

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

# Compact NS Masterpact NW

Catalogue

2005



## **The Guiding System, the new way to create your electrical installations**

### **A comprehensive offer of products with consistent design**

The Guiding System is first and foremost a Merlin Gerin product offer covering all electrical distribution needs. However, what makes all the difference is that these products have been designed to operate together: mechanical and electrical compatibility, interoperability, modularity, communication. Thus the electrical installation is both optimised and more efficient: better continuity of supply, enhanced safety for people and equipment, guaranteed upgradeability, effective monitoring and control.

### **Tools to simplify design and implementation**

With the Guiding System, you have a comprehensive range of tools - the Guiding Tools - that will help you increase your product knowledge and product utilisation. Of course this is in compliance with current standards and procedures. These tools include technical booklets and guides, design aid software, training courses, etc. and are regularly updated.

**The Guiding System, combined with the know-how and creativity, allows optimised, reliable, open-ended and standard compliant installations**

### **For a genuine partnership with you**

Because each electrical installation is unique, there is no standard solution. With the Guiding System, the variety of combinations allows for genuine customisation solutions. You can create and implement electrical installations to meet your creative requirements and design knowledge. You and Merlin Gerin's Guiding System form a genuine partnership.

**For more details on the Guiding System, consult [www.merlin-gerin.com](http://www.merlin-gerin.com)**

**A consistent design of offers from Medium Voltage to Ultra terminal**

**All Merlin Gerin offers are designed according to electrical, mechanical and communication consistency rules. The products express this consistency by their overall design and shared ergonomics.**



*Discrimination guarantees co-ordination between the operating characteristics of serial-connected circuit-breakers. Should a fault occurs downstream, only the circuit-breaker placed immediately upstream from the fault will trip.*



*Prefabricated and tested solutions, upstream and downstream from the device complying with the IEC 60439-1 switchboard standard.*

**Transparent Ready**

*Thanks to the use of standard Web technologies, you can offer your customers intelligent Merlin Gerin switchboards allowing easy access to information: follow-up of currents, voltages, powers, consumption history, etc.*

**Guiding Tools  
for more efficient design  
and implementation  
of your installations.**

#### **Electrical consistency:**

Each product complies with or enhances system performance at co-ordination level: breaking capacity,  $I_{sc}$ , temperature rise, etc. for more safety, continuity of supply (discrimination) or economic optimisation (cascading).

The leading edge technologies employed in Merlin Gerin's Guiding System ensure high performance levels in discrimination and cascading of protection devices, electrodynamic withstand of switches and current distributors, heat loss of devices, distribution blocks and enclosures.

Likewise, inter-product ElectroMagnetic Compatibility (EMC) is guaranteed.

#### **Mechanical consistency:**

Each product adopts dimensional standards simplifying and optimising its use within the system.

It shares the same accessories and auxiliaries and complies with global ergonomic choices (utilisation mode, operating mode, setting and configuration devices, tools, etc.) making its installation and operation within the system a simpler process.

#### **Communication consistency:**

Each product complies with global choices in terms of communication protocols (Modbus, Ethernet, etc.) for simplified integration in the management, supervision and monitoring systems.

## SM6

Medium voltage switchboard system from 1 to 36 kV



## Sepam

Protection relays



## Masterpact

Protection switchgear from 100 to 6300 A



## Trihal

MV/LV dry cast resin transformer from 160 to 5000 kVA

## Evolis

MV vacuum switchgear and components from 1 to 24 kV.

## The Technical guide

These technical guides help you comply with installation standards and rules i.e.: The electrical installation guide, the protection guide, the switchboard implementation guide, the technical booklets and the co-ordination tables all form genuine reference tools for the design of high-performance electrical installations. For example, the LV protection co-ordination guide - discrimination and cascading - optimises choice of protection and connection devices while also increasing markedly continuity of supply in the installations.



## CAD software and tools

The CAD software and tools enhance productivity and safety. They help you create your installations by simplifying product choice through easy browsing in the Guiding System offers. Last but not least, they optimise use of our products while also complying with standards and proper procedures.



## Compact

Protection switchgear system  
from 100 to 630 A



## Multi 9

Modular protection switchgear  
system up to 125 A



## Prisma Plus

Functional system for electrical  
distribution switchboards  
up to 3200 A



### Pragma

Enclosures for  
distribution  
switchboards  
up to 160 A

### Canalis

Prefabricated Busbar  
Trunking  
from 25 to 4000 A

### PowerLogic

Power  
management

## Training

Training allows you to acquire the Merlin Gerin expertise (installation design, work with power on, etc.) for increased efficiency and a guarantee of improved customer service.

The training catalogue includes beginner's courses in electrical distribution, knowledge of MV and LV switchgear, operation and maintenance of installations, design of LV installations to give but a few examples.



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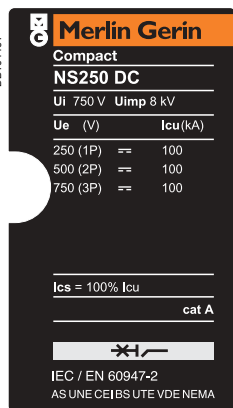
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***Appendix***  
***C1251N DC technical data***  
***Technical characteristics***  
***and catalogue numbers*** 152

Compact NS 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.



NS250 DC rating plate.

## Compact NS 16 to 630 A

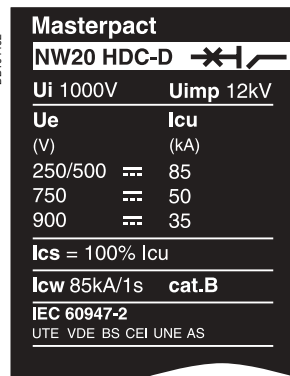
The Compact NS range is designed for DC voltages from 24 to 750 V and offers:

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

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

3P/4P	DC	Breaking capacity Icu (kA)				
		NS100	NS160	NS250	NS400	NS630
2P	H	100 kA / 500 V	100 kA / 500 V	100 kA / 500 V	100 kA / 500 V	100 kA / 500 V
	N	85 kA / 500 V	85 kA / 500 V	85 kA / 500 V	85 kA / 500 V	85 kA / 500 V
1P	H	85 kA / 250 V	85 kA / 250 V	85 kA / 250 V	85 kA / 250 V	85 kA / 250 V
	N	50 kA / 250 V	50 kA / 250 V	50 kA / 250 V	50 kA / 250 V	50 kA / 250 V

(1) L/R = time constant of the distribution system (see page 19).



NW20 HDC-D rating plate.

## Masterpact NW 1000 to 4000 A

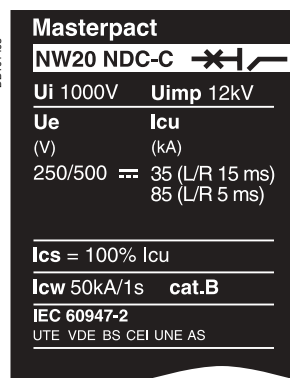
The Masterpact NW range is designed for DC voltages from 24 to 900 V and offers:

- 3 and 4-pole versions
- three current ratings: 1000, 2000 and 4000 A
- two high breaking-capacity levels N and H:
  - N = 35 kA for systems ≤ 500 V
  - H = 85 kA for systems ≤ 500 V, H = 50 kA for systems ≤ 750 V, H = 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.

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

3P/4P	H	Breaking capacity Icu (kA)		
		NW10 (1000 A)	NW20 (2000 A)	NW40 (4000 A)
3P/4P	H	35 kA / 900 V	35 kA / 900 V	35 kA / 900 V
	H	50 kA / 750 V	50 kA / 750 V	50 kA / 750 V
	H	85 kA / 500 V	85 kA / 500 V	85 kA / 500 V
	N	35 kA / 500 V	35 kA / 500 V	35 kA / 500 V

(1) L/R = time constant of the distribution system (see page 19).



NW20 NDC-C rating plate.

PB101047-15



NS160 DC - 1P.

PB101048-22



NS160 DC - 2P.

PB101055-30



NS160 DC - 3P.

PB100895-35



NS630 DC - 4P.

EB8199\_A



NW10 DC - 3P.

PB101125-70



NW10 DC - 4P.

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

## **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 NS 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 NS 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 NS 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 NS 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, EN 60947-1/2/3/4/5 and the specifications of the marine classification companies (Veritas, Lloyd's Register of Shipping, Det Norske Veritas, etc.).

## **Open communication**

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

## **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.

Compact NS 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 NS 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 NS 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 NS 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 NS 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 NS range enables parallel connection of the poles, thereby optimising the use of the rated currents.

**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.

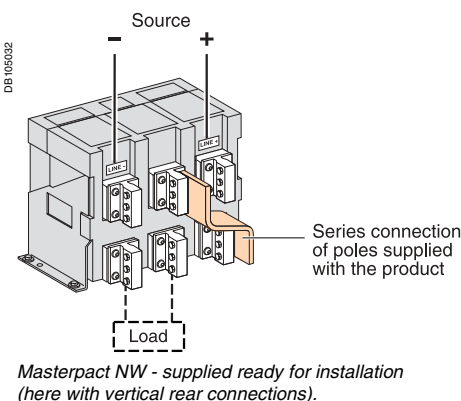
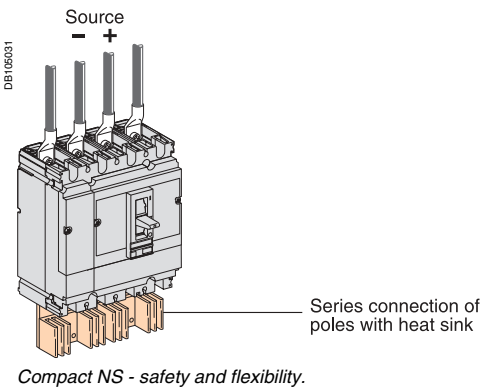
To that end, series connection of poles meets:

- 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  $\leq 250$  V.

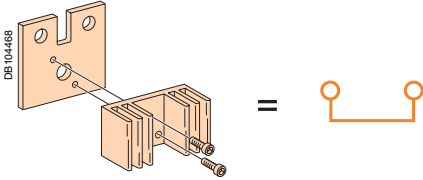
The configurations of DC systems and the exceptional performance levels of Compact NS circuit breakers mean the poles can be parallel connected. This technique virtually doubles, triples or quadruples the current rating depending on the type of circuit breaker and thus reduces the cost of solutions.



# Great flexibility in adapting to DC applications

## Series connection of poles

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

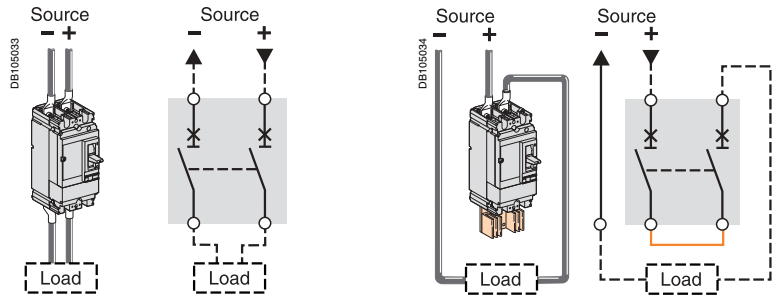


One type of connection per framesize, two catalogue numbers for all series connections.

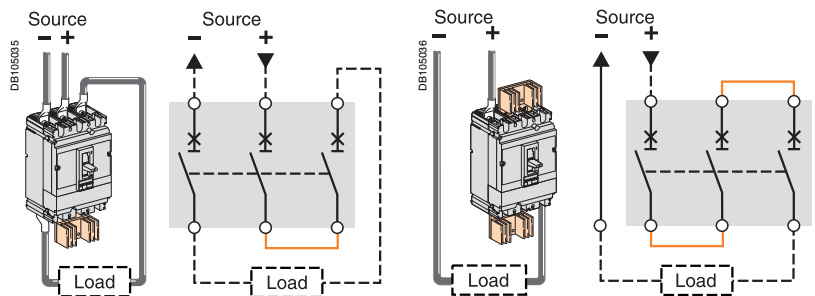
### Compact NS

#### Examples of series connection

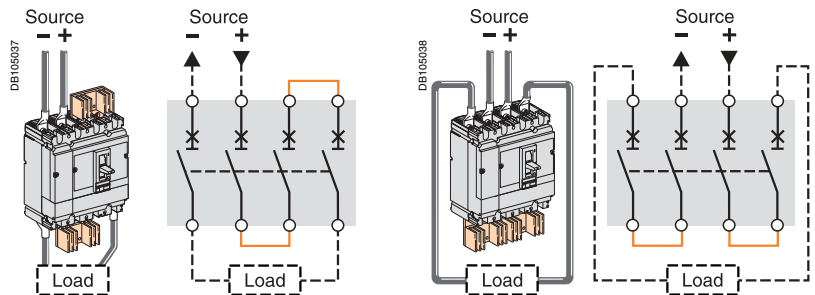
##### Two-pole devices



##### Three-pole devices

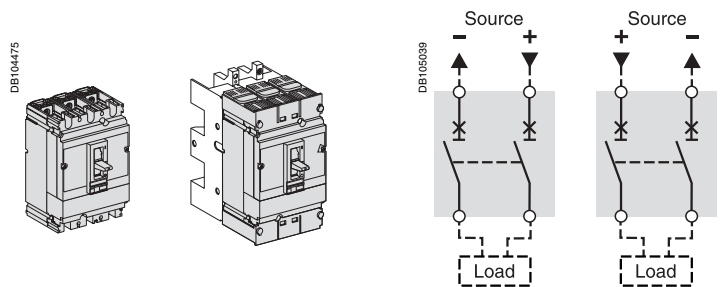


##### Four-pole devices



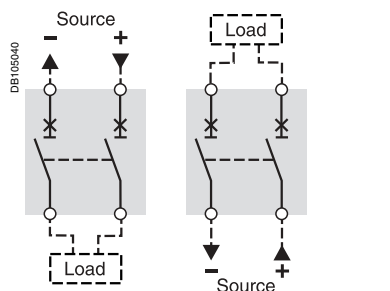
- All connections are possible for the fixed and withdrawable versions.
- Indifferent connection of polarities, from left to right or right to left.
- Indifferent connection of upstream and downstream cables to top or bottom terminals.
- Series connection of poles is possible by upstream/downstream connections.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

#### Great flexibility for connections

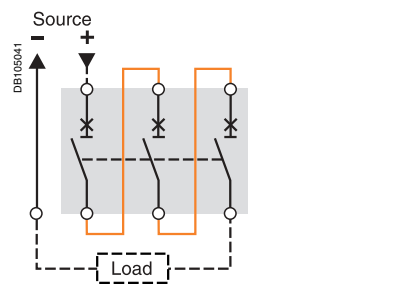


All connections are possible for the fixed and withdrawable versions.

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

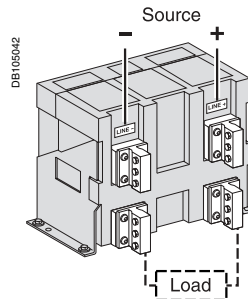
## Series connection of poles

Masterpact NW circuit breakers, with high ratings and installed as incoming devices, offer three coupling versions C, D and E ready for connection.

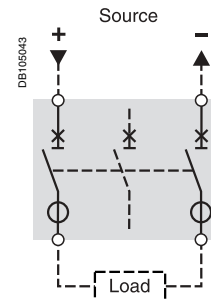
### Masterpact NW

#### Three versions supplied ready for connection

##### Version C

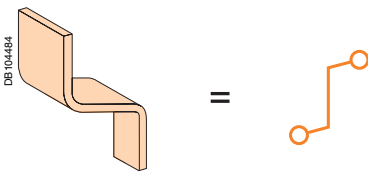


Rear view.

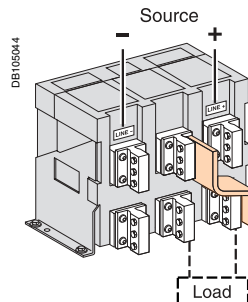


Three-pole case - two poles in series (front view).

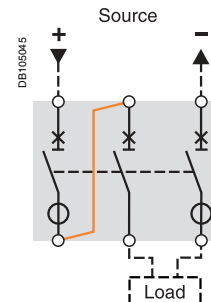
The safe prefabricated series connections are factory made due to the power ratings. They also dissipate heat.



##### Version D

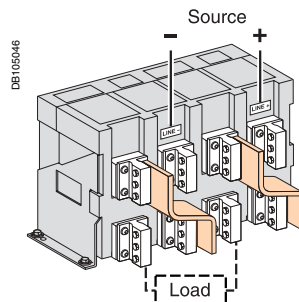


Rear view with connections.

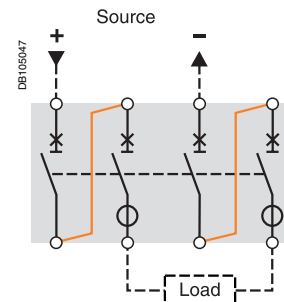


Three-pole case - three poles in series (front view).

##### Version E



Rear view with connections.

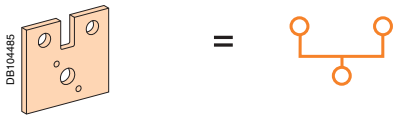


Four-pole case - four poles in series (front view).

# Great flexibility in adapting to DC applications

## Parallel connection of poles

The exceptional performance levels of Compact NS 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.



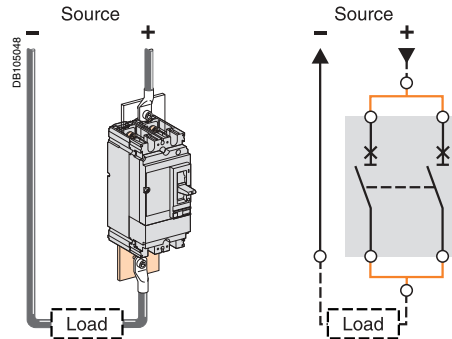
Parallel pole connection accessories are identical to those for series connections. They are equipped with heat sinks. Customer connections are made directly to the connection plates after removing the heat sinks.



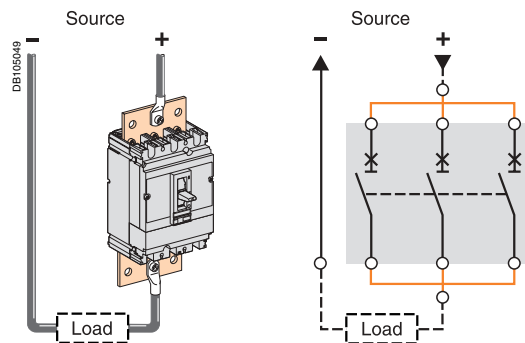
Specific connections are required for parallel connection of three poles.

### Examples of parallel connection

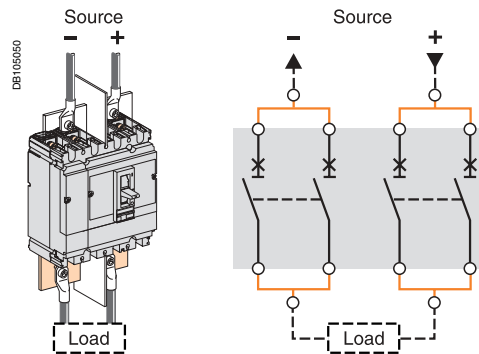
#### Two-pole devices



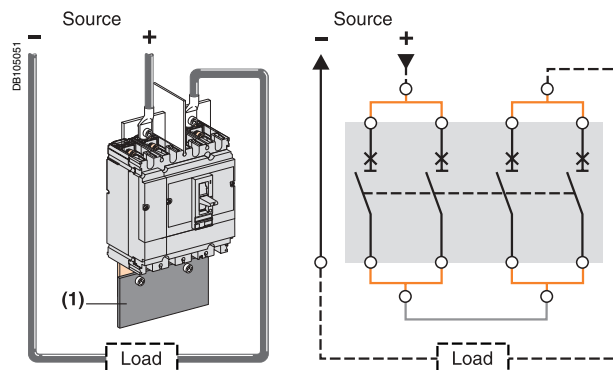
#### Three-pole devices



#### 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.