	B8	B9	B10	C7	C8	C9	D1
NSX100/160/250 DC	27.5	73	9	52.5	105	140	45.5	91	9.25	121	155	164	75
NSX400/630 DC	40	123	24.6	70	140	185	61.5	123	5	145	179	188	100

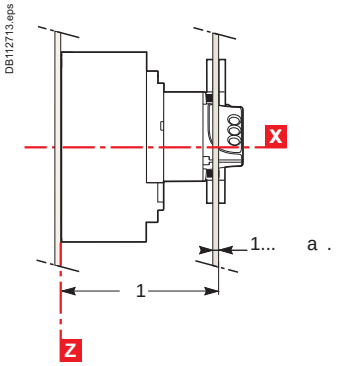
Dimensions and mounting

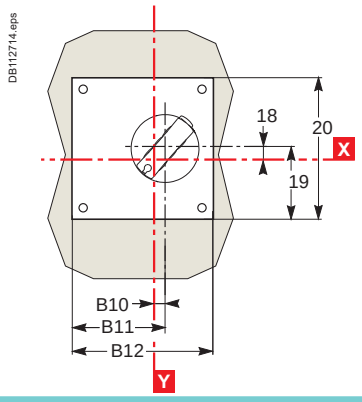
MCC and CNOMO type direct rotary handles for Compact NSX100 to 630 DC fixed version

Dimensions

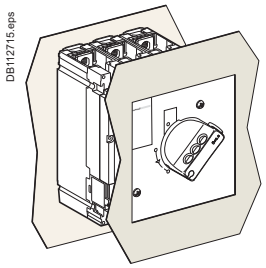
MCC type direct rotary handle

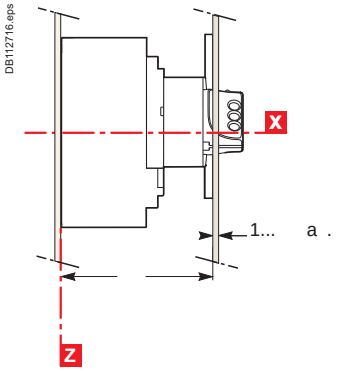


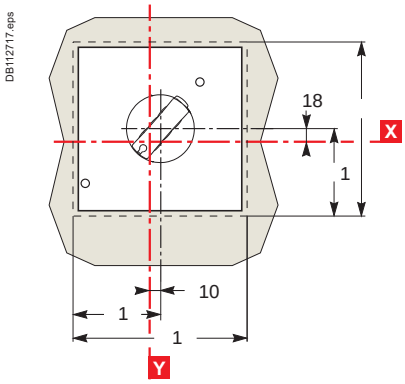




CNOMO type direct rotary handle

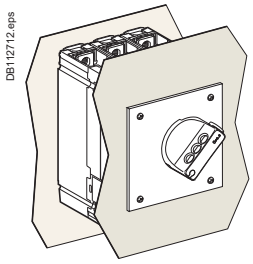


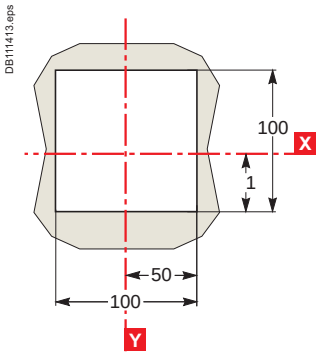


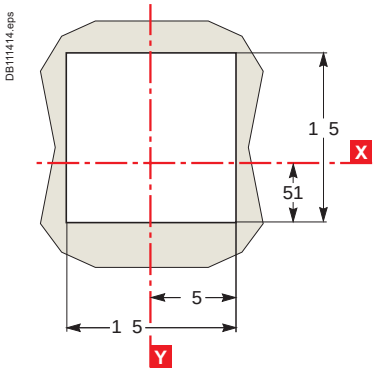


Front-panel cutout

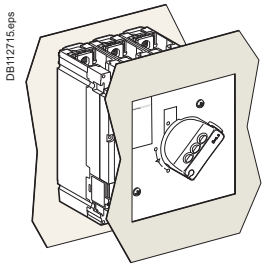
MCC type direct rotary handle

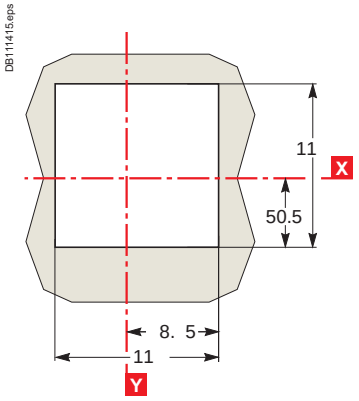


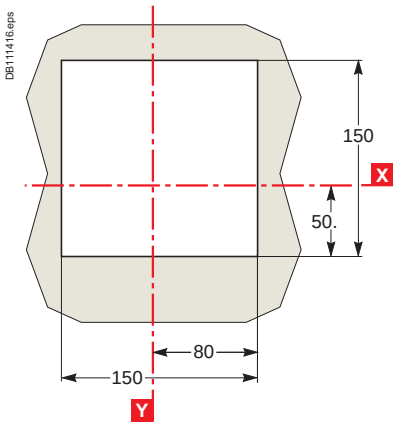




CNOMO type direct rotary handle







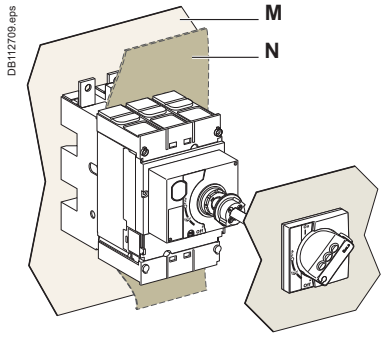
Type	A18	A19	A20	A21	A22	B10
NSX100/160/250 DC	9	60	120	65	130	9.25
NSX400/630 DC	24.6	83	160	82	164	5

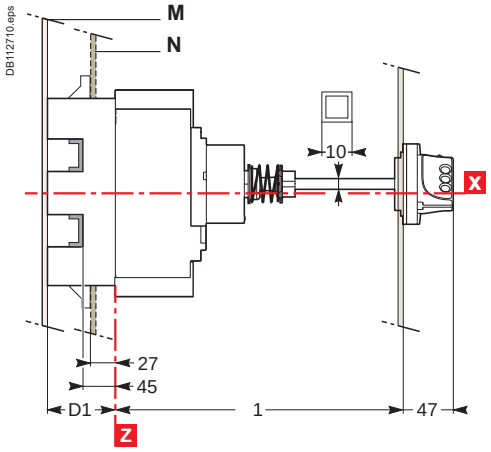
Type	B11	B12	B13	B14	P1	P2
NSX100/160/250 DC	69	120	65	130	125	135
NSX400/630 DC	85	160	82	164	149	158

Extended rotary handle for Compact NSX100 to 630 DC

Dimensions

Fixed and plug-in circuit breakers

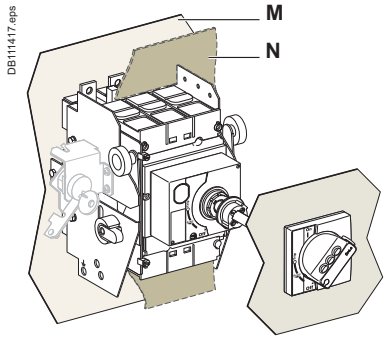


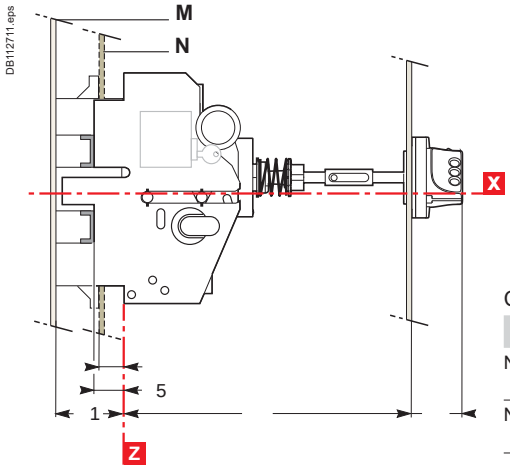


Cutout for shaft (mm)

Type	R1
NSX100/160/250 DC	min. 171 max. 600
NSX400/630 DC	min. 195 max. 600

Withdrawable circuit breaker

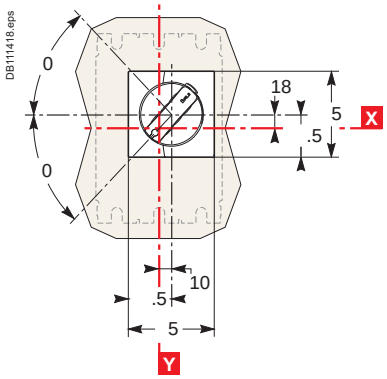


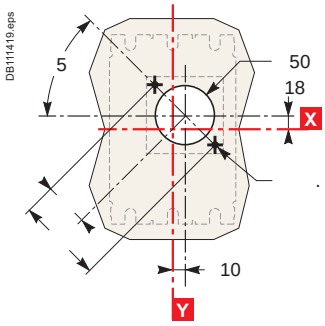


Cutout for shaft (mm)

Type	R2
NSX100/160/250 DC	min. 248 max. 600
NSX400/630 DC	min. 272 max. 600

Dimensions and front-panel cutout





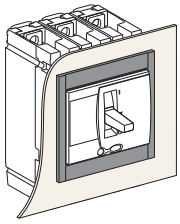
Type	A18	B10	D1
NSX100/160/250 DC	9	9.25	75
NSX400/630 DC	24.6	5	100

Front-panel accessories
Compact NSX100 to 630 DC

IP30 front-panel escutcheons

For toggle, rotary handle or motor mechanism module

DB114997.eps



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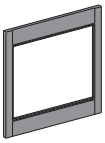

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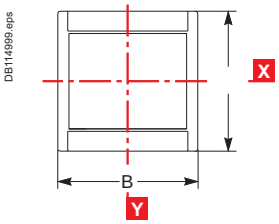
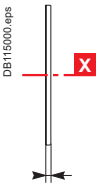
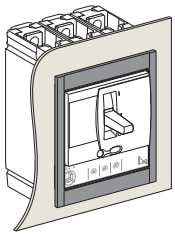


DB115000.eps



For toggle or rotary handle with access to trip unit

DB115001.eps



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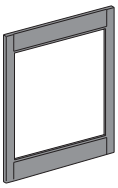

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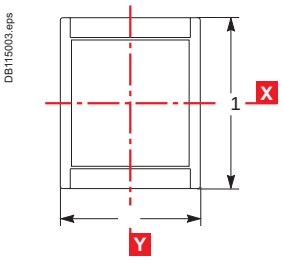

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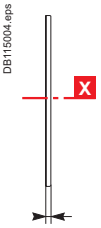
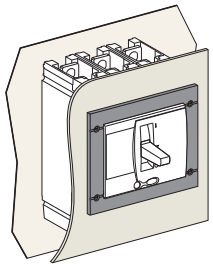


IP40 front-panel escutcheons

For toggle, rotary handle or motor mechanism module and protection collar

DB115064.eps



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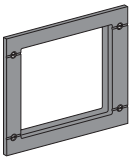

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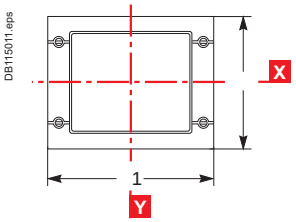

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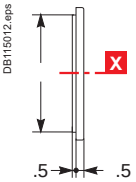
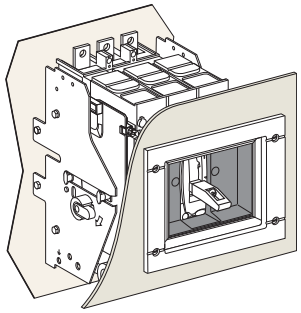


Protection collars for IP40 front-panel escutcheons

For toggle

DB115021.eps



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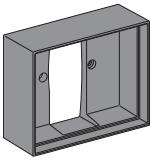

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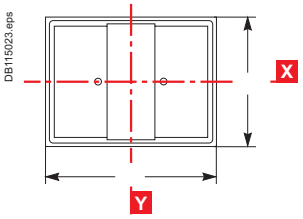

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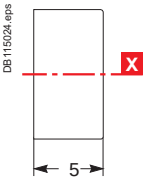
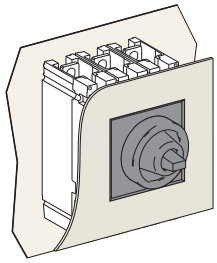


IP43 toggle cover

DB115030.eps



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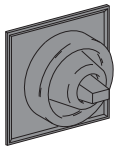

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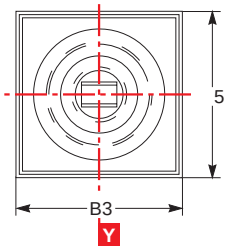

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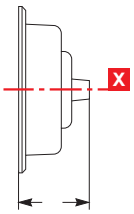
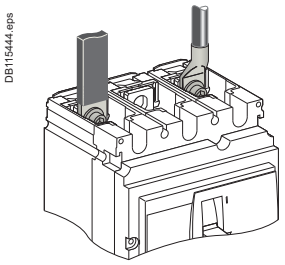


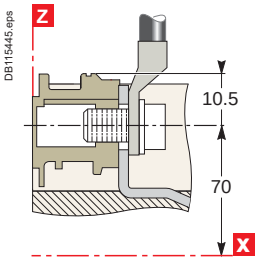
Type	A	A1	A2	A3	A4	A5	B	B1	B2	B3	C
NSX100/160/250 DC	113	138	114	101	73	85	113	157	91	103	40
NSX400/630 DC	163	211	164	151	122.5	138	163	189	122.5	138	60

Power connections
Compact NSX100 to 630 DC fixed version

Front connection without accessories

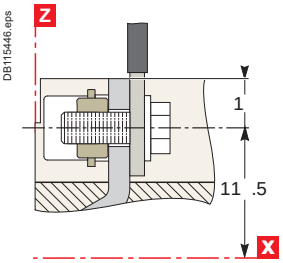


NSX100 to 250 DC



Cables with lugs/bars

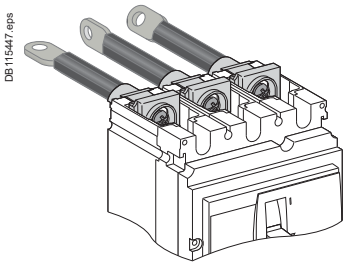
NSX400/630 DC



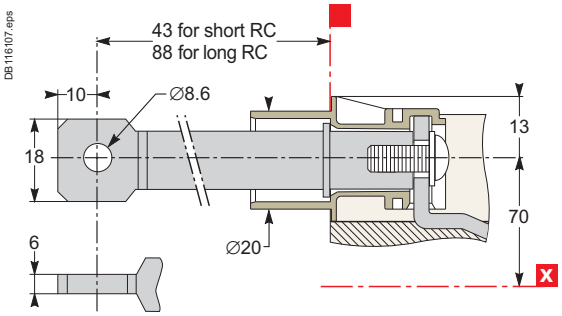
Bars/cables with lugs

Connection with accessories

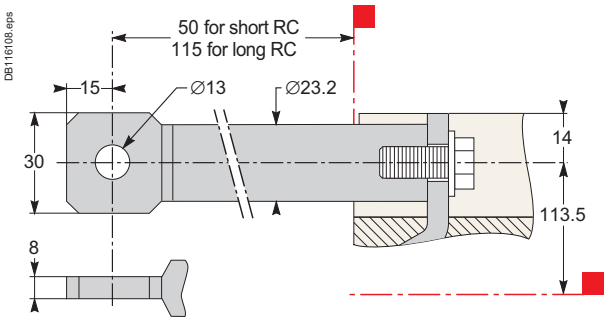
Long and short rear connectors



NSX100 to 250 DC



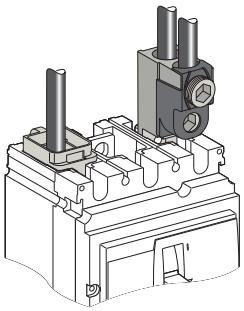
NSX400/630 DC



Connection with accessories (cont.)

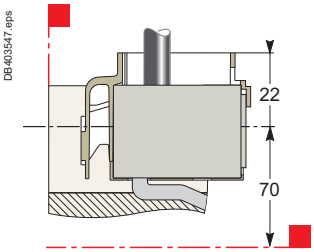
Bare-cable connectors

DB115450.eps



NSX100 to 250 DC

DB403547.eps



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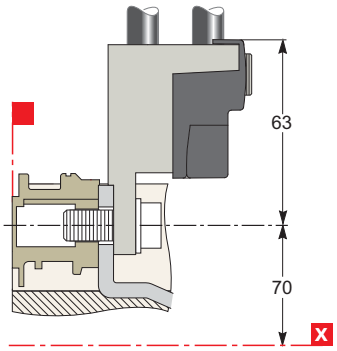

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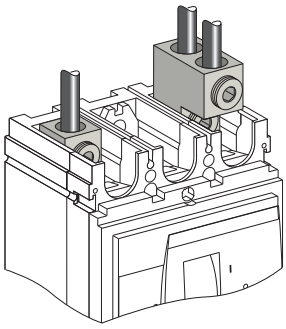

NSX400/630 DC

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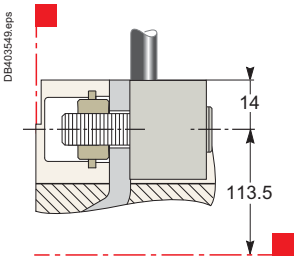

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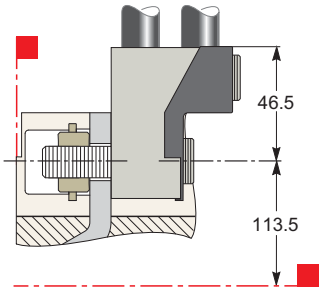
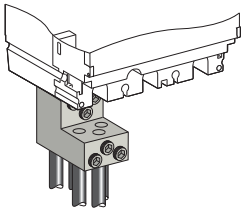


Distribution connectors (for NSX100 to 250 DC only)

DB115456.eps



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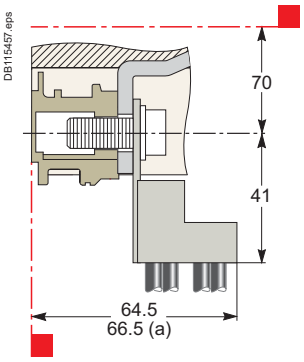
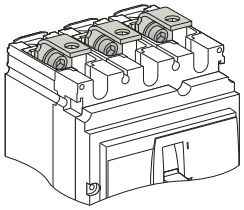


(a) NSX250 DC.

Right-angle terminal extensions (upstream only)

NSX100 to 250 DC

DB115458.eps



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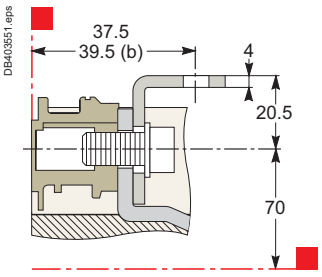
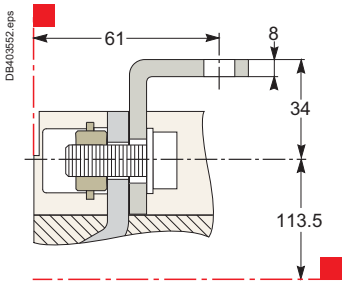


NSX400/630 DC

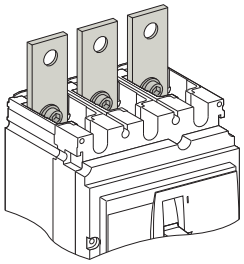
DB403552.eps



(b) NSX250 DC.

Straight terminal extensions (for NSX100 to 250 DC only)

DB115461.eps



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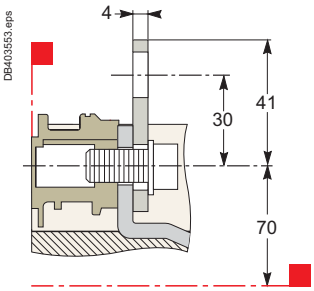
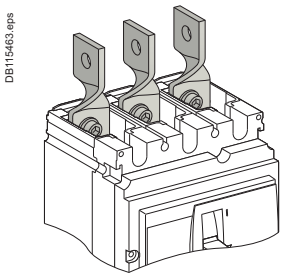


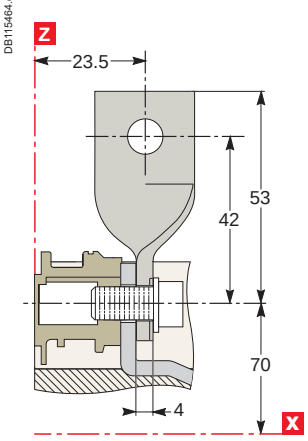
Power connections
Compact NSX100 to 630 DC fixed version

Connection with accessories (cont.)

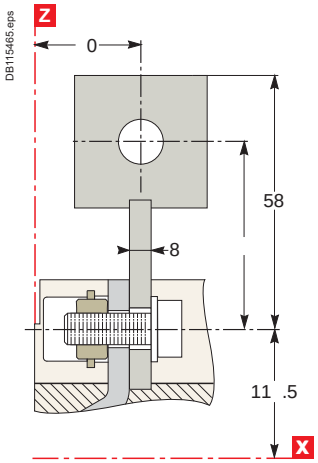
Edgewise terminal extensions



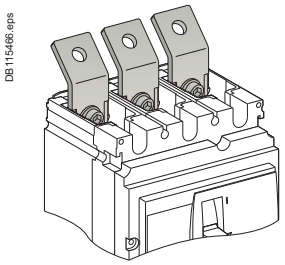
NSX100 to 250 DC



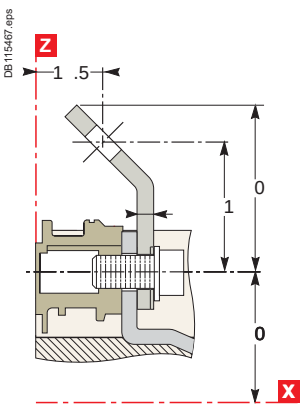
NSX400/630 DC



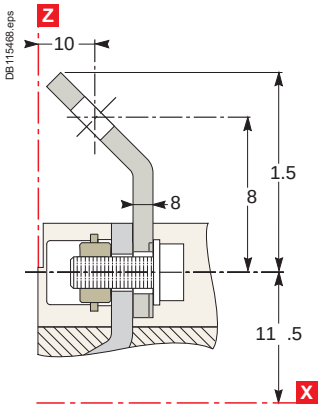
45° terminal extensions



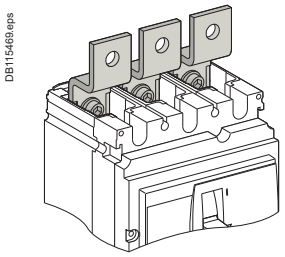
NSX100 to 250 DC



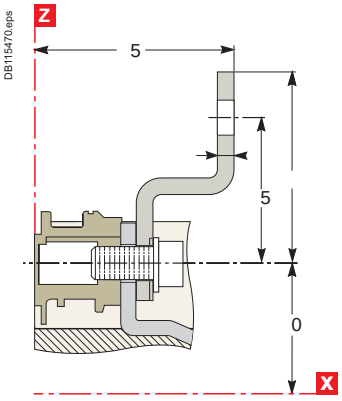
NSX400/630 DC



Double-L terminal extensions



NSX100 to 250 DC

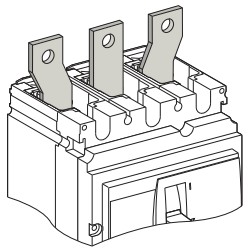


Connection with accessories (cont.)

Spreaders **3P** **4P**

NSX100 to 250 DC

DB115471.eps



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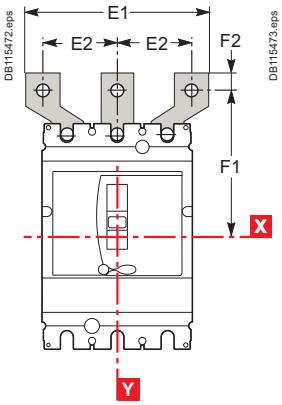

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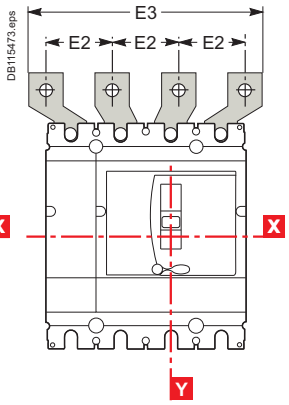

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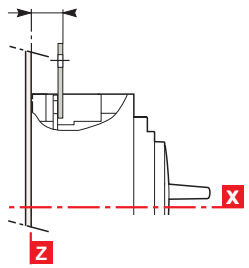
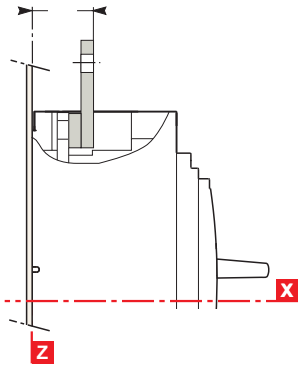
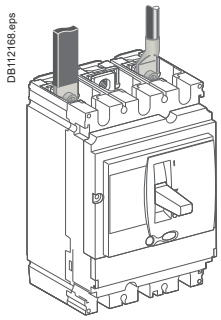


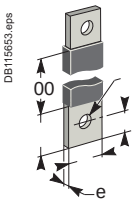


Type	C3	C4	E1	E2	E3	F1	F2
NSX100/160 DC	23.5	-	114	45	159	100	11
NSX250 DC	25.5	-	114	45	159	100	11
NSX400/630 DC	-	44	135 170	52.5 70	187.5 240	152.5 166	15 15

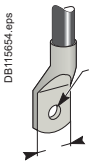
Power connections

Connection of insulated bars or cables with lugs to Compact NSX100 to 630 DC





Bar.



Lug.

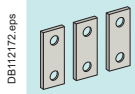
Direct connection to NSX100 to 630 DC

Dimensions		NSX100 DC	NSX160/250 DC	NSX400/630 DC
Bars	L (mm)	≤ 25	≤ 25	≤ 32
	l (mm)	d + 10	d + 10	d + 15
	d (mm)	≤ 10	≤ 10	≤ 15
	e (mm)	≤ 6	≤ 6	3 ≤ e ≤ 10
	Ø (mm)	6.5	8.5	10.5
Lugs	L (mm)	≤ 25	≤ 25	≤ 32
	Ø (mm)	6.5	8.5	10.5
Torque (Nm) (1)		10	15	50
Torque (Nm) (2)		5/5	5/5	20/11
Torque (Nm) (3)		8	8	20

(1) Tightening torque on the circuit breaker for lugs or bars.
(2) Tightening torque on fixed devices for rear connectors//tightening torque on plug-in or withdrawable devices for power connectors.
(3) Tightening torque on the plug-in base for terminal extensions.

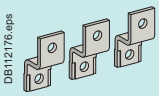
Accessories for NSX100 to 250 DC

Straight terminal extensions



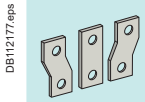
Tinned copper

Double-L terminal extensions



Tinned copper

Spreaders: separate parts

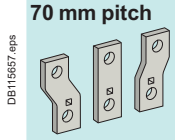


Tinned copper

For U > 600 V, the mandatory insulation kit is not compatible with spreaders made up of separate parts.

Accessories for NSX400 and 630 DC

Spreaders made up of separate parts for 52.5 and 70 mm pitch

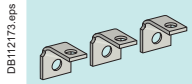


Tinned copper

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

Accessories for NSX100 to 630 DC

Right-angle terminal extensions



Tinned copper
To be mounted on upstream side.

Edgewise terminal extensions

Tinned copper

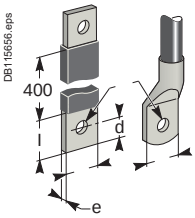
45° terminal extensions

Tinned copper

Connection with accessories to NSX100 to 250 DC (IEC 228)

Pole pitch	
Without spreaders	35 mm
With spreaders	45 mm

Dimensions			With spreaders or terminal extensions	
			NSX100 DC	NSX160/250 DC
	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
	Torque (Nm) (1)		10	15
	Torque (Nm) (2)		5	5



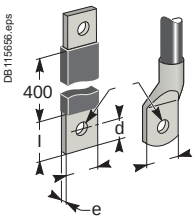
(1) Tightening torque on the circuit breaker for spreaders or terminal extensions.
(2) Tightening torque on the plug-in base for spreaders or terminal extensions.

Spreaders and straight, right-angle, 45°, double-L and edgewise terminal extensions are supplied with flexible interphase barriers.

Connection with accessories to NSX400 DC and 630 DC (IEC 228)

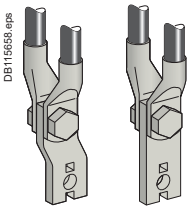
Pole pitch	
Without spreaders	45 mm
With spreaders	52.5 or 70 mm

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
	Torque (Nm) (1)		50	50
	Torque (Nm) (2)		20	20



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

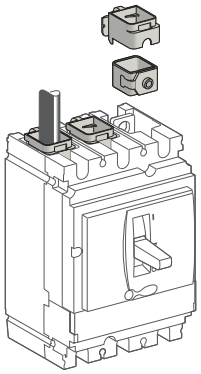
Spreaders and right-angle, 45° and edgewise terminal extensions are supplied with flexible interphase barriers.



Mounting detail: 2 cables with lugs.

Connection of bare cables to Compact NSX100 to 630 DC

DB115659.eps



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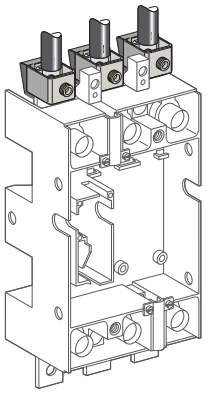
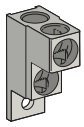


Connection for NSX100 to 250 DC

DB112315.eps

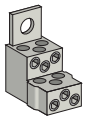
1-cable connector

DB112317.eps



2-cable connector

DB111327.eps



Distribution connector

DB115663.eps

	1-cable connector	Steel ≤ 160 A	Aluminium ≤ 250 A		
	L (mm)	25	25		
	S (mm²) Cu / Al	1.5 to 95 (1)	25 to 50	70 to 95	120 to 185 150 max. flex.
	Torque (Nm)	12	20	26	26
	2-cable connector				
	L (mm)	25 or 50			
	S (mm²) Cu / Al	2 x 50 to 2 x 120			
	Torque (Nm)	22			
	6-cable distribution connector (copper or aluminium)				
	L (mm)	15 or 30			
	S (mm²) Cu / Al	1.5 to 6 (1)	8 to 35		
	Torque (Nm)	4	6		

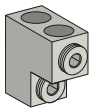
(1) For flexible cables from 1.5 to 4 mm², connection with crimped or self-crimping ferrules.

Connection to NSX400 and 630 DC

DB112316.eps

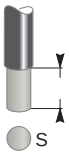
1-cable connector

DB111326.eps



2-cable connector

DB115663.eps



	1-cable connector	2-cable connector
L (mm)	30	30 or 60
S (mm²) Cu / Al	35 to 300 rigid 240 max. flex.	2 x 35 to 2 x 240 rigid 240 max. flex.
Torque (Nm)	31	31

Conductor materials and electrodynamic stresses

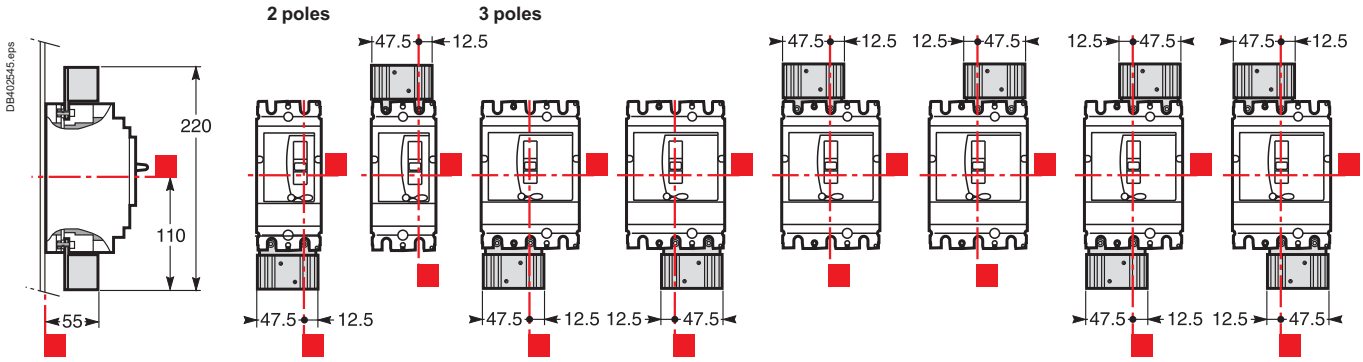
Compact NSX DC circuit breakers can be connected indifferently with bare-copper, tinned-copper and tinned-aluminium conductors (flexible or rigid bars, cables).
In the event of a short-circuit, thermal and electrodynamic stresses will be exerted on the conductors. They must therefore be correctly sized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

Compact (fixed version) 2P-3P-4P Parallel and series connection of poles

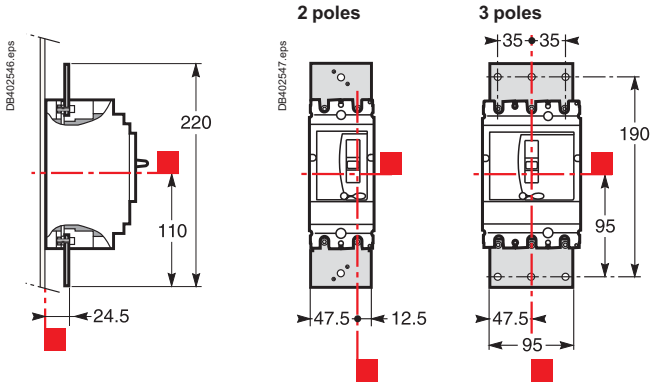
Compact NSX100 to NSX250 DC

2P fixed version (Compact NSX100-160 N/H DC) - 3P fixed version (Compact NSX100-250 DC)

With series connections

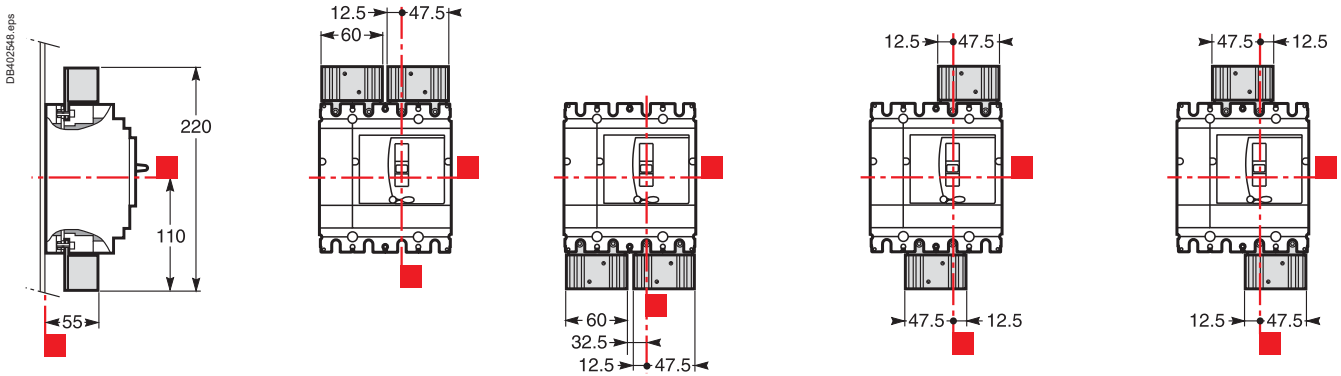


With parallel connections

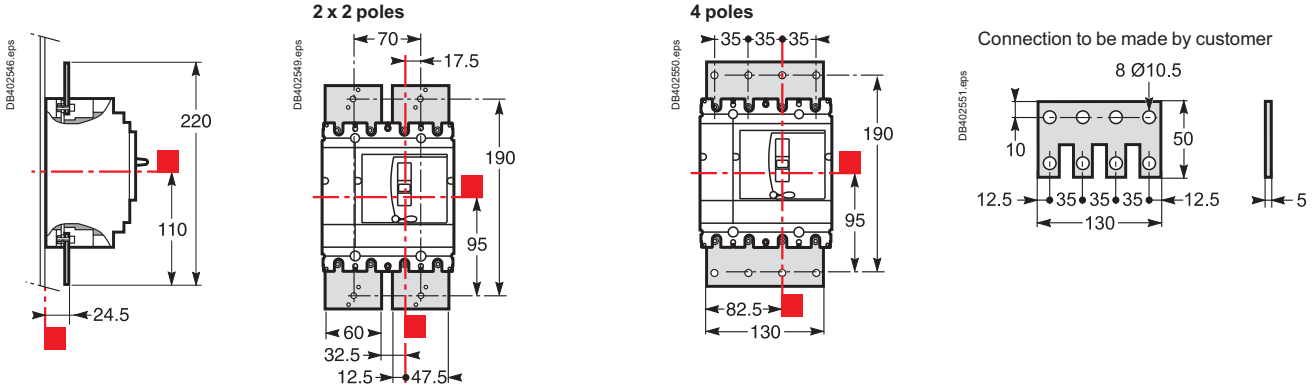


4P fixed version (Compact NSX100-250 DC)

With series connections

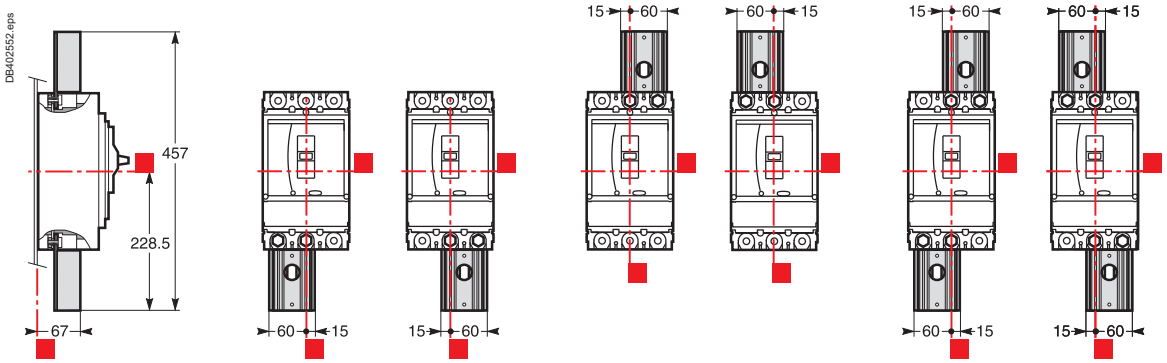


With parallel connections

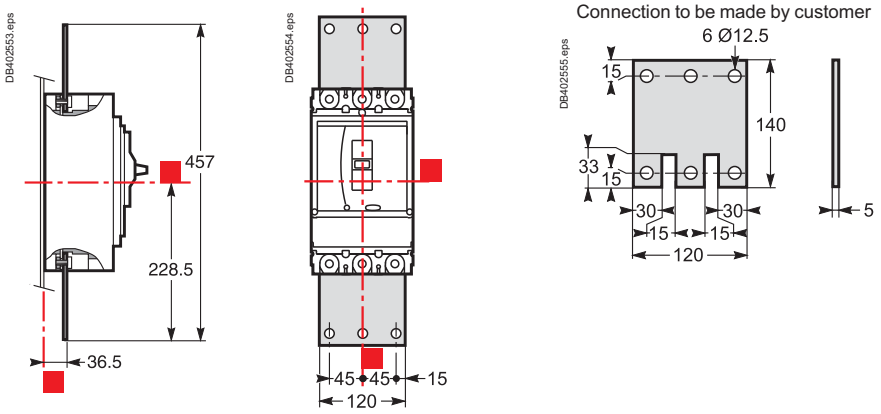


3P fixed version (Compact NSX400-630 DC)

With series connections

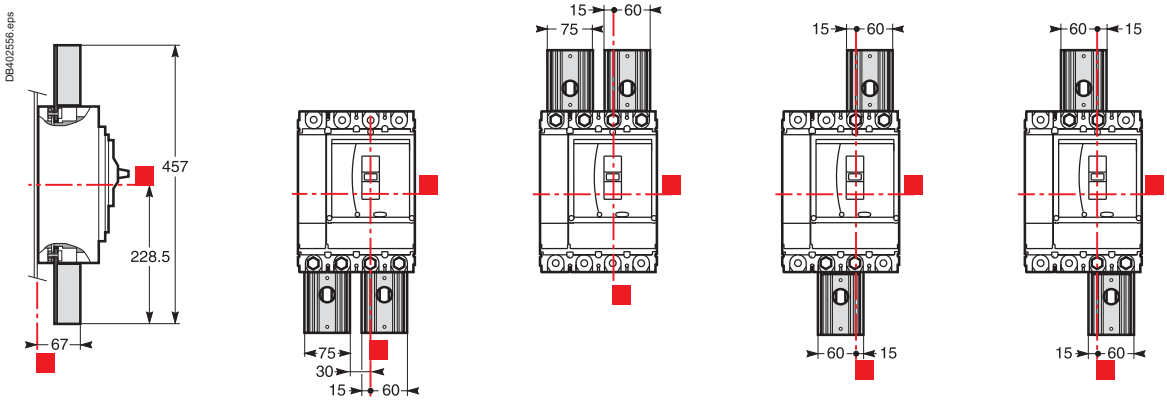


With parallel connections

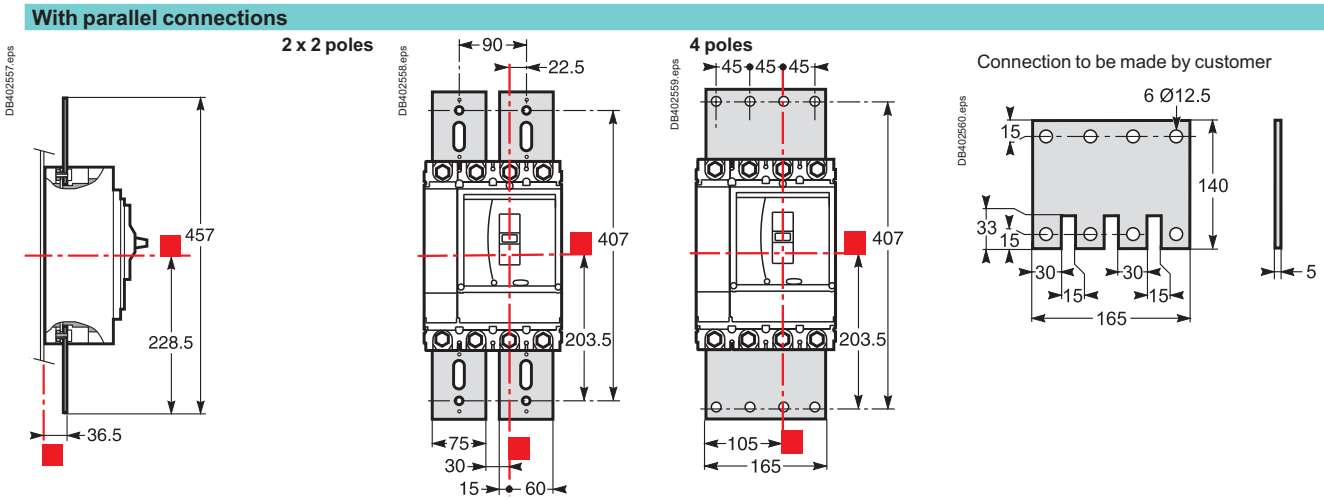


4P fixed version (Compact NSX100 to NSX630 DC)

With series connections



With parallel connections



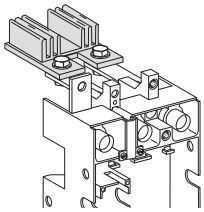
Compact (withdraw. version) 3P-4P Parallel and series connection of poles

Compact NSX100 to NSX250 DC

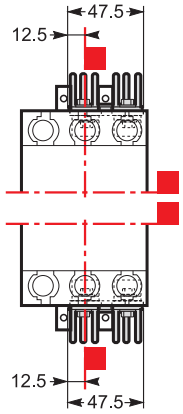
3P withdrawable version

Connections mounted with heat sink directed outwards

DB402561.eps



DB402562.eps



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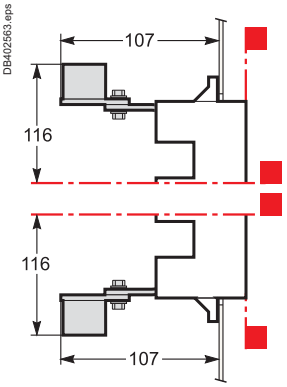
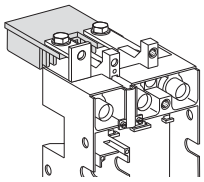
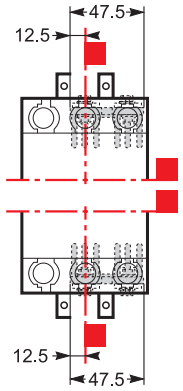


Connections mounted with heat sink directed inwards

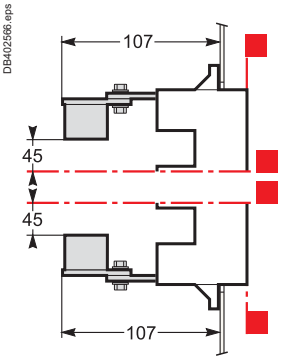
DB402564.eps



DB402565.eps



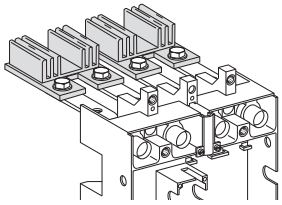
DB402566.eps



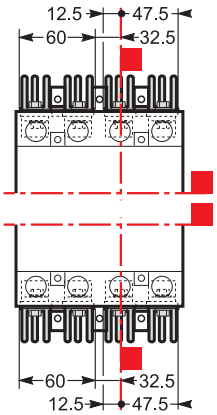
4P withdrawable version

Connections mounted with heat sink directed outwards

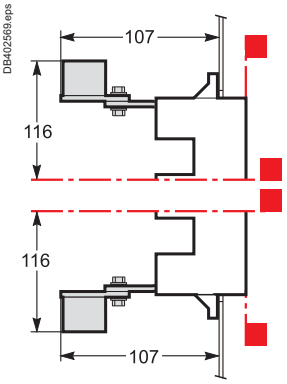
DB402567.eps



DB402568.eps

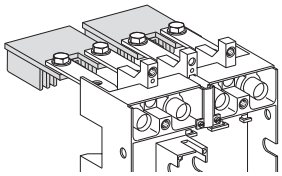


DB402569.eps

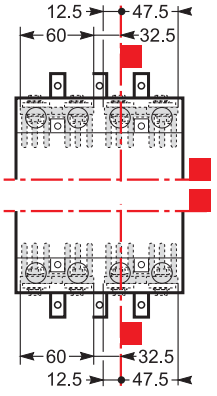


Connections mounted with heat sink directed inwards

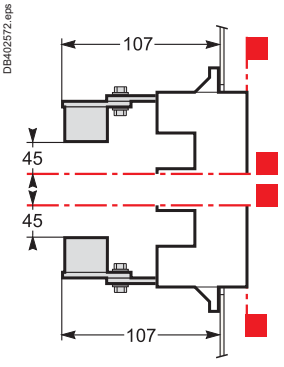
DB402570.eps



DB402571.eps



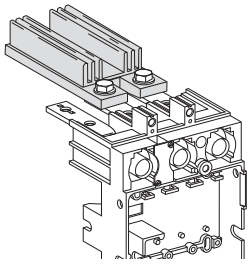
DB402572.eps



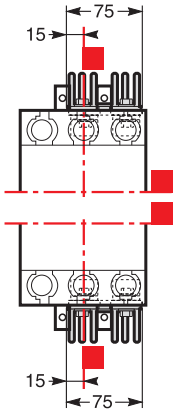
3P withdrawable version

Connections mounted with heat sink directed outwards

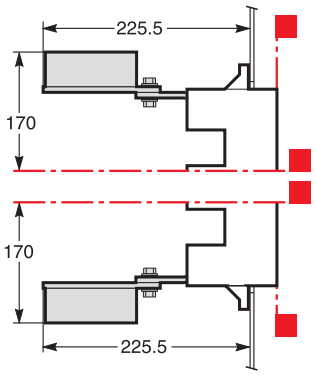
DB402573.eps



DB402574.eps

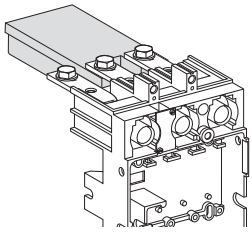


DB402575.eps

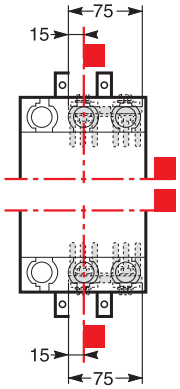


Connections mounted with heat sink directed inwards

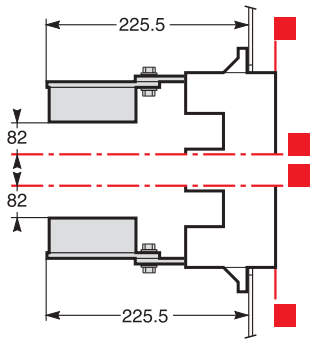
DB402576.eps



DB402577.eps



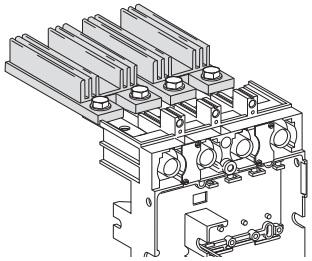
DB402578.eps



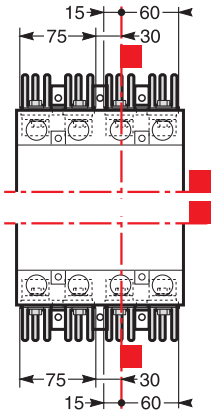
4P withdrawable version

Connections mounted with heat sink directed outwards

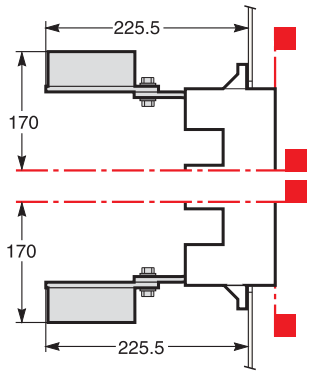
DB402579.eps



DB402580.eps

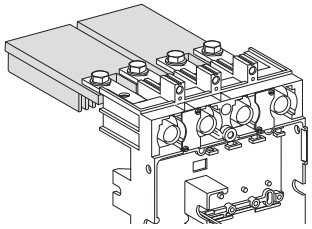


DB402581.eps

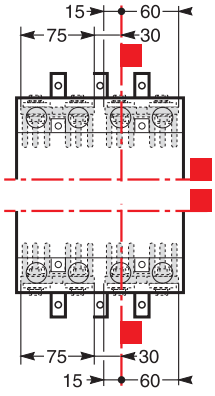


Connections mounted with heat sink directed inwards

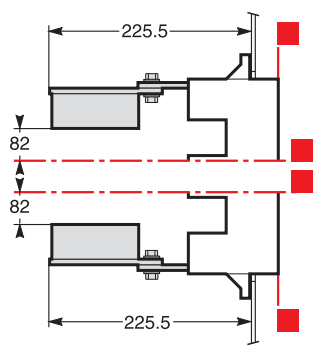
DB402582.eps



DB402583.eps

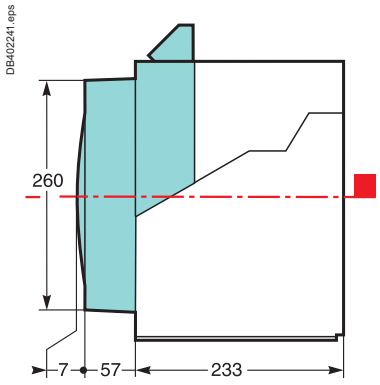


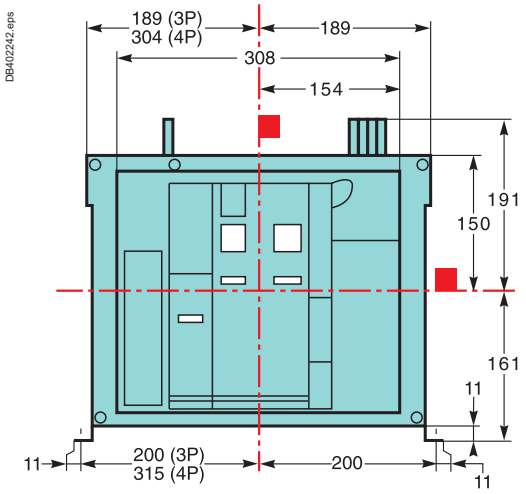
DB402584.eps



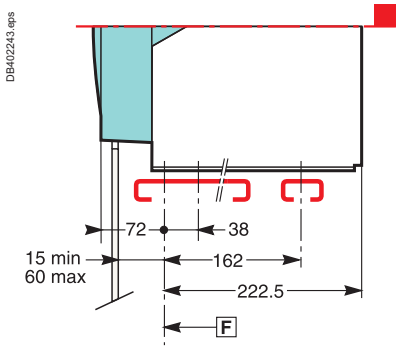
Masterpact NW10 to 40 DC
Fixed device
Version C/D (3 poles)
Version E (4 poles)

Device

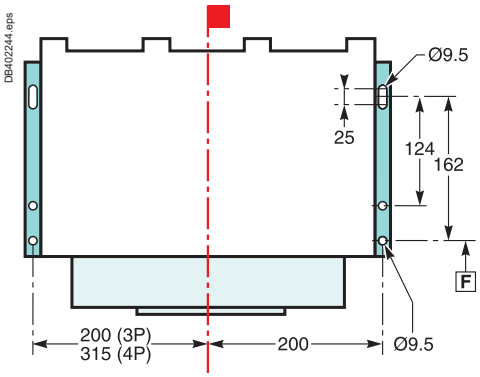




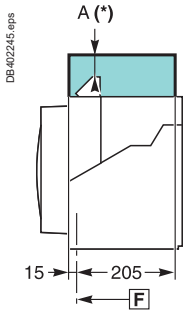
Mounting on base plate or rails

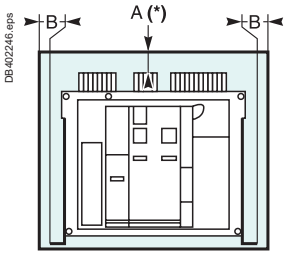


Mounting detail

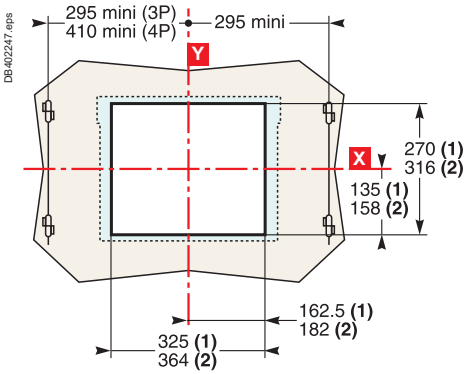


Safety clearances





Door cutout

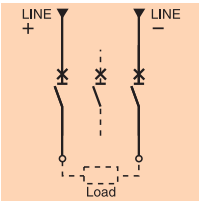


	Insulated parts	Metal parts	Energised parts
A	0	0	100
B	0	0	60

F: Datum.

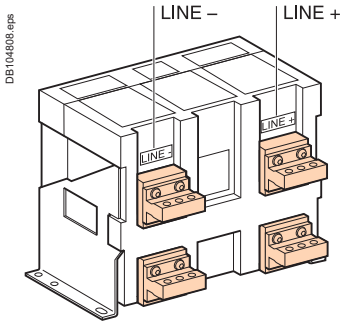
Note:
(1) Without escutcheon.
(2) With escutcheon.
X and Y are the symmetry planes for a 3-pole device.
A(*) An overhead clearance of 110 mm is required to remove the arc chutes.
An overhead clearance of 20 mm is required to remove the terminal block.

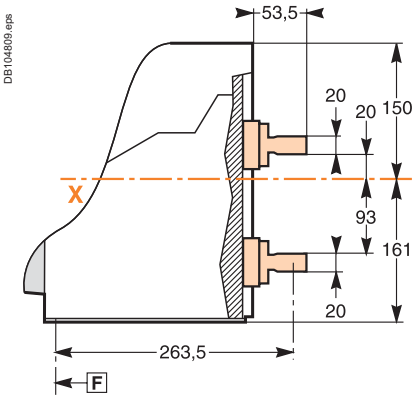
Fixed device
Version C



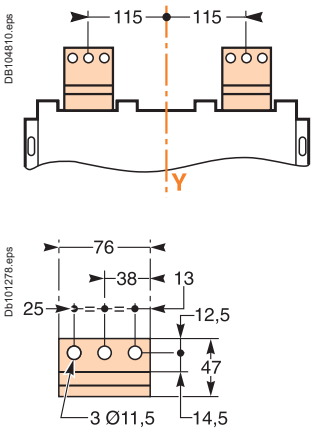
Connections

Horizontal rear connection (NW10 - NW20 DC)

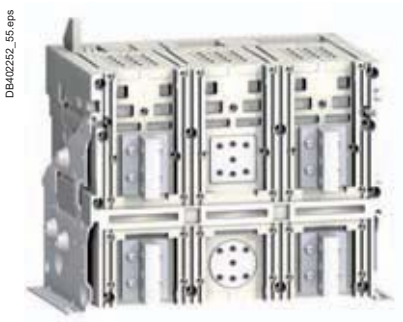


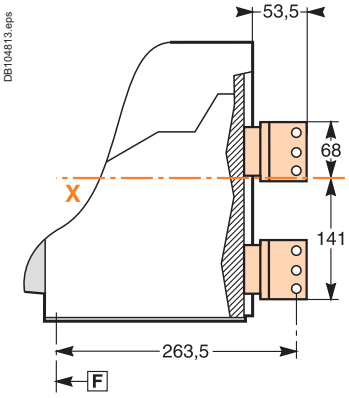


Detail

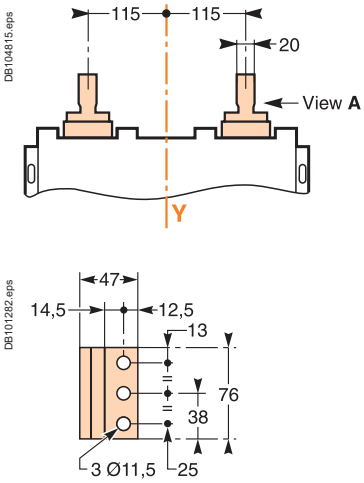


Vertical rear connection (NW10 - NW20 DC)



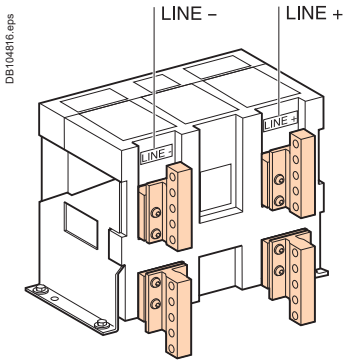


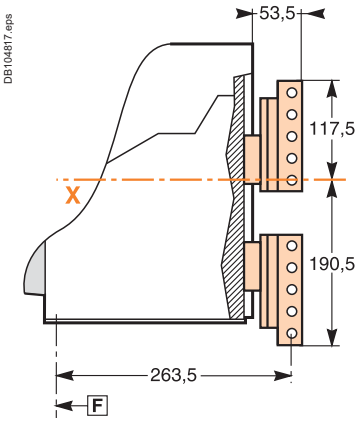
Detail



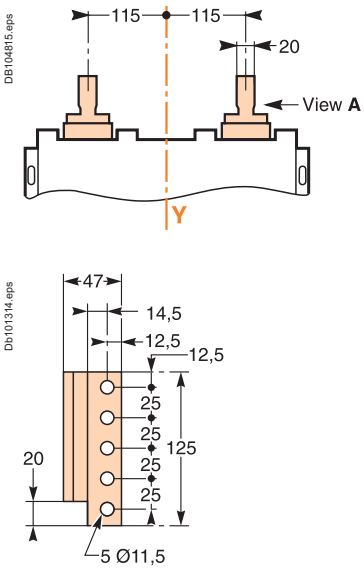
View A detail.

Vertical rear connection (NW40 DC)





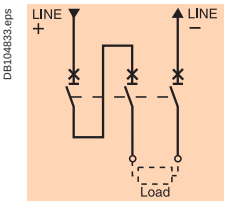
Detail



View A detail.

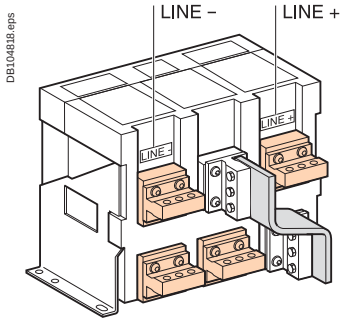
Note:
Recommended connection screws: ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

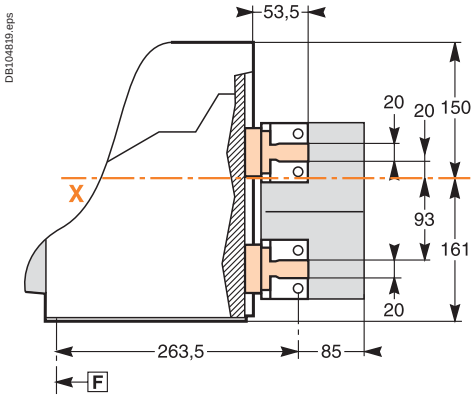
Masterpact
NW10 to 40 DC
Fixed device
Version D



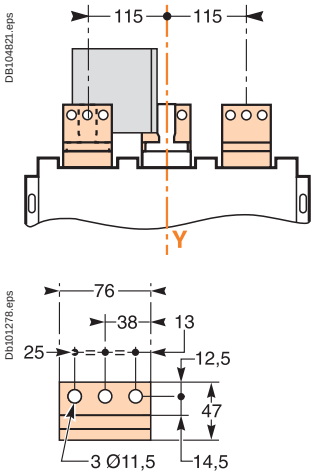
Connections

ori ontal rear connection N - N DC

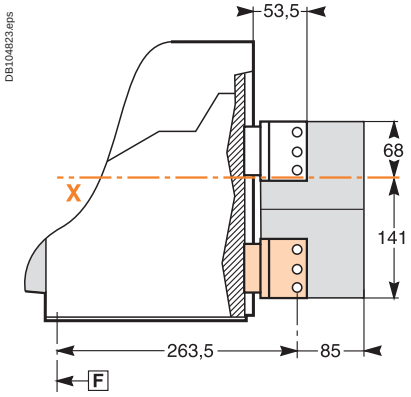




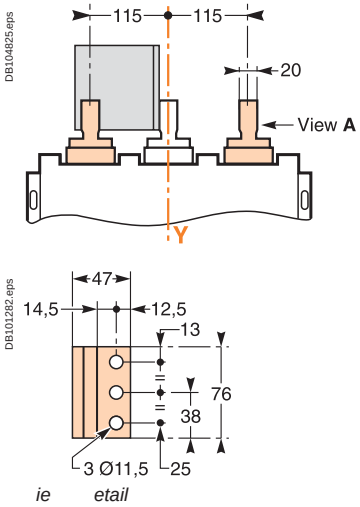
Detail



ertical rear connection N - N DC

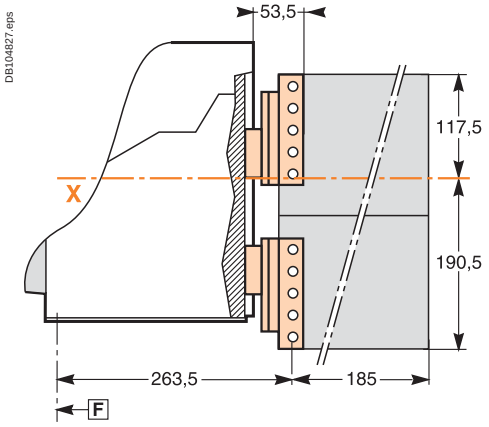


Detail

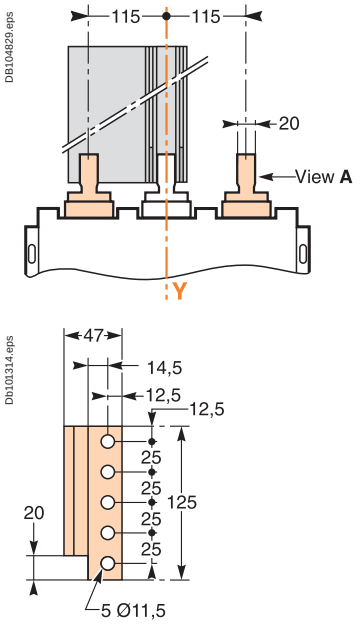


ie etail

ertical rear connection N DC



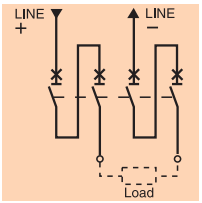
Detail



ie etail

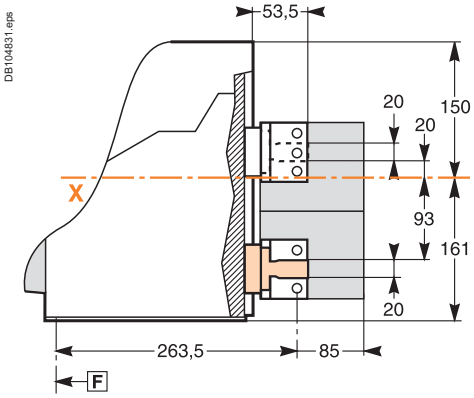
Note:
ecommen e connection scre s ***M10*** *class*
i tenin tor ue ***50 Nm*** *it contact as er*

Fixed device
Version E

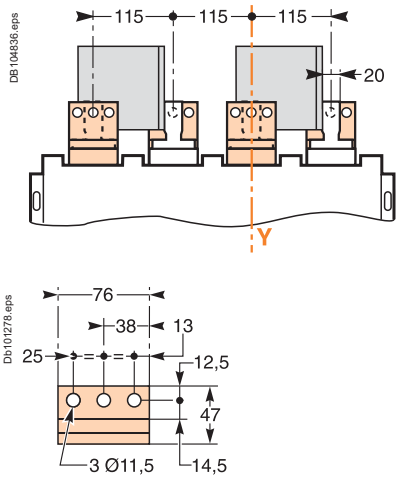


Connections

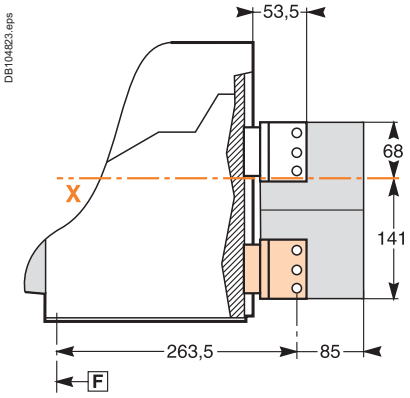
Horizontal rear connection (NW10 - NW20 DC)



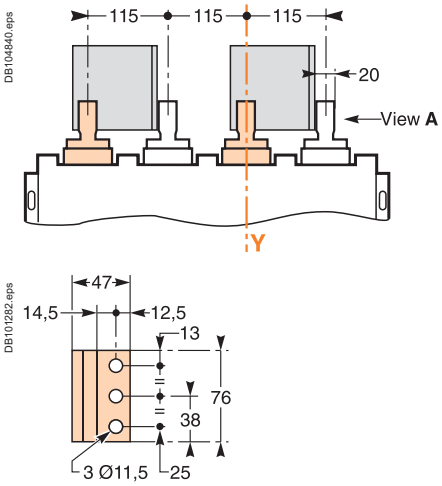
Detail



Vertical rear connection (NW10 - NW20 DC)

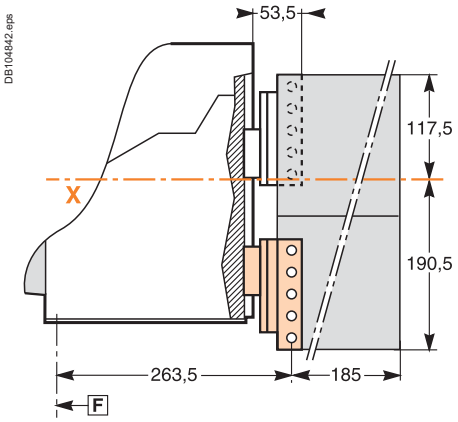


Detail

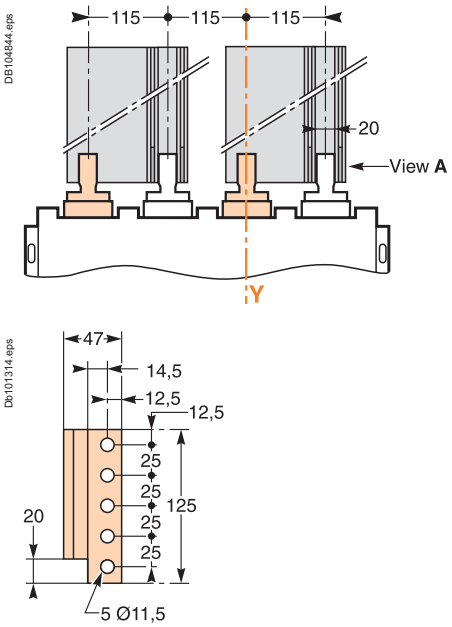


View A detail.

Vertical rear connection (NW40 DC)



Detail

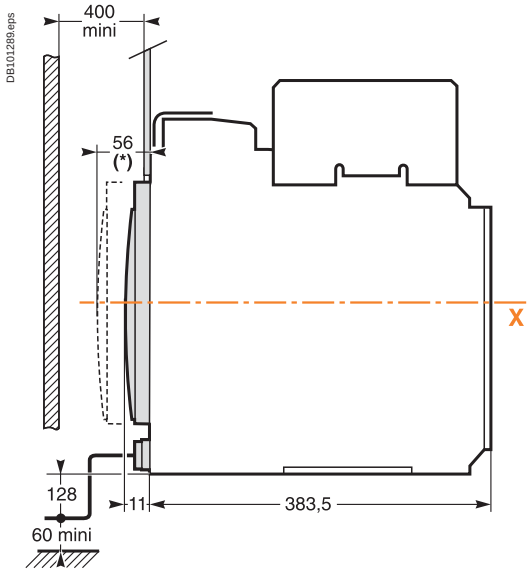


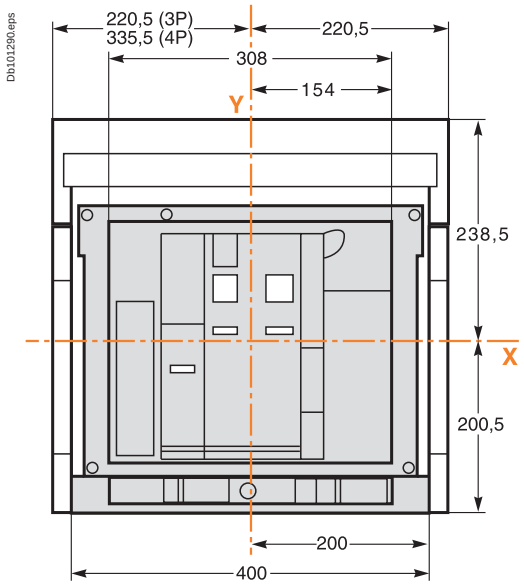
View A detail.

Note:
Recommended connection screws: ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

Masterpact NW10 to 40 DC
Drawout device
Version C/D (3 poles)
Version E (4 poles)

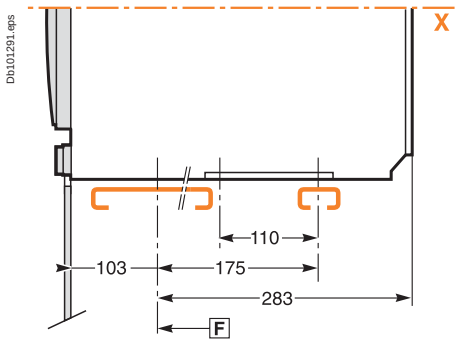
Device



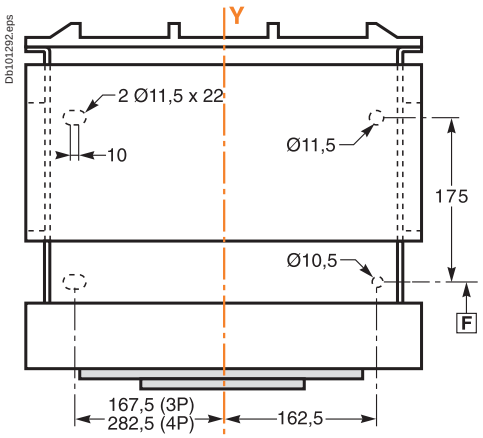


(*) ra out position

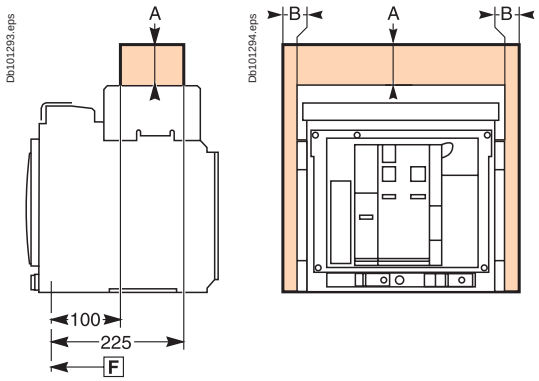
ountin on ase plate or rails



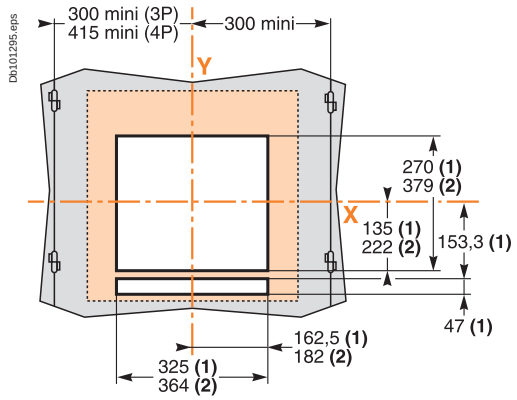
ountin detail



Safet clearances



Door cutout

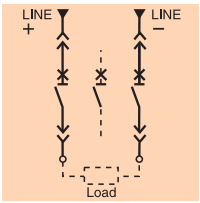


	nsulated parts	etal parts	Ener ised parts
	0	0	0
	0	0	60

F atum

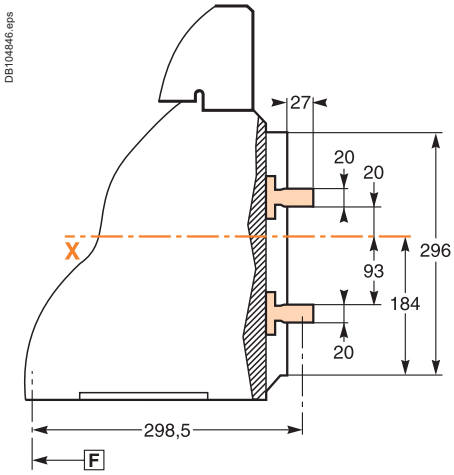
Note:
(1) it out escutc eon
(2) it escutc eon
X an Y are t e symmetry planes for a pole e ice

Drawout device
Version C

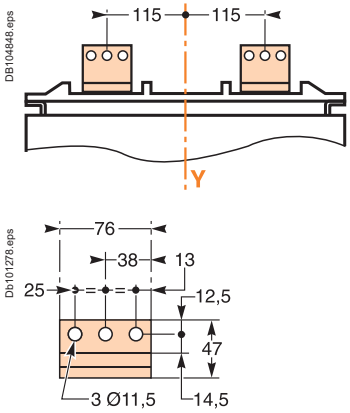


Connections

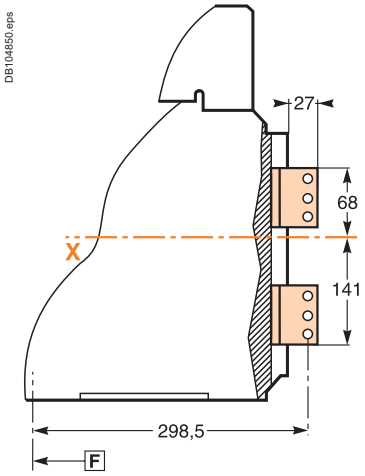
Horizontal rear connection (NW10 - NW20 DC)



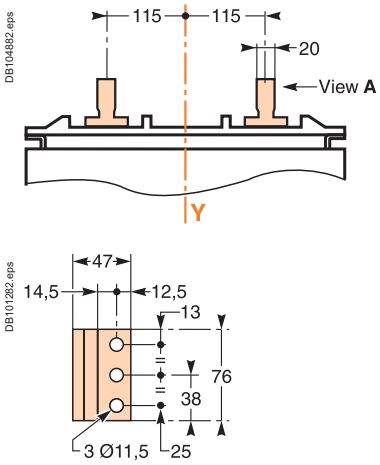
Detail



Vertical rear connection (NW10 - NW20 DC)

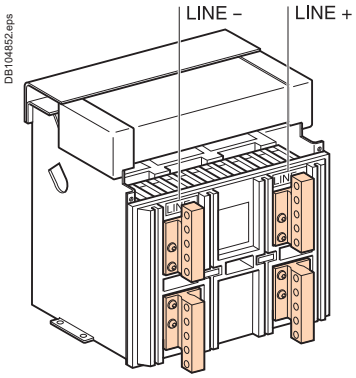


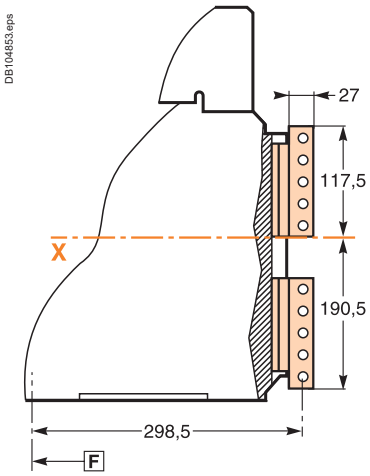
Detail



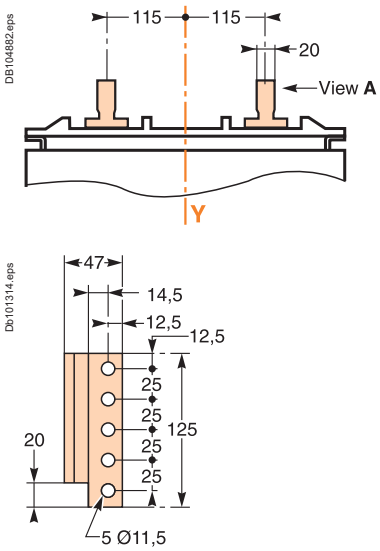
View A detail.

Vertical rear connection (NW40 DC)





Detail

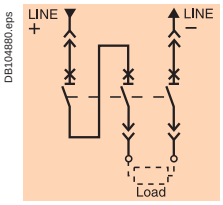


View A detail.

Note:
Recommended connection screws: ***M10*** *class 8.8.*
Tightening torque: ***50 Nm*** *with contact washer.*

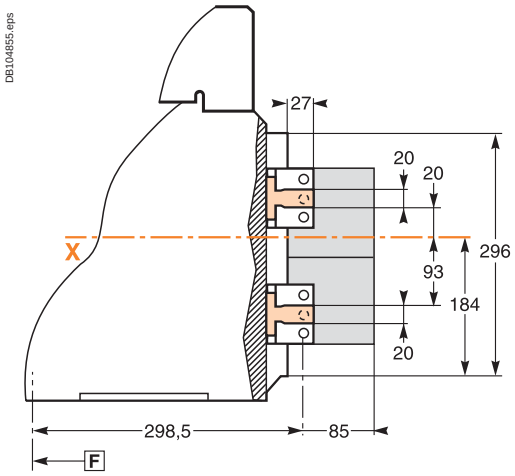
Masterpact NW10 to 40 DC

Drawout device
Version D

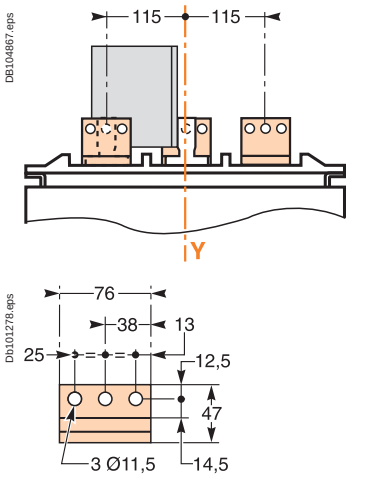


Connections

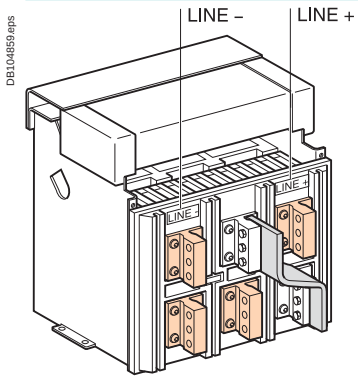
ori ontal rear connection N - N DC

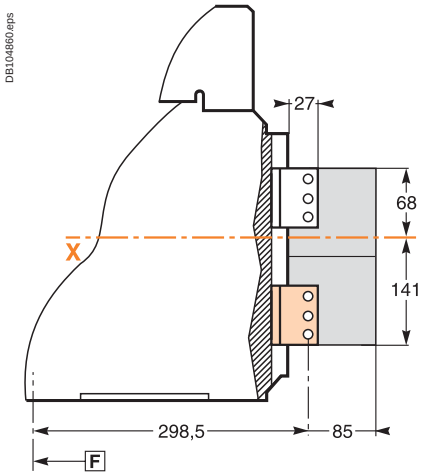


Detail

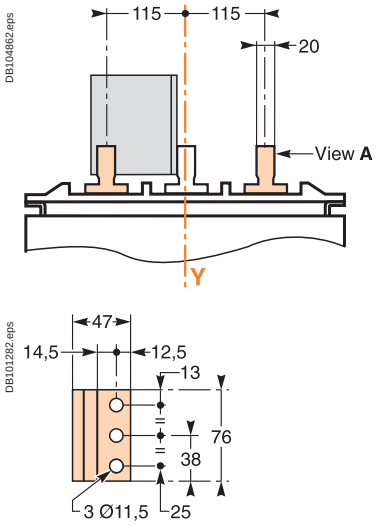


ertical rear connection N - N DC



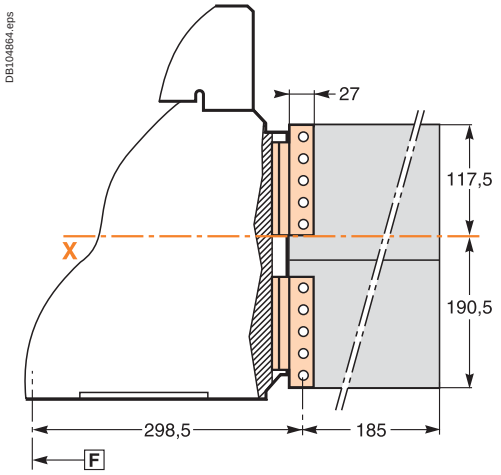


Detail

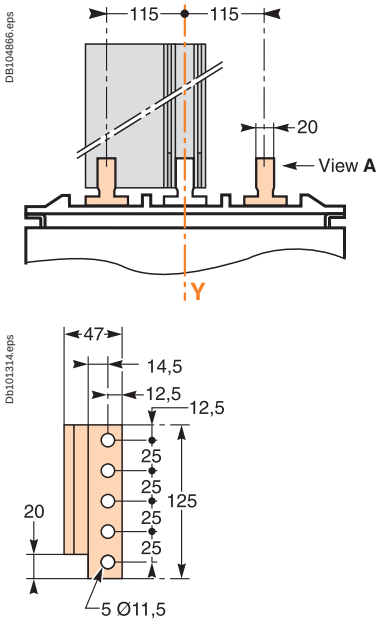


ie etail

ertical rear connection N DC



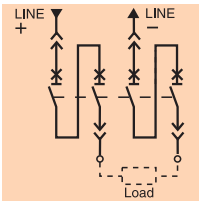
Detail



ie etail

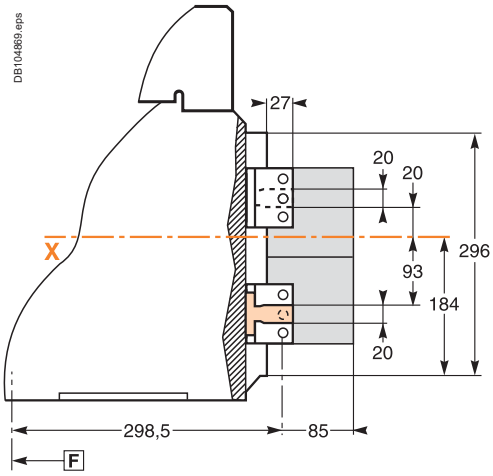
Note:
ecommen e connection scre s ***M10*** *class*
i tenin tor ue ***50 Nm*** *it contact as er*

Drawout device
Version E

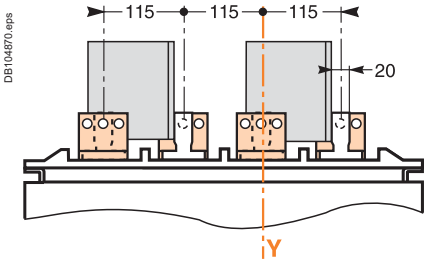


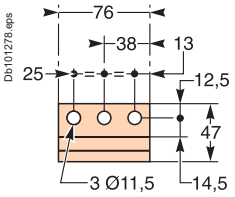
Connections

Horizontal rear connection (NW10 - NW20 DC)

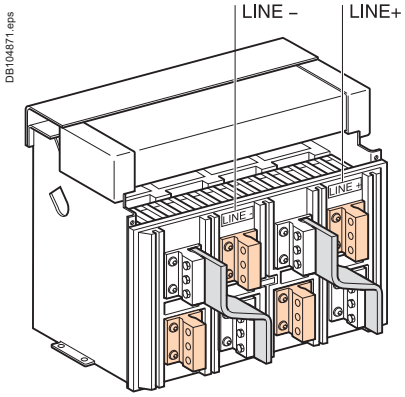


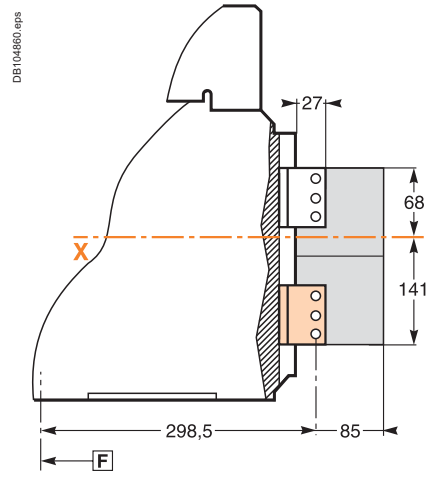
Detail



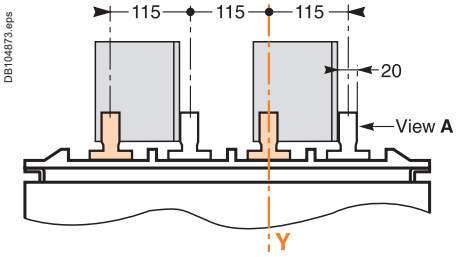


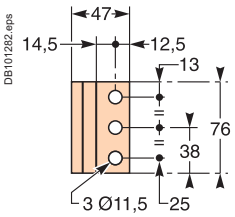
Vertical rear connection (NW10 - NW20 DC)





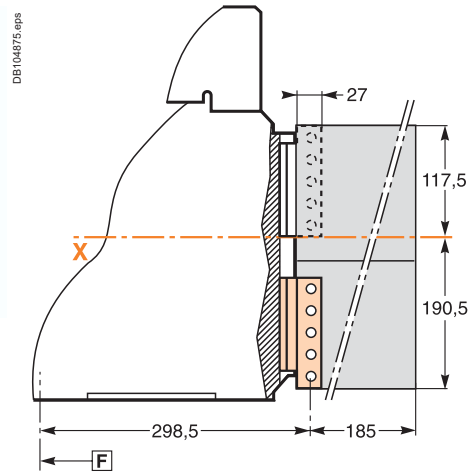
Detail



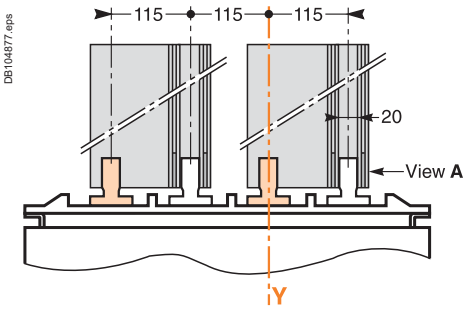


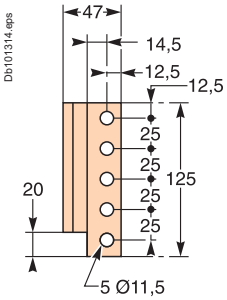
View A detail.

Vertical rear connection (NW40 DC)



Detail



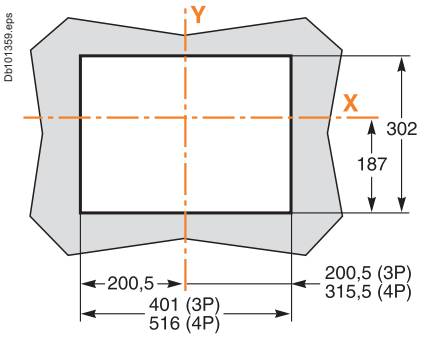


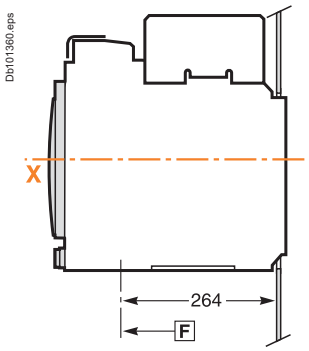
View A detail.

Note:
*Recommended connection screws: **M10** class 8.8.*
*Tightening torque: **50 Nm** with contact washer.*

Masterpact NW10 to 40 DC
Accessories

Rear panel cutout (drawout device)
NW10 to NW40 DC

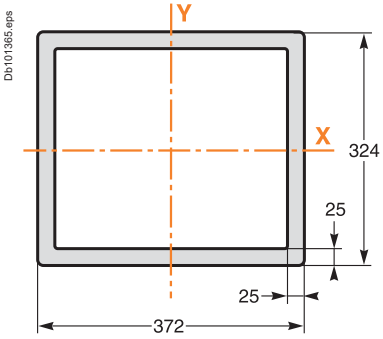




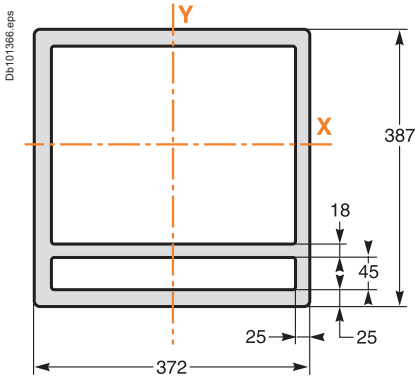
F : *Datum.*

Escutcheon

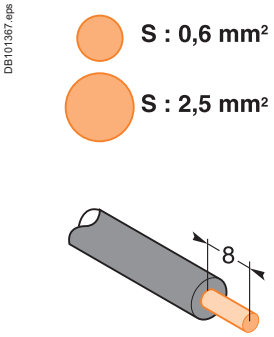
Fixed device

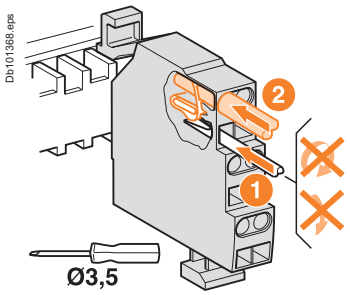


Drawout device



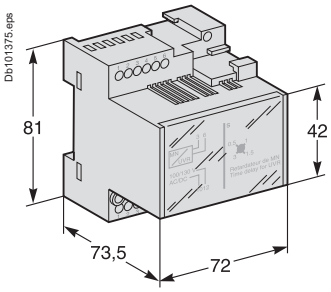
Connection of auxiliary wiring to terminal block

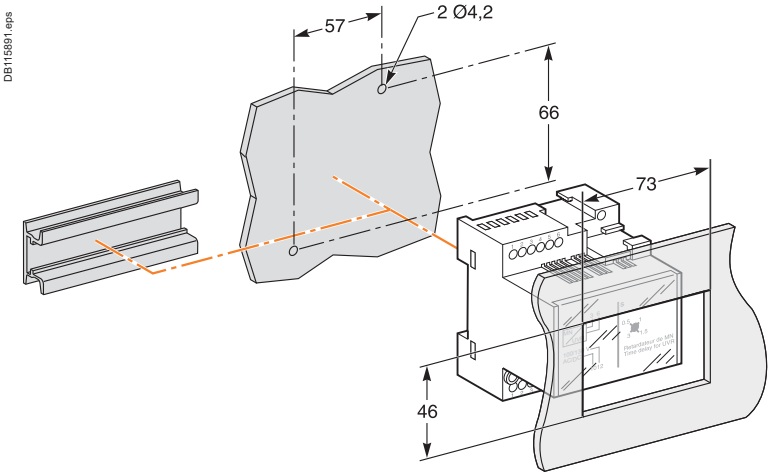




One conductor only per connection point.

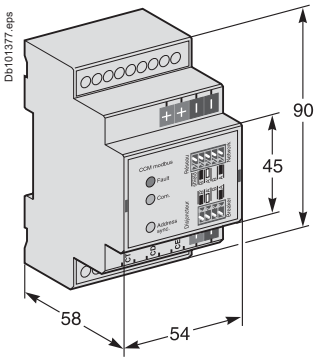
Delay unit for MN release





"Chassis" communication module

Modbus



TOOLS

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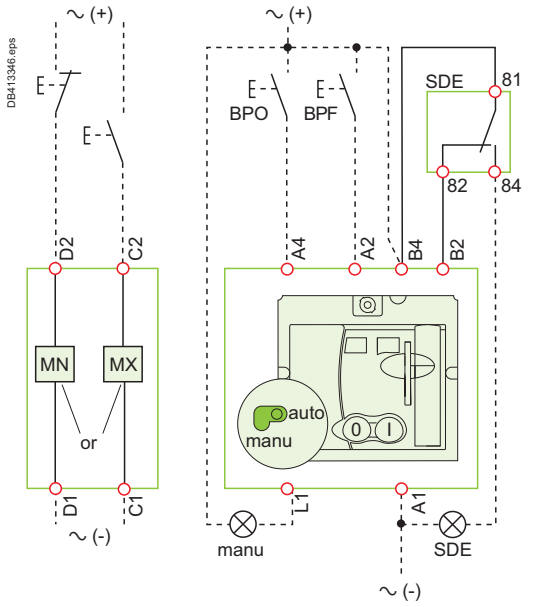
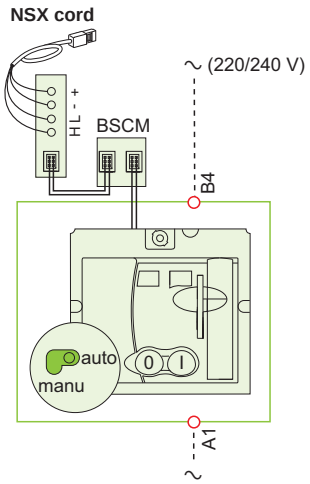
Electrical diagrams

Compact NSX100 to 630 DC
Fixed circuit breakers

Remote operation



otor mechanism T



Communicatin motor mechanism Tc

(1) NSX100-250 DC only.

Remote operation

MN: undervoltage release
or
MX: shunt release

Motor mechanism (MT)

A4: opening order
A2: closing order
B4, A1: power supply to motor mechanism
L1: manual position (manu)
B2: SDE interlocking (mandatory for correct operation)

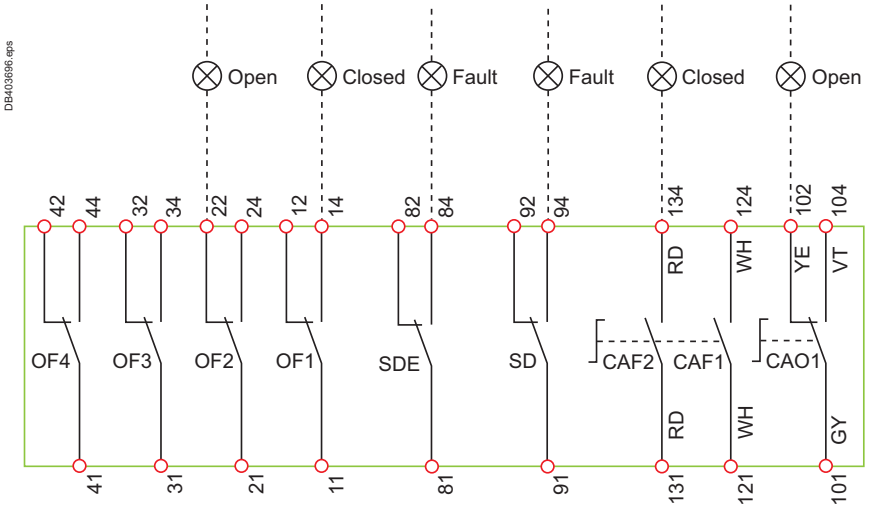
BPO: opening pushbutton
BPF: closing pushbutton

Communicating motor mechanism (MTc) (1)

B4, A1: motor mechanism power supply
BSCM: breaker status and control module

Compact NSX100 to 630 DC
Fixed circuit breakers

Indication contacts



The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

Terminals shown in red **O** *must be connected by the customer.*

Indication contacts

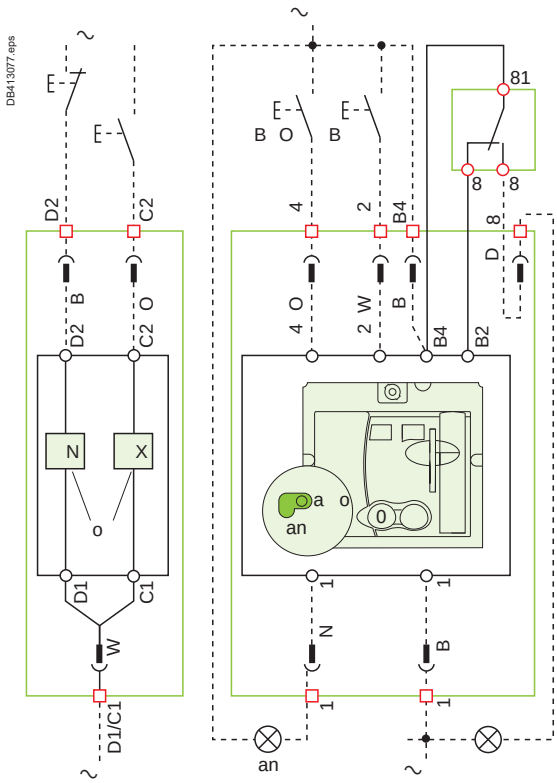
OF2 / OF1:	device ON/OFF indication contacts
OF4 / OF3:	device ON/OFF indication contacts (NSX400/630)
SDE:	fault-trip indication contact (short-circuit, overload, ground fault, earth leakage)
SD:	trip-indication contact
CAF2/CAF1:	early-make contact (rotary handle only)
CAO1:	early-break contact (rotary handle only)

Colour code for auxiliary wiring

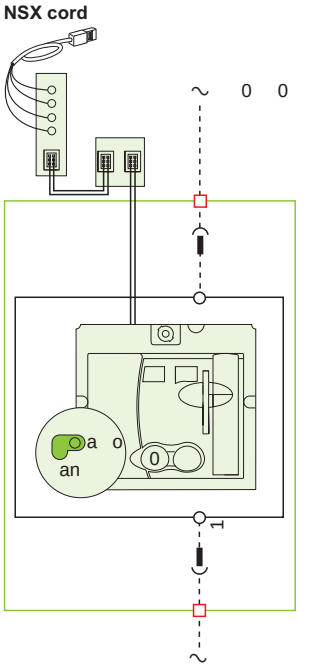
RD:	red	**VT:**	violet
WH:	white	**GY:**	grey
YE:	yellow	**OR:**	orange
BK:	black	**BL:**	blue
GN:	green		

Compact NSX100 to 630 DC
Plug-in / withdrawable circuit breakers

Remote operation



Motor mechanism (MT)

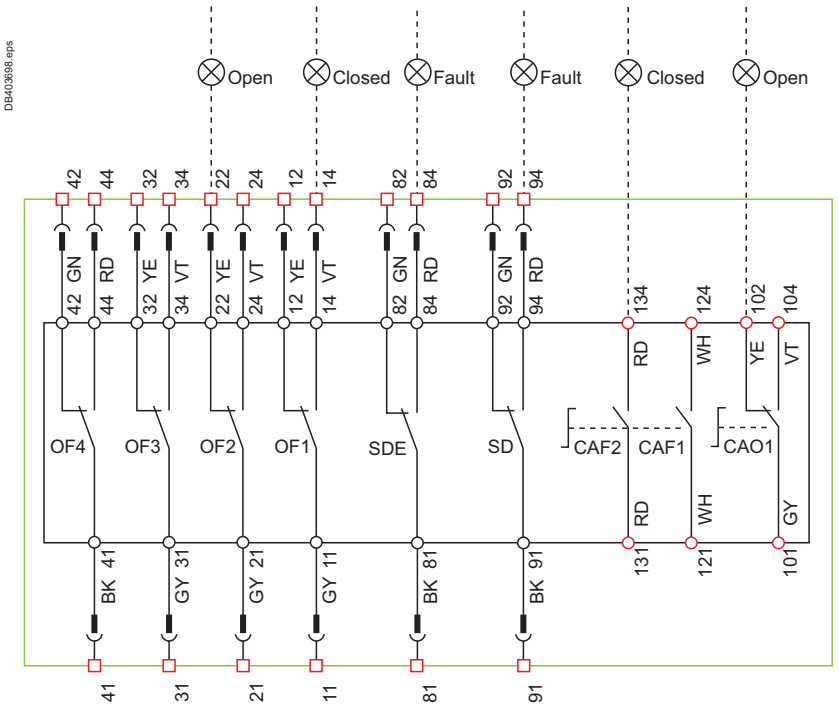


Communicating motor mechanism (MTc) (1)

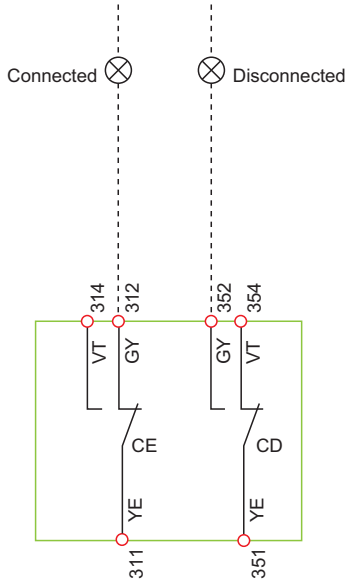
(1) NSX100-250 DC only.

Compact NSX100 to 630 DC
Plug-in / withdrawable circuit breakers

Indication contacts



Carriage switches



Remote operation

MN: undervoltage release
or
MX: shunt release

Motor mechanism (MT)

A4: opening order
A2: closing order
B4, A1: motor mechanism power supply
L1: manual position (manu)
B2: SDE interlocking (mandatory for automatic or remote recharging)
BPO: opening pushbutton
BPF: closing pushbutton

Communicating motor mechanism (MTc)

B4, A1: motor mechanism power supply
BSCM: breaker status and control module

Indication contacts

OF2 / OF1: device ON/OFF indication contacts
OF4 / OF3: device ON/OFF indication contacts (NSX400/630)
SDE: fault-trip indication contact (short-circuit, overload, ground fault, earth leakage)
SD: trip-indication contact
CAF2/CAF1: early-make contact (rotary handle only)
CAO1: early-break contact (rotary handle only)

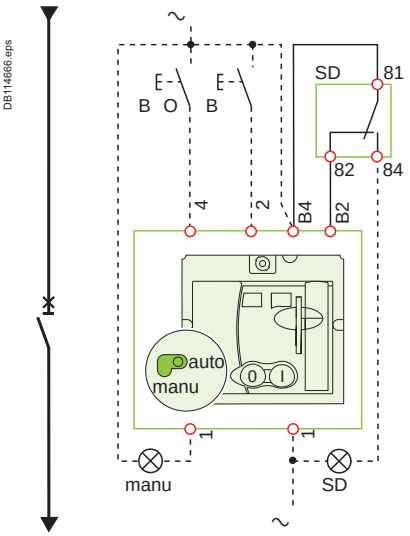
Compact NSX100 to 630 DC
Motor mechanism

The diagram is shown with circuits de-energised, all devices open, connected and charged and relays in normal position.

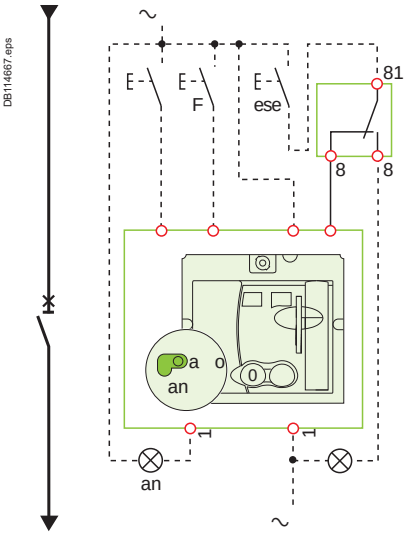
After tripping initiated by the "Push to trip" button or by the undervoltage (MN) release or the shunt (MX) release, device reset can be automatic, remote or manual.

Following tripping due to an electrical fault (with an SDE contact), reset must be carried out manually.

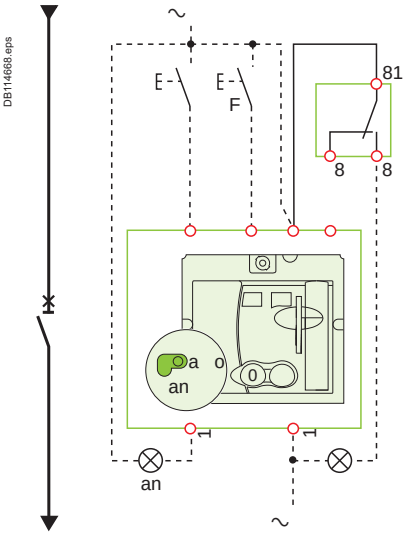
Motor mechanism (MT) with automatic reset



Motor mechanism (MT) with remote reset



Motor mechanism (MT) with manual reset

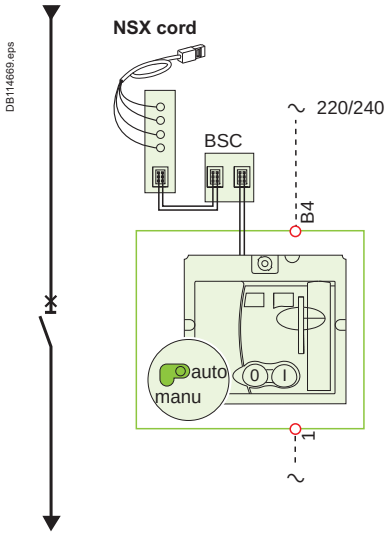


Symbols

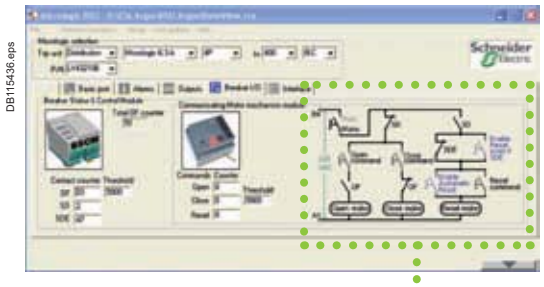
Q:	circuit breaker
A4 :	opening order
A2:	closing order
B4, A1:	motor mechanism power supply
L1:	manual position (manu)
B2:	SDE interlocking (mandatory for correct operation)
BPO:	opening pushbutton
BPF:	closing pushbutton
SDE:	fault-trip indication contact (short-circuit, overload, ground fault, earth leakage)

Compact NSX100 to 630 DC
Motor mechanism

Communicating motor mechanism (MTc) (1)

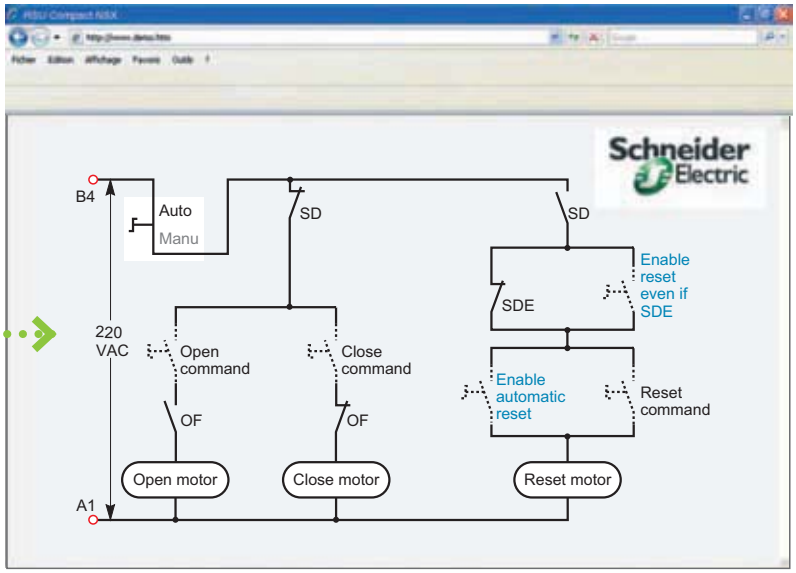


Schematic representation of the communicating motor mechanism (MT).



RSU utility setup screen for the communicating motor mechanism.

RSU screen for the communicating motor mechanism (MTc)



Single-line diagram of communicating motor mechanism
Opening, closing and reset orders are transmitted via the communication network. The "Enable automatic reset" and "Enable reset even if SDE" parameters must be set using the RSU software via the screen by clicking the blue text.

"**Auto/manu**" is a switch on the front of the motor mechanism.

Symbols

Q:	circuit breaker
B4, A1:	motor mechanism power supply
BSCM:	breaker status and control module

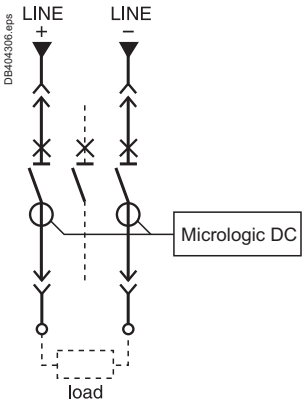
Terminals shown in red O must be connected by the customer.

(1) NSX100-250 only.

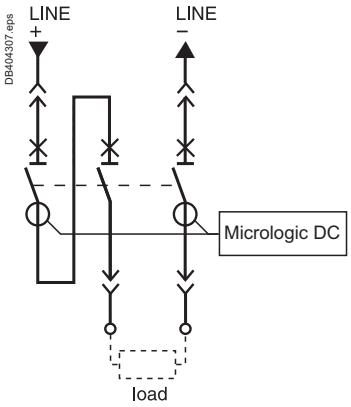
Masterpact NW10 to NW40 DC
Fixed and drawout devices

Diagrams are shown with circuits de-energised, all devices open, connected and charged and relays in the normal position.

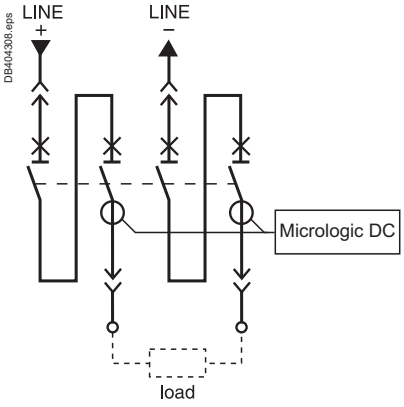
Version C



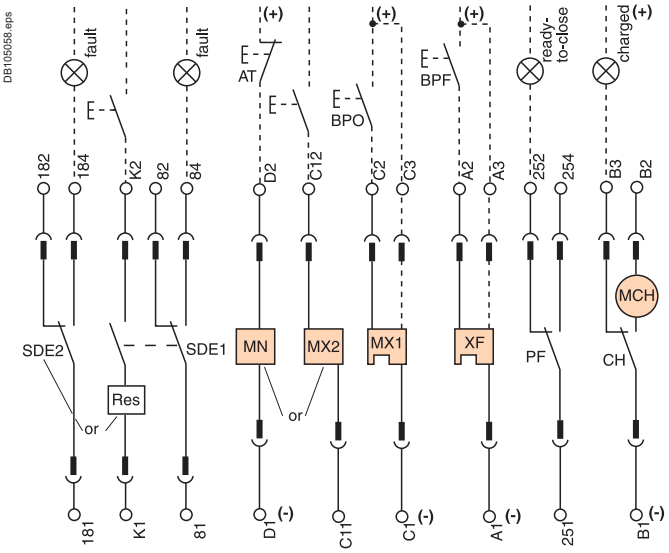
Version D



Version E



Remote operation



Control unit

Terminal block marking

Com : E1-E6 communication

E5	E6
E3	E4
E1	E2

Remote operation

SDE2 / Res	SDE1	MN / MX2	MX1	XF	PF	MCH
184 / K2	84	D2 / C12	C2	A2	254	B2
182	82		C3	A3	252	B3
181 / K1	81	D1 / C11	C1	A1	251	B1

SDE2: fault-trip indication contact
or
Res: remote reset

SDE1: fault-trip indication contact (supplied as standard)

MN: undervoltage release
or
MX2: shunt release

MX1: shunt release (standard or communicating)

XF: closing release (standard or communicating)

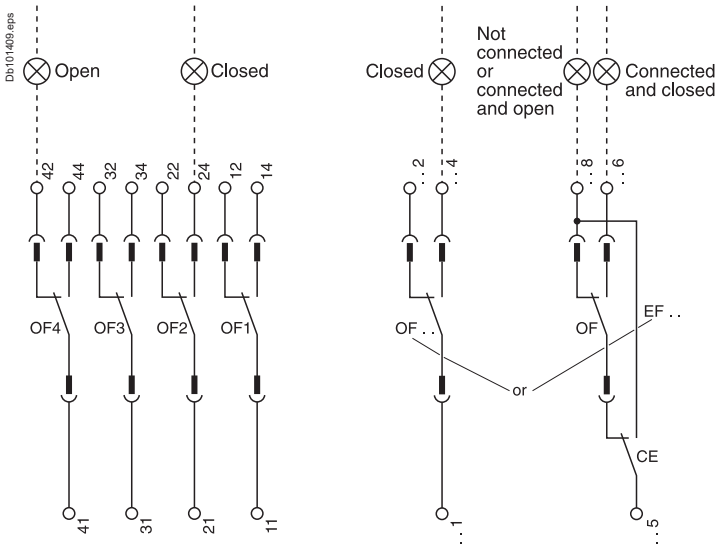
PF: ready-to-close contact

MCH: electric motor

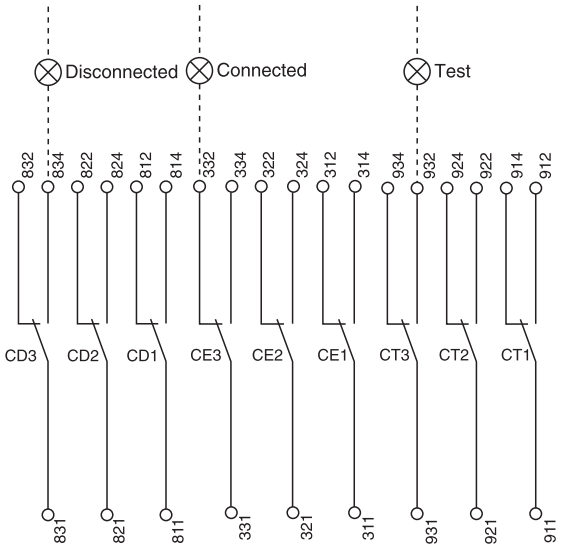
Note:
When communicating MX or XF releases are used, the third wire (C3,A3) must be connected even if the communication module is not installed.

Masterpact NW10 to NW40 DC
Fixed and drawout devices

Indication contacts



Chassis contacts



Indication contacts

OF4	OF3	OF2	OF1
44	34	24	14
42	32	22	12
41	31	21	11

OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11
244	234	224	214	144	134	124	114
242	232	222	212	142	132	122	112
241	231	221	211	141	131	121	111

or

EF24	EF23	EF22	EF21	EF14	EF13	EF12	EF11
248	238	228	218	148	138	128	118
246	236	226	216	146	136	126	116
245	235	225	215	145	135	125	115

Chassis contacts

CD3	CD2	CD1	CE3	CE2	CE1	CT3	CT2	CT1
834	824	814	334	324	314	934	924	914
832	822	812	332	322	312	932	922	912
831	821	811	331	321	311	931	921	911

or

CE6	CE5	CE4
364	354	344
362	352	342
361	351	341

or

CE9	CE8	CE7
394	384	374
392	382	372
391	381	371

Indication contacts

OF4
OF3
OF2
OF1 — ON/OFF indication contacts

OF24 or EF24 — ON/OFF indication contacts Combined "connected-closed" indication contacts

OF22 or EF22

OF21 or EF21

OF14 or EF14

OF13 or EF13

OF12 or EF12

OF11 or EF11

Chassis contacts

CD3
CD2
CD1 — Disconnected position contacts

CE3
CE2
CE1 — Connected position contacts

CT3
CT2
CT1 — Test position contacts

or

CE6
CE5
CE4 — Connected position contacts

or

CE9
CE8
CE7 — Connected position contacts

or

CD6
CD5
CD4 — Disconnected position contacts

Legend:

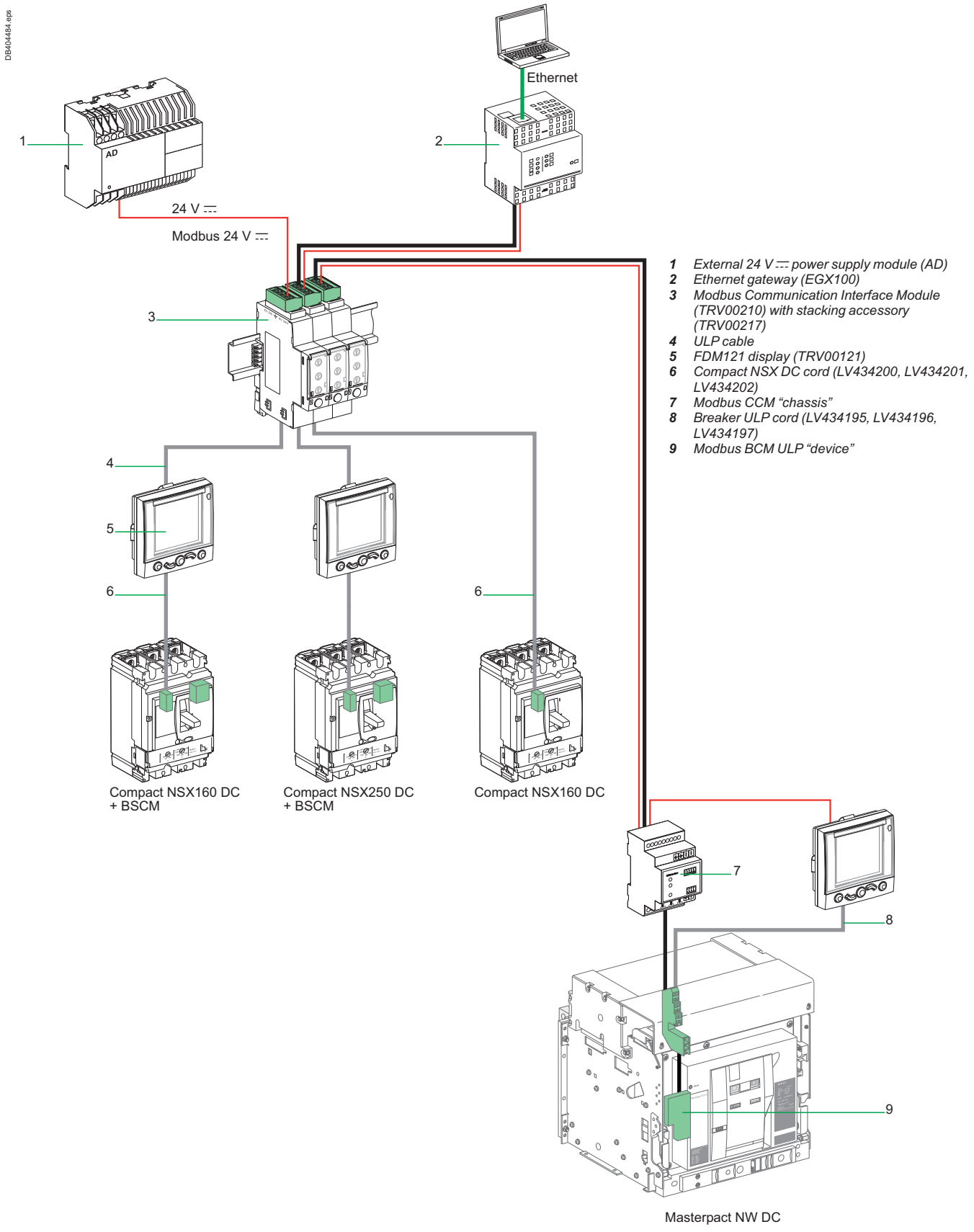
Drawout device only.

XXX SDE1, OF1, OF2, OF3, OF4 supplied as standard.

Interconnected connections (only one wire per connection point).

Masterpact NW DC
Communication

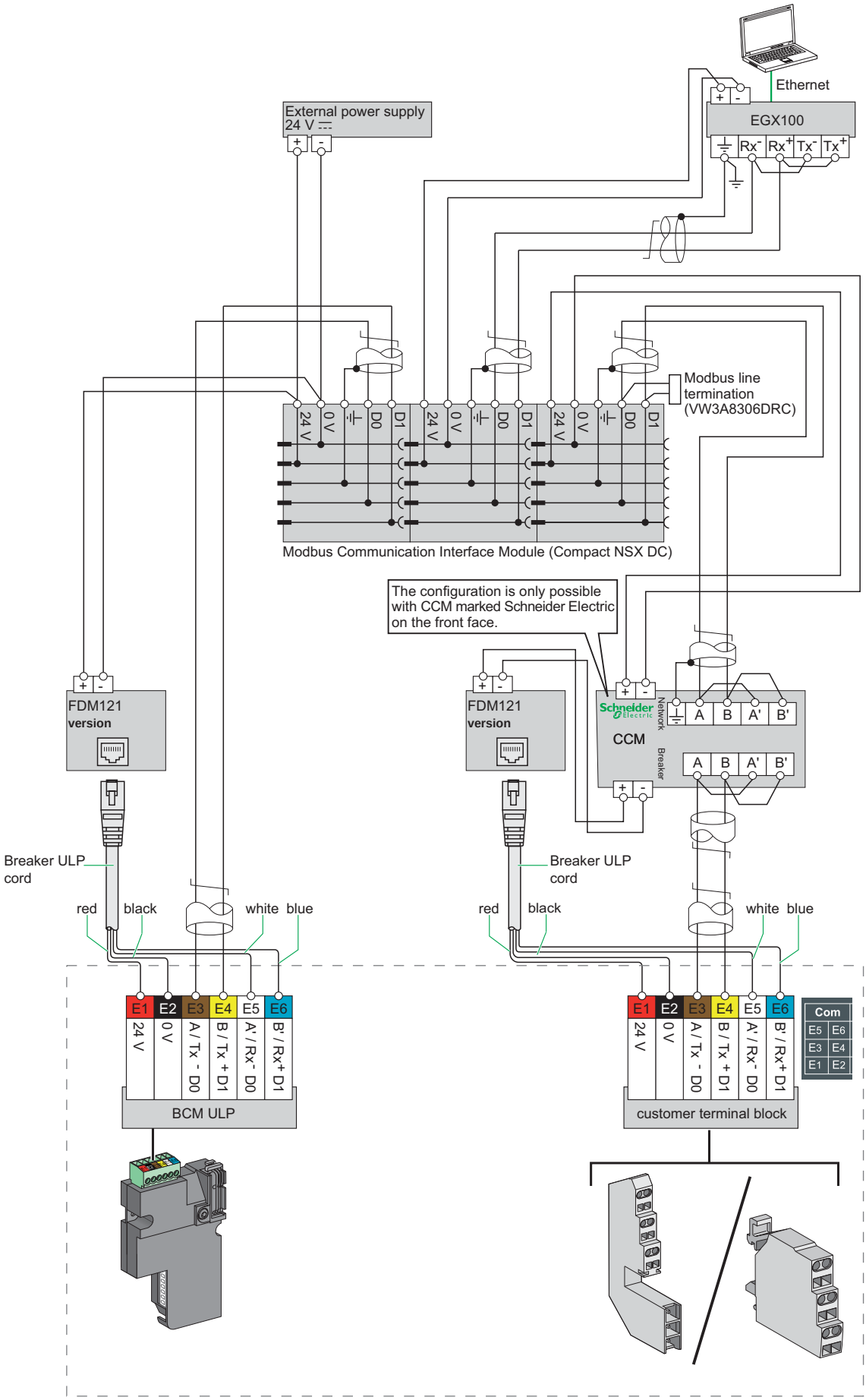
Connection of circuit breakers to the Modbus communication network



1 *External 24 V ⎓ power supply module (AD)*
2 *Ethernet gateway (EGX100)*
3 *Modbus Communication Interface Module (TRV00210) with stacking accessory (TRV00217)*
4 *ULP cable*
5 *FDM121 display (TRV00121)*
6 *Compact NSX DC cord (LV434200, LV434201, LV434202)*
7 *Modbus CCM "chassis"*
8 *Breaker ULP cord (LV434195, LV434196, LV434197)*
9 *Modbus BCM ULP "device"*

Masterpact NW DC
Communication

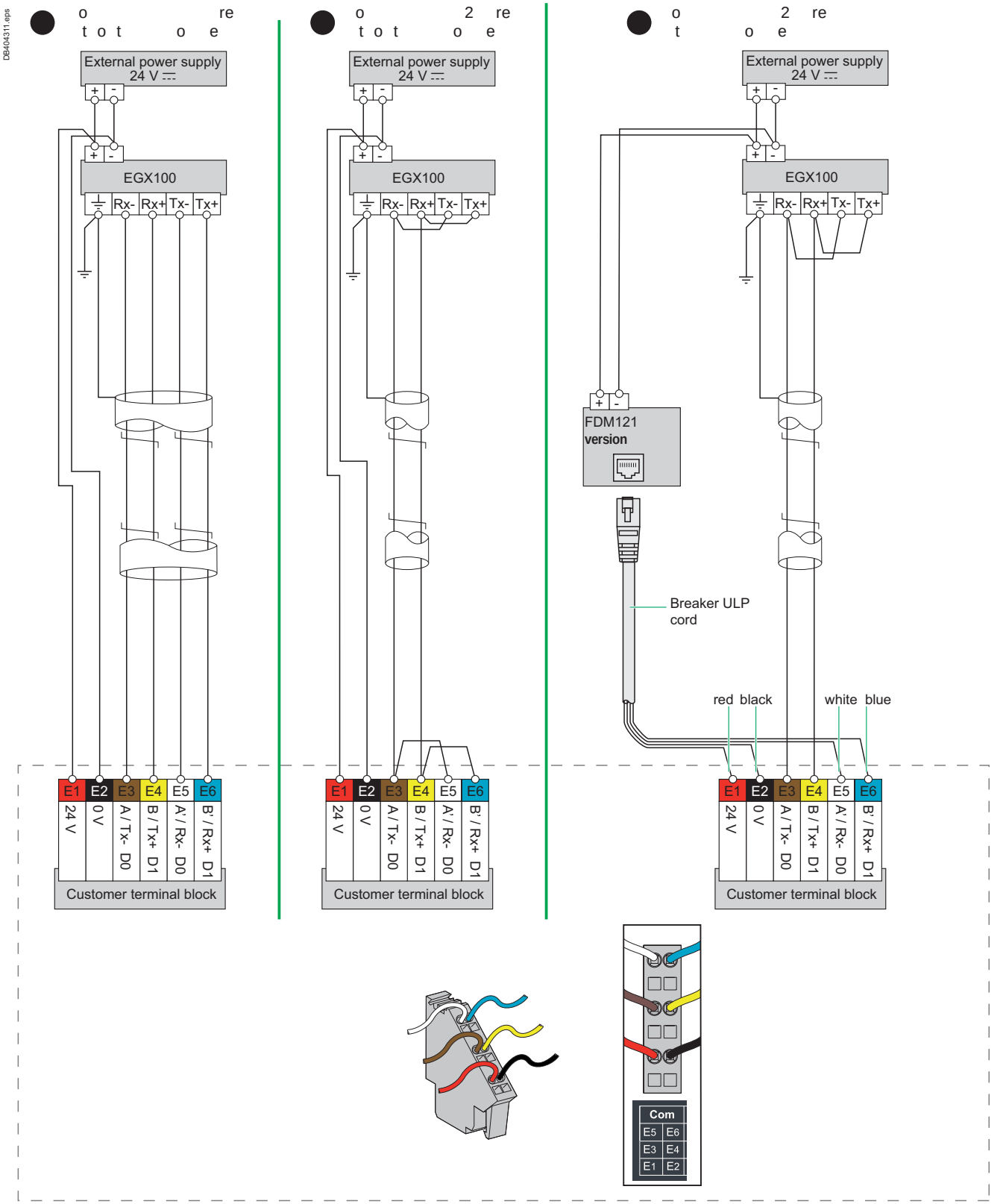
DB404310.eps



Fixed, electrically operated Masterpact NW DC

Wiring of the COM option (with BCM ULP) and external power supply

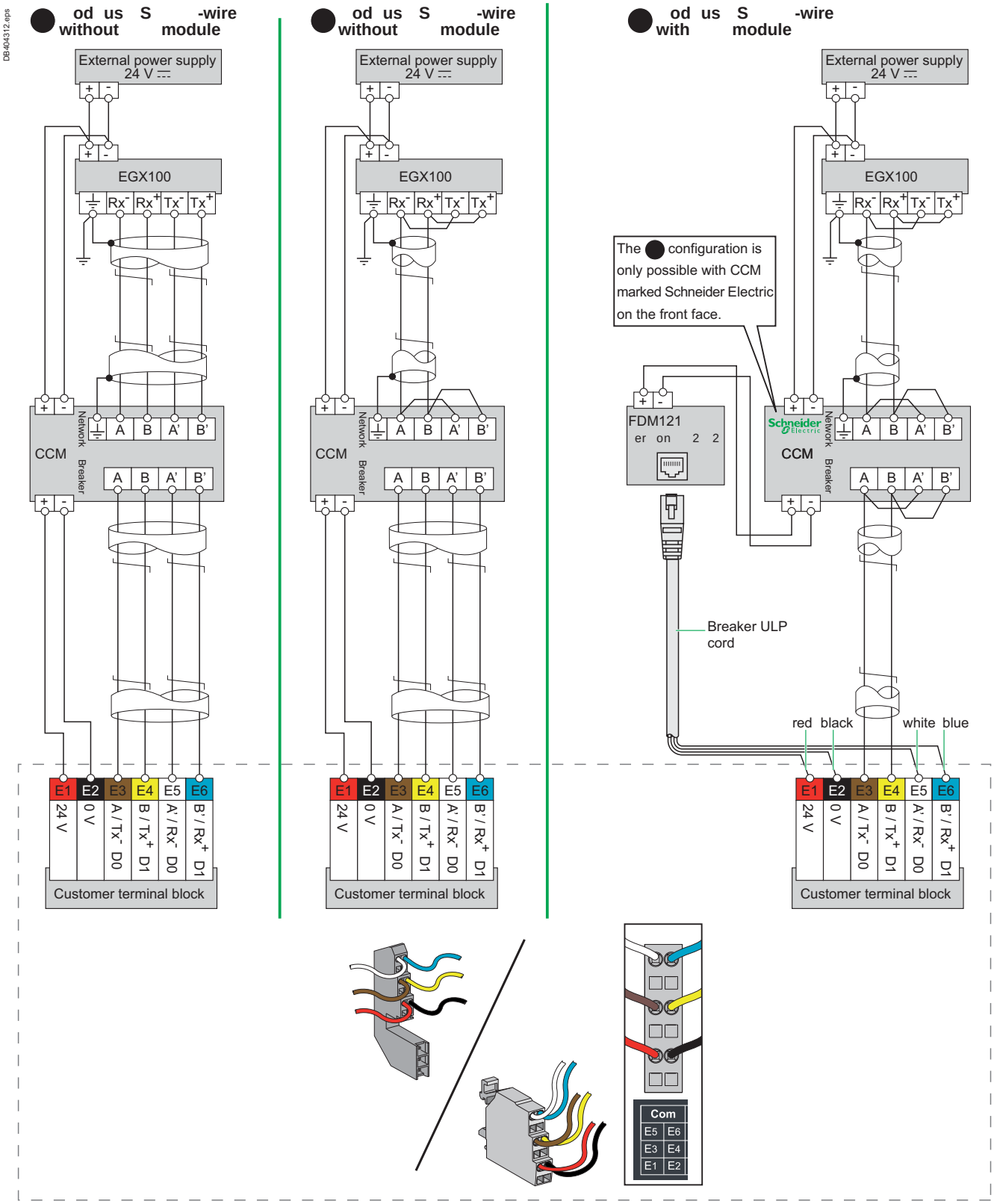
To setup 4 wires and 2 wires, use the utility RSU.



Withdrawable Masterpact NW DC

Wiring of the COM option (with CCM) and external power supply

To setup 4 wires and 2 wires, use the utility RSU.



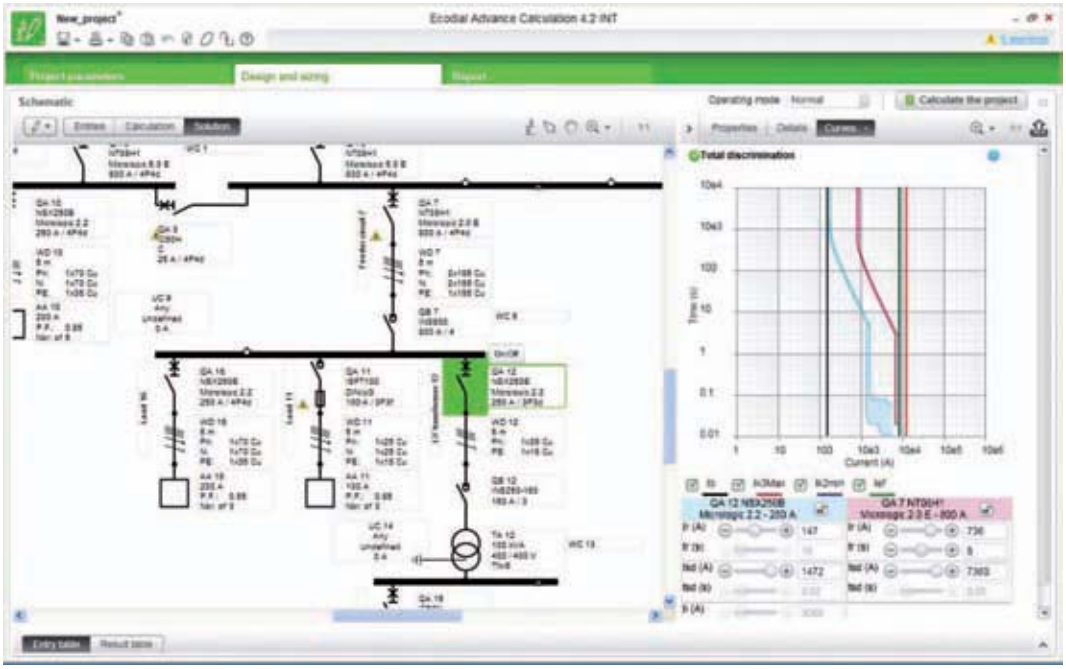
TOOLS

Ecodial

Ecodial software is dedicated to LV electrical installation calculation in accordance with the IEC60364 international standard or national standards.

This 4th generation, "Ecodial Advance Calculation 4", offers a new ergonomic and new features:

- operating mode that allows easy calculation in case of installation with different type of sources (parallel transformers, back-up generators...)
- discrimination analysis associating curves checking and discrimination tables
- direct access to protection settings including residual current protections
- easy selection of alternate solutions or manual selection of a product.

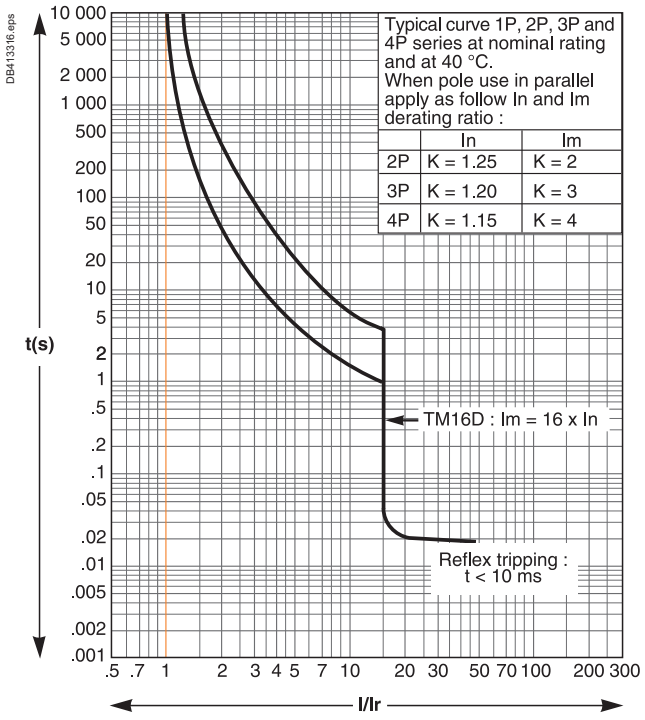


Additional characteristics

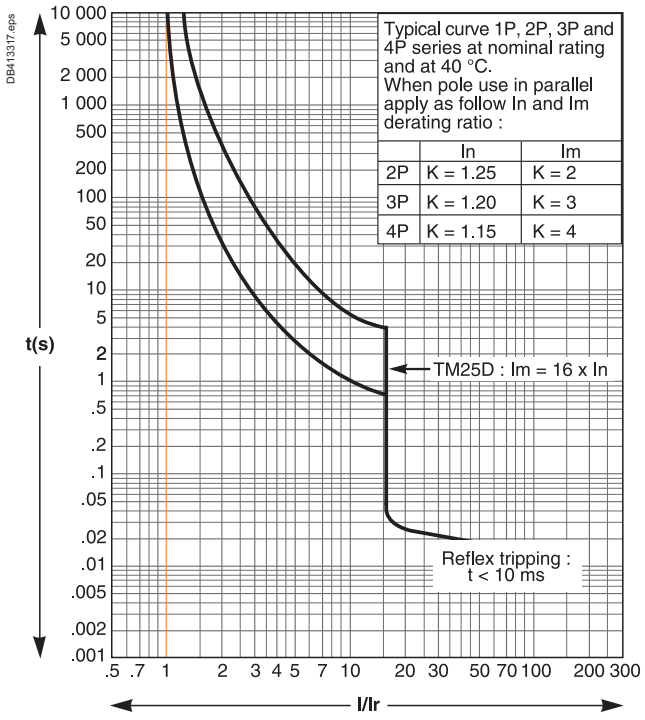
Compact NSX100 to 250 DC
Tripping curves

TM magnetic trip units

TM16D / TM16G

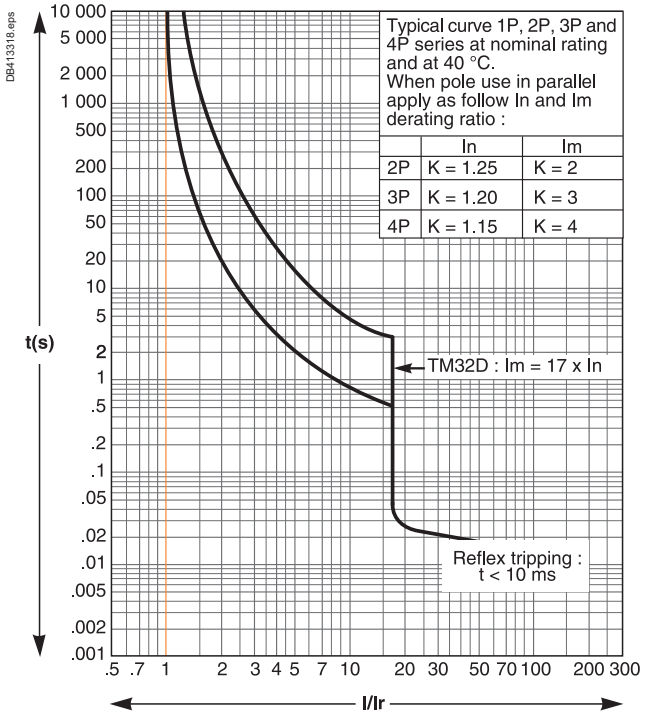


TM25D / TM25G

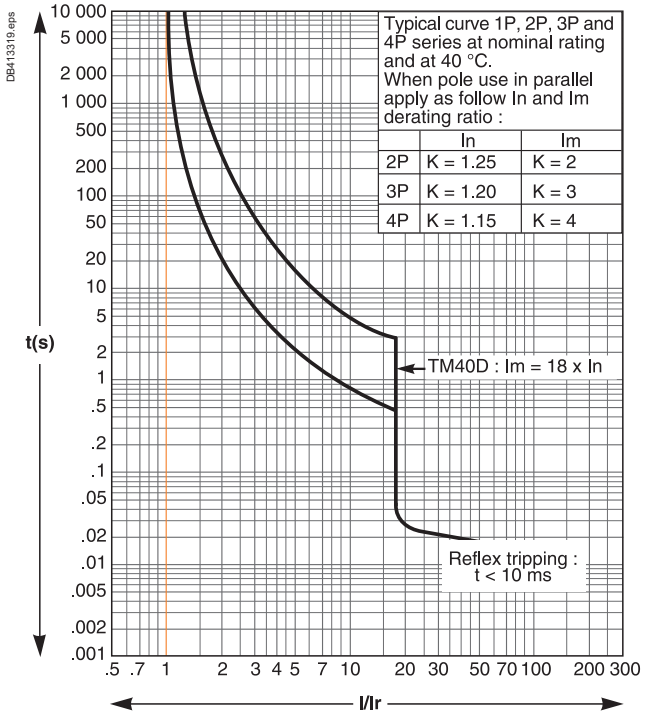


Reflex tripping.

TM32D



TM40D

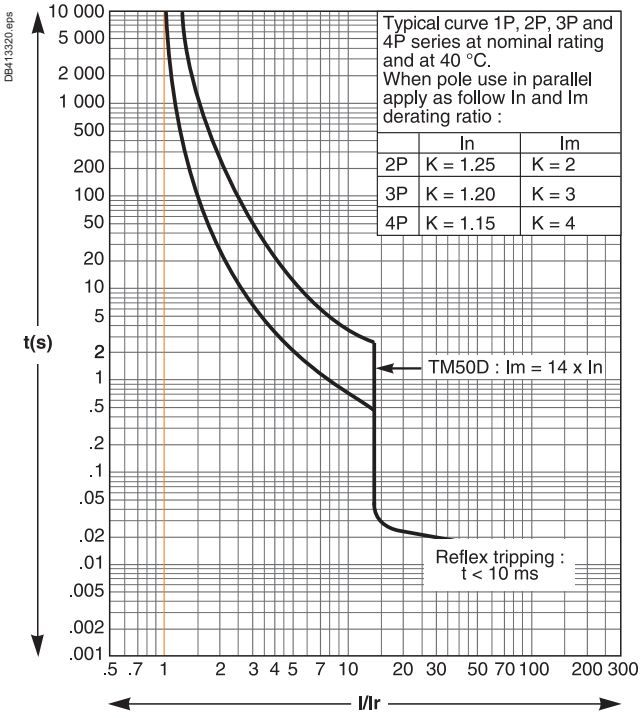


Reflex tripping.

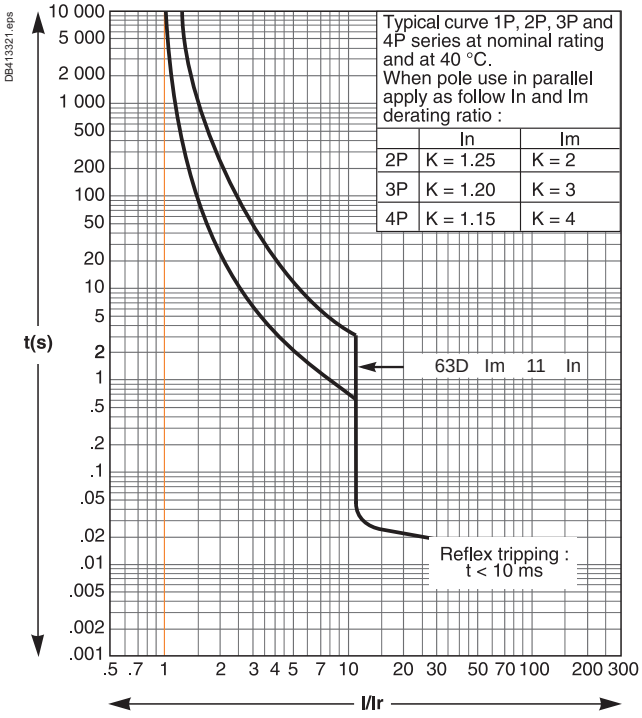
Compact NSX100 to 250 DC
Tripping curves

TM magnetic trip units (cont.)

TM50D

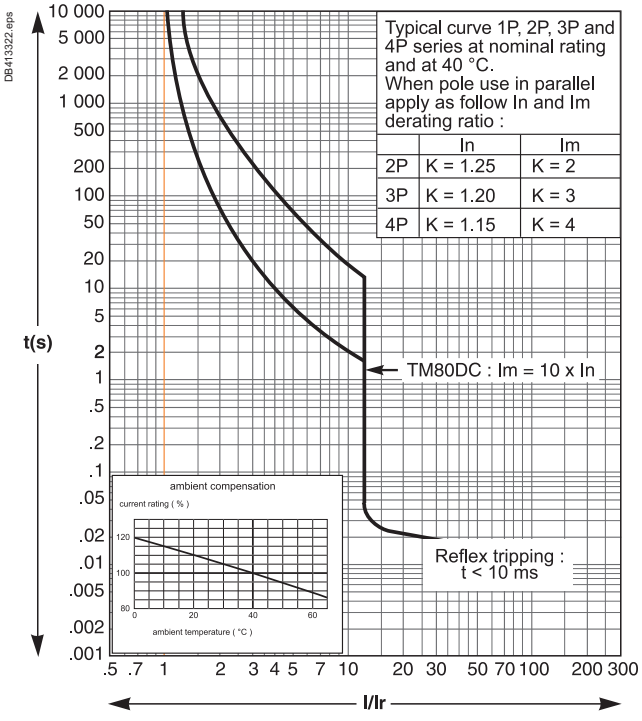


TM63D

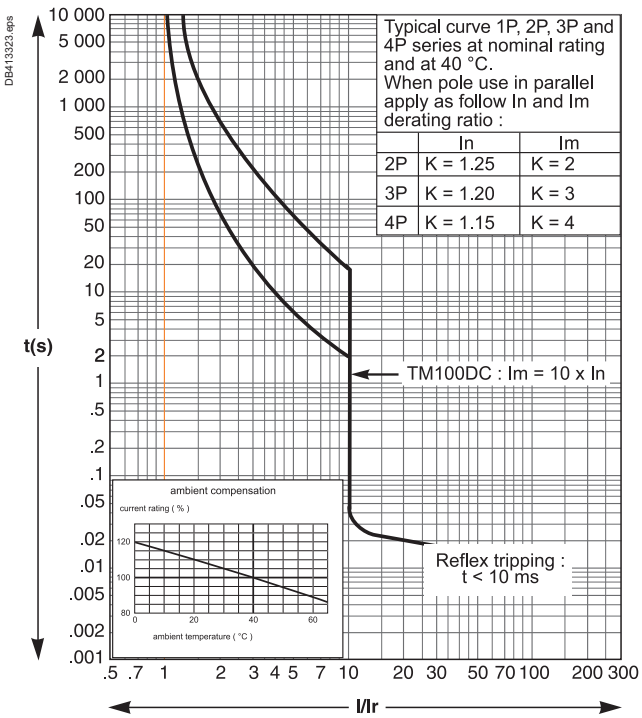


Reflex tripping.

TM80DC



TM100DC

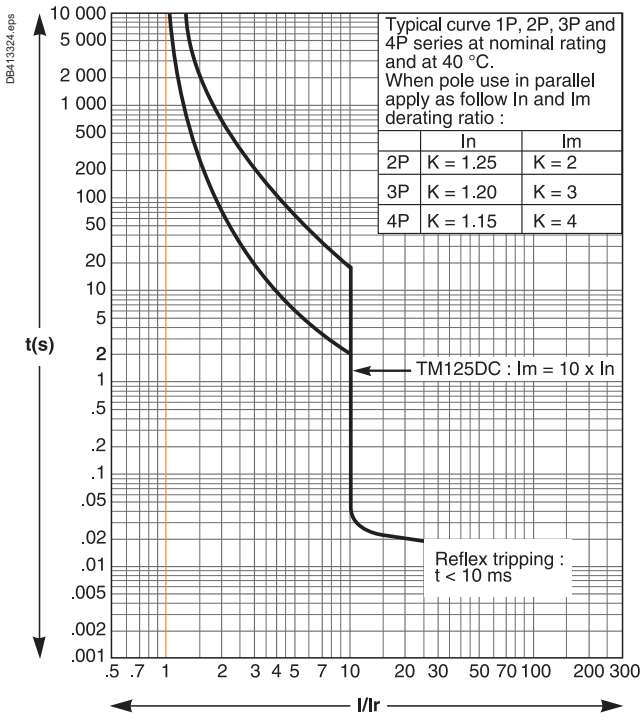


Reflex tripping.

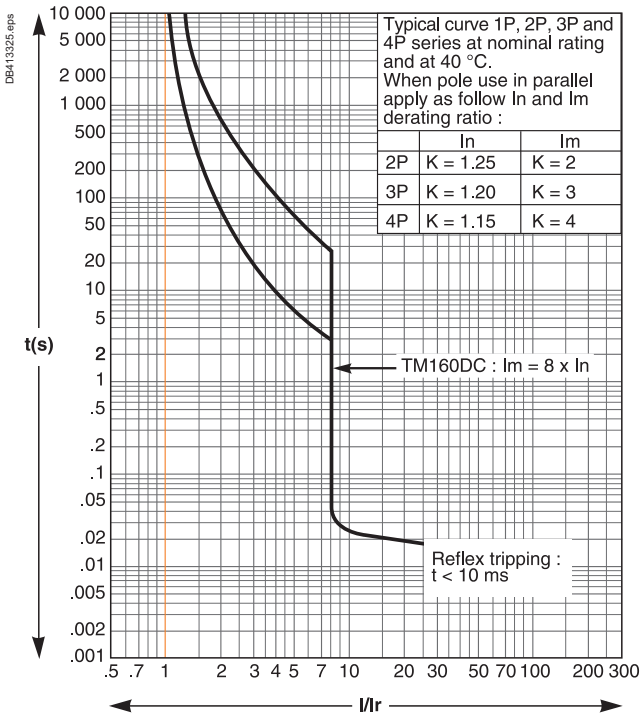
Compact NSX100 to 250 DC
Tripping curves

TM magnetic trip units (cont.)

TM125DC

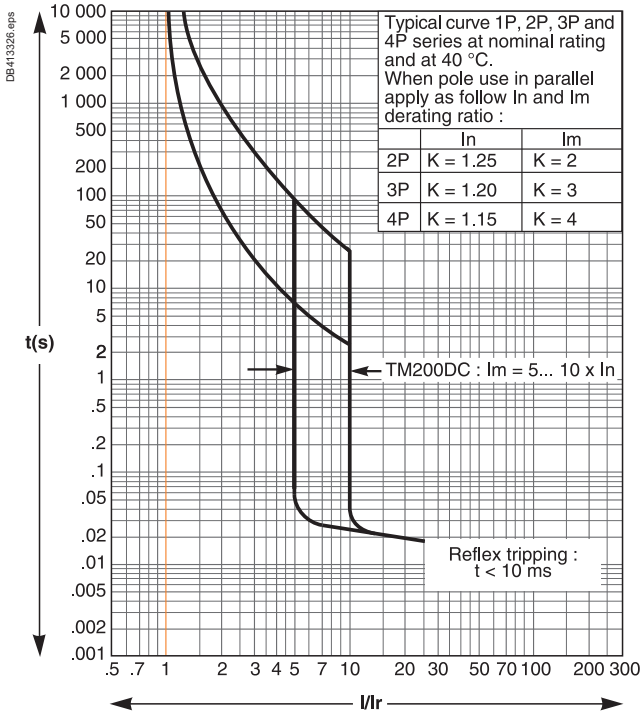


TM160DC

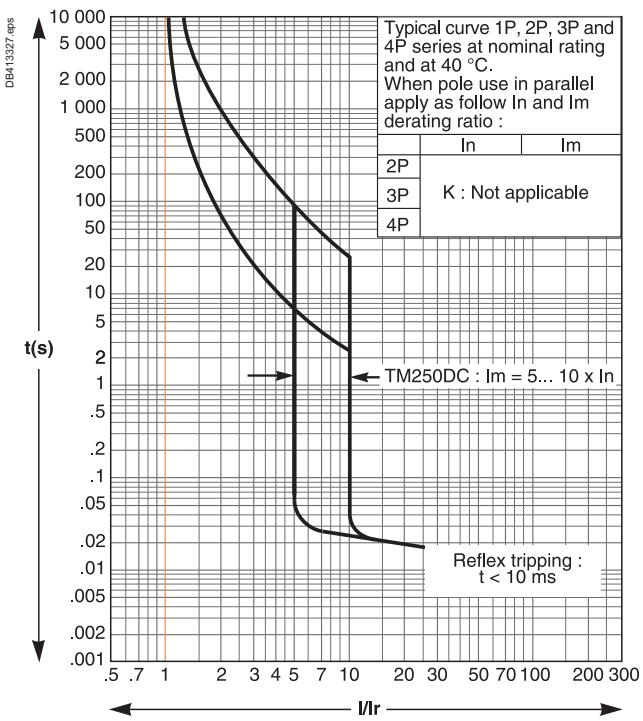


Reflex tripping.

TM200DC



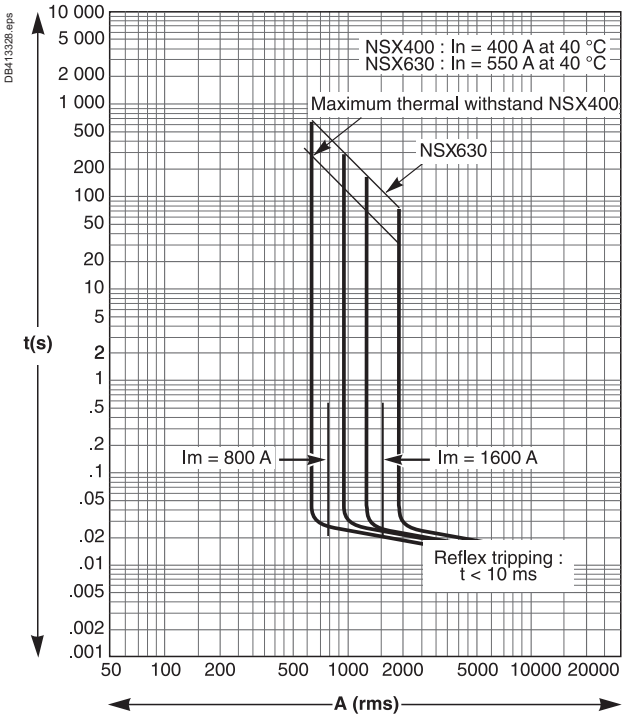
TM250DC



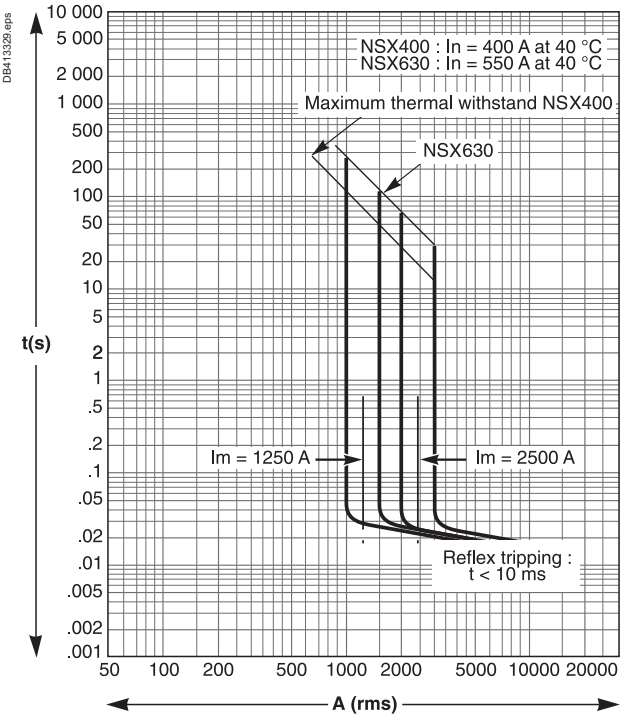
Reflex tripping.

Compact NSX400 to 630 DC
Tripping curves

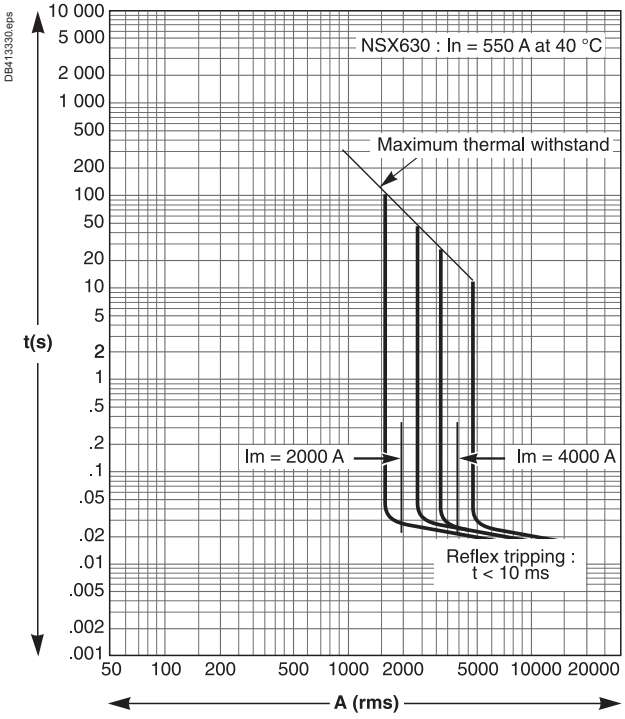
MP1 for NSX400/630 DC



MP2 for NSX400/630 DC



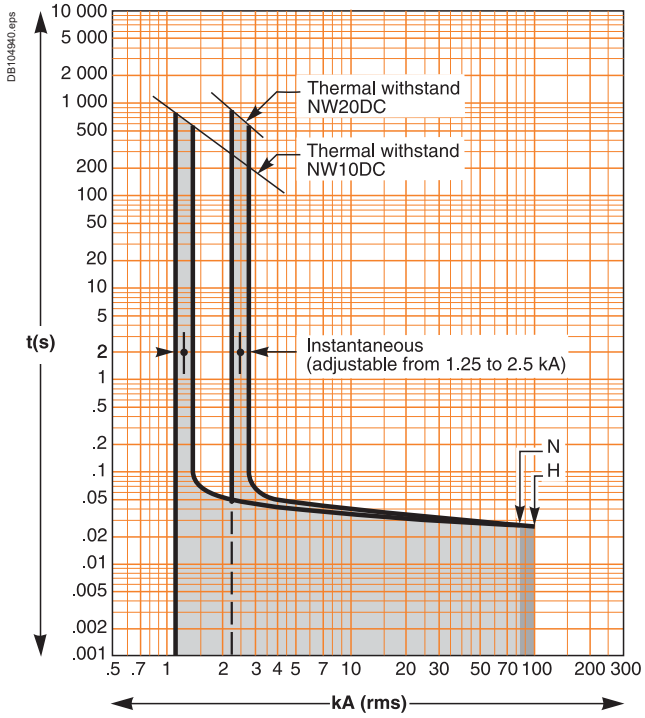
MP3 for NSX630 DC



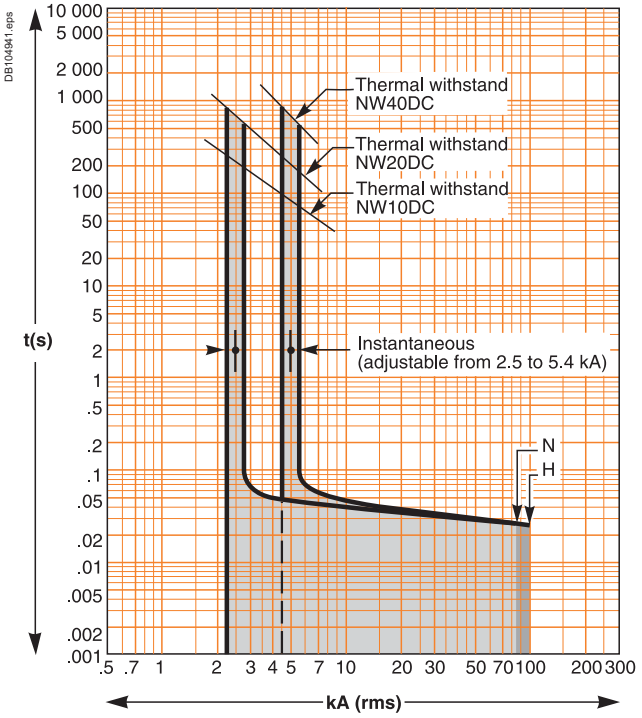
Masterpact NW10 to NW40 DC
Tripping curves
U = 500 V DC, L/R = 5 ms

Micrologic DC 1.0 instantaneous protection

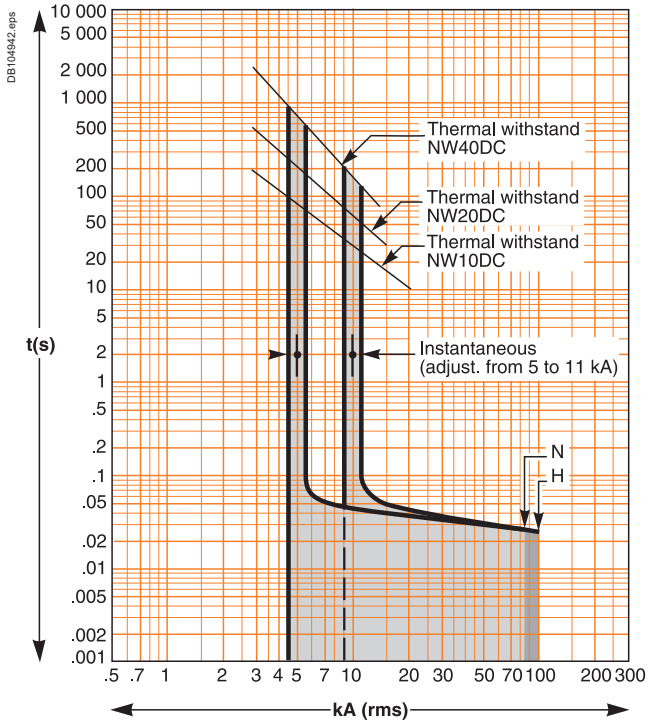
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors



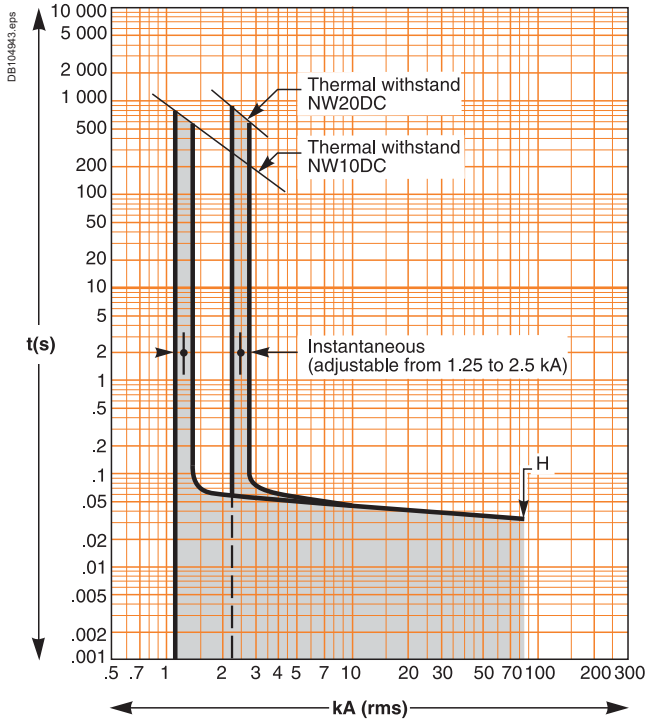
With 5000 - 11000 A sensors



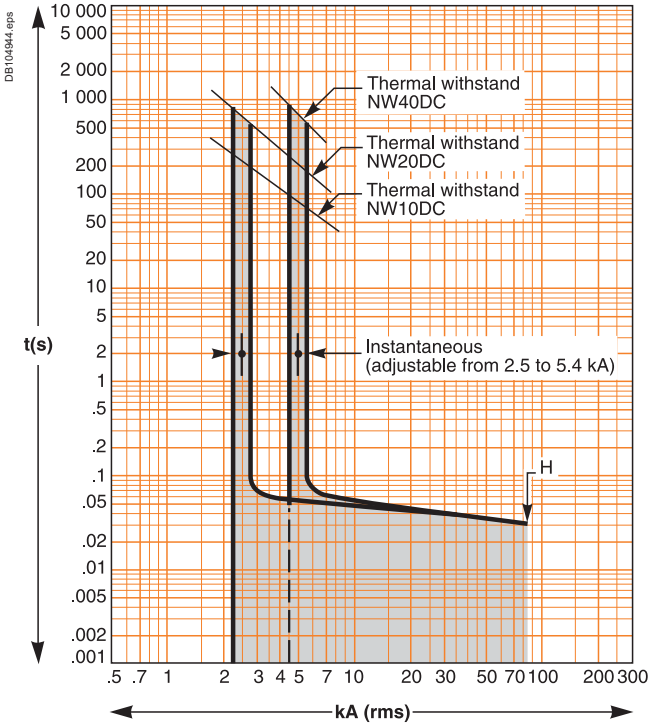
Masterpact NW10 to NW40 DC
Tripping curves
U = 750/900 V DC, L/R = 5 ms

Micrologic DC 1.0 instantaneous protection

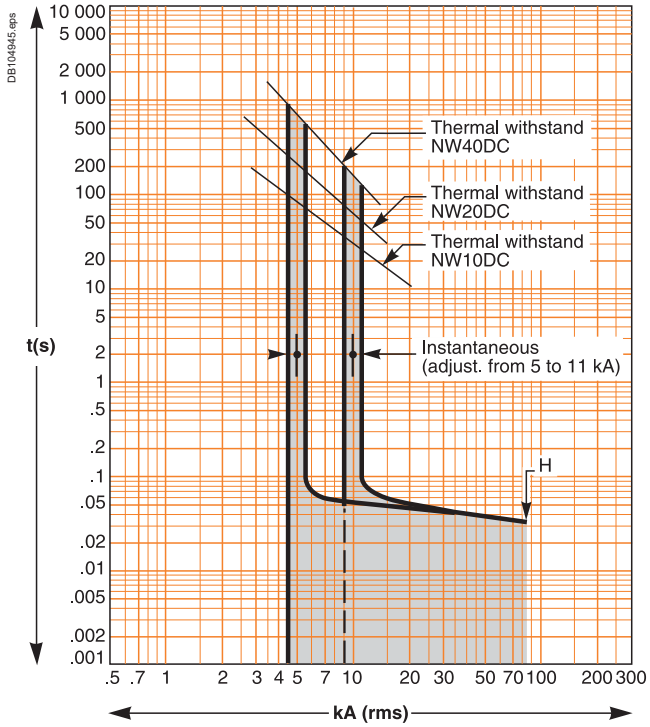
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors



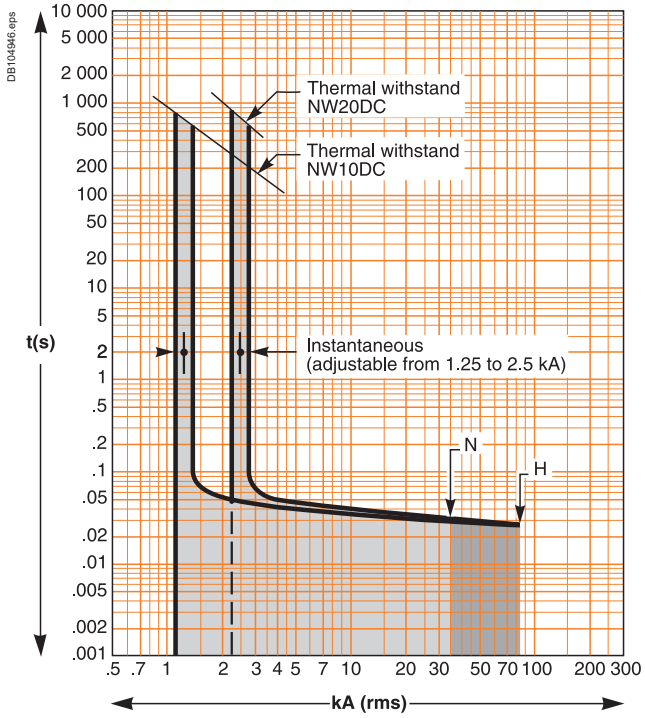
With 5000 - 11000 A sensors



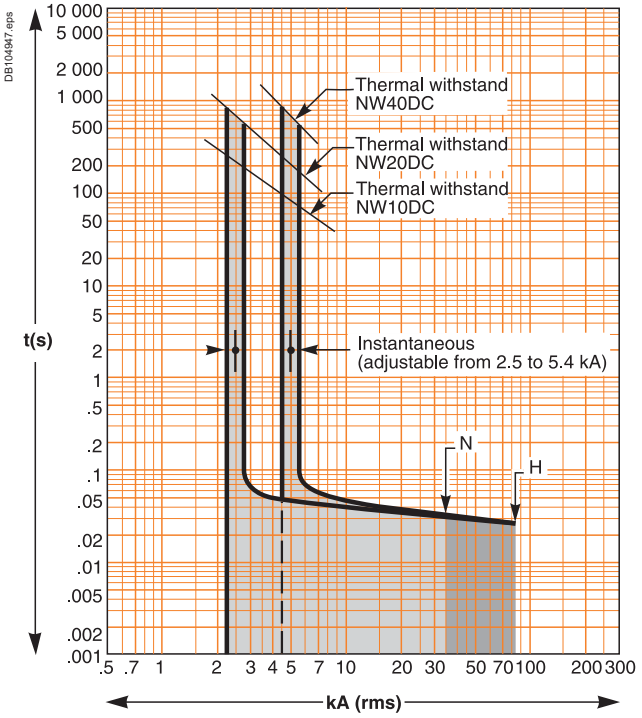
Masterpact NW10 to NW40 DC
Tripping curves
U = 500 V DC, L/R = 15 ms

Micrologic DC 1.0 instantaneous protection

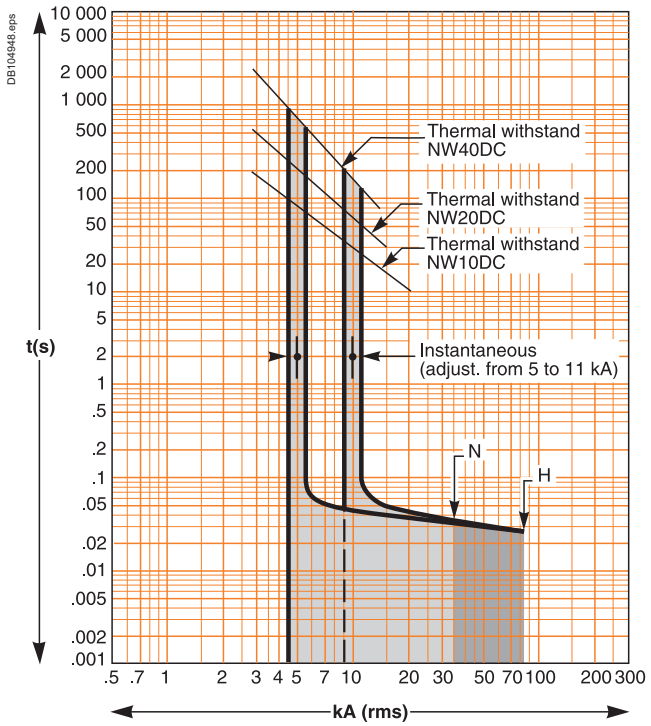
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors



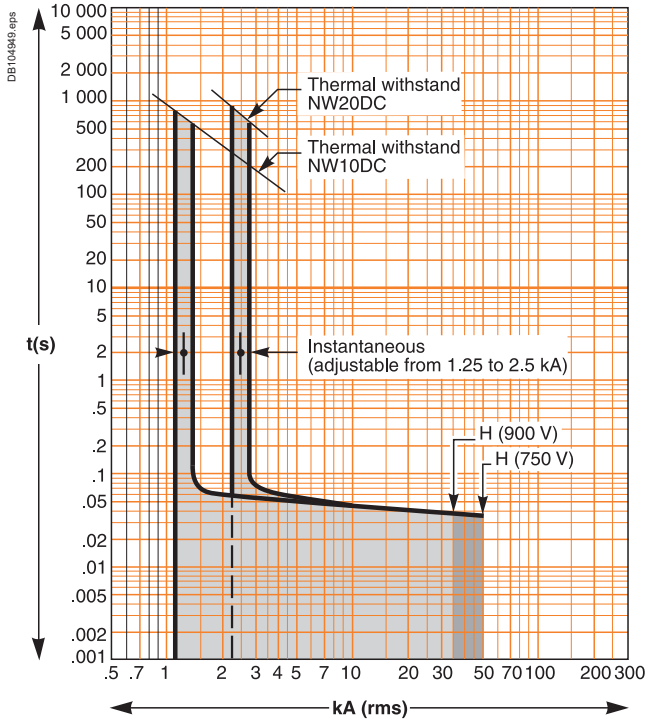
With 5000 - 11000 A sensors



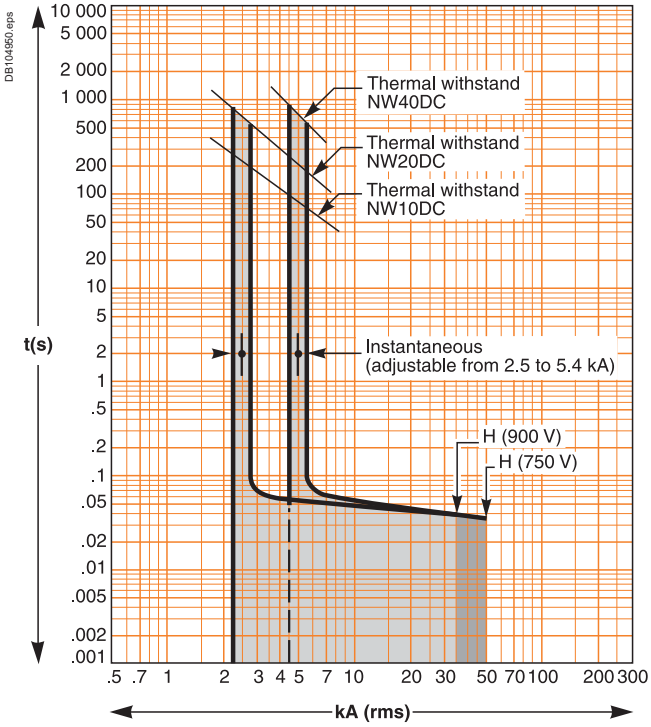
Masterpact NW10 to NW40 DC
Tripping curves
U = 750/900 V DC, L/R = 15 ms

Micrologic DC 1.0 instantaneous protection

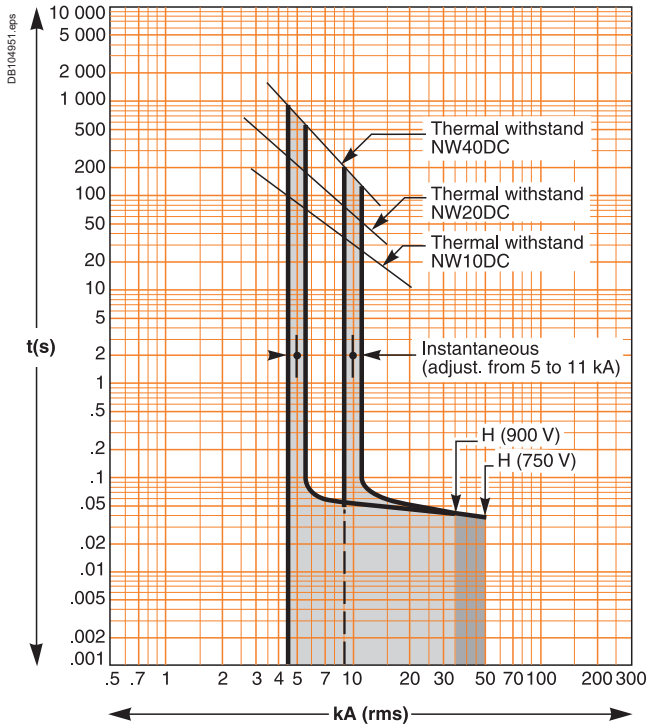
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors



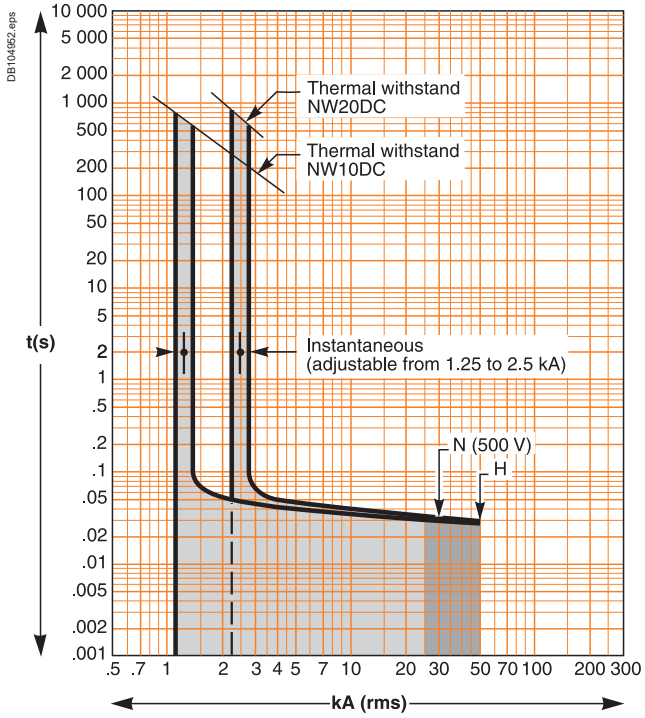
With 5000 - 11000 A sensors



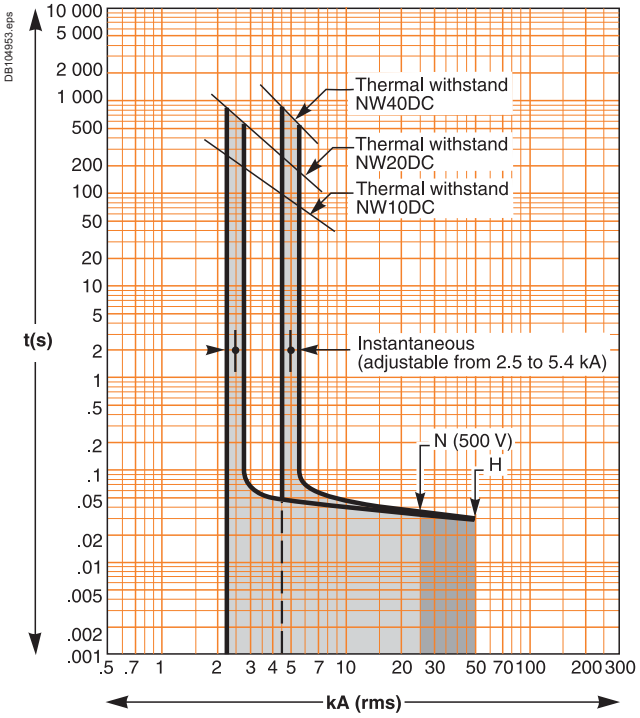
Masterpact NW10 to NW40 DC
Tripping curves
U = 500/750 V DC, L/R = 30 ms

Micrologic DC 1.0 instantaneous protection

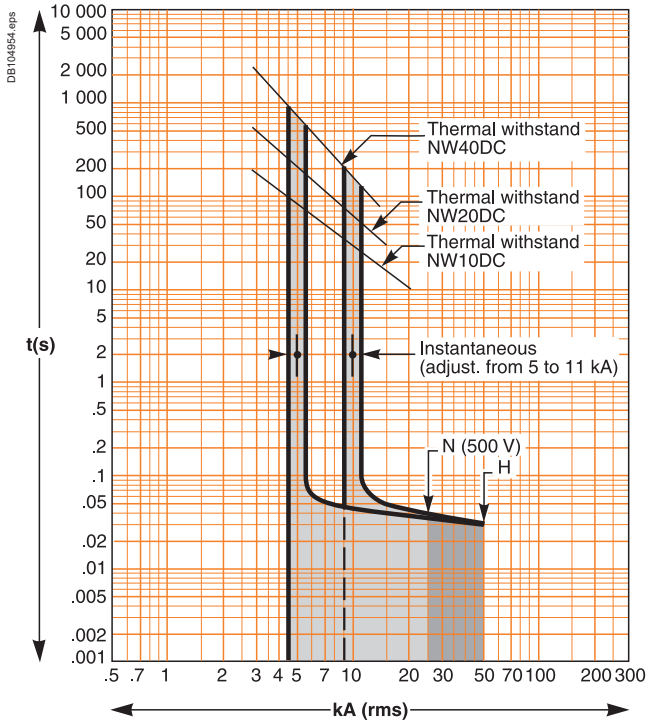
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors



With 5000 - 11000 A sensors



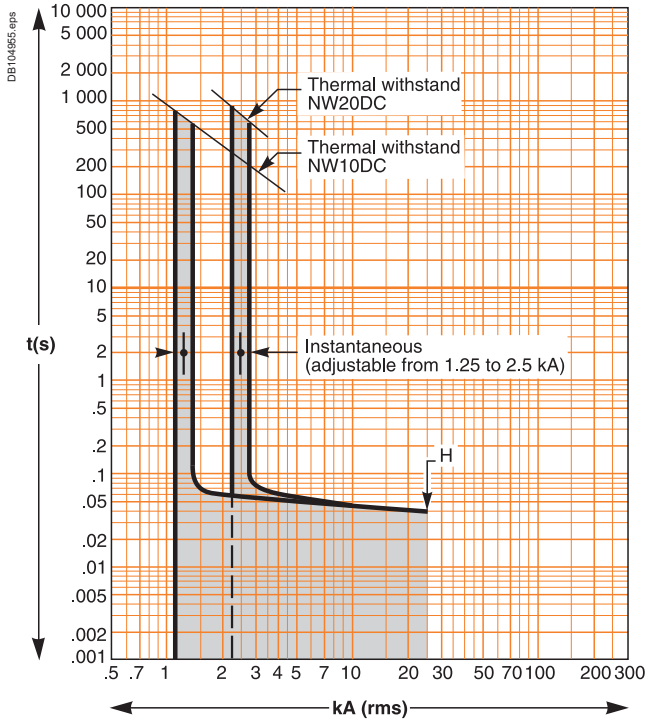
Masterpact NW10 to NW40 DC

Tripping curves

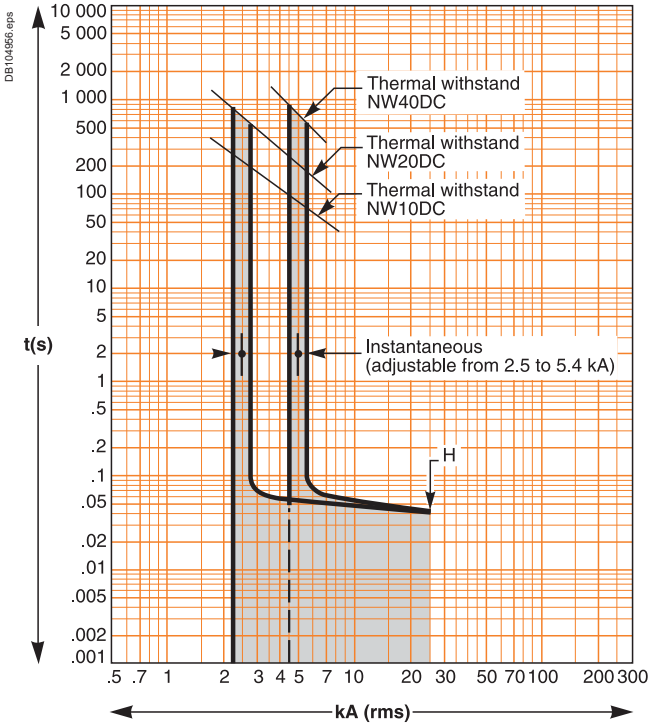
U = 900 V DC, L/R = 30 ms

Micrologic DC 1.0 instantaneous protection

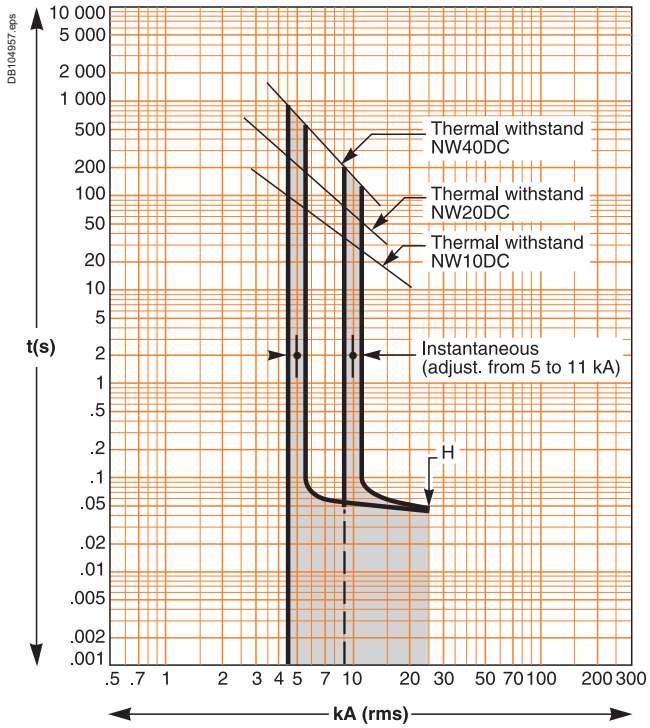
With 1250 - 2500 A sensors



With 2500 - 5400 A sensors

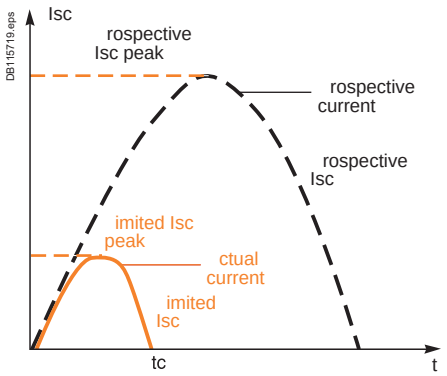


With 5000 - 11000 A sensors



Current and energy limiting curves

The limiting capacity of a circuit breaker is its aptitude to let through a current, during a short-circuit, that is less than the prospective short-circuit current.



The exceptional limiting capacity of the Compact NSX DC 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 NSX DC 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 steps:

- ■ break three times consecutively a fault current equal to 100 % of Icu
- ■ check that the device continues to function normally, that is:
- □ it conducts the rated current without abnormal temperature rise
- □ protection functions perform within the limits specified by the standard
- □ suitability for isolation is not impaired.

Longer service life of electrical installations

Current-limiting circuit breakers greatly reduce the negative effects of short-circuits on installations.

Thermal effects
Less temperature rise in conductors, therefore longer service life for cables.

Mechanical effects
Reduced electrodynamic forces, therefore less risk of electrical contacts or busbars being deformed or broken.

Electromagnetic effects
Fewer 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 and energy limiting curves

The limiting capacity of a circuit breaker is expressed by two curves which are a function of the prospective short-circuit current (the current which would flow if no protection devices were installed):

- ■ the actual peak current (limited current)
- ■ thermal stress (A^2s), i.e. the energy dissipated by the short-circuit in a conductor with a resistance of 1 Ω.

Example
What is the real value of a 150 kA rms prospective short-circuit (i.e. 330 kA peak) limited by an NSX250L DC upstream ?
The answer is 30 kA peak (curve page E-13).

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 A^2s.

CSA		1.5 mm²	2.5 mm²	4 mm²	6 mm²	10 mm²
PVC	Cu	2.97×10^4	8.26×10^4	2.12×10^5	4.76×10^5	1.32×10^6
	Al					5.41×10^5
PRC	Cu	4.10×10^4	1.39×10^5	2.92×10^5	6.56×10^5	1.82×10^6
	Al					7.52×10^5
CSA		**16 mm²**	**25 mm²**	**35 mm²**	**50 mm²**	
PVC	Cu	3.4×10^6	8.26×10^6	1.62×10^7	3.31×10^7	
	Al	1.39×10^6	3.38×10^6	6.64×10^6	1.35×10^7	
PRC	Cu	4.69×10^6	1.39×10^7	2.23×10^7	4.56×10^7	
	Al	1.93×10^6	4.70×10^6	9.23×10^6	1.88×10^7	

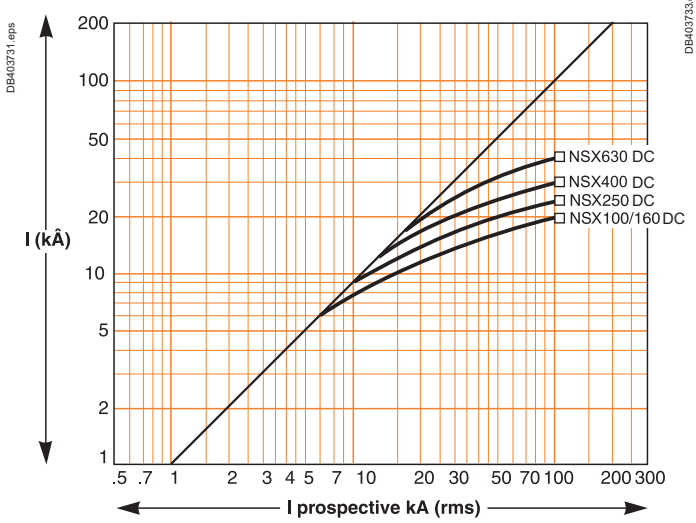
Example
Is a Cu/PVC cable with a CSA of 10 mm² adequately protected by an NSX160F?
The table above indicates that the permissible stress is 1.32×10^6 A^2s.
All short-circuit currents at the point where an NSX160F (Icu = 35 kA) is installed are limited with a thermal stress less than 6×10^5 A^2s (curve page E-13).
Cable protection is therefore ensured up to the limit of the breaking capacity of the circuit breaker.

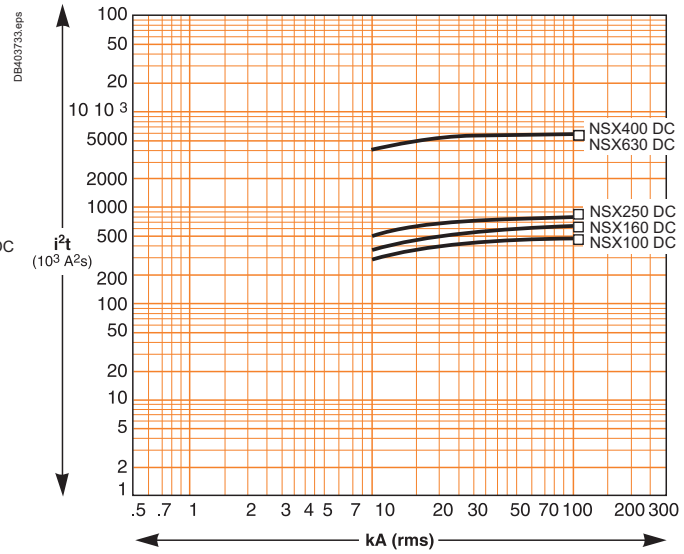
Current and energy limiting curves
Compact NSX DC

Current-limiting curves and thermal stress for L/R = 5 ms

Peak current U < 250 V DC: 1P
250 V < U < 500 V DC: 2P
500 V < U < 750 V DC: 3P

Thermal stress U < 250 V DC: 1P
250 V < U < 500 V DC: 2P

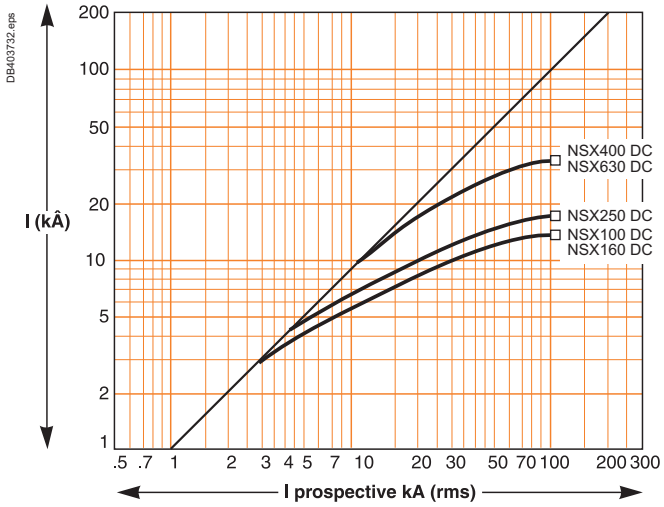


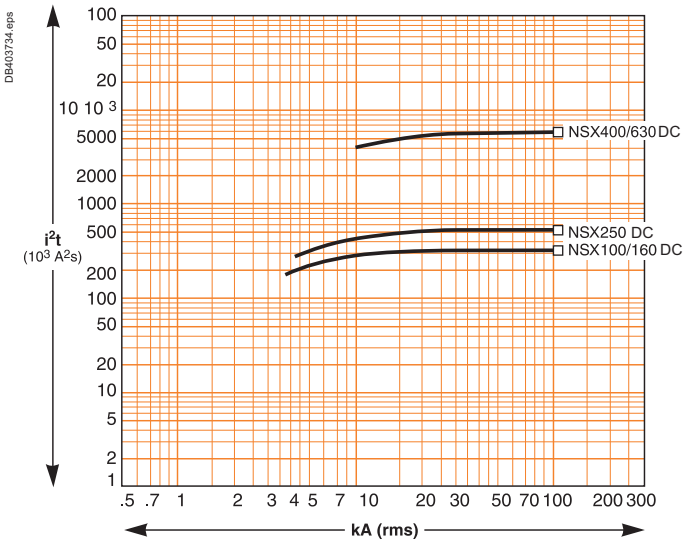


Current-limiting curves and thermal stress for L/R = 15 ms

Peak current U < 250 V DC: 1P
250 V < U < 500 V DC: 2P
500 V < U < 750 V DC: 3P

Thermal stress U < 250 V DC: 1P
250 V < U < 500 V DC: 2P





Compact NSX100 DC to NSX630 DC

Protection discrimination

Protection discrimination is an essential element that must be taken into account starting at the design stage of a low voltage installation to ensure the highest level of availability for users.
Discrimination is important in all installations for the comfort of users, however it is fundamental in installations requiring a high level of service continuity, e.g. industrial manufacturing processes.
Industrial installations without discrimination run a series of risks of varying importance including:

- ■ production deadline overruns
- ■ interruption in manufacturing, entailing:
  - □ production or finished-product losses
  - □ risk of damage to production machines in continuous processes
- ■ restarting of machines, one by one, following a general power outage
- ■ shutdown of vital safety equipment such as lubrification pumps, smoke fans, etc.

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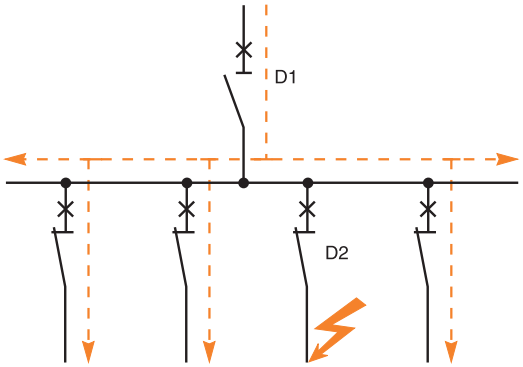


What is discrimination?

Discrimination, also called selectivity, is the coordination of automatic protection devices in such a manner that a fault appearing at a given point in a network is cleared by the protection device installed immediately upstream of the fault, and by that device alone.

■ **total discrimination**

Discrimination is said to be total if, for all fault current values, from overloads up to the non-resistive short-circuit current, circuit breaker D2 opens and D1 remains closed.

■ **partial discrimination**

Discrimination is partial if the above condition is not respected up to the full short-circuit current, but only to a lesser value termed the selectivity limit current (Is).

■ **no discrimination**

In the event of a fault, both circuit breakers D1 and D2 open.

Protection discrimination

Upst.: Compact NSX100 DC and NSX160 DC
Downstream: Compact NSX100 DC and NSX160 DC

	Upstream	Compact NSX100 DC - Thermal magnetic protection							
	Type of trip unit	TM16D	TM25D	TM32D	TM40D	TM50D	TM63D	TM80DC	TM100DC
	Fixed or adjustable	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
	Im (A)	260	400	550	700	700	700	640	800
Downstream	**Rating In (A)**								
Compact NSX100 DC	**16**			550	700	700	700	640	800
TM-D trip units	**25**				700	700	700	640	800
	32						700	640	800
	40							640	800
	50							640	800
	63								800
TM-DC trip units	**80**								
	100								

	Upstream	Compact NSX160 DC - Thermal magnetic protection									
	Type of trip unit	TM16D	TM25D	TM32D	TM40D	TM50D	TM63D	TM80DC	TM100DC	TM125DC	TM160DC
	Fixed or adjustable	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
	Im (A)	260	400	550	700	700	700	640	800	1250	1250
Downstream	**Rating In (A)**										
Compact NSX100 DC	**16**			550	700	700	700	640	800	1250	1250
TM-D trip units	**25**				700	700	700	640	800	1250	1250
	32						700	640	800	1250	1250
	40							640	800	1250	1250
	50							640	800	1250	1250
	63								800	1250	1250
TM-DC trip units	**80**										1250
	100										1250
Compact NSX160 DC	**16**			550	700	700	700	640	800	1250	1250
TM-D trip units	**25**				700	700	700	640	800	1250	1250
	32						700	640	800	1250	1250
	40							640	800	1250	1250
	50							640	800	1250	1250
	63								800	1250	1250
TM-DC trip units	**80**										1250
	100										1250
	125										
	160										

Protection discrimination

Upstream: Compact NSX250 DC
Downstream: Compact NSX100 and NSX250 DC

	Upstream	Compact NSX250 DC - Thermal magnetic protection							
	Type of trip unit	TM80DC	TM100DC	TM125DC	TM160DC	TM200DC		TM250DC	
	Fixed or adjustable	Fixed	Fixed	Fixed	Fixed	Adjustable		Adjustable	
						Min.	Max.	Min.	Max.
	Im (A)	640	800	1250	1250	1000	2000	1250	2500
Downstream	**Rating In (A)**								
Compact NSX100 DC	**16**	640	800	1250	1250	1000	2000	1250	2500
TM-D trip units	**25**	640	800	1250	1250	1000	2000	1250	2500
	32	640	800	1250	1250	1000	2000	1250	2500
	40	640	800	1250	1250		2000	1250	2500
	50	640	800	1250	1250		2000	1250	2500
	63		800	1250	1250		2000	1250	2500
TM-DC trip units	**80**			1250	1250		2000		2500
	100				1250		2000		2500
Compact NSX160 DC	**16**	640	800	1250	1250	1000	2000	1250	2500
TM-D trip units	**25**	640	800	1250	1250	1000	2000	1250	2500
	32	640	800	1250	1250	1000	2000	1250	2500
	40	640	800	1250	1250		2000	1250	2500
	50	640	800	1250	1250		2000	1250	2500
	63		800	1250	1250		2000	1250	2500
TM-DC trip units	**80**			1250	1250		2000		2500
	100				1250		2000		2500
	125						2000		2500
	160						2000		2500
Compact NSX250 DC	**80**				1250		2000	1250	2500
TM-DC trip units	**100**				1250		2000	1250	2500
	125						2000		2500
	160						2000		2500
	200 Irm min.						2000		2500
	200 Irm max.								2500
	250 Irm min.								2500
	250 Irm max.								

Protection discrimination

Upstream: Compact NSX400-NSX630 DC
Downstream: Compact NSX100 to NSX630 DC

	pstream a netic trip unit d usta le m	NSX DC-NSX DC - a netic protection onl					
		in	ax	in	ax	in	ax
Downstream	**atin n**						
Compact NSX DC		800	1600	1250	2500	2000	4000
D trip units		800	1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
DC trip units			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
Compact NSX DC		800	1600	1250	2500	2000	4000
D trip units		800	1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
DC trip units			1600	1250	2500	2000	4000
			1600	1250	2500	2000	4000
			1600		2500	2000	4000
			1600		2500	2000	4000
Compact NSX DC			1600	1250	2500	2000	4000
DC trip units			1600	1250	2500	2000	4000
			1600		2500	2000	4000
			1600		2500	2000	4000
	rm min				2500	2000	4000
	rm max						4000
	rm min				2500	2000	4000
	rm max						4000
Compact NSX DC-NSX DC	**rm min**				2500		4000
	rm max				2500		4000
	rm min						4000
	rm max						4000
Compact NSX DC	**rm min**						
	rm max						

Protection discrimination

Upstream: Masterpact NW10 DC
Downstream: Compact NSX100 to NSX630 DC, Masterpact NW10 DC

	Upstream	Masterpact NW10 DC magnetic protection only									
	Magnetic trip unit	1250 A to 2500 A					2500 A to 5400 A				
	Adjustable	Setting					Setting				
		A	B	C	D	E	A	B	C	D	E
	Ii (A)	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
Downstream	**Rating In (A)**										
Compact NSX100 DC	**16**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
TM-D trip units	**25**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	32	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	40	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	50	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	63	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
TM-DC trip units	**80**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	100	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
Compact NSX160 DC	**16**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
TM-D trip units	**25**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	32	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	40	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	50	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	63	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
TM-DC trip units	**80**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	100	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	125				2000	2500	2500	3300	4000	5000	5400
	160				2000	2500	2500	3300	4000	5000	5400
Compact NSX250 DC	**80**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
TM-DC trip units	**100**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	125				2000	2500	2500	3300	4000	5000	5400
	160				2000	2500	2500	3300	4000	5000	5400
	200 Irm min.		1500	1600	2000	2500	2500	3300	4000	5000	5400
	200 Irm max.							3300	4000	5000	5400
	250 Irm min.				2000	2500	2500	3300	4000	5000	5400
	250 Irm max.							3300	4000	5000	5400
Compact NSX400 DC - NSX630 DC	**MP1 Irm min.**	1250	1500	1600	2000	2500	2500	3300	4000	5000	5400
	MP1 Irm max.					2500	2500	3300	4000	5000	5400
	MP2 Irm min.				2000	2500	2500	3300	4000	5000	5400
	MP2 Irm max.								4000	5000	5400
Compact NSX630 DC	**MP3 Irm min.**							3300	4000	5000	5400
	MP3 Irm max.										
Masterpact NW10 DC Ii = 1250/2500 A	**Setting A**			1600	2000	2500	2500	3300	4000	5000	5400
	B				2000	2500	2500	3300	4000	5000	5400
	C				2000	2500	2500	3300	4000	5000	5400
	D					2500	2500	3300	4000	5000	5400
	E							3300	4000	5000	5400
Masterpact NW10 DC Ii = 2500/5400 A	**Setting A**							3300	4000	5000	5400
	B									5000	5400
	C									5000	5400
	D										
	E										

Protection discrimination

Upstream: Masterpact NW10 DC and NW20 DC
Downstream: Compact NSX100 to NSX630 DC, Masterpact NW10 DC and NW20 DC

	Upstream	Masterpact NW10 DC - Masterpact NW20 DC magnetic protection only									
	Magnetic trip unit	5000 A to 11000 A					2500 A to 5400 A				
	Adjustable	Setting					Setting				
		A	B	C	D	E	A	B	C	D	E
	Ii (A)	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
Downstream	**Rating In (A)**										
Compact NSX100 DC	**16**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
TM-D trip units	**25**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	32	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	40	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	50	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	63	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
TM-DC trip units	**80**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	100	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
Compact NSX160 DC	**16**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
TM-D trip units	**25**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	32	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	40	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	50	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	63	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
TM-DC trip units	**80**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	100	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	125	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	160	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
Compact NSX250 DC	**80**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
TM-DC trip units	**100**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	125	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	160	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	200 Irm min.	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	200 Irm max.	5000	8000	10000	11000	11000		3300	4000	5000	5400
	250 Irm min.	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	250 Irm max.	5000	8000	10000	11000	11000		3300	4000	5000	5400
Compact NSX400 DC-NSX630 DC	**MP1 Irm min.**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	MP1 Irm max.	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	MP2 Irm min.	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	MP2 Irm max.	5000	8000	10000	11000	11000			4000	5000	5400
Compact NSX630 DC	**MP3 Irm min.**	5000	8000	10000	11000	11000		3300	4000	5000	5400
	MP3 Irm max.		8000	10000	11000	11000					
Masterpact NW10 DC Ii = 1250/2500 A	**Setting A**	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	B	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	C	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	D	5000	8000	10000	11000	11000	2500	3300	4000	5000	5400
	E	5000	8000	10000	11000	11000		3300	4000	5000	5400
Masterpact NW10 DC Ii = 2500/5400 A	**Setting A**	5000	8000	10000	11000	11000		3300	4000	5000	5400
	B	5000	8000	10000	11000	11000				5000	5400
	C	5000	8000	10000	11000	11000				5000	5400
	D		8000	10000	11000	11000					
	E		8000	10000	11000	11000					
Masterpact NW10 DC Ii = 5000/11000 A	**Setting A**		8000	10000	11000	11000					
	B			10000	11000	11000					
	C										
	D										
	E										
Masterpact NW20 DC Ii = 2500/5400 A	**Setting A**							3300	4000	5000	5400
	B									5000	5400
	C									5000	5400
	D										
	E										

Protection discrimination

Upstream: Masterpact NW20 DC and NW40 DC
Downstream: Compact NSX100 to NSX630 DC, Masterpact NW10 to NW40 DC

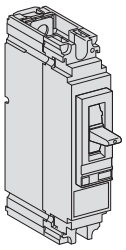
	Upstream	Masterpact NW20 DC - Masterpact NW40 DC magnetic protection only									
	Magnetic trip unit	5000 A to 11000 A					5000 A to 11000 A				
	Adjustable	Setting					Setting				
		A	B	C	D	E	A	B	C	D	E
	Ii (A)	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Downstream	**Rating In (A)**										
Compact NSX100 DC	**16**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
TM-D trip units	**25**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	32	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	40	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	50	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	63	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
TM-DC trip units	**80**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	100	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Compact NSX160 DC	**16**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
TM-D trip units	**25**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	32	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	40	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	50	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	63	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
TM-DC trip units	**80**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	100	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	125	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	160	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Compact NSX250 DC	**80**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
TM-DC trip units	**100**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	125	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	160	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	200 Irm min.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	200 Irm max.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	250 Irm min.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	250 Irm max.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Compact NSX400 DC-NSX630 DC	**MP1 Irm min.**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	MP1 Irm max.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	MP2 Irm min.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	MP2 Irm max.	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Compact NSX630 DC	**MP3 Irm min.**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	MP3 Irm max.		8000	10000	11000	11000		8000	10000	11000	11000
Masterpact NW10 DC Ii = 1250/2500 A	**Setting A**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	B	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	C	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	D	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	E	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
Masterpact NW10 DC Ii = 2500/5400 A	**Setting A**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	B	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	C	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	D		8000	10000	11000	11000	5000	8000	10000	11000	11000
	E		8000	10000	11000	11000	5000	8000	10000	11000	11000
Masterpact NW10 DC Ii = 5000/11000 A	**Setting A**		8000	10000	11000	11000	5000	8000	10000	11000	11000
	B			10000	11000	11000	5000	8000	10000	11000	11000
	C										
	D										
	E										
Masterpact NW20 DC Ii = 2500/5400 A	**Setting A**	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	B	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	C	5000	8000	10000	11000	11000	5000	8000	10000	11000	11000
	D		8000	10000	11000	11000	5000	8000	10000	11000	11000
	E		8000	10000	11000	11000	5000	8000	10000	11000	11000
Masterpact NW20 DC Ii = 5000/11000 A	**Setting A**		8000	10000	11000	11000	5000	8000	10000	11000	11000
	B			10000	11000	11000	5000	8000	10000	11000	11000
	C										
	D										
	E										
Masterpact NW40 DC Ii = 5000/11000 A	**Setting A**						5000	8000	10000	11000	11000
	B						5000	8000	10000	11000	11000
	C										
	D										
	E										

Catalogue numbers and order form

Compact NSX100 DC to NSX630 DC for direct current
Choice of device

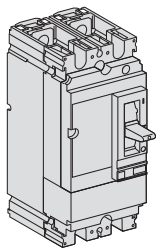
Compact NSX F N

ith thermal-ma netic trip unit T -D



Compact NSX F C DC		Compact NSX F C DC	
atin	d cu DC	d cu DC - DC	
16D			
20D			
25D			
30D			
40D			
50D			
63D			
80D			
100D			

Compact NSX F C DC		Compact NSX F C DC	
atin	d cu DC	d cu DC - DC	
125D			
160D			



Compact NSX N C DC		Compact NSX C DC	
atin	d cu DC	d cu DC - DC	
16D			
20D			
25D			
30D			
40D			
50D			
63D			
80D			
100D			

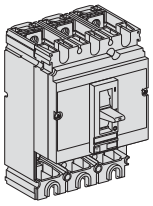
Compact NSX N C DC		Compact NSX C DC	
atin	d cu DC	d cu DC - DC	
125D			
160D			

Compact NSX C DC		Compact NSX S C DC	
atin	d cu DC	d cu DC - DC	
16D			
20D			
25D			
30D			
40D			
50D			
63D			
80D			
100D			

Compact NSX C DC		Compact NSX S C DC	
atin	d cu DC	d cu DC - DC	
125D			
160D			

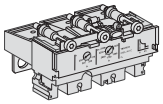
Compact NSX DC

asic frame



atin	cu DC - DC - DC
NSX100 DC	
NSX160 DC	
NSX250 DC	
	cu DC - DC - DC
NSX100S DC	
NSX160S DC	
NSX250S DC	

Trip unit

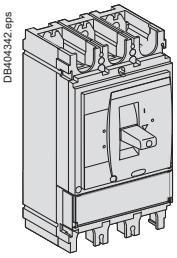


Standard protection trip unit T -D DC		
atin	d	d
16D		
25D		
32D		
40D		
50D		
63D		
80DC		
100DC		
125DC		
160DC		
200DC		
250DC		
T pe protection trip unit T -		
atin	d	d
16		
25		
40		
63		

Compact NSX100 DC to NSX630 DC for direct current

Choice of device (cont.)
Parallel or series connection accessories

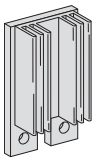
Compact NSX400/630 DC with trip unit MP


DB404342.eps

	3P	4P
Trip unit MP1		
Compact NSX400F DC (36kA)	**LV438403**	**LV438408**
Compact NSX400S DC (100kA)	**LV438418**	**LV438419**
Compact NSX630F DC, 45 mm pitch (36kA)	**LV438503**	**LV438508**
Compact NSX630S DC, 45 mm pitch (100kA)	**LV438518**	**LV438519**
Trip unit MP2		
Compact NSX400S DC (100kA)	**LV438428**	**LV438429**
Compact NSX630S DC, 45 mm pitch (100kA)	**LV438528**	**LV438529**
Trip unit MP3		
Compact NSX630S DC, 45 mm pitch (100kA)	**LV438538**	**LV438539**

Special connection accessories for parallel or series connection


DB104731.eps



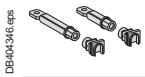
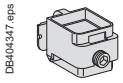
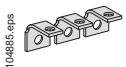
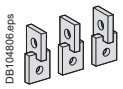
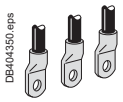
			NSX100-250 DC	NSX400-630 DC
Connection accessories				
Connection accessories for parallel or series connection of 2 poles (1)	1 connection plate equipped with heat sink + 1 interphase barrier (2)		**LV438328**	**LV438338**
Connection plates				
Connection plates for parallel connection of 3 poles	1 set of 2 connection plates		**LV438329**	(3)
Connection plates for parallel connection of 4 poles			(3)	(3)
1P short terminal shields	1 pair		**LV438320**	
2P short terminal shields	2 pairs	2 x	**LV438320**	
3P terminal shields for series connection of poles	1 set		**LV438325**	**LV438345**
4P terminal shields for series connection of poles	1 set		**LV438326**	**LV438346**
4P terminal shields for parallel connection of poles (2P/4P)	1 set		**LV438327**	**LV438337**

(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.

(3) To be made by the customer.

Compact NSX100 DC to NSX630 DC for direct current
Connection accessories

Connection accessories (Cu or Al)				NSX100-250 DC	NSX400-630 DC
Rear connections					
 DB404346.eps	2 short			LV429235	LV432475
	2 long			LV429236	LV432476
Cable connectors					
 DB404347.eps	Snap-on, for cable:	1.5 to 95 mm² ; ⩽ 160 A	Set of 2	LV429246	
			Set of 3	LV429242	
			Set of 4	LV429243	
		25 to 95 mm² ; ⩽ 250 A	Set of 2	LV429255	
			Set of 3	LV429227	
			Set of 4	LV429228	
		120 to 185 mm² ; ⩽ 250 A	Set of 2	LV429247	
			Set of 3	LV429259	
			Set of 4	LV429260	
 DB404348.eps	For 1 cable from 35 to 300 mm²		Set of 3		LV432479
			Set of 4		LV432480
	For 2 cables from 35 to 240 mm²		Set of 3		LV432481
			Set of 4		LV432482
 DB404349.eps	Voltage measurement input for cable connector 185 mm² or 1 x 300 mm² or 2 x 240 mm²		Set of 2	LV429348	LV429348
Terminal extensions					
 DB104885.eps	Right-angle terminal extensions		Set of 2	LV429250	
			Set of 3	LV429261	LV432484
			Set of 4	LV429262	LV432485
 DB104884.eps	Straight terminal extensions		Set of 2	LV429251	
			Set of 3	LV429263	
			Set of 4	LV429264	
 DB104806.eps	Edgewise pads		Set of 3		LV432486
			Set of 4		LV432487
Crimp lugs for copper cable (supplied with 2 or 3 interphase barriers)					
 DB404350.eps	For cable 120 mm²		Set of 3	LV429252	
			Set of 4	LV429256	
	For cable 150 mm²		Set of 3	LV429253	
			Set of 4	LV429257	
	For cable 185 mm²		Set of 3	LV429254	
			Set of 4	LV429258	
	For cable 240 mm²		Set of 3		LV432500
			Set of 4		LV432501
	For cable 300 mm²		Set of 3		LV432502
			Set of 4		LV432503
Crimp lugs for aluminium cable (supplied with 2 or 3 interphase barriers)					
 DB404351.eps	For cable 150 mm²		Set of 3	LV429504	
			Set of 4	LV429505	
	For cable 185 mm²		Set of 3	LV429506	
			Set of 4	LV429507	
	For cable 240 mm²		Set of 3		LV432504
			Set of 4		LV432505
	For cable 300 mm²		Set of 3		LV432506
			Set of 4		LV432507
Barriers					
 DB115920.eps	Interphase barriers		Set of 6	LV429329	LV432570

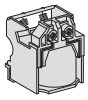
Compact NSX100 DC to NSX630 DC for direct current
Electrical auxiliaries

Electrical auxiliaries

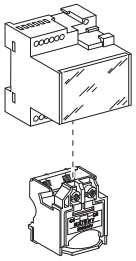
uxiliar contacts chan eover


DB404352.eps

O or SD or SD or SD			
O or SD or SD or SD low level			
SD adapter, mandatory for trip unit			


DB404353.eps

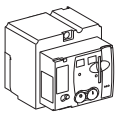
olta e releases		X	N
C	24 50/60 z		
	48 50/60 z		
	110 130 50/60 z		
	220 240 50/60 z 208 277 60 z		
	380 415 50 z 440 480 60 z		
	525 50 z 600 60 z		
DC	12		
	24		
	30		
	48		
	60		
	125		
	250		


DB115631.eps

MN 48 V 50/60 Hz with fixed time delay		
Composed of	N 48 DC	
	Delay unit 48 50/60 z	
MN 220-240 V 50/60 Hz with fixed time delay		
Composed of	N 250 DC	
	Delay unit of 220 240 50/60 z	
MN 48 V DC/AC 50/60 Hz with adjustable time delay		
Composed of	N 48 DC	
	Delay unit 48 50/60 z	
MN110-130 V DC/AC 50/60 Hz with adjustable time delay		
Composed of	N 125 DC	
	Delay unit 110 130 50/60 z	
MN 220-250 V 50/60 Hz with adjustable time delay		
Composed of	N 250 DC	
	Delay unit of 220 240 50/60 z	

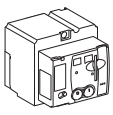
Motor mechanism

Motor mechanism module supplied with SDE adapter

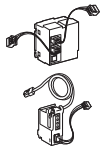

DB112265.eps

	olta e	T	T	T -
C	48 60 50/60 z			
	110 130 50/60 z			
	220 240 50/60 z 208 277 60 z			
	380 415 50/60 z 440 480 60 z			
DC	24 30			
	48 60			
	110 130			
	250			
Operations counter				

Communicating motor mechanism module supplied with SDE adapter


DB112265.eps

otor mechanism module	c 100/160	220 240 50/60 z	
	c 250	220 240 50/60 z	
Breaker and Status Communication odule	BSC		



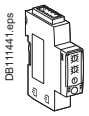
NSX cord	Wire length 0.35 m	
	Wire length 1.3 m	
	Wire length 3 m	
	480 C wire length 0.35 m	

(1) S only

Compact NSX100 DC to NSX630 DC for direct current
Electrical auxiliaries (cont.)

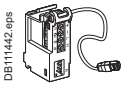
Communication accessories (1)

ULP communication module


DB111441.eps

Modbus interface	Modbus SL communication interface module	**TRV00210**

ULP wiring accessories


DB111442.eps

NSX cord L = 0.35 m	**LV434200**
NSX cord L = 1.3 m	**LV434201**
NSX cord L = 3 m	**LV434202**
NSX cord for U > 480 V AC L = 1.3 m	**LV434204**


DB115621.eps

10 stacking connectors for communication interface modules	**TRV00217**


DB111443.eps

2 Modbus line terminators	**VW3A8306DRC** (2)


DB115622.eps

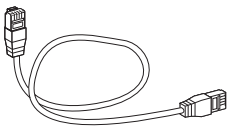
RS 485 roll cable (4 wires, length 60 m)	**50965**


DB115623.eps

5 RJ45 connectors female/female	**TRV00870**

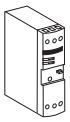

DB111444.eps

10 ULP line terminators	**TRV00880**

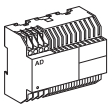

DB111445.eps

10 RJ45/RJ45 male cord L = 0.3 m	**TRV00803**
10 RJ45/RJ45 male cord L = 0.6 m	**TRV00806**
5 RJ45/RJ45 male cord L = 1 m	**TRV00810**
5 RJ45/RJ45 male cord L = 2 m	**TRV00820**
5 RJ45/RJ45 male cord L = 3 m	**TRV00830**
1 RJ45/RJ45 male cord L = 5 m	**TRV00850**
2 wires RS 485 insulated repeated	**TRV00211**

Power supply modules


DB122278.eps

External power supply module 100-240 V AC 110-230 V DC / 24 V DC-3 A class 2	**ABL8RPS24030** (3)

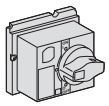
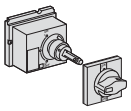

DB122736.eps

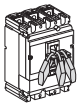
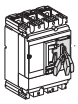
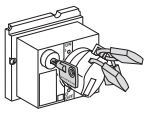
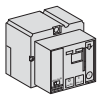
External power supply module 24 V DC-1 A OVC IV	
24-30 V DC	**54440**
48-60 V DC	**54441**
100-125 V AC	**54442**
110-130 V AC	**54443**
200-240 V AC	**54444**
380-415 V AC	**54445**

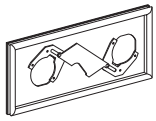
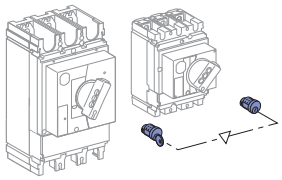
(1) NSX100-250 DC only.
(2) SDE adapter mandatory for trip unit TM,TMG.
(3) See Telemecanique catalogue.

Compact NSX100 DC to NSX630 DC for direct current

Operation and locking/Interlocking

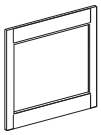
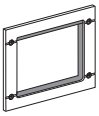
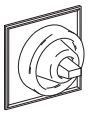
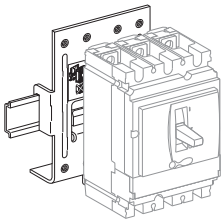
Rotary handles		NSX100-250 DC	NSX400-630 DC
Direct rotary handles			
 DB115918.eps	With black handle	LV429337	LV432597
	With red handle on yellow front	LV429339	LV432599
	MCC conversion accessory	LV429341	LV432606
	CNOMO conversion accessory	LV429342	LV432602
Extended rotary handle			
 DB115917.eps	With black handle	LV429338	LV432598
	With red handle on yellow front	LV429340	LV432600
	With telescopic handle for withdrawable device	LV429343	LV432603
Accessories			
	Indication auxiliary 1 early-break contact	LV429345	LV432605
	Indication auxiliary 2 early-break contacts	LV429346	LV429346

Locks		NSX100-250 DC	NSX400-630 DC
Toggle locking device for 1 to 3 padlocks			
 DB115913.eps	By removable device	29370	29370
 DB115916.eps	By fixed device	LV429371	LV432631
Locking of the rotary handle			
 DB115914.eps	Keylock adapter (keylock not included)	LV429344	LV432604
	Keylock (keylock adapter not included) Ronis 1351B.500	41940	41940
	Keylock (keylock adapter not included) Profalux KS5 B24 D4Z	42888	42888
Locking of the motor mechanism modules			
 DB115919.eps	Keylock adapter + Ronis keylock (special)	LV429449	LV432649
	Keylock (keylock adapter not included) Ronis 1351B.500		41940
	Keylock (keylock adapter not included) Profalux KS5 B24 D4Z		42888

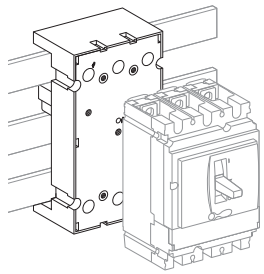
Interlocking			
Mechanical interlocking for circuit breakers		NSX 100-250	NSX 400-630
 DB111486.eps	With toggles	LV429354	LV432614
 DB111487.eps	With rotary handles	LV429369	LV432621
Interlocking with key (2 keylocks / 1 key) for rotary handles			
 DB122268.eps	Keylock kit (keylock not included) (1)	LV429344	LV432604
	1 set of 2 keylocks Ronis 1351B.500	41950	41950
	(1 key only, keylock kit not included) Profalux KS5 B24 D4Z	42878	42878

Compact NSX100 DC to NSX630 DC for direct current
Installation

Installation accessories

Front-panel escutcheons		NSX 100-250	NSX 400-630
 DB112269.eps	IP30 escutcheon for all control types	LV429525	LV432557
	IP30 trip unit access escutcheon for toggle	LV429526	LV432559
IP30			
 DB112737.eps	IP40 escutcheon for all control types	LV429317	LV432558
IP40			
IP43 rubber toggle cover			
 DB112738.eps	1 toggle cover	LV429319	LV432560
Lead-sealing accessories			
 DB115615.eps	Bag of accessories	LV429375	LV429375
Din rail adapter			
 DB112739.eps	1 adapter	LV429305	

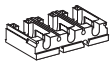
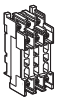
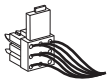
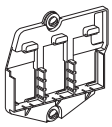
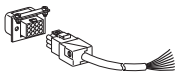
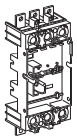
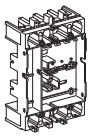
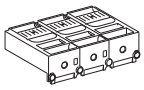
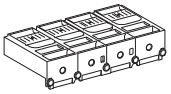
60 mm plate busbar adapter

 DB111428.eps	3P 60 mm busbar adapter	LV429372	LV432623
	4P 60 mm busbar adapter	LV429373	LV432624

(1) For only 1 device.

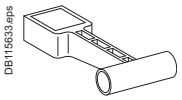
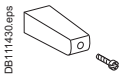
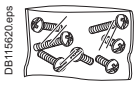
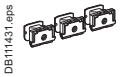
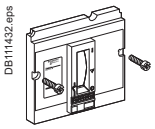
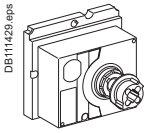
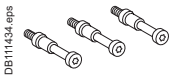
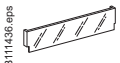
Compact NSX100 DC to NSX630 DC for direct current
Plug-in/withdrawable accessories

Plug-in/withdrawable version accessories

			NSX 100-250	NSX 400-630
Insulation accessories				
 DB117159.eps	1 connection adapter for plug-in base	3P	LV429306	LV432584
		4P	LV429307	LV432585
Auxiliary connections				
 DB117160.eps	1 9-wire fixed connector (for base)		LV429273	LV429273
 DB117161.eps	1 9-wire moving connector (for circuit breaker)		LV429274	LV432523
 DB116368.eps	1 support for 2 moving connectors		LV429275	LV432525
 DB115885.eps	9-wire manual auxiliary connector (fixed + moving)		LV429272	LV429272
Plug-in base accessories				
 DB117164.eps	2 long insulated right angle terminal extensions	Set of 2	LV429276	LV432526
 DB117165.eps	2 IP40 shutters for base		LV429271	LV432521
 DB117180.eps	Base	2P	LV429265	
		3P	LV429266	LV432516
 DB117181.eps	Base	4P	LV429267	LV432517
 DB117182.eps	2 power connections	2/3/4P	LV429268	LV432518
 DB117183.eps	1 short terminal shields	2/3P	LV429515	LV432591
 DB117184.eps	1 short terminal shields	4P	LV429516	LV432592
 DB117171.eps	1 safety trip interlock	2/3/4P	LV429270	LV432520
Installation and connection				
	Kit for Compact	3P	LV429289 + LV429282 + LV429283	LV422538 + LV422532 + LV422533
		4P	LV429290 + LV429282 + LV429283	LV422539 + LV422532 + LV422533

Spare parts: Compact NSX100 DC to NSX630 DC for direct current

Spare parts

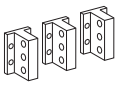
		NSX 100-250	NSX 400-630
 DB115633.eps	Additional toggle extension for NSX400/630		32595
 DB111430.eps	10 spare toggle extensions (NSX250)	LV429313	
	5 spare toggle extensions		LV432553
 DB115620.eps	Bag of screws	LV429312	LV432552
 DB111431.eps	12 snap-in nuts (fixed/FC) M6 for NSX100N/H/L	LV429234	
	M8 for NSX160/250N/H/L	LV430554	
 DB111432.eps	NS retrofit escutcheon Small cut-out	LV429528	LV432571
 DB111433.eps	IP40 toggle escutcheon Compact NS type/small cut-out	29315	32556
 DB111438.eps	1 set of 10 identification labels	LV429226	LV429226
 DB111429.eps	1 base for extended rotary handle	LV429502	LV432498
 DB111434.eps	Torque limiting screws (set of 12) 3P/4P Compact NSX100-630	LV429513	LV432513
 DB111436.eps	5 transparent covers for trip unit TM, MA, NA	LV429481	

Spare parts: Masterpact NW DC
Connection

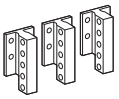
Connection

		C or D type	E type
Fixed or drawout circuit breakers or switches			
Rear connection (vertical or horizontal mounting) / Replacement kit (3 or 4 parts)			
1000/2000 A	Vertical or horizontal Top or bottom	**47966**	**47967**
4000 A	Vertical or horizontal Top or bottom	**47968**	**47969**

DB404366.eps



DB413008.eps

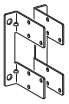


Vertical mounting

Connection accessories

Additional support brackets for mounting on a backplate		
For fixed rear-connected circuit breaker (2 parts)		**47829**

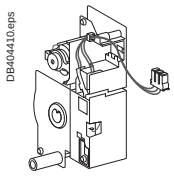
DB404369.eps



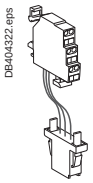
Spare parts: Masterpact NW DC
Remote operation

emote operation

ear motor



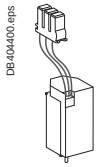
C part		
C 50/60 z	48	
	100/130	
	200/240	
	250/277	
	380/415	
	440/480	
DC	24/30	
	48/60	
	100/125	
	200/250	
erminal block 1 part	For fixed circuit breaker	
	For drawout circuit breaker	



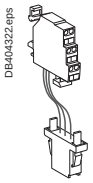
i e *ra out*

Installation manual		

Closin and openin release XF or X



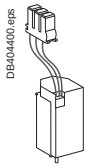
Standard coil part		
C 50/60 z	12 DC	
DC	24/30 DC, 24 C	
	48/60 DC, 48 C	
	100/130 C/DC	
	200/250 C/DC	
	277 C	
	380/480 C	
Communicatin coil part		
C 50/60 z	12 DC	
DC	24/30 DC, 24 C	
	48/60 DC, 48 C	
	100/130 C/DC	
	200/250 C/DC	
	277 C	
	380/480 C	
erminal block 1 part	For fixed circuit breaker	
	For drawout circuit breaker	



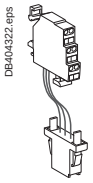
i e *ra out*

Installation manual		

ndervolta e release N



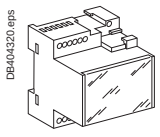
ndervolta e release part		
C 50/60 z	24/30 DC, 24 C	
DC	48/60 DC, 48 C	
	100/130 C/DC	
	200/250 C/DC	
	380/480 C	
erminal block 1 part	For fixed circuit breaker	
	For drawout circuit breaker	



i e *ra out*

Installation manual		

N dela unit



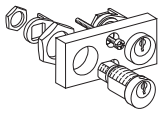
N dela unit part			
		(non-adjustable)	**r** (adjustable)
C 50/60 z	48/60 C/DC		
DC	100/130 C/DC		
	200/250 C/DC		
	380/480 C/DC		
Installation manual			

Spare parts: Masterpact NW DC
Chassis locking and accessories

Chassis locking

"Disconnected" position locking / 1 part

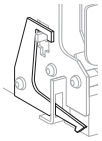
DB404325.eps



By padlocks		
	VCPO	Standard
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	**64934**
	2 locks 1 key + adaptation kit	**64935**
	2 locks 2 different keys + adaptation kit	**64936**
1 keylock Profalux (without adaptation kit):	identical key not identified combination	**33173**
	identical key identified 215470 combination	**33174**
	identical key identified 215471 combination	**33175**
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	**64937**
	2 locks 1 key + adaptation kit	**64938**
	2 locks 2 different keys + adaptation kit	**64939**
1 keylock Ronis (without adaptation kit):	identical key not identified combination	**33189**
	identical key identified EL24135 combination	**33190**
	identical key identified EL24153 combination	**33191**
	identical key identified EL24315 combination	**33192**
Adaptation kit (without keylock):	adaptation kit Profalux / Ronis	**48564**
	adaptation kit Kirk	**48565**
	adaptation kit Castell	**48566**
Installation manual		**47952**

Door interlock / 1 part

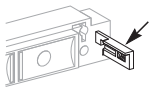
DB404326.eps



Right and left-hand side of chassis (VPECD or VPECG)	**47914**
Installation manual	**47952**

Racking interlock

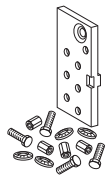
DB404327.eps



5 parts	**64940**
Installation manual	**47952**

Breaker mismatch protection / 1 part

DB404329.eps

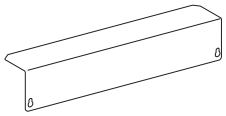


Breaker mismatch protection (VDC)	**33767**
Installation manual	**47952**

Chassis accessories

Auxiliary terminal shield (CB) / 1 part

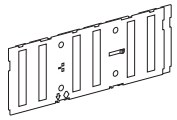
DB404331.eps



800/4000 A	3P	**64942**
	4P	**48596**
4000b/6300 A	3P	**48597**
	4P	**48598**

Safety shutters + locking block / 1 part

DB404332.eps



800/4000 A	3P	**48721**
	4P	**48723**
4000b/6300 A	3P	**48722**
	4P	**48724**
Installation manual		**47952**

Shutter locking block (for replacement) / 1 part

DB404333.eps

2 parts for 800/4000 A	**48591**
Installation manual	**47952**

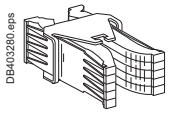
Earthing kit for chassis

	3P	4P
Types for N1/H1/NA/HA		
	48433	**48434**

Note: *the installation manual is enclosed.*

Spare parts: Masterpact NW DC
Clusters

Clusters



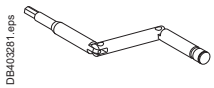
1 disconnecting contact cluster for chassis (see table below) (part 1)	**64906**

Table : number of clusters required for the different chassis models

Chassis rating (A)	Masterpact NW 3P				Masterpact NW 4P			
	N1	H1/H2	H3	L1	N1	H1/H2	H3	L1
250		12 (H1)						
630	6	12		24	8	16		32
800	6	12		24	8	16		32
1000	6	12		24	8	16		32
1250	6	12		24	8	16		32
1600	12	12		24	16	16		32
2000		24	24	42		32	32	56
2500		24	24			32	32	
3200		36	36			48	48	
4000		42	42			56	56	
4000b		72				96		
5000		72				96		
6300		72				96		

Note: *the minimum order is 6 parts.*

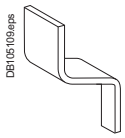
Racking handle



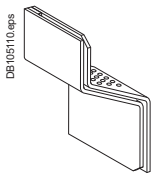
Racking handle	**47944**

DC rear connection

Serial connection kit



For NW10/20 DC	**48642**

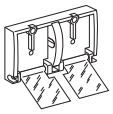


For NW40 DC	**48643**

Spare parts: Masterpact NW DC
Circuit breaker locking and accessories

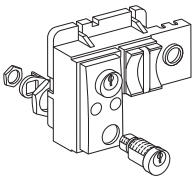
Circuit breaker locking

Pushbutton locking device / 1 part


DB404337.eps

By padlocks		48536
Installation manual		47951

OFF position locking / 1 part


DB404411.eps

By padlocks		
		48539
By Profalux keylocks		
Profalux	1 lock with 1 key + adaptation kit	64928
	2 locks 1 key + adaptation kit	64929
	2 locks 2 different keys + adaptation kit	64930
1 keylock Profalux (without adaptation kit):	identical key not identified combination	33173
	identical key identified 215470 combination	33174
	identical key identified 215471 combination	33175
By Ronis keylocks		
Ronis	1 lock with 1 key + adaptation kit	64931
	2 locks 1 key + adaptation kit	64932
	2 locks 2 different keys + adaptation kit	64933
1 keylock Ronis (without adaptation kit):	identical key not identified combination	33189
	identical key identified EL24135 combination	33190
	identical key identified EL24153 combination	33191
	identical key identified EL24315 combination	33192
Adaptation kit (without keylock):	adaptation kit Profalux / Ronis	64925
	adaptation kit Kirk	64927
	adaptation kit Castell	64926
Installation manual		47951

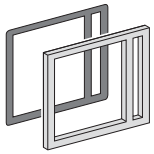
Other circuit breaker accessories

Mechanical operation counter / 1 part

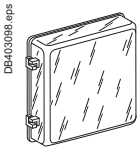

DB125617.eps

Operation counter CDM	48535
Installation manual	47951

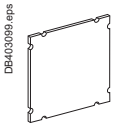
Escutcheon and accessories / 1 part


DB403097.eps

Escutcheon


DB403098.eps

Cover


DB403099.eps

Blanking plate

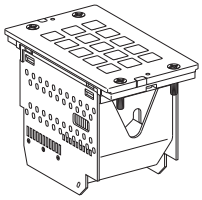
	Fixed	Drawout
Escutcheon	48601	48603
Transparent cover (IP 54)		48604
Escutcheon blanking plate	48605	48605
Installation manual		47951

Spring charging handle / 1 part


DB404413.eps

Spring charging handle	47940
Installation manual	47951

Arc chute for Masterpact NW / 1 part


DB404414.eps

		C type		D type		E type
Type NW DC	2 x	47934	3 x	47934	4 x	47934
Installation manual						47951

Spare parts: Masterpact NW DC
Mechanical interlocking for source changeover

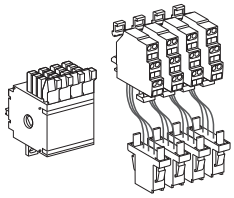
Cable-type door interlock

1 complete assembly for Masterpact NW fixed or drawout device ***Note:*** *the installation manual is enclosed.*	**48614**

Spare parts: Masterpact NW DC
Indication contacts

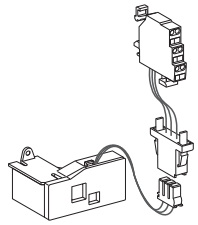
Indication contacts

ON/OFF indication contacts (OF) / 12 parts



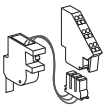
1 additional block of 4 contacts		64922
Wiring	For fixed circuit breaker	47074
	For drawout circuit breaker	47849
Installation manual		47951

"Fault trip" indication contacts (SDE) / 1 part



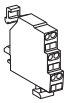
Changeover contact (SDE)	6 A - 240 V	47915
	Low-level	47916
Wiring	For fixed circuit breaker	47074
	For drawout circuit breaker	47849
Installation manual		47951

"Ready to close" contact (1 max.) / 1 part



		PF
1 changeover contact (5 A - 240 V)		47080
1 low-level changeover contact		47081
Wiring	For fixed circuit breaker	47074
	For drawout circuit breaker	47849
Installation manual		47951

"Connected, disconnected, test position" indication contact (carriage switches) / 1 part

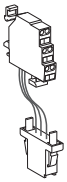


Changeover contacts	6 A - 240 V	33170
CE, CD, CT	Low-level	33171
Installation manual		47952

Set of additional actuaters for carriage switches / 1 set

1 set		48560

Combined closed / connected contacts for use with 1 auxiliary contact / 1 part



1 contact (5 A - 240 V)		48477
or 1 low-level contact		48478
Installation manual		47952

Electrical closing pushbutton / 1 part

		BPFE
1 pushbutton		48534
Installation manual		47951

Auxiliary terminals for chassis alone

3 wire terminal (1 part)		47849
6 wire terminal (1 part)		47850
Jumpers (10 parts)		47900

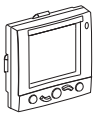
Spare parts: Masterpact NW DC
Instructions

Instructions		
Chassis accessories		**47952**
Circuit breaker accessories		**47951**
Fixed and drawout circuit breaker		**47950**
User manual	NW DC (French)	**64923**
	NW DC (English)	**64924**
Modbus communication notice for manual		**33088**

Spare parts: Masterpact NW DC Monitoring and control converter

Monitoring and control

ULP display module


DB111440.eps

Switchboard front display module FDM121	**TRV00121**
FDM mounting accessory (diameter 22 mm)	**TRV00128**

ULP wiring accessories


DB127985.eps

Breaker ULP cord L = 0.35 m	**LV434195**
Breaker ULP cord L = 1.3 m	**LV434196**
Breaker ULP cord L = 3 m	**LV434197**


DB111443.eps

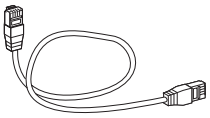
10 Modbus line terminators	**VW3A8306DRC** (1)


DB115623.eps

5 RJ45 connectors female/female	**TRV00870**


DB111444

10 ULP line terminators	**TRV00880**


DB111445.eps

10 RJ45/RJ45 male cord L = 0.3 m	**TRV00803**
10 RJ45/RJ45 male cord L = 0.6 m	**TRV00806**
5 RJ45/RJ45 male cord L = 1 m	**TRV00810**
5 RJ45/RJ45 male cord L = 2 m	**TRV00820**
5 RJ45/RJ45 male cord L = 3 m	**TRV00830**
1 RJ45/RJ45 male cord L = 5 m	**TRV00850**

Converter

RS485/Ethernet	**EGX100MG/EGX300** (*)

(1) See Telemecanique catalogue.
(*) Consult us.

Order form: Compact NSX100 DC to NSX630 DC

Check the applicable square boxes ☐ and enter the appropriate information in the rectangles

Circuit breaker — Quantity

Compact type	NSX	
	NSX	
Rating		
Circuit breaker	N	
Number of poles	or	
Circuit breaker	DC	
Number of poles	or	
Number of poles tripped	4d or 4d	
Fixed device	Front conn. ☐	Long rear conn. ☐
	Short rear conn. ☐	
Plug in/withdr.	Plug in ☐	Withdrawable ☐

Thermal-magnetic trip unit

Thermal-magnetic NSX to	TM-D rating 16 … 63	
	TM rating 16 … 63	
	TM-DC rating 80 … 250	
Magnetic only NSX	NSX400/630	
	NSX400/630	
	NSX630	

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 NSX100 to 250, 1 set of 2 connection plates	
	2 2 poles 4 connection plates	

Special terminal shields for parallel or series connection

1 short	1 pair	
2 short	2 1 pair 1	
3 short for series connection of poles	1 set	
4 short for series connection of poles	1 set	
4 short for parallel connection of poles 2 /4	1 set	

Connection

NSX100/250 connectors	Snap on 1.5² to 95² 160			
	Snap on 25² to 95² 250			
	Snap on 120² to 185² 250			
NSX400/630 connectors	1 cable 35² to 300²			
	2 cables 35² to 240²			
Voltage measurement input	or bare cable connector	NSX100/250 ⩽ 185²		
	or bare cable connector	NSX400/630		
Right angle terminal extensions				
Straight extensions	NSX100/250			
Edgewise extensions	NSX400/630			
Cu cable lugs	NSX100/250	120² ☐	150² ☐	185²
	NSX400/630	240² ☐	300²	
Al cable lugs	NSX100/250	150² ☐	185²	
	NSX400/630	240² ☐	300²	
Interface barriers				Set of 6

Indication and measurements

Auxiliary contact OF, SD or SD			Standard ☐	Low level ☐	
SDE adapter trip unit					

Remote operation

Electrical operation	Motor mechanism		AC ☐	DC ☐		
Voltage releases	Instantaneous	MX	AC ☐	DC ☐		
		MN	AC ☐	DC ☐		
	Fixed time delay	MN	AC ☐	DC ☐		
	Adjust. time delay	MN	AC ☐	DC ☐		

Rotary handles

Direct	Black ☐	Red on yellow front	☐
	CCM 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 S5 B24 D4	
Motor mechanism	Keylock adapter Keylock Ronis special	NSX100/250	
	Keylock adapter keylock not included	NSX400/630	
	Keylock Ronis 1351B.500 ☐	Profalux S5 B24 D4	

Interlocking

Mechanical	Toggle ☐		Rotary handle
By key 2 keylocks, 1 key	Keylock adapter keylock not included		
or rotary handle	Keylock Ronis 1351B.500 ☐	Profalux S5 B24 D4	

Installation accessories

Front panel escutcheon	Toggle
	Rotary handle, motor mechanism, escutcheon collar IP 405
Toggle cover	
Sealing accessories	
DIN rail adapter	NSX100/250

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 IP 4 shutters for base			
Chassis accessories	Escutcheon collar	Toggle ☐		
	Locking kit keylock not included			
	2 carriage switches conn./disconnected position indication			
Parts of plug in	Plug in base QC/ C 2 ☐	3 ☐	4	
	Set of 2 power connections	Standard ☐		
	Safety trip for advanced opening			
	For 3 /4 chassis		Moving part	
			Fixed part	

Communication

	NSX Cord 0.35 m ☐	NSX Cord 1.3 m	☐	
	NSX Cord 480 C 0.35 m ☐	NSX Cord 3 m	☐	
BSCM				
Communicating motor mechanism 220 240				
Switchboard front display module FDM121				
FDM mounting accessory				
Modbus interface				
Stacking accessory				
Line termination				
RJ45 connectors female/female ☐	Wire length 0.3 m	RJ45 ☐	Wire length 0.6 m	RJ45 ☐
	Wire length 1 m	RJ45 ☐	Wire length 2 m	RJ45 ☐
	Wire length 3 m	RJ45 ☐	Wire length 5 m	RJ45 ☐

(1) S only

Order form: Masterpact NW DC

Name of customer .....

ddress for delivery .....

.....

equested delivery date .....

Customer order no. .....

o indicate your choices, check the applicable square bo es ☐

and enter the appropriate information in the rectangles

Circuit rea er or switch-disconnector t

asterpact type	**N**	☐
	N	☐
	N	☐
Circuit breaker	**N**	☐
Special switch disconnectors	**DCD- N or N**	☐
Switch disconnector		☐
Sensor version	**to**	☐
	to	☐
	to	☐
ersion	**C D E**	☐
ype of equipment	i ed	☐
	Drawout chassis	☐

Communication

C module	odbus	Device	☐	Chassis ☐
ront Display odule D 121			☐	ounting accessory ☐
Breaker Cord		0.35	☐	
		1.3	☐	
		3 m	☐	

Connection

ertical	Standard version	op	☐	Bottom ☐
ori ontal	ertical connection is standard however the connectors can be rotated on site conversion to horizontal connection e cept on the NW40			

ndication contacts

F - N FF indication contacts

Standard	4 O 10 /240 C and low level		
dditional	1 block of 4 O	a . 2 ty	☐

EF - com ined connected closed contacts

	1 6 /240 C	a . 8 ty	☐
	1 low level	a . 8 ty	☐

SDE - fault-trip indication contact

Standard	1 SD 6 /240 C	☐	
dditional	1 SD 6 /240 C	☐ 1 SD low level	☐
Carria e switches	ow level	☐ 6 /240 C	☐
CE connected position	a . 3	ty	☐
CD disconnected position	a . 3	ty	☐
CT test position	a . 3	ty	☐
C N actuator for CE - CD - CT additional carria e switches		ty	☐

emote operation

Electrical operation	**C** gear motor	☐
	XF closing voltage release	☐
	X opening voltage release	☐
	F ready to close contact ow level	☐
	6 /240 C	☐
	FE electrical closing pushbutton	☐
	ES electrical reset option	☐
	automatic reset option	☐
emote trippin	**N** undervoltage release	☐
	delay unit non ad ustable	☐
	r ad ustable delay unit	☐
	e X shunt release	☐

oc in

- N FF push utton loc in	by transparent cover padlocks ☐

FF position loc in

C	by padlocks			☐
S	by keylocks	eylock kit w/o keylock	rofalu ☐	onis ☐
		1 keylock	rofalu ☐	onis ☐
		2 identical keylocks, 1 key	rofalu ☐	onis ☐
		2 keylocks, different keys	rofalu ☐	onis ☐

Chassis loc in in disconnected position

S D	by keylocks	eylock kit w/o keylock	rofalu ☐	onis ☐
			irt ☐	Castell ☐
		1 keylock	rofalu ☐	onis ☐
		2 identical keylocks, 1 key	rofalu ☐	onis ☐
		2 keylocks, different keys	rofalu ☐	onis ☐
		Optional connected/disconnected/test position locking		☐
EC - door interlock		On right hand side of chassis		☐
		On left hand side of chassis		☐
C - racking interlock				☐
cable type door interlock				☐
DC mismatch protection				☐
C shutter position indication and locking				☐
racking interlock between crank and O pushbutton for NW				☐
D E automatic spring discharge before breaker removal for NW				☐

ccessories

safety shutters on chassis	☐
CD mechanical operation counter	☐
C au iliary terminal shield for chassis	☐
CD escutcheon	☐
C transparent cover for escutcheon	☐
blanking plate for escutcheon	☐

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92506 ueil almaison Cede
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Capital social 896 313 776
www.schneider electric.com

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Design Schneider lectric
 hotos Schneider lectric
 dition ltavia Conne ion made in rance

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